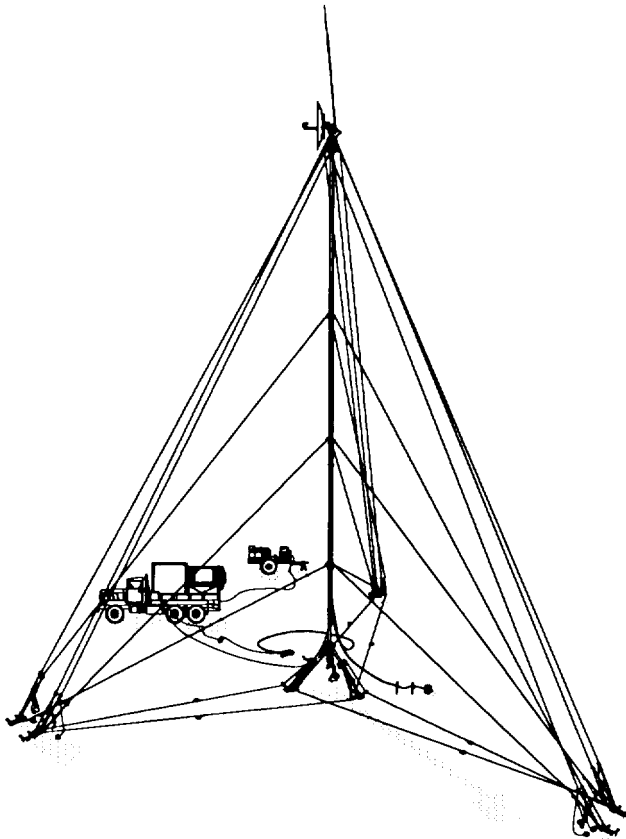


**OPERATOR'S, UNIT, AND
DIRECT SUPPORT
MAINTENANCE MANUAL**



**MAST AB-1373/TRC
(NSN 5985-01-333-9687) (EIC: N/A)**

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HEADQUARTERS, DEPARTMENT OF THE ARMY

1 NOVEMBER 1991

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No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 1 July 1995

**OPERATOR'S, UNIT, AND DIRECT SUPPORT
MAINTENANCE MANUAL**

**MAST AB- 1373/TRC
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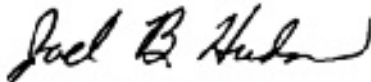
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TM 11-5985-394-13

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**OPERATOR'S, UNIT, AND DIRECT SUPPORT
MAINTENANCE MANUAL**

**MAST AB-1373/TRC
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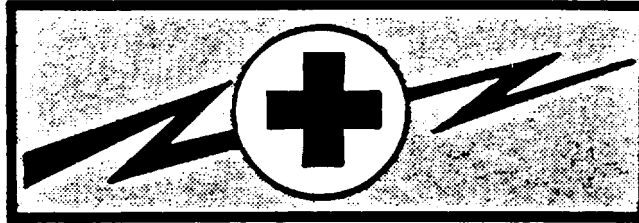
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5

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

- 1 DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL
- 2 IF POSSIBLE, TURN OFF THE ELECTRICAL POWER
- 3 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
- 4 SEND FOR HELP AS SOON AS POSSIBLE
- 5 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

WARNING**HIGH VOLTAGE**

is used in the operation of this equipment.

DEATH ON CONTACT

may result if personnel fail to observe safety precautions.

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering First Aid. When a technician is aided by other personnel, they must be warned about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before working on the equipment.

Be careful not to contact high-voltage connections or 115 V ac input connections when deploying or operating this equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

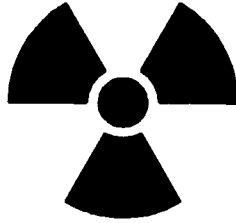
Do not be misled by the term "low voltage". Potentials as low as 50 volts may cause death under adverse conditions.

For First Aid refer to FM-21-11.

B

WARNING

RADIATION HAZARD



**ELECTROMAGNETIC
RADIATION**

**DO NOT STAND IN THE DIRECT PATH OF THE ANTENNA
WHEN THE POWER IS ON!! DO NOT WORK ON THE WAVEGUIDES
WHILE POWER TO THE AN/GRC-222 OR AN/GRC-103(V) RADIO SET IS ON!!**

High frequency electromagnetic radiation can cause fatal internal burns. It can literally "cook" internal organs and flesh. If you feel the slightest warming effect while near this equipment,

MOVE AWAY QUICKLY!!

C

WARNING

Do not deploy the mast if power lines are less than 200 feet from center of deployment site in any direction. Failure to observe this warning may result in serious injury or death.

WARNING

Do not attempt to deploy or retrieve the mast during electrical storms or when winds exceed 25 mph. Failure to follow this warning could result in personal injury or death.

Hard hats, eye protection, gloves, and safety shoes must be worn while working in mast area to prevent personal injury.

WARNING

Do not attempt to deploy the mast without a full crew. While deploying the mast ensure that only deployment crew members are allowed within the deployment area. Failure to observe this warning may result in serious injury or death.

WARNING

Always perform a site survey prior to deployment of mast. Avoid sites containing large rocks or dense trees within deployment area. Ensure that soil conditions are compatible with use of guy stakes and guy anchors. Failure to observe this warning may result in serious personal injury or death.

WARNING

Improper use of the mast lightning rod assembly may cause cracking of the composite tubes or loosening of the threaded inserts. This damage may cause the rod to fall during deployment or retrieval, causing a serious hazard.

Excessive tightening, crushing of the tubes by application of force while on the ground (such as being stepped on or run over by a vehicle), or side pull on the lightning rod assembly potentially causes this damage.

Change 3 D

WARNING

Mast sections must be checked for cracks prior to deployment. Cracks which exceed acceptable limits may result in the mast toppling, causing personal injury or death. Those mast sections which contain cracks within acceptable limits can be safely used but should be repaired as soon as possible to avoid injury to hands due to jagged edges or splintering.

WARNING

Two more operators are required for lifting or carrying any item weighing more than 37 pounds. Failure to comply with this warning could result in personal injury.

WARNING

Extending lower leg of tripod beyond red mark can cause upper and lower legs to separate. Extending more than one leg at a time can cause the tripod to topple. Failure to observe these precautions may result in equipment damage or personal injury.

WARNING

Mast must be kept vertical and straight during deployment and retrieval. Failure to do so may cause mast to topple resulting in extensive equipment damage and personal injury.

E

WARNING

Check condition of lifting belt prior to raising or lowering the mast. Keep feet clear of area directly below mast at all times. Do not continue to lower mast if the lifting belt becomes loose. This is an indication that the mast is binding in the barrel assembly and must be straightened before proceeding with the mast retrieval. Failure to comply with this warning may result in equipment damage or personal injury.

WARNING

Ensure that snap hooks are free of dirt and are fully closed. Failure to comply could cause the mast to topple, resulting in equipment damage and personal injury.

WARNING**USE OF CLEANING SOLVENT**

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Avoid prolonged breathing of vapor. The solvent should not be used near heat or flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, avoid prolonged contact with skin. The use of chemical gloves (solvent resistant), chemical splash goggles and full faceshield are required when using TRICHLOROTRIFLUOROETHANE. DO NOT use compressed air to dry parts when TRICHLOROTRIFLUOROETHANE has been used. TRICHLOROTRIFLUOROETHANE is a substance which harms public health and environment by destroying ozone in the upper atmosphere.

Change 1 F

Change

No.1

Headquarters
Department of the Army
Washington, DC, 15 June 1993

**OPERATOR'S, UNIT, AND DIRECT SUPPORT
MAINTENANCE MANUAL**

**MAST AB-1373/TRC
(NSN 5985-01-333-9687) (EIC: N/A)**

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C-3 thru C-6
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**Operator's, Unit, and Direct Support
Maintenance Manual
Mast AB-1373/TRC
(NSN 5985-01-333-9687) (EIC: N/A)**

**REPORTING ERRORS AND RECOMMENDING
IMPROVEMENTS**

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual to: Commander, U.S. Army Communications - Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-LM-LT, Fort Monmouth, New Jersey 07703-5007. A reply will be furnished to you.

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HOW TO USE THIS MANUAL

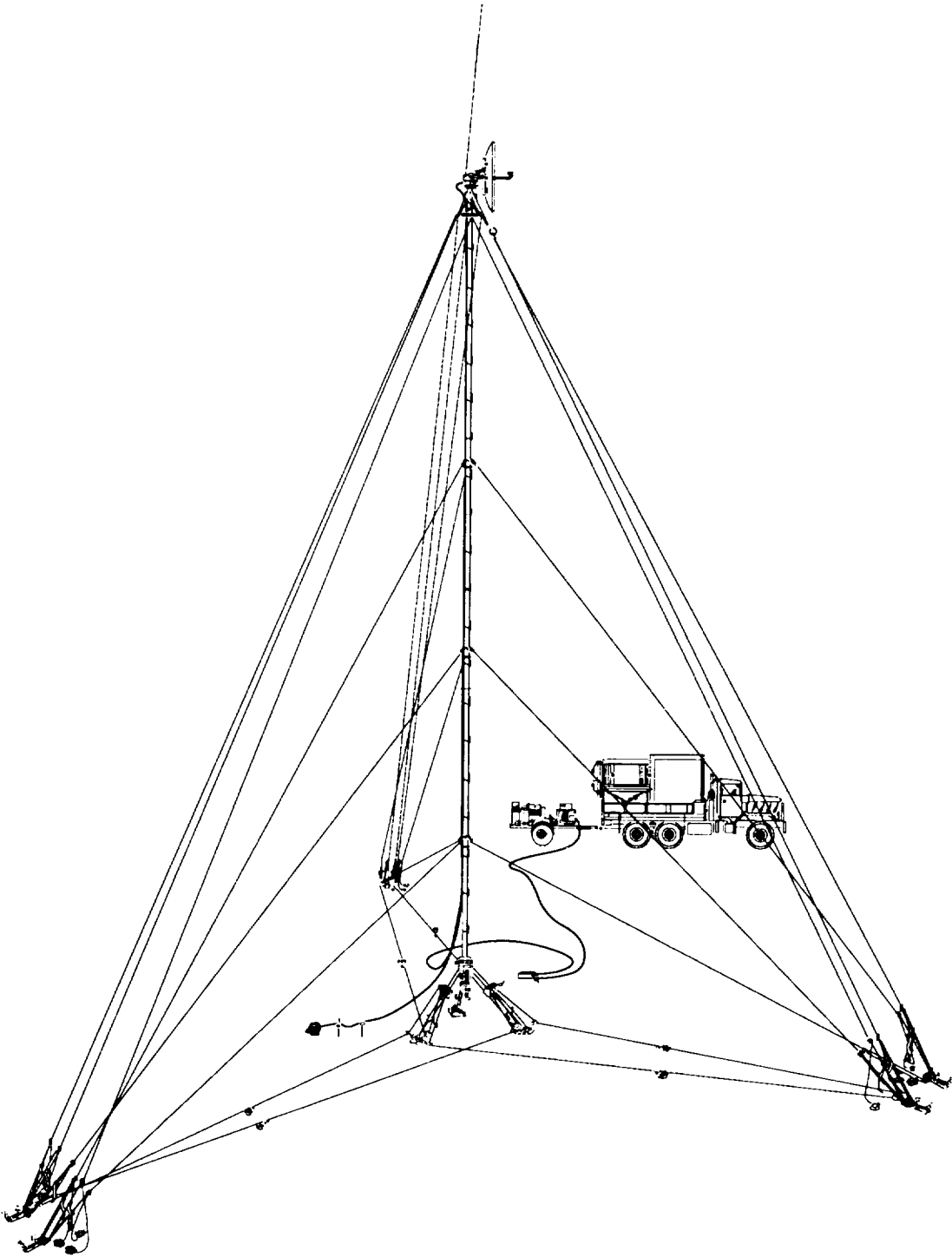
This manual is designed to help you operate and maintain the equipment. All task descriptions will take you step-by-step through the procedure. Don't take shortcuts. Before you begin any task, you should read through the complete procedure, make sure you know what needs to be done, then go back and follow the steps as written. Pay particular attention to WARNINGS and CAUTIONS, as they contain information that will prevent injury to personnel or damage to equipment.

The front cover index identifies frequently used information. Each item is boxed and identified by topic and page number.

Bend the manual a bit and look at the edges of the pages. The black bars on the cover should line up with the pages which have black edge markers.

Flip through the pages to find the black marker that matches the one on the cover for the topic you want.

If the front cover index does not help locate a topic, use the alphabetical index at the back of the manual to find it.



Mast AB-1373/TRC

CHAPTER 1

INTRODUCTION

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1-1 SCOPE

This manual provides the procedures for site selection and preparation, deployment, and retrieval of Mast AB-1373/TRC. The manual also contains maintenance procedures to be performed by operator, unit, and direct support personnel. Deployment of multiple masts and ancillary equipment are described in separate appendices.

1-2 CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS

Refer to the latest issue of DA Pam 25-30 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

1-3 MAINTENANCE FORMS, RECORDS, AND REPORTS

- a Reports of Maintenance and Unsatisfactory Equipment Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, as contained in Maintenance Management Update.
- b Reporting of Item and Packaging Discrepancies Fill out and forward SF 364 [Report of Discrepancy (ROD)] as prescribed in AR 735-11-2/DLAR 4140.55/SECNAVINST 4355.18/AFR 400-54/MCO 4430.3J.

1-3 MAINTENANCE FORMS, RECORDS, AND REPORTS - Continued

c Transportation Discrepancy Report

Fill out and forward SF 361 [Transportation Discrepancy Report (TDR)] as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-4 HAND RECEIPT (-HR) MANUAL

This manual has a companion document with a TM number followed by "-HR" (which stands for Hand Receipt). The TM 11-5985-394-10-HR consists of preprinted hand receipts (DA Form 2062) that list end item related equipment (i.e., COEI, BII, and AAL) you must account for. As an aid to property accountability, additional -HR manuals may be requisitioned from the Commander, U.S. Army Publications Distribution Center - St. Louis, ATTN: SFIS-APC-S-OC, 1655 Woodson Road, St. Louis, MO 63114-6181 in accordance with procedures in Chapter 3, AR 310-2.

1-5 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs)

If your equipment needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to: Commander, U.S. Army Communications - Electronics Command and Fort Monmouth, ATTN: AMSEL-ED-PH, Fort Monmouth, New Jersey 07703-5000. We'll send you a reply.

1-6 DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

1-7 ADMINISTRATIVE STORAGE

Equipment issued to and used by Army activities will have preventive maintenance performed in accordance with the Preventive Maintenance Checks and Services (PMCS) tables before being placed in administrative storage. When equipment is removed from administrative storage, PMCS should be performed to ensure operational readiness. Refer to paragraph 4-31 for preparation of equipment for storage or shipment.

1-8 WARRANTY INFORMATION

The AB-1373/TRC is warranted by Harris Corporation for 3 years from date of delivery to the Government. For warranty information, refer to TB 11-5985-394-25.

1-9 NOMENCLATURE CROSS-REFERENCE LIST

The following list gives common names used in this manual for equipment nomenclature. Use official nomenclature when completing report forms.

Common Name	Nomenclature
Mast	Mast AB-1373/TRC
Pallet Assembly	Antenna Support Group OE-481/TRC

1-10 LIST OF ABBREVIATIONS

The following list defines abbreviations used in this manual.

A	ampere
ac	alternating current
CCA	circuit card assembly
CCW	counterclockwise
cm	centimeter
cu	cubic
CW	clockwise
dc	direct current
DGM	digital group multiplexer
DMM	digital multimeter
kg	kilogram
km/h	kilometers per hour
kW	kilowatt
m	meter
mm	millimeter
MHz	megahertz
mph	miles per hour
RF	radio frequency
V	volts

1-11 GLOSSARY

An explanation of terms used in this manual is given below.

Term	Meaning
Anchor Stakes	Stakes used to secure tripod baseplates to ground.
Antenna	Either of two antennas that may be used with Mast AB-1373/TRC (see Appendix F).
Azimuth	Horizontal rotation of antenna.
Barrel Assembly	Central part of tripod assembly through which mast sections are inserted during erection of mast.
Baseplate	Ground support for tripod leg. Has attachment loops for deflection pulley snap hooks.
Controller	Remote control for directing antenna.
Crosspin	Pin used to support mast and to install or remove guy stakes and anchor stakes.

1-11 GLOSSARY- Continued

Term	Meaning
Crosspin Hole	Hole located in mast section for crosspin support of mast.
Deflection Pulley	Part of guy winch assembly. Deflection pulley snap hooks attach to tripod baseplate attachment loops.
Deployment	Term which refers to siting, assembling, and erecting mast.
Elevation	Vertical movement of antenna.
Extension Cable	Part of guy winch assembly. Runs from guy winch, through deflection pulley, to top guy assembly or mid guy assembly.
Fast Tensioning System	Adjustable web belt used to provide tensioning of guy assemblies.
Ferrules	Small metal rings which identify guy assemblies.
Guy Anchor	Two guy stake couplers used to anchor guy assemblies.
Guy Anchor Position	One of three locations for two guy stake couplers. Located 82 feet from center of tripod.
Guy Assembly	Steel cable with attached snap hook and spool on one end and a snap hook on the other end. Used to provide vertical rigidity and straightness of mast.
Guy Ring Assembly	Three-piece assembly which attaches to mast. Provides attachment points for guy assemblies.
Guy Stakes	Stakes used to anchor guy stake coupler.
Guy Stake Coupler	Anchoring device for guy assemblies and fast tensioning systems.
Guy Winch	Tripod-mounted winch used to maintain tension on guy assemblies.
Lifting Winch	Tripod-mounted winch used to raise mast.
Locking Pins	Attachment devices used to secure various parts of the mast to other parts.
Mast Headload	Includes lightning rod, antenna, antenna mounting bracket, and positioner attached to mast top section by retaining ring.
Mast Section	Any of 21 identical 5.2-foot long components of the mast.
Pallet	Primary structural part of the OE-481/TRC. The pallet consists of an upper pallet section and a lower pallet section.

1-11 GLOSSARY - Continued

Term	Meaning
Positioner	Electromechanical device attached to top section of mast. Provides mounting surface for antenna and lightning rod. Directs aim of antenna.
Retrieval	Term which refers to disassembly of erected mast.
Return Pulley	Part of top guy and mid guy assemblies. Return pulley snap hooks attach guy assemblies to guy stake couplers.
Shoe Assembly	Part of lifting winch that mates with mast section.
Snap Hooks	Attachment hooks used on guy assemblies, extension cables, and deflection and return pulleys.
Starbar Assembly	Stabilizer bar which attaches to mast top section and provides directional stability for antenna.
Tensiometer	Device for measurement of guy assembly tension.
Top Section	Top component of mast on which positioner and starbar are mounted.
Tripod	Supports and stabilizes mast. Consists of barrel assembly and adjustable legs.
Windward (or Uphill) Leg	Tripod leg positioned to face into the wind or in the uphill direction of any slope on which the mast is being deployed.

Section II. EQUIPMENT DESCRIPTION

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Mast Assembly	1-14a	1-14
Positioner System.....	1-14b	1-14

1-12 EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

a Characteristics

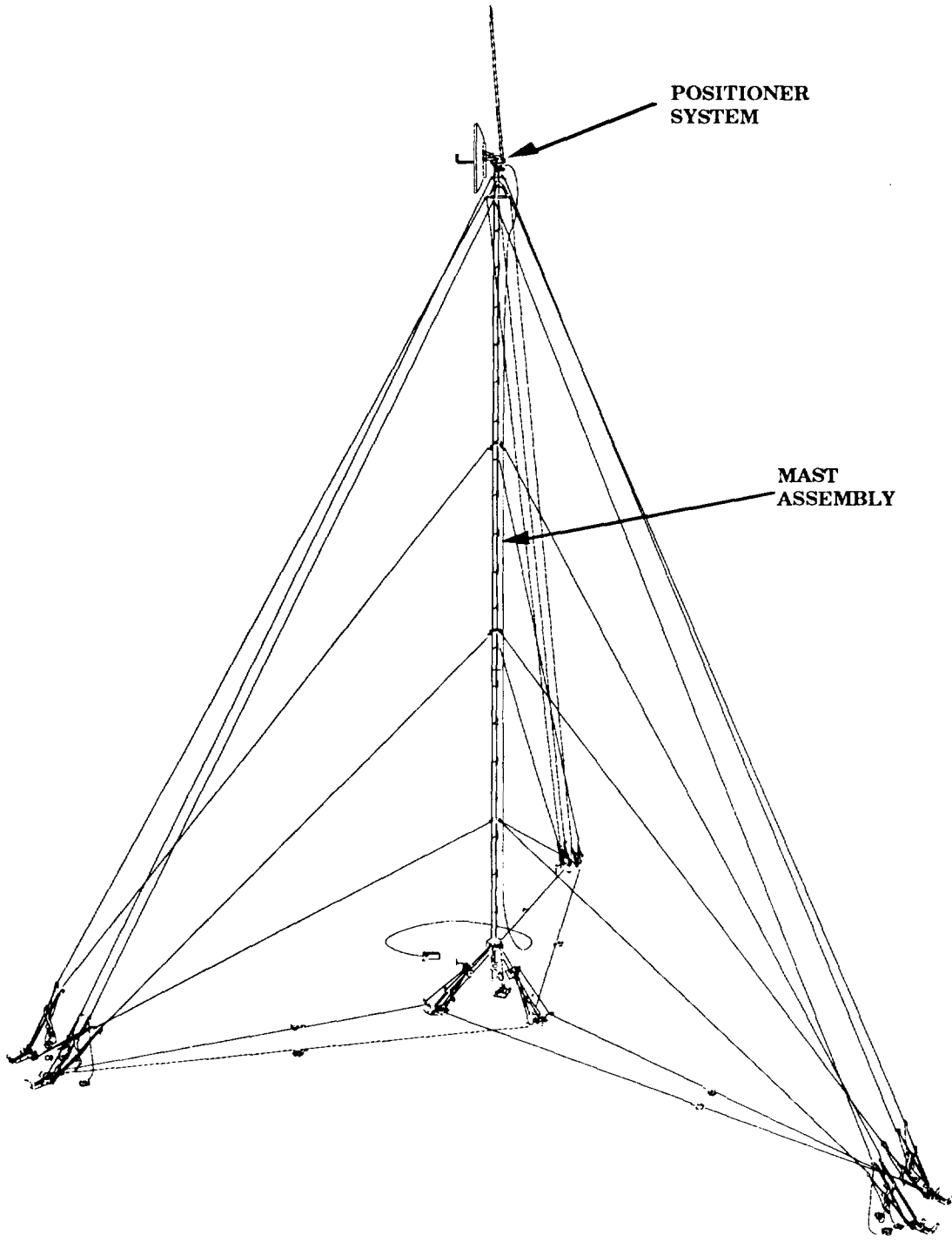
- (1) Transportable, manually erected, guyed mast with lightning protection.
- (2) Transport is primarily by Antenna Support Group OE-481/TRC, a pallet-based system capable of transporting three mast assemblies.
- (3) Resists water and other environmental elements.
- (4) Mast height is variable in 4.3-foot increments by adding or removing mast sections.
- (5) Direction of antenna is remotely controlled using an electrically operated positioning system.

b Capabilities and Features

- (1) Supports either of two lightweight antennas: AS-1425/GRC (large antenna) or AS-3047/GRC-103(V) (small antenna).
- (2) Permits antenna heights from 14 to 100 feet.
- (3) Supports functional operation of the following DGM assemblages: AN/TRC-138A, 138B, -173, -173A, -74, -174A, -175, or -175A.
- (4) Can be deployed or retrieved by an experienced three-member team in 1 hour under tactical conditions.
- (5) Can be deployed on maximum 10-degree (18 percent) slope.
- (6) Can be deployed in winds up to 25 mph. Directional pointing accuracy is maintained in winds up to 60 mph. Maximum survival wind speed is 80 mph.

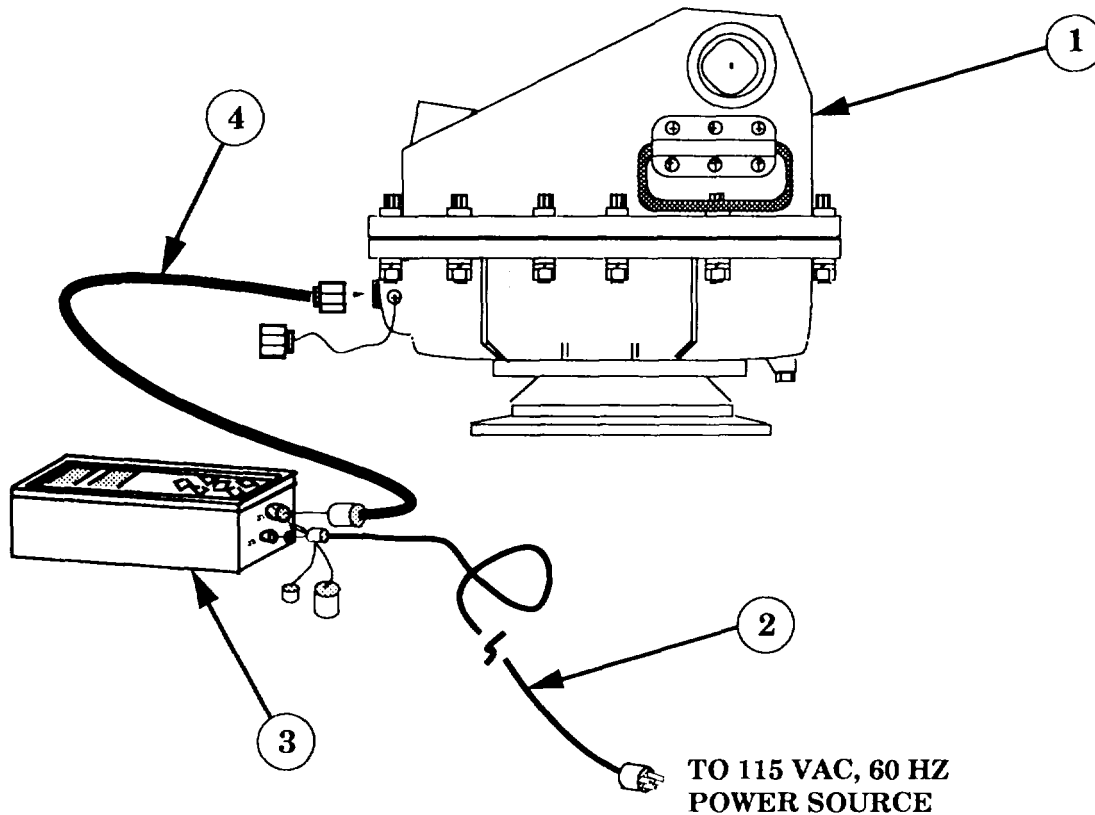
1-13 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

Mast AB-1373/TRC consists of two major components: the positioner system and the mast assembly. The positioner system provides for structural support of the antenna and lightning rod assembly, and for directional control of the antenna. The mast assembly provides the interface for the positioner system. Antenna height is variable, in 4.3-foot increments, from approximately 14 to 100 feet.



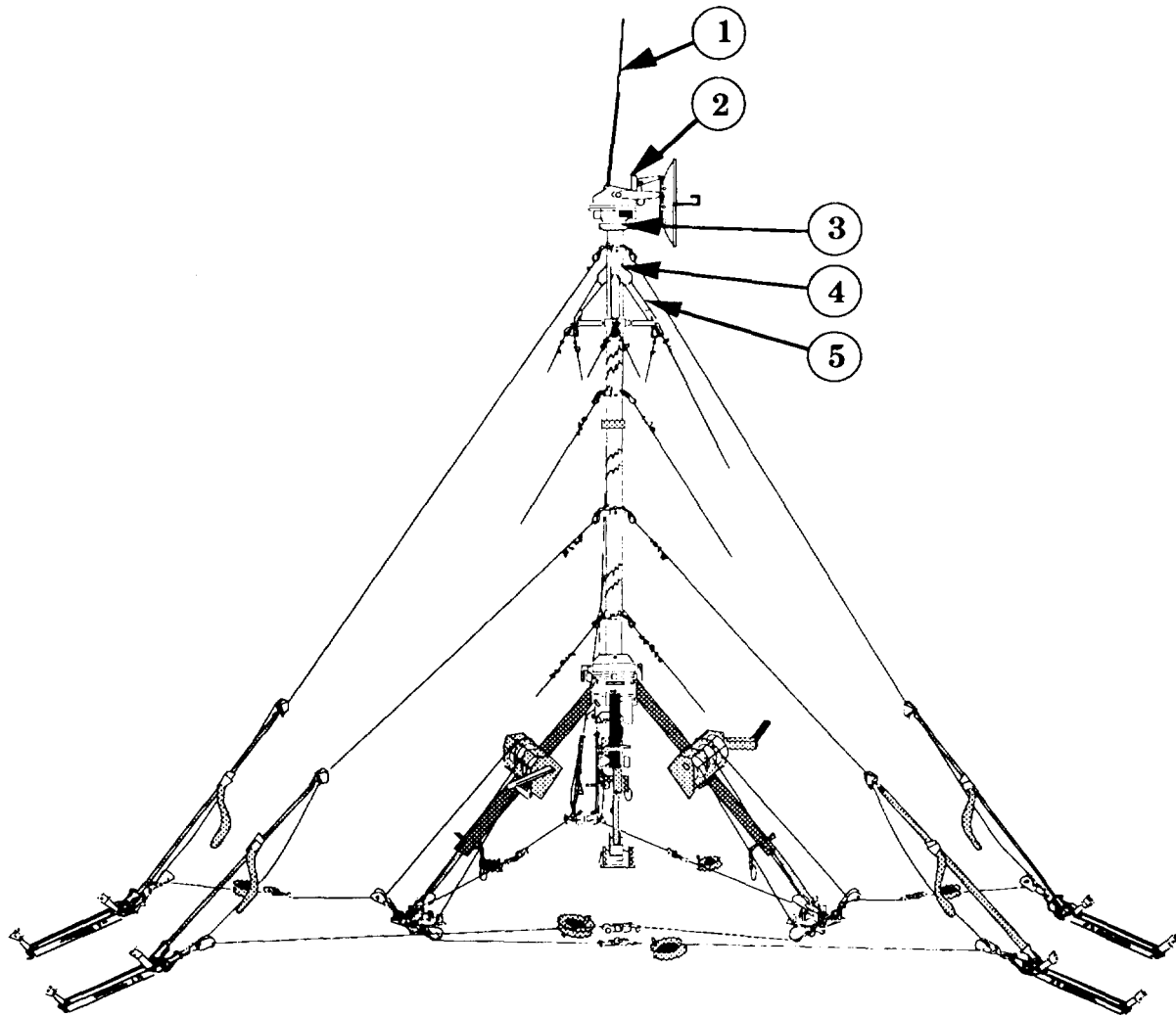
1-13 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued

a Positioner System



KEY	COMMON NAME	FUNCTION
1	Positioner	Mechanism for mounting and positioning antenna.
2	Cable Assembly W2	Used to connect controller to 115 V ac, 60 Hz power source.
3	Controller	Hand-held unit. Provides remote control of positioner.
4	Cable Assembly W1	Used to connect controller to positioner. Cable is marked in 2-foot increments to indicate height of mast and may be used as field measurement device.

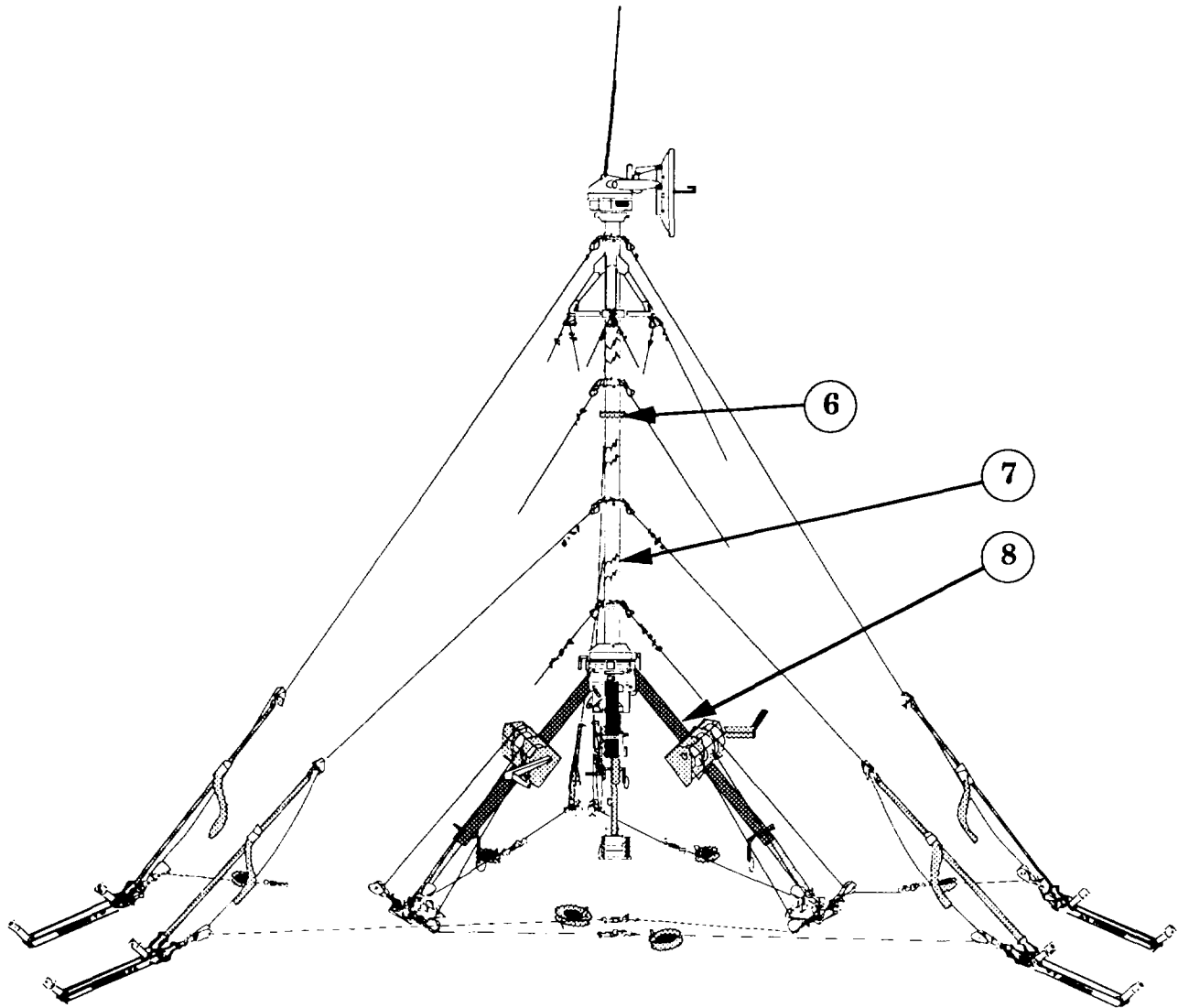
1-13 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued



KEY	COMMON NAME	FUNCTION
1	Lightning Rod Assembly	Lightning protection ground path for antenna and mast.
2	Antenna Mounting Bracket	Attachment and support for antenna.
3	Retaining Ring	Attaches positioner to top section of mast.
4	Top Section	Mount for positioner, starbar tubes, and top guy ring assembly.
5	Starbar Assembly	Provides directional stability of mast. Each of three starbar assemblies provide attachment points for two starbar guy assemblies.

1-13 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued

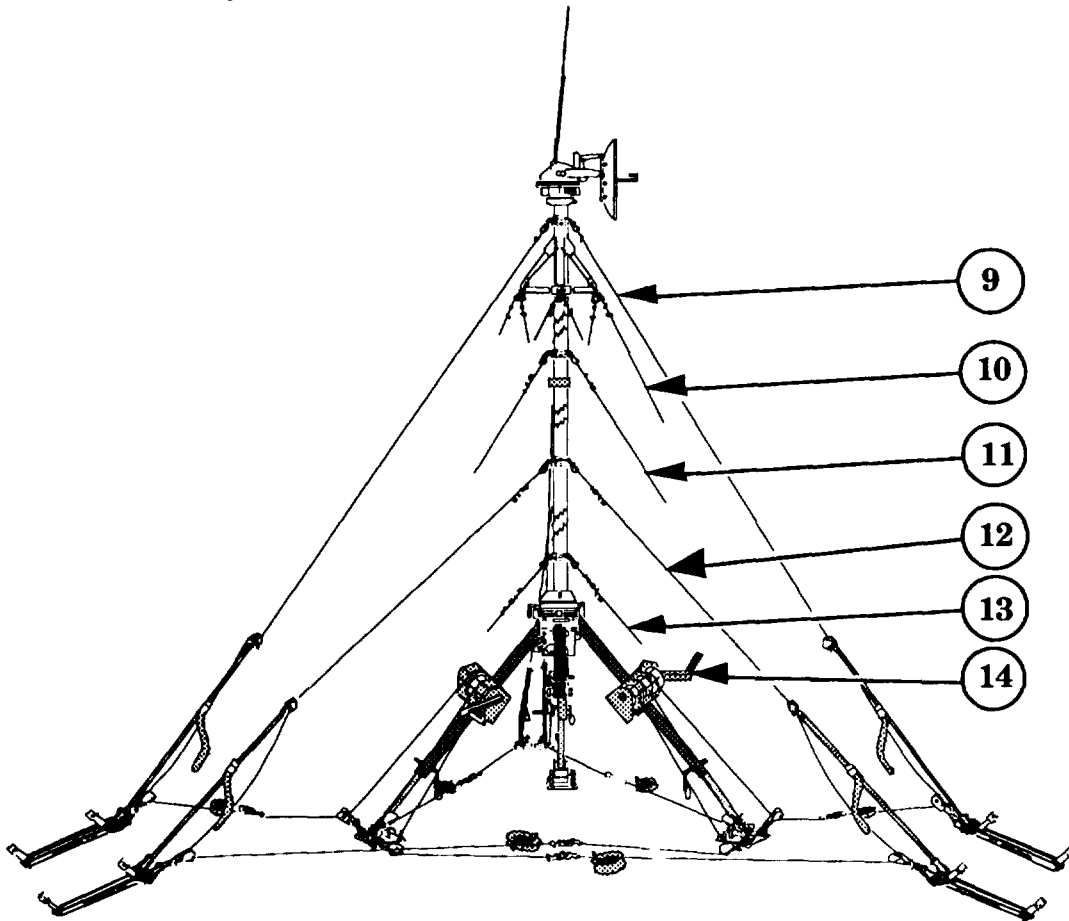
b Mast Assembly - Continued



KEY	COMMON NAME	FUNCTION
6	Cable Strap	Secures ground cable (lightning), RF cable, positioner cable, and deicing cable to mast.
7	Mast Section	Vertical support. Each mast section is 5.2 feet long and adds 4.3 feet of height. A maximum of 21 mast sections can be used.
8	Tripod Assembly	Provides support and stability for mast. Allows for mounting of guy winches and lifting winch.

1-13 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued

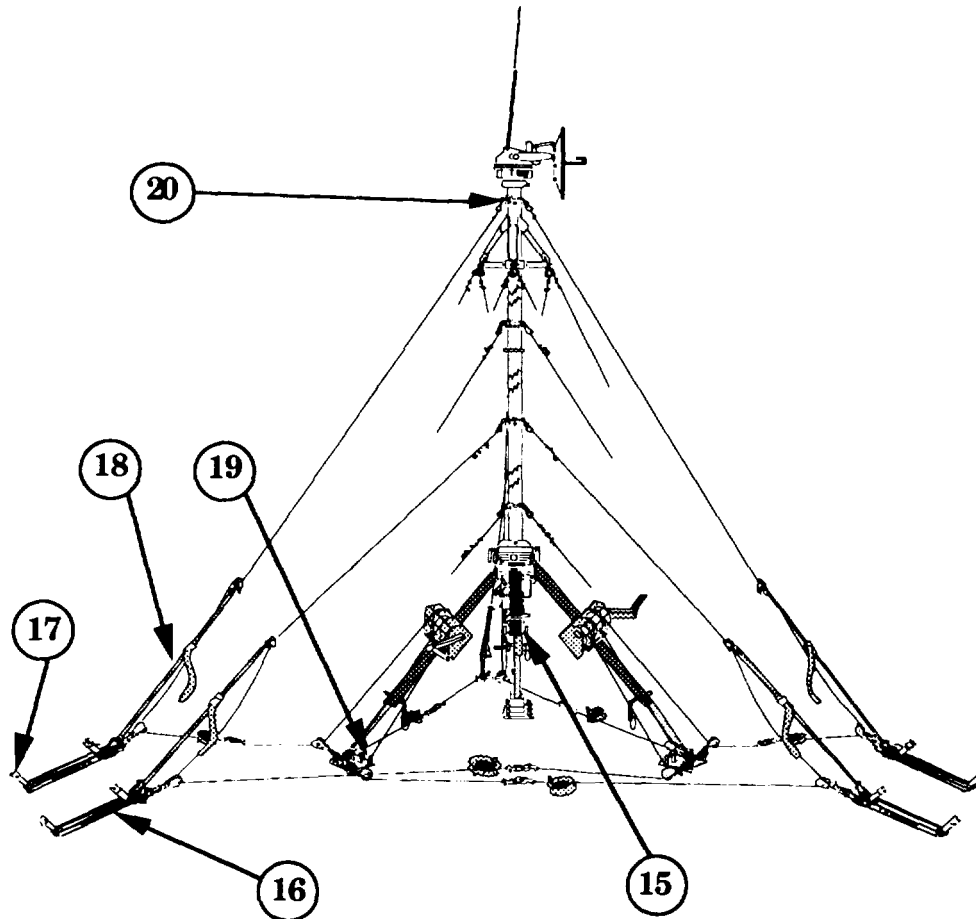
b Mast Assembly - Continued



KEY	COMMON NAME	FUNCTION
9	Top Guy Assembly	Provides vertical rigidity and alignment of mast. Three top guy assemblies are used.
10	Starbar Guy Assembly	Provides torsional rigidity of mast. Six starbar guy assemblies are used.
11	Upper Intermediate Guy Assembly	Provides vertical rigidity and alignment of mast. Three upper intermediate guy assemblies are used.
12	Mid Guy Assembly	Provides vertical rigidity and alignment of mast. Three mid guy assemblies are used.
13	Lower Intermediate Guy Assembly	Provides vertical rigidity and alignment of mast. Three lower intermediate guy assemblies are used.
14	Guy Winch	Two identical guy winches provide tension control for individual guy assemblies. One guy winch is used to tension three top guy assemblies. A second guy winch is used to tension three mid guy assemblies.

1-13 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued

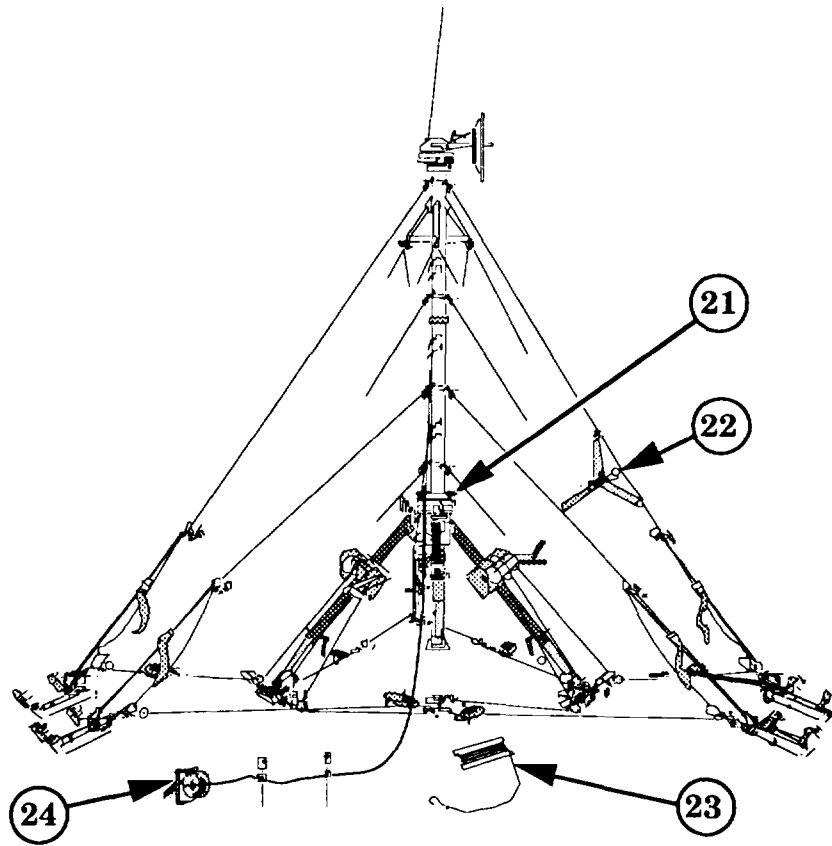
b Mast Assembly - Continued



KEY	COMMON NAME	FUNCTION
15	Lifting Winch	Lifts mast during erection and supports mast during retrieval.
16	Guy Stake Coupler	Attachment point for all guy assemblies and return pulleys. Six couplers are used.
17	Guy Stake	Secures guy stake coupler to ground. Two 3-foot guy stakes are used with each guy stake coupler.
18	Fast Tensioning System	Provides tensioning of guy assemblies after mast erection. Permits disconnection of guy winches from guy assemblies. One fast tensioning system is used for each guy assembly.
19	Anchor Stake	Secures baseplate of tripod leg to ground. Four 14-inch long anchor stakes are used with each baseplate.
20	Guy Ring Assembly	Provides for attachment of guy assemblies to mast. Four guy ring assemblies are used.

1-13 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued

b. Mast Assembly - Continued



KEY	COMMON NAME	FUNCTION
21	Crosspin	Supports mast during erection, operation, and retrieval. Also used when driving or removing guy stakes and anchor stakes.
22	Tensiometer	Used to check tension of guy assemblies.
23	Radius Rope	Used to lay out deployment site area.
24	Ground Rod Assembly	Ground cable (lightning), cable spool, and two ground rods for connection to lightning rod assembly.

1-14 EQUIPMENT DATA

a. Mast Assembly

Temperature Ranges:	
Operating	-40 °F to 125 °F (-40 °C to 52 °C)
Storage	-50 °F to 160 °F (-46 °C to 71 °C)
Mast Type.....	Vertical-raising, sectionalized, tubular
Mast Section Lengths:	
Bevel-to-Bevel	51.6 in. (131 cm)
Total	62.5 in. (159 cm)
Tripod Height:	
Legs Collapsed and Retracted	Approximately 51.2 in. (130 cm)
Legs Extended for Normal Deployment.....	Approximately 82 in. (208 cm)
Guy Assembly Lengths:	
Top	148 ft (45 m)
Starbar.....	134.5 ft (41 m)
Upper Intermediate	115 ft (35 m)
Mid	108 ft (33 m)
Lower Intermediate	90 ft (27 m)
Extension Cable Length	82 ft (25 m)
Weights:	
Mast.....	919 lbs (417.7 kg) unpacked
Mast Section	9 lbs (4.1 kg)
Lifting Winch.....	44 lbs (20 kg) in bag
Guy Winch.....	37 lbs (17 kg) in bag
Tripod Assembly	97 lbs (44 kg) in bag

b. Positioner System

Power Required	115 V ac, 3 A minimum; 60 Hz nominal; single phase
Temperature Ranges:	
Operating	-50 °F to 125 °F (-45.6 °C to 52 °C)
Storage	-70 °F to 160 °F (-56.7 °C to 71 °C)
Relative Humidity	0 - 100 percent
(1) Positioner	
Weight.....	15 in. (38 cm)
Width.....	13.5 in. (34 cm)
Depth.....	16 in. (41 cm)

1-14 EQUIPMENT DATA - Continued

b. Positioner System - Continued

(2) Controller

Weight.....	3.5 lbs (1.4 kg)
Height.....	4 in. (10.2 cm)
Width.....	4 in. (10.2 cm)
Depth.....	8 in. (20.3 cm)

(3) Cable Assemblies

Control.....	W1, 110 ft (33.53 m) insulated multiconductor cable
Power	W2, 60 ft (18.29 m) insulated 3-conductor cable

Section III. PRINCIPLES OF OPERATION

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Guy Winches	1-26	1-25
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Fast Tensioning System.....	1-28	1-29
Tensiometer.....	1-29	1-30

1-15. GENERAL

The mast employs a tripod as the ground base element. Total mast height is variable from 14 feet, with only the tripod and one mast section supporting the positioner and antenna, to 100 feet with 21 mast sections installed.

Two guy winches provide constant guy tension to the top and middle of the mast during deployment, then are relieved from tension using fast tensioning systems. The lifting winch is used to raise each of the 21 mast sections. Accessories are provided to assist with guying, anchoring, and operating the mast.

1-16. RADIUS ROPE

The radius rope is a light nylon rope, 82 feet long, with an S-hook on one end. The radius rope is used to lay out the deployment site area and determine the guy anchor locations.

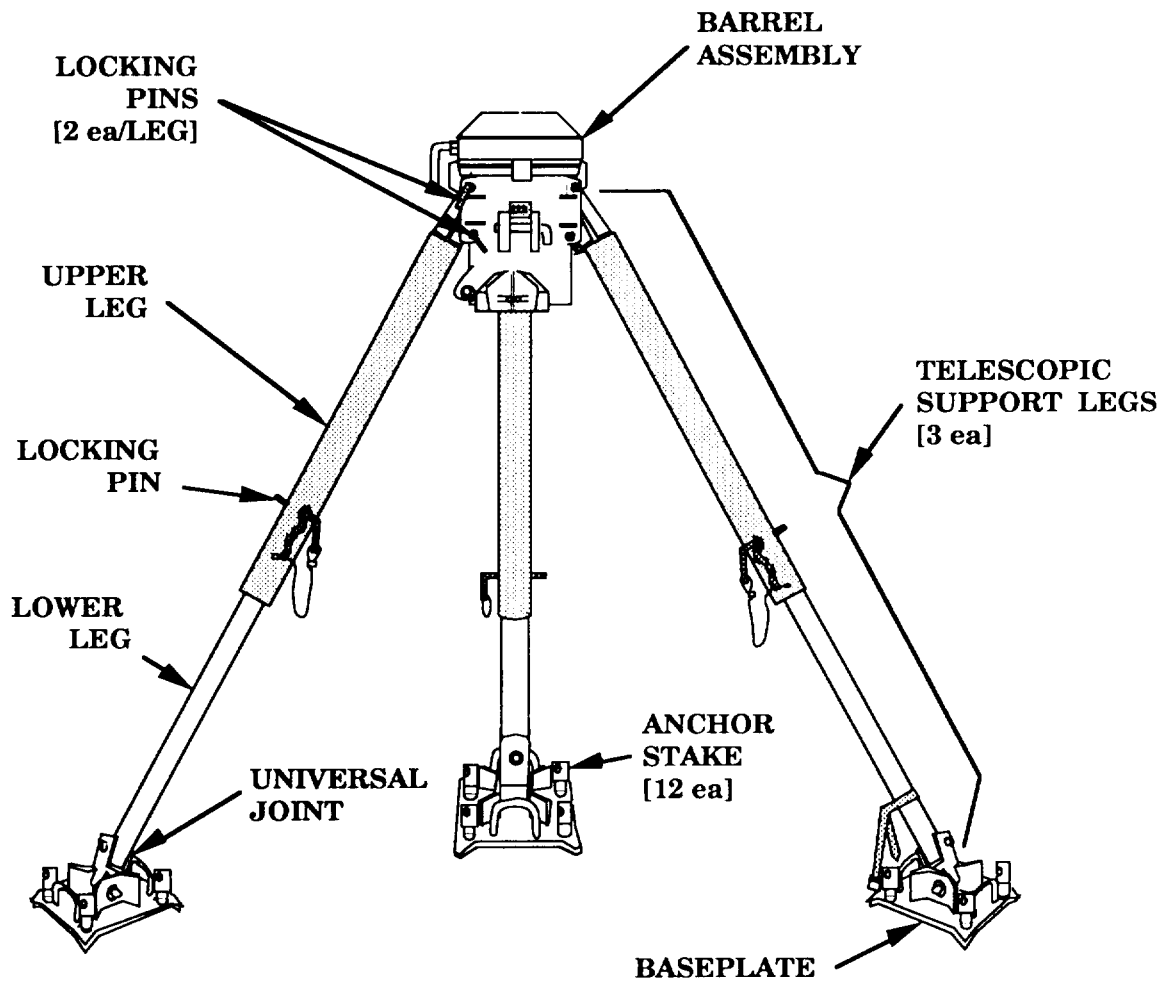
1-17. CROSSPIN

Three crosspins are included with each mast assembly. A crosspin is a round bar about 1-foot long and 1/2-inch in diameter. The crosspin is used to support the mast assembly during the lifting procedure and during operation.

Crosspins are also used as safety handles when driving anchor stakes or guy stakes. This protects hands from dangerous sledge hammer impacts at the stake head. A crosspin is inserted into the stake about 3 inches (leaving about 8 inches exposed for handling) while driving the stake.

Additionally, crosspins are used to pull out guy stakes, anchor stakes, and ground rods when retrieving the mast. The crosspin is used as a lever to twist and pull the stake or ground rod during removal.

1-18. TRIPOD ASSEMBLY



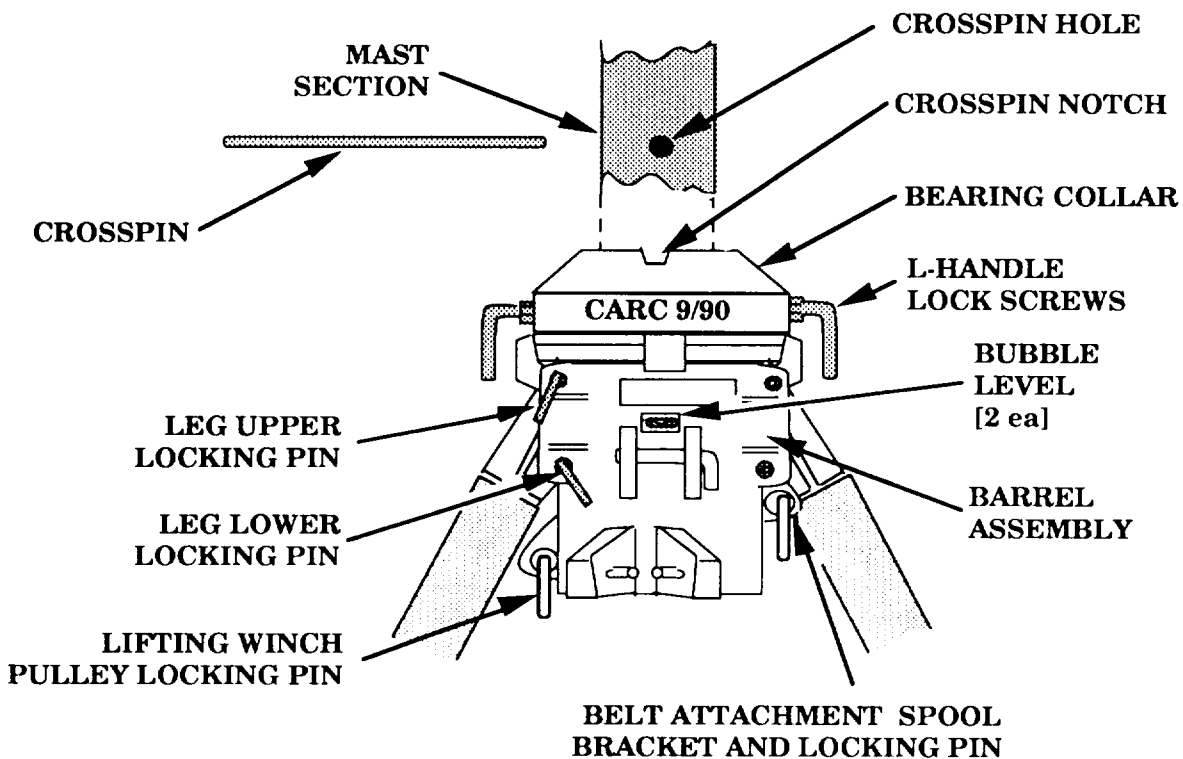
The tripod consists of one barrel assembly and three identical telescopic support legs. Each of the three legs is made up of two major parts: the upper leg and the lower leg.

The upper leg is secured to the barrel assembly with two locking pins. The lower leg is secured to the upper leg, at the white reference mark, with a locking pin.

The tripod is leveled, as required, using any hole in the lower leg between the red and white reference marks. Placement of the locking pin into the portion of the lower leg painted red renders the tripod unsafe.

The end of the lower leg is connected to a baseplate by a universal joint. This allows the baseplate to lie flat on the ground. Each of the three baseplates is secured to the ground with four anchor stakes.

1-19. BARREL ASSEMBLY



The barrel assembly consists of two bubble levels, a bearing collar, attachment points for each support leg, and anchoring points for the lifting winch belt. In addition, the barrel assembly vertically guides the mast sections during deployment and retrieval.

Bubble levels provide visual indications of tripod level during deployment of the mast. Bubble levels consist of two limit lines and a bubble. If the bubble rests within the limit lines the tripod is level. If the bubble rests outside of the limit lines the tripod must be adjusted.

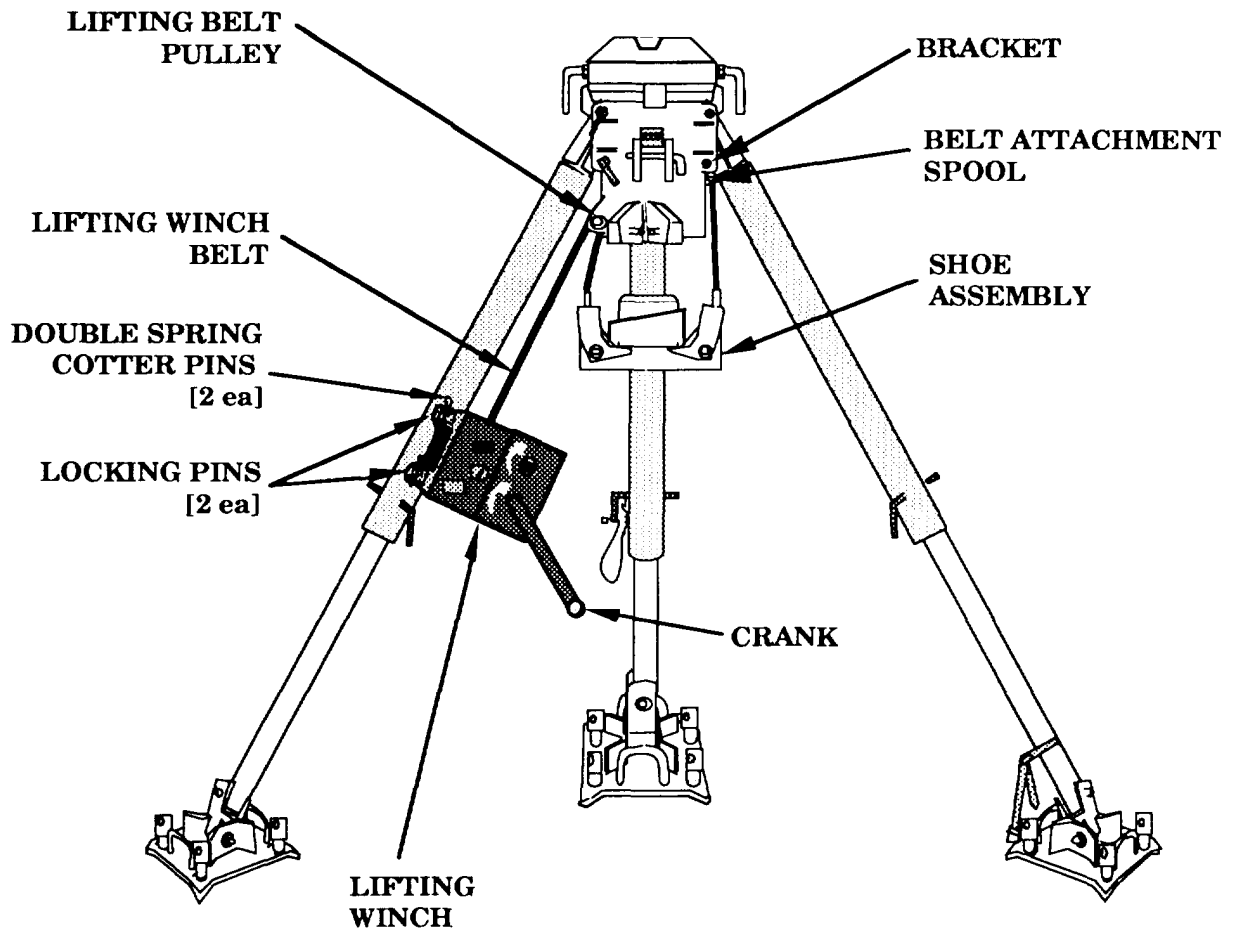
The bearing collar can be rotated around the top of the barrel assembly. It contains two L-handle lock screws and two crosspin notches. The L-handle lock screws are used to secure the bearing collar to the barrel assembly during normal operation. The crosspin notches provide a resting point for the crosspin during deployment, operation, and retrieval of the mast. The bearing collar is usually rotated to match the crosspin notches with the position of the crosspin.

The barrel assembly provides attachment points for each tripod support leg. Each leg is secured to the barrel assembly by an upper locking pin and a lower locking pin. The upper locking pin is inserted during deployment. The lower locking pin is removed to kneel the tripod during deployment or retrieval of the mast.

The lifting winch belt is secured to the barrel assembly in two locations; the belt attachment spool bracket and the lifting winch pulley bracket. Three of each type of bracket are provided to allow attachment of the winch to any of the tripod legs. The belt attachment spool and the pulley are secured to the barrel assembly by locking pins.

The center of the barrel assembly is hollow to allow vertical insertion or removal of mast sections during deployment or retrieval.

1-20. LIFTING WINCH



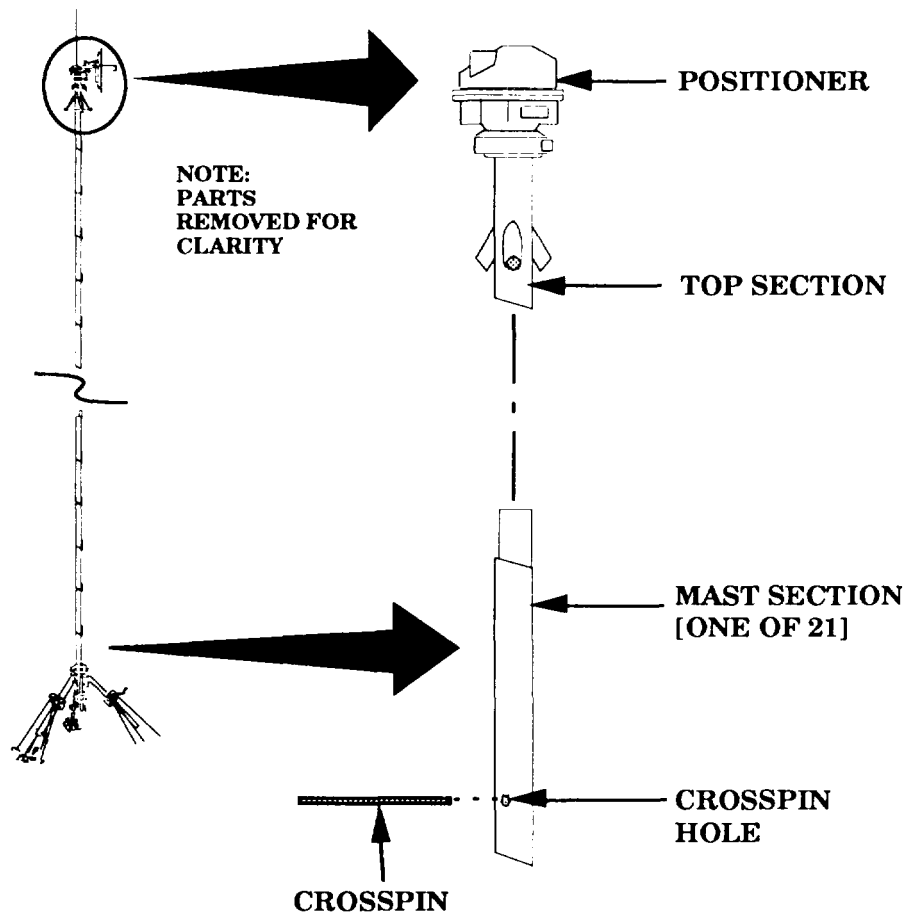
The lifting winch is used to raise or lower the mast assembly during deployment or retrieval.

The lifting winch is attached to one upper leg with two locking pins which are secured with double spring cotter pins. The lifting winch is manually operated using the two-position crank. An automatic brake is provided to prevent mast collapse if the crank is released during operation of the winch.

The crank operates the lifting winch drum which winds and unwinds the lifting winch belt. The lifting winch belt is fastened to the barrel assembly in two locations. The belt attachment spool is connected to a bracket on one side of the barrel assembly, while the lifting belt pulley is fastened to a bracket on the opposite side.

The lifting winch belt supports the shoe assembly. The shoe assembly mates with the mast section and lifts or lowers mast sections.

1-21. MAST SECTIONS

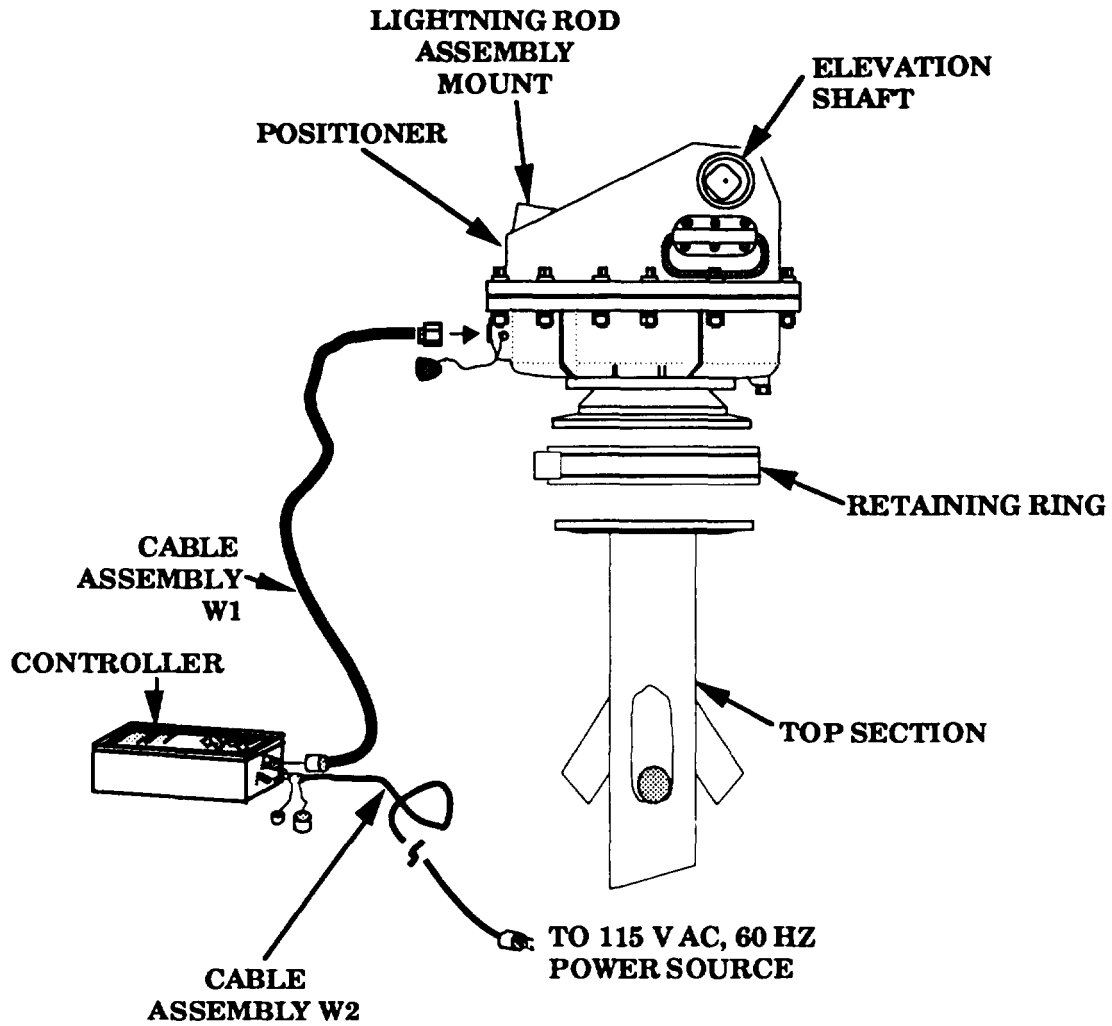


The mast consists of 21 identical mast sections and a top section. The mast sections are beveled to prevent twisting as the mast is deployed or retrieved.

Each mast section has a crosspin hole which is located near the lower end. A crosspin is inserted through the crosspin hole and serves as the mast support during mast erection, operation, and retrieval. The crosspin hole is also used for locking guy ring assemblies in place on the mast.

The top section is the attachment point for the positioner and the three starbar assemblies.

1-22. POSITIONER



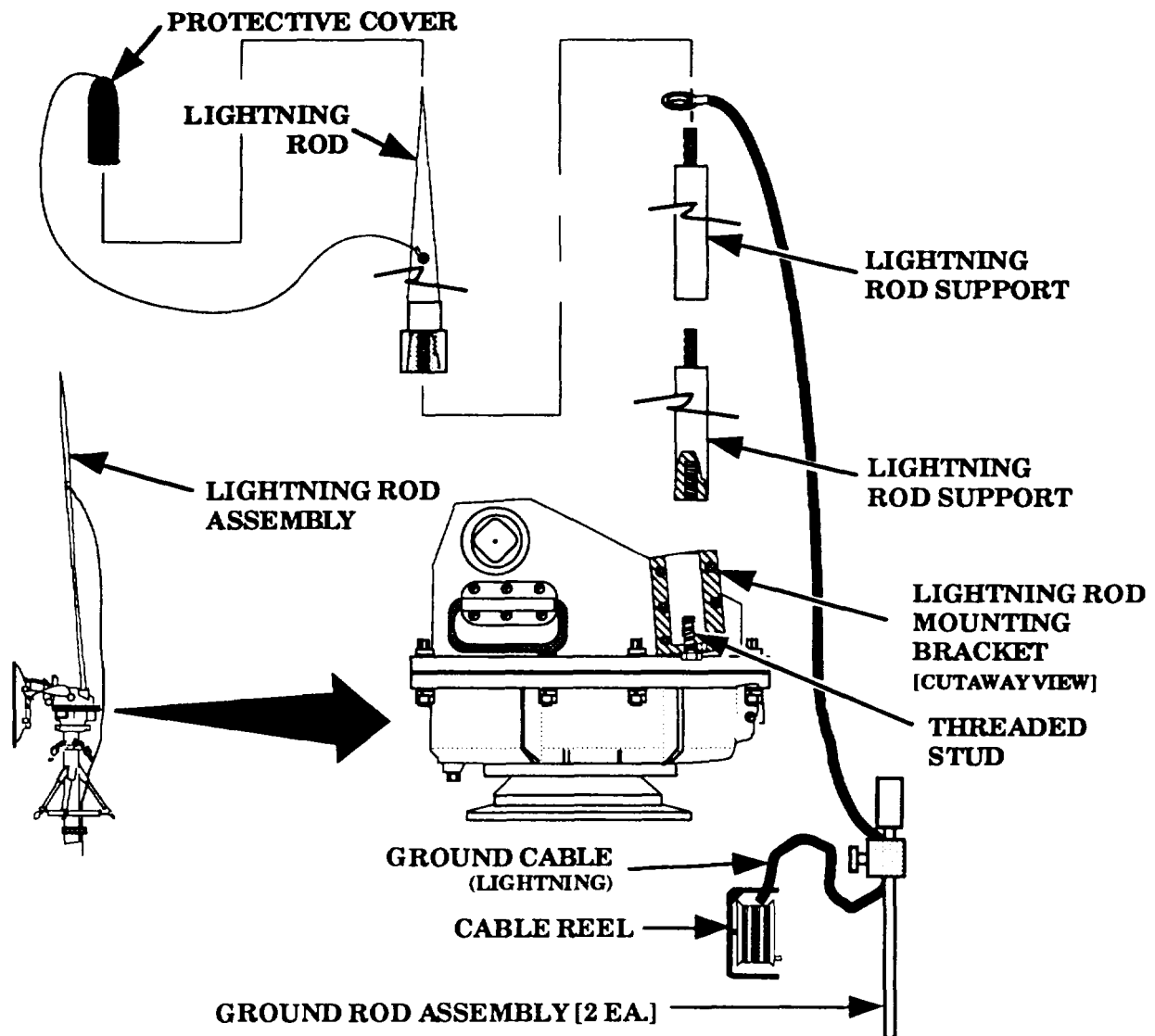
The positioner is secured to the mast top section by the retaining ring. A lightning rod assembly is mounted on the top rear of the positioner.

The remotely controlled positioner moves the antenna in azimuth and elevation.

The antenna is attached to the antenna mounting bracket which is attached to the positioner elevation shaft.

The controller is hand-held and is connected to the positioner by cable assembly W1. Cable assembly W2 connects the controller to the 115 V ac power source.

1-23. LIGHTNING PROTECTION EQUIPMENT

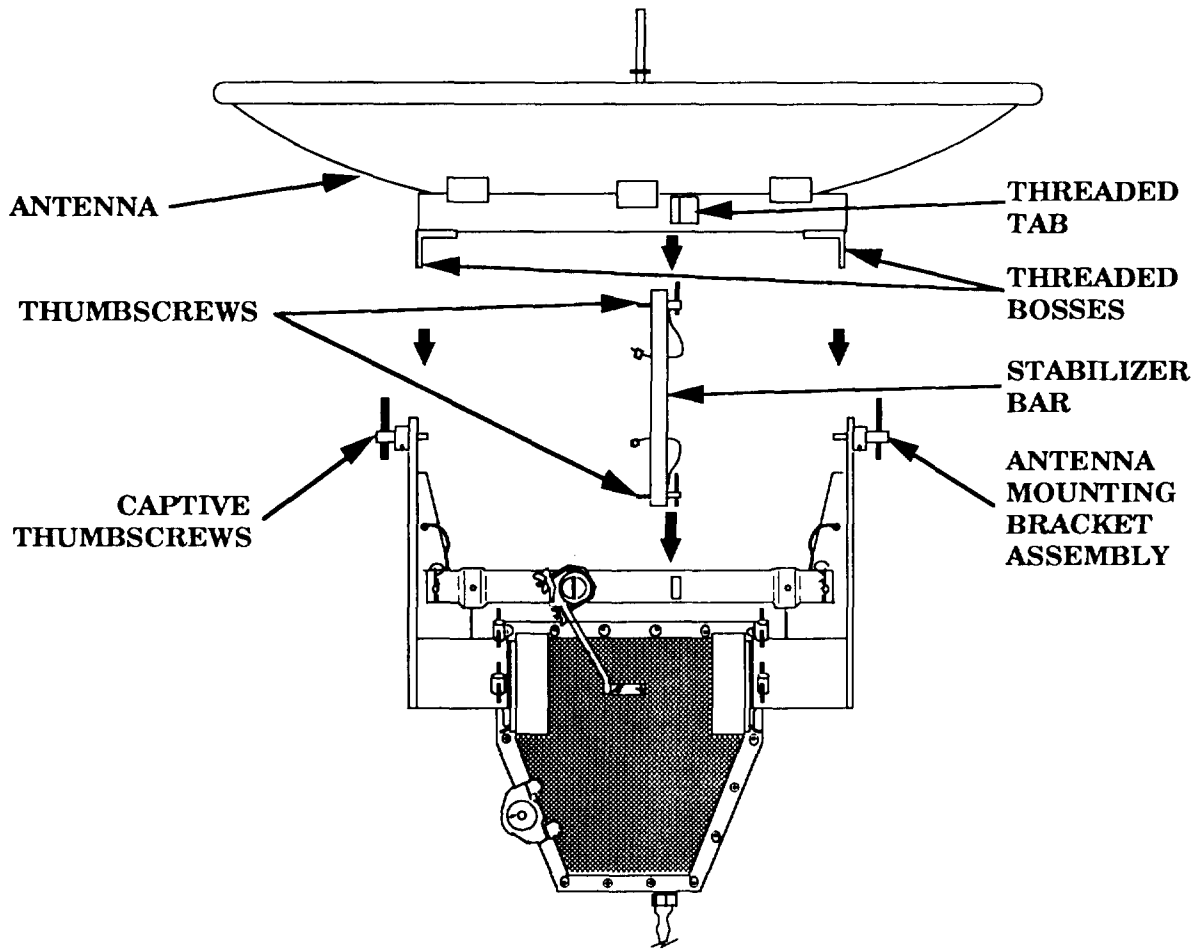


The lightning protection equipment consists of the lightning rod, a protective cover, two lightning rod supports, two ground rod assemblies, and a ground cable (lightning) with attached cable reel.

The two lightning rod supports are screwed together. The ground cable (lightning) lug is placed over the stud between the lightning rod and the top lightning rod support. The assembly is then hand tightened, and threaded into the lightning rod mounting bracket on the positioner. The ground rods are driven into the ground near the base of the mast. The ground end of the cable is attached to the ground rods to complete the lightning protection circuit.

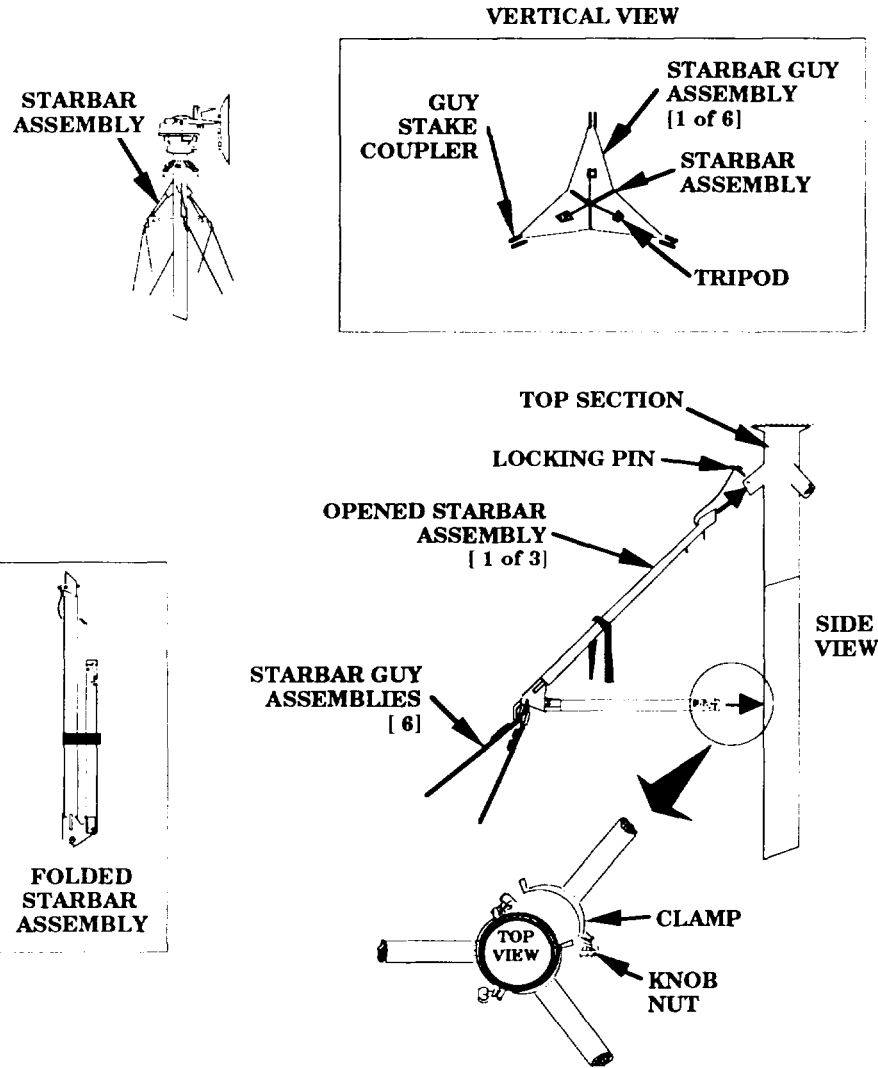
The pointed tip of the lightning rod assembly is protected by a cover, which also protects personnel from injury. The protective cover must be removed prior to mast erection and reinstalled after mast retrieval.

1-24. ANTENNA MOUNTING BRACKET



The antenna mounting bracket provides the attachment point between the antenna and the positioner. The antenna is attached to the antenna mounting bracket using three captive thumbscrews. Refer to Appendix F for mounting the AS-1425/GRC or AS-3047/GRC-103(V) antenna.

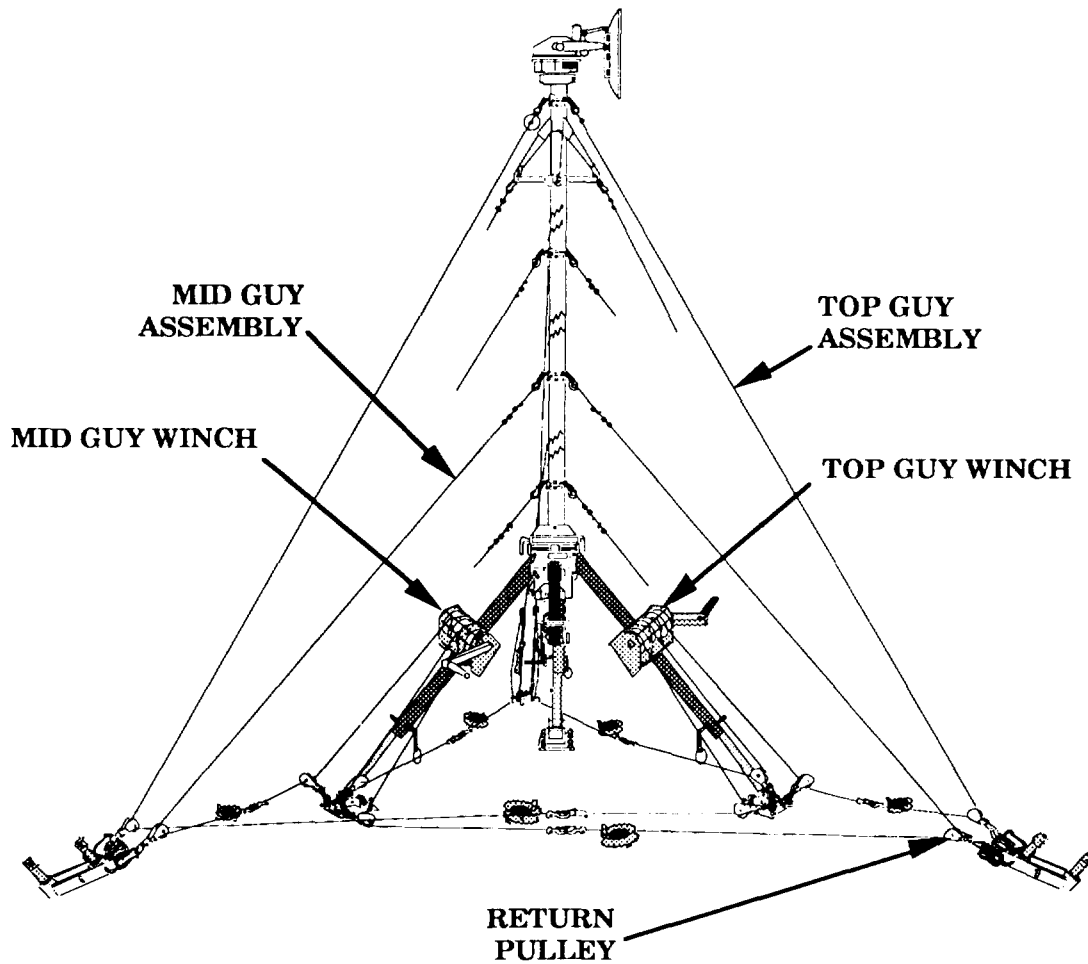
1-25. STARBAR ASSEMBLY



Three starbar assemblies are attached to the top section. The starbar assemblies are positioned to split the angles of the tripod legs and, when properly guyed, resist the twisting force of the wind against the antenna. This allows the mast to remain directionally stable in winds up to 60 miles per hour.

The starbar assemblies are inserted into the top section starbar mounting tubes where they are secured using locking pins. The horizontal portions of the starbar assemblies are clamped to the mast section by use of three clamps with knob nuts.

1-26. GUY WINCHES

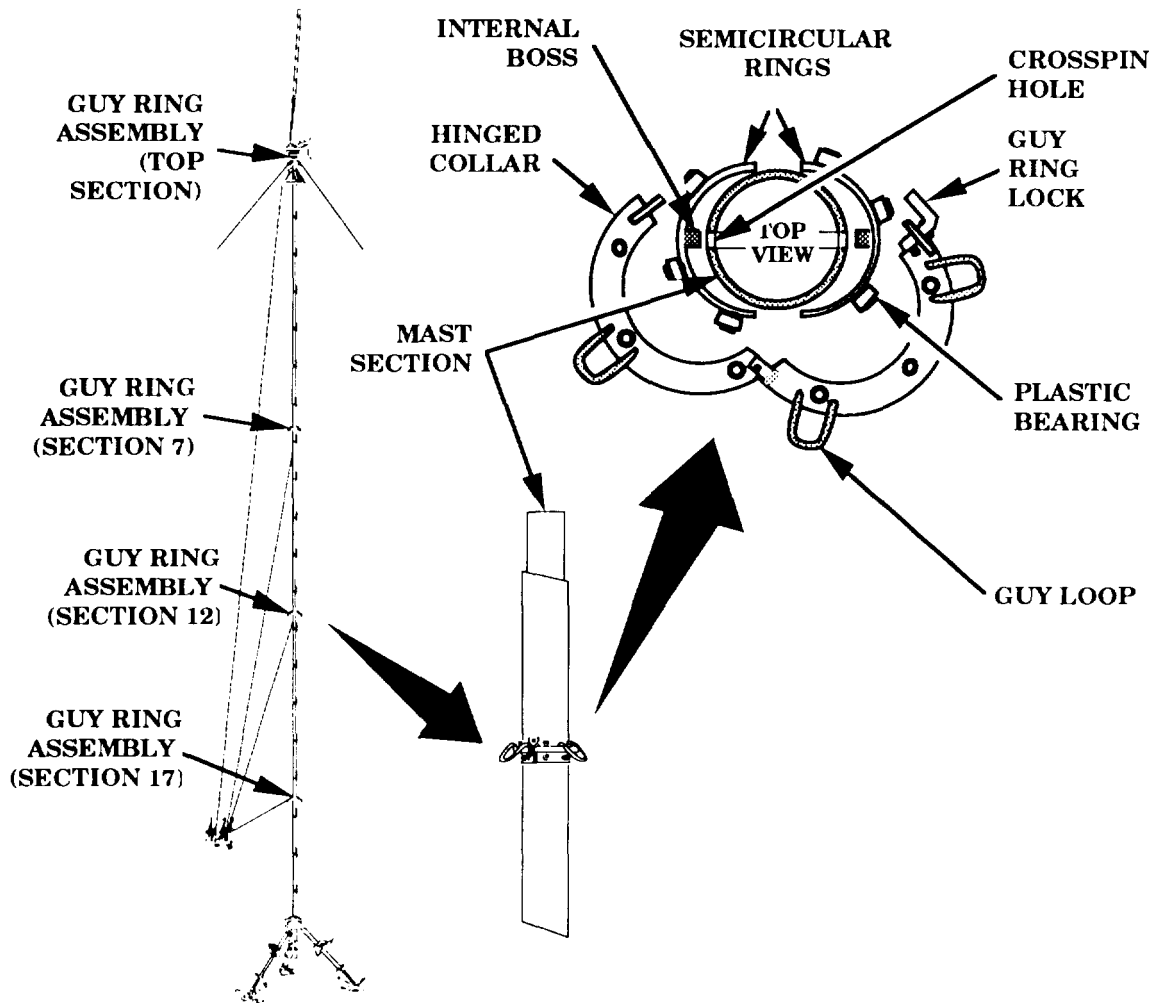


The top guy winch and mid guy winch are secured to separate tripod legs using locking pins. Guy winches control the tension of the top guy assemblies and the mid guy assemblies during mast erection and retrieval. The two guy winches are interchangeable. Top guy assemblies and mid guy assemblies must not be connected to the same guy winch.

Each guy winch is a three-reel mechanical assembly, operated by a hand crank. The three guy cable reels contain extension cables that run through deflection pulleys and are connected to the guy assemblies with snap hooks. The guy cable reels can be separately tensioned to keep the mast vertical and straight during erection and retrieval. Attached tensioning rods are provided for this task. A tensioning rod is inserted into one of the holes in the outer edge of the reel for correctly tensioned guy assemblies. The winch safety release can then be released and unblocked reels can be tensioned as required.

A brake system is controlled by the guy winch safety release. The brake system enables winding or unwinding of extension cables. Unwinding of guy assemblies requires pressing the winch safety release before cranking. Individual guy assemblies are tensioned by cranking one or two reels at a time, or by blocking one or two reels with the tensioning rods and releasing the other reel(s).

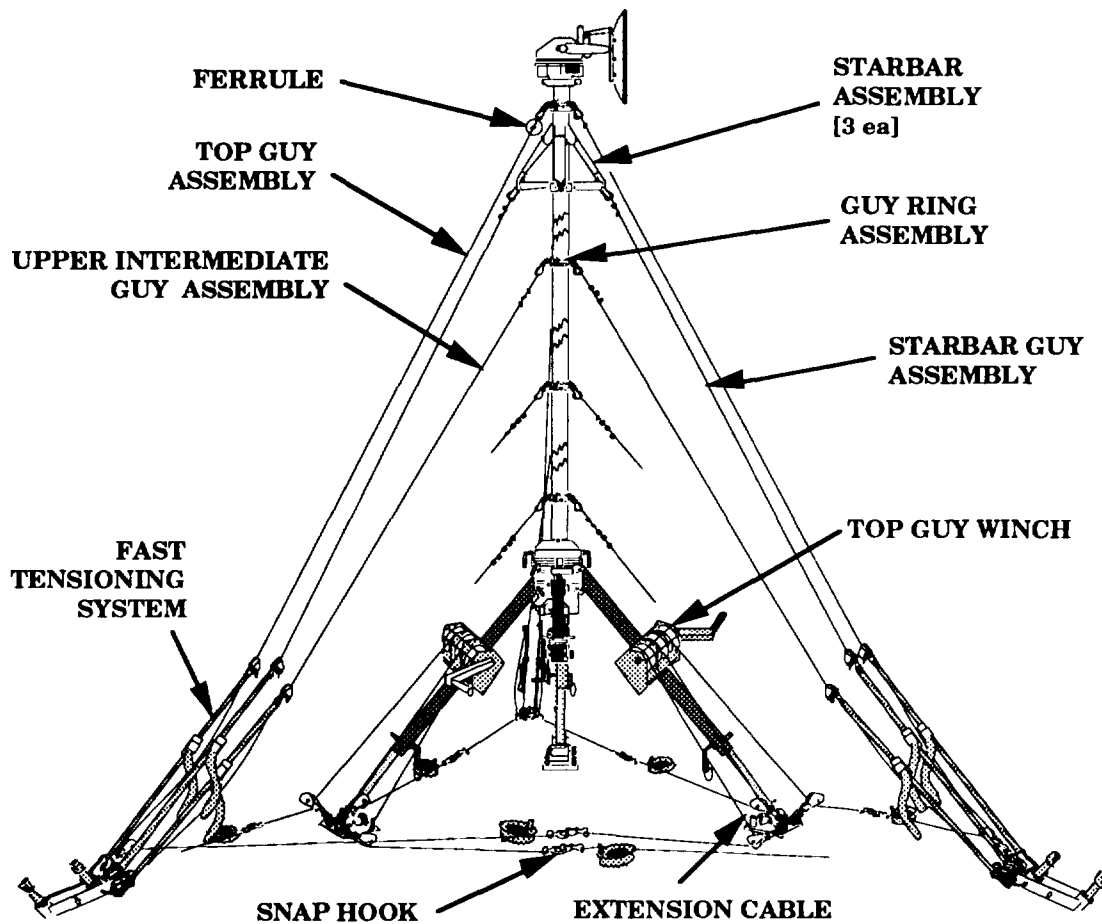
1-27. GUYING SYSTEM



Four identical guy ring assemblies are attached to the mast at the top section, mast section 7, mast section 12, and mast section 17. The guy ring assemblies consist of two semicircular rings and a hinged collar. The two semicircular rings are placed around the mast section, with plastic bearings pointing downward and the two internal bosses inserted into the crosspin hole of the mast section. The hinged collar is placed around the semicircular rings, closed, and secured with the guy ring lock.

Three guy loops on the hinged collar allow attachment of guy cables. The guy loops are angled down toward the guy anchor positions.

1-27. GUYING SYSTEM - Continued

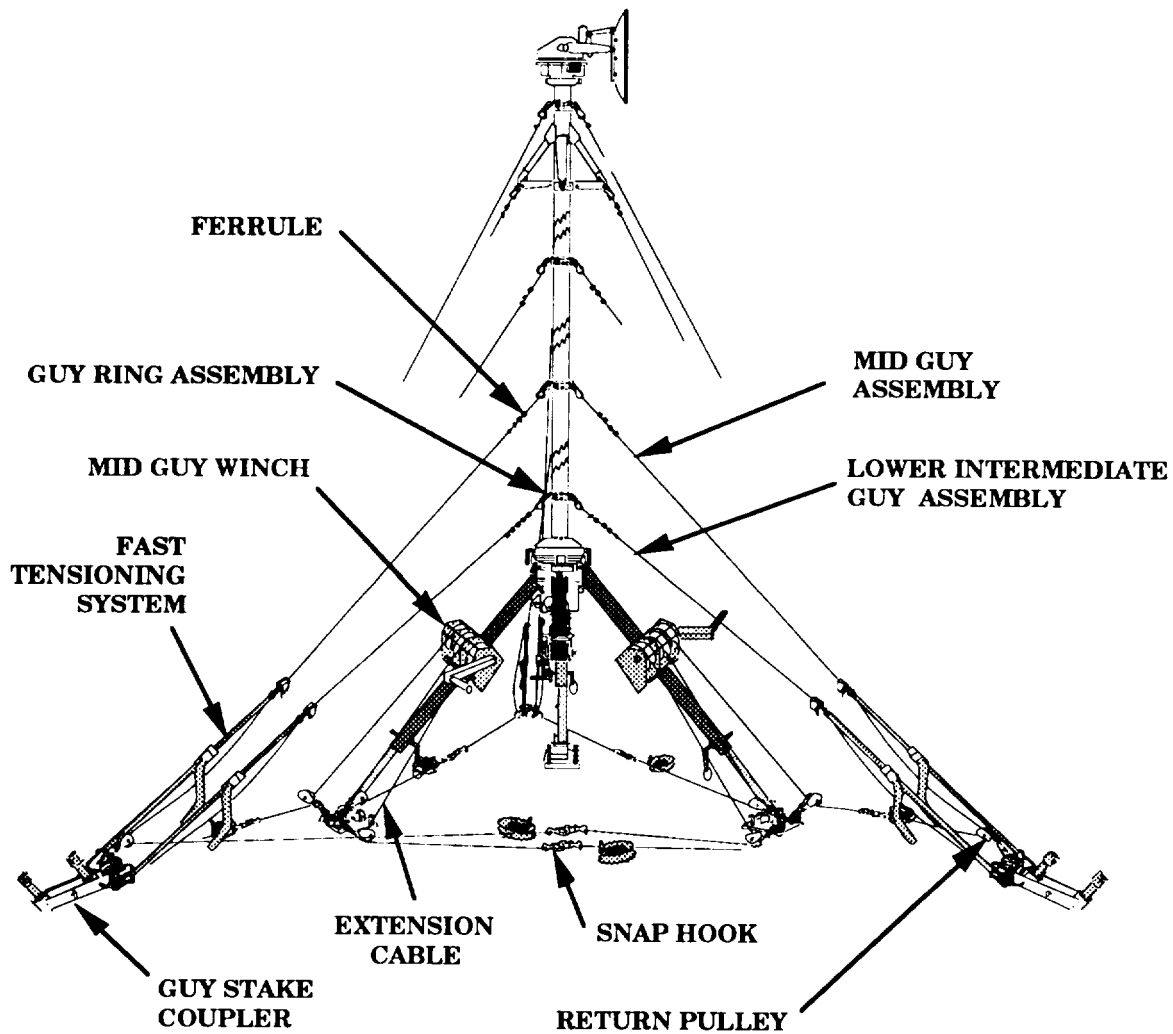


Three top guy assemblies are attached to the guy ring assembly located near the top of the mast. Each of the three top guy assemblies is identified with one metal ferrule. During erection of the mast the tension of each top guy assembly is controlled by one of three top guy winch cable reels. The top guy winch is attached to the top guy assemblies through extension cables using snap hooks. After the mast is fully erected, tension is controlled by fast tensioning systems.

Six starbar guy assemblies, identified with two metal ferrules, are attached to the starbar assemblies. The starbar assembly is positioned so that it splits the angles of the tripod legs. Tension of the starbar guy assemblies is set using fast tensioning systems.

Three upper intermediate guy assemblies, identified with three metal ferrules, are attached to the guy ring assembly at mast section 7. Tensioning of the upper intermediate guy assemblies is performed using fast tensioning systems.

1-27. GUYING SYSTEM - Continued

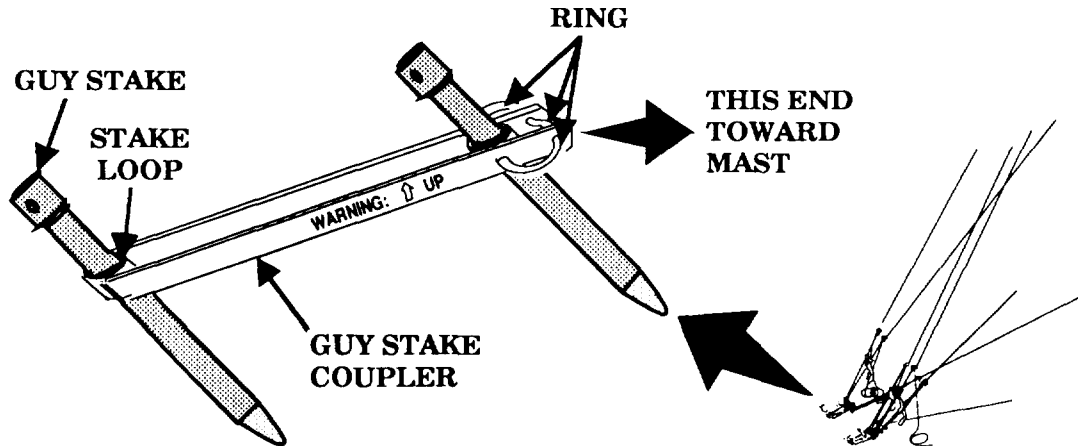


Three mid guy assemblies, identified with four metal ferrules, are attached to the guy ring assembly at mast section 12. The tension of each mid guy assembly is controlled by one of three mid guy winch cable reels. The mid guy winch is attached to the mid guy assemblies through extension cables using snap hooks. After the mast is fully erected, tension is controlled using fast tensioning systems.

Three lower intermediate guy assemblies, identified with five metal ferrules, are attached to the guy ring assembly at mast section 17. Tension of the lower intermediate guy assemblies is set using fast tensioning systems.

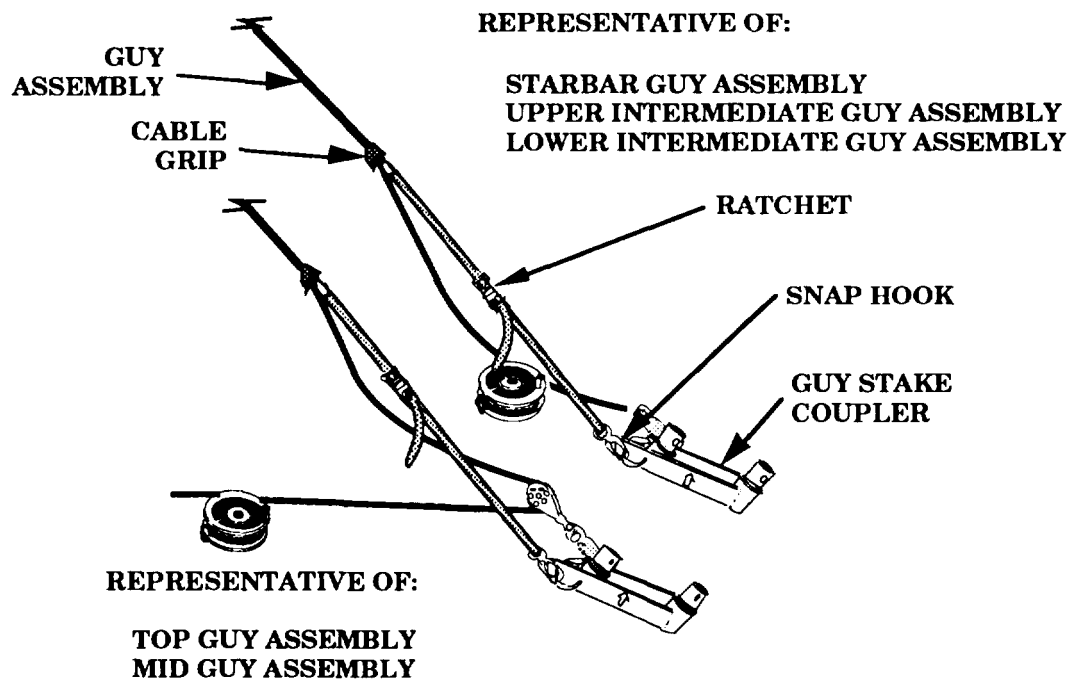
Top and mid guy assemblies are looped through return pulleys attached to guy stake couplers. The guy stake couplers are also used as the anchors for the fast tensioning systems.

1-27. GUYING SYSTEM - Continued



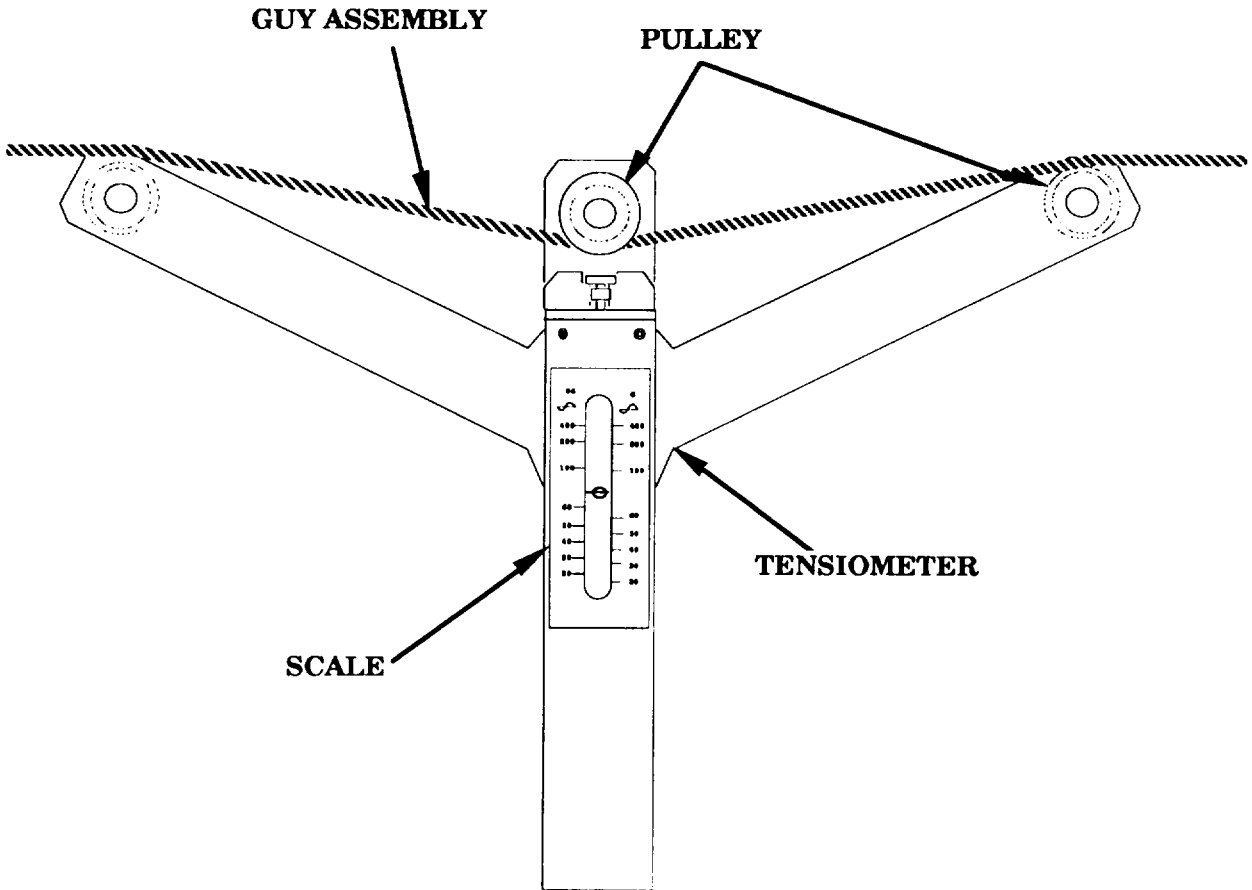
The guy stake coupler contains two angled stake loops which guide the guy stakes into the ground at the correct angle. The guy stake coupler is equipped with three rings used to anchor return pulleys and fast tensioning systems.

1-28. FAST TENSIONING SYSTEM



Fast tensioning systems consist of nylon webbing with a snap hook on one end and a cable grip on the other. The middle of the nylon belt contains a ratchet. The cable grip is attached to a guy assembly, and the snap hook is attached to the loop on the appropriate guy stake coupler. The ratchet is used to shorten the belt, which increases tension on the guy assemblies. When tension is to be released, the ratchet is unlocked by squeezing the release lever.

1-29. TENSIO METER



The tensiometer is a Y-shaped device used to measure guy assembly tension. The pulley in the center of the Y is placed over the guy assembly, one tensiometer arm pulley is centered on the guy assembly, and the other arm is levered into place against the guy assembly. The scale shows guy assembly tension.

CHAPTER 2

OPERATING INSTRUCTIONS

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Preventive Maintenance Checks and Services.....	II	2-10
Operation Under Usual Conditions	III	2-19
Operation Under Unusual Conditions	IV	2-115

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

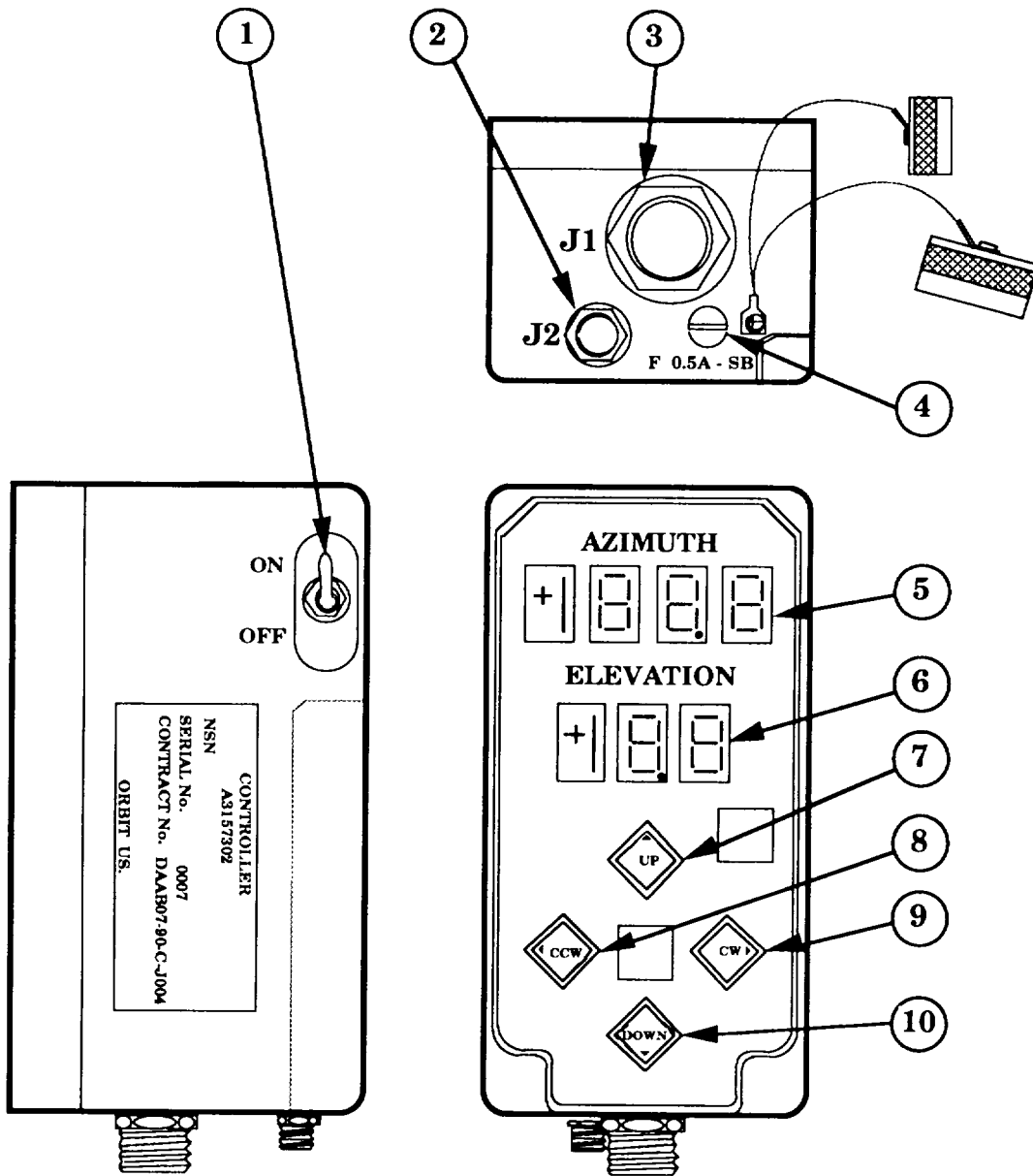
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Mast Assembly.....	2-2b	2-4

2-1. SCOPE

This section describes operator controls and indicators for Mast AB-1373/TRC.

2-2. CONTROLS AND INDICATORS

a. Controller



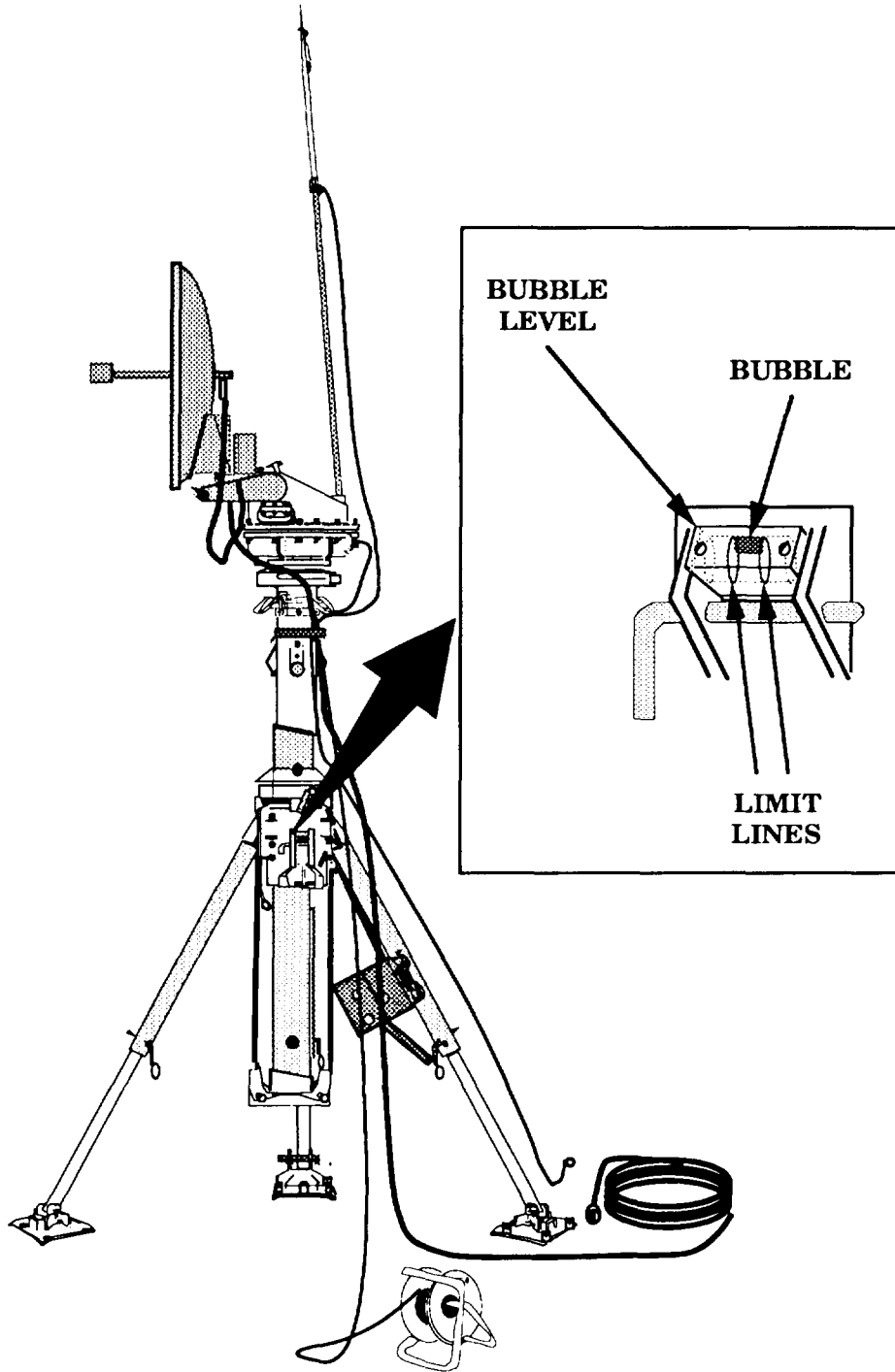
2-2. CONTROLS AND INDICATORS - Continued**a. Controller - Continued**

Key	Name	Type	Function
1	ON/OFF	Toggle switch	Provides power ON/OFF function for controller and positioner. During first 5 seconds after power on, activates digital display self-test.
2	J2	Connector	Provides connection point for cable assembly W2.
3	J1	Connector	Provides connection point for cable assembly W1.
4	Fuse Cover	Seal Screw	Provides access to fuse F 0.5A-SB.
5	AZIMUTH	Digital display	Displays current positioner azimuth angle. In self-test mode, activates all display segments as +188.8.
6	ELEVATION	Digital display	Displays current positioner elevation angle. In self-test mode, activates all digital display segments as +18.8.
7	UP	Pushbutton	Controls upward movement of positioner.
8	CCW	Pushbutton	Controls counterclockwise (CCW) movement of positioner.
9	CW	Pushbutton	Controls clockwise (CW) movement of positioner.
10	DOWN	Pushbutton	Controls downward movement of positioner.

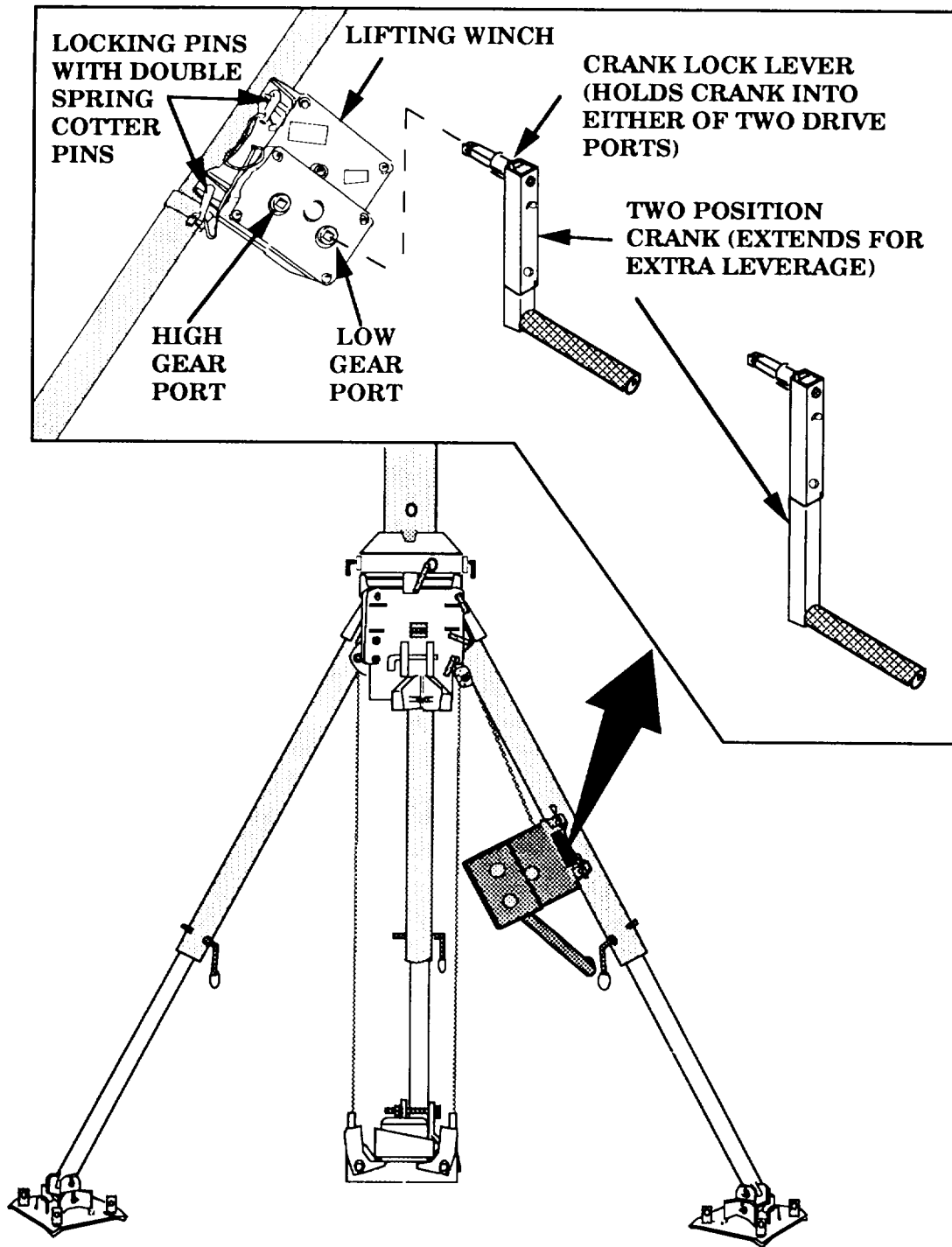
2-2. CONTROLS AND INDICATORS - Continued

b. Mast Assembly

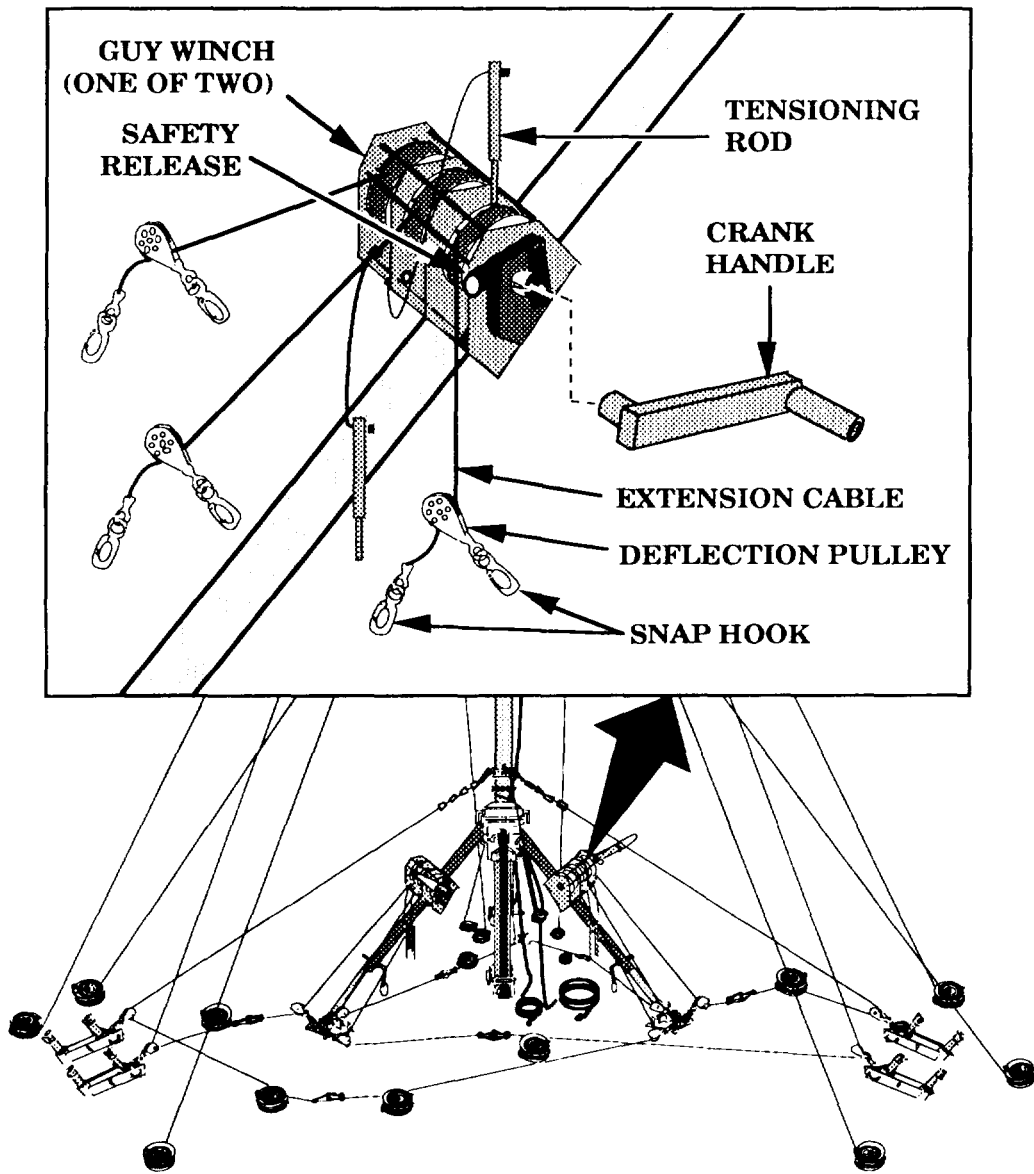
Key	Name	Type	Function
Page 2-5	Bubble Level	Indicator	Leveling indicator to permit accurate adjustment of tripod during deployment. Two bubble levels are placed 120 degrees to each other on the barrel assembly, to provide indication of tripod tilt.
Page 2-6	Lifting Winch	Mechanical Control	Used for raising mast sections during deployment, has two gear speeds. Low gear provides strong lift, but is slow. High gear provides faster lift, but requires more effort from the operator.
Page 2-7	Guy Winch	Mechanical Control	Provides individual guy assembly tension. Two guy winches are provided, one for top guy assemblies and one for mid guy assemblies. Each winch controls tension of three guy assemblies.
Page 2-8	Fast Tensioning System	Mechanical Control	Used for adjustment of individual guy assembly tension after mast has been erected. Also provides for connection between guy winch extension cables and guy assemblies during short mast deployment.
Page 2-9	Tensiometer	Indicator	Used to check guy assembly tension. Right (G) scale is used for lower intermediate and mid guy assemblies. Left (SG) scale is used for upper intermediate, starbar, and top guy assemblies.



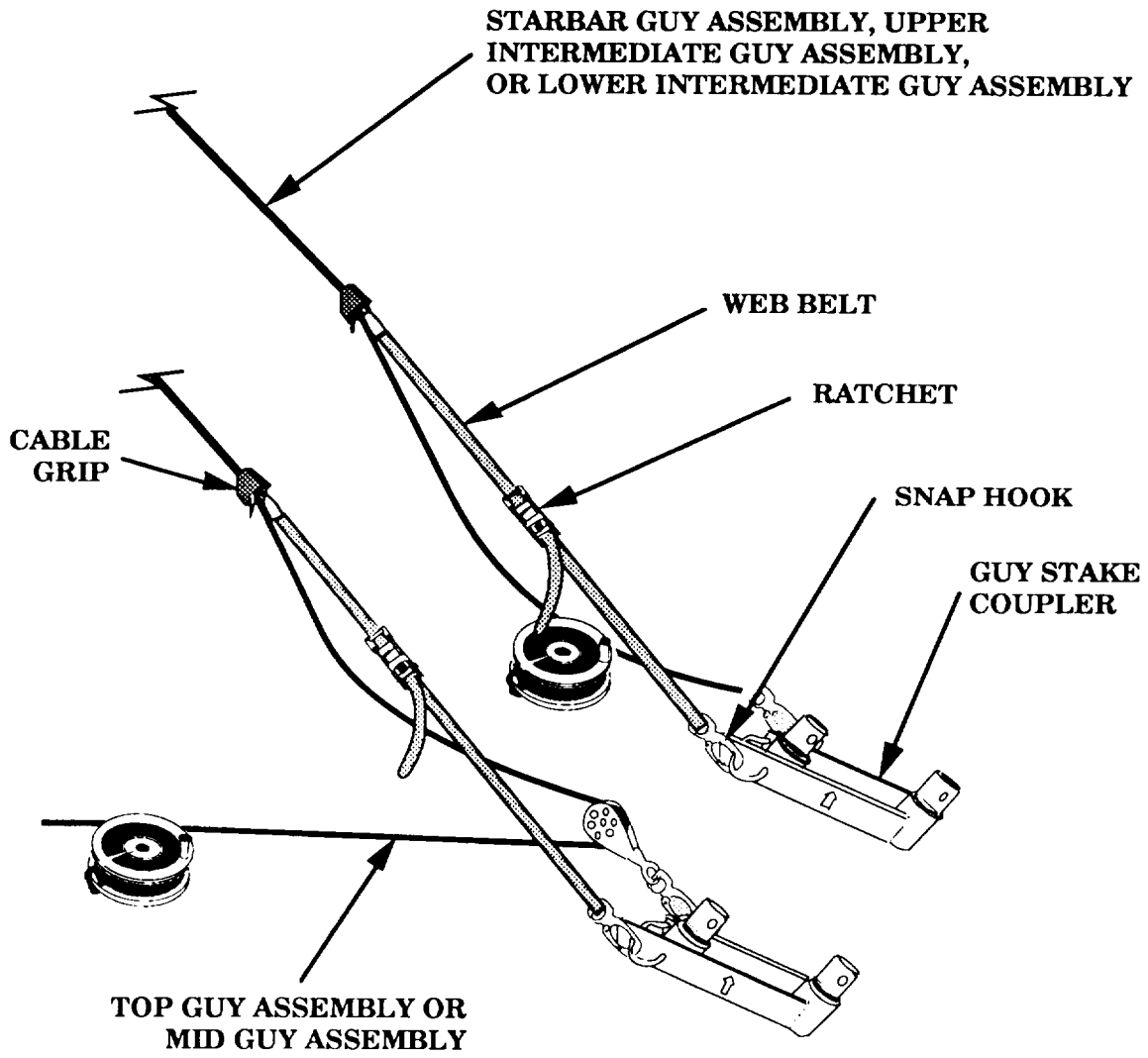
Bubble Level



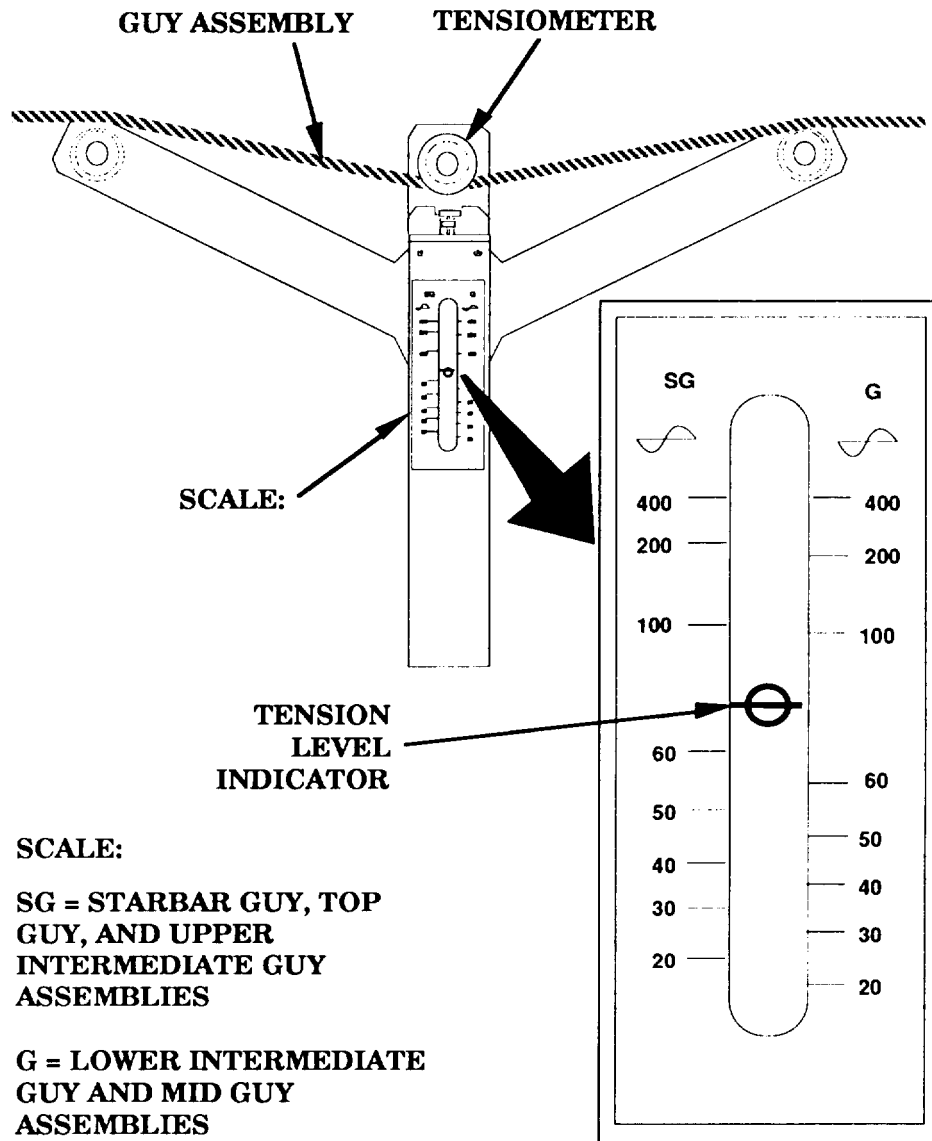
Lifting Winch



Guy Winch



Fast Tensioning System



Tensiometer

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

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2-3. GENERAL

Preventive Maintenance Checks and Services (PMCS) are essential to the efficient operation of the mast. PMCS prevent possible damage that might occur through neglect or failure to observe warning symptoms on time. Ensure all noted discrepancies are corrected. PMCS covers those scheduled procedures which are essential to operation of masts.

2-4. OPERATOR PMCS TABLE

Table 2-1 lists all scheduled maintenance tasks required for the mast. The columns of Table 2-1 are described below.

a. Column (1) - Item Number (Item No.)

This column contains a number for each procedure to be performed. When reporting malfunctions or failures on DA Form 2404, Equipment Inspection and Maintenance Worksheet, enter this number in the "TM Item No." column.

b. Column (2) - Interval (Interval B, D, A, S)

These columns tell when to perform a procedure. A dot in a column tells which procedures apply. Some procedures will have more than one dot.

c. Column (3) - Item To Be Inspected

This column has the name of the item to be inspected.

d. Column (4) - Procedure

This column tells how to do the required checks and services. Carefully perform these instructions in the order listed.

2-4. OPERATOR PMCS TABLE - Continued**e. Column (5) - Equipment Is Not Ready/Available If**

This column states conditions that will cause the equipment not to be ready for operation.

2-5. PREVENTIVE MAINTENANCE PROCEDURES**NOTE**

Within designated intervals, these checks are to be performed in the order listed. If the mast must be kept in continuous operation, check and service only those items that can be accessed without interrupting operations. Complete checks and services when the mast can be disassembled.

a. Before You Operate

Perform before (B) PMCS in Table 2-1. Observe WARNINGS and CAUTIONS contained in this manual and on plates installed on equipment.

b. While You Operate

Perform during (D) PMCS in Table 2-1. Observe WARNINGS and CAUTIONS contained in this manual and on plates installed on equipment.

c. After You Operate

Perform after (A) PMCS in Table 2-1. Observe WARNINGS and CAUTIONS contained in this manual and on plates installed on equipment.

d. Semiannually

Perform semiannual (S) PMCS in Table 2-1. Observe WARNINGS and CAUTIONS contained in this manual and on plates installed on equipment.

e. Order

Always do preventive maintenance in the same order.

f. Reporting

Any discrepancies shall be recorded on DA Form 2404 and reported to higher level maintenance.

Table 2-1 Operator Preventive Maintenance Checks and Services

NOTE

Within designated interval, these checks are to be performed in the order listed.

B - Before operation D - During operation A - After operation S - Semiannually

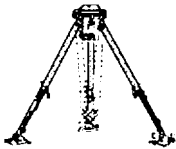
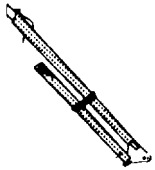

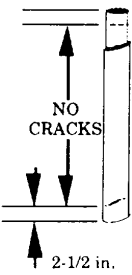
(1) ITEM NO	(2) INTERVAL				(3) ITEM TO BE INSPECTED	(4) Procedure	(5) Equipment is Not Ready/Available If:
	B	D	A	S			
(1)	•		•	•	Tripod 	Check that upper and lower legs are present and undamaged. Locking pins are present and secured with lanyards. Barrel assembly internal plastic bearings turn. Baseplates are complete and joints rotate freely.	Parts are missing or damaged.
(2)	•		•	•	Starbar Assemblies 	Check for damage preventing normal operation. Check That pivot joint works freely, locking pin is present and working, tubes are not cracked or bent.	Any starbar assembly is damaged.
(3)	•		•	•	Anchor 	Check that anchor stake is not broken, head or tip is not missing, head is not crushed.	Any anchor stake is damaged.
(4)	•		•	•	Mast Sections 	Check that all mast sections are present and no cracks extend beyond a band 2-1/2 inches from either end (refer to para 2-6).	Number of mast sections missing or damaged prevent mast deployment at desired height.

Table 2-1. Operator Preventive Maintenance Checks and Services - Continued

B - Before operation D - During operation A - After operation S - Semiannually

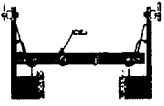





(1) Item No	(2) Interval				(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
	B	D	A	S			
5	•		•	•	Antenna Mounting Bracket 	Check for loss of parts, damage, or corrosion	Parts are missing, damaged, or corroded.
6	•		•	•	Top Section 	Check for damage such as cracks or dents	Cracks exist or dents prevent assembly.
7	•		•	•	Guy Ring corrosion 	Check for damage or	Corrosion or damage is present.
8	•		•	•	Retaining Ring 	Check for damage or corrosion. Check that latch locks positioner to top section securely	Damage or corrosion prevents retaining ring from securing positioner to top section, or latch does not function properly.
9	•		•	•	Cable Assembly W1 	Inspect insulation and connectors for damage	Insulation is broken, or pins are bent or missing.
9a	•				Radius Rope 	Untie any undesired knots. If radius rope is used for smaller guy radius deployments, ensure single knot is at 25 feet and double knot at 59 feet (refer to para 2-20).	

Table 2-1. Operator Preventive Maintenance Checks and Services - Continued

B - Before operation D - During operation A - After operation S - Semiannually



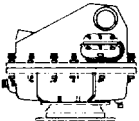
(1) Item No	(2) Interval				(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
	B	D	A	S			
10	•		•	•	Cable Assembly W2 	Inspect insulation and connectors for damage	Insulation is broken, or pins are bent or missing.
11	•		•	•	Controller 	Connect cable assembly W1 to positioner and controller Connect cable assembly W2 to controller and 115 V ac power source. Set power to ON. Unit will self-test. Displays should light indicating +188.8 in azimuth and +18.8 in elevation.	Correct readings are not obtained on controller, or displays do not light.
12	•		•	•	Positioner 	<p>NOTE</p> Some positioners may exceed specified limits for azimuth and elevation	Positioner does not move through entire range in azimuth and elevation, correct readings are not Obtained on controller, or
						Cycle positioner in azimuth (press and hold CW then CCW pushbutton on controller) and elevation)press and hold Up then Down pushbutton) throughout full range (display should read -18.0 thru + 18.0 elevation,+180.0 thru -180.0 azimuth) to ensure positioner movement and controller readings. At same time listen for grindings noises indicating damage.	

Table 2-1. Operator Preventive Maintenance Checks and Services - Continued

B - Before operation D - During operation A - After operation S - Semiannually

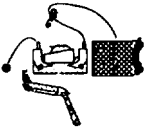

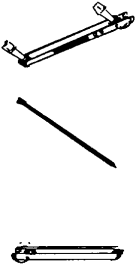
(1) Item No	(2) Interval				(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
	B	D	A	S			
13	•		•	•	Lifting Winch Assembly 	Operate lifting winch by inserting and turning crank Check easy turning of shoe assembly. Check for cut or worn lifting belt. Check for damaged or missing belt attachment spool and pulley. Check shoe assembly for loose or missing screws. Operate lifting winch that crank remains stationary when handle is released. Lubricate lifting winch assembly (refer to para 3-1).	Lifting winch parts or components are damaged or missing. Check Lifting winch turns in lowering direction when crank handle is released.
14	•		•	•	Guy Winch 	Operate guy winch with crank to determine if winch functions. Check pulleys for free movement. Check for bent or missing snap hooks Check for bent or missing tensioning rods. Check for extension cable kinks and broken wires. Check safety release for proper operation.	Guy winch parts are bent, broken, or missing. Extension cables are kinked. More than three cable wires are broken in any one place, or more than five cable wires are broken along the length of the cable.
15		•			Guy Stakes and Couplers 	Check each guy stake and guy stake coupler for firm hold during mast operation. Check guy stake head and tip for damage Check guy stake coupler for damage	Guy stakes are loose. Any guy stake head is crushed or missing, or tip is missing. Any guy stake coupler is broken or severely bent.

Table 2-1. Operator Preventive Maintenance Checks and Services - Continued

B - Before operation D - During operation A - After operation S - Semiannually






(1) Item No	(2) Interval				(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
	B	D	A	S			
16	•	•	•	•	Guy Assemblies 	Check for kinks, broken cable wire strands, loose or missing crimps. Check if pulleys are jammed with dirt or other objects which prevent turning. Check if guy assembly spools are broken or missing. Check each guy assembly for proper tension daily during mast operation (refer to para 2-11z).	Guy assemblies are improperly tensioned.
17	•		•	•	Fast Tensioning Systems 	Check nylon web for cuts or frays. Check metal parts for corrosion. Check operation of strap and ratchet. Check snap hook for functioning open or spring closed.	Nylon web is cut or severely frayed. Ratchet and strap fail to release or hold. Cable grip fails to secure or release cable. Snap hooks will not
18	•		•	•	Tensiometer 	Check tensiometer for free roller movement. Check for dirt or corrosion inside the tensiometer. Check tensiometer for correct reading (refer to para 2-7).	Tensiometer rollers do not turn freely. Dirt or corrosion prevent proper operation of tensiometer. Tensiometer reads incorrectly.
19	•		•	•	Ground Cable 	Check for badly worn cable or broken strands (Lightning)	Cable is badly worn, or many strands are broken.

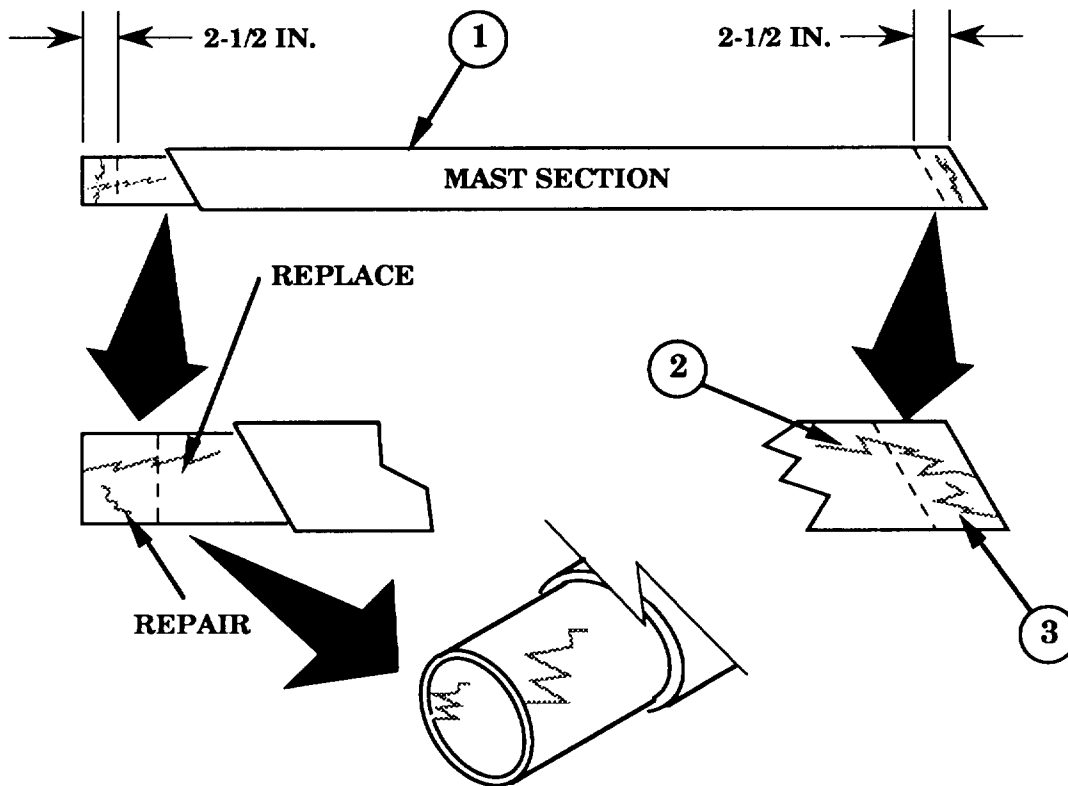
Table 2-1. Operator Preventive Maintenance Checks and Services - Continued

B - Before operation D - During operation A - After operation S - Semiannually

(1) Item No	(2) Interval				(3) Item To Be Inspected	(4) Procedure	(5) Equipment Is Not Ready/Available If:
	B	D	A	S			
20	•		•	•	Lightning Rod Supports 	Carefully inspect each tube for cracks, especially at end where metal insert is installed.	Cracks in tube exist.
	•		•	•		Check that metal insert is secure in each tube	Metal insert is loose, spins freely in tube.

Change 3 2-16a/(2-16b blank)

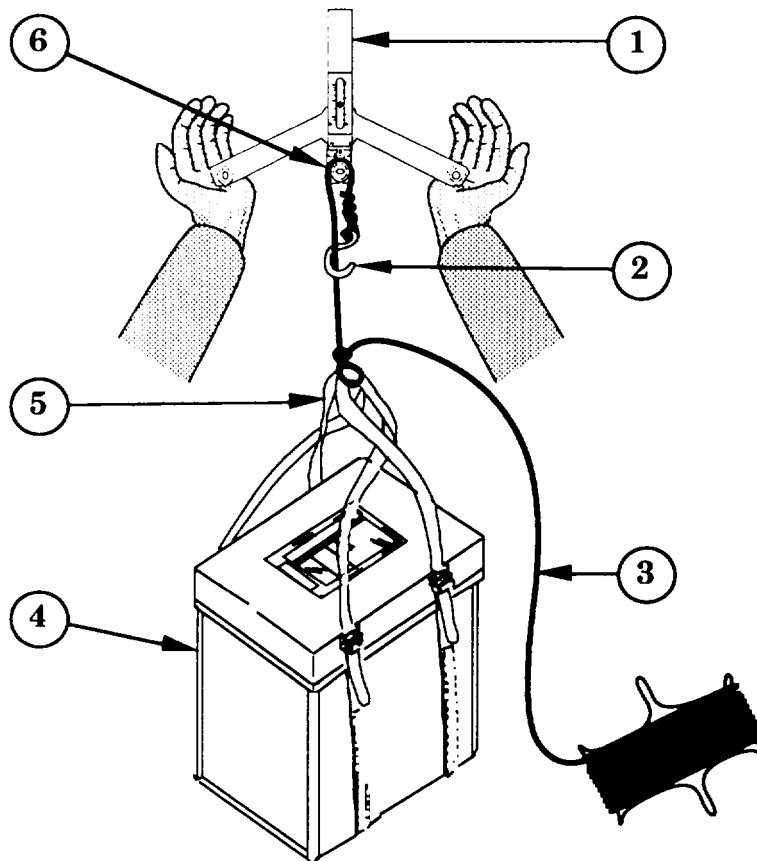
2-6. MAST SECTION CRACK INSPECTION

**WARNING**

Mast sections must be checked for cracks prior to deployment. Cracks which exceed acceptable limits may result in the mast toppling, causing personal injury or death. Those mast sections which contain cracks within acceptable limits can be safely used but should be repaired as soon as possible to avoid injury to hands due to jagged edges or splintering.

- a Check mast section (1) inside and outside for cracks.
- b If crack (2) extends beyond band 2-1/2 inches from either end of mast section, mast section (1) is unsafe. Do not use. Set aside faulty mast section.
- c If crack (3) lies completely within band 2-1/2 inches from either end of mast section, refer to higher level maintenance for disposition or repair.
- d Repeat steps a thru c for remaining 20 mast sections.

2-7. TENSIOMETER PERFORMANCE CHECK

**NOTE**

The performance check described in the following steps involves the use of one fully equipped guy winch bag as a weight.

- a Ensure correct equipment is stowed in one guy winch bag (refer to para 2-10).
- b Unwind approximately 10 feet of radius rope (3).
- c Tie radius rope (3) to guy winch bag straps (5), leaving 3 feet of rope between guy winch bag (4) and tensiometer (1).
- d Loop radius rope (3) over tensiometer center roller (6) and hook radius rope S-hook (2) over radius rope.
- e Grasp tensiometer (1) and lift guy winch bag (4) 6 inches off ground.
- f Observe reading on SG scale of tensiometer (1). If the SG scale does not read between 35 and 65, the tensiometer should be replaced.

Section III. OPERATION UNDER USUAL CONDITIONS

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2-8. SITE SELECTION AND PREPARATION

a. Site Selection Criteria

The mast is designed for deployment on various terrains. However, the more level the site, the easier it is to deploy and retrieve the mast. Sites which contain large rocks, dense trees, or dense bushes should be avoided. In selecting a deployment site, comply with the following:

- (1) Perform site survey prior to deployment of mast. An area of 164 feet in diameter is required for deployment of a single mast. An area of 260 feet in diameter is required for deployment of multiple masts.
- (2) Select terrain which does not slope more than 10 degrees.
- (3) Provide adequate drive-thru space for truck and trailer.
- (4) Avoid mast deployment on or over roads and traveled areas.
- (5) Select deployment site for soil conditions compatible with use of guy stakes and guy anchors.
- (6) Plan for reasonably clear path for guy assemblies from tripod legs to guy anchor positions. Avoid obstructions, such as tree branches, that will interfere with top guy assembly runs to guy anchors.
- (7) Provide for tactical situation, security, and other requirements determined by system planners. Select site that provides for any tactical requirements, such as camouflage and transmission line-of-sight.
- (8) Refer to specific manual for other site considerations for any ancillary equipment.

b. Collocated Antennas

Collocated antennas should not face each other. Communications may degrade if nearby antennas radiate toward each other.

c. Nearby Power Lines

Power lines should be at least 200 feet away from the mast in any direction.

d. Multiple Mast Site Layout

Refer to Appendix G for multiple mast site layout.

e. Smaller Mast Height and Guy Radius Deployment

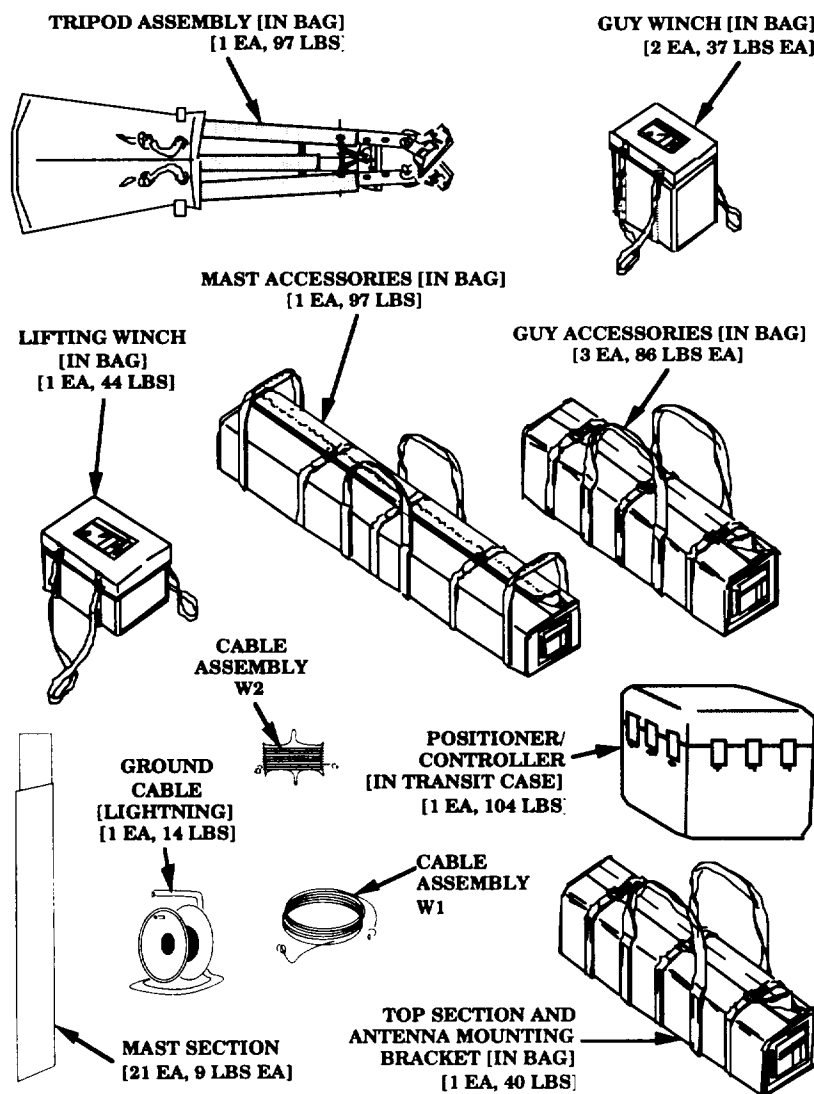
When the area required for full deployment of the mast is not available, the mast may be deployed using a smaller guy radius of 59 or 25 feet. Special instructions for these deployments are given in paragraphs 2-21 and 2-22. These procedures, however, must not be attempted without prior experience in full mast deployment.

2-9. UNLOADING TRANSPORT BAGS AND EQUIPMENT

WARNING

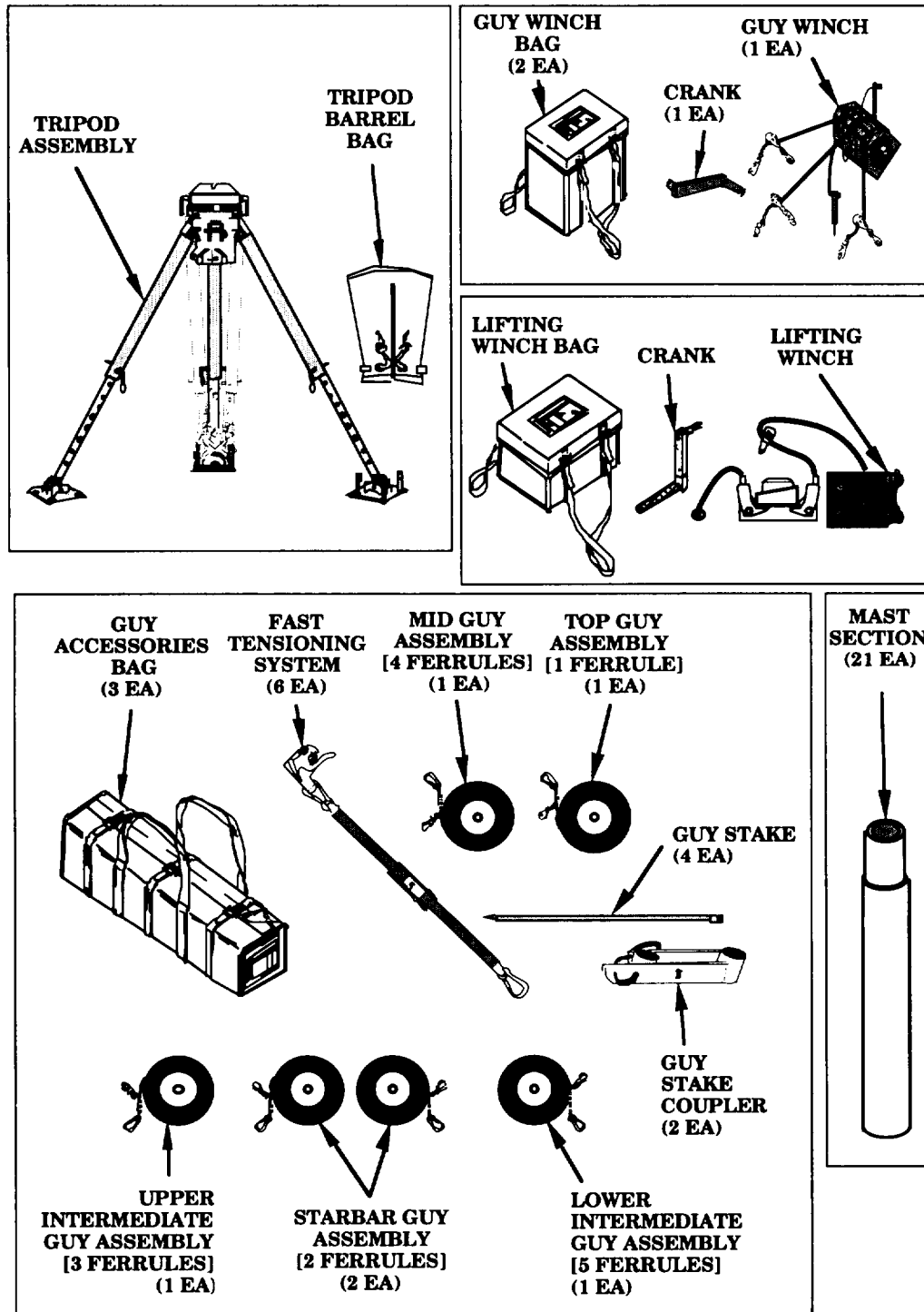
Two or more operators are required for lifting or carrying any item weighing more than 37 pounds. Failure to comply with this warning could result in personal injury. Safety shoes are required for unloading the mast. Failure to wear safety shoes could result in personal injury.

- a. Unload Mast AB-1373/TRC from Antenna Support Group OE-481/TRC in accordance with TM 11-5985-392-13.
- b. Check that following equipment and bags are present.

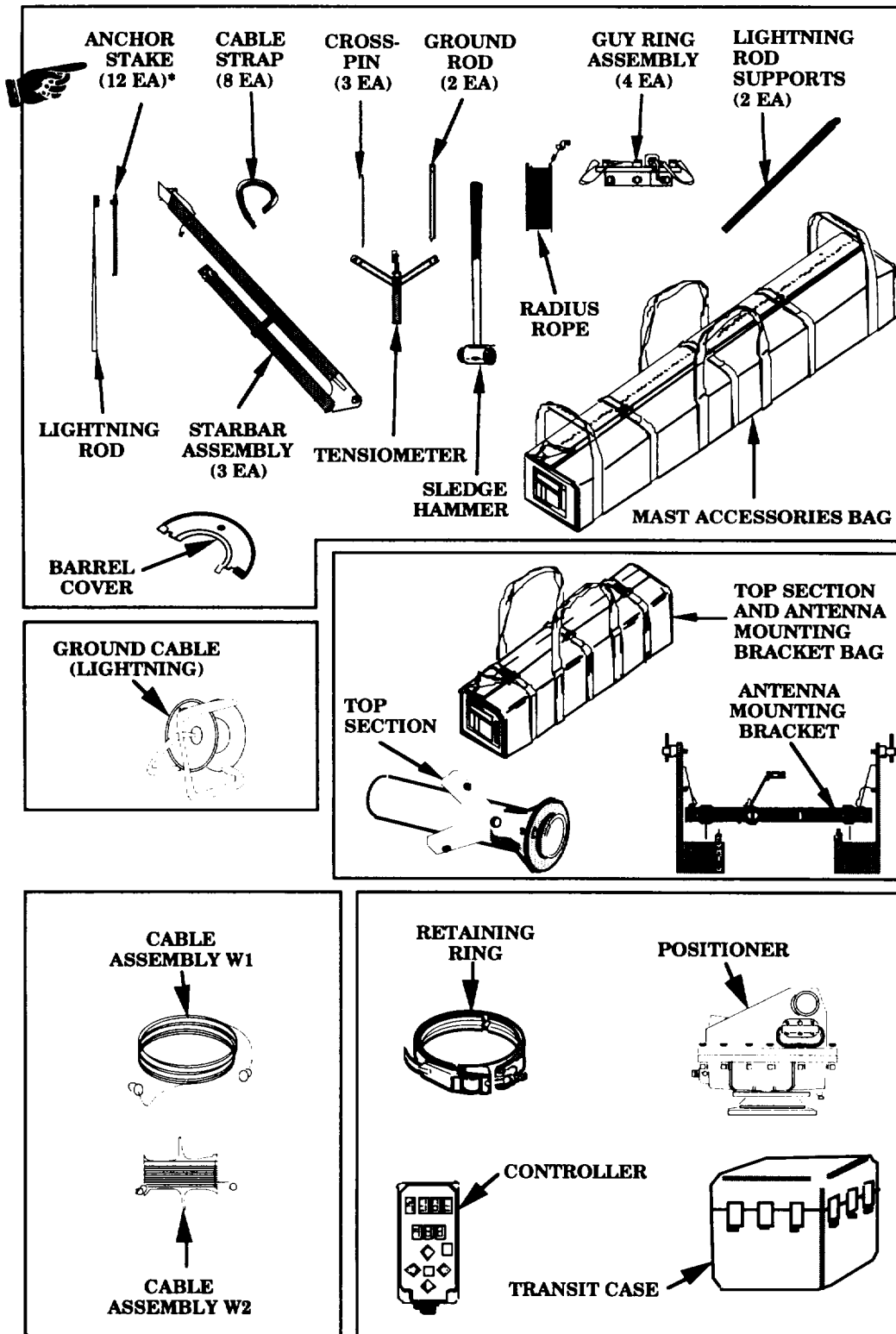


2-10. UNPACKING EQUIPMENT

Open bags and check contents of equipment bags using the following illustrations.



2-10. UNPACKING EQUIPMENT - Continued



*Requisition guy stake GP-101/U, NSN 4030-00-187-5265, for arctic, rocky, or similar hard soil conditions (refer to TM 11-5985-394-23P). Required modification of this stake is covered in paragraph 2-19.

2-11. DEPLOYING MAST

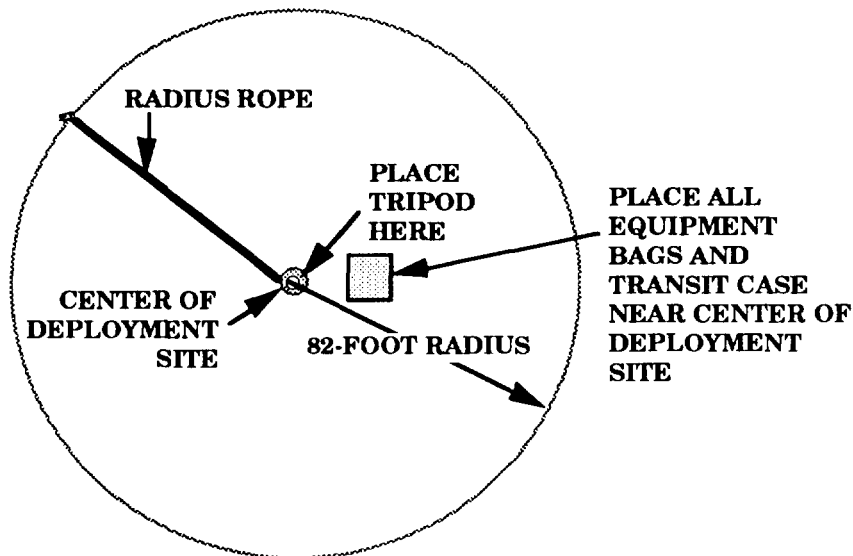
WARNING

Do not attempt to deploy the mast during electrical storms or when winds exceed 25 mph. Failure to follow this warning could result in personal injury or death. Hard hats, eye protection, gloves, and safety shoes must be worn while working in mast area to prevent personal injury.

NOTE

Three operators are required to deploy the mast.

a. Laying Out Equipment

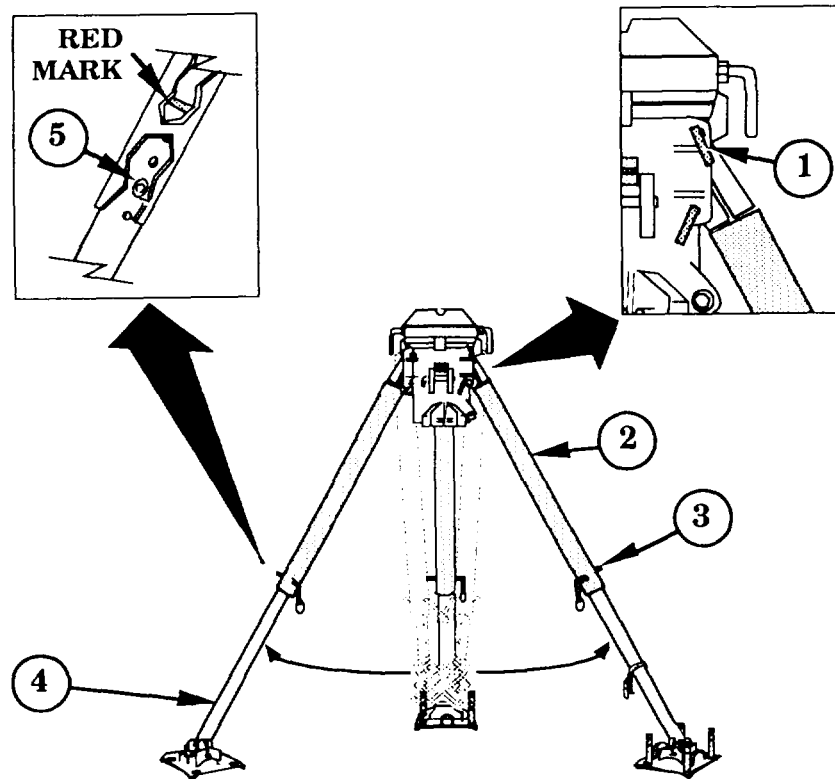


1.

- (1) Select approximate center of deployment site. (For special instructions on siting for multiple mast deployment, refer to Appendix G of this manual.)
- (2) Place all equipment bags and transit case near center of deployment site.
- (3) Remove radius rope from mast accessories bag.
- (4) Operator 1: Stand at selected center of deployment site holding radius rope S-hook. Operator 2: Walk directly outward with radius rope to its full 82-foot extension, and then in a circular path to ensure site is free of obstructions for deployment of guy assemblies.
- (5) Place tripod on ground at center of deployment site.
- (6) Remove six guy assemblies from each guy accessories bag and lay out 8 to 10 feet from tripod. Keep guy assemblies from each guy accessories bag together as a group.

2-11. DEPLOYING MAST - Continued

b. Setting Up Tripod



- (1) Remove bag from tripod barrel assembly.
- (2) Remove straps securing tripod legs.
- (3) Stand tripod upright, unfold and secure each leg (2) using upper locking pins (1) on barrel assembly.
- (4) Determine ground slope or wind direction. If deploying on slope, position one leg (2) uphill. If deploying on level ground, position one leg (2) into wind.

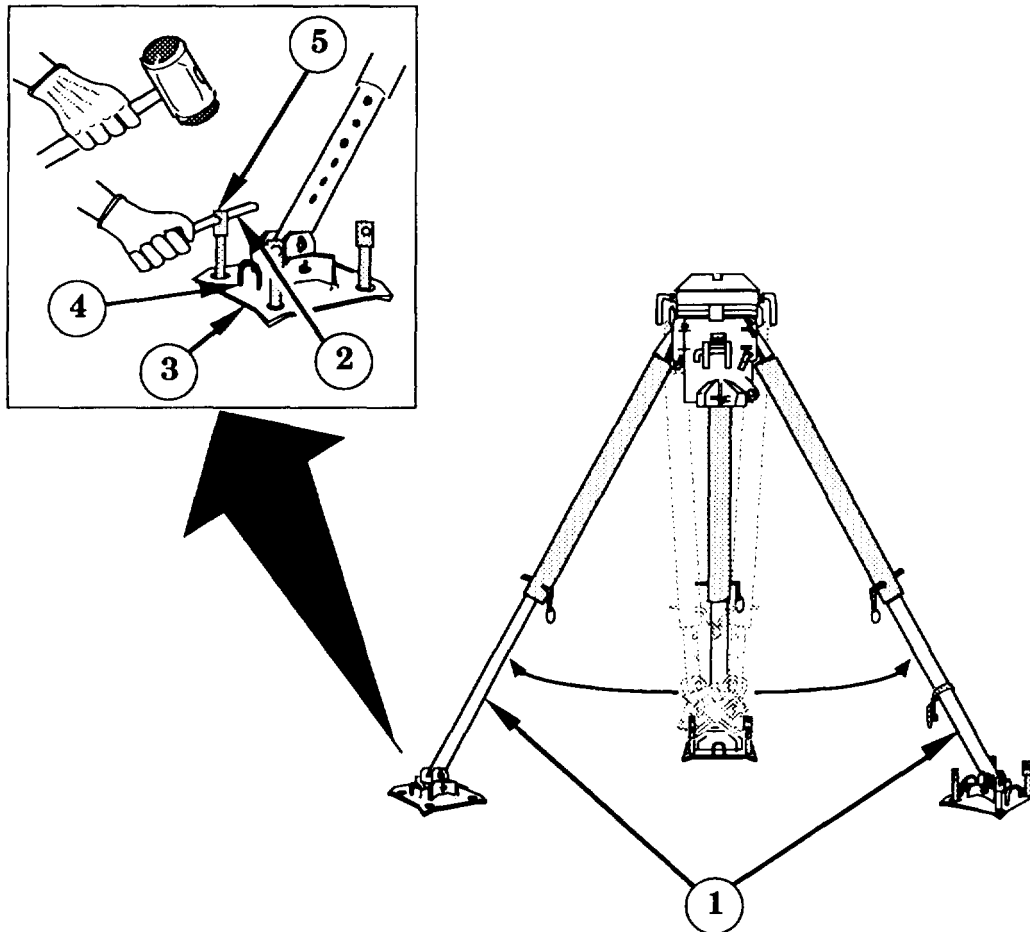
WARNING

Extending lower leg beyond red mark can cause upper and lower legs to separate. Extending more than one leg at a time can cause the tripod to topple. Failure to observe these precautions may result in equipment damage or personal injury.

- (5) Extend lower legs (4) to white reference mark (5) or, as needed, to level tripod. Secure each lower leg with locking pin (3).

2-11. DEPLOYING MAST - Continued

b. Setting Up Tripod - Continued



- (6) Orient baseplates (3) flat on ground with loop (4) facing outward from tripod.

WARNING

Wear eye protection and gloves while driving anchor stakes with hammer. Failure to do so could result in personal injury.

- (7) Remove 12 anchor stakes (5), one crosspin (2), and sledge hammer from mast accessories bag.

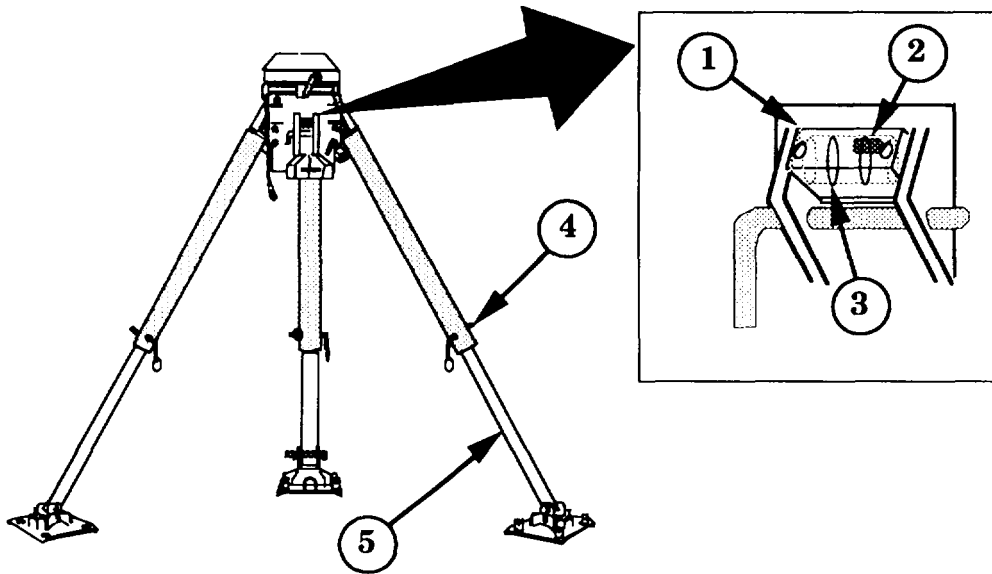
NOTE

Do not install anchor stakes in baseplate of leg facing into wind or uphill.

- (8) Insert crosspin (2) through anchor stake (5). Use hammer to drive four anchor stakes (5) through holes in each baseplate (3) of two legs (1) that are not facing into wind or uphill.

2-11. DEPLOYING MAST - Continued

c. Checking Tripod Leveling



- (1) Use two bubble levels (1) to detect off-level condition. Leveling bubbles (2) should be at least one-half into limit lines (3).

WARNING

Do not remove locking pin from more than one leg at a time. Removal of more than one pin will cause the tripod to collapse and may result in personal injury.

NOTE

Bubble should be located in center of limit lines. If bubble is left of limit lines, extend leg located to the right of the bubble level. If bubble is right of limit lines, extend leg located to the left of the bubble level.

- (2) Determine which leg requires adjustment.
- (3) Support tripod and remove locking pin (4) on leg that requires adjustment.

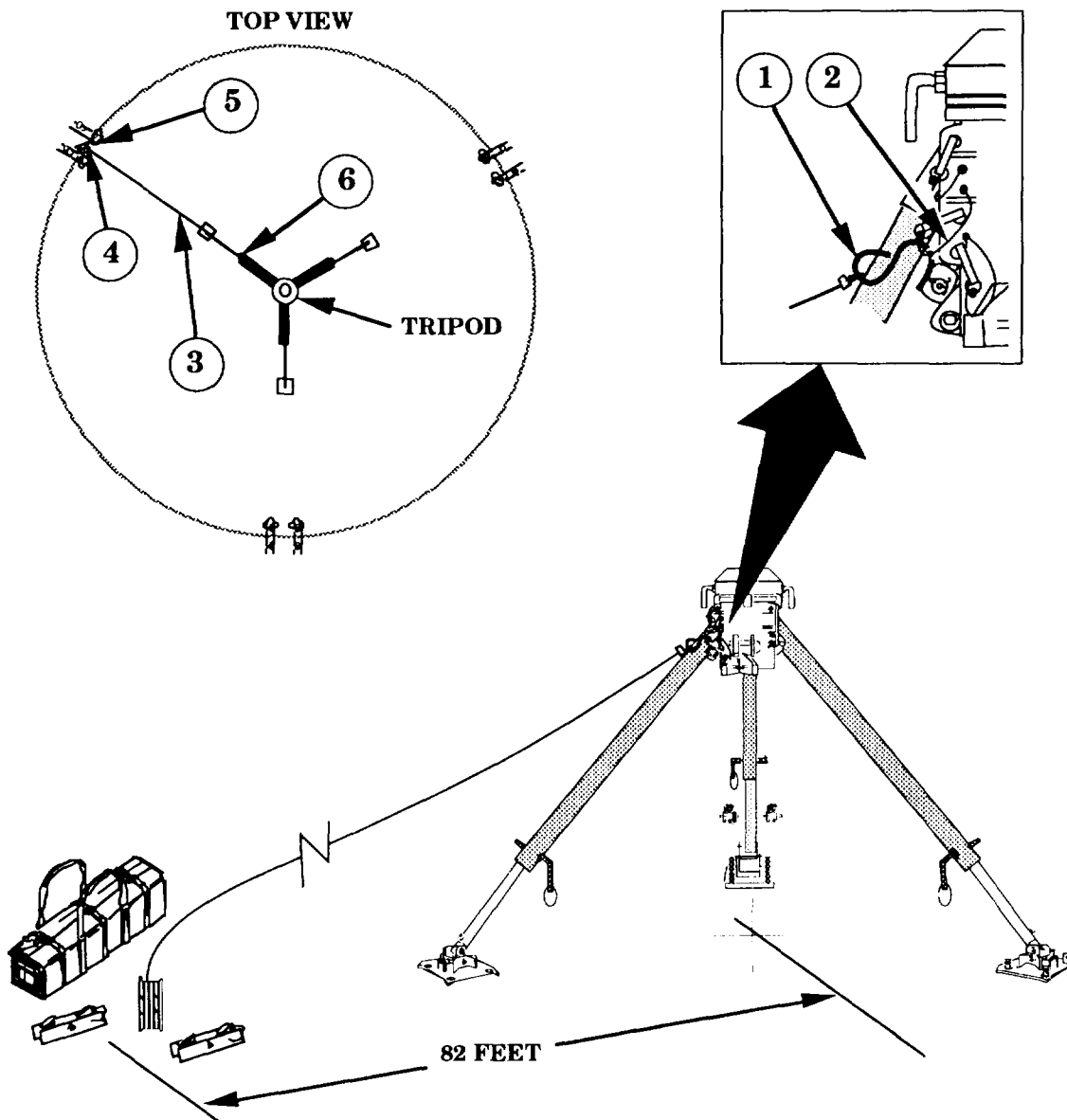
NOTE

Tripod legs should not be lowered beyond white reference mark on lower leg. If tripod leg is lowered beyond white reference mark, mast sections cannot be inserted into shoe assembly and barrel assembly.

- (4) Extend lower leg (5) to level tripod.
- (5) Secure leg with locking pin (4).
- (6) Repeat steps 1 thru 5 as necessary to level remaining legs.

2-11. DEPLOYING MAST - Continued

d. Locating Guy Anchor Positions



- (1) Connect radius rope S-hook (1) to lanyard (2).
- (2) Operator 1: Walk directly outward from leg (6) and fully unwind radius rope (3) to guy anchor position (4) Find exact guy anchor position by lining up radius rope (3) and leg (6).
- (3) Operator 2: Carry one guy accessories bag, crosspin, and sledge hammer to guy anchor position.

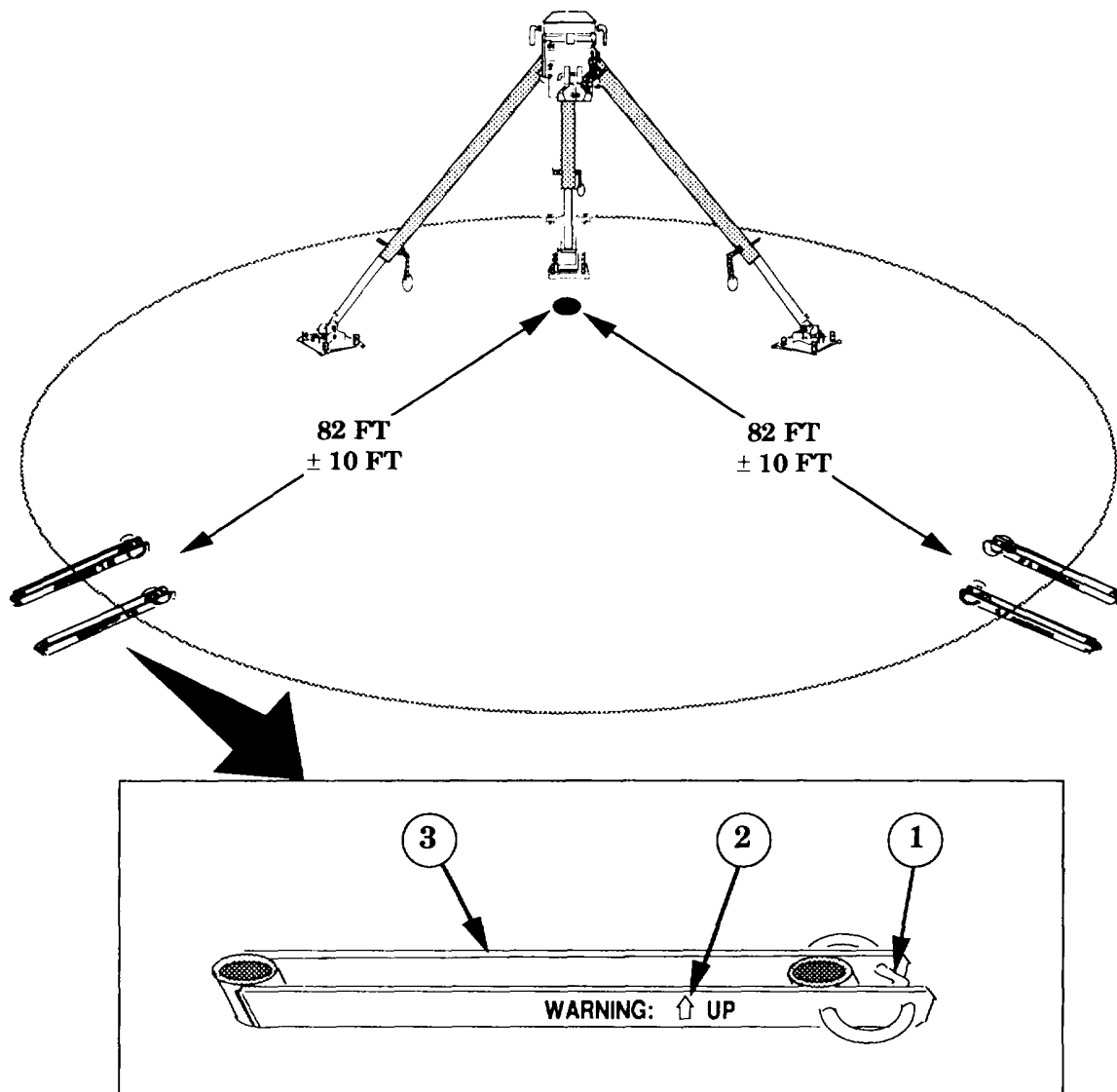
NOTE

Guy anchor positions have a tolerance of 10 feet in any direction before significant loss of strength occurs.

- (4) Remove two guy stake couplers from guy accessories bag. Lay one guy stake coupler (5) on either side of radius rope (3) and approximately 1 foot apart.

2-11. DEPLOYING MAST - Continued

d. Locating Guy Anchor Positions - Continued



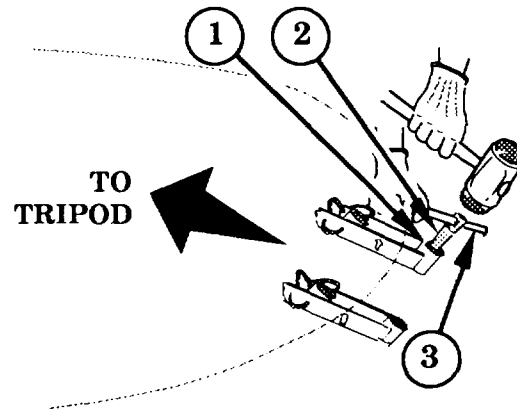
WARNING

Improper or inadequate installation of guy stake couplers may result in the mast toppling over, causing personal injury or death.

(5) Point loop end (1) of guy stake couplers (3) toward tripod with arrow (2) pointing up.

2-11. DEPLOYING MAST - Continued

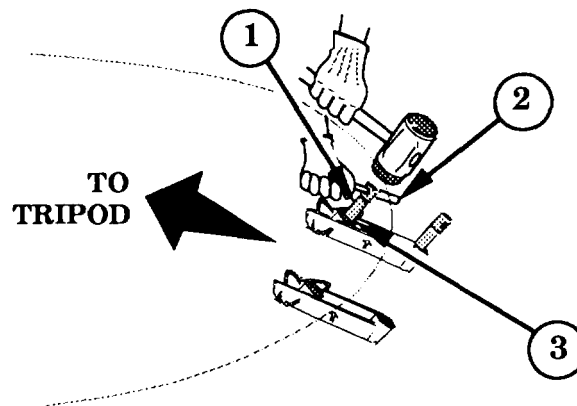
d. Locating Guy Anchor Positions - Continued



WARNING

Wear gloves and safety glasses while driving guy stakes. Failure to do so may result in personal injury.

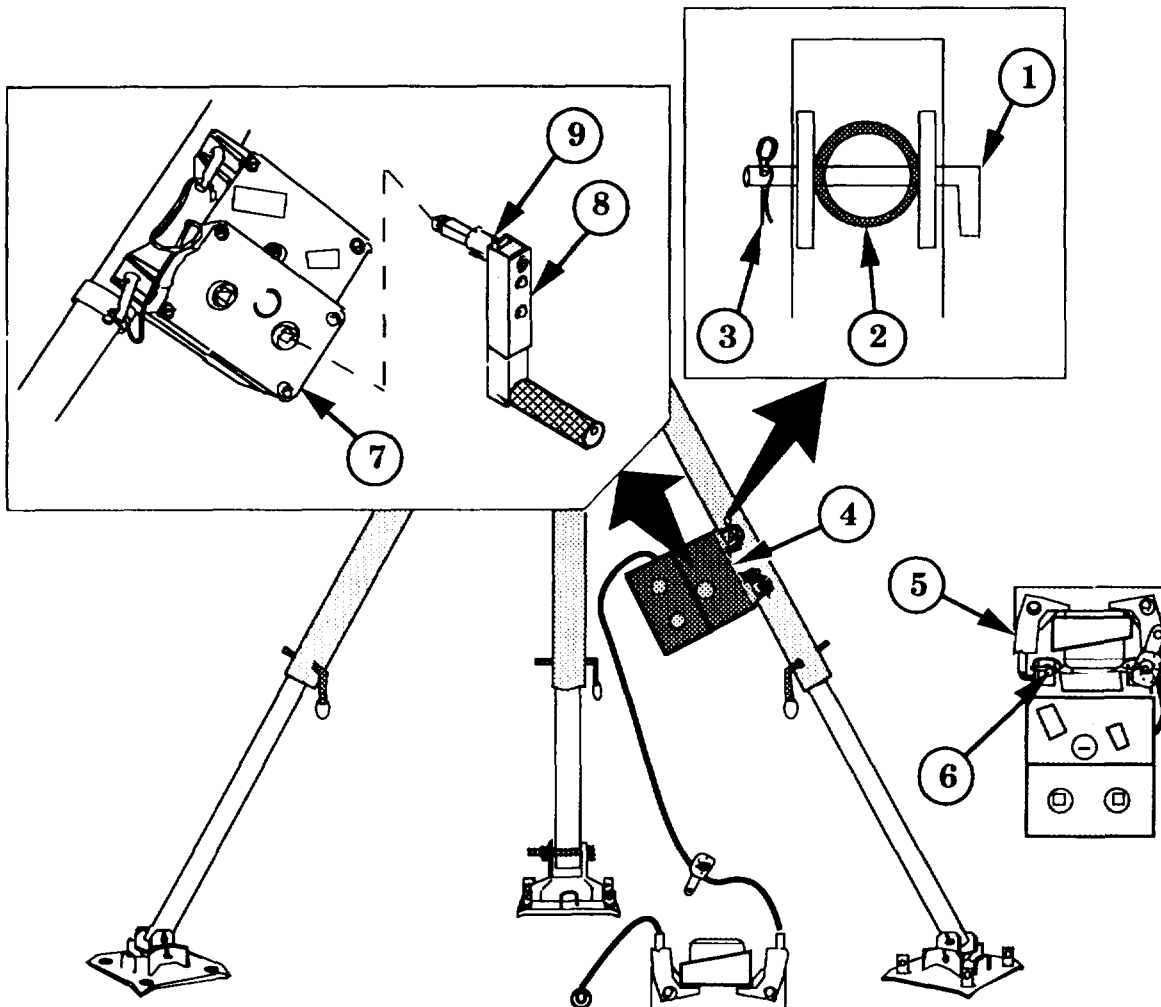
- (6) Insert guy stake (2) through hole (1) at rear of guy stake coupler. Insert crosspin (3) through head of guy stake. Use hammer to drive guy stake (2) into ground until head is 4 inches above guy stake coupler. Remove crosspin (3).



- (7) Adjust front of guy stake coupler to point toward tripod. Insert guy stake (1) through hole (3) in front of guy stake coupler. Insert crosspin (2) through head of guy stake (1). Drive second guy stake (1) into front hole (3) so head is between 3 and 8 inches above guy stake coupler.
- (8) Repeat steps 6 and 7 to secure second guy stake coupler at this location.
- (9) Repeat steps 1 thru 8 for remaining two guy anchor positions.
- (10) Rewind radius rope and place in mast accessories bag.

2-11. DEPLOYING MAST - Continued

e. Mounting Lifting Winch Assembly



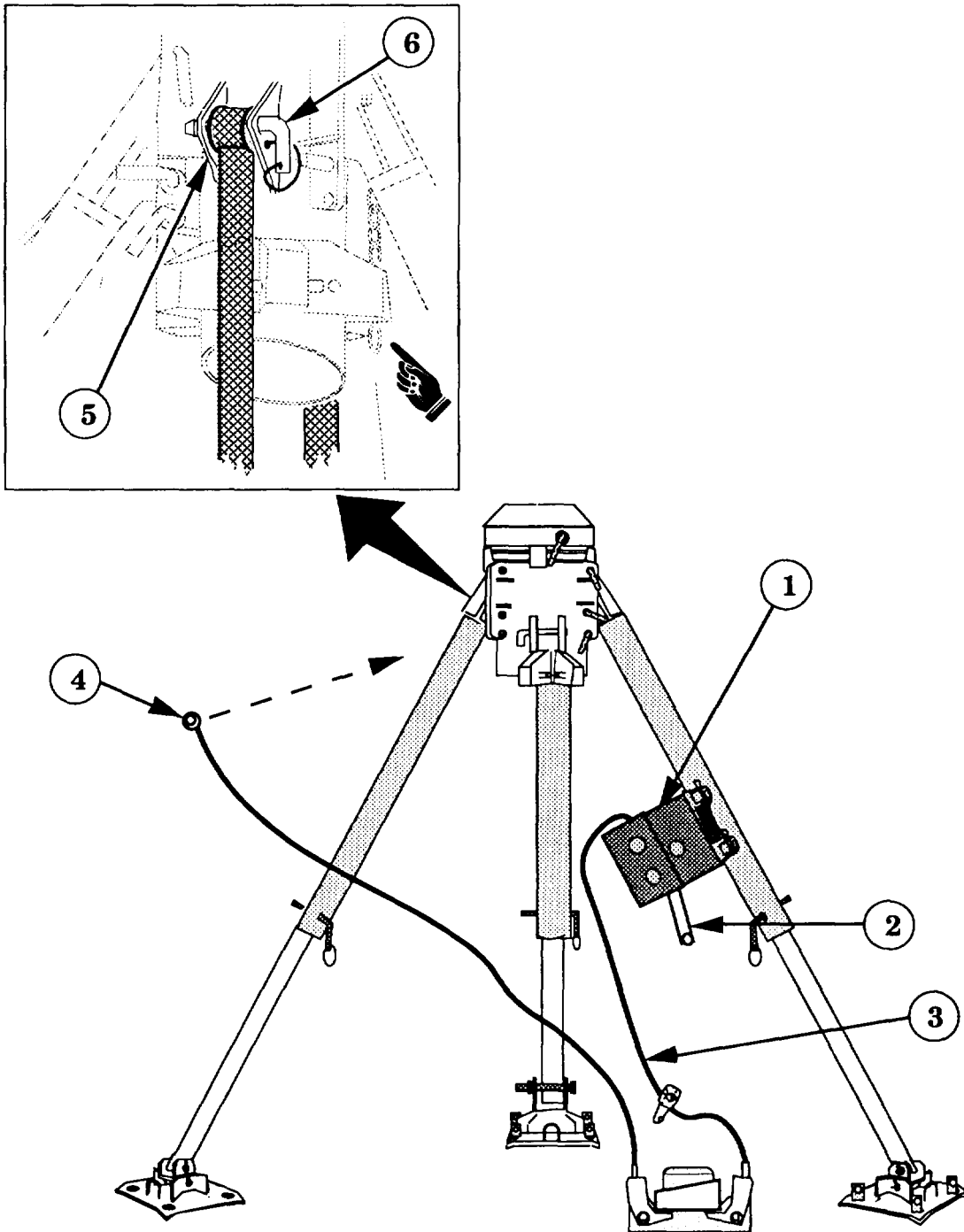
CAUTION

Keep lifting winch belt flat, avoid twisting or tangling. Failure to do so may result in belt damage.

- (1) Remove lifting winch from lifting winch bag and remove locking pin (6) to release shoe assembly (5).
- (2) Use two locking pins (1) to attach lifting winch (4) on either anchored leg (2), so that lifting winch belt faces upward. Winch body (7) must face center of tripod. Secure locking pins (1) using double spring cotter pins (3).
- (3) Install crank (8) on winch body (7). Use crank lock lever (9) to secure crank (8).

2-11. DEPLOYING MAST - Continued

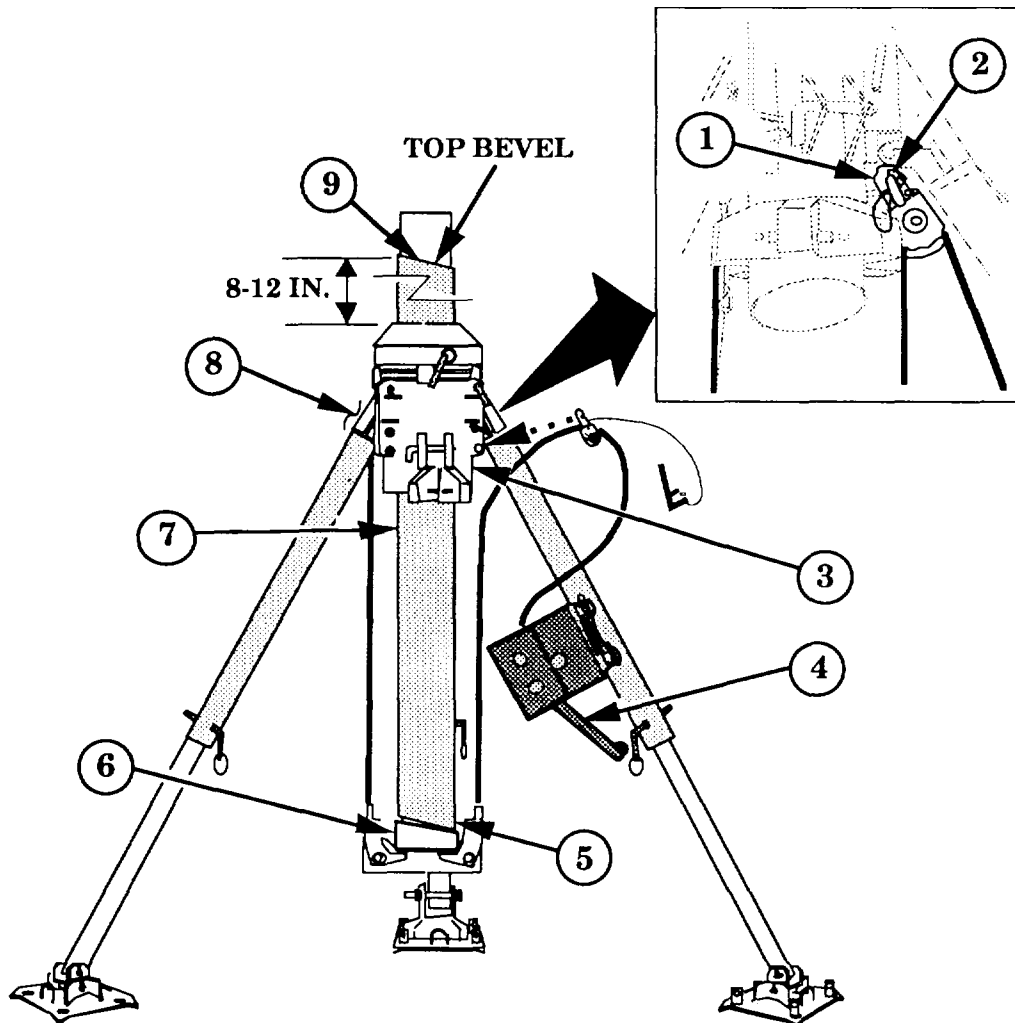
e. Mounting Lifting Winch Assembly - Continued



- (4) Turn crank (2) and pull on lifting winch belt (3) to release about 8 feet of belt.
- (5) Insert belt attachment spool (4) into bracket on barrel assembly (5) opposite lifting winch (1) and secure using locking pin (6).

2-11. DEPLOYING MAST - Continued

e. Mounting Lifting Winch Assembly - Continued



- (6) Use locking pin (2) to attach lifting belt pulley (1) to bracket on barrel assembly (3) opposite belt attachment spool (8).
- (7) Insert one mast section (7) up through barrel assembly (3). Rotate shoe assembly (6) and align mast section (7) so that bottom bevel (5) mates with shoe assembly (6).

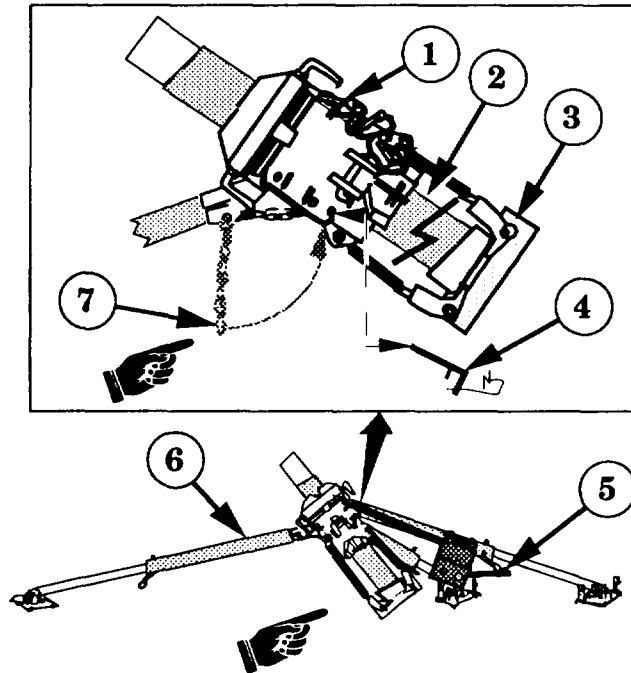
WARNING

Check condition of lifting belt prior to raising or lowering the mast. Keep feet clear of area directly below mast at all times. Failure to do so could result in personal injury.

- (8) Turn hand crank (4) to raise or lower mast section (7) so that top bevel (9) is 8 to 12 inches above top of barrel assembly (3).

2-11. DEPLOYING MAST - Continued

f. Kneeling Tripod



- (1) Clear an area in line with unanchored leg for about four paces outward from center of tripod.

WARNING

Two operators must hold barrel assembly while the third operator lowers leg. Failure to observe this warning may result in personal injury.

- (2) Remove lower locking pin (4) from unanchored leg (6).
 (3) Tilt leg (6) outward enough to clear slot at leg attachment point.
 (4) Insert loop of lanyard (7) into slot at leg attachment point.
 (5) Insert locking pin (4) to secure lanyard (7) in position.

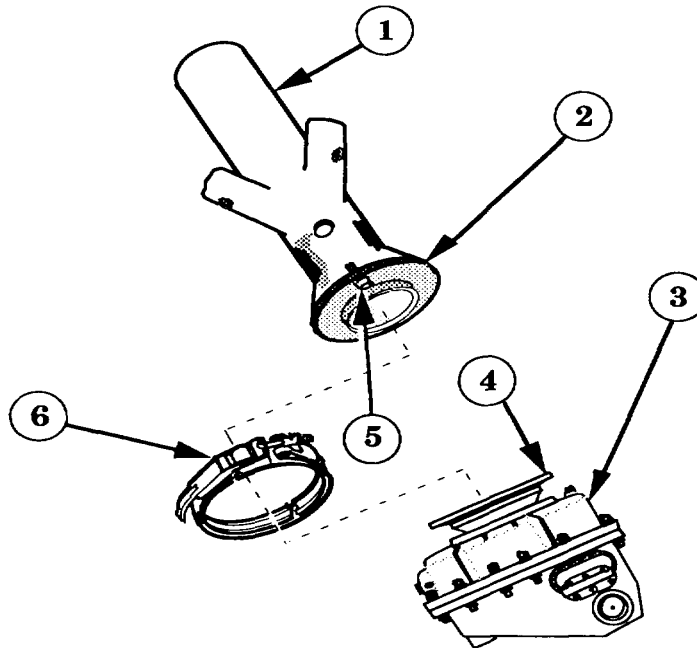
WARNING

Ensure that lanyard is straight and not twisted or kinked. Failure to observe this warning may result in personal injury.

- (6) Lower leg to full extension permitted by lanyard without dislodging shoe assembly (3) from mated mast section (2) in barrel assembly (1).
 (7) Use lifting winch (5) to lower mast section (2) until shoe assembly (3) touches ground.

2-11. DEPLOYING MAST - Continued

g. Assembling Mast Headload

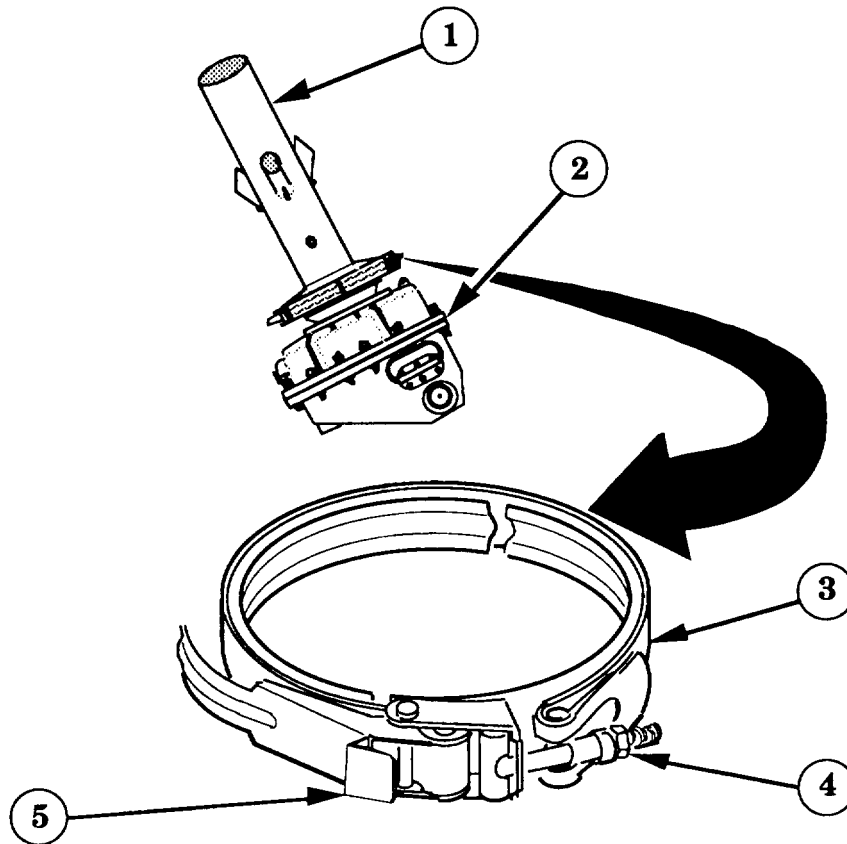
**WARNING**

Two operators are required to lift positioner. Failure to comply may result in personal injury.

- (1) Remove positioner from transit case and place positioner (3) top-side down on ground.
- (2) Unlatch and remove retaining ring (6) from positioner (3).
- (3) Remove top section (1) from top section and antenna mounting bracket bag.
- (4) Ensure area on top section mounting plate (2) is free of grit, dirt, or other foreign material.
- (5) Install top section (1) on positioner mounting plate (4) by inserting guide pin (5) into mating hole in mounting plate (4).

2-11. DEPLOYING MAST - Continued

g. Assembling Mast Headload - Continued

**WARNING**

Care must be taken to avoid pinching fingers between retaining ring and mounting plates during the following steps.

- (6) Use retaining ring (3) to lock top section (1) and positioner (2) together. Grasp retaining ring (3) with both hands and attempt to turn. If retaining ring (3) is loose, use 8-inch adjustable wrench to tighten adjustment nut (4).
- (7) Ensure retaining ring safety latch (5) is locked.

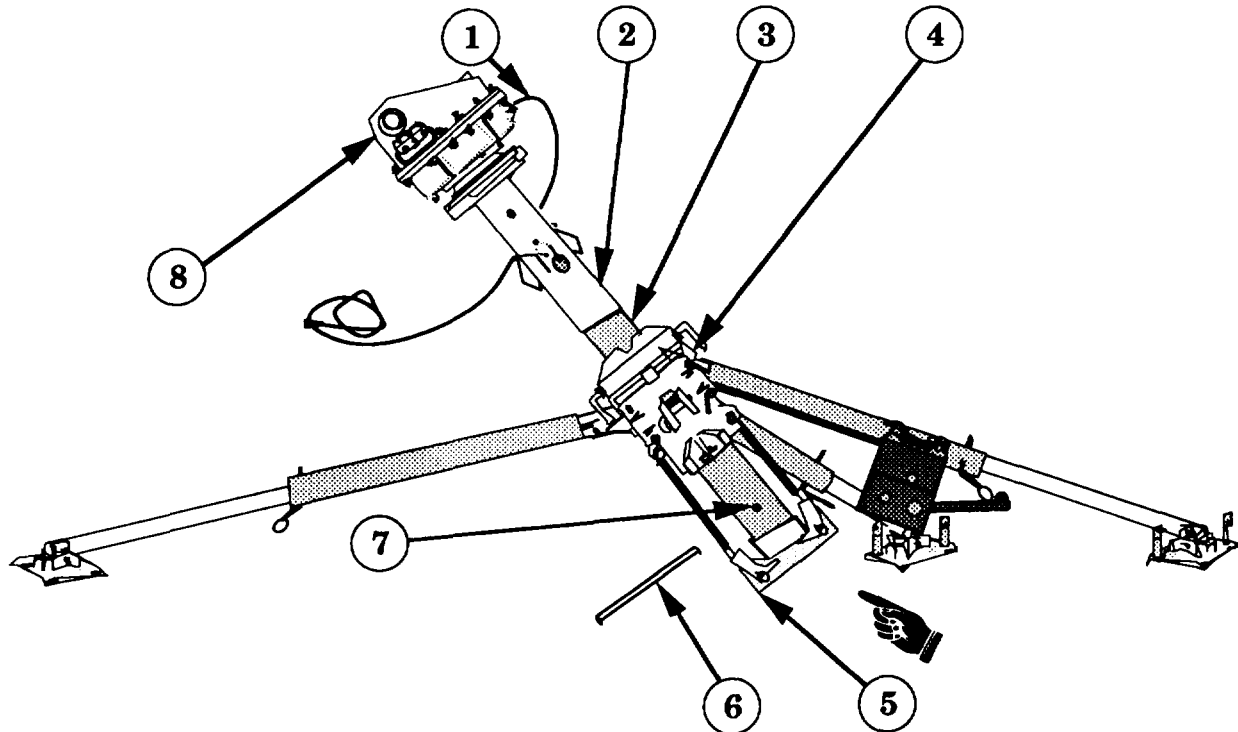
WARNING

A second operator must always check retaining ring before continuing with this task. Failure to do so may result in the positioner and attached equipment toppling from mast causing damage to equipment, personal injury, or death.

- (8) Ensure that second operator checks that positioner (2) and top section (1) are securely joined by retaining ring (3) and that retaining ring safety latch (5) is locked.

2-11. DEPLOYING MAST - Continued

g. Assembling Mast Headload - Continued



WARNING

Care must be taken to avoid pinching fingers when mating top section with mast section.

- (9) Operators 1 and 2: Ensure that bevel of top section (2) and mast section (3) in barrel assembly (4) match. While operator 3 stabilizes tripod, install top section and positioner (2 and 8) on mast section (3) in barrel assembly (4) without dislodging mated shoe assembly (5).
- (10) If required, insert crosspin (6) in crosspin hole (7). Use crosspin (6) as a lever to aid in aligning top section (2) with mast section (3).
- (11) Rotate top section and positioner so that cable connector faces upward.

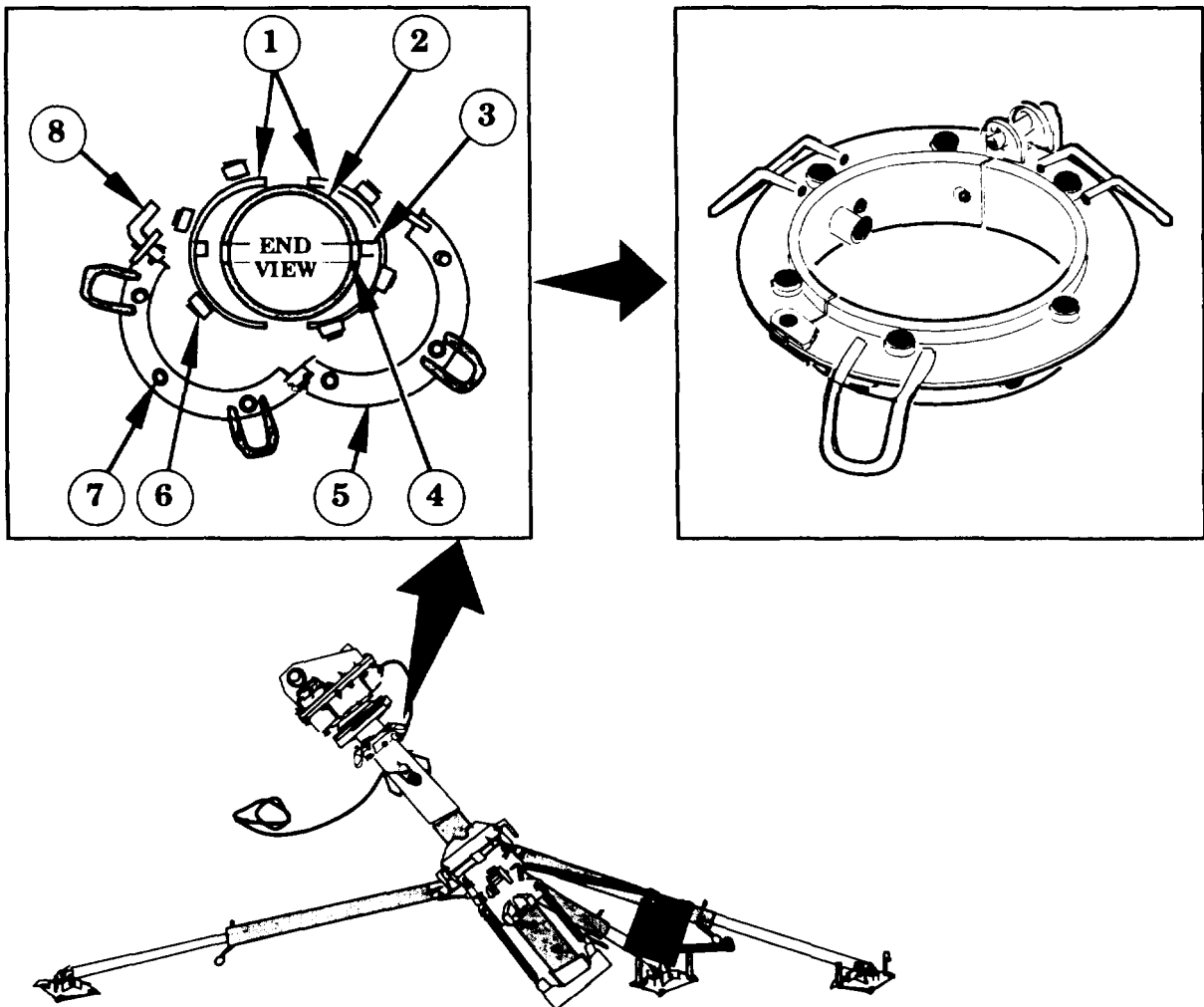
NOTE

Cable assembly W1 is labeled TO POSITIONER and TO CONTROLLER at respective ends.

- (12) Connect end of cable assembly W1 (1) labeled TO POSITIONER to positioner (8).
- (13) Connect W1 cable connector cover to J1 connector cover.

2-11. DEPLOYING MAST - Continued

h. Mounting Guy Ring Assembly On Top Section

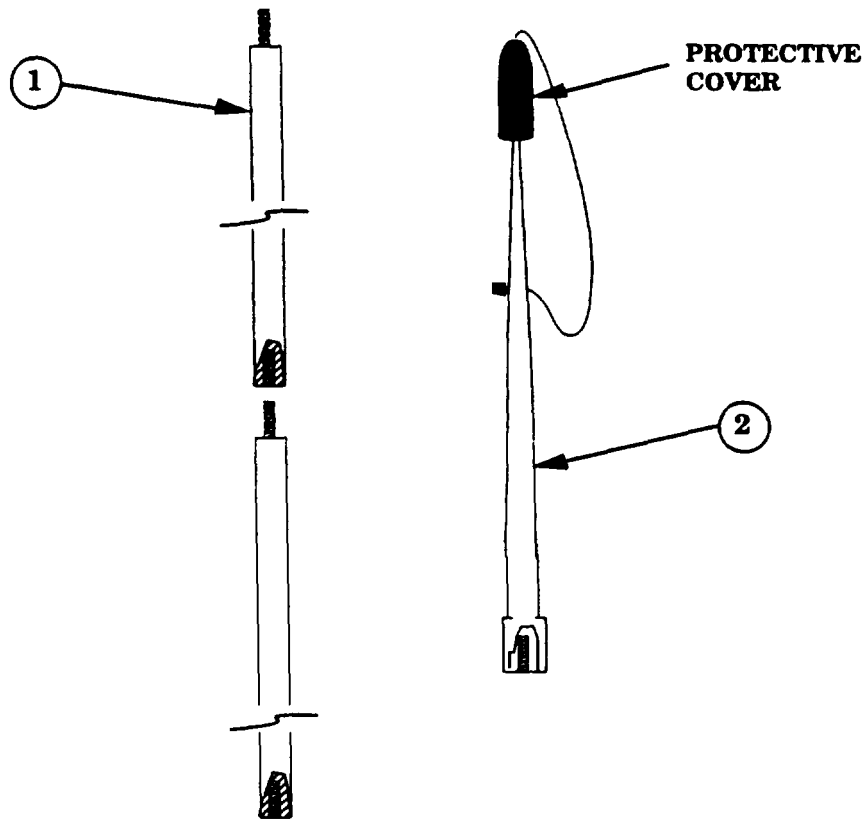


- (1) Remove guy ring assembly from mast accessories bag.
- (2) Open hinged collar (5) by turning and pulling guy ring lock (8). Remove semicircular rings (1) from guy ring assembly.
- (3) Place two semicircular rings (1) around mast top section (2) so that plastic bearings (6) face downward. Insert internal bosses (3) into crosspin hole (4) on mast top section (2).
- (4) Place hinged collar (5) around groove in semicircular rings (1) with plastic bearings (7) facing upward.
- (5) Close hinged collar (5) and secure by inserting and turning guy ring lock (8).

Change 1 2-39

2-11. DEPLOYING MAST - Continued

i. Installing Lightning Protection Equipment

**WARNING**

When mating or threading the lightning rod and supports together, make sure that they are level and aligned. If slight bending is detected, carefully inspect the assembly for damage.

Do not tighten any portion of the lightning rod assembly with tools. Hand tighten only. Excessive force in tightening the rod tubes will cause the metal inserts to loosen, possibly causing the lightning rod assembly to fall during deployment or use.

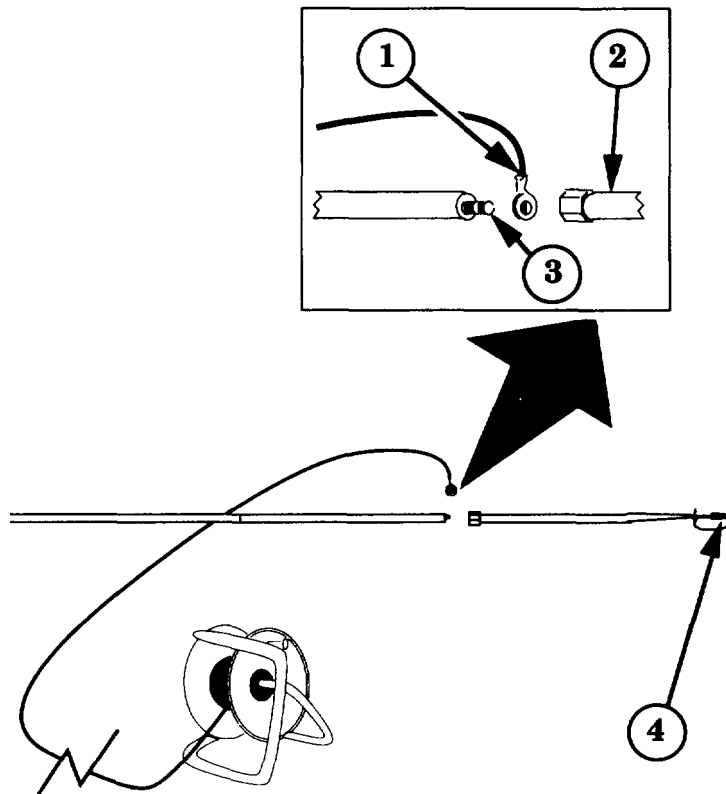
NOTE

Keep protective cover on lightning rod until ready to mount lightning rod on positioner.

- (1) Remove lightning rod (2) and two lightning rod supports (1) from mast accessories bag.
- (2) Screw two lightning rod supports (1) together.

2-11. DEPLOYING MAST - Continued

i. Installing Lightning Protection Equipment - Continued



- (3) Obtain ground cable (lightning) and release ground rod strap by twisting cable reel handle.
- (4) Place ground cable lug (1) between lightning rod (2) and support stud (3). Thread lightning rod onto support stud.

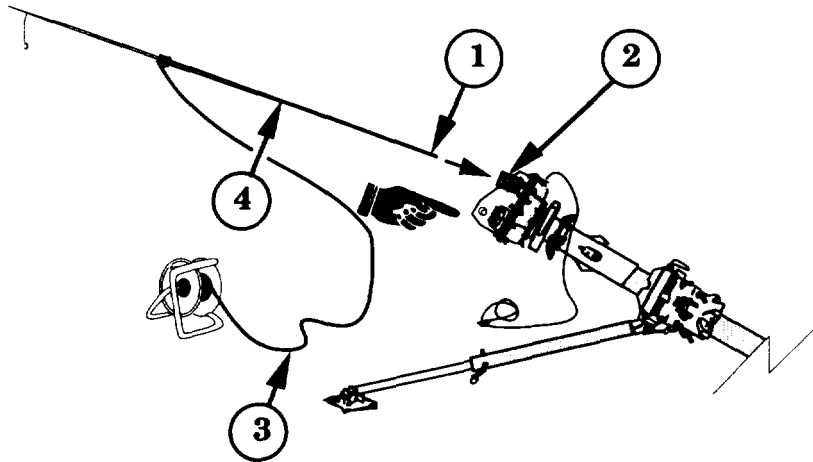
WARNING

Beware of the lightning rod point. Wear protective goggles while lightning rod protective cover is removed and tripod assembly is raised to vertical position. Failure to comply with warning may result in personal injury.

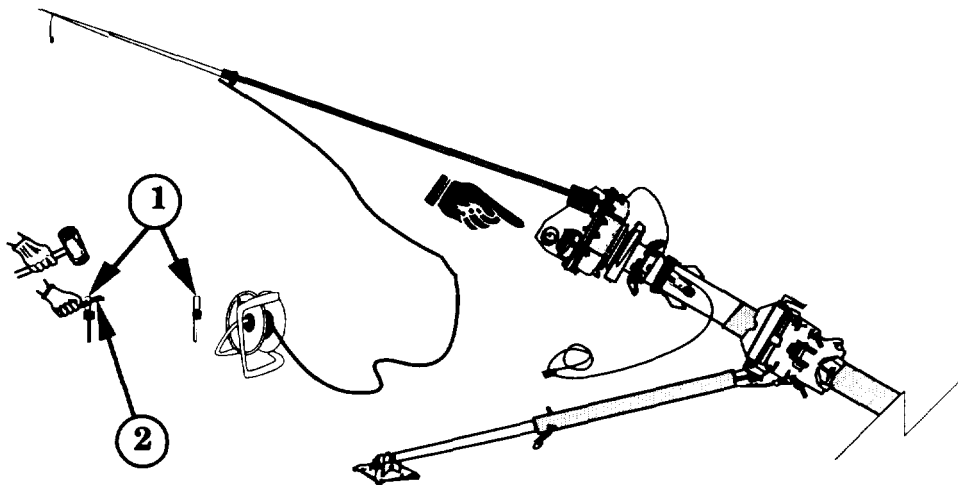
- (5) Remove protective cover (4) from lightning rod (2).

2-11. DEPLOYING MAST - Continued

i. Installing Lightning Protection Equipment - Continued



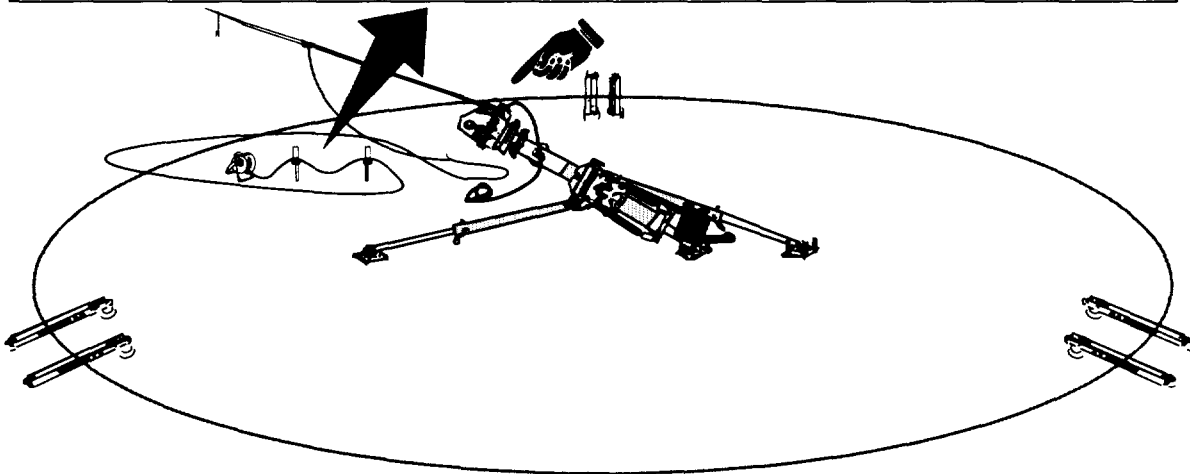
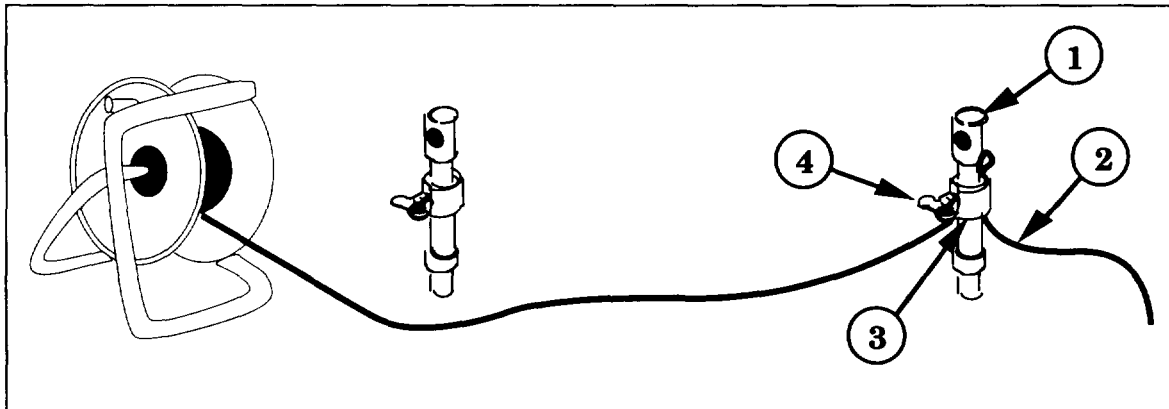
- (6) Thread lightning rod assembly (1) into lightning rod mounting bracket (2), while keeping ground cable (lightning) (3) from wrapping around lightning rod supports (4).



- (7) Remove two ground rods (1) from mast accessories bag.
- (8) Position ground rods (1) five paces from tripod approximately 5 feet apart.
- (9) Insert crosspin (2) into hole in one ground rod (1).
- (10) Use sledge hammer to drive ground rod (1) into ground until 8 inches remains exposed.
- (11) Repeat steps 9 and 10 for second ground rod.

2-11. DEPLOYING MAST - Continued

i. Installing Lightning Protection Equipment - Continued

**CAUTION**

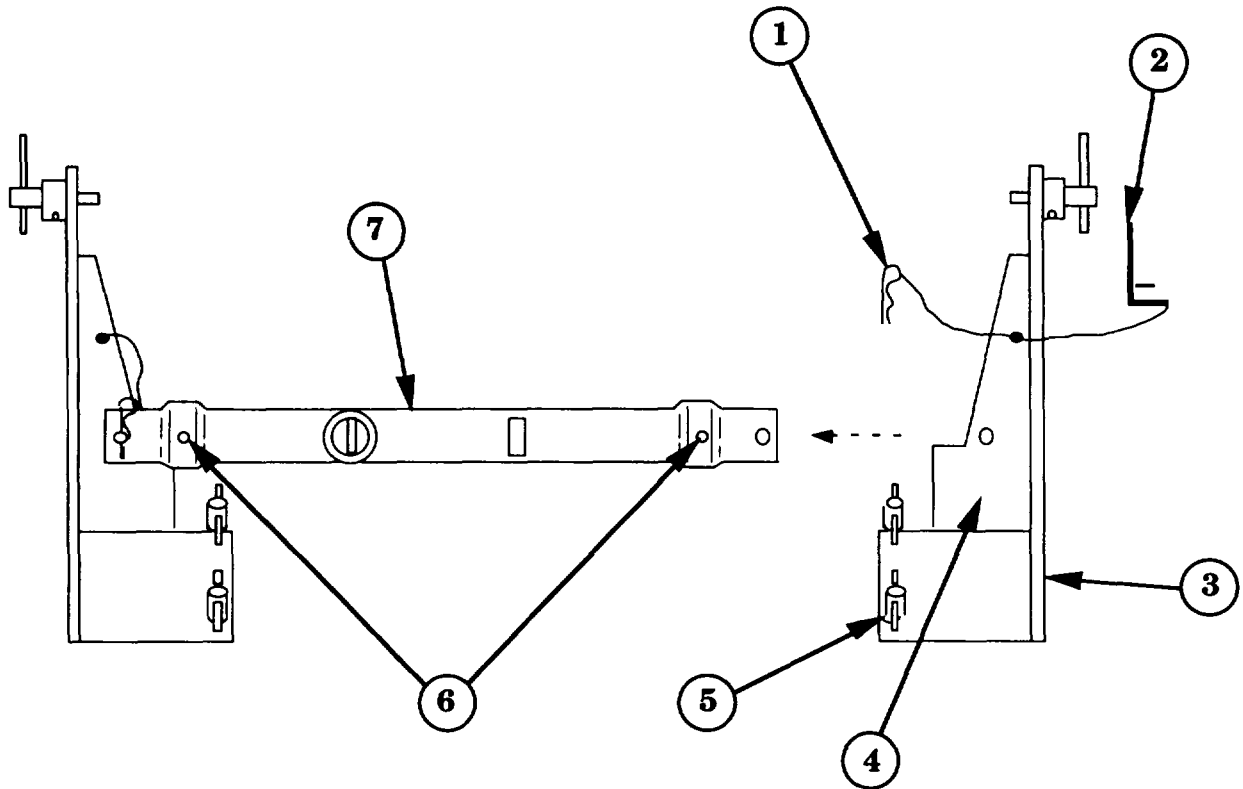
Keep ground cable and ground rods clear of guy assembly paths. Failure to comply may result in equipment damage.

- (12) Walk away from mast, unreeling ground cable (lightning) (2) until ground cable is completely unrolled from reel. Return with reel to ground rod (1).
- (13) Attach ground cable (lightning) (2) to ground rod (1) by folding and inserting into clamp (3).
- (14) Tighten clamp thumbscrew (4) securing cable to ground rod (1).
- (15) Repeat steps 13 and 14 for second ground rod.

Change 2 2-43

2-11. DEPLOYING MAST - Continued

j. Assembling Antenna Mounting Bracket

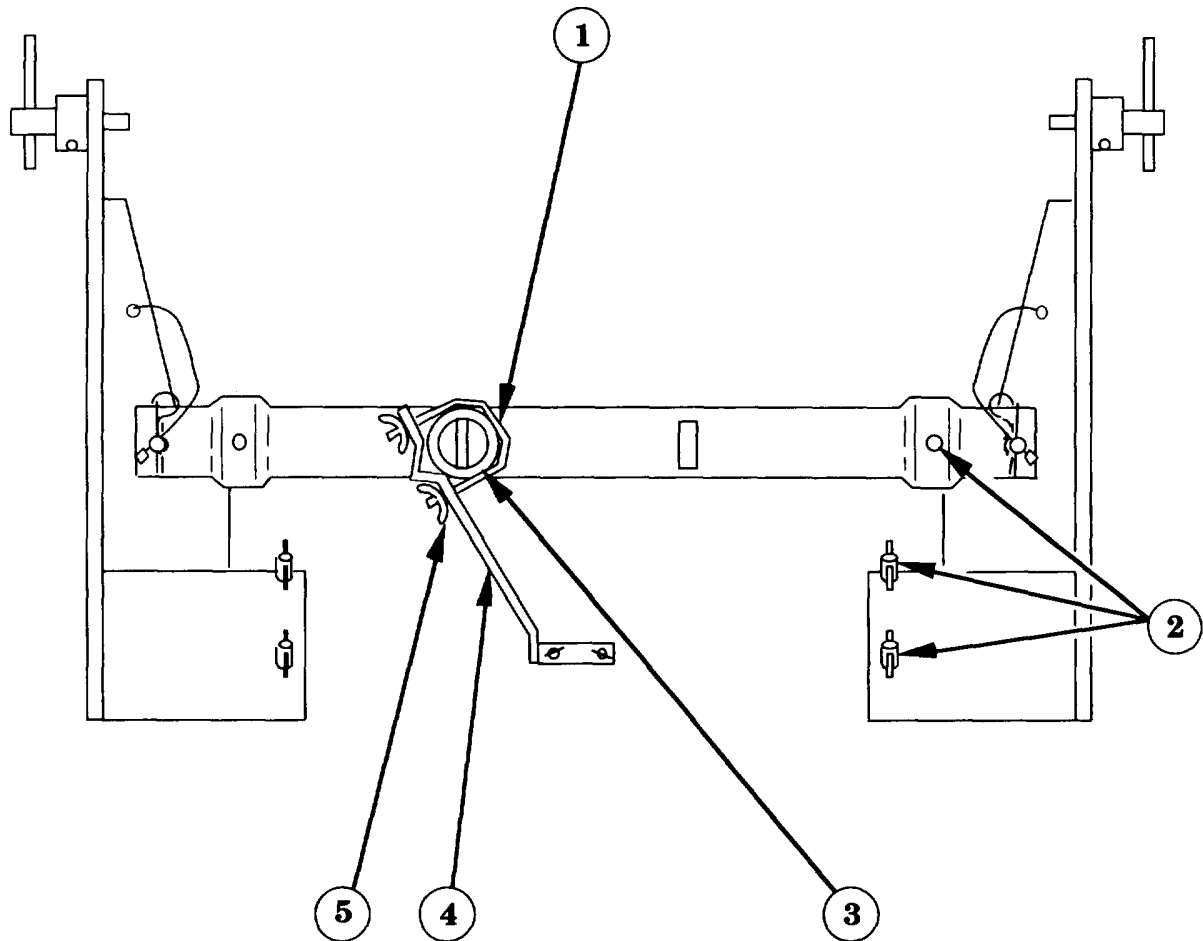


- (1) Remove five antenna mounting bracket pieces from top section and antenna mounting bracket bag.
- (2) Place two end bracket assemblies (3) on ground approximately 2 feet apart facing each other with thumbscrews (5) on top. Place middle bracket assembly (7) between two end bracket assemblies (3) so that thumbscrews (6) are on bottom.
- (3) Insert flat plate (4) of one end bracket assembly (3) into slot in end of middle bracket assembly (7).
- (4) Secure end bracket assembly (3) to middle bracket assembly (7), using locking pin (2) inserted through bottom of middle bracket assembly (7).
- (5) Secure locking pin with double spring cotter pin (1).
- (6) Repeat steps 3 thru 5 for other end of middle bracket assembly.

Change 2 2-44

2-11. DEPLOYING MAST - Continued

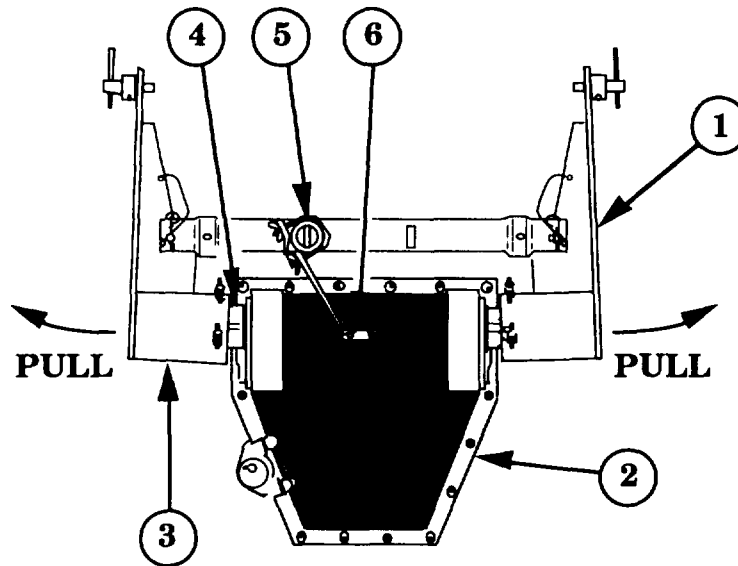
j. Assembling Antenna Mounting Bracket - Continued



- (7) Loosen six thumbscrews (2) but do not remove.
- (8) Slip U-bolt (1) of cable relief bracket (4) on upright post (3).
- (9) If using AS-3047/GRC-103(V) antenna, orient cable relief bracket (4) to one side.
- (10) Fasten cable relief bracket (4) loosely with two wing nuts (5).

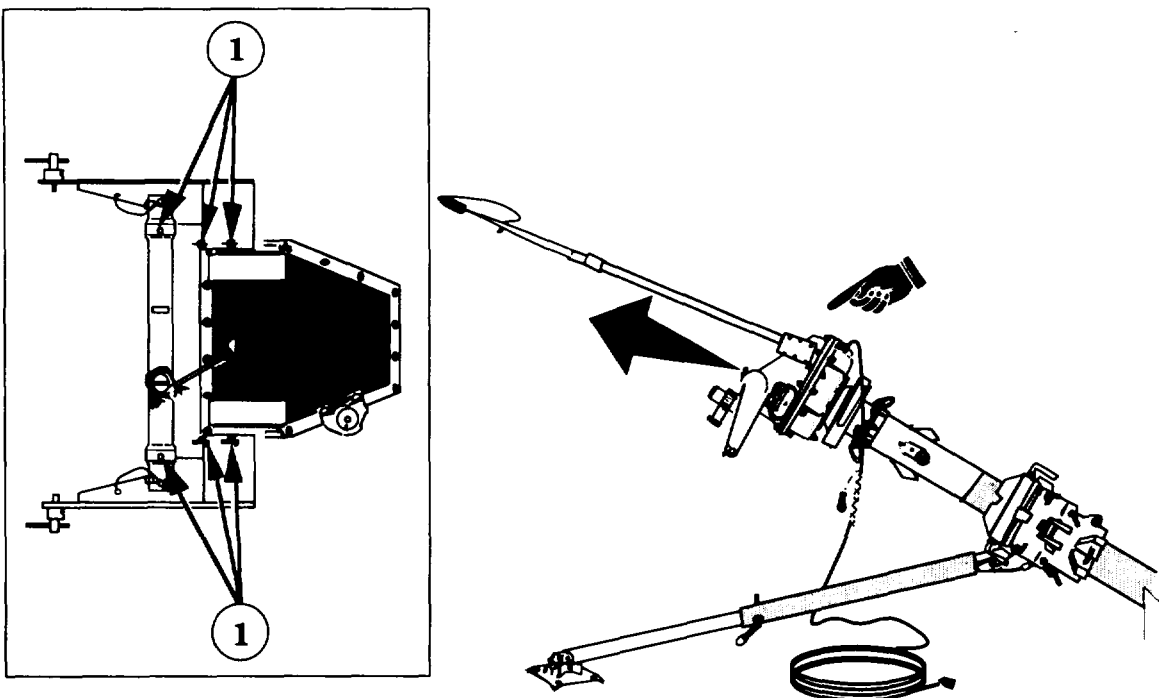
2-11. DEPLOYING MAST - Continued

j. Assembling Antenna Mounting Bracket - Continued



(11) Using both hands, pull loosely assembled antenna mounting bracket (1) apart and slip over positioner (2) so positioner elevation shaft (4) enters mating bracket hubs (3), first one side then the other. Move cable relief bracket (6) as required.

(12) Ensure that upright post (5) is parallel to mast section.



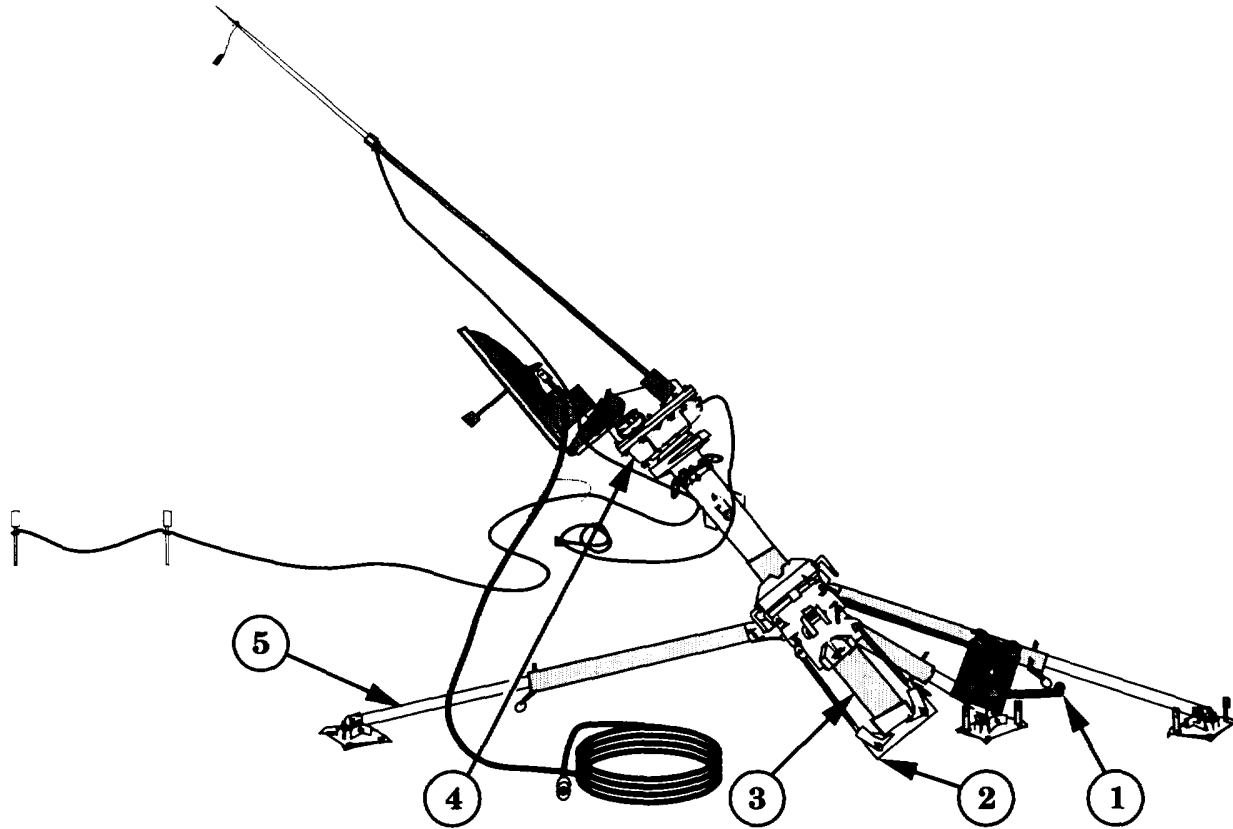
(13) Tighten six thumbscrews (1) and ensure all locking pins are in place.

2-11. DEPLOYING MAST - Continued

k. Installing Antenna

See Appendix F of this manual for antenna mounting instructions.

l. Returning Tripod to Vertical Position



- (1) Verify that hardware is secured and connectors are tight.

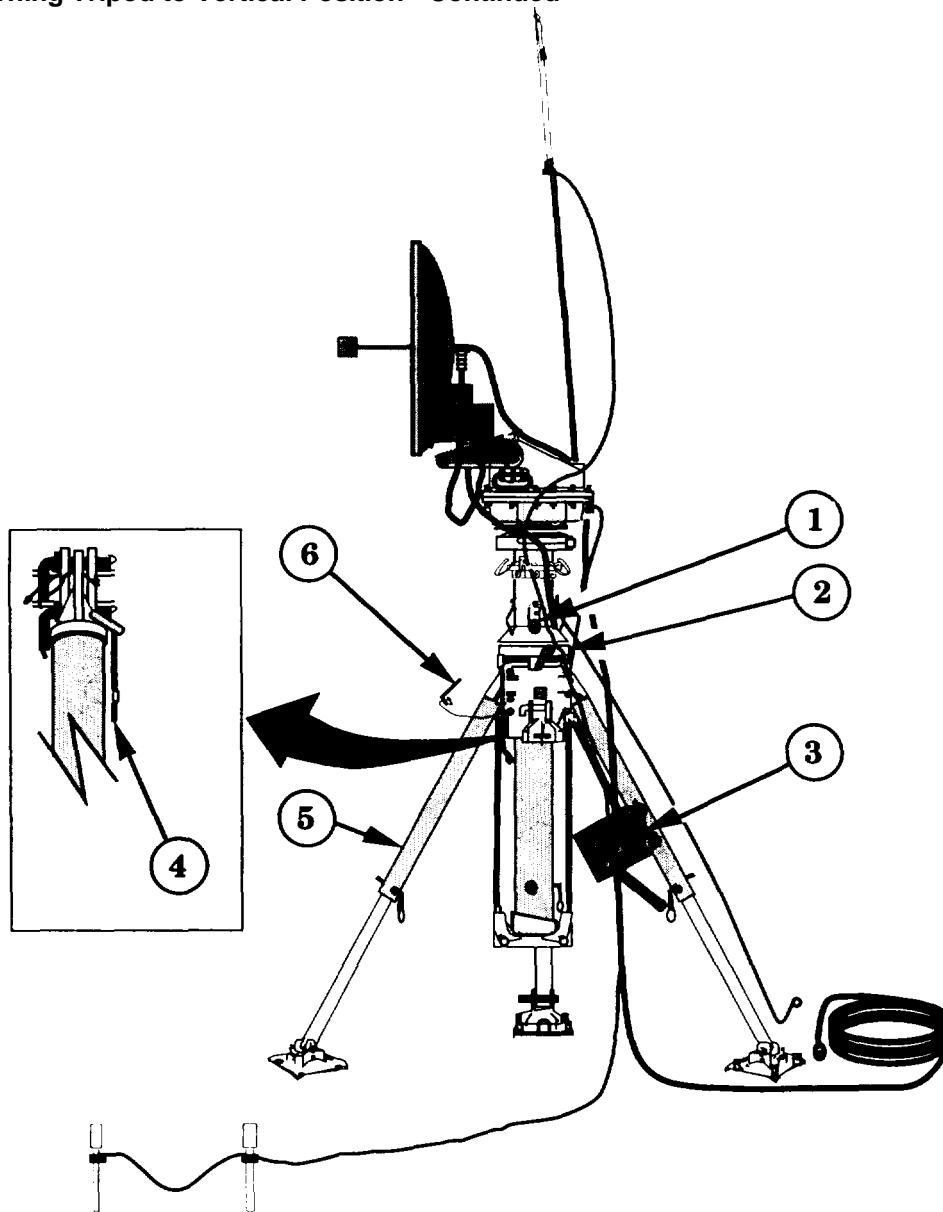
WARNING

Lifting hazard. Three operators are required to perform the following step. Failure to comply may result in equipment damage and personal injury.

- (2) Use lifting winch (1) to raise mast (3) until shoe assembly (2) is 8 to 12 inches from ground.
- (3) Operators 1 and 2: Lift positioner (4).
Operator 3: Push unanchored leg (5) inward to place tripod in upright position.

2-11. DEPLOYING MAST - Continued

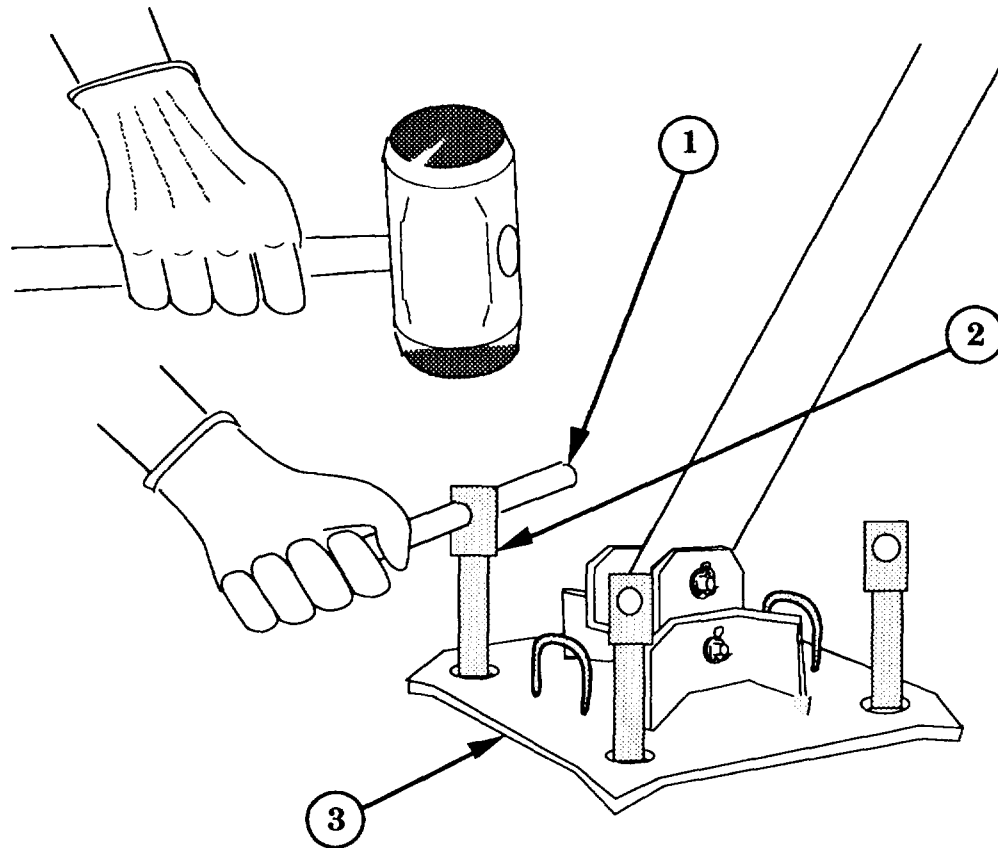
I. Returning Tripod to Vertical Position - Continued



- (4) When tripod approaches vertical and baseplate is resting securely on ground, release lanyard (4) by removing locking pin (6). Continue raising tripod to upright position.
- (5) Secure tripod leg (5) by inserting locking pin (6).
- (6) Use lifting winch (3) to lower mast until top section mounting tubes (1) rest on barrel assembly (2).

2-11. DEPLOYING MAST - Continued

m. Securing Third Tripod Leg



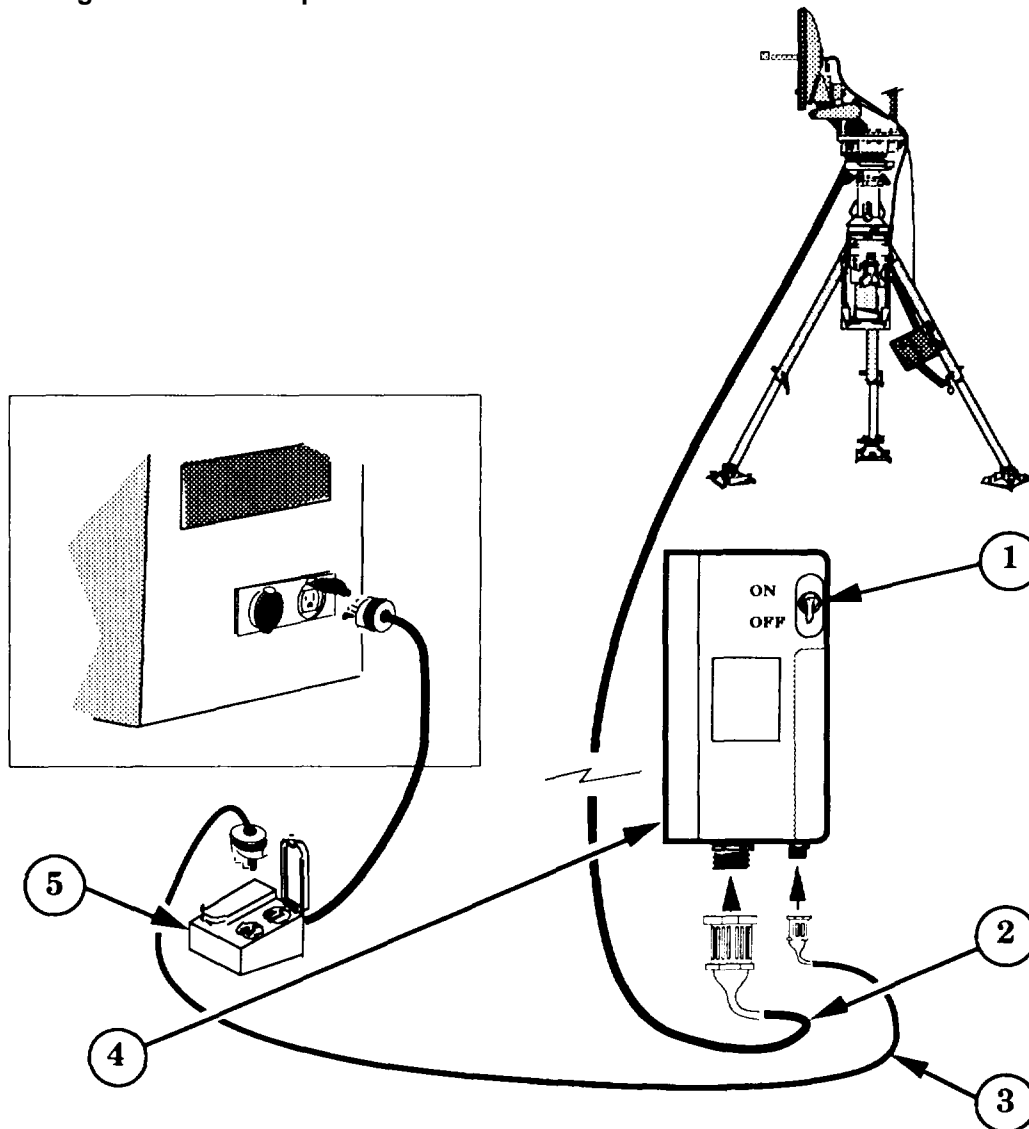
WARNING

Wear gloves and safety glasses while driving anchor stakes. Failure to do so may result in personal injury. Failure to properly anchor the baseplate may result in damage to the equipment and possible personal injury.

- (1) Insert crosspin (1) through hole in anchor stake (2).
- (2) Use hammer to drive four anchor stakes (2) to secure baseplate (3) to ground.

2-11. DEPLOYING MAST - Continued

n. Performing Positioner Preoperational Check

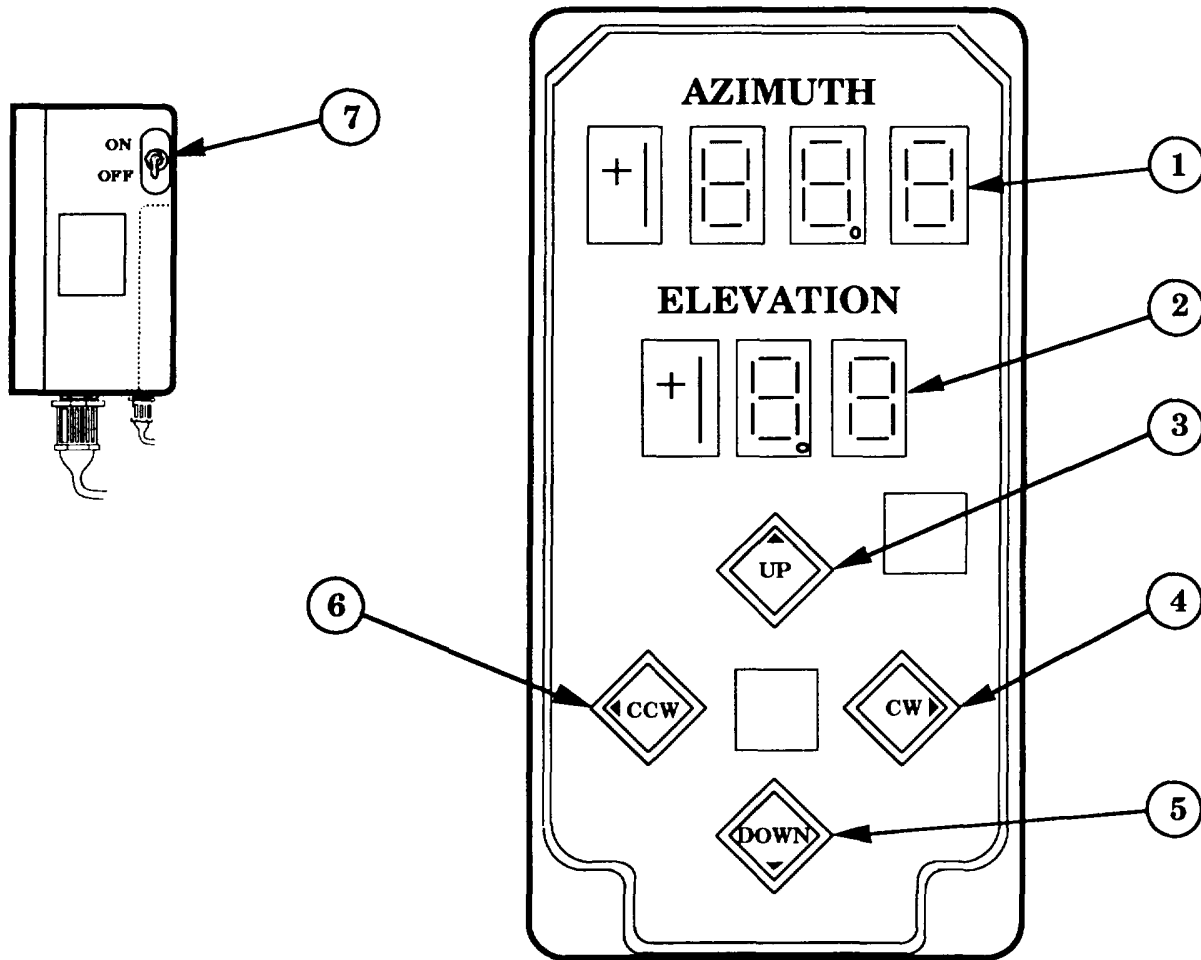
**NOTE**

If positioner or controller fails, refer to higher level maintenance.

- (1) Ensure controller ON/OFF switch (1) is set to OFF position.
- (2) Connect cable assemblies W1 (2) and W2 (3) to controller (4).
- (3) Connect W2 (3) to 115 V ac, 60 Hz source (5).
- (4) Set controller ON/OFF switch (1) to ON position. This initiates a self test of the controller displays.

2-11. DEPLOYING MAST - Continued

n. Performing Positioner Preoperational Check - Continued



NOTE

Controller self test lasts for approximately 5 seconds. Controller will then display current antenna position.

- (5) During controller self test, verify azimuth display (1) reads +188.8 and elevation display (2) reads +18.8.
- (6) Press and hold UP pushbutton (3) until antenna reaches maximum upward position. Elevation display (2) should read at least +18.0.
- (7) Press and hold DOWN pushbutton (5) until antenna reaches maximum downward position. Elevation display (2) should read at least -18.0. Press and hold UP pushbutton (3) until elevation display (2) reads 0.0.
- (8) Press and hold CW pushbutton (4) until antenna reaches maximum clockwise position (as viewed from the top). Azimuth display (1) should read at least +180.0.
- (9) Press and hold CCW pushbutton (6) until antenna reaches maximum counter-clockwise position (as viewed from the top). Azimuth display (1) should read at least -180.0. Press and hold CW pushbutton (4) until azimuth display (1) reads 0.0.
- (10) Set controller ON/OFF switch (7) to OFF position.

2-11. DEPLOYING MAST - Continued

o. Laying Out Mast Sections and Guy Ring Assemblies

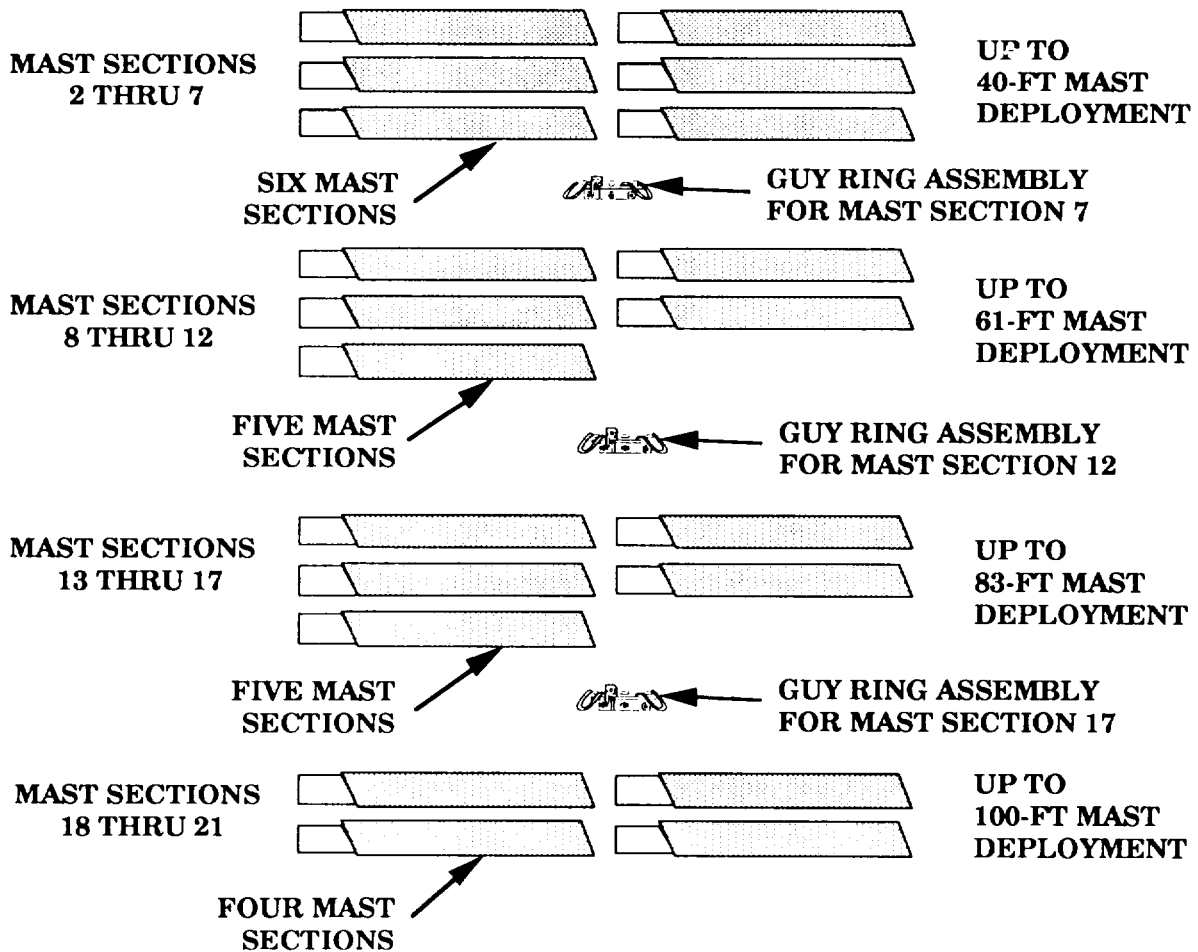
CAUTION

Do not drop or throw mast sections. Failure to comply will result in equipment damage.

NOTE

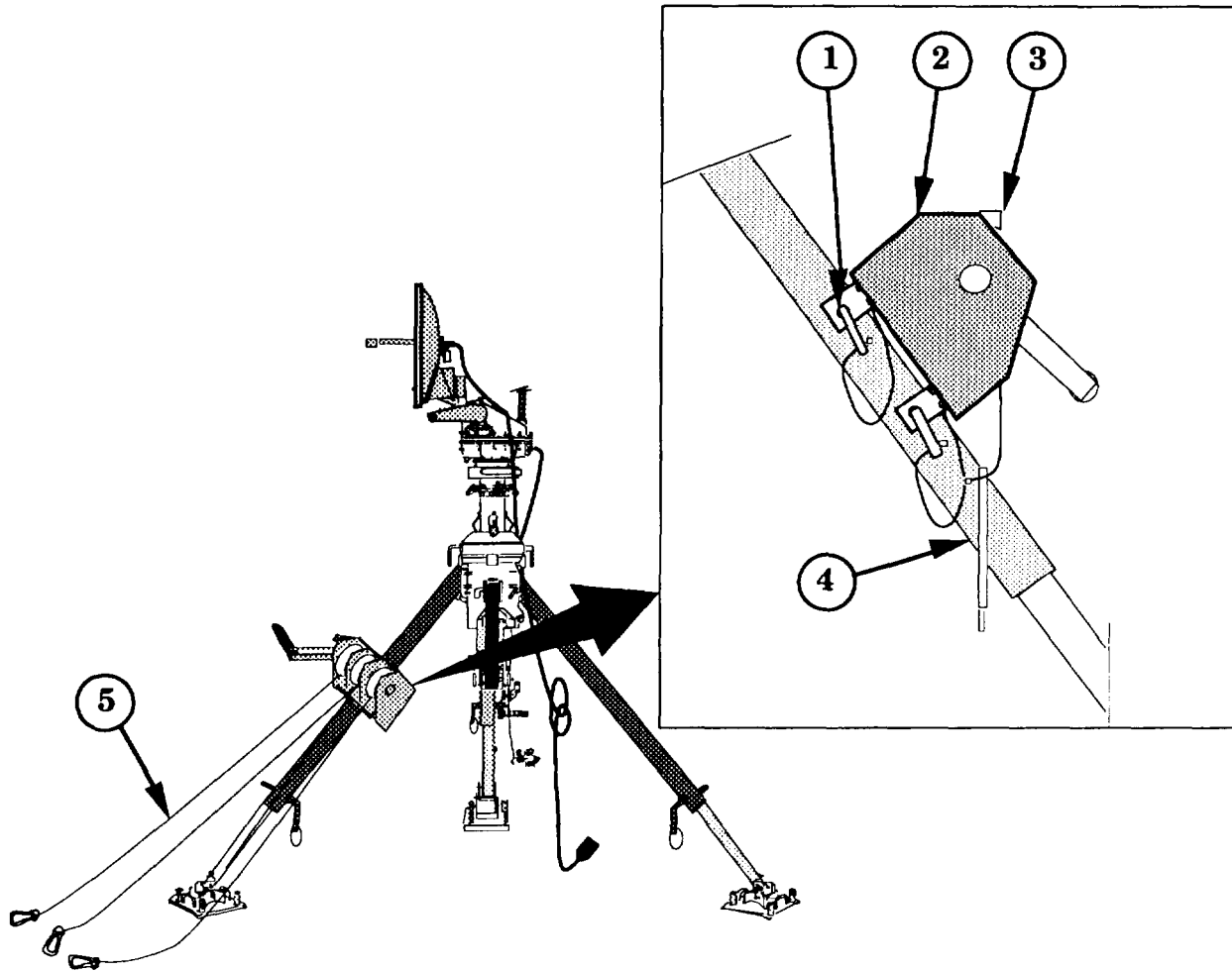
The following grouping allows easy recognition of which mast sections require guy ring assembly installation.

- (1) Determine required mast height. (Each mast section adds 4.3 feet to antenna height.)
- (2) Lay out mast sections as shown below using only those mast sections required. Ensure that mast sections are not in path of guy assemblies.
- (3) Place guy ring assemblies between groups of mast sections as illustrated.



2-11. DEPLOYING MAST - Continued

p. Mounting Top Guy Winch and Top Guy Assembly



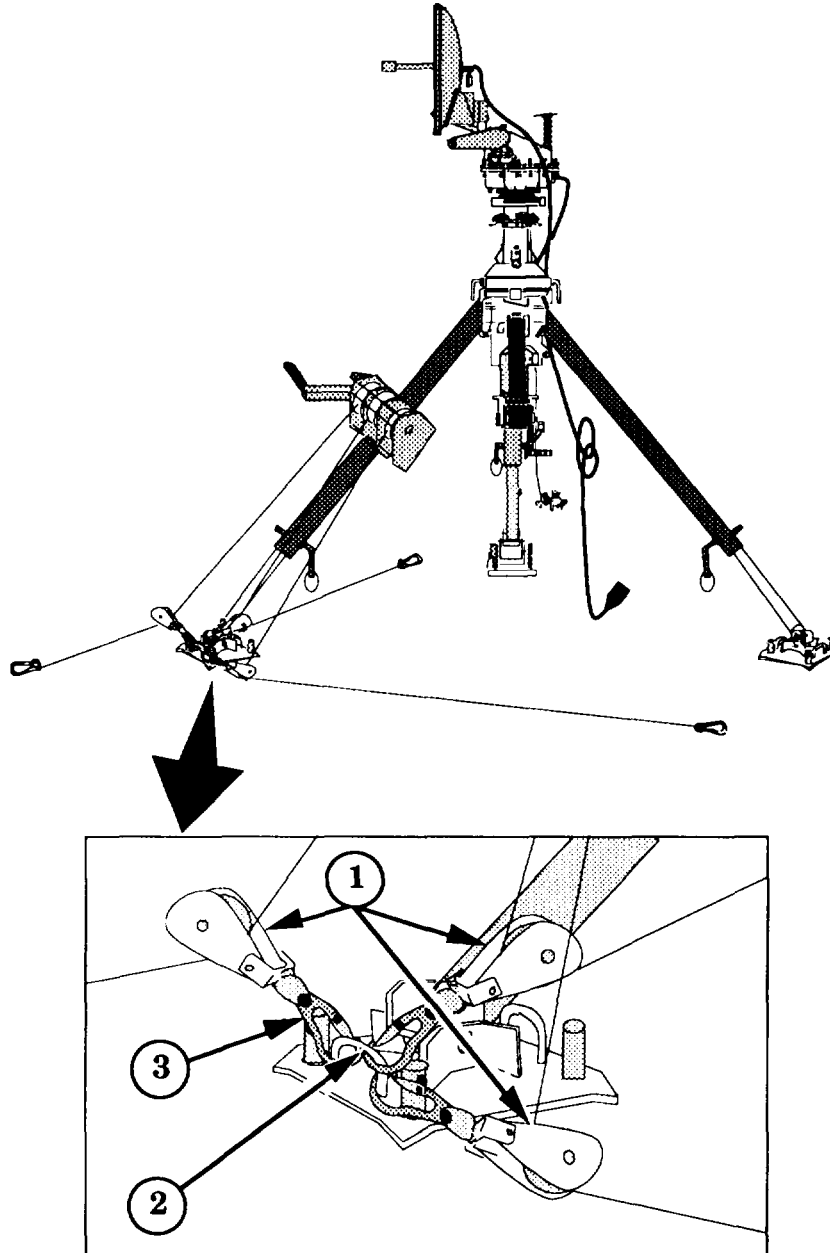
WARNING

Wear gloves while handling cables. Failure to do so may result in personal injury.

- (1) Remove guy winch from guy winch bag.
- (2) Use two locking pins (1) to attach guy winch (2) to upper leg (4).
- (3) Operator 1: Push and hold safety release (3).
Operator 2: Pull out about 6 feet of extension cables (5) from guy winch (2).

2-11. DEPLOYING MAST - Continued

p. Mounting Top Guy Winch and Top Guy Assembly - Continued



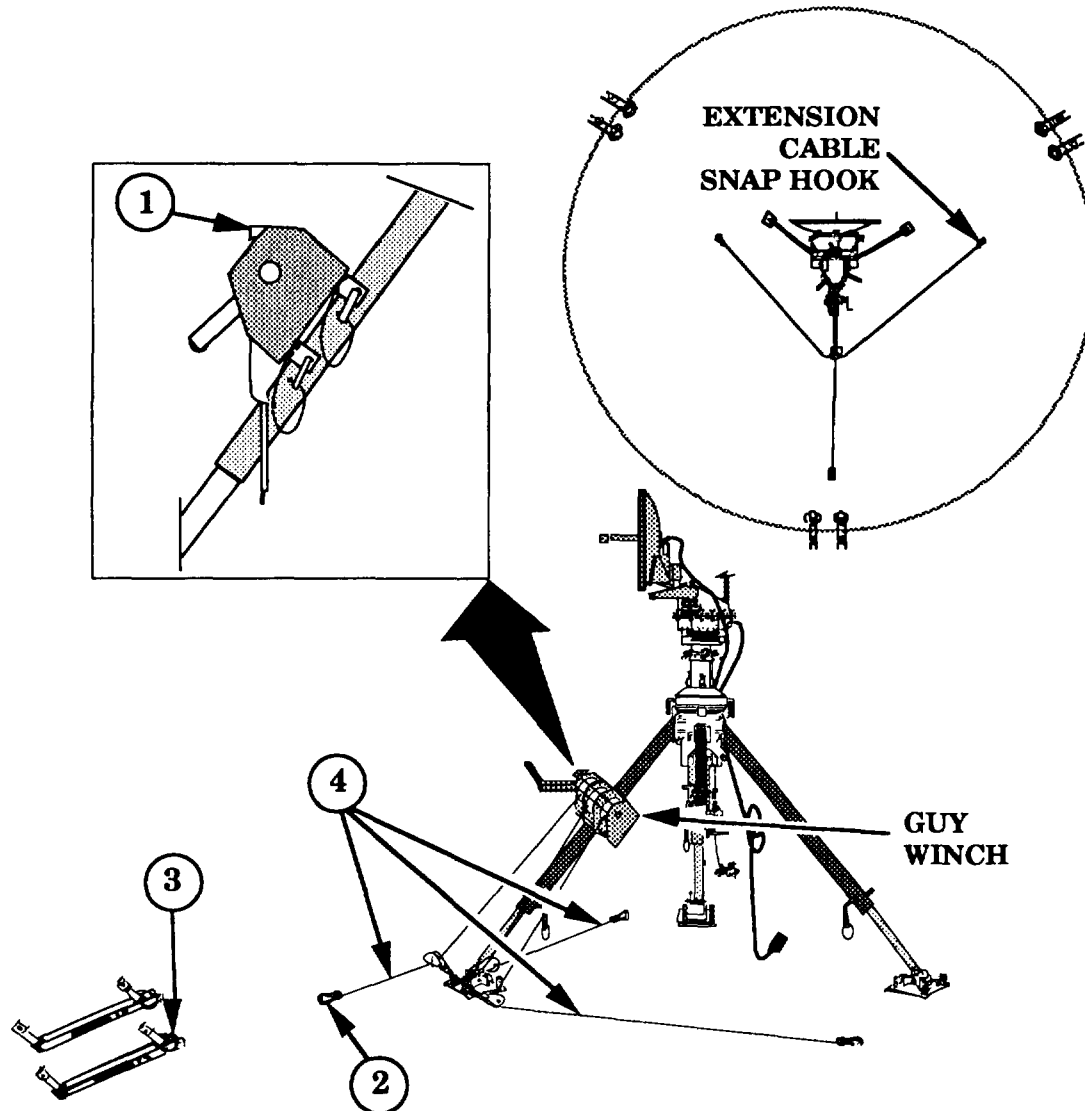
NOTE

Do not cross extension cables when attaching deflection pulleys.

- (4) Attach deflection pulleys (1) to baseplate attachment loop (2) using pulley snap hooks (3).

2-11. DEPLOYING MAST - Continued

p. Mounting Top Guy Winch and Top Guy Assembly - Continued



CAUTION

To prevent backlash, use gloved hand as brake while pulling cables from guy winch.

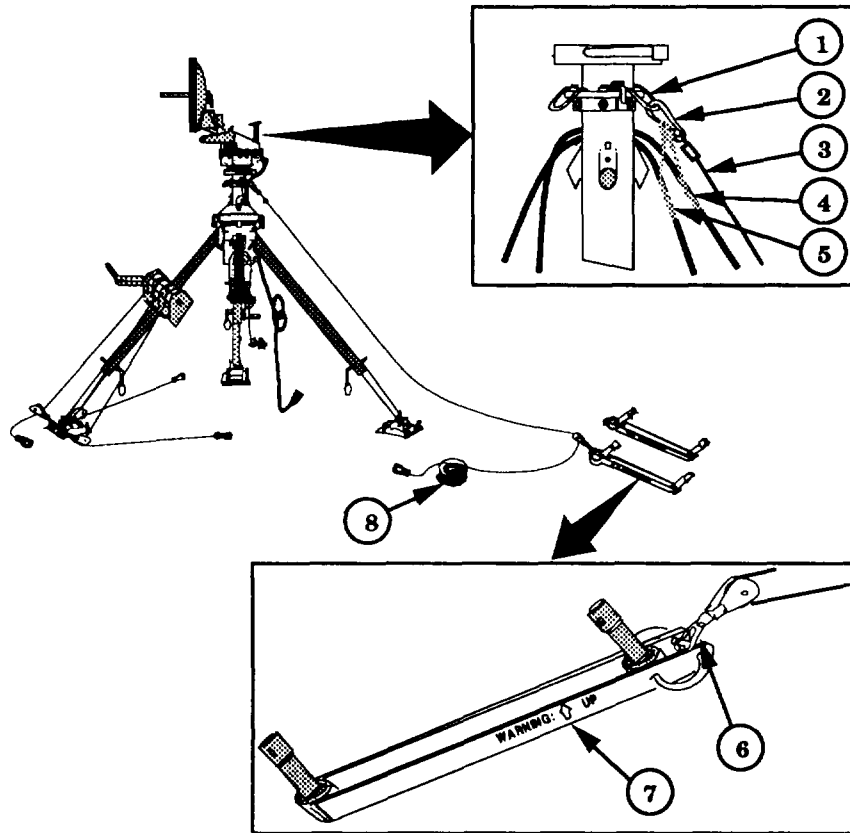
NOTE

If kink in cable causes pulley to bind, the cable must be replaced.

- (5) Operator 1: Press and hold guy winch safety release (1).
Operator 2: Pull extension cables (4) from guy winch for about six paces.
- (6) Lay extension cable snap hooks (2) on ground between tripod and each guy anchor position (3).

2-11. DEPLOYING MAST - Continued

p. Mounting Top Guy Winch and Top Guy Assembly - Continued



NOTE

Top guy assemblies are identified by one ferrule.

- (7) Attach RF cable strain relief (4) and cable assembly W1 strain relief (5) to one top guy assembly snap hook (2).
- (8) Attach one top guy assembly (3) to guy ring assembly (1) using snap hook (2).
- (9) Insert crosspin through center of guy assembly spool (8).
- (10) Carry guy assembly spool (8), unreeling top guy assembly, to guy stake coupler (7).

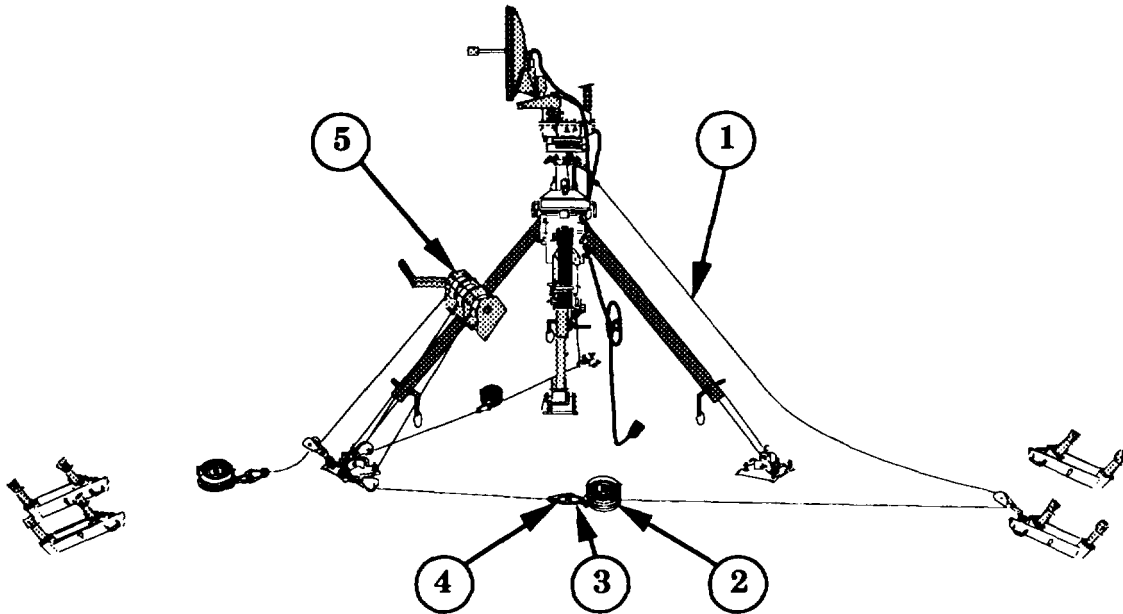
WARNING

Ensure that snap hooks are free of dirt and are fully closed. Failure to comply could cause the mast to topple, resulting in equipment damage and persona injury.

- (11) Attach return pulley snap hook (6) to guy stake coupler (7), so that snap hook faces up.

2-11. DEPLOYING MAST - Continued

p. Mounting Top Guy Winch and Top Guy Assembly - Continued

**CAUTION**

Do not kink cables. Do not pull on cables if kinked. Failure to comply may result in damage to cable.

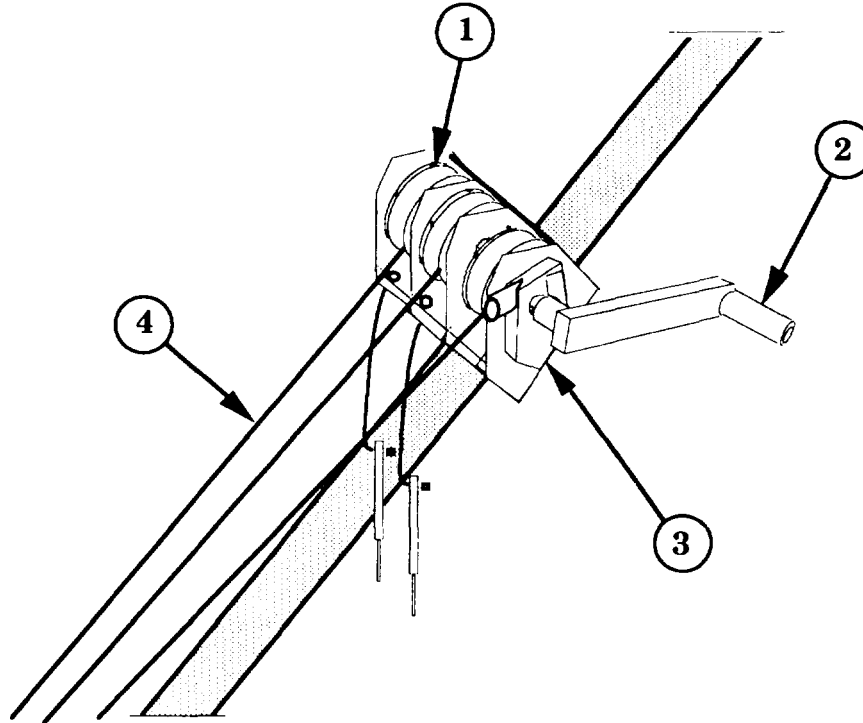
NOTE

Spool remains attached to guy assembly.

- (12) Carry attached guy assembly spool (2) back toward guy winch (5). Continue unreeling top guy assembly (1) until guy assembly is fully unreeled.
- (13) Connect guy assembly snap hook (3) to extension cable snap hook (4), then lay guy assembly spool on ground.
- (14) Repeat steps 8 thru 13 to mount two remaining top guy assemblies.

2-11. DEPLOYING MAST - Continued

p. Mounting Top Guy Winch and Top Guy Assembly - Continued

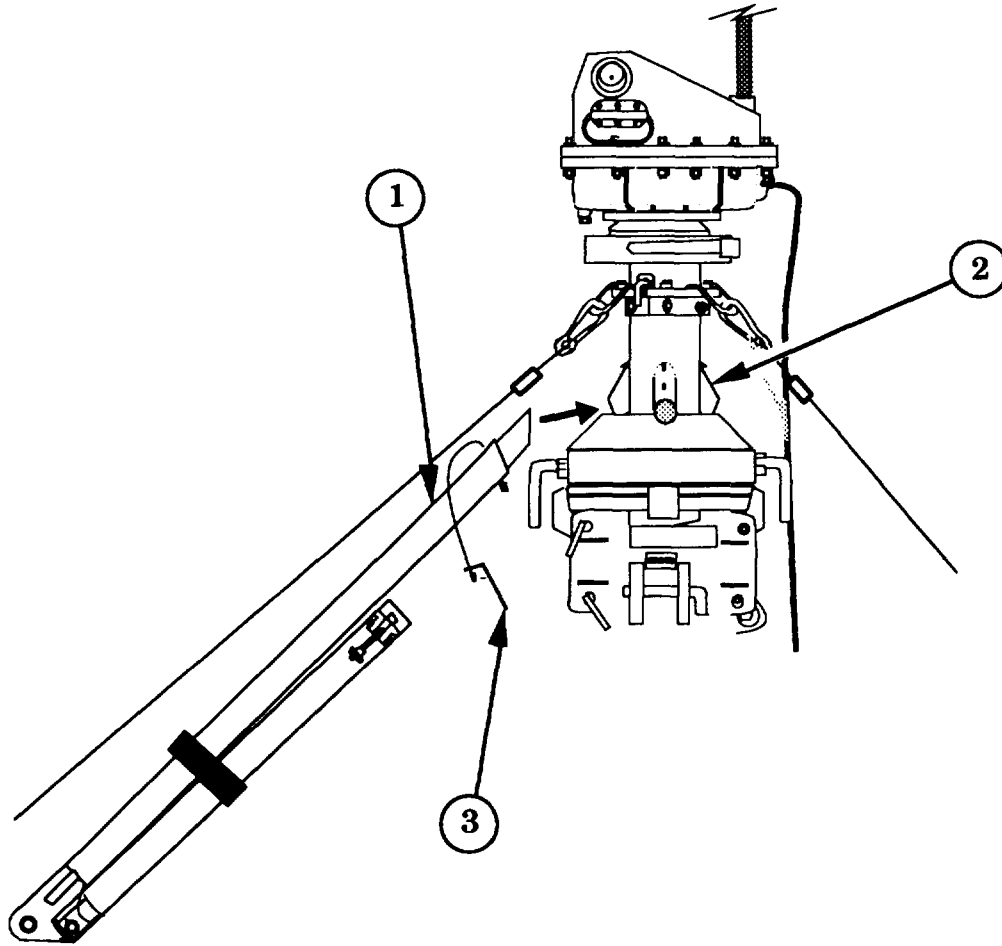


(15) Attach crank (2) to guy winch (3).

(16) Turn each guy winch reel (1) by hand to take up loose slack in extension cables (4), then turn crank (2) counterclockwise to tighten all three extension cables (4) and attached top guy assemblies.

2-11. DEPLOYING MAST - Continued

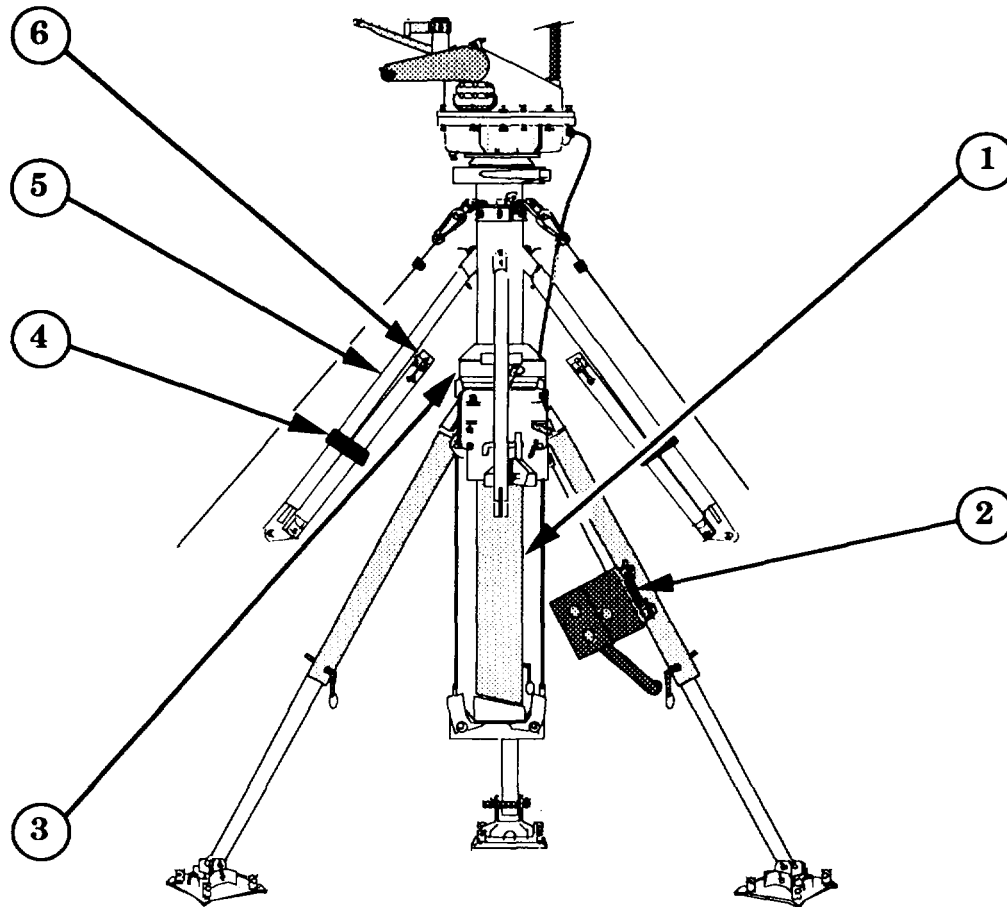
q. Mounting Starbar Assembly and Starbar Guy Assembly



- (1) Insert three starbar assemblies (1) into top section mounting tubes (2).
- (2) Secure three starbar assemblies (1) by first inserting locking pins (3) then rotating pins to locked position.

2-11. DEPLOYING MAST - Continued

q. Mounting Starbar Assembly and Starbar Guy Assembly - Continued

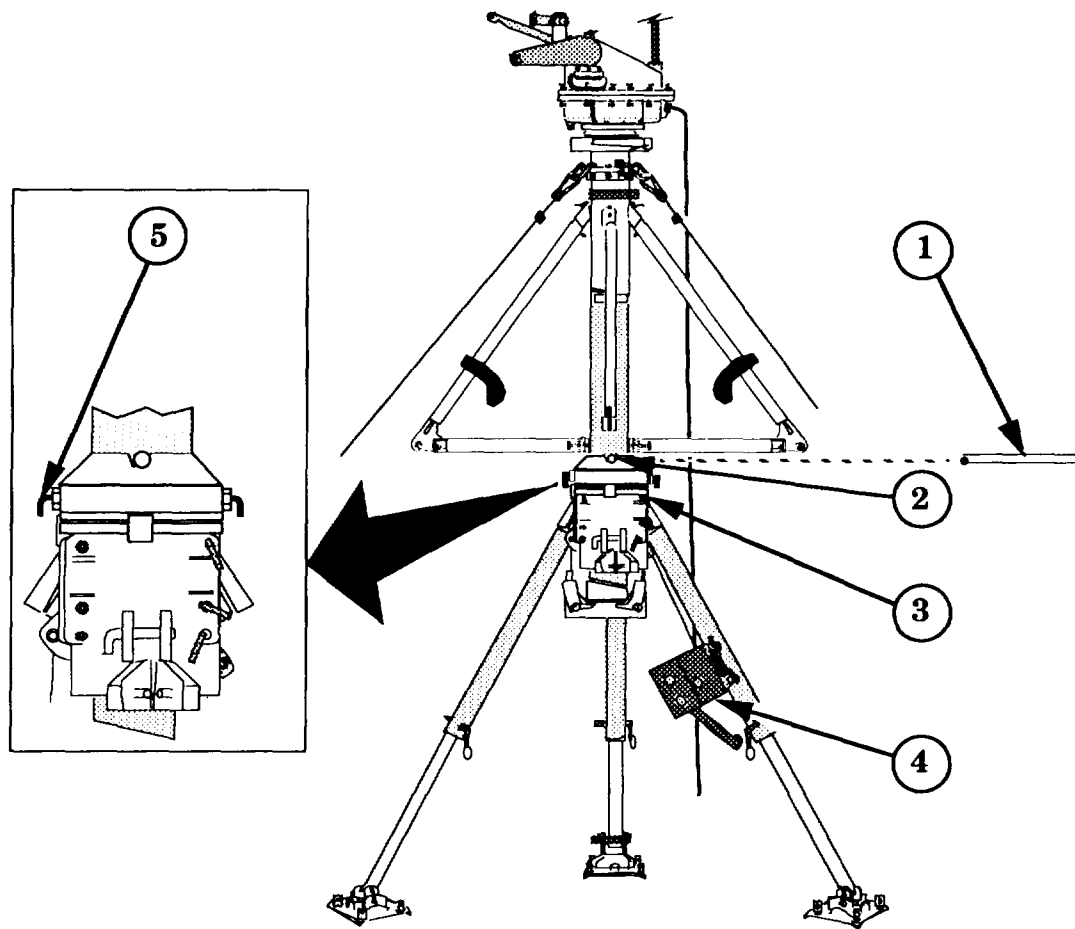
**WARNING**

Check condition of lifting winch belt prior to raising or lowering the mast. Keep feet clear of area directly below mast at all times. Failure to do so could result in personal injury.

- (3) Use lifting winch (2) to raise mast (1) until starbar assembly straps (4) are as high as can be comfortably reached.
- (4) Release three straps (4) from starbar assemblies (5). Allow starbar clamps (6) to rest on top of barrel assembly (3).

2-11. DEPLOYING MAST - Continued

q. Mounting Starbar Assembly and Starbar Guy Assembly - Continued

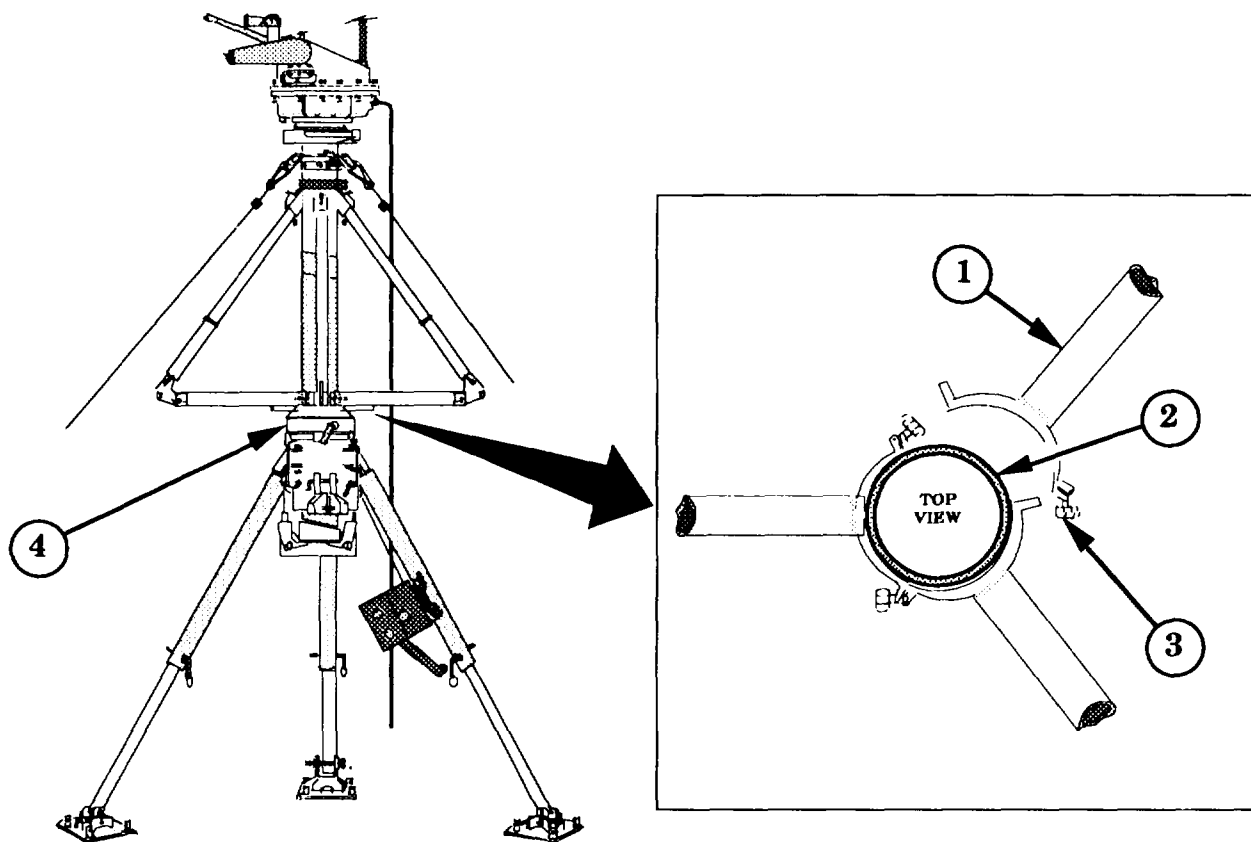
**NOTE**

Lifting winch has two gear speeds. Low gear requires less effort but is slow. High gear provides faster lift, but requires more effort from the operator. Winch crank should be inserted into gear most comfortable for operator. Winch crank handle can be extended for more leverage.

- (5) Use lifting winch (4) to raise crosspin hole (2) to just above barrel assembly (3) and insert crosspin (1).
- (6) Loosen two L-handle lock screws (5) on barrel assembly, and turn top of barrel assembly until crosspin notch is under crosspin. Tighten L-handle lock screws.
- (7) Lower mast until crosspin rests in crosspin notch.

2-11. DEPLOYING MAST - Continued

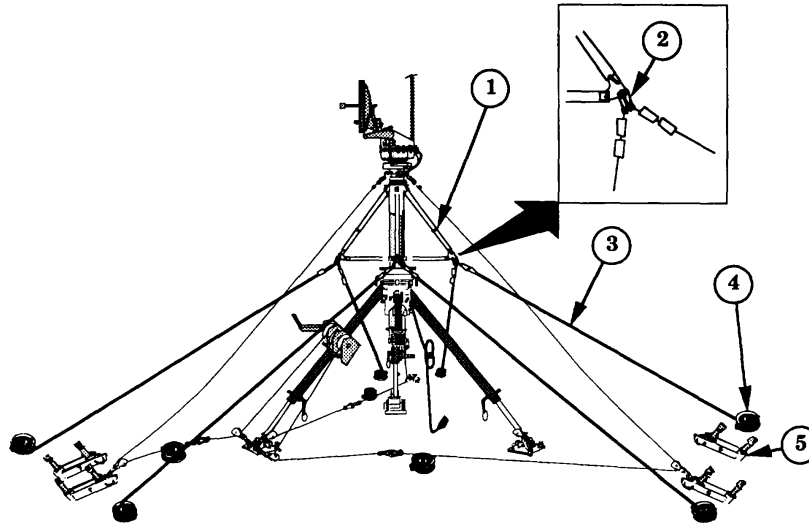
q. Mounting Starbar Assembly and Starbar Guy Assembly - Continued



- (8) Pull three starbar assemblies (1) down to rest on barrel assembly (4). Clamp three starbar assemblies (1) together around mast section (2) using knob nuts (3).

2-11. DEPLOYING MAST - Continued

q. Mounting Starbar Assembly and Starbar. Guy Assembly - Continued



NOTE

Starbar guy assemblies are identified with two ferrules.

- (9) Attach one starbar guy assembly (3) to starbar (1) with snap hook (2).

NOTE

Ensure guy assemblies do not cross.

- (10) Unwind guy assembly (3) beyond guy anchor position (5). Lay cable spool (4) on ground.

CAUTION

Ensure that no two starbar guy assemblies are attached to the same guy stake coupler. Failure to comply may result in damage to the starbar assembly.

NOTE

Two starbar guy assemblies attach to each starbar.

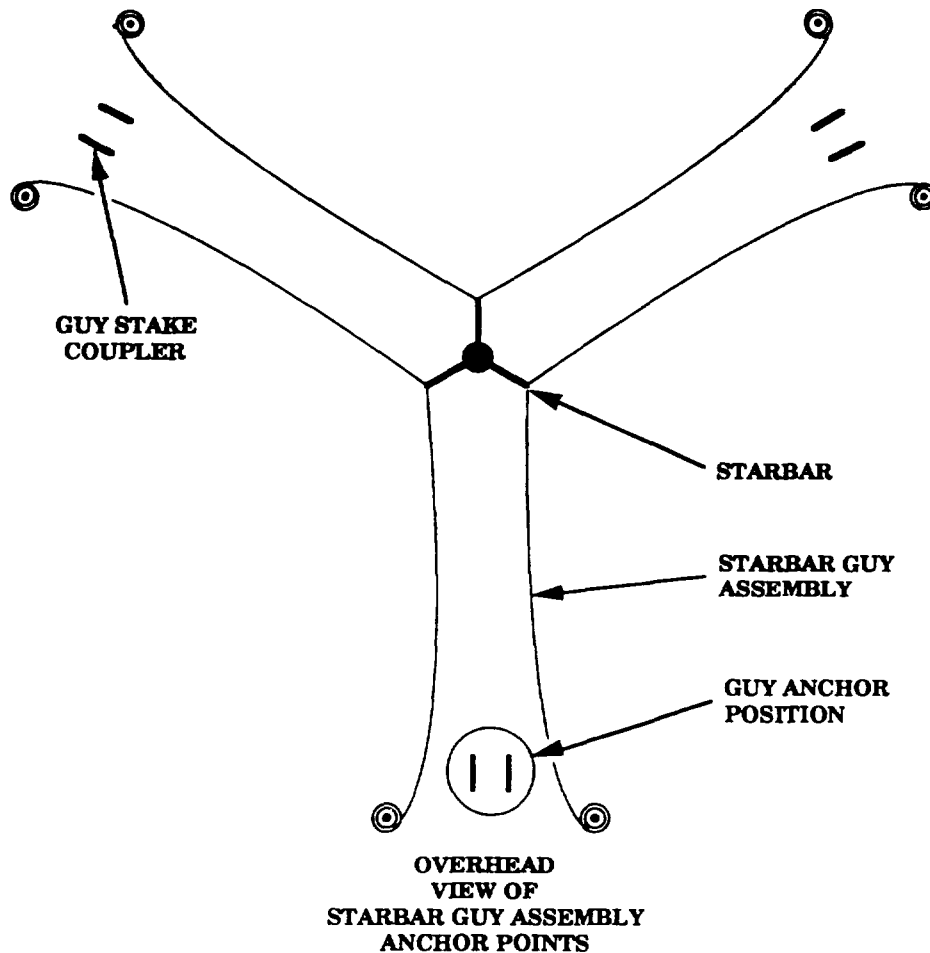
- (11) Repeat steps 9 and 10 for five remaining starbar guy assemblies (3).

2-11. DEPLOYING MAST - Continued

q. Mounting Starbar Assembly and Starbar Guy Assembly - Continued

NOTE

When step 11 has been completed, starbar guy assemblies should be laid out as shown below

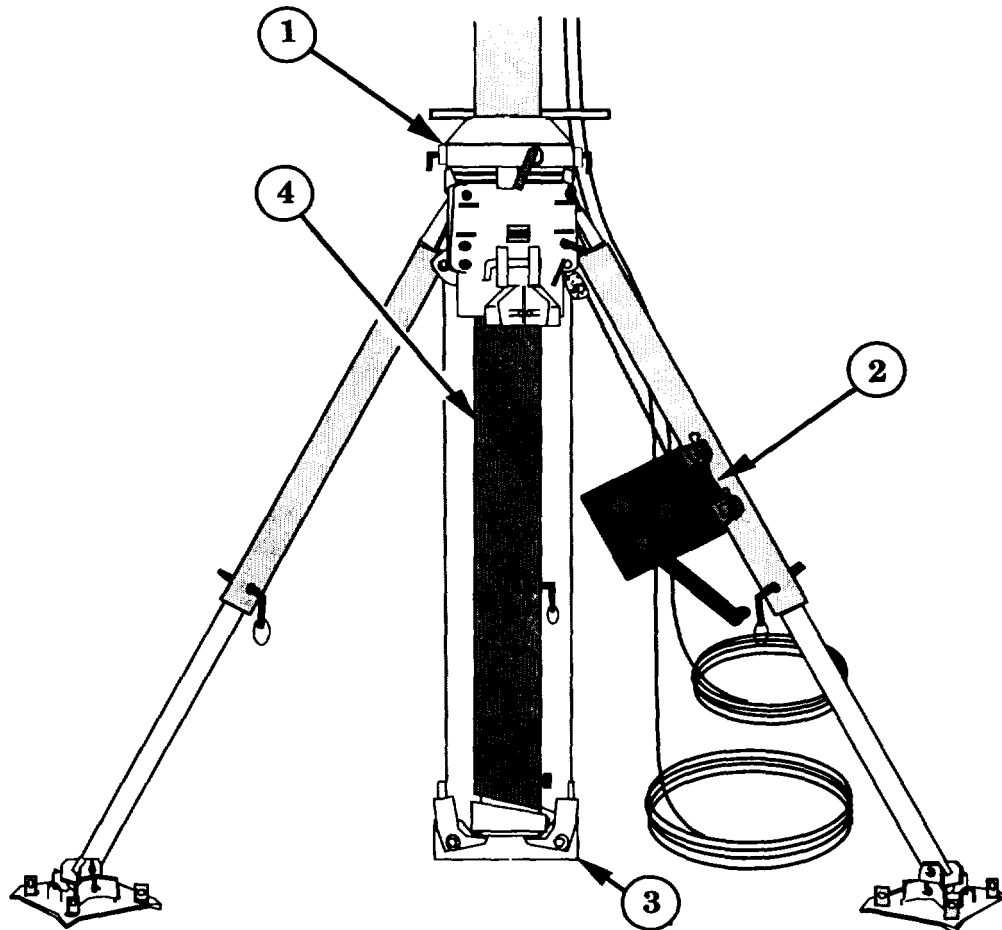
**WARNING**

Do not cause excessive side pull to the lightning rod assembly. Ensure that the ground cable is correctly supported by the cable strap. The ground cable should not experience tension during mast deployment. If excessive side pull or a tensioned ground cable is detected, the mast should be retracted and the lightning rod assembly inspected immediately for damage. Failure to comply may result in the lightning rod assembly falling, causing personal injury.

- (12) Attach one cable strap above starbar assembly to secure RF, WI, and lightning ground cables, taking care not to cause excessive side pull to the lightning rod assembly.

2-11. DEPLOYING MAST - Continued

r. Raising Mast Sections 2 thru 7

**WARNING**

Check that mast is vertical and straight during the following procedure. Adjust top guy assembly tension as necessary to maintain mast in straight and vertical position. Failure to do so may result in mast toppling and personal injury.

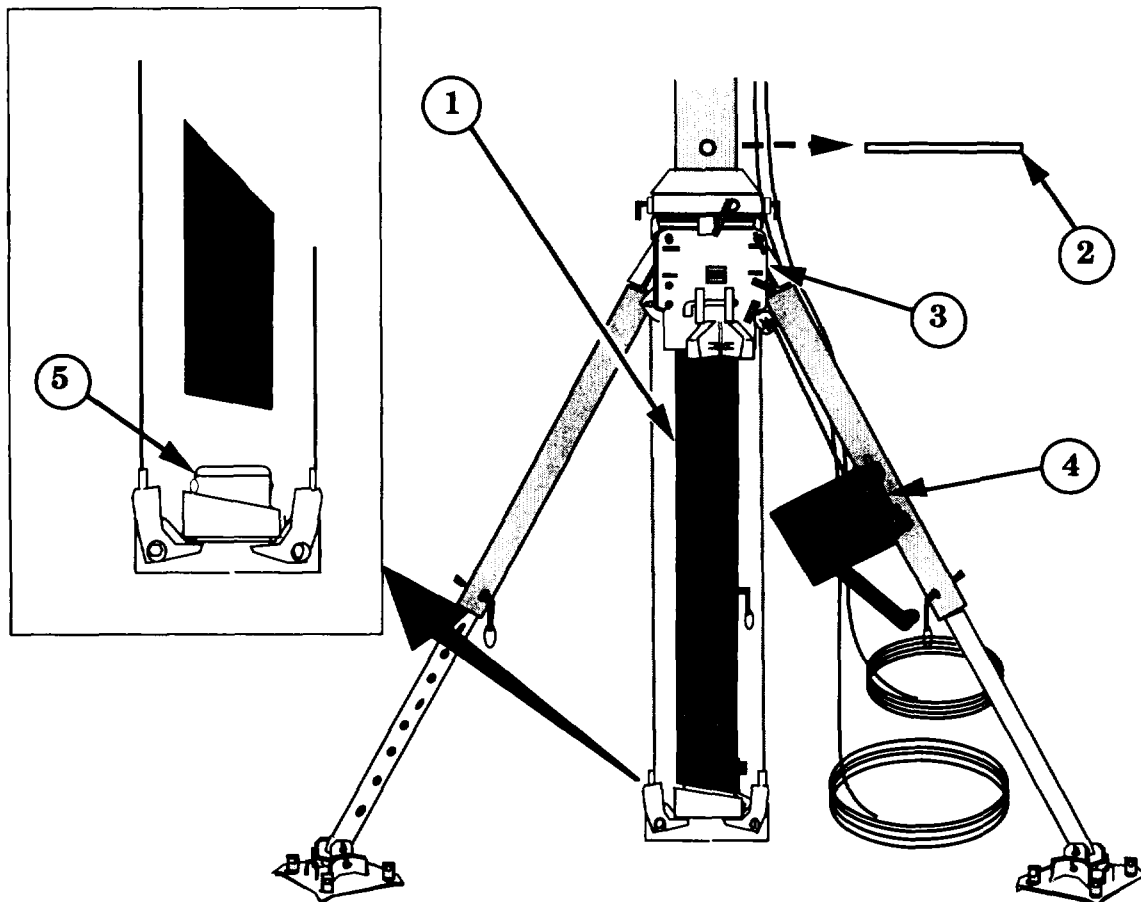
NOTE

If deployment height is less than 40 feet, stop at desired height, insert crosspin, and refer to paragraph 2-11z for mounting fast tensioning systems and tensioning guys. Refer to paragraph 2-18 for mast deviation correction procedures.

- (1) Using lifting winch (2), lower shoe assembly (3) to allow insertion of next mast section (4) between barrel assembly (1) and shoe assembly (3).

2-11. DEPLOYING MAST - Continued

r. Raising Mast Sections 2 thru 7 - Continued

**WARNING**

Keep hands clear of mating surfaces when inserting shoe assembly into mast section. Failure to comply could result in personal injury.

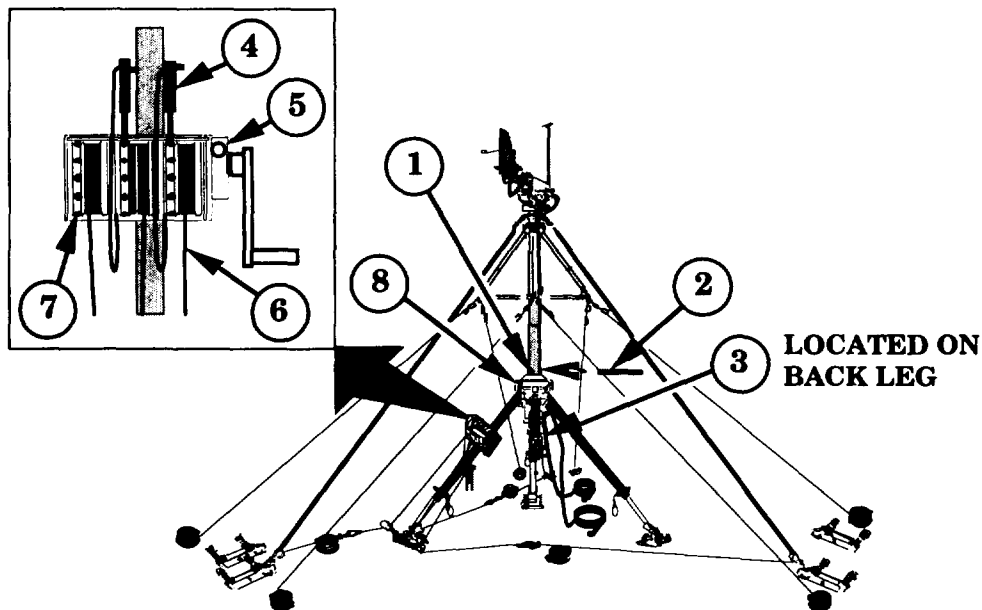
NOTE

Top of shoe assembly rotates and can be easily turned by hand to match bevel on mast section.

- (2) Insert next mast section (1) into barrel assembly (3).
- (3) Turn mast section (1) until bevel matches shoe assembly (5).
- (4) Insert shoe assembly (5) into bottom of mast section (1).
- (5) Crank lifting winch (4) until crosspin (2) is approximately 1 inch above barrel assembly (3) and remove crosspin (2).

2-11. DEPLOYING MAST - Continued

r. Raising Mast Sections 2 thru 7 - Continued

**WARNING**

During operation of guy winch, ensure crank remains properly seated. Always take thumb off safety release and ensure locking mechanism is engaged before letting go of crank. Failure to do so may topple mast causing equipment damage and personal injury. Keep feet from under shoe assembly when raising mast. Failure to do so may result in personal injury.

- (6) Operator 1: Press and hold guy winch safety release (5) and, using crank, slowly pay out extension cables (6), as required, while operator 2 simultaneously cranks lifting winch (3) to raise mast. Operator 2: Continue cranking lifting winch (3) until crosspin hole (1) is above barrel assembly (8).
- (7) Insert crosspin (2) then crank lifting winch (3) to lower mast until crosspin (2) rests on barrel assembly (8).

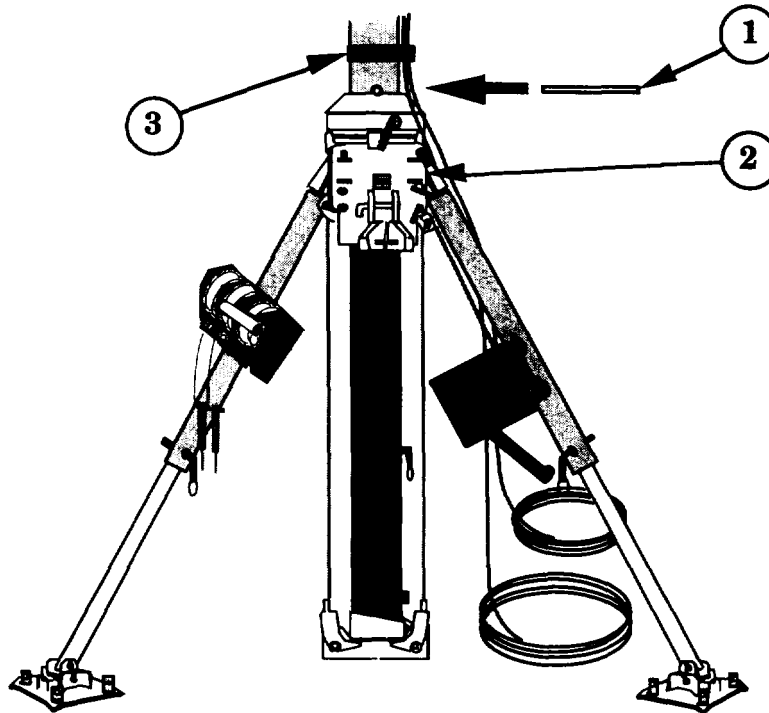
CAUTION

Uneven tension may cause difficulty inserting mast sections. Adjust individual guy assembly tension using tensioning rods at guy winch. Failure to comply may result in damage to mast.

- (8) To maintain even tension on individual top guy assemblies, insert tensioning rod(s) (4) into hole(s) closest to top of loose cable reel(s) (7) and rotate reel(s) downward.

2-11. DEPLOYING MAST - Continued

r. Raising Mast Sections 2 thru 7 - Continued



NOTE

Install a cable strap on every third mast section.

- (9) Repeat steps 1 thru 8 for each mast section until mast section 4 crosspin (1) is resting on barrel assembly (2). Secure cables to mast using cable straps (3).
- (10) Repeat steps 1 thru 8 for each mast section until mast section 6 crosspin (1) is resting on barrel assembly (2).

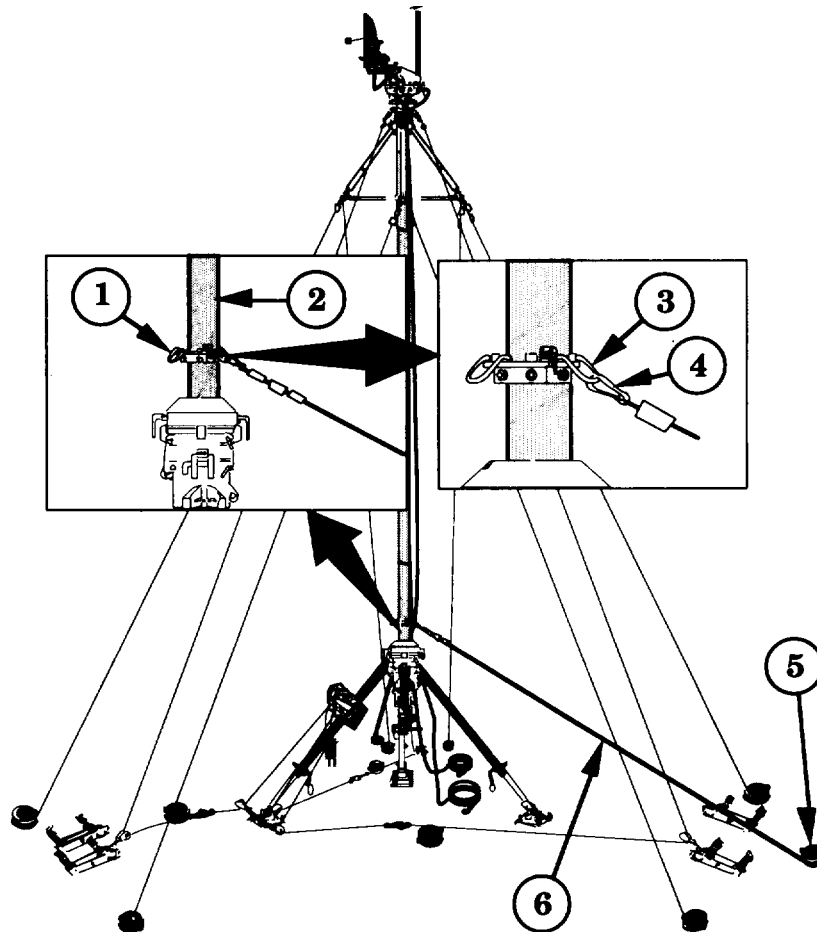
NOTE

Do not insert crosspin in mast section 7.

- (11) Repeat steps 1 thru 6 until mast section 7 crosspin hole is above barrel assembly.

2-11. DEPLOYING MAST - Continued

s. Mounting Upper Intermediate Guy Assembly



- (1) Attach guy ring assembly (1) to mast section 7 (2).

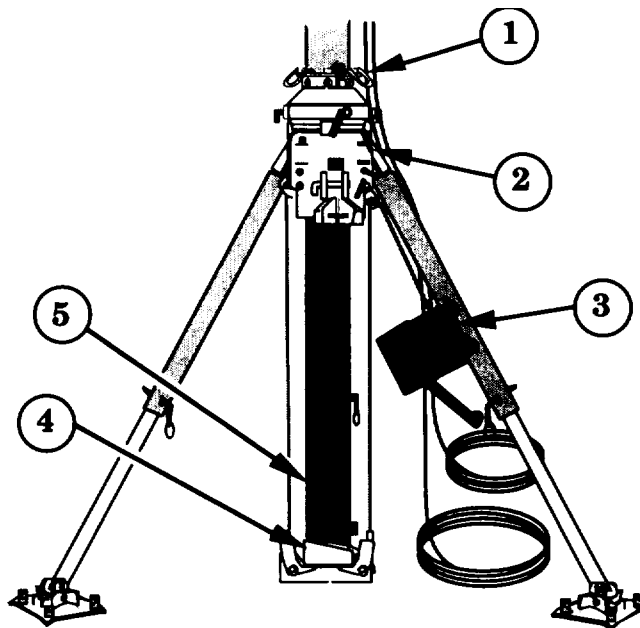
NOTE

Upper intermediate guy assemblies are identified by three ferrules.

- (2) Use snap hook (4) to attach one upper intermediate guy assembly (6) to guy loop (3) on guy ring assembly (1).
- (3) Unwind guy assembly (6) beyond guy anchor position and lay spool (5) on ground.
- (4) Repeat steps 2 and 3 for remaining two upper intermediate guy assemblies.

Change 2 2-69

2-11. DEPLOYING MAST - Continued
t. Raising Mast Sections 8 thru 12



NOTE

If deployment height is less than 61 feet, stop at desired height, insert crosspin, and refer to paragraph 2-11z for mounting fast tensioning systems and tensioning guys.

- (1) Crank lifting winch (3) downward until guy ring assembly (1) rests on top of barrel assembly (2).
- (2) Continue cranking lifting winch (3) to move shoe assembly (4) downward to allow insertion of next mast section (5) into barrel assembly (2).

WARNING

Keep hands clear of mating surfaces while inserting shoe assembly into mast section. Failure to do so may result in personal injury. Mast must be kept vertical and straight. Adjust top guy assemblies to maintain mast in straight and vertical position if necessary. Failure to do so may result in the mast toppling and possible personal injury.

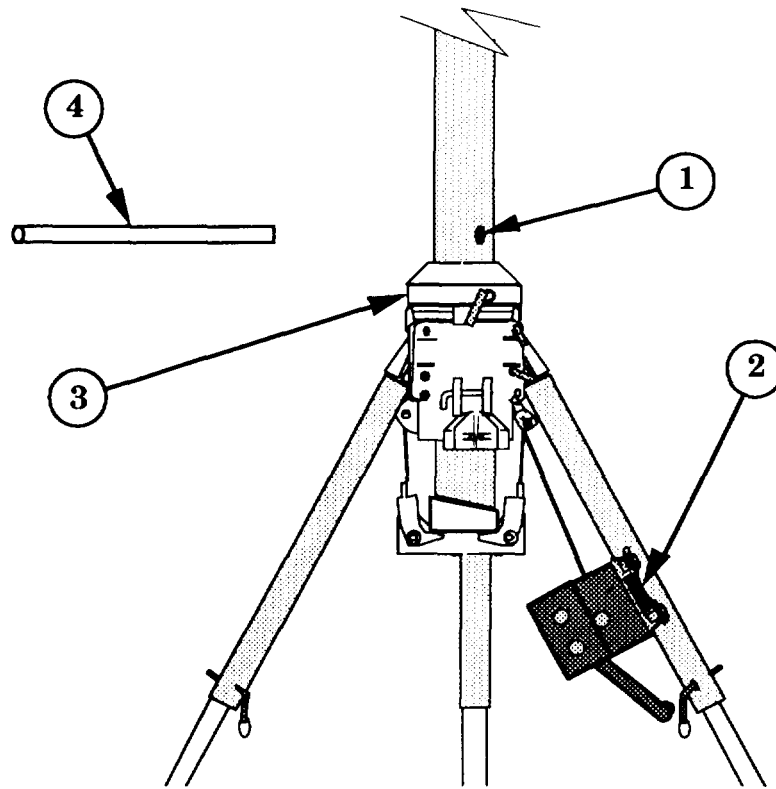
NOTE

Refer to paragraph 2-18 for mast deviation correction procedure.

- (3) Insert mast section (5) into barrel assembly (2). Turn top of shoe assembly (4) until shoe mates with bottom of mast section (5).

2-11. DEPLOYING MAST - Continued

t. Raising Mast Sections 8 thru 12 - Continued



- (4) Crank lifting winch (2) to raise mast. Stop when mast section crosspin hole (1) is above barrel assembly (3).
 (5) Insert crosspin (4) and lower mast until crosspin rests on barrel assembly (3).

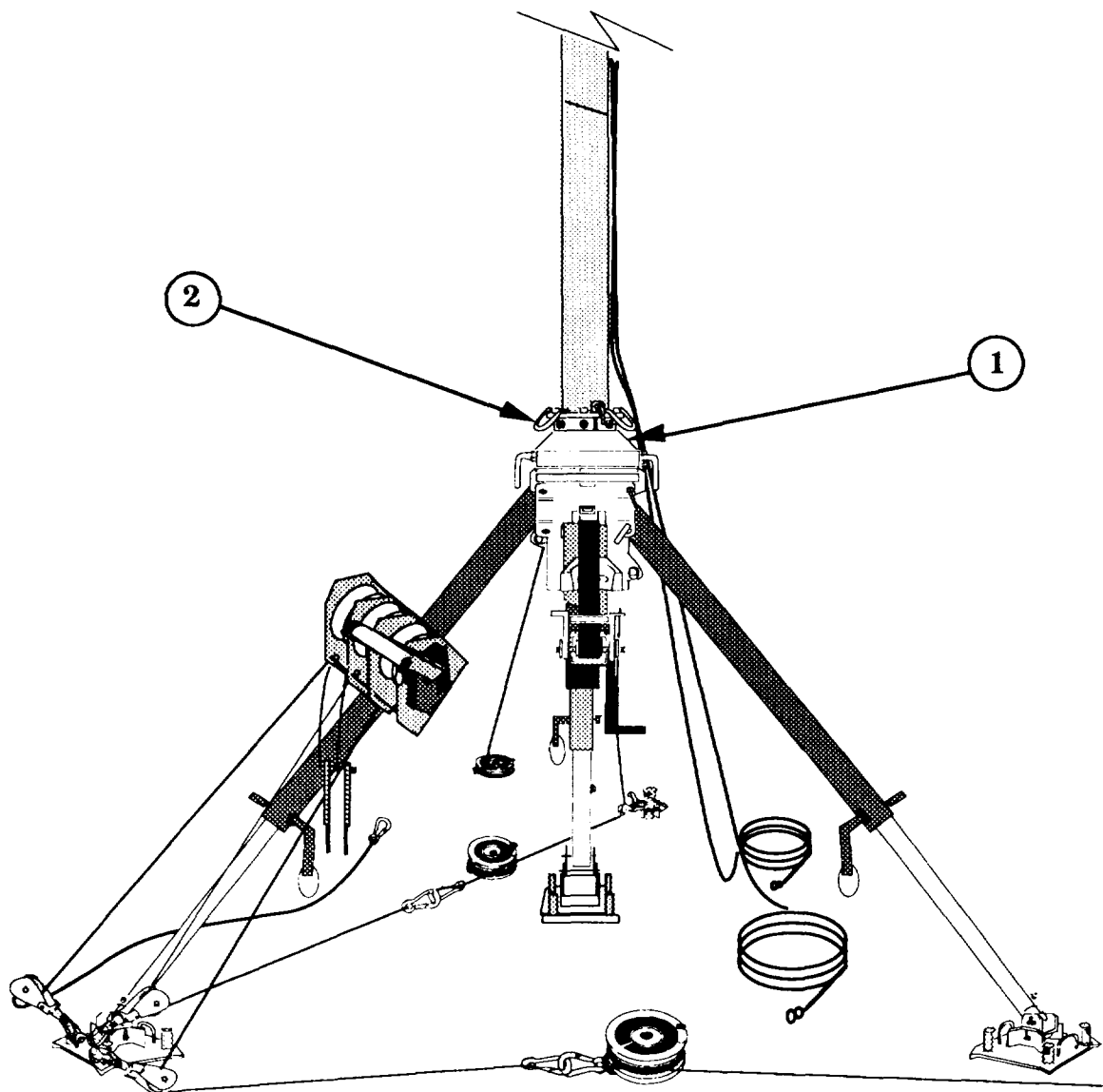
NOTE

Install a cable strap on every third mast section. Do not insert crosspin in mast section 12.

- (6) Repeat steps 2 thru 5 until mast section 12 crosspin hole (1) is above barrel assembly (3).

2-11. DEPLOYING MAST - Continued

t. Raising Mast Sections 8 thru 12 - Continued

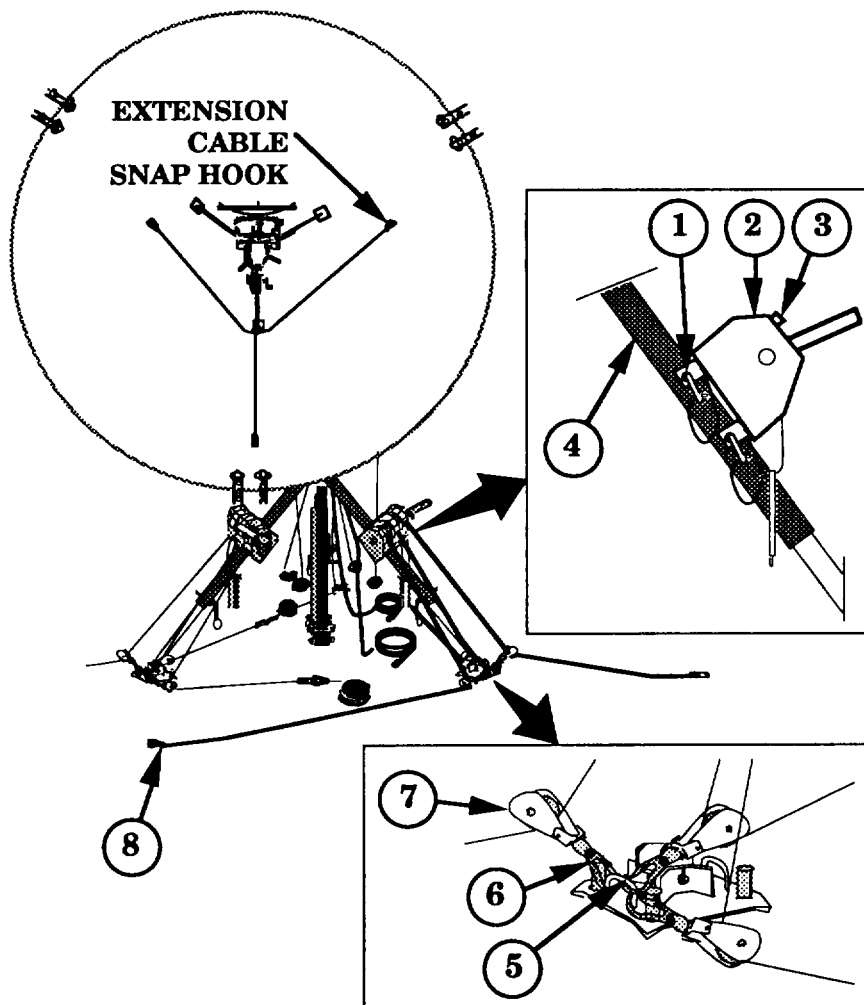


(7) Attach guy ring assembly (2) to mast section 12.

(8) Crank lifting winch downward until guy ring assembly (2) rests on top of barrel assembly (1).

2-11. DEPLOYING MAST - Continued

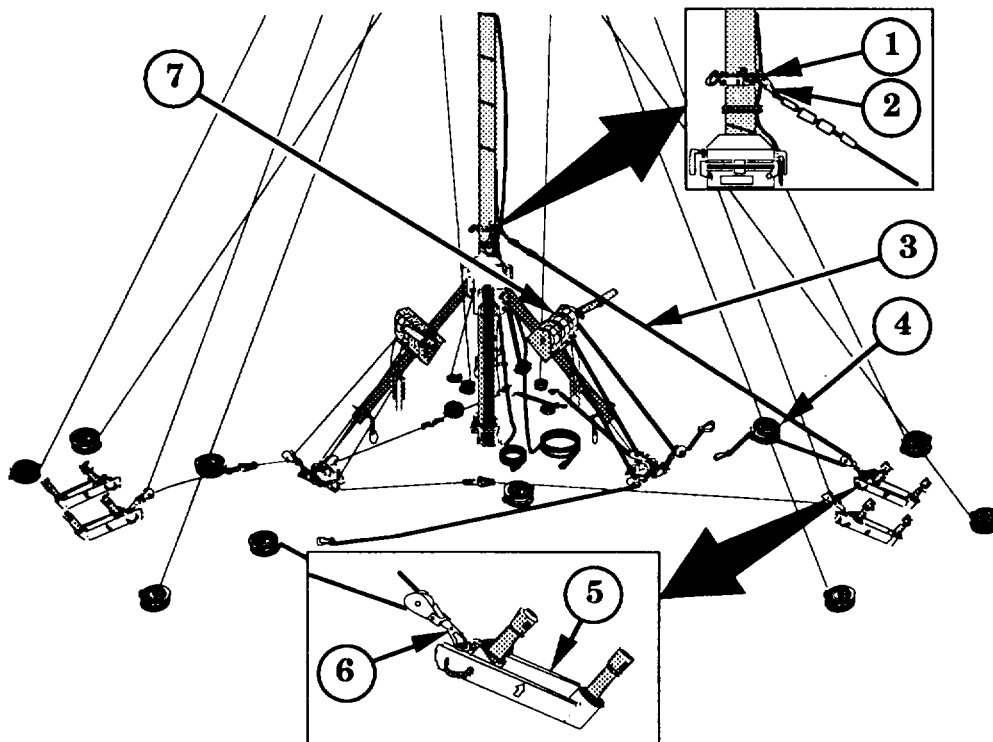
u. Mounting Mid Guy Winch



- (1) Remove guy winch from guy winch bag.
- (2) Use two locking pins (1) to attach guy winch (2) to remaining leg (4).
- (3) Operator 1: Press and hold safety release (3). Operator 2: Pull out about 6 feet of extension cables (8) from guy winch.
- (4) Attach deflection pulleys (7) to baseplate attachment loop (5) using pulley snap hooks (6).
- (5) Operator 1: Press and hold guy winch safety release (3). Operator 2: Pull out extension cables (8) from guy winch (2) for about 20 paces.
- (6) Lay extension cable snap hooks (8) on ground between tripod and guy anchor positions.

2-11. DEPLOYING MAST - Continued

v. Mounting Mid Guy Assembly



NOTE

Mid guy assemblies are identified with four ferrules.

- (1) Attach one mid guy assembly snap hook (2) to guy ring assembly (1).
- (2) Unwind guy assembly (3) and carry attached spool (4) to respective guy stake coupler (5).

WARNING

Do not attach top guy assembly return pulley snap hook and mid guy assembly return pulley snap hook to same guy stake coupler. Ensure that snap hooks are free of dirt and are fully closed. Failure to comply could cause the mast to topple, resulting in equipment damage and personal injury.

- (3) Attach return pulley snap hook (6) to unused guy stake coupler (5), so that snap hook faces up.

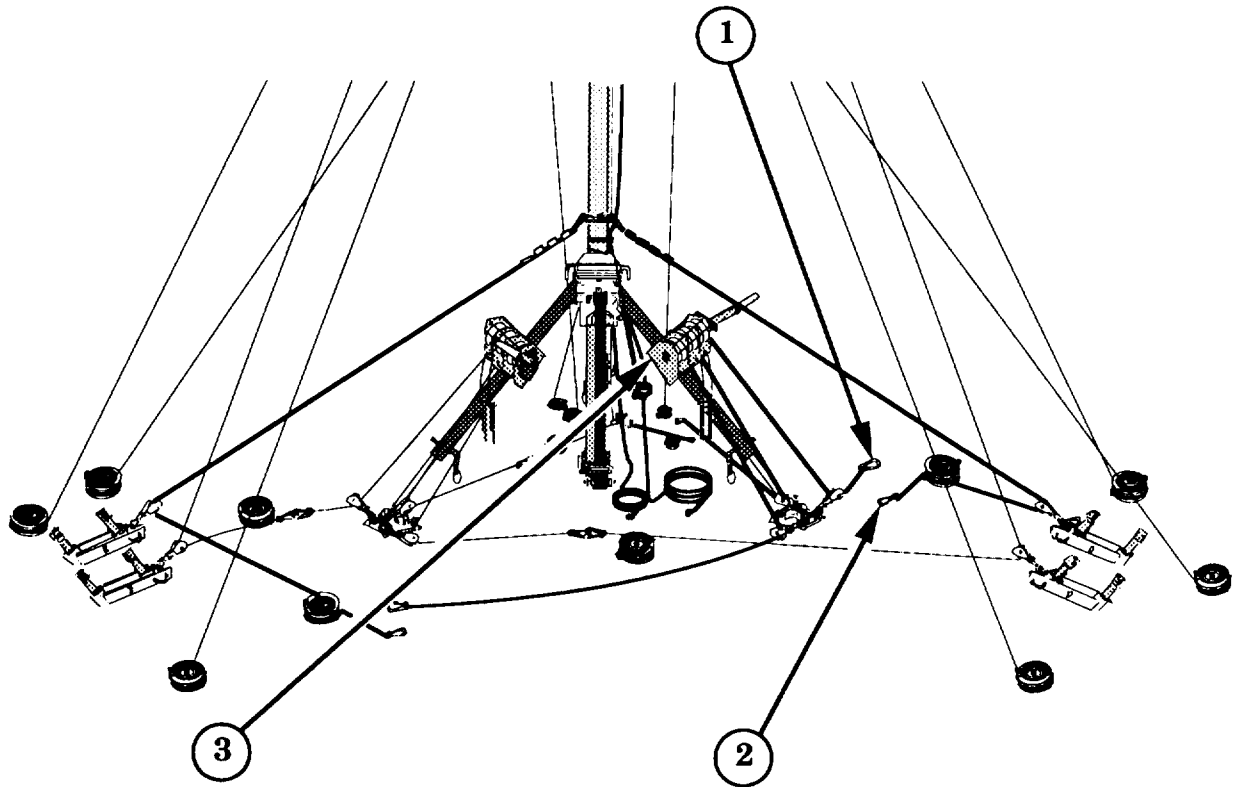
NOTE

Spool remains attached to cable assembly.

- (4) Carry attached spool (4) toward mid guy winch (7). Continue unreeling mid guy assembly until guy assembly is fully unreeled.

2-11. DEPLOYING MAST - Continued

v. Mounting Mid Guy Assembly - Continued



- (5) Connect extension cable snap hook (1) to mid guy assembly snap hook (2).
- (6) Repeat steps 1 thru 5 for two remaining guy assemblies.
- (7) Use guy winch (3) to reel in slack.

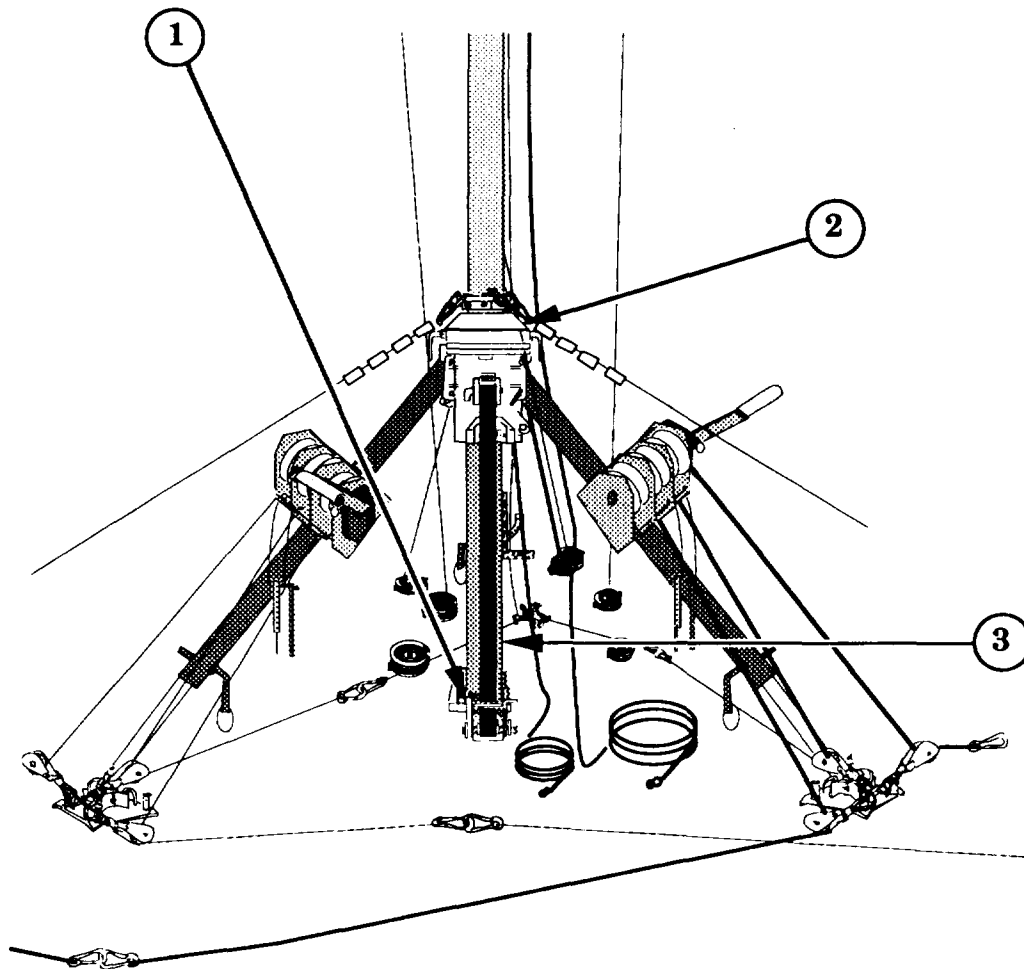
NOTE

If kink in cable causes pulley to bind, cable must be replaced.

- (8) Inspect all guy and cable assemblies for kinks.

2-11. DEPLOYING MAST - Continued

w. Raising Mast Sections 13 thru 17

**NOTE**

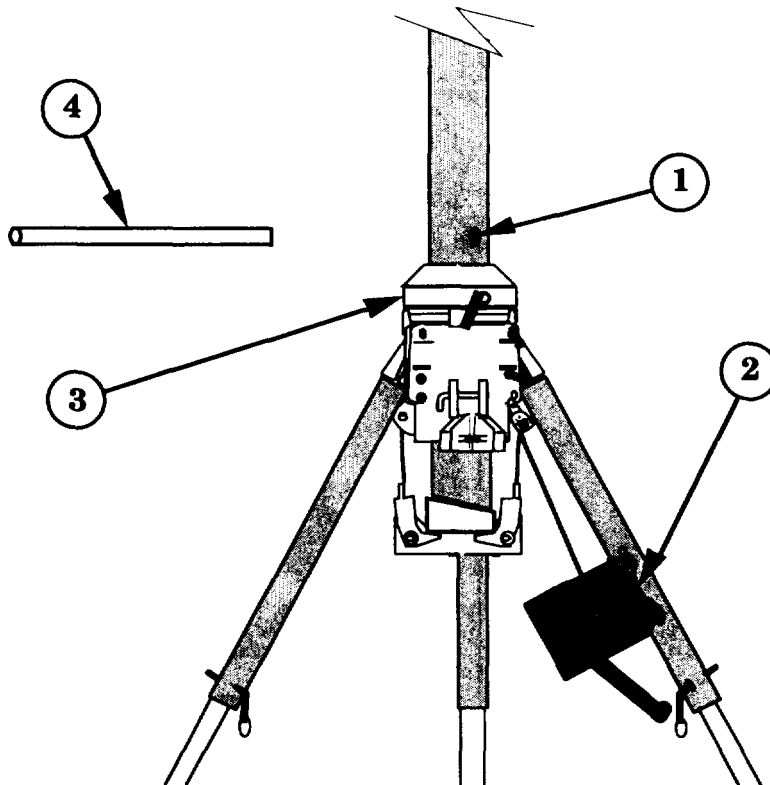
Top and mid guy assemblies must be constantly tensioned using both guy winches. Two guy winch operators must work together to keep the mast going up straight. Too much tension will increase operator fatigue.

If deployment height is less than 83 feet, stop at desired height, insert crosspin, and refer to paragraph 2-11z for mounting fast tensioning systems and tensioning guys.

- (1) Continue lowering shoe assembly (1) to allow insertion of next mast section into barrel assembly (2).
- (2) Insert mast section (3) into barrel assembly (2). Turn shoe assembly (1) until bevels match.

2-11. DEPLOYING MAST - Continued

w. Raising Mast Sections 13 thru 17 - Continued

**WARNING**

Mast must be kept vertical and straight. Adjust guy cable tensions to keep mast vertical and straight. Failure to do so may result in equipment damage and personal injury.

NOTE

Refer to paragraph 2-18 for mast deviation correction procedures.

- (3) Crank lifting winch (2) to raise mast. Stop when crosspin hole (1) is above barrel assembly (3).
- (4) Insert crosspin (4) and use lifting winch (2) to lower mast until crosspin (4) rests on barrel assembly (3).

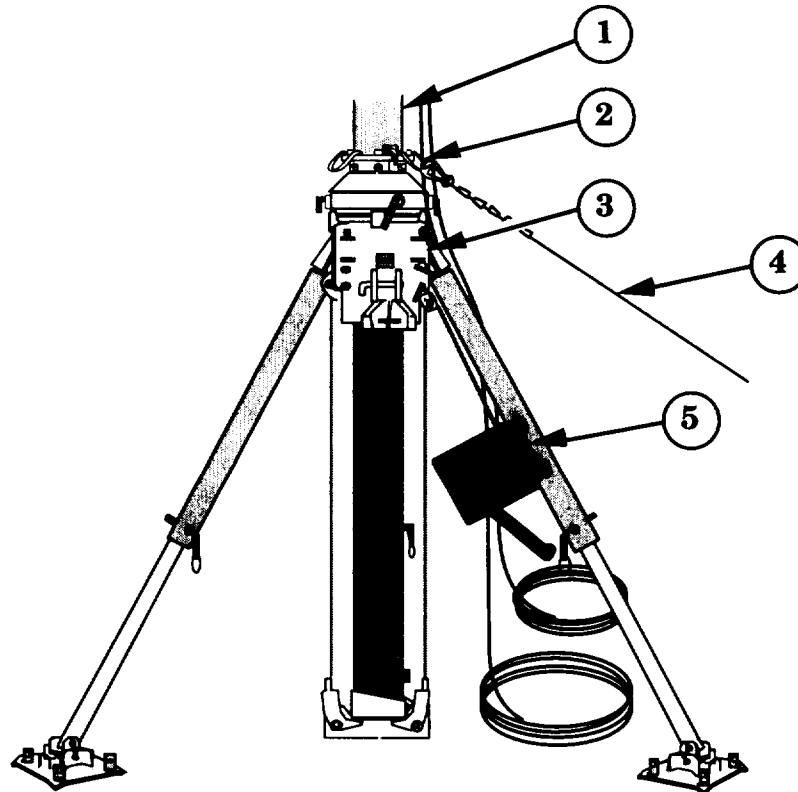
NOTE

Install a cable strap on every third mast section.

- (5) Repeat steps 1 thru 4 for mast sections 14 thru 16.
- (6) Repeat steps 1 thru 3 for mast section 17.

2-11. DEPLOYING MAST - Continued

x. Mounting Lower Intermediate Guy Assembly



- (1) Attach guy ring assembly (2) to mast section 17 (1).
- (2) Crank lifting winch (5) to lower mast until guy ring assembly (2) rests on barrel assembly (3).

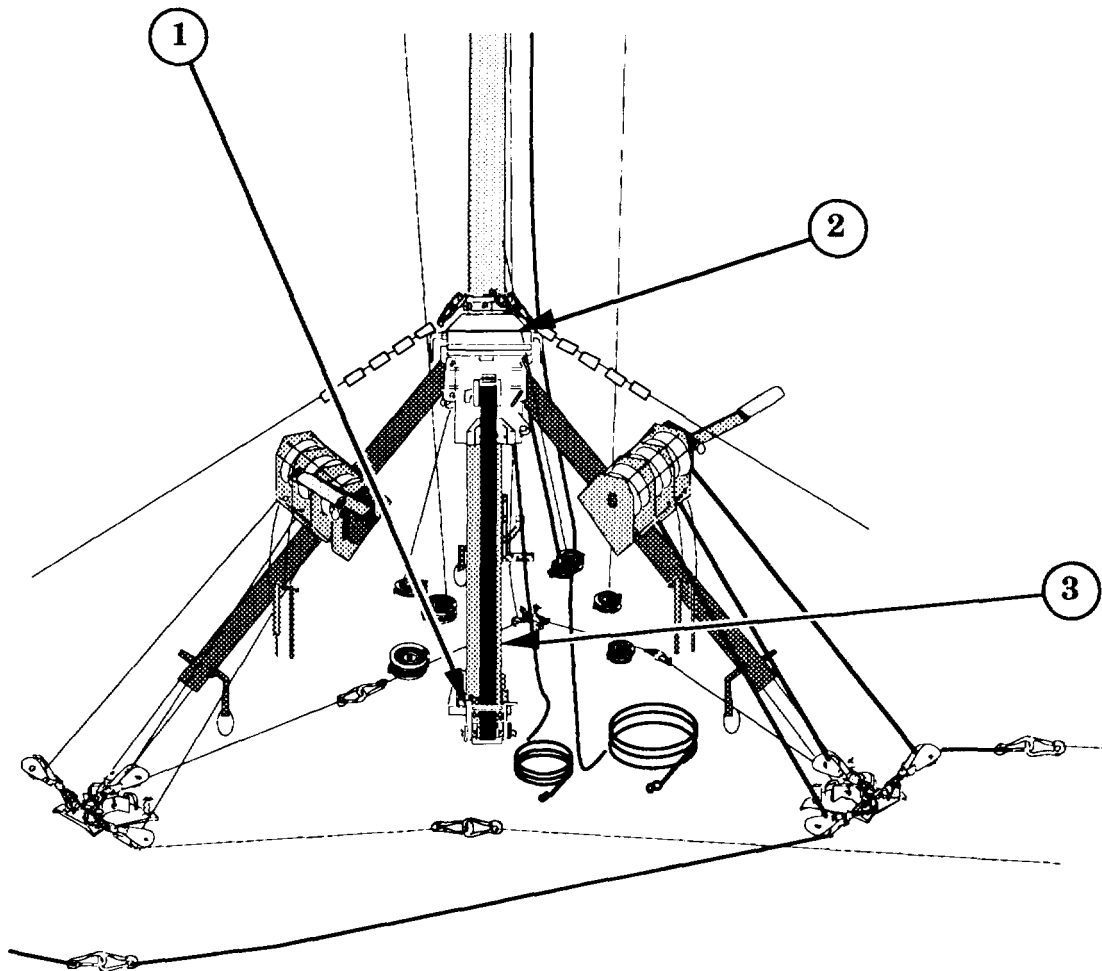
NOTE

Lower intermediate guy assemblies have five ferrules.

- (3) Attach one lower intermediate guy assembly (4) to guy ring assembly (2).
- (4) Unwind guy assembly (4) beyond guy anchor position and place guy assembly spool on ground.
- (5) Repeat steps 3 and 4 for remaining two guy assemblies.

2-11. DEPLOYING MAST - Continued

y. Raising Mast Sections 18 thru 21

**NOTE**

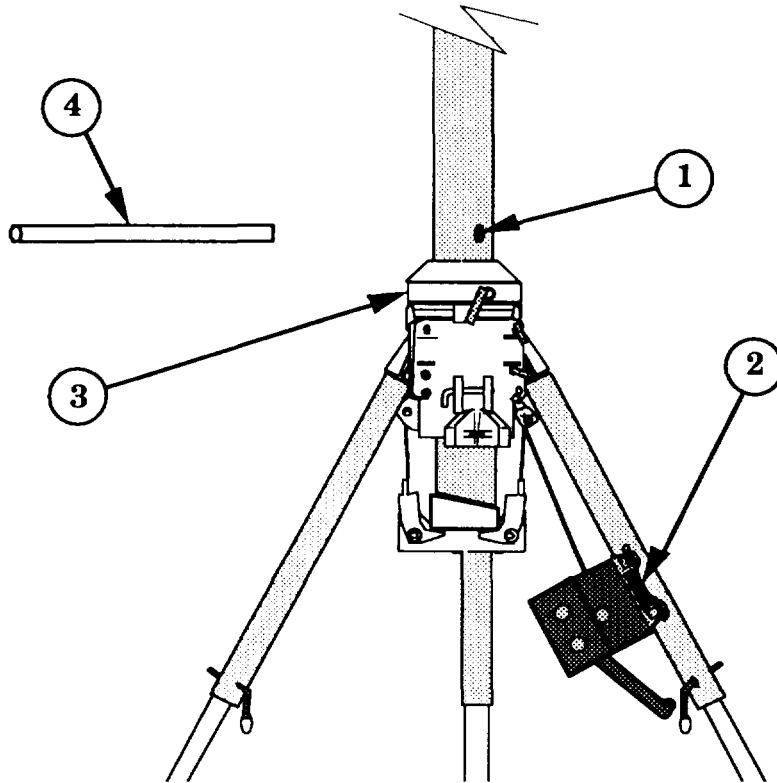
If deployment height is less than 100 feet, stop at desired height, insert crosspin, and refer to paragraph 2-11z for mounting fast tensioning systems and tensioning guys.

Refer to paragraph 2-18 for mast deviation correction procedures.

- (1) Continue lowering shoe assembly (1) to allow insertion of next mast section into barrel assembly (2).
- (2) Insert mast section (3) into barrel assembly (2). Turn shoe assembly (1) until bevels match.

2-11. DEPLOYING MAST - Continued

y. Raising Mast Sections 18 thru 21 - Continued

**WARNING**

Mast must be kept vertical and straight. Adjust guy cable tensions to keep mast vertical and straight. Failure to do so may result in equipment damage and personal injury.

- (3) Crank lifting winch (2) to raise mast. Stop when crosspin hole (1) is above barrel assembly (3).
- (4) Insert crosspin (4) and use lifting winch (2) to lower mast until crosspin (4) rests on barrel assembly (3).

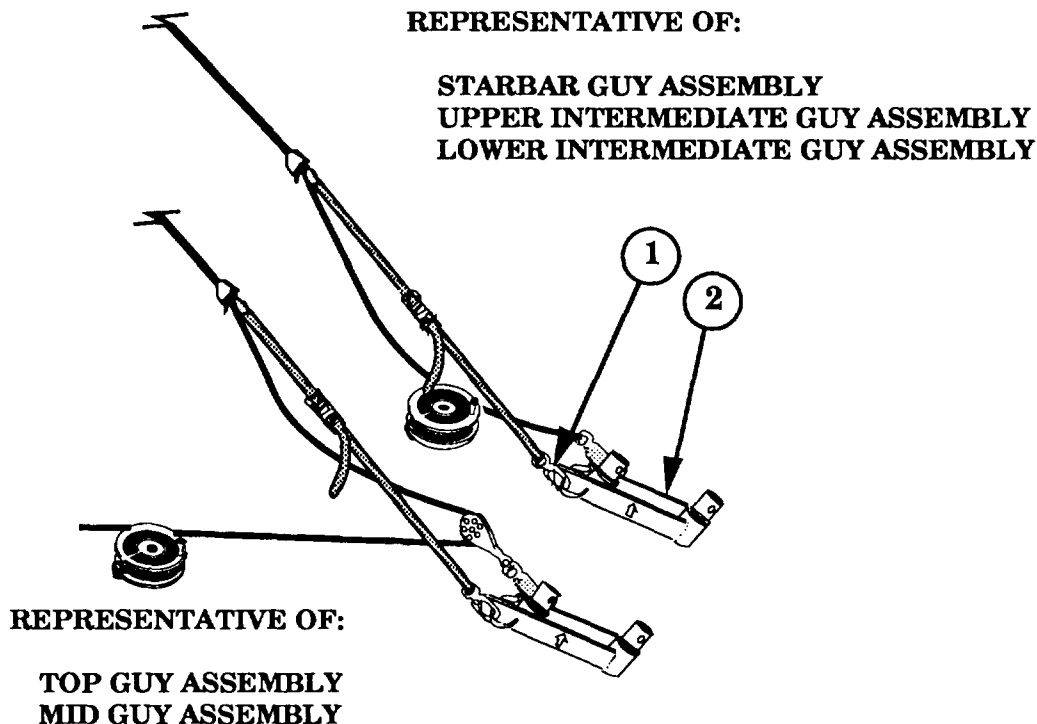
NOTE

Install a cable strap on every third mast section.

- (5) Repeat steps 1 thru 4 for mast sections 19 thru 21.
- (6) After all mast sections have been installed, verify that crosspin is in place in last mast section.

2-11. DEPLOYING MAST - Continued

z. Mounting Fast Tensioning Systems and Tensioning Guys



WARNING

Wear gloves while handling guy assemblies. Failure to comply may result in personal injury.

Prior to performing any tensioning of guy assemblies, ensure crosspin is in place to support mast.

Ensure that snap hooks are free of dirt and are fully closed. Failure to comply with these precautions could cause the mast to topple, resulting in equipment damage and personal injury.

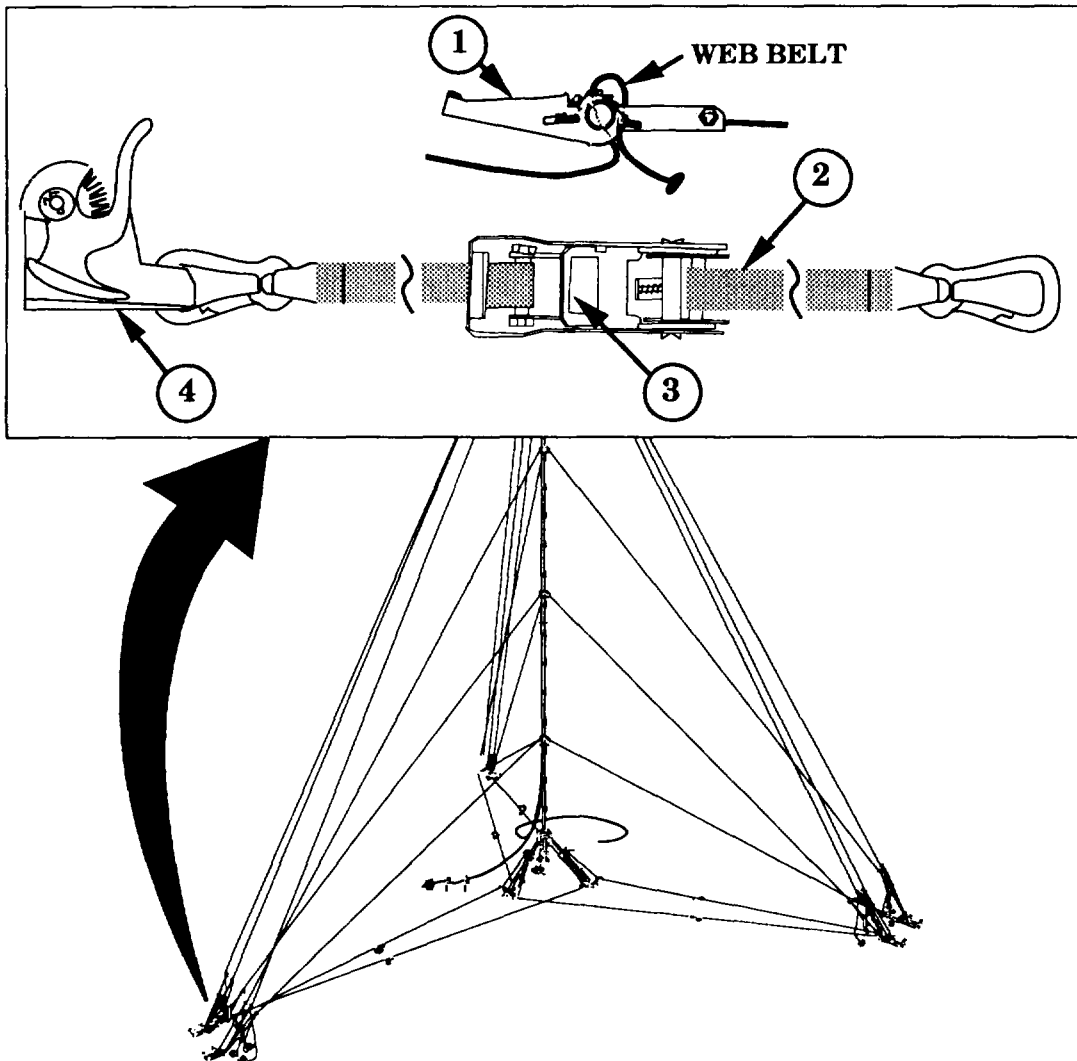
NOTE

An operator must be stationed at each guy anchor location to operate the fast tensioning systems. Each of the following steps must be performed simultaneously at each guy anchor position.

- (1) Attach fast tensioning system snap hooks (1) to guy stake couplers (2) corresponding to lower intermediate guy assemblies. Fast tensioning systems are attached so that snap hooks face up.

2-11. DEPLOYING MAST - Continued

z. Mounting Fast Tensioning Systems and Tensioning Guys - Continued



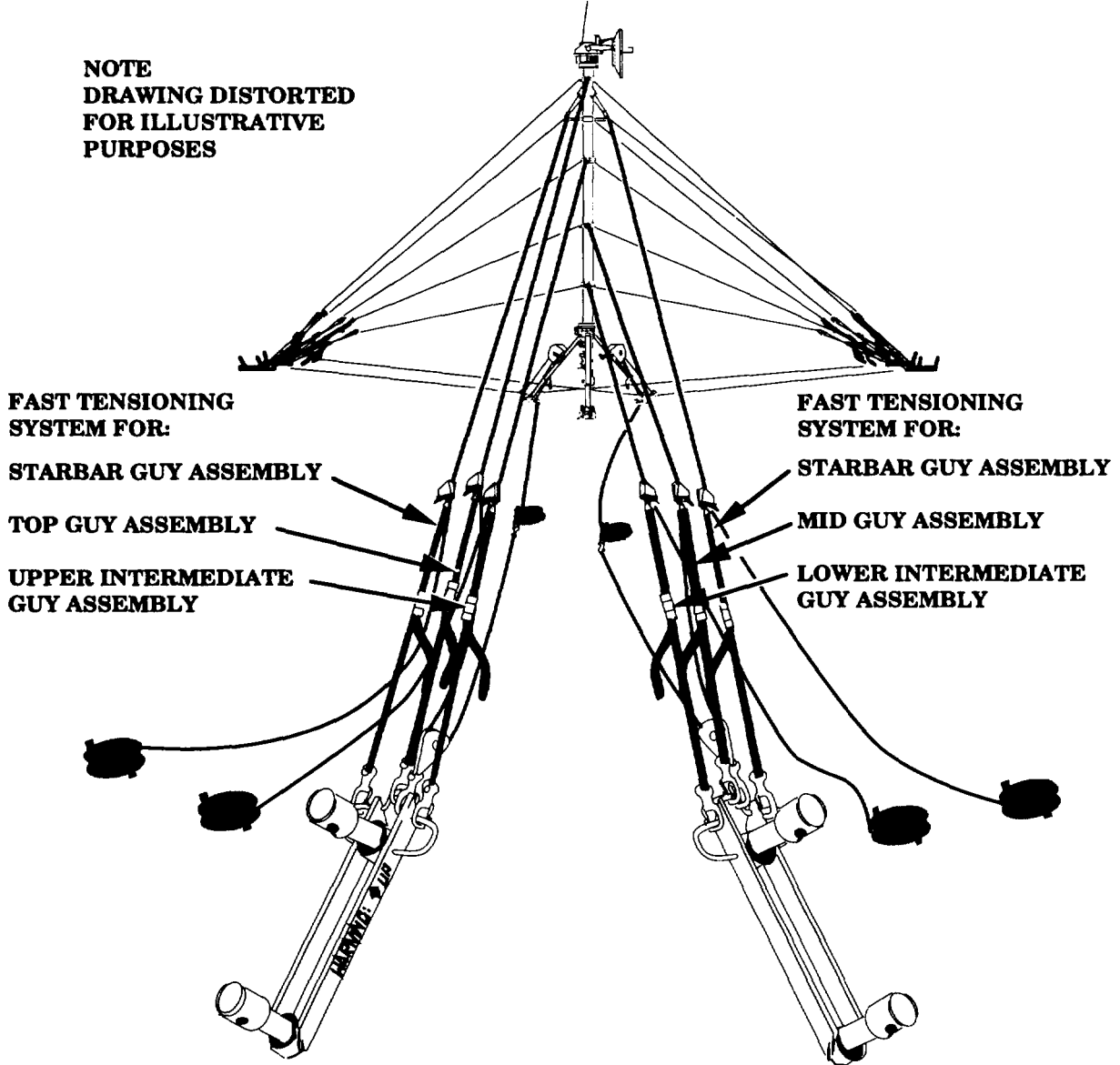
CAUTION

Do not over tighten guy assemblies. Over tightening guy assemblies may cause damage to equipment.

- (2) Place fast tensioning system ratchets (1) in release position by lifting release levers (3) and completely unfolding ratchets.
- (3) Fully extend fast tensioning web belts (2).
- (4) Attach cable grips (4) to lower intermediate guy assemblies.

2-11. DEPLOYING MAST - Continued

z. Mounting Fast Tensioning Systems and Tensioning Guys - Continued



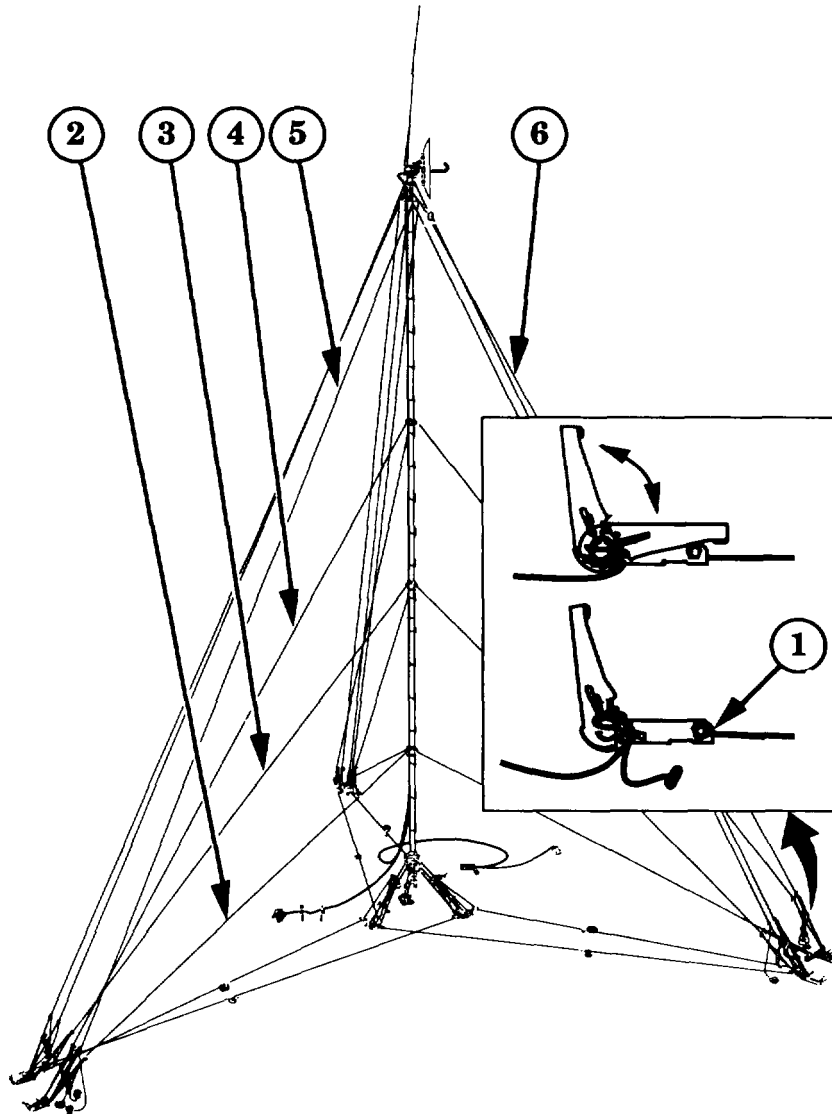
NOTE

After completion of the next step, the fast tensioning system should appear as shown above.

- (5) Repeat steps 1 thru 4 for all mid, upper intermediate, starbar, and top guy assemblies.

2-11. DEPLOYING MAST - Continued

z. Mounting Fast Tensioning Systems and Tensioning Guys - Continued

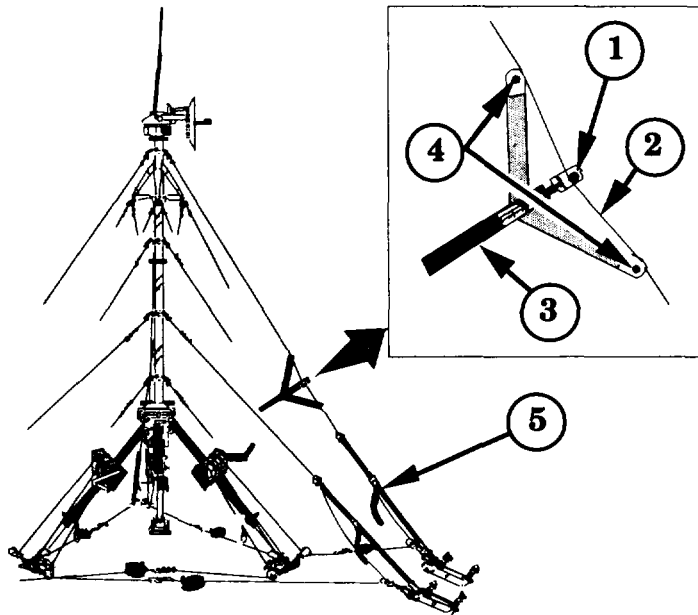
**NOTE**

Ensure that mast remains straight and vertical while tightening guy assemblies.

- (6) Operators 1, 2, and 3: Simultaneously remove slack from lower intermediate guy assembly (2) fast tensioning system by pulling web belt through center of ratchet (1).
- (7) Lift release lever and move ratchet (1) to half open position, and release lever then cycle ratchet handle between half open and closed positions.
- (8) Repeat steps 6 and 7 for mid (3), upper intermediate (4), starbar (5), and top (6) guy assemblies.
- (9) Remove tension from guy winch extension cables to allow fast tensioning systems to straighten mast.

2-11. DEPLOYING MAST - Continued

z. Mounting Fast Tensioning Systems and Tensioning Guys - Continued



WARNING

Wear gloves while handling guy assemblies. Failure to do so may result in personal injury.
Avoid pinching fingers when using tensiometer.

- (10) Attach tensiometer (3) to guy assembly (2) by hooking center roller (1) over guy assembly (2). Twist/pull tensiometer (3) to place guy assembly (2) over outer rollers (4).

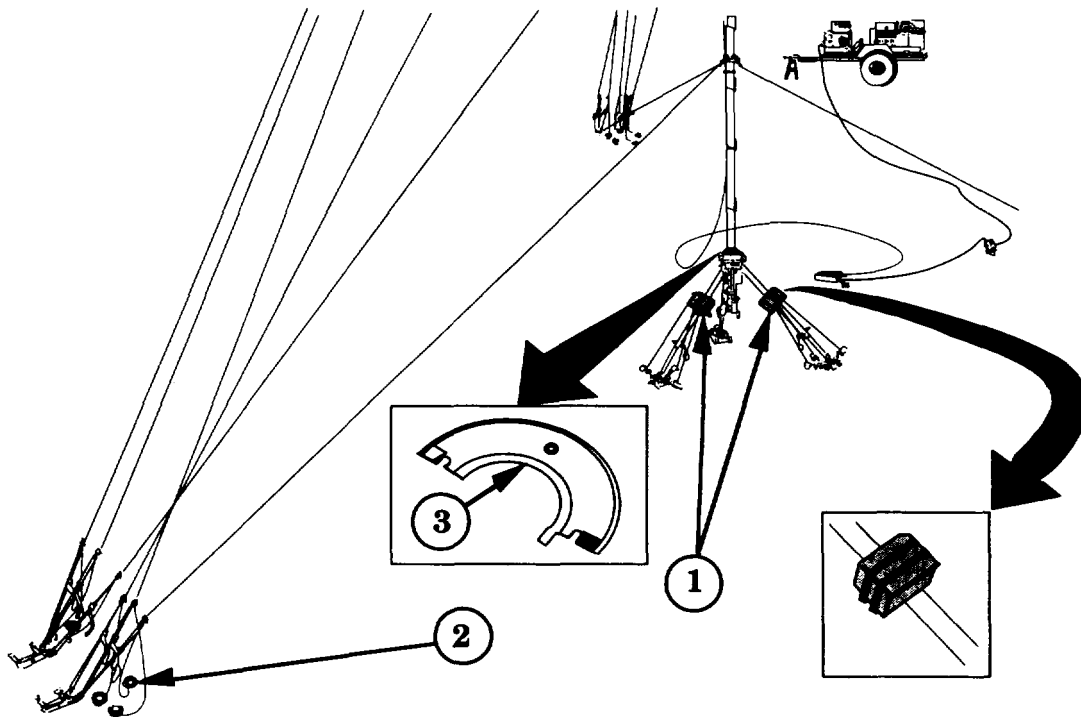
WARNING

Do not touch release lever on ratchet during deployment. Failure to comply may cause the mast to topple, resulting in death or personal injury.

- (11) Use tensiometer (3) to measure guy assembly (2) tension at all guy anchor positions. Using fast tensioning systems (5), adjust guy assembly tension as specified below.

Guy Assembly	Tension
Lower Intermediate Guy Assembly	40 to 60 on tensiometer right (G) scale.
Mid Guy Assembly	40 to 60 on tensiometer right (G) scale.
Upper Intermediate Guy Assembly	60 to 100 on tensiometer left (SG) scale.
Starbar Guy Assembly	60 to 100 on tensiometer left (SG) scale.
Top Guy Assembly	60 to 100 on tensiometer left (SG) scale.

2-12. PREOPERATIONAL PREPARATIONS



- a. Set controller ON/OFF switch to ON position. Use controller to position antenna, as directed, to establish radio link.
- b. If tactical considerations permit, disconnect guy winch cable snap hooks from mid guy assemblies and top guy assemblies. Reel in loose extension cables and roll up top and mid guy assemblies (2). Add warning tape to guy assemblies.
- c. Remove and store guy and lifting winch cranks on top of winches. Place winch bag (1) over each winch and crank. Fasten bag in place using bag straps and buckles.
- d. Place barrel cover (3) over barrel assembly.
- e. Clear mast site area of loose equipment, bags, and tools for security and safety.

2-13. RETRIEVING MAST

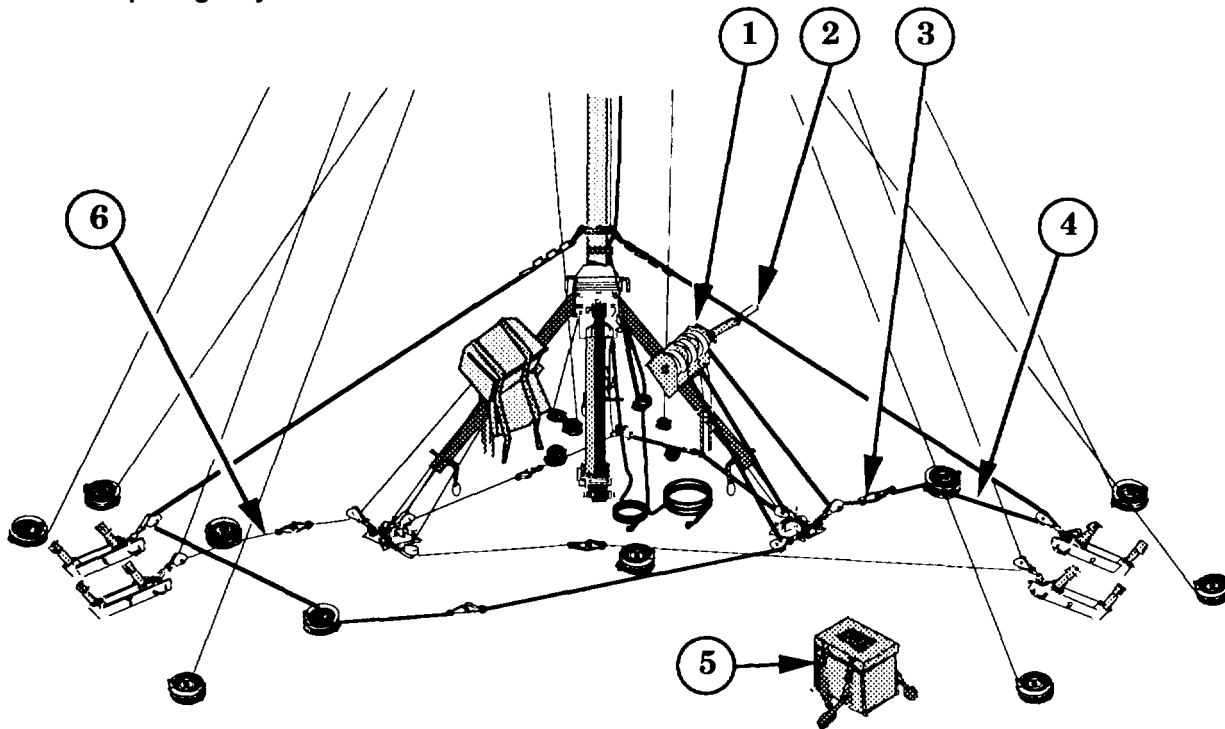
WARNING

Do not attempt to retrieve mast during electrical storms or when winds exceed 25 mph. Failure to follow this warning could result in personal injury or death.

Hard hats, eye protection, gloves, and safety shoes are required when disassembling mast. Do not remove ground cable until mast is fully retrieved.

NOTE

Three operators are required to retrieve the mast.

a. Preparing Guy Winches

- (1) Remove guy winch bags (5) from both guy winches (1).
- (2) Mount both guy winch cranks (2).

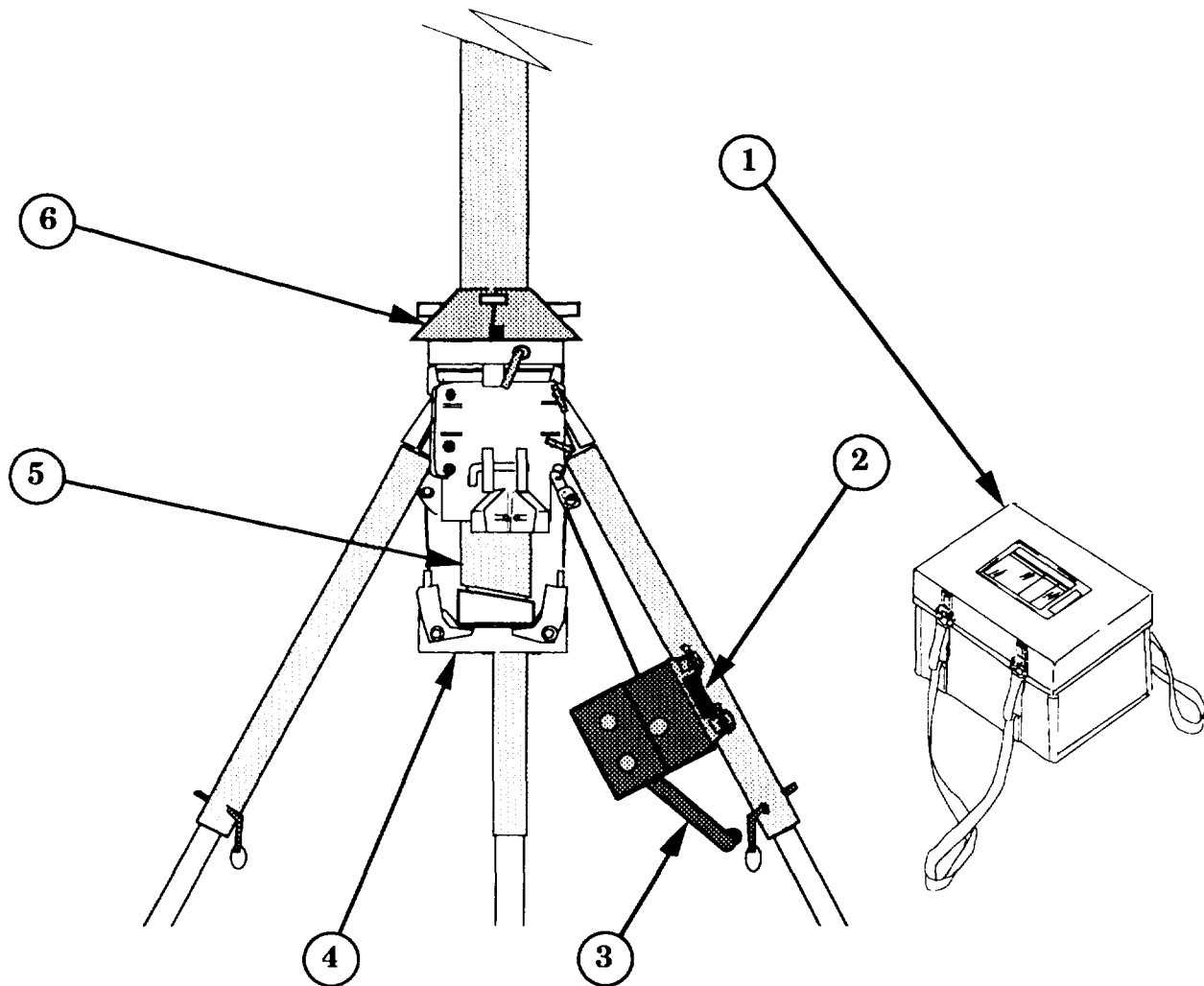
NOTE

Reattach any removed cables and retension them before removing fast tensioning systems.

- (3) Ensure extension cable snap hooks (3) are connected to respective mid guy assemblies (4) and top guy assemblies (6).
- (4) Use guy winches (1) to tension mid guy assemblies (4) and top guy assemblies (6).

2-13. RETRIEVING MAST - Continued

b. Preparing Lifting Winch



- (1) Remove lifting winch bag (1) from lifting winch (2) and mount lifting winch crank (3).
- (2) Remove barrel cover (6) from barrel assembly.

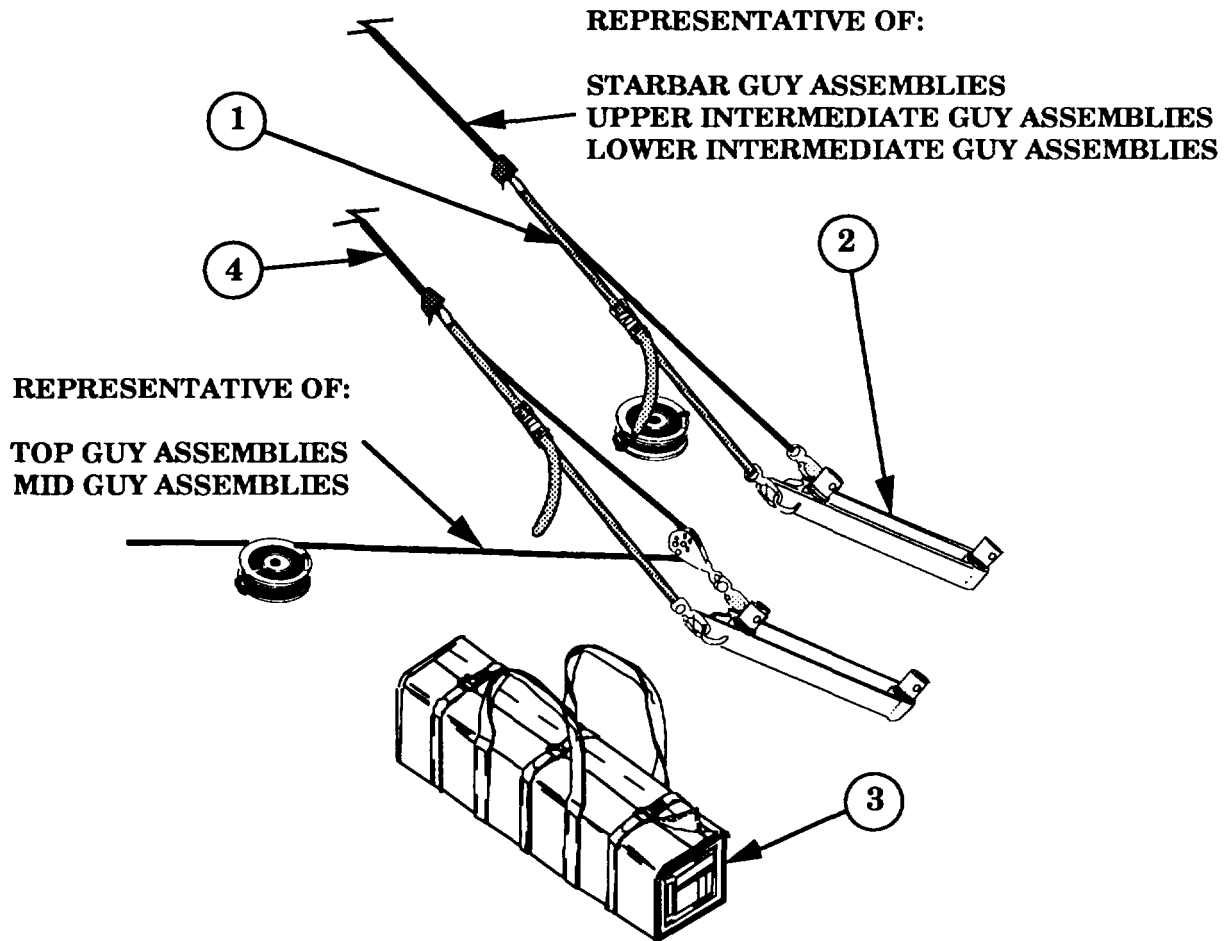
WARNING

Do not continue to lower mast if the lifting belt becomes loose. This is an indication that the mast is binding in the barrel assembly and must be straightened before proceeding with the mast retrieval. Failure to comply with this warning may result in equipment damage or personal injury.

- (3) Use crank (3) to raise shoe assembly (4) and insert shoe assembly into bottom of mast section (5).

2-13. RETRIEVING MAST - Continued

c. Removing Fast Tensioning Systems and Releasing Unnecessary Guys



WARNING

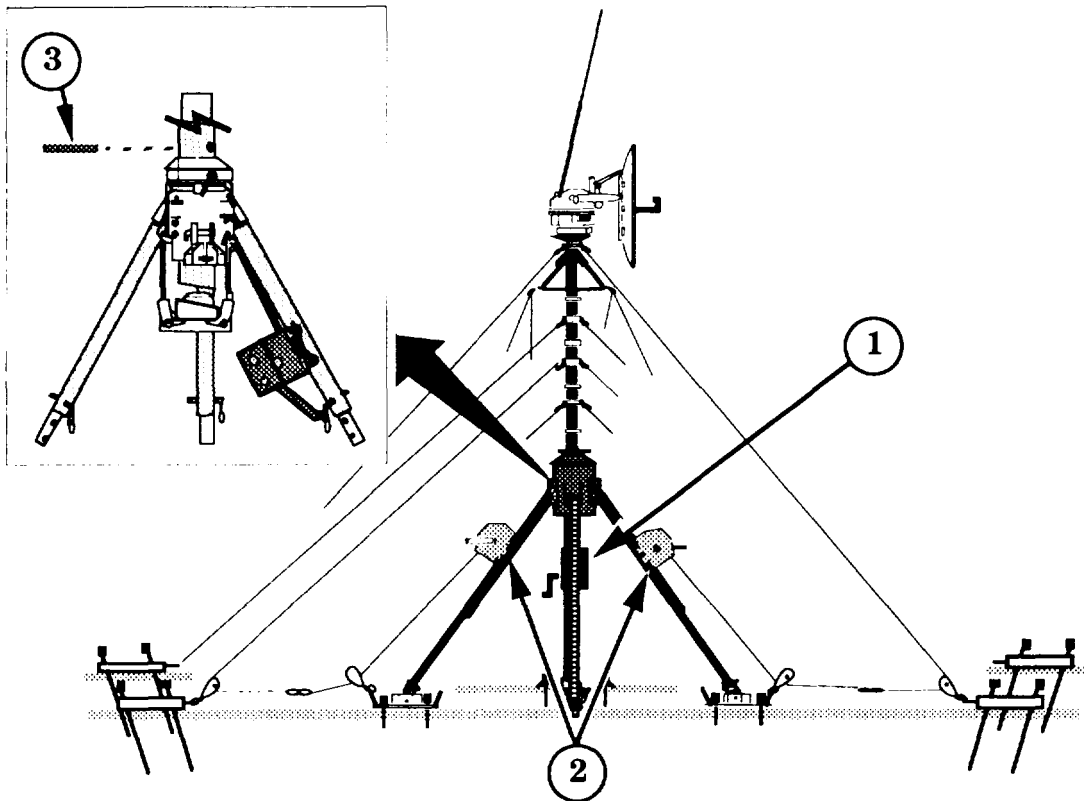
Top guy and mid guy assembly snap hooks must remain connected during the following procedures. Failure to comply with this warning may result in equipment damage or personal injury.

NOTE

Reattach any removed cables and retension them before removing fast tensioning system.

- (1) Disconnect and remove 18 fast tensioning systems (1) from guy stake couplers (2) and guy assemblies (4).
- (2) Place 18 fast tensioning systems (1) near guy accessories bags (3) for packing.

2-13. RETRIEVING MAST - Continued

**WARNING**

Adjust guy cable tensions to keep mast vertical and straight. Failure to do so may result in equipment damage and personal injury.

NOTE

Lifting winch has two gear speeds. Low gear requires less effort but is slow. High gear provides faster lift but requires more effort from operator. Winch crank should be inserted into gear most comfortable for operator. Winch crank handle can be extended for more leverage.

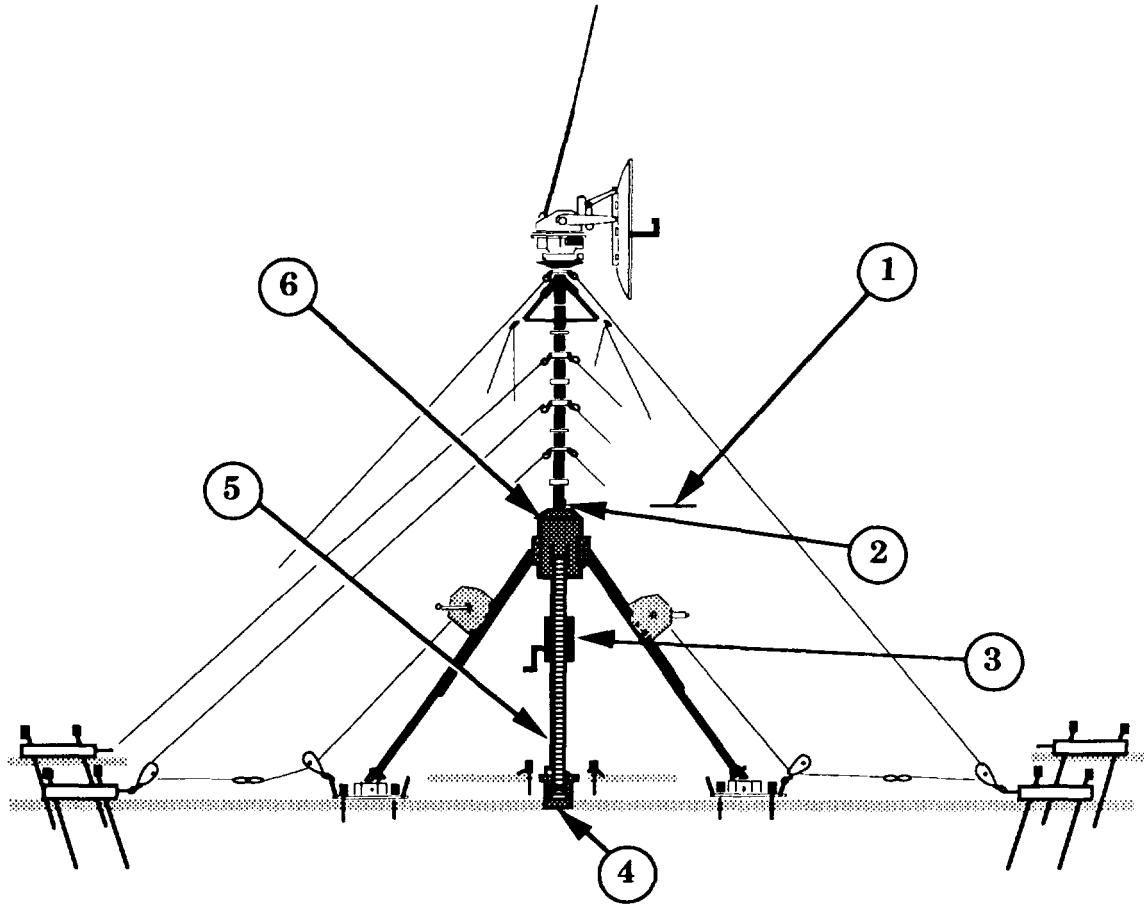
While lowering mast, remove cable straps as necessary.

- (1) Crank lifting winch (1) to raise mast 1 inch. Remove crosspin (3) and set nearby for use during mast retrieval.
- (2) Operator 1: Crank lifting winch (1) to lower mast.

Operators 2 and 3: As operator 1 cranks lifting winch, use guy winches (2) to maintain tension and keep mast straight and vertical.

2-13. RETRIEVING MAST - Continued

d. Lowering Mast Sections - Continued

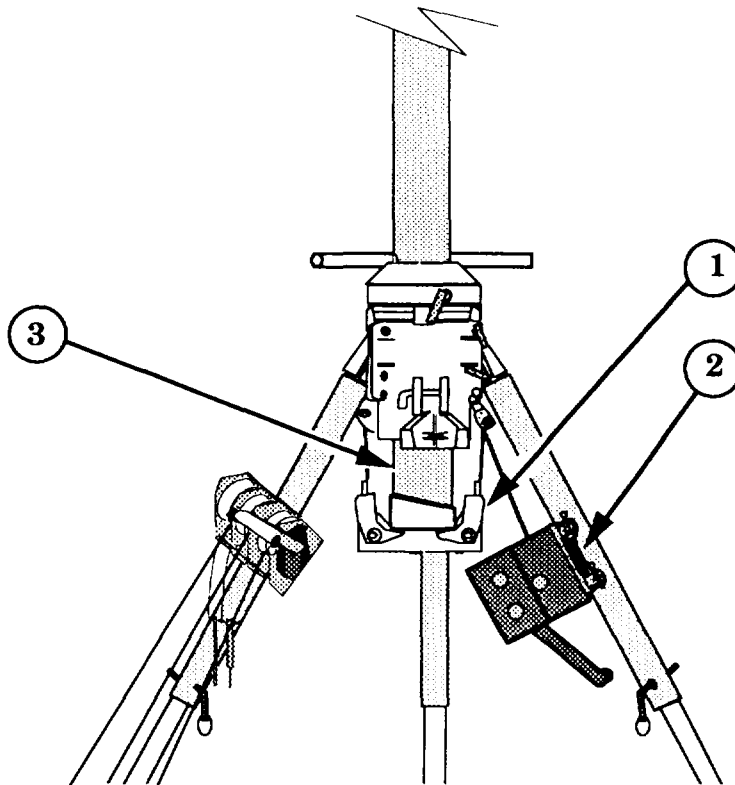


- (3) Continue lowering mast (5) until next mast section crosspin hole (2) is 1 inch above barrel assembly (6).
- (4) Insert crosspin (1) in crosspin hole (2).

NOTE

Remove cable straps as necessary.

- (5) Crank lifting winch (3) to lower mast until mast is supported by crosspin (1).
- (6) Continue lowering shoe assembly (4) to relieve tension on lifting winch belt.
- (7) To remove shoe from mast, push up on mast (5), kick shoe (4) down and away from mast (5), then pull down on mast section to remove.
- (8) Place removed mast section in nearby location.

2-13. RETRIEVING MAST - Continued**d. Lowering Mast Sections - Continued****WARNING**

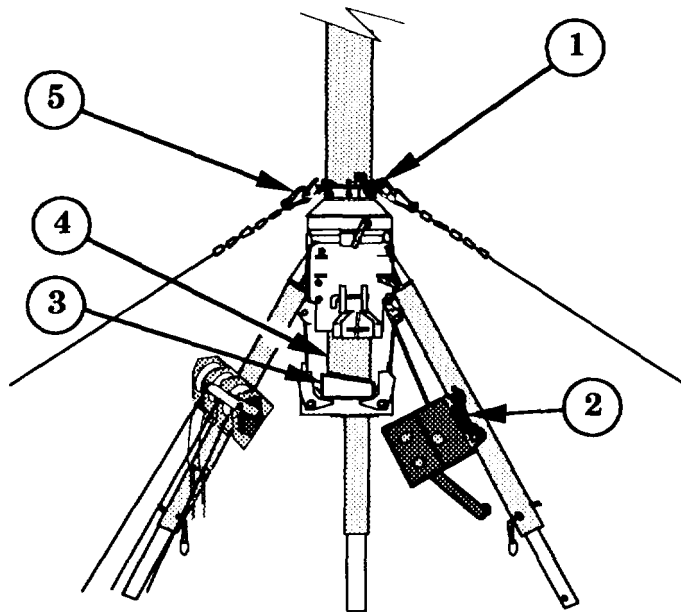
Keep hands clear of mating surfaces when inserting shoe assembly into mast section. Failure to comply may result in personal injury.

(9) Crank lifting winch (2) to raise shoe assembly (1) until shoe mates with mast (3).

(10) Repeat steps 1 thru 9 until guy ring assembly rests on barrel assembly.

2-13. RETRIEVING MAST - Continued

d. Lowering Mast Sections - Continued



WARNING

Adjust guy cable tensions to keep mast vertical and straight. Failure to do so may cause mast to topple resulting in extensive equipment damage and personal injury.

NOTE

Refer to paragraph 2-18 for mast deviation correction procedures.

(11) Using lifting winch (2) raise shoe assembly (3) until shoe mates with mast (4).

WARNING

Wear protective gloves when handling guy assemblies. Failure to do so may result in personal injury.

(12) Disconnect guy assembly snap hooks (5) and remove guy assemblies.

(13) Roll up guy assemblies. Roll cables onto spools under tension and keep neat, tight cable spools.

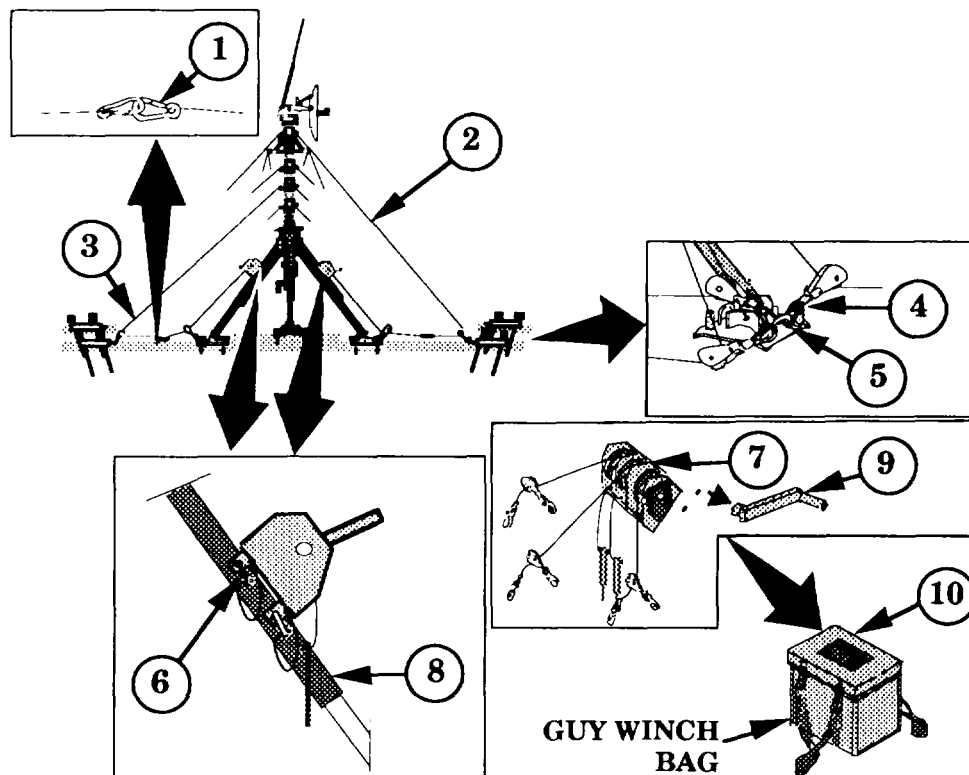
(14) Using lifting winch (2) raise mast 1 inch.

(15) Remove guy ring assembly (1) by turning guy ring lock, opening hinged collar and removing hinged collar and semicircular rings. Reassemble guy ring assemblies and place near mast accessories bag.

(16) Repeat steps 2 thru 15 for remaining mast sections.

2-13. RETRIEVING MAST - Continued

e. Removing Guy Winches

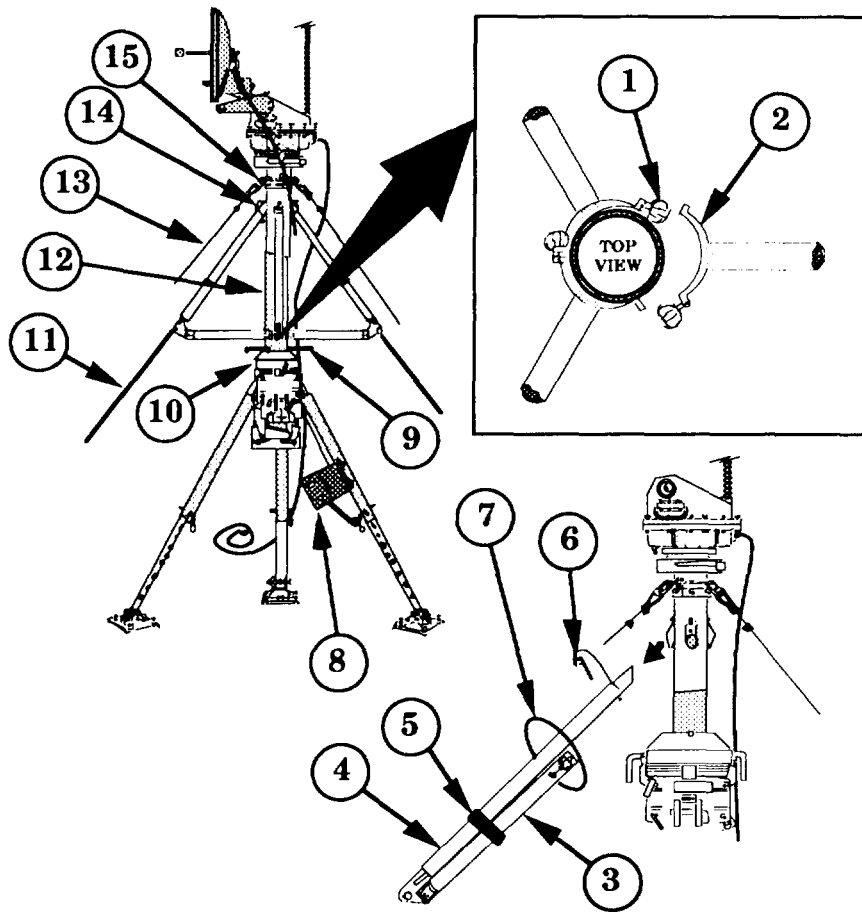
**CAUTION**

Prior to reeling in cables, fully extend cables in a straight line away from tripod leg to prevent kinking or damage to cables.

- (1) Disconnect guy extension cable snap hooks (1) from mid guy assembly (3) and top guy assembly (2).
- (2) Reel in excess extension cables using guy winches (7).
- (3) Disconnect deflection pulley snap hooks (4) from tripod baseplate loops (5). Reel in extension cables using guy winches (7).
- (4) Remove handcrank (9) from guy winch (7).
- (5) Hold guy winches (7) and remove two locking pins (6) securing guy winches (7) to tripod legs (8).
- (6) Place handcrank and guy winch near guy winch bag (10).
- (7) Roll guy assemblies (2 and 3) onto attached spools and remove from area.

2-13. RETRIEVING MAST - Continued

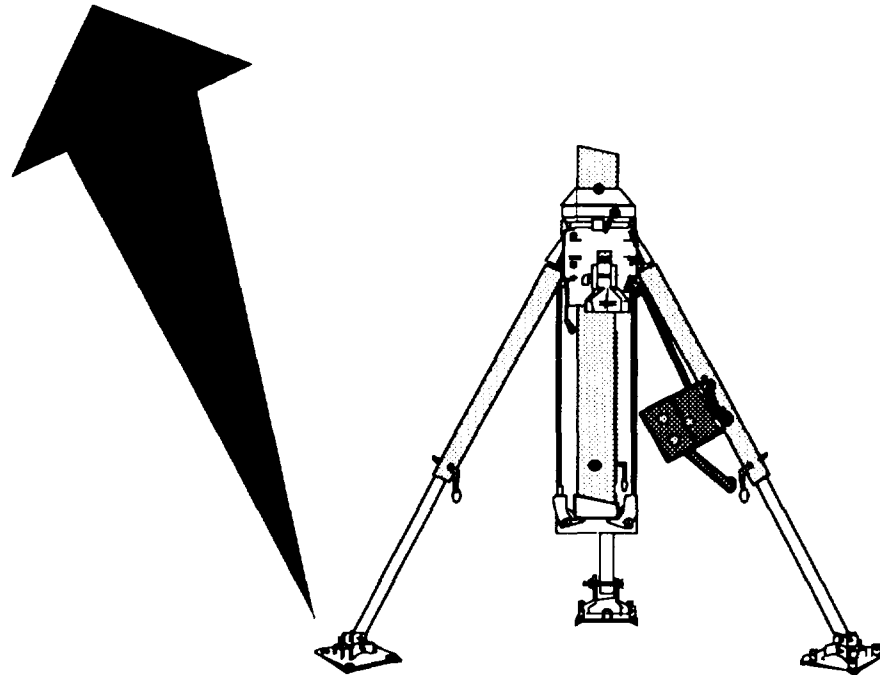
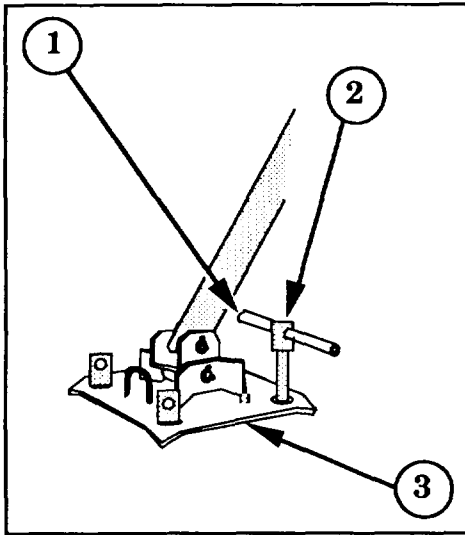
f. Removing Starbar Assembly



- (1) Remove and roll up starbar guy assemblies (11). Loosen threestarbar knob nuts (1) to release three clamps (2).
- (2) Use lifting winch (8) to raise mast (12) until crosspin hole is 1 inch above barrel assembly (10). Remove crosspin (9) and lower mast until starbar straps (5) can be comfortably reached.
- (3) Fold each lower starbar support tube (3) against upperstarbar tube (4) and secure using strap (5).
- (4) Continue lowering mast (12) until starbar mounting tubes (14) rest on barrel assembly (10).
- (5) Release three starbar locking pins (6) by twisting, then pulling, pins from starbar assemblies (7).
- (6) Remove starbar assemblies (7) and place next to mast accessories bag.
- (7) Remove top guy assemblies (13) from guy ring assembly (15).
- (8) Rotate spools to wind up guy assemblies.
- (9) Disconnect RF cable strain relief and cable assembly W1 strain relief from top guy assembly snap hook.

2-13. RETRIEVING MAST - Continued

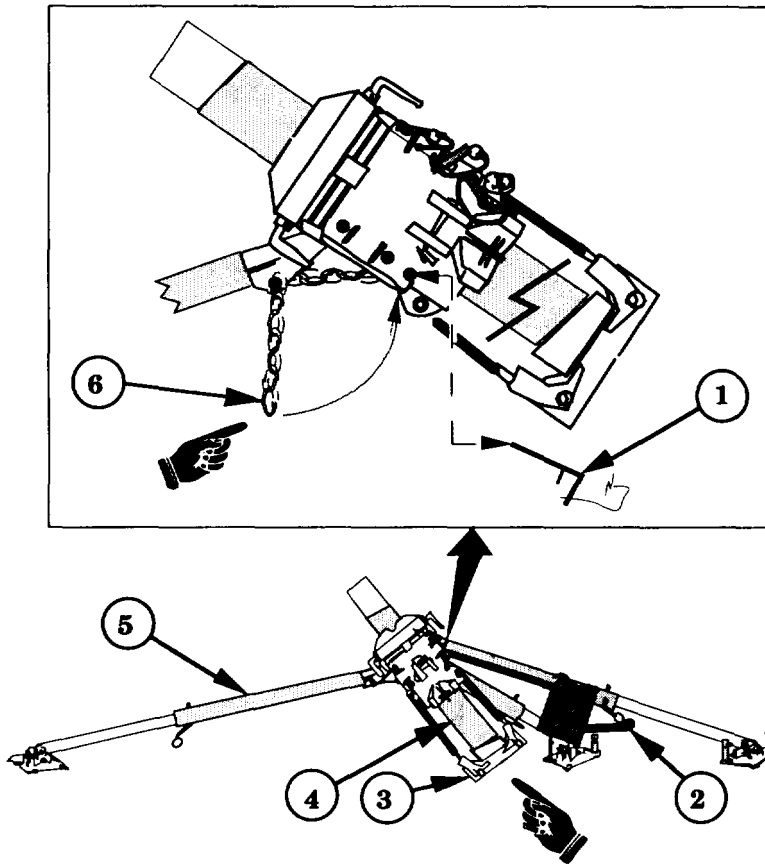
g. Kneeling Tripod



- (1) Use crosspin (1) to remove four anchor stakes (2) from tripodbaseplate (3) of leg to be kneeled (uphill/upwind).
- (2) Place anchor stakes near mast accessories bag for packing.
- (3) Crank lifting winch to raise mast so 8 to 12 inches of mast section is above barrel assembly.

2-13. RETRIEVING MAST - Continued

g. Kneeling Tripod - Continued

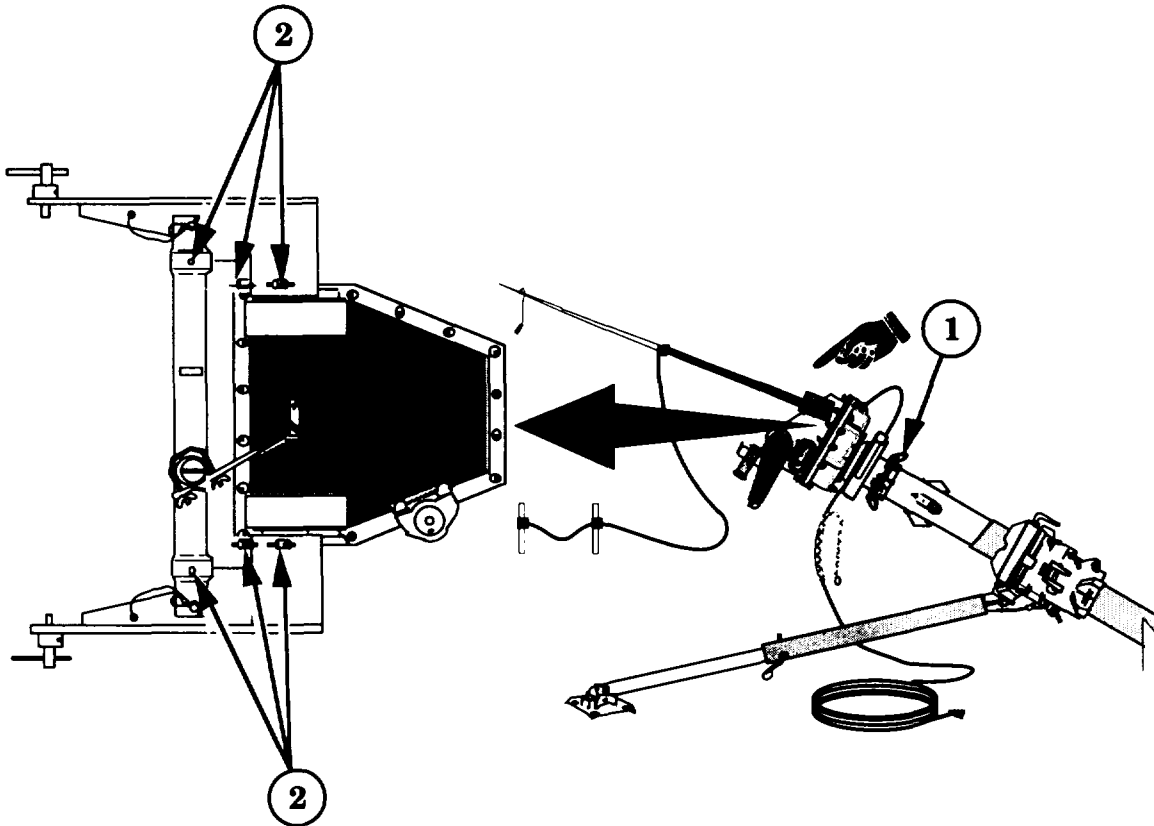
**WARNING**

The mast headload is very heavy and awkward to handle. Two operators are required to support the tripod while a third operator performs the following steps. Failure to comply with this warning may result in equipment damage and personal injury.

- (4) Remove lower locking pin (1) from unanchored leg (5).
- (5) Tilt leg (5) outward enough to clear slot at leg attachment point.
- (6) Insert loop of lanyard (6) into slot at leg attachment point.
- (7) Insert locking pin (1) to secure lanyard in position.
- (8) Lower leg (5) to full extension permitted by lanyard (6), without dislodging shoe assembly (3) from mast section (4).
- (9) Use lifting winch (2) to lower mast section (4) until shoe assembly (3) touches ground.

2-13. RETRIEVING MAST - Continued**h. Disassembling Antenna**

Refer to Appendix F for instructions on disassembling antenna.

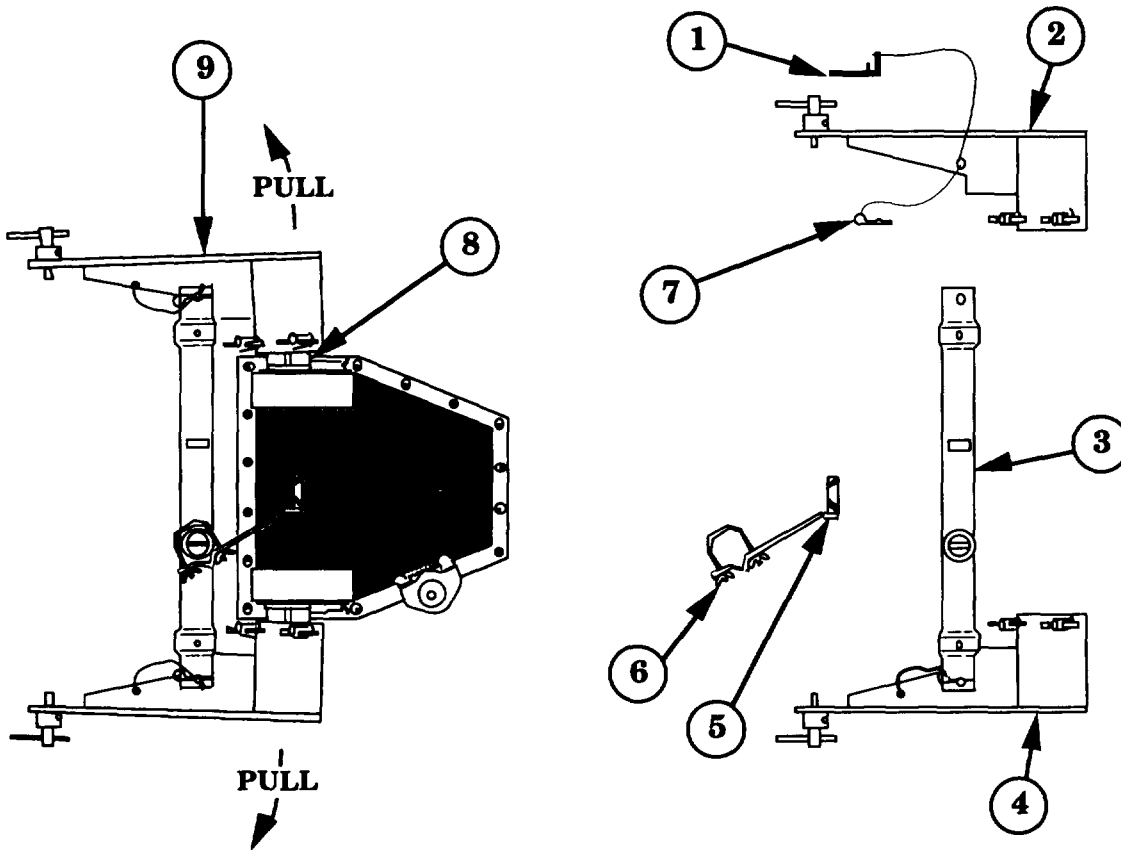
i. Removing Antenna Mounting Bracket

- (1) Remove top guy ring assembly (1) by turning guy ring lock, opening hinged collar, and removing semicircular rings. Reassemble guy ring assemblies and place near mast accessories bag.
- (2) Loosen six thumbscrews (2).

2-98 Change 2

2-13. RETRIEVING MAST - Continued

i. Removing Antenna Mounting Bracket - Continued

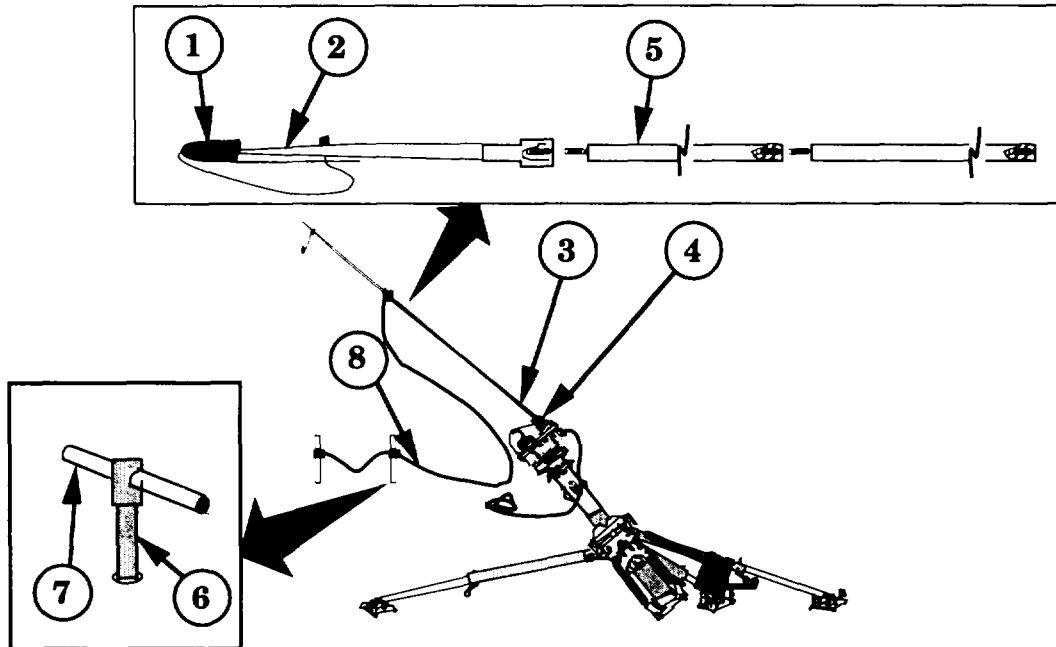


- (3) Using both hands, pull antenna mounting bracket (9) apart and remove from positioner elevation shaft (8), first on one side then the other.
- (4) Loosen two wing nuts (6) and remove cable relief bracket (5). Place bracket next to top section and antenna mounting bracket bag.
- (5) Remove two double spring cotter pins (7) from two locking pins (1). and remove locking pins.
- (6) Remove bracket assemblies (2 and 4) from middle bracket assembly (3). Place near top section and antenna mounting bracket bag.

Change 2 2-99

2-13. RETRIEVING MAST - Continued

j. Removing Lightning Protection Equipment



- (1) Unscrew lightning rod assembly (3) from lightning rod mounting bracket (4).

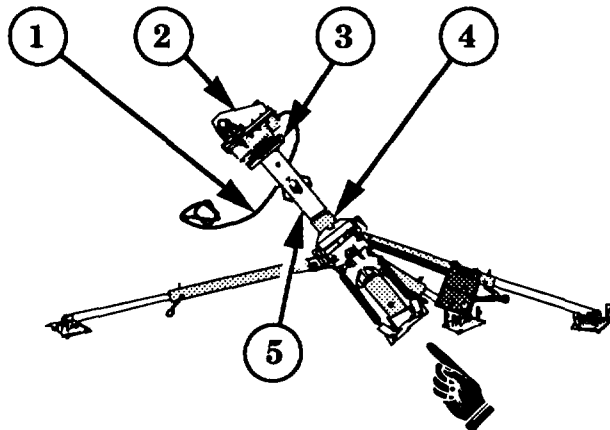
WARNING

Keep protective cover on lightning rod tip. Failure to comply may result in personal injury.

- (2) Place protective cover (1) on lightning rod tip (2).
- (3) Unscrew and separate lightning rod (2) and two lightning rod supports (5)
- (4) Place lightning rod (2) and two lightning rod supports (5) near mast accessories bag for packing.
- (5) Remove cable clamps securing ground cable (lightning) (8) to ground rods (6).
- (6) Insert crosspin (7) through hole in head of ground rod (6).
- (7) Pull and twist crosspin (7) with a back-and-forth twisting motion pulling ground rod (6) from ground.
- (8) Place ground rods near mast accessories bag for packing.
- (9) Wind up ground cable (lightning) and remove from area.

2-13. RETRIEVING MAST - Continued

k. Removing Mast Headload

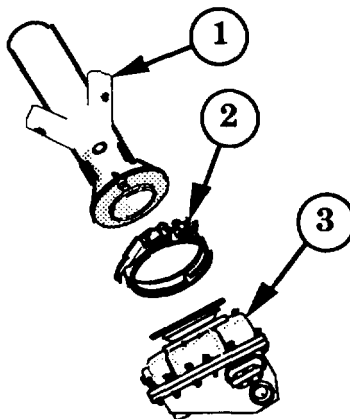


- (1) Disconnect cable assembly W1 (1) from positioner (2). Install protective cap on connector and roll up cable assembly.

WARNING

Removal of the assembled top section and positioner requires three operators. Failure to comply could result in equipment damage and personal injury.

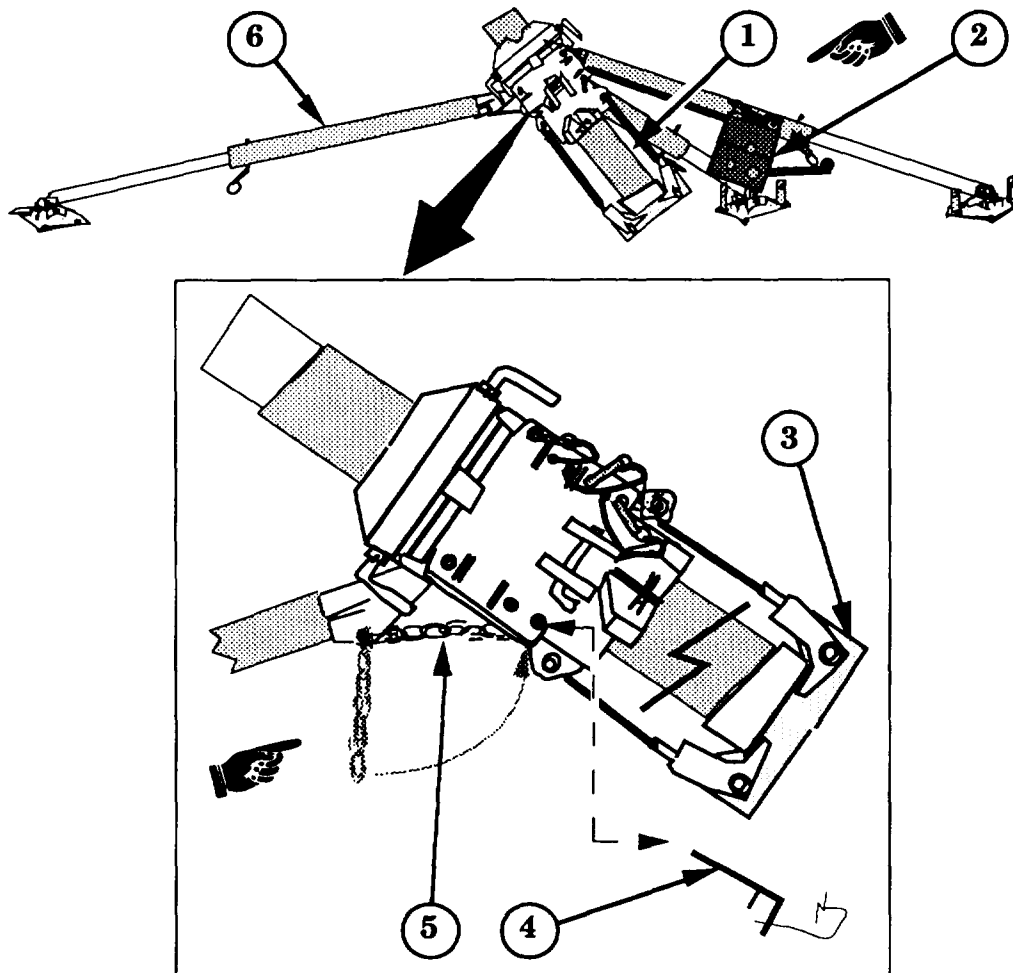
- (2) While one operator steadies tripod, remove assembled top section and positioner (3) from mast section (4).
- (3) Set assembled top section and positioner (3) on ground with top section (5) up.



- (4) Unlatch and remove retaining ring (2).
- (5) Remove top section (1) from positioner (3).

2-13. RETRIEVING MAST - Continued

1. Returning Tripod to Vertical

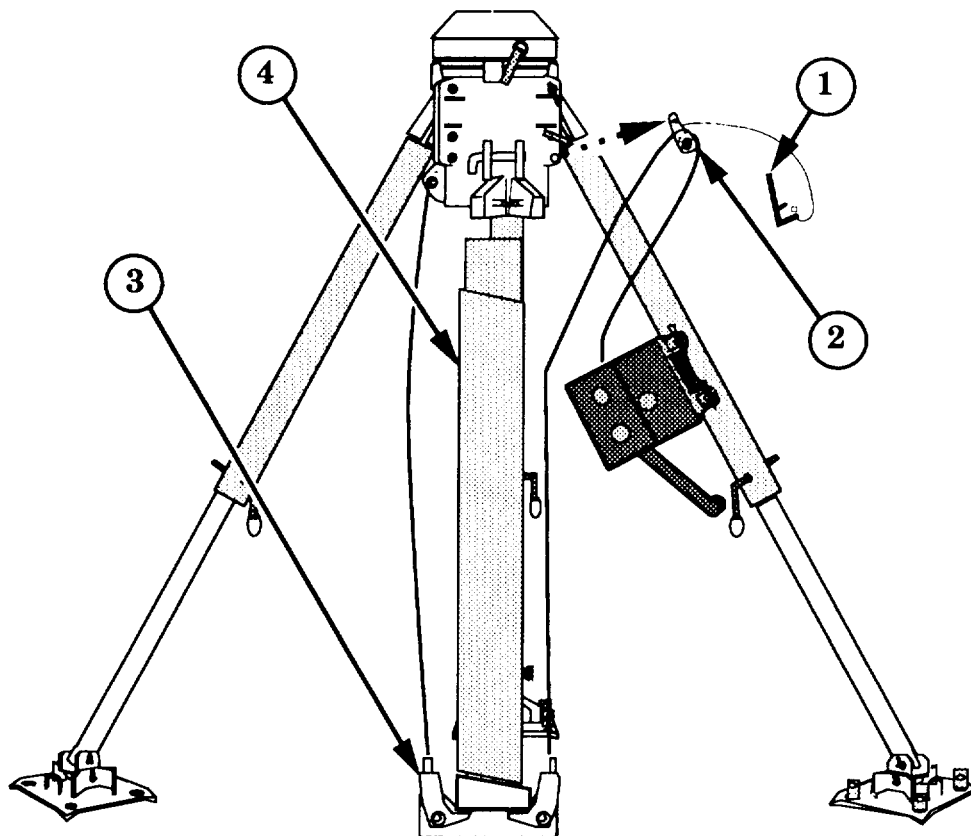
**WARNING**

Three operators are required to perform the following step. Failure to comply could result in personal injury.

- (1) Use lifting winch (2) to raise mast (1) until shoe assembly (3) is 8 to 12 inches from ground.
- (2) While two operators lift tripod, push leg (6) inward toward tripod.
- (3) Release lanyard (5) by removing locking pin (4). Continue raising tripod to upright position.
- (4) Secure leg (6) by inserting locking pin (4).

2-13 RETRIEVING MAST - Continued

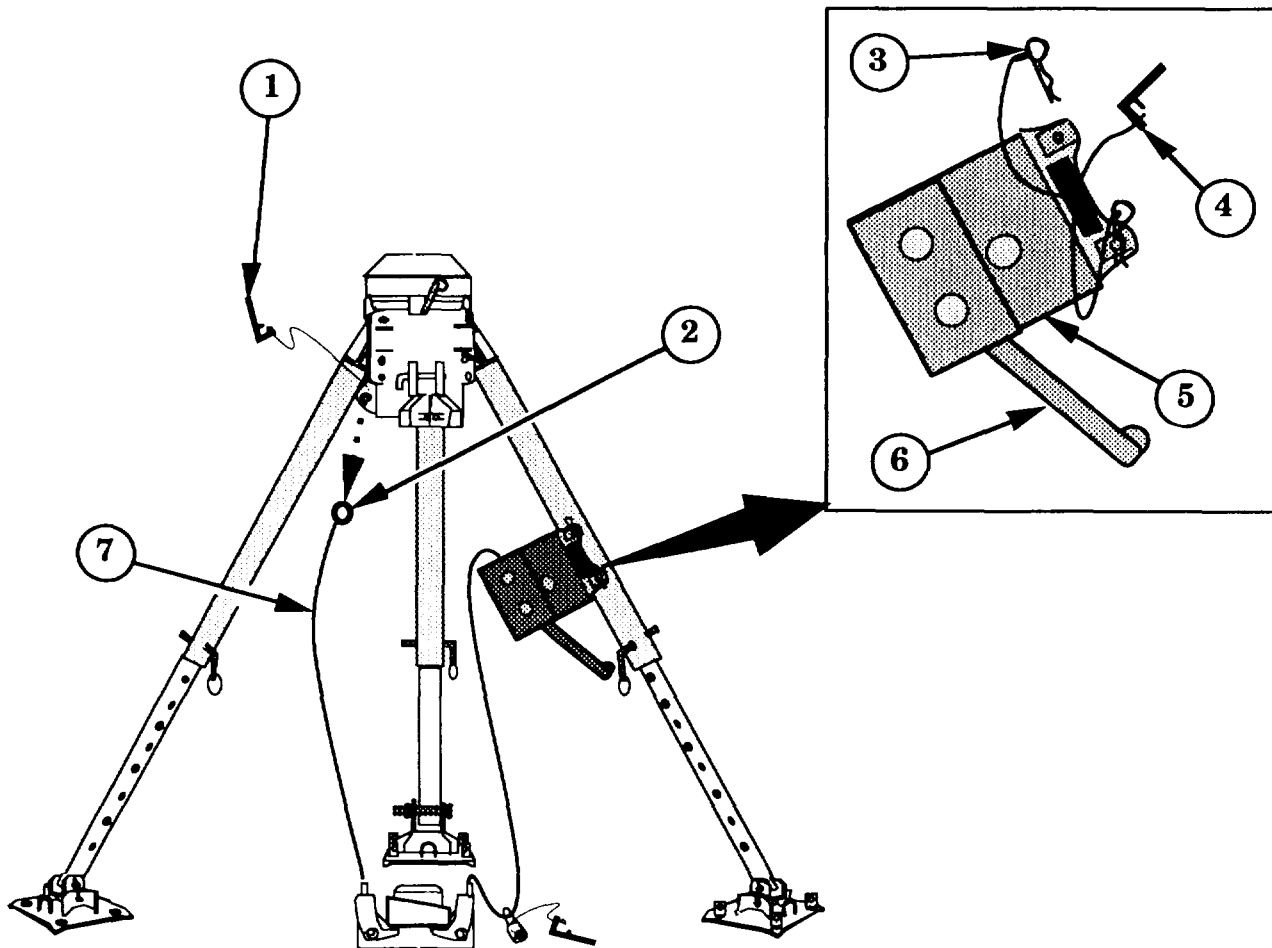
m. Removing Lifting Winch



- (1) Remove mast section (4) from shoe assembly (3).
- (2) Remove locking pin (1), releasing lifting winch pulley (2).

2-13. RETRIEVING MAST - Continued

m. Removing Lifting Winch - Continued



- (3) Remove locking pin (1), releasing belt attachment spool (2).

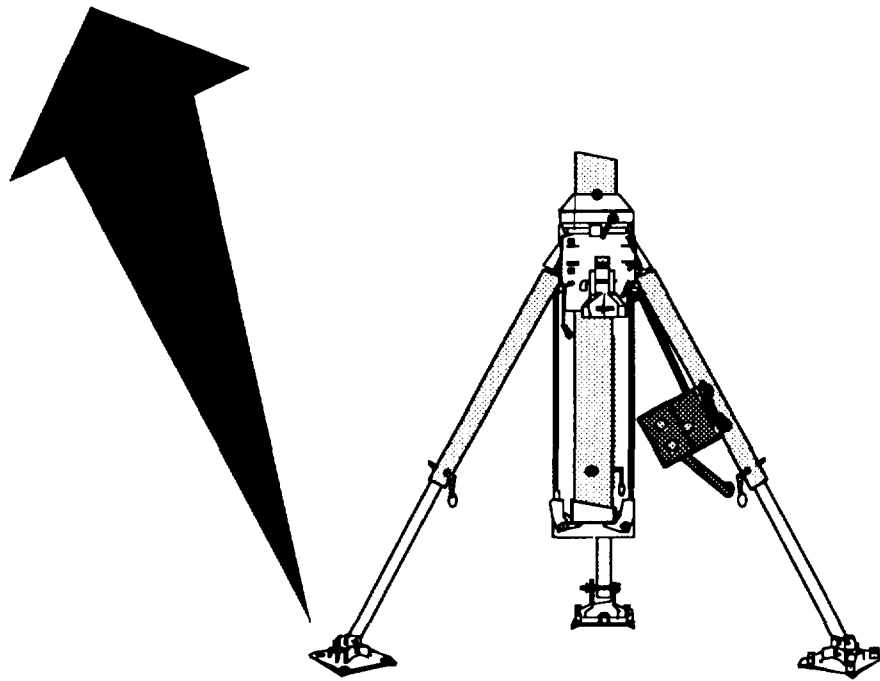
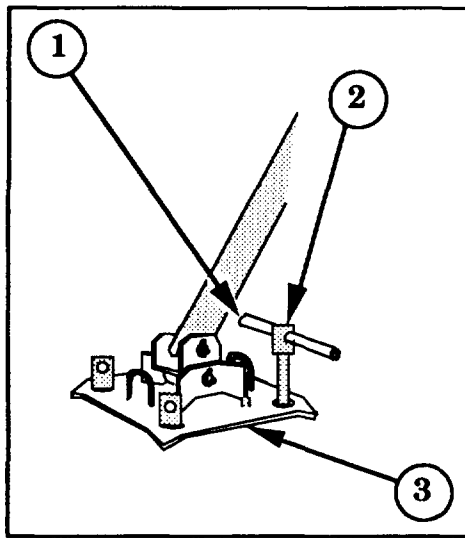
CAUTION

Reel in lifting winch belt while lifting winch is still mounted to tripod. Keep tension on belt to prevent belt from twisting. Failure to comply may result in damage to belt.

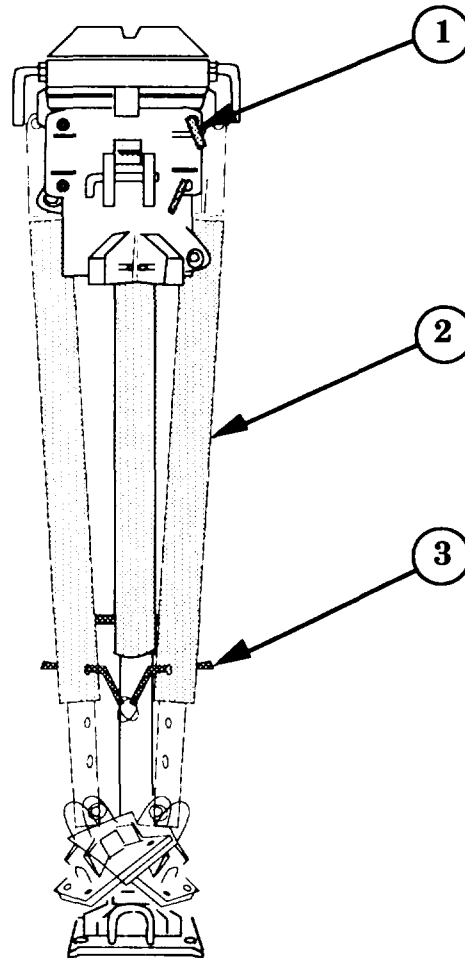
- (4) Crank lifting winch (5) until belt (7) is completely retracted.
- (5) Unlock and remove lifting winch crank (6).
- (6) Support lifting winch and remove two double spring cotter pins (3) and two locking pins (4).
- (7) Place lifting winch (5) and crank (6) near lifting winch bag for packing.

2-13. RETRIEVING MAST - Continued

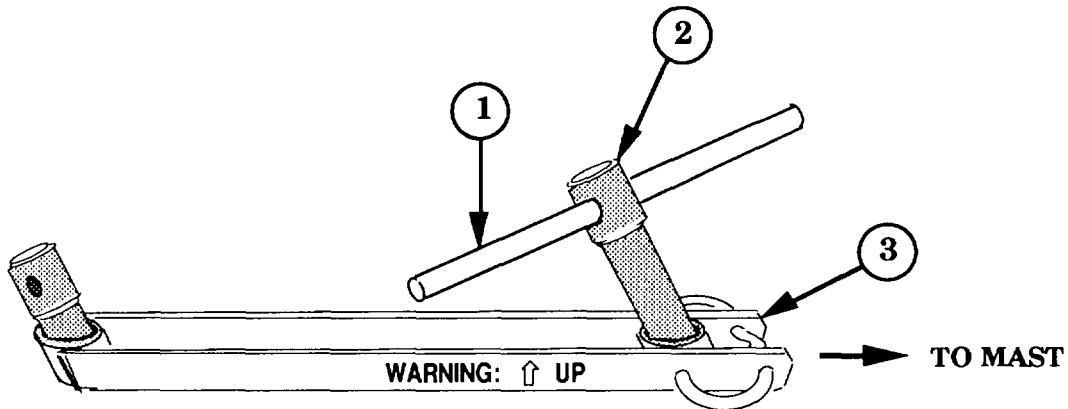
n. Removing Anchor Stakes



- (1) Use crosspin (1) to remove anchor stakes (2) from tripod baseplates (3).
- (2) Place anchor stakes (2) near mast accessories bag for packing.

2-13. RETRIEVING MAST - Continued**o. Removing Tripod**

- (1) Remove locking pin (3) and collapse one leg (2) to shortest position. Replace locking pin (3) in leg.
- (2) Repeat step 1 for remaining two legs
- (3) Remove three upper locking pins (1), fold tripod legs and strap legs (2) together.
- (4) Remove tripod from work area.

2-13. RETRIEVING MAST - Continued**p. Removing Guy Stakes**

- (1) Insert crosspin (1) through hole in head of guy stake (2).

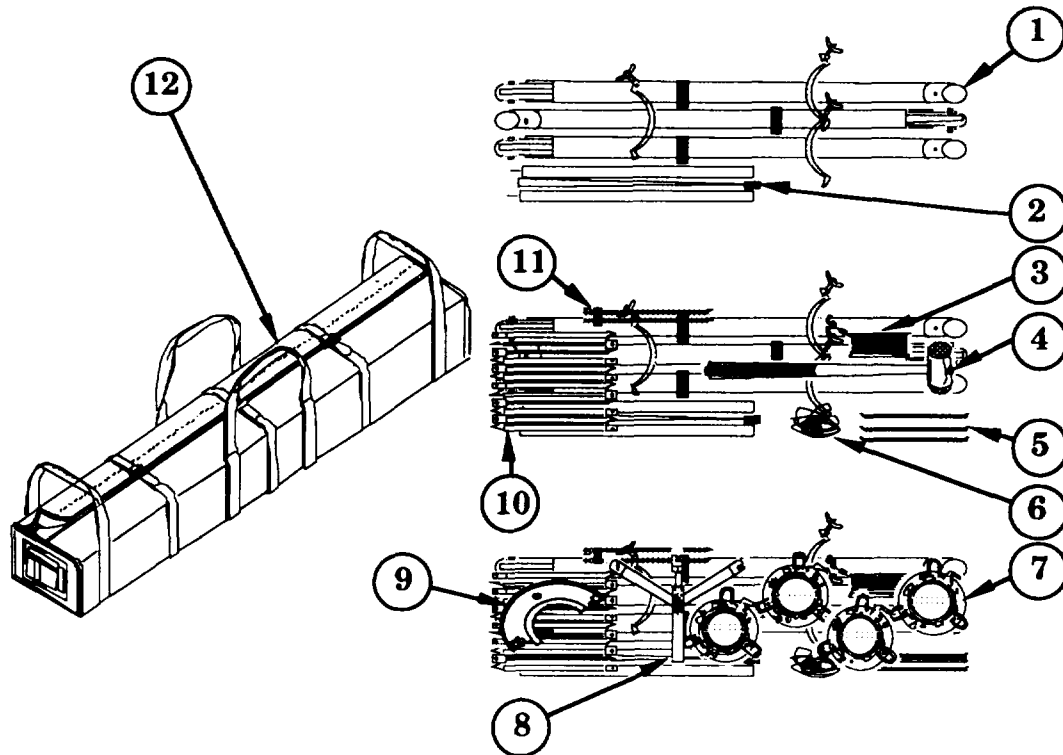
WARNING

Stand behind guy stake when pulling stakes from ground. Failure to comply may result in personal injury.

- (2) Stand on side of guy stake (2) away from mast. Pull and twist crosspin (1) with a back-and-forth twisting motion, pulling guy stake from guy stake coupler (3) and ground. Place guy stakes near guy accessories bag for packing.

2-14. PACKING EQUIPMENT

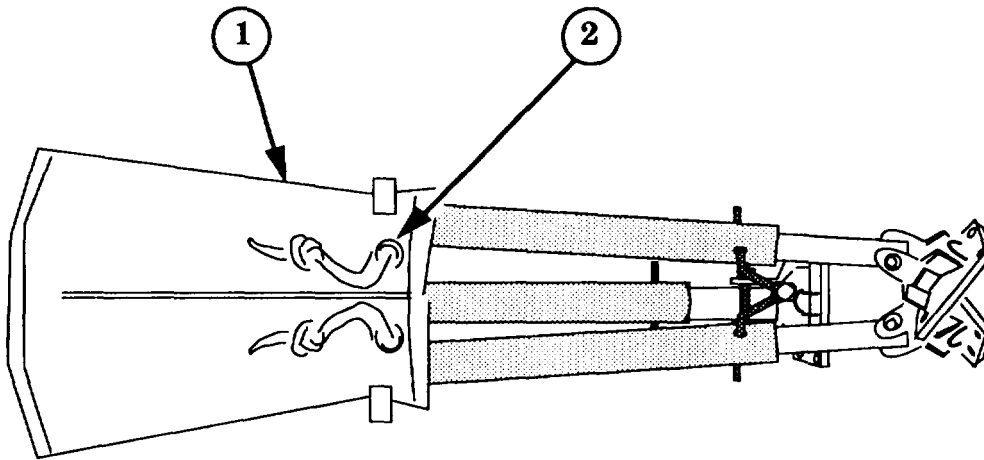
a. Mast Accessories Bag



- (1) Place three starbar assemblies (1) side by side into bottom of mast accessories bag (12).
- (2) Place lightning rod (2) and two lightning rod supports next to starbar assemblies (1).
- (3) Place 12 anchor stakes (10) in gaps at one end of mast accessories bag (12).
- (4) Place three crosspins (5) at opposite end from anchor stakes (9).
- (5) Place eight cable straps (6) together next to crosspins (5).
- (6) Place sledge hammer (4) on top of starbar assemblies (1).
- (7) Place two ground rods (11) opposite lightning rod assembly (2).
- (8) Place rolled-up radius rope (3) between handle of sledge hammer (4) and starbar assemblies (1).
- (9) Place four guy ring assemblies (7) along top of starbar assemblies (1) as far to one end as possible.
- (10) Place tensiometer (8) on top of starbar assemblies (1) at opposite end from guy ring assemblies (7).
- (11) Place barrel cover (9) on top of anchor stakes.
- (12) Close cover using adhesive flap tape and fasten three straps.

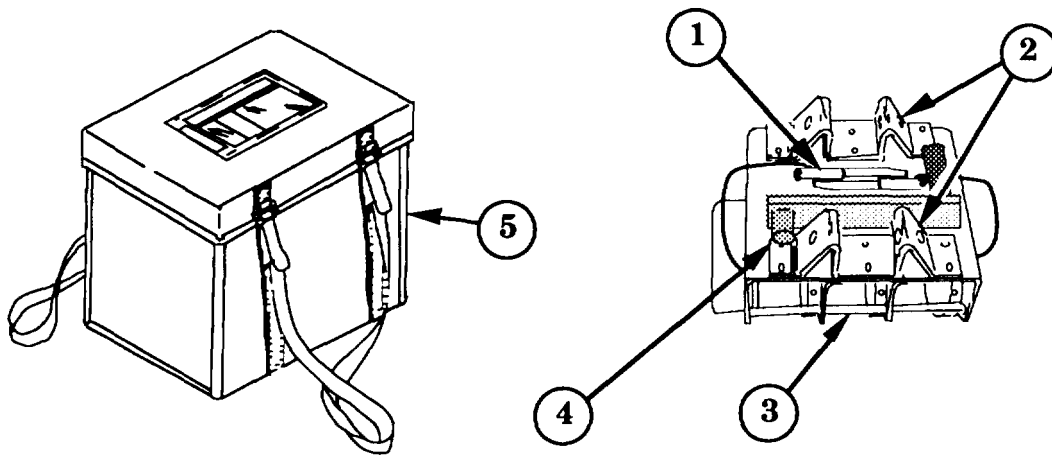
2-14. PACKING EQUIPMENT - Continued

b. Tripod Assembly



- (1) Place tripod barrel bag (1) over barrel assembly.
- (2) Tighten and tie draw string (2) to secure bag.

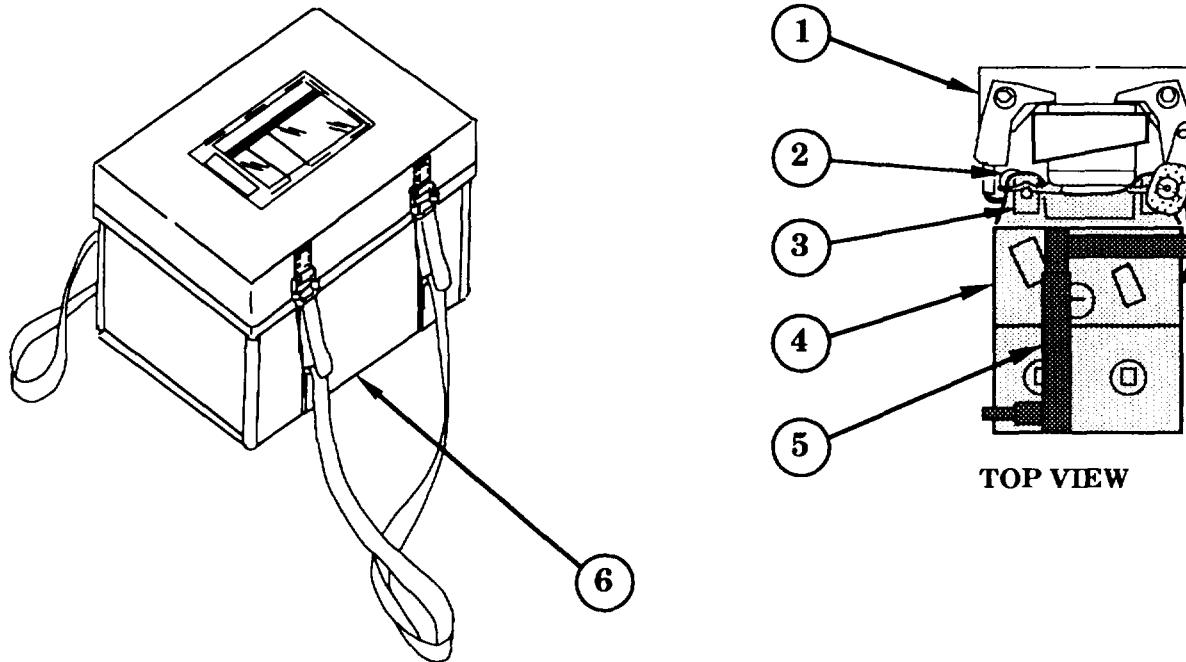
c. Guy Winch Bag



- (1) Place guy winch (3) so that mounting brackets (2) are facing up. Lay tensioning rods (1) between mounting brackets (2).
- (2) Place guy winch (3) in guy winch bag (5) with mounting brackets facing up.
- (3) Place lift winch crank (4) in bag on top of guy winch (3).
- (4) Close cover and fasten straps.
- (5) Repeat steps 1 thru 4 for second guy winch.

2-14. PACKING EQUIPMENT - Continued

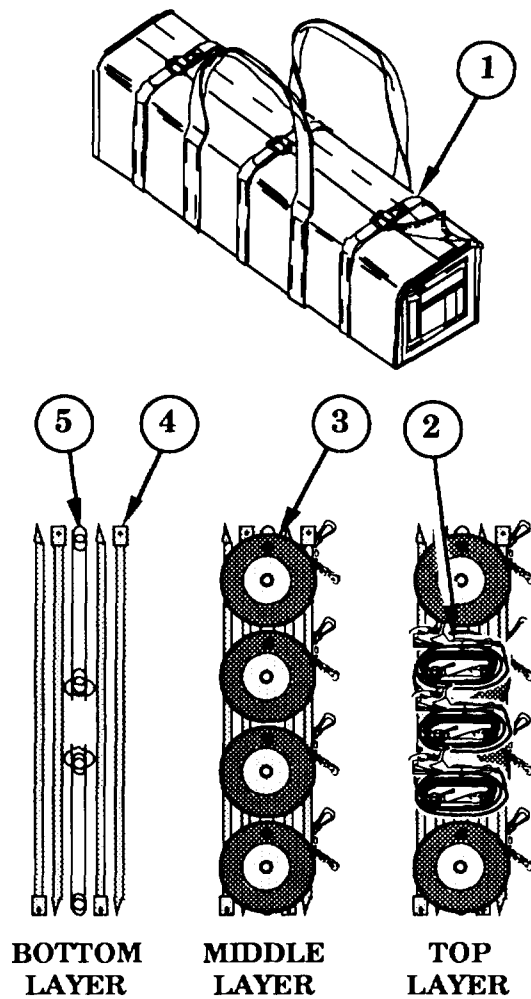
d. Lifting Winch Bag



- (1) Place lifting winch (4) on flat end opposite mounting brackets (3).
- (2) Place shoe assembly (1) on mounting brackets (3) and belt attachment spool (2) between mounting brackets (3), and insert locking pin so that shoe assembly (1) cannot move.
- (3) Using lifting winch crank (5), carefully tighten belt. When belt is tight, remove lifting winch crank (5).
- (4) Place lifting winch (4) flat in lifting winch bag (6). Place crank (5) on top of lifting winch (4).
- (5) Close cover and fasten straps.

2-14. PACKING EQUIPMENT - Continued

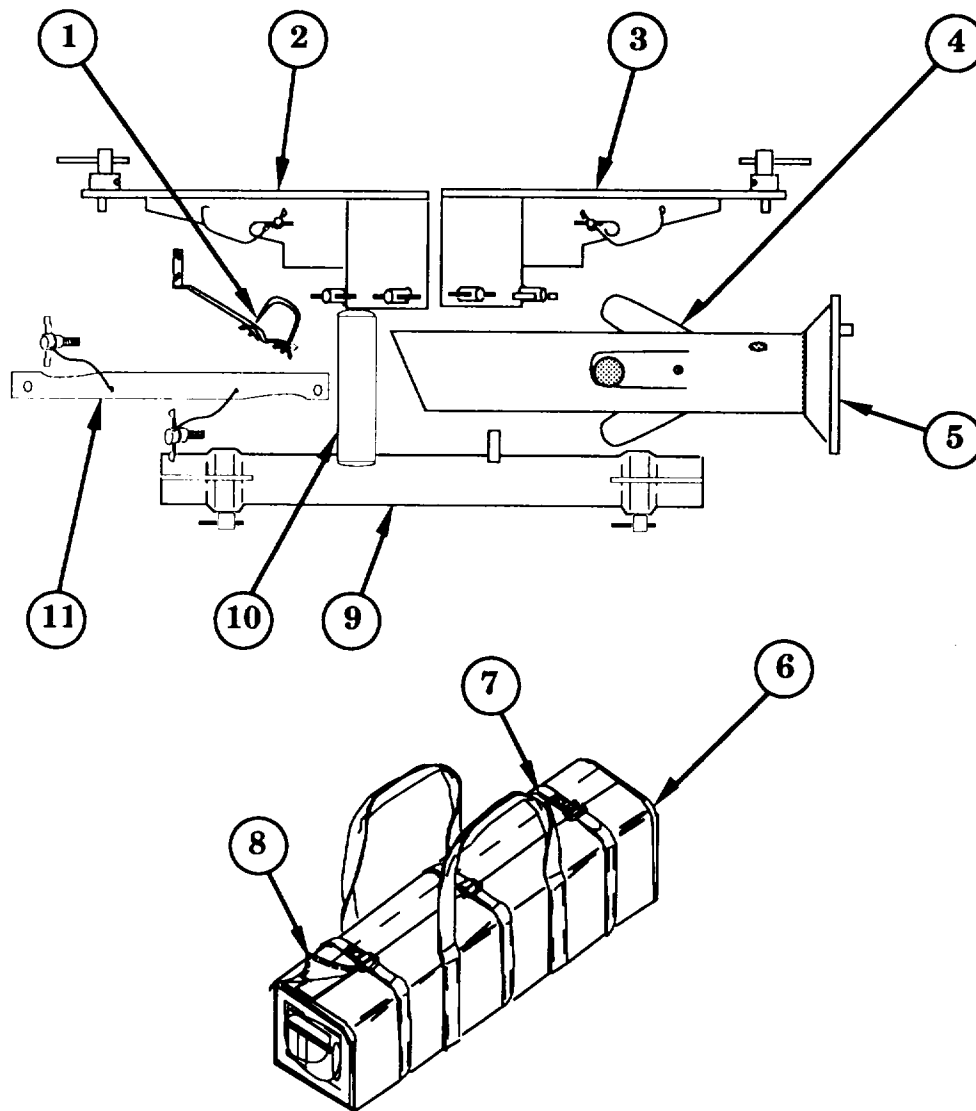
e. Guy Accessories Bag



- (1) Place four guy stakes (4) side by side in guy accessories bag (1).
- (2) Place two guy stake couplers (5) between four guy stakes (4).
- (3) Lay four guy assemblies (3) flat on top of guy stakes (4).
- (4) Place two guy assemblies (3) at each end of guy accessories bag (1) on top of guy assemblies (3) already in bag (1).
- (5) Wrap web straps around each fast tensioning ratchet (2) then place fast tensioning systems in center on top of guy assemblies (3).
- (6) Close cover using adhesive flap tape and fasten three straps.

2-14. PACKING EQUIPMENT - Continued

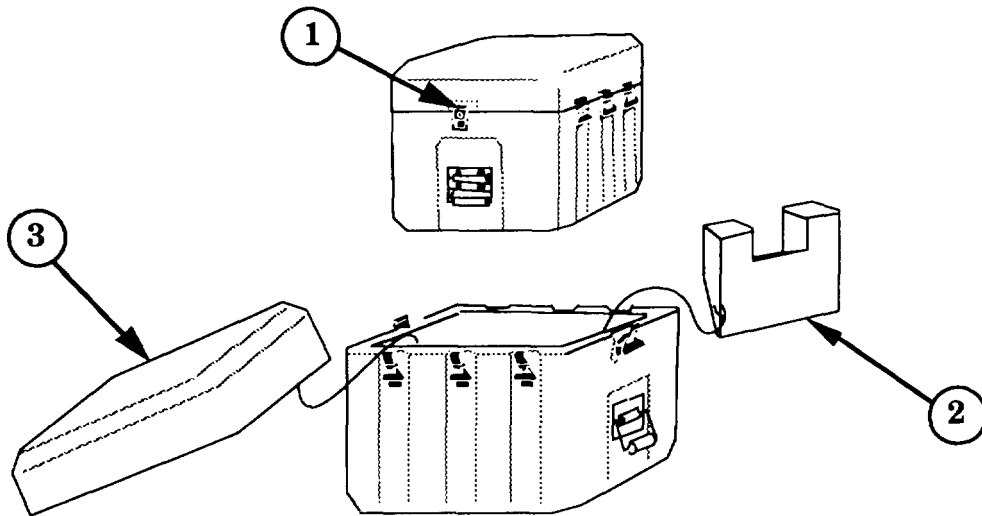
f. Top Section and Antenna Mounting Bracket Bag



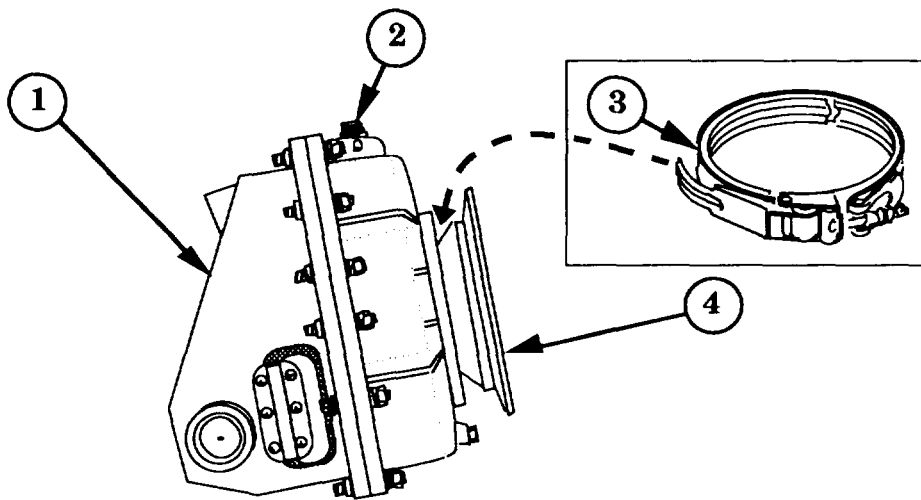
- (1) Place top section (4) in bag (6) with mounting plate (5) closest to end of bag.
- (2) Place two end bracket assemblies (2 and 3) next to top section with ends facing each other.
- (3) Place middle bracket assembly (9) in opposite end of bag with upright post (10) flat.
- (4) Place strain relief bracket (1) in end of bag opposite top section (4).
- (5) Place antenna support bracket (11) next to strain relief bracket (1).
- (6) Close cover using adhesive flap tape (8) and fasten three straps (7).

2-14. PACKING EQUIPMENT - Continued

g. Positioner/Controller Transit Case



- (1) Release eight latches (1).
- (2) Remove cover (3) from transit case and set cover aside.
- (3) Remove foam wedge (2) and set aside.



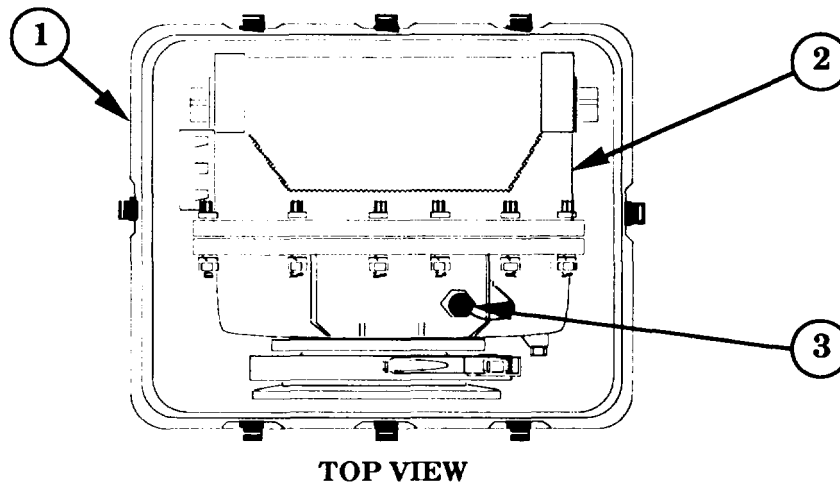
NOTE

Two operators are required to perform the following steps.

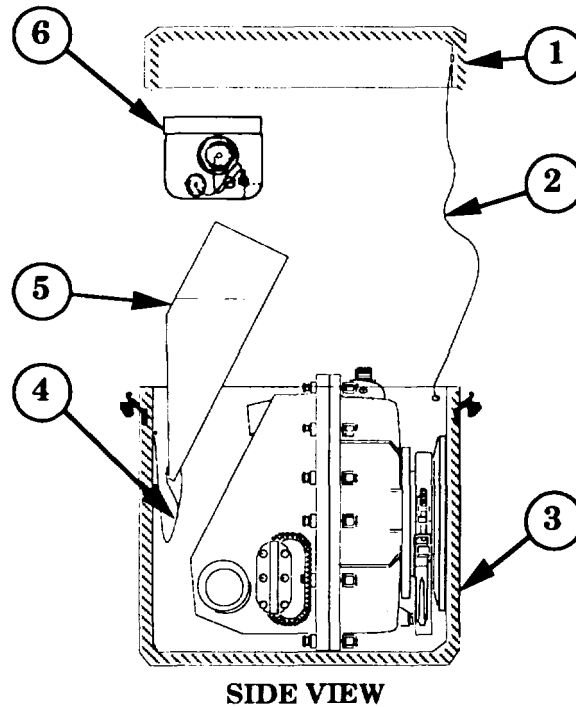
- (4) Place positioner (1) on ground with connector (2) facing upward.
- (5) Open retaining ring (3) and place retaining ring around positioner baseplate (4).
- (6) Latch retaining ring (3).

2-14. PACKING EQUIPMENT - Continued

g. Positioner/Controller Transit Case - Continued



(7) Place positioner (2) in transit case (1) with connector (3) facing upward.



(8) Place foam wedge (5) in transit case (3).

(9) Place controller (6) face up on top of foam wedge (5).

(10) Place cover (1) on transit case (3), ensuring that both lanyards (2 and 4) are inside transit case (3).

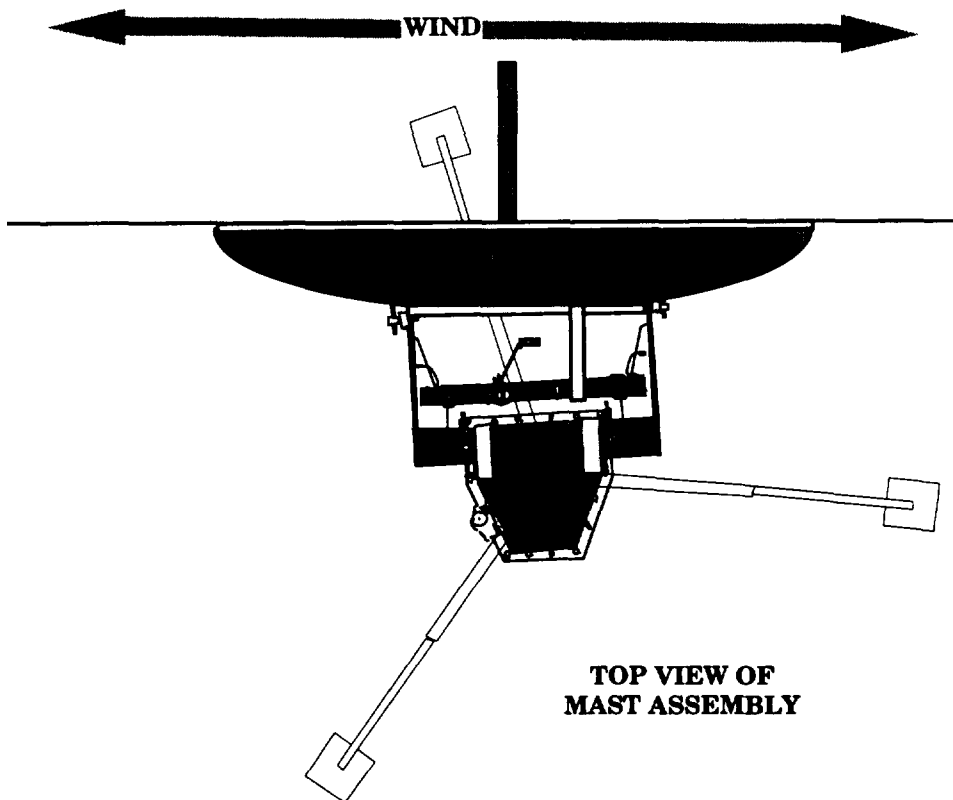
(11) Fasten eight latches to secure cover.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

Subject	Para	Page
Unusual Weather.....	2-15	2-115
Emergency Procedures.....	2-16	2-116
Night Operations.....	2-17	2-118
Locating Guy Anchor Positions.....	2-17a	2-118
Mast Straightness and Verticality.....	2-17b	2-119
Mast Deviation Correction Procedures.....	2-18	2-120
Unusual Soil Conditions.....	2-19	2-123
Preparation of Radius Rope for Smaller Guy Radius Deployments.....	2-20	2-123
Deploying Mast with 59-Foot Guy Anchor Radius.....	2-21	2-124
Deploying Mast with 25-Foot Guy Anchor Radius.....	2-22	2-129

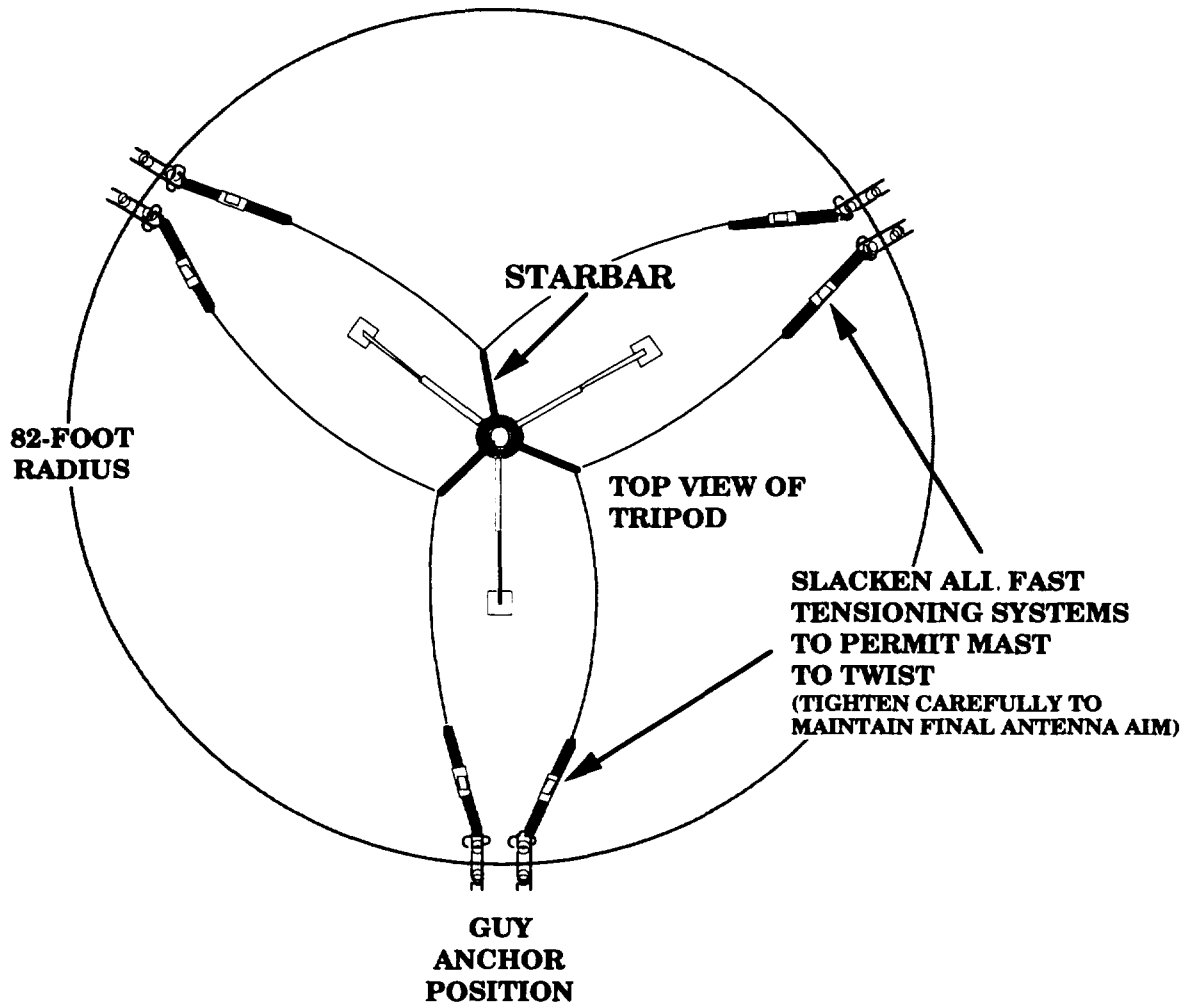
2-15. UNUSUAL WEATHER

- a. When the mast is operated under conditions of salt air, sea spray, rain storms, dust storms, sand storms, or snow, ensure:
 - (1) Additional weight is added, as necessary, to anchor stakes.
 - (2) Winches and barrel assembly are covered.
- b. When wind speeds exceed 60 mph, rotate antenna, using controller, so that minimal antenna surface area faces wind. This may, however, disrupt communications.



2-16. EMERGENCY PROCEDURES

When the positioner is not operational, the antenna can be manually rotated by performing the following steps.

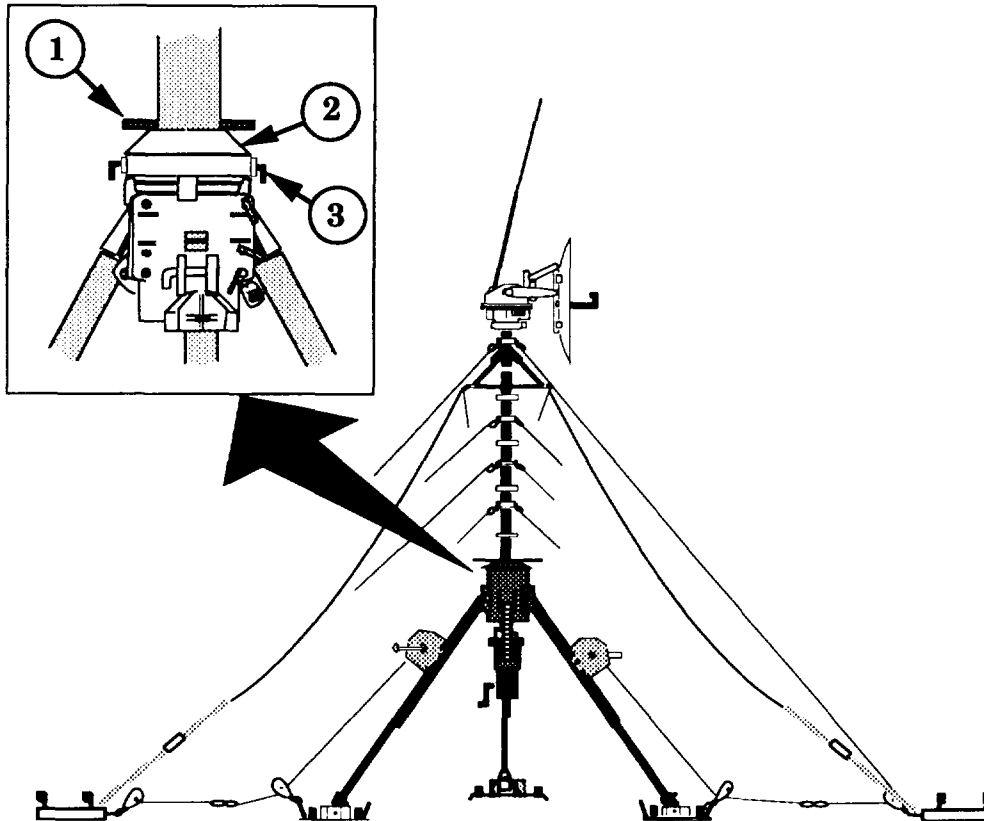


NOTE

Using this procedure, antenna repositioning is limited to less than 30 degrees.

- a. Loosen fast tensioning systems on starbar guy assemblies to remove all tension so that guy assemblies are completely slack.

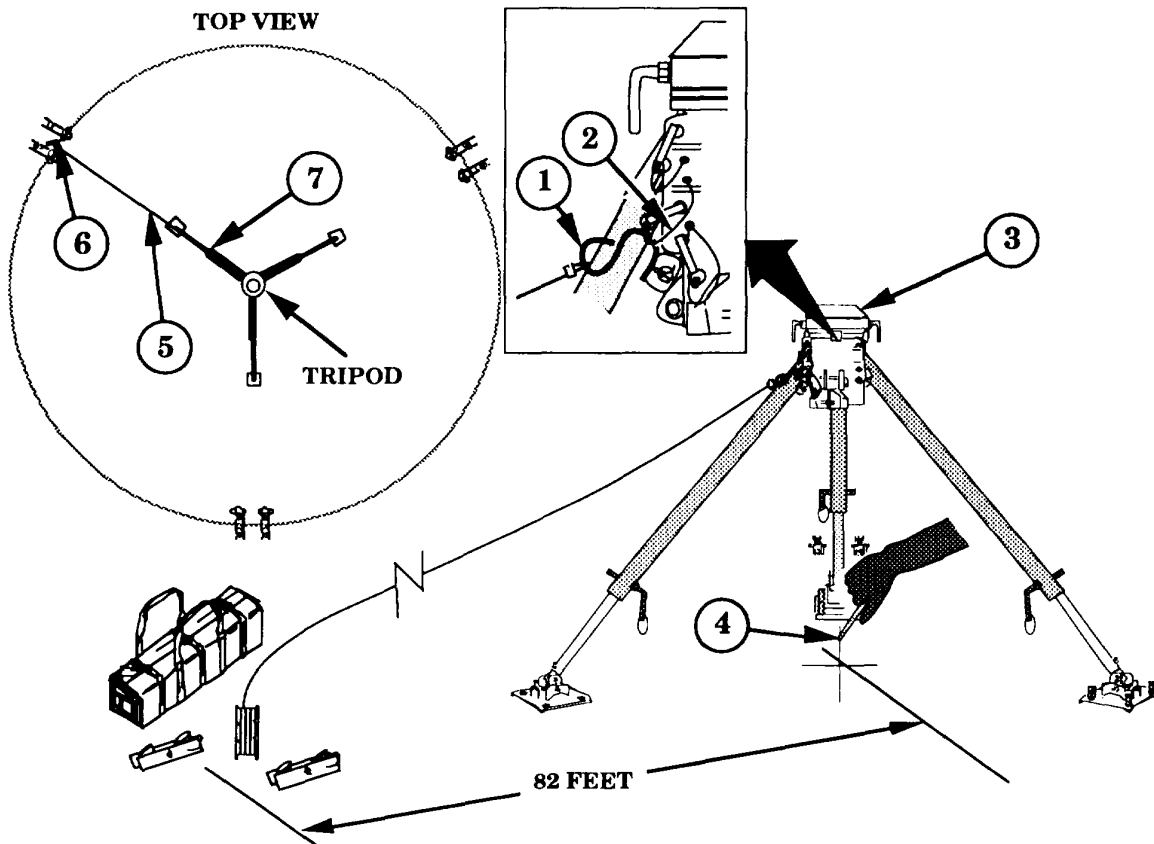
2-16. EMERGENCY PROCEDURES - Continued



- b. Loosen two L-handle lock screws (3) on barrel assembly top (2).
- c. Using crosspin (1) as a lever, rotate mast to reposition antenna.
- d. Tighten L-handle lock screws (3) on barrel assembly top (2).
- e. Adjust guy assembly tension to read 60 to 100 on tensiometer SG scale (refer to para 2-11z, step 11).

2-17. NIGHT OPERATIONS

The preferred method for night deployment employs the use of chemical lights. For tactical conditions wrap chemical lights in black plastic tape leaving a small opening at bottom of each light.



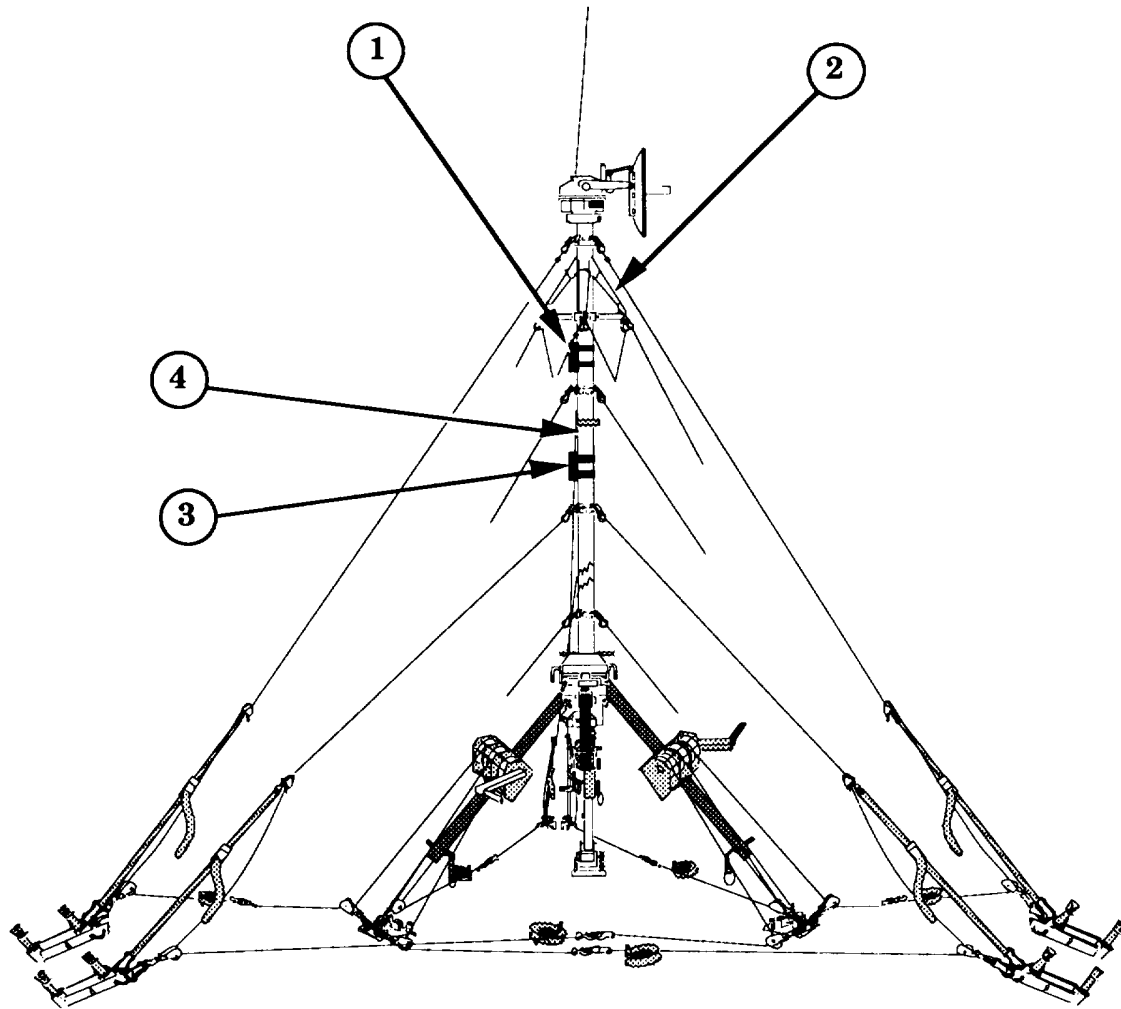
NOTE

Perform mast deployment (refer to para 2-11), substituting the following steps as required.

a. Locating Guy Anchor Positions

- (1) Connect radius rope S-hook (1) to lanyard (2).
- (2) Operator 1: Hold chemical light (4) directly under tripod barrel assembly (3).
- (3) Operator 2: Walk directly outward from leg (7) and fully unwind radius rope (5) to guy anchor position (6). Find exact guy anchor position by lining up radius rope (5) until chemical light (4) disappears behind tripod leg (7).
- (4) Operator 3: Carry one guy accessories bag, crosspin, and sledge hammer to guy anchor position (6).
- (5) Complete locating guy anchor position (refer to para 2-11d, steps 4 thru 7).
- (6) Repeat steps 3 thru 5, above, for remaining two guy anchor positions.
- (7) Rewind radius rope and place in mast accessories bag.

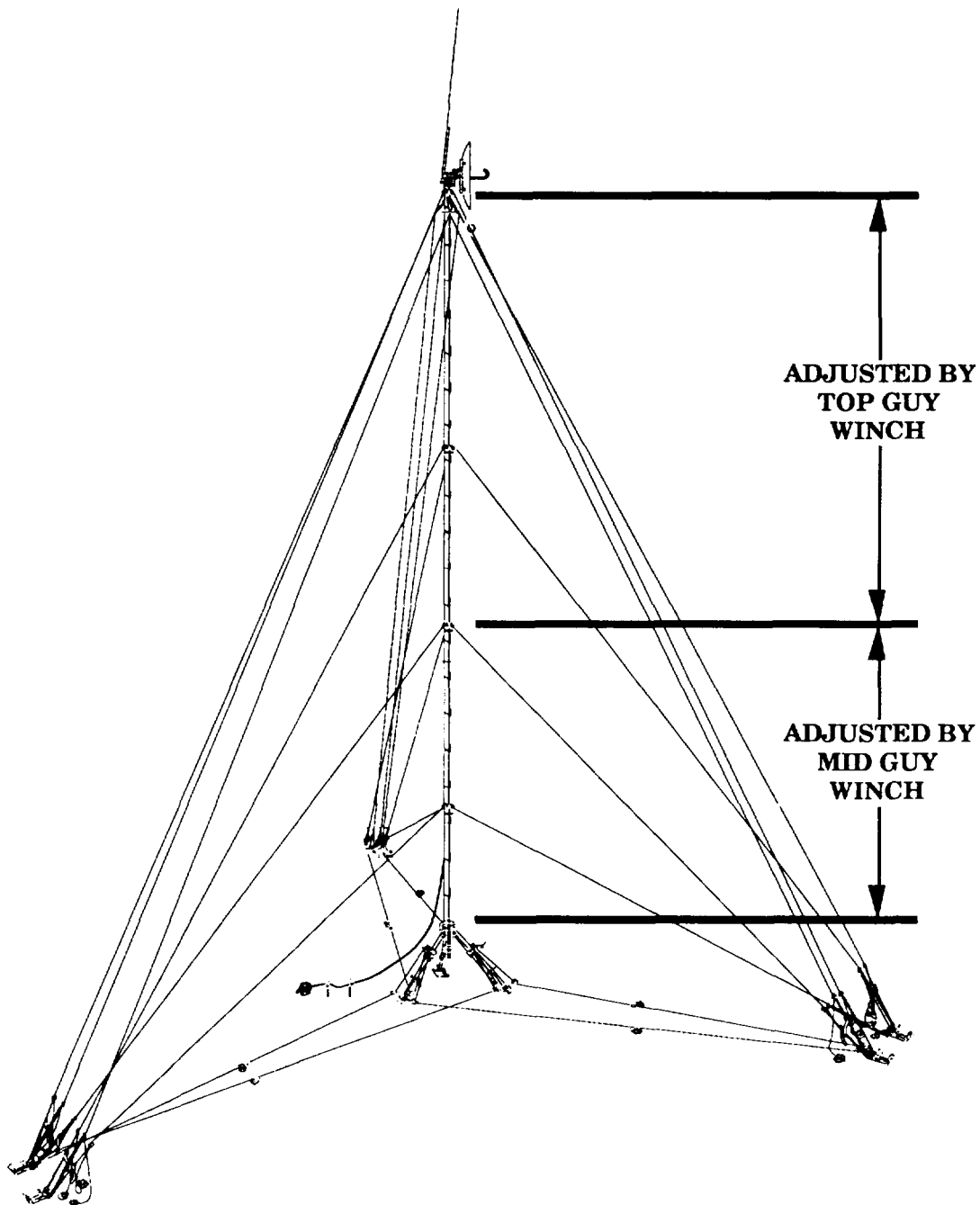
b. Mast Straightness and Verticality



- (1) Attach one chemical light (1) to mast under starbar assembly (2).
- (2) Attach second chemical light (3) to mast section 7 (4), directly in line with chemical light (1) under starbar assembly.
- (3) Determine mast straightness and verticality by using mast and lights like a rifle sight.

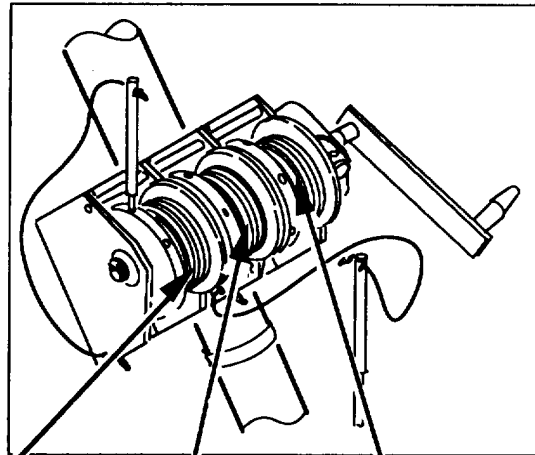
2-18. MAST DEVIATION CORRECTION PROCEDURES

Maintaining verticality and straightness during deployment and retrieval of the mast is extremely important. Mast deviations are corrected using guy winches. The mid guy winch controls tension to the lower half of the mast, and the top guy winch controls tension to the upper half.



2-18. MAST DEVIATION CORRECTION PROCEDURES - Continued

Each guy winch contains three cable tensioning reels which can be controlled independently or collectively to maintain tension on the top or mid guy assemblies. The tensioning reel on the right moves the mast in the direction of the tripod leg on the right of the guy winch. The tensioning reel on the left moves the mast in the direction of the tripod leg on the left of the guy winch. The tensioning reel in the center moves the mast in the direction of the tripod leg supporting the guy winch.

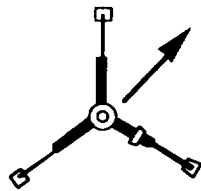


INCREASE TENSION TO CORRECT MAST, IF DEVIATING TO RIGHT OF WINCH LOCATION

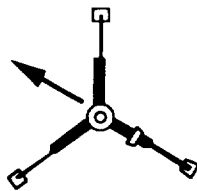
INCREASE TENSION TO CORRECT MAST, IF DEVIATING AWAY FROM WINCH LOCATION

INCREASE TENSION TO CORRECT MAST, IF DEVIATING TO LEFT OF WINCH LOCATION

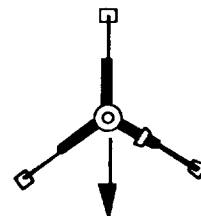
If the mast deviates from a vertical and straight condition, correct using the following procedures (same for top or mid guy winches).



RIGHT DEVIATION



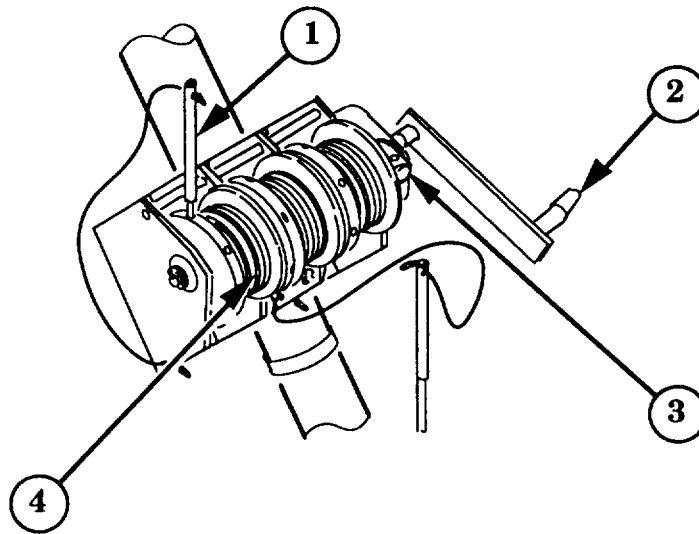
CENTER DEVIATION



LEFT DEVIATION

- a. Determine direction of deviation (right, center, or left of tripod leg supporting guy winch).

2-18. MAST DEVIATION CORRECTION PROCEDURES - Continued

**WARNING**

Always grasp guy winch crank before pressing guy winch safety release. Failure to do so may topple the mast resulting in death or personal injury.

- b. Block reels (4) that do not require adjustment by inserting tensioning rods (1).
- c. Press and hold safety release (3) on guy winch and rotate crank (2) one complete revolution to loosen only over tensioned guy assembly.
- d. Insert tensioning rod into applicable guy winch cable reel and increase tension by rotating downward.
- e. Repeat steps a thru d until mast is straight and vertical.

2-19. UNUSUAL SOIL CONDITIONS

When the mast is deployed underartic, rocky, or similar hard soil conditions,

- a Use alternate guy stake GP-101/U.
- b. Enlarge hole in head of stake to $15 + 0.11$ millimeters.
- 0.00

2-20. PREPARATION OF RADIUS ROPE FOR SMALLER GUY RADIUS DEPLOYMENTS**NOTE**

Several methods can be used for marking the radius rope. The method described below is one which can be easily performed, using cable assembly W1 as a measuring tool.

- a Operator 1: Fully extend cable assembly W1. Grasp radius rope S-hook and end of W1 marked "Positioner".
- b. Operator 2: Unwind 25 feet of radius rope from spool using 2-foot markers on W1 as a measuring guide. Grasp radius rope at 25-foot point.
- c. Operator 3: Unwind additional foot of radius rope from spool. Loop spool around radius rope and tie single knot in rope at 25-foot point.
- d. Operator 2: Unwind radius rope to 59 feet and grasp rope at 59-foot point.
- e. Operator 3: Unwind additional foot of radius rope from spool. Loop spool around radius rope and tie two knots in rope at 59-foot point.

Change 2 2-123

2-21. DEPLOYING MAST WITH 59-FOOT GUY ANCHOR RADIUS

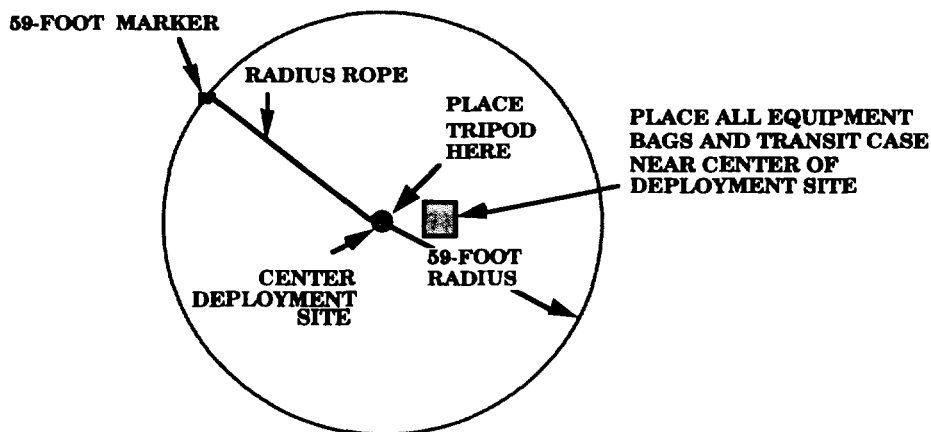
This procedure is to be used for mast heights between 25 and 60 feet where obstructions or other conditions do not permit using the recommended 82-foot radius. This procedure is identical to full mast deployment except that only one guy winch is used and the mid guy assembly is used in place of the top guy assembly.

WARNING

Mast height must not exceed 60 feet (12 mast sections) since significant loss of strength occurs with reduced radius. Failure to comply may result in mast toppling over causing personal injury or death.

NOTE

Three operators experienced in full mast deployment are required for successful accomplishment of this procedure. Observe all WARNINGS and CAUTIONS given in paragraph 2-11.

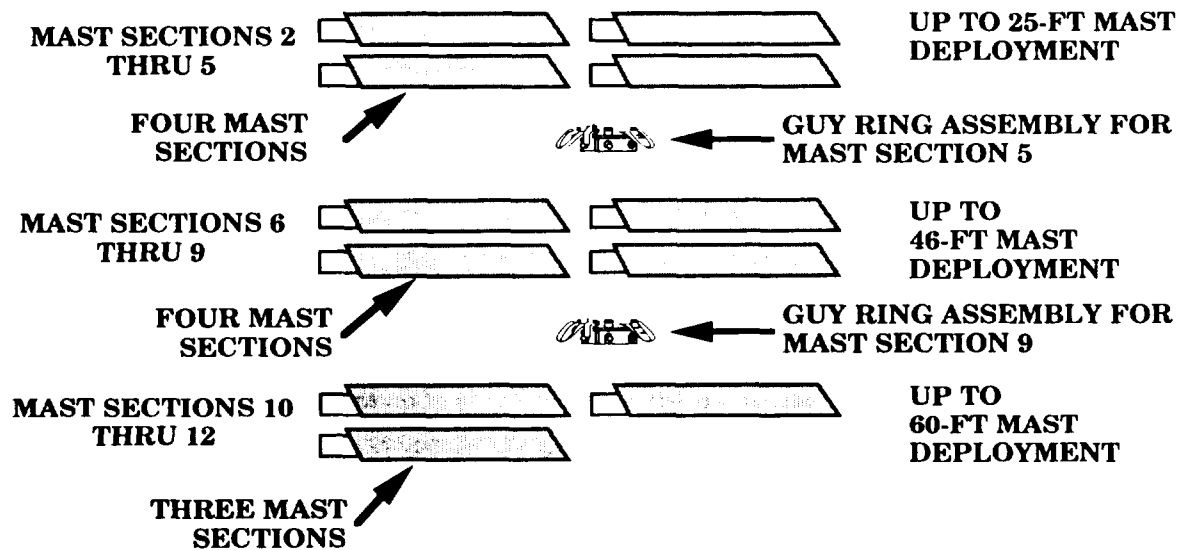
**NOTE**

Only one guy winch is used for this deployment.

- a. Select approximate center of deployment site and place all equipment bags and transit case near center of deployment site.
- b. Knot radius rope as instructed in paragraph 2-20.
- c. Use radius rope at its 59-foot extension marker (double knot) to ensure site is free of obstructions for deployment of guy assemblies (refer to para 2-11a, steps 3 and 4).
- d. Set up tripod at center of deployment site and check tripod leveling (refer to paras 2-11b and c).

2-21. DEPLOYING MAST WITH 59-FOOT GUY ANCHOR RADIUS - Continued

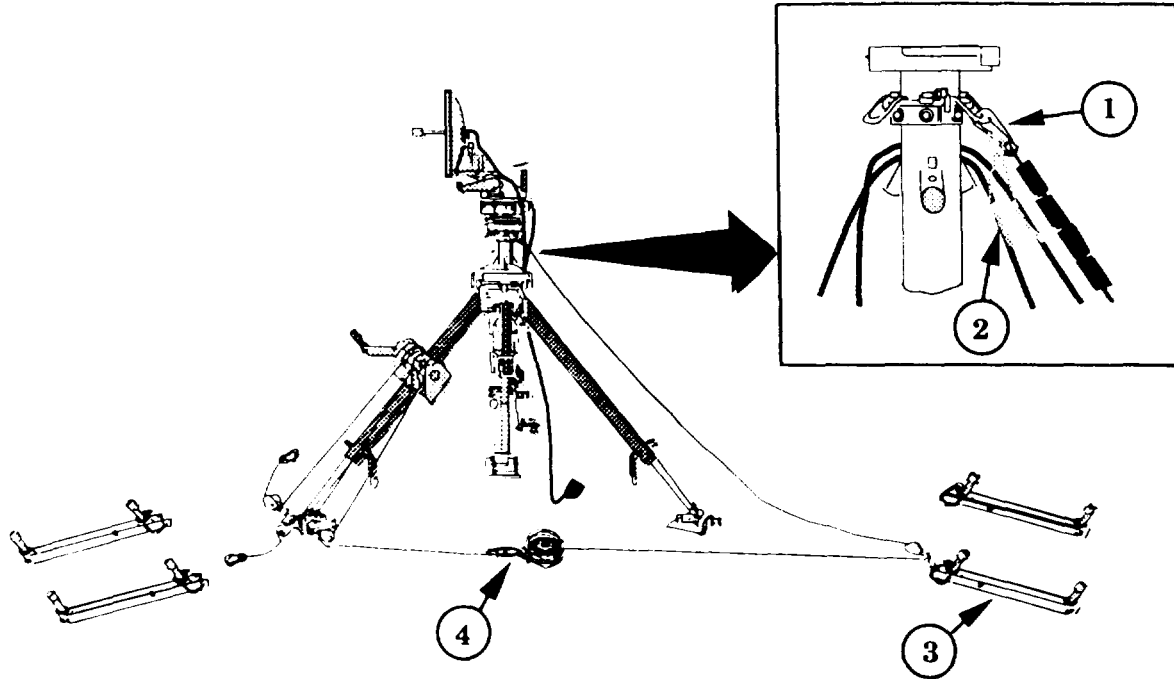
- e. Remove guy assemblies except for top guy from each guy accessories bag and lay out 8 to 10 feet from tripod.
- f. Use 59-foot extension marker on radius rope to determine exact guy anchor position (refer to para 2-11 d, steps 1 and 2).
- g. Locate guy stake coupler position and drive guy stakes into ground to seure coupler (refer to para 2-11d, steps 3 thru 9).
- h. Continue deployment: Install lifting winch assembly, positioner, lightning protection equipment, and antenna (refer to paras 2-11e thru l).
- i. Secure tripod and perform positioner preoperational check (refer to paras 2-11m and n).
- j. Lay out mast sections and guy ring assemblies as shown below for desired mast height. Each mast section adds 4.3 feet to antenna height.



Change 2 2-125

2-21. DEPLOYING MAST WITH 59-FOOT GUY ANCHOR RADIUS - Continued

- k. Mount guy winch and attach deflection pulleys (refer to para 2-11p, steps 1 thru 4), then pull out extension cable until snap hook is approximately 12 feet from baseplate.

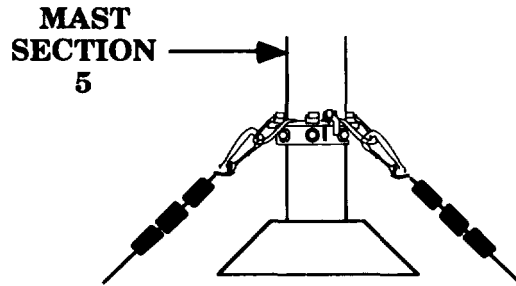


- l. Attach RF and W1 cable strain reliefs (2) to mid guy assembly snap hook (1) then attach snap hook to guy ring assembly.
- m. Unreel mid guy assembly to left guy stake coupler (3) and attach return pulley to center ring. Fully unreel cable and attach mid guy assembly snap hook to guy winch snap hook (4).
- n. Repeat steps l and m, except omit strain reliefs, and attach remaining two mid guy assemblies.
- o. Mount starbar assembly and starbar guy assemblies (refer to para 2-11q).
- p. Attach one cable strap above starbar assembly to secure RF, WI, and lightning ground cables, taking care not to cause excessive side pull to the lightning rod assembly.

2-21. DEPLOYING MAST WITH 59-FOOT GUY ANCHOR RADIUS - Continued**NOTE**

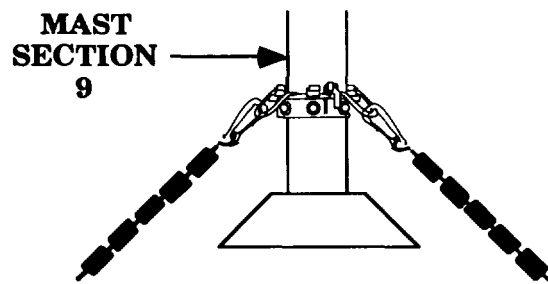
Attach cable strap on every third mast section.

- q. Raise mast sections 2 thru 4 (refer to para 2-11r, steps 1 thru 9).

**NOTE**

Do not insert crosspin in mast sections 5 and 9.

- r. Raise mast section 5 until crosspin hole is above barrel assembly. Attach guy ring assembly on mast section 5.
- s. Attach upper intermediate guy assemblies to guy ring assembly on mast section 5 (refer to para 2-11s, steps 2 thru 4).
- t. Raise mast sections 6 thru 9 and attach guy ring assembly on mast section 9.

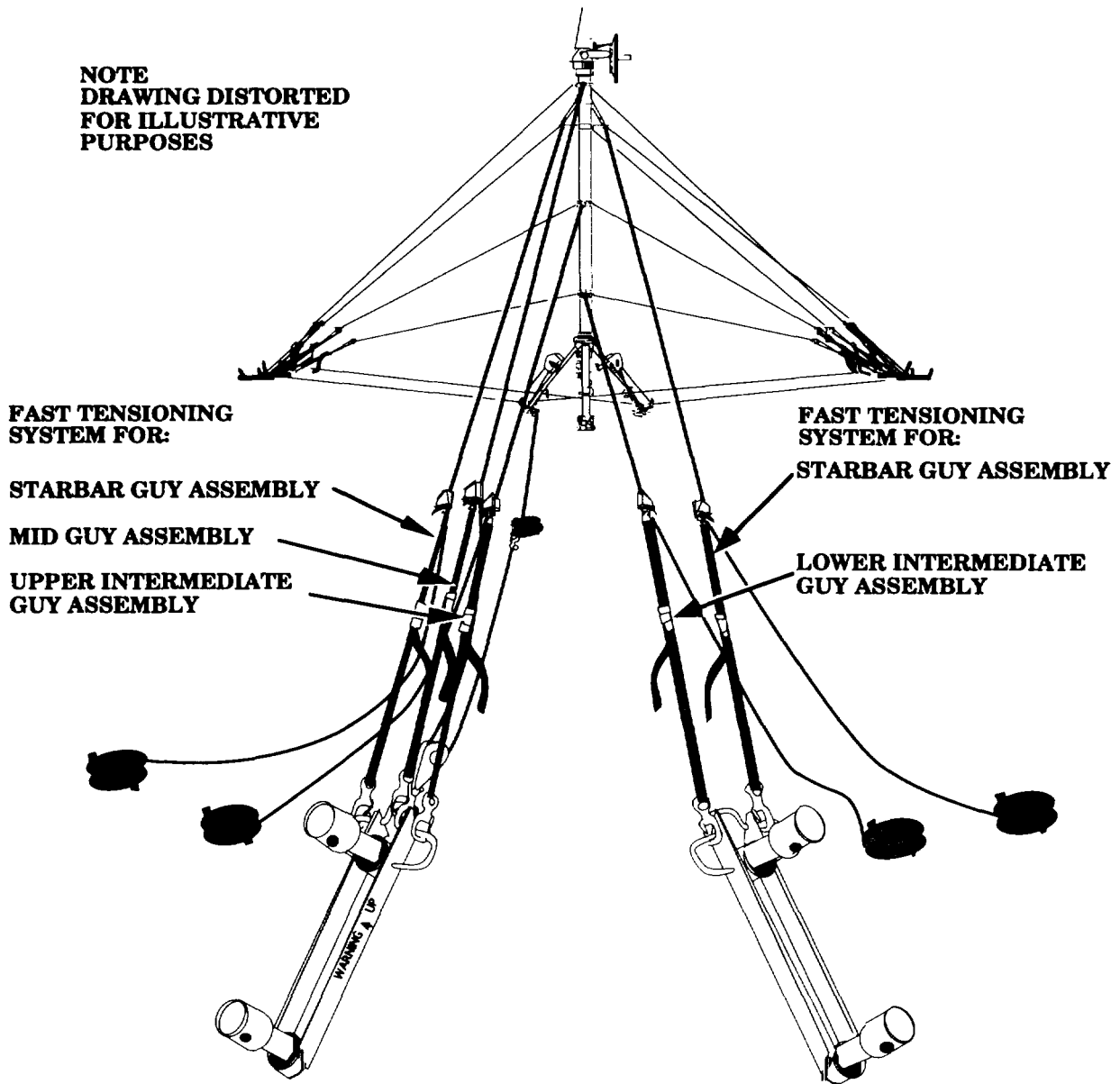


- u. Attach lower intermediate guy assemblies to guy ring assembly on mast section 9 (refer to para 2-11x, steps 2 thru 5).
- v. Raise mast sections 10 thru 12.
- w. After all mast sections have been installed, verify that crosspin is in place in last mast section.

Change 2 2-127

2-21. DEPLOYING MAST WITH 59-FOOT GUY ANCHOR RADIUS - Continued

NOTE
DRAWING DISTORTED
FOR ILLUSTRATIVE
PURPOSES



NOTE

After completion of the next step, the fast tensioning system should appear as shown above.

- x. Mount fast tensioning systems, then tension guys (refer to para 2-11z, steps 1 thru 11).

2-22. DEPLOYING MAST WITH 25-FOOT GUY ANCHOR RADIUS

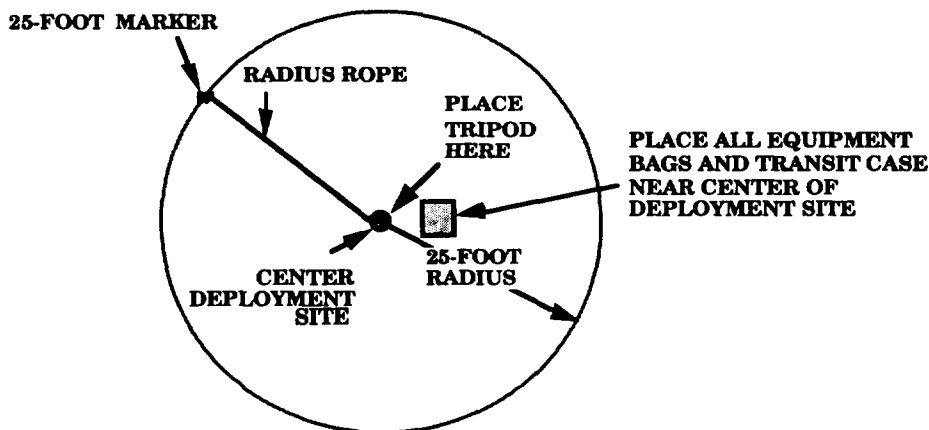
This procedure is to be used for mast heights between 10 and 25 feet where obstructions or other conditions do not permit using the recommended 82-foot or 59-foot radius. This procedure uses only one guy winch, and the mid guy assembly is used as the top guy. In addition, two fast tensioning systems are used, and only one guy stake coupler is required for each anchor position.

WARNING

Mast height must not exceed 25 feet (five mast sections) since significant loss of strength occurs with reduced radius. Failure to comply may result in the mast toppling over causing personal injury or death.

NOTE

Three operators experienced in full mast deployment are required for successful accomplishment of this procedure. Observe all WARNINGS and CAUTIONS given in paragraph 2-11.



NOTE

Only one guy winch is used for this deployment.

- a. Select approximate center of deployment site and place all equipment bags and transit case near center.
- b. Knot radius rope as instructed in paragraph 2-20.
- c. se radius rope at its 25-foot extension marker (single knot) to ensure site is free of obstructions for deployment of guy assemblies (refer to para 2-11a, steps 3 and 4).
- d. Set up tripod at center of deployment site and check tripod leveling (refer to paras 2-11b and c).

2-22. DEPLOYING MAST WITH 25-FOOT GUY ANCHOR RADIUS - Continued

- e. Remove mid guy assembly, starbar guy assemblies, and one fast tensioning system from each guy accessories bag and lay out 8 to 10 feet from tripod.

NOTE

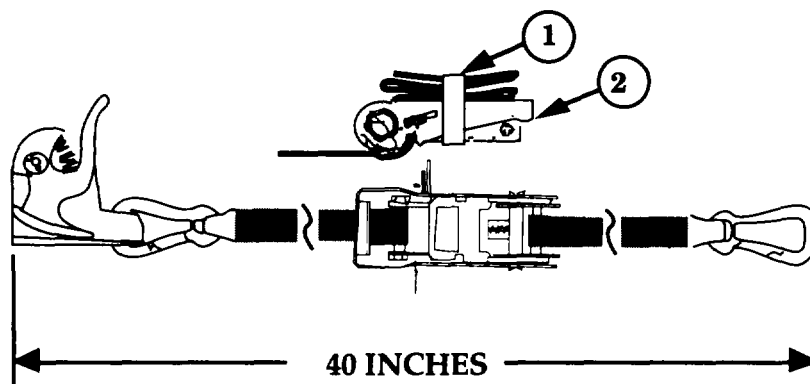
Guy anchor positions have a tolerance of 5 feet in any direction before significant loss of mast strength occurs.

- f. Use 25-foot extension marker on radius rope to determine exact guy anchor position (refer to para 2-11d, steps 1 and 2).
- g. Carry guy accessories bag, sledge hammer, and crosspin to guy anchor position.

NOTE

Only one guy stake coupler is used at each anchor position.

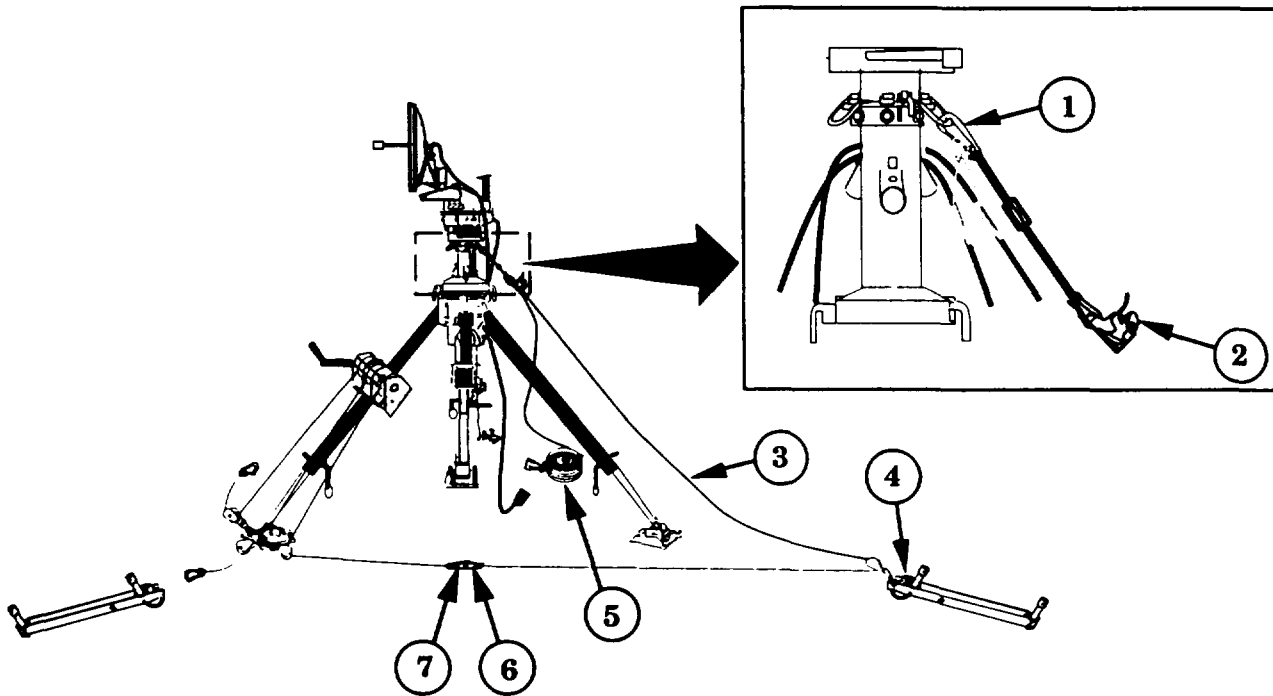
- h. Locate guy stake coupler position and drive guy stakes into ground to secure coupler (refer to para 2-11d, steps 5 thru 7). Repeat steps f and g, and secure couplers at remaining guy anchor positions.
- i. Continue deployment: Install lifting winch assembly, positioner, lighting protection equipment, and antenna (refer to paras 2-11e thru L).
- j. Secure tripod and perform positioner preoperational check (refer to paras 2-11m and n).
- k. Lay out mast sections (maximum of four) for desired mast height. Each mast section adds 4.3 feet to antenna height.
- l. Mount guy winch and attach deflection pulleys (refer to para 2-11p, steps 1 thru 4), then pull out extension cable until snap hook is approximately 6 feet from baseplate.

**NOTE**

Two fast tensioning systems will be attached to each mid guy assembly, one at each end.

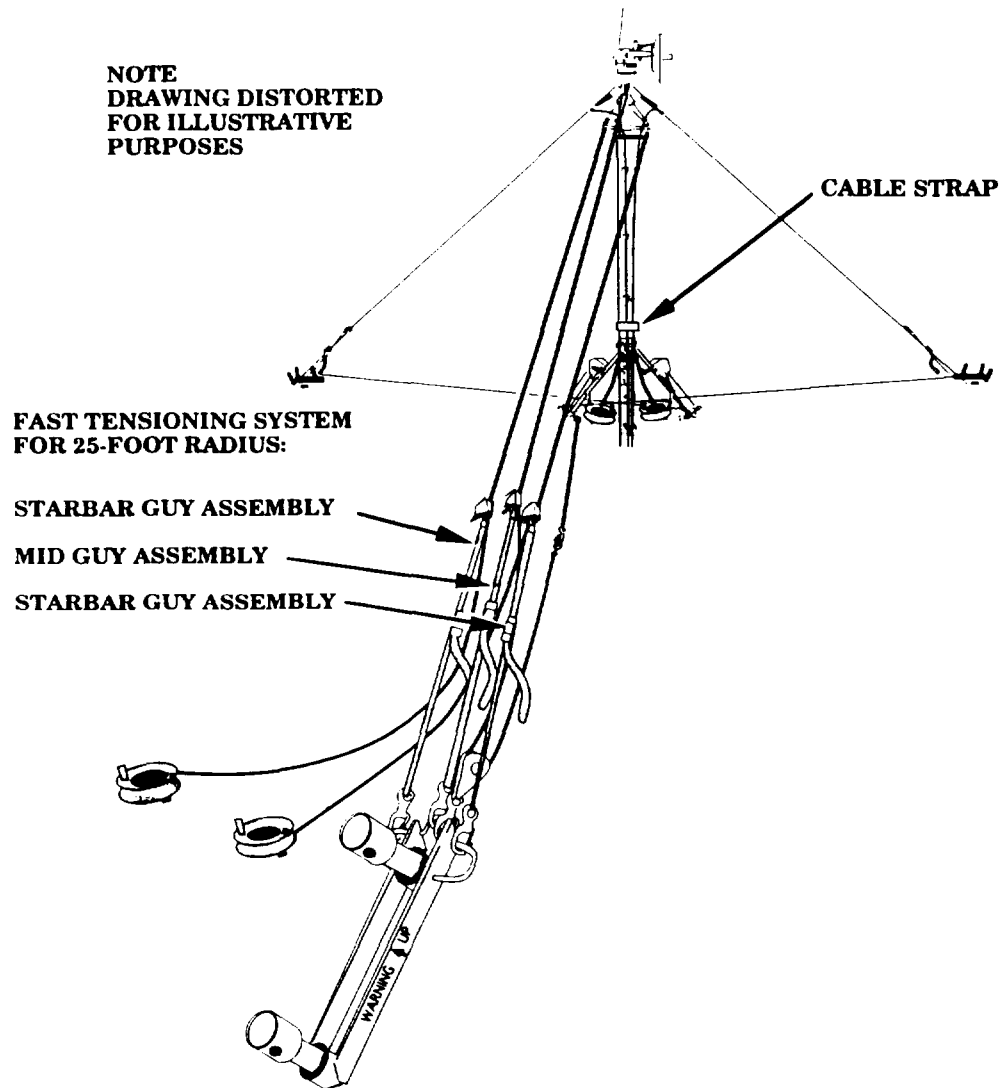
- m. Adjust total length of one fast tensioning system to approximately 40 inches. Crank ratchet handle until web belt is locked in place. Fold excess web belt slack and secure to closed ratchet handle (2) with cable strap (1).

2-22. DEPLOYING MAST WITH 25-FOOT GUY ANCHOR RADIUS - Continued



- n. Attach RF cable strain relief and W1 cable strain relief to fast tensioning system snap hook (1), then attach snap hook to guy ring assembly at top section.
- o. Attach mid guy assembly snap hook (6) to extension cable snap hook (7), then unreel mid guy assembly (5) toward guy stake coupler (4). Attach return pulley snap hook to center of guy stake coupler (4). Continue unreeling mid guy assembly to tripod, then unreel additional 6 to 7 feet.
- p. Attach top section fasttensioning system cable grip (2) to mid guy assembly cable (3).
- q. Repeat steps m thru p, except omit strain reliefs, and attach remaining two mid guy assemblies.
- r. Mount starbar assembly and starbar guy assemblies (refer to para 2-11q).
- s. Attach one cable strap above starbar assembly to secure RF, W I, lightning, and excess guy cables, taking care not to cause excessive side pull to the lightning rod assembly.
- t. Raise mast sections 2 thru 5 (refer to para 2-11r, steps 1 thru 8).
- u. Install cable strap on mast section 5.
- v. Verify that crosspin is in place in last mast section.

2-22. DEPLOYING MAST WITH 25-FOOT GUY ANCHOR RADIUS - Continued



NOTE

After completion of the next step, the fast tensioning system should appear as shown above.

- w. Mount fast tensioning systems (refer to para 2-11z, steps 1 thru 4). Tension guys to read 60 to 100 on tensiometer left (SG) scale.

CHAPTER 3
OPERATOR MAINTENANCE

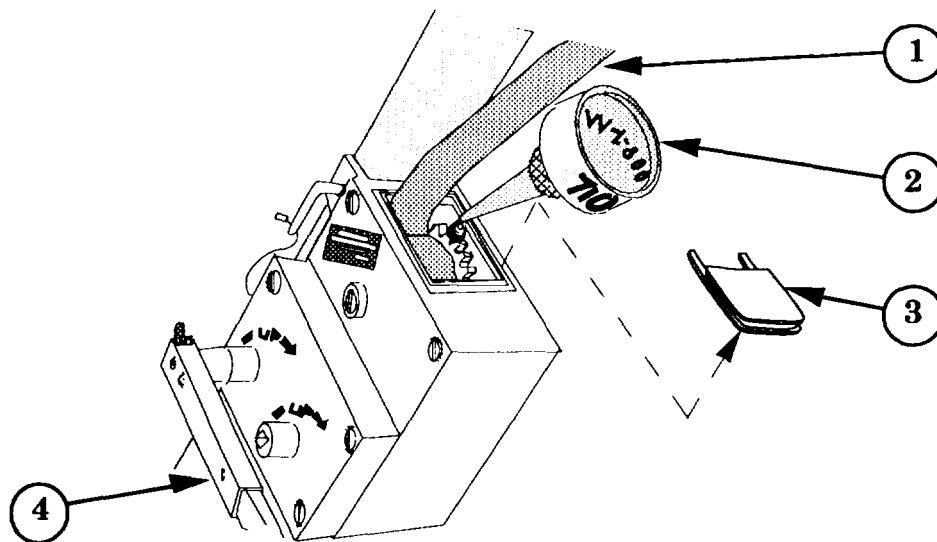
<u>Subject</u>	<u>Section</u>	<u>Page</u>
Lubrication Instructions	I	3-1
Operator Maintenance Procedures.....	II	3-2

Section I. LUBRICATION INSTRUCTIONS

<u>Subject</u>	<u>Para</u>	<u>Page</u>
Lifting Winch Lubrication	3-1	3-1

3-1. LIFTING WINCH LUBRICATION

Lubrication of the lifting winch must be performed prior to mast retrieval or every 3 months during deployment.



- a. Remove lifting winch bag from lifting winch and mount winch crank (4).
- b. Remove plastic cover (3) by pulling up then out.
- c. Apply 4 to 5 drops of VV-L-800 oil (2) to lifting winch gears.
- d. Rotate crank to unwind 2 feet of lifting winch belt (1) from lifting winch.
- e. Again apply 4 to 5 drops of oil to lifting winch gears.
- f. Turn crank to tighten lifting winch belt (1).
- g. Remove crank from lifting winch and replace plastic cover (3).
- h. Place crank on lifting winch and cover with lifting winch bag.

Section II. OPERATOR MAINTENANCE PROCEDURES

<u>Subject</u>	<u>Para</u>	<u>Page</u>
Checks, Adjustments, and Alignments	3-2	3-2
Operator Maintenance.....	3-3	3-2
Cleaning.....	3-4	3-3

3-2. CHECKS, ADJUSTMENTS, AND ALIGNMENTS

The operator must perform daily checks on the mast when it is deployed.

WARNING

Always wear gloves when handling guy cable assemblies and wear eye protection (safety goggles/glasses) when driving guy stakes. Failure to do so may result in personal injury.

NOTE

If the mast must be kept in continuous operation, check and service only those items that can be accessed without affecting operation. Perform complete checks and services when operational requirements permit.

Component	Check	Adjustment or Alignment
Guy Anchors	Guy stake coupler anchors firm. Stakes not pulled up/out due to cable tension.	Drive anchor stakes more firmly, use additional anchor stakes, or apply weight to anchor stakes.
Mast	Mast is vertical and straight. Top is within 5 feet of center, bow less than 3 feet.	Use fast tensioning systems to straighten mast.
Lower Intermediate Guy Assembly, Mid Guy Assembly	Tension is 40 to 60 units on tensiometer G scale	Tension guy assemblies (refer to para 2-11z, step 11).
Upper Intermediate Guy Assembly, Top Guy Assembly, Starbar Guy Assembly	Tension is 60 to 100 units on tensiometer SG scale.	Tension guy assemblies (refer to para 2-11z, step 11).

3-3. OPERATOR MAINTENANCE

Operator maintenance of the mast is limited to preventive maintenance checks and services, and lubrication.

3-4. CLEANING

Equipment should be cleaned as often as operating conditions require, and should be kept free of dust, moisture, and grease. Use the following procedure to clean the items listed below.

Tripod Assembly	Tripod Barrel Bag
Guy Winches	Guy Winch Bags
Lifting Winch	Lifting Winch Bag
Fast Tensioning Systems	Guy Assemblies
Guy Stakes	Guy Stake Couplers
Guy Accessories Bags	Anchor Stakes
Cable Straps	Crosspins
Ground Rods	Guy Ring Assemblies
Lightning Rod	Mast Accessory Bag
Radius Rope	Sledge Hammer
Starbar Assemblies	Tensiometer
Lightning Rod Support	Mast Sections
Ground Cable (Lightning)	Top Section
Mounting Bracket	Cable Assembly W1
Cable Assembly W2	Controller
Positioner	Transit Case

- a. Hose each item with clean water to wet and wash away accumulated mud, dirt, or salt.
- b. Use soft cloth dampened with water to wash heavily soiled areas.
- c. Rinse item with fresh water.
- d. Use clean, soft cloth to remove excess water on item.
- e. Allow item to air dry.

3-3/(3-4 blank)

CHAPTER 4

UNIT MAINTENANCE

<u>Subject</u>	<u>Section</u>	<u>Page</u>
Repair Parts; Special Tools; Test, Measurement, and Diagnostic Equipment (TMDE); and Support Equipment.....	I	4-1
Service Upon Receipt	II	4-1
Preventive Maintenance Checks and Services (PMCS)	III	4-2
Troubleshooting	IV	4-5
Maintenance Procedures.....	V	4-12
Preparation for Storage or Shipment.....	VI	4-46

Section I. REPAIR PARTS; SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

<u>Subject</u>	<u>Para</u>	<u>Page</u>
Common Tools and Equipment.....	4-1	4-1
Special Tools, TMDE, and Support Equipment.....	4-2	4-1
Repair Parts	4-3	4-1

4-1. COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

4-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

All tools, TMDE, and support equipment required to perform maintenance procedures in this chapter are listed in the Maintenance Allocation Chart (MAC) in Appendix B of this manual.

4-3. REPAIR PARTS

Repair parts are listed and illustrated in the repair parts and special tools list, TM 11-5985-394-23P.

Section II. SERVICE UPON RECEIPT

<u>Subject</u>	<u>Para</u>	<u>Page</u>
Service Upon Receipt of Equipment	4-4	4-1

4-4. SERVICE UPON RECEIPT OF EQUIPMENT

- a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on SF 361 Transportation Discrepancy Report.

4-4. SERVICE UPON RECEIPT OF EQUIPMENT - Continued

- b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.
- c. Check DA Pam 25-30 to see whether the equipment has been modified.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

<u>Subject</u>	<u>Para</u>	<u>Page</u>
General.....	4-5	4-2
Unit PMCS Table	4-6	4-2
Column (1) - Item Number (Item No.)	4-6a	4-2
Column (2) - Interval (Interval B, M, S)	4-6b	4-2
Column (3) - Item to be Inspected	4-6c	4-2
Column (4) - Procedure.....	4-6d	4-2
Preventive Maintenance Procedures.....	4-7	4-3
Before You Operate.....	4-7a	4-3
Monthly	4-7b	4-3
Semiannually	4-7c	4-3
Order	4-7d	4-3
Reporting	4-7e	4-3

4-5. GENERAL

Preventive Maintenance Checks and Services (PMCS) are essential to the efficient operation of the mast. PMCS prevent possible damage that might occur through neglect or failure to observe warning symptoms on time. Ensure all noted discrepancies are corrected. PMCS covers those scheduled procedures which are essential to operation of masts.

4-6. UNIT PMCS TABLE

Table 4-1 lists scheduled maintenance tasks required for the mast. The columns of Table 4-1 are described below.

a. Column (1) - Item Number (Item No.)

This column contains a number for each procedure to be performed. When reporting malfunctions or failures on DA Form 2404, Equipment Inspection and Maintenance Worksheet, enter this number in the "TM Item No." column.

b. Column (2) - Interval (Interval B, M, S)

These columns tell when to perform a procedure. A dot in a column tells which procedures apply.

c. Column (3) - Item To Be Inspected

This column contains the name of the item to be inspected.

d. Column (4) - Procedure

This column tells how to perform the required checks and services on the appropriate item. Carefully perform these instructions in the order listed.

4-7. PREVENTIVE MAINTENANCE PROCEDURES

NOTE

Within designated intervals, these checks are to be performed in the order listed. If the mast must be kept in continuous operation, check and service only those items that can be accessed without interrupting operations. Complete checks and services when the mast can be disassembled.

a. Before You Operate

Perform before (B) PMCS in Table 4-1. Observe WARNINGS and CAUTIONS contained in this manual and on plates installed on equipment.

b. Monthly

Perform monthly (M) PMCS in Table 4-1. Observe WARNINGS and CAUTIONS contained in this manual and on plates installed on equipment.

c. Semiannually

Perform semiannual (S) PMCS in Table 4-1. Observe WARNINGS and CAUTIONS contained in this manual and on plates installed on equipment.

d. Order

Always do preventive maintenance in the same order.

e. Reporting

Any discrepancies shall be recorded on DA Form 2404 and reported to higher level maintenance.

4-7. PREVENTIVE MAINTENANCE PROCEDURES - Continued

Table 4-1. Unit Preventive Maintenance Checks and Services

B-Before

M-Monthly

S-Semiannually

ITEM NO.	INTERVAL			ITEM TO BE INSPECTED	PROCEDURES
	B	M	S		
1			•	Lightning Protection Equipment	Clean all ground terminal connections to remove corrosion.
2	•			Positioner System	<p>Check positioner and controller exteriors for loose or missing hardware.</p> <p>Check positioner external connector J1 for bent, corroded, or retracted pins.</p> <p>Check controller external connectors J1 and J2 for bent, broken, corroded, or retracted pins.</p> <p>Inspect cable assemblies W1 and W2 for frayed or exposed wires and damaged connectors.</p>
•	•				
	•	•	•		
3	•	•		Equipment Hardware	Inspect for frayed lanyards, missing lanyards, locking pins, or double spring cotter pins.
4		•		Mast Assembly	Inspect mast assembly for paint deterioration, bare metal, and corrosion. Refer to TB 43-0118 for instructions on maintaining equipment surfaces.

Section IV. TROUBLESHOOTING

<u>Subject</u>	<u>Para</u>	<u>Page</u>
General	4-8	4-5
Testing and Troubleshooting Positioner System.....	4-9	4-5

4-8. GENERAL

If faults or failures are detected, take corrective action. If the item cannot be repaired at the unit level, remove and replace faulty unit and send faulty item to direct support maintenance for repair.

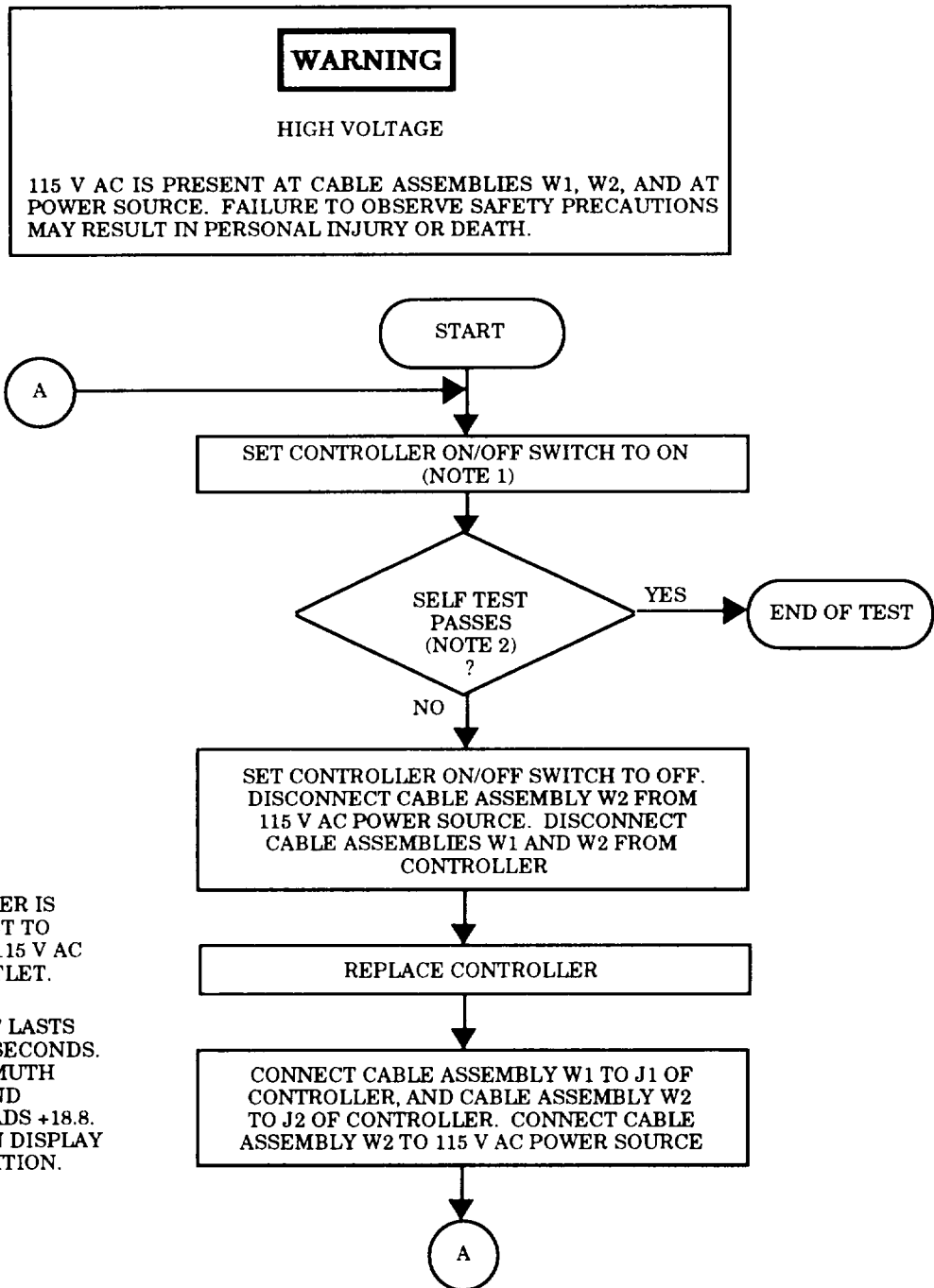
4-9. TESTING AND TROUBLESHOOTING POSITIONER SYSTEM

Mount positioner on mast, or place positioner on its base on a clean flat surface. Before beginning test, verify that nearby objects will not interfere with positioner movement. If positioner or controller fails any step, remove and replace faulty unit and retest. To begin troubleshooting, refer to the appropriate fault symptom.

WARNING

Two personnel should always be present during troubleshooting procedures. Failure to do so could result in equipment damage or personal injury.

Fault Symptom	Action	Reference
Controller displays lit but not readable.	Perform test procedure as indicated in Flowchart 4-1.	Page 4-6
Controller display not lit. (ON/OFF switch set to ON and 115 V ac power source connected to controller).	Perform test procedure as indicated in Flowchart 4-2.	Page 4-7
Controller display changes randomly when UP, DOWN, CW, or CCW pushbutton is pressed.	Perform test procedure as indicated in Flowchart 4-3.	Page 4-9
Positioner does not respond to controller command.	Perform test procedure as indicated in Flowchart 4-3.	Page 4-9
Controller display does not change when UP, DOWN, CW, or CCW pushbutton is pressed.	Perform test procedure as indicated in Flowchart 4-3.	Page 4-9



NOTES

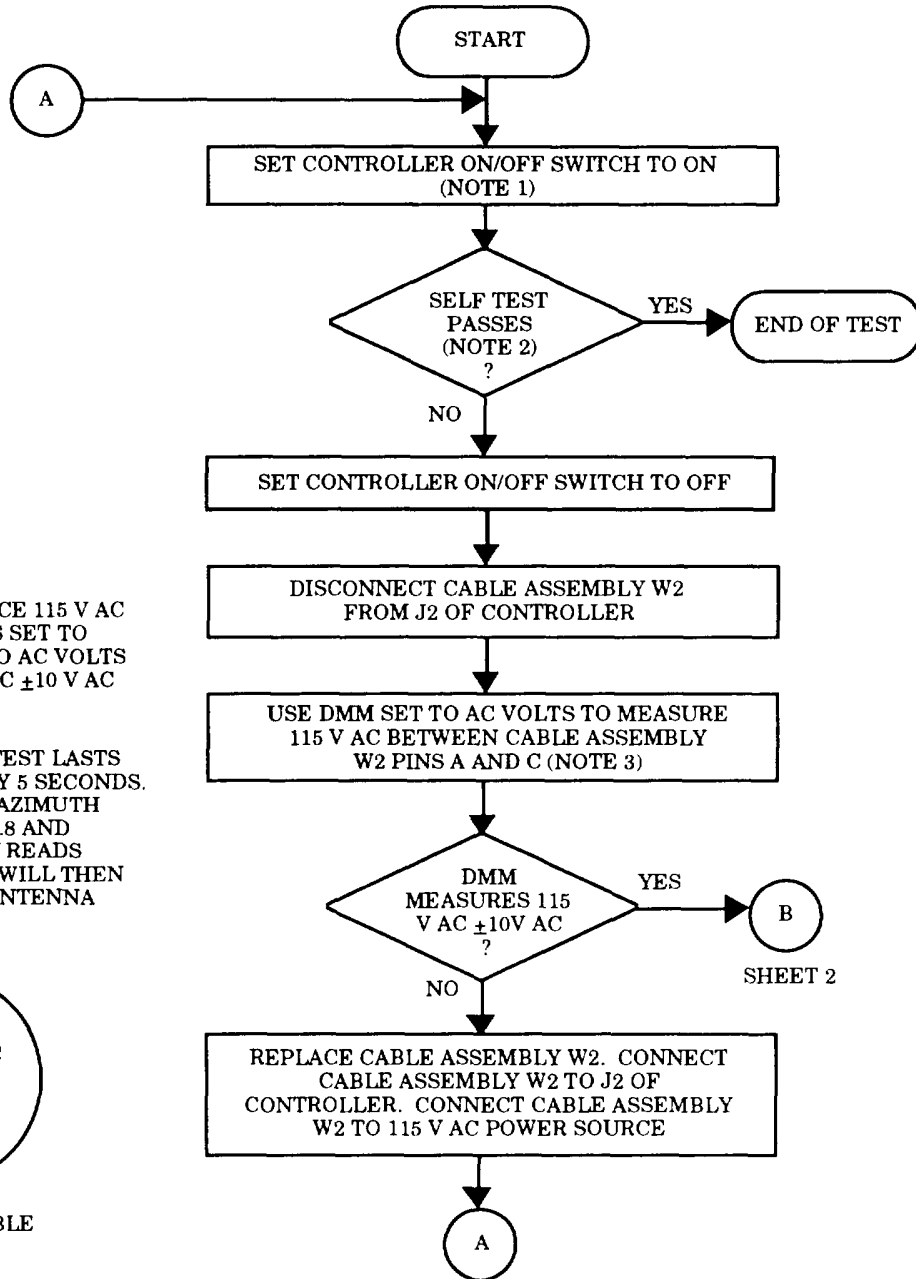
1. ENSURE THAT 115 V AC SOURCE CIRCUIT BREAKER IS SET TO ON. USE DMM SET TO AC VOLTS TO MEASURE 115 V AC ± 10 V AC AT SOURCE OUTLET.
2. CONTROLLER SELF TEST LASTS FOR APPROXIMATELY 5 SECONDS. DURING SELF TEST, AZIMUTH DISPLAY READS +188.8 AND ELEVATION DISPLAY READS +18.8. CONTROLLER WILL THEN DISPLAY CURRENT ANTENNA POSITION.

Flowchart 4-1

WARNING

HIGH VOLTAGE

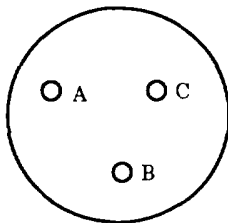
115 V AC IS PRESENT AT CABLE ASSEMBLIES W1, W2, AND AT POWER SOURCE. FAILURE TO OBSERVE SAFETY PRECAUTIONS MAY RESULT IN PERSONAL INJURY OR DEATH.



NOTES

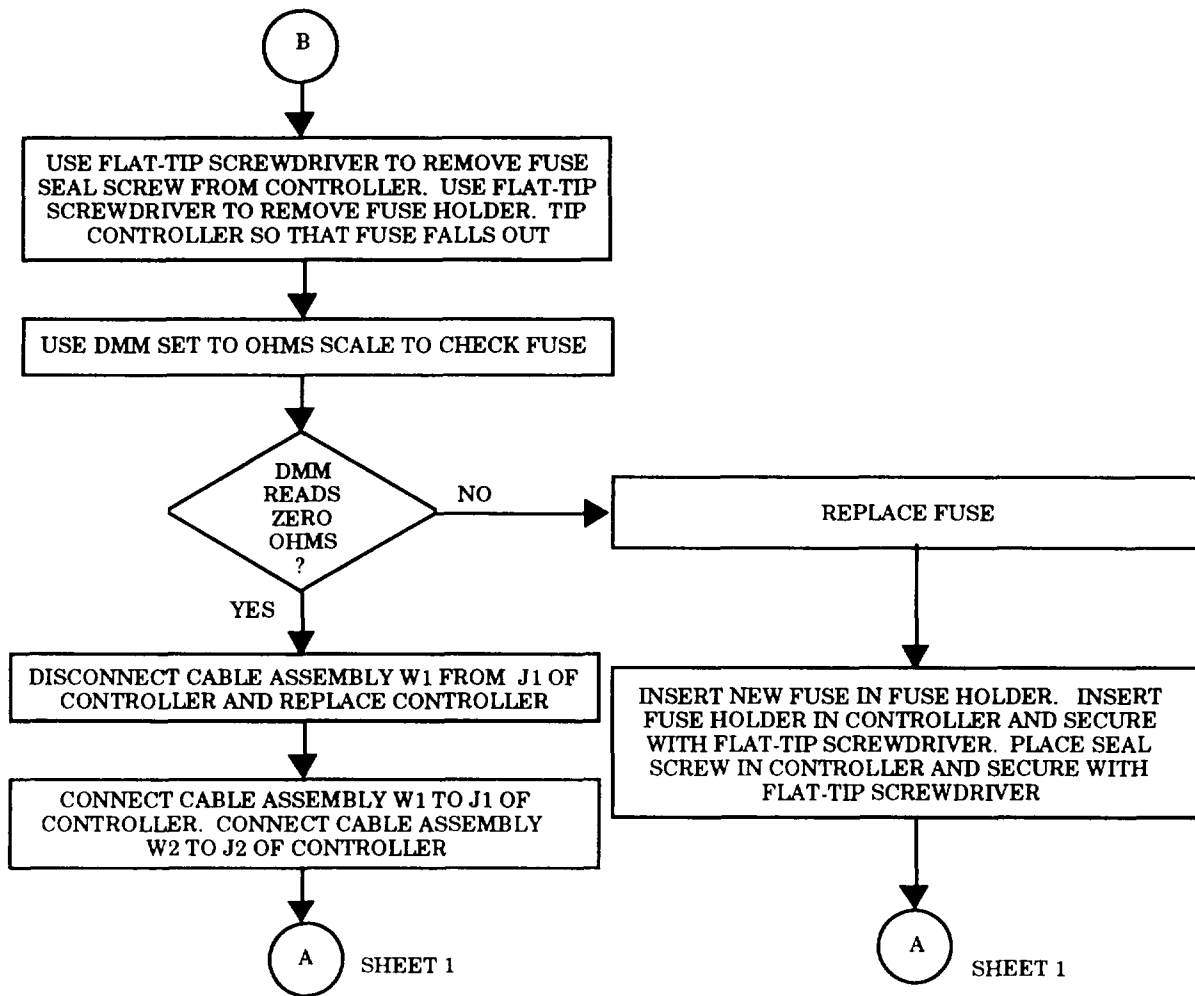
1. ENSURE THAT SOURCE 115 V AC CIRCUIT BREAKER IS SET TO ON. USE DMM SET TO AC VOLTS TO MEASURE 115 V AC ±10 V AC AT SOURCE OUTLET.
2. CONTROLLER SELF TEST LASTS FOR APPROXIMATELY 5 SECONDS. DURING SELF TEST, AZIMUTH DISPLAY READS +188.8 AND ELEVATION DISPLAY READS +18.8. CONTROLLER WILL THEN DISPLAY CURRENT ANTENNA POSITION.

3.



W2 POWER CABLE

Flowchart 4-2 (Sheet 1 of 2)

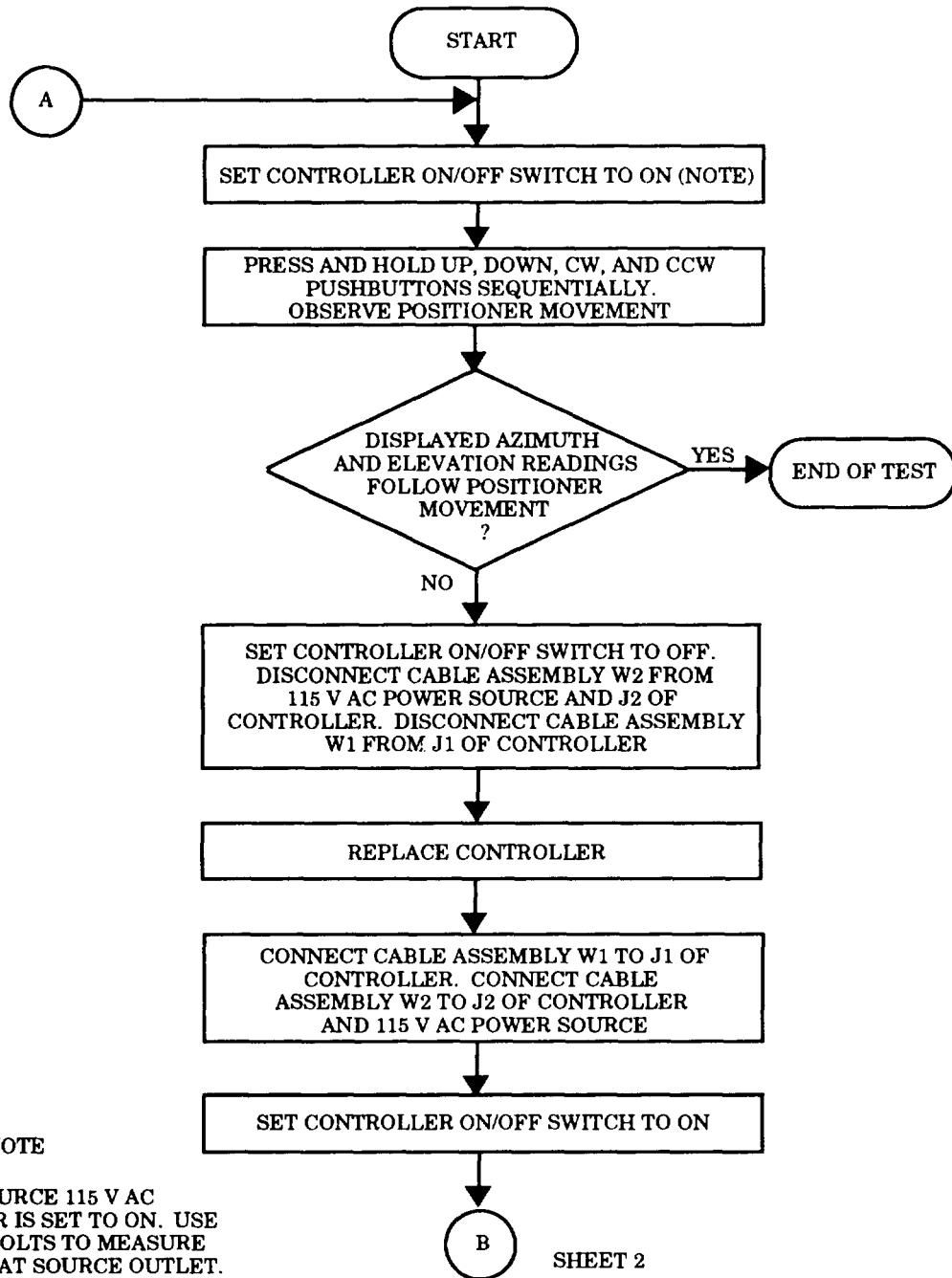


Flowchart 4-2 (Sheet 2 of 2)

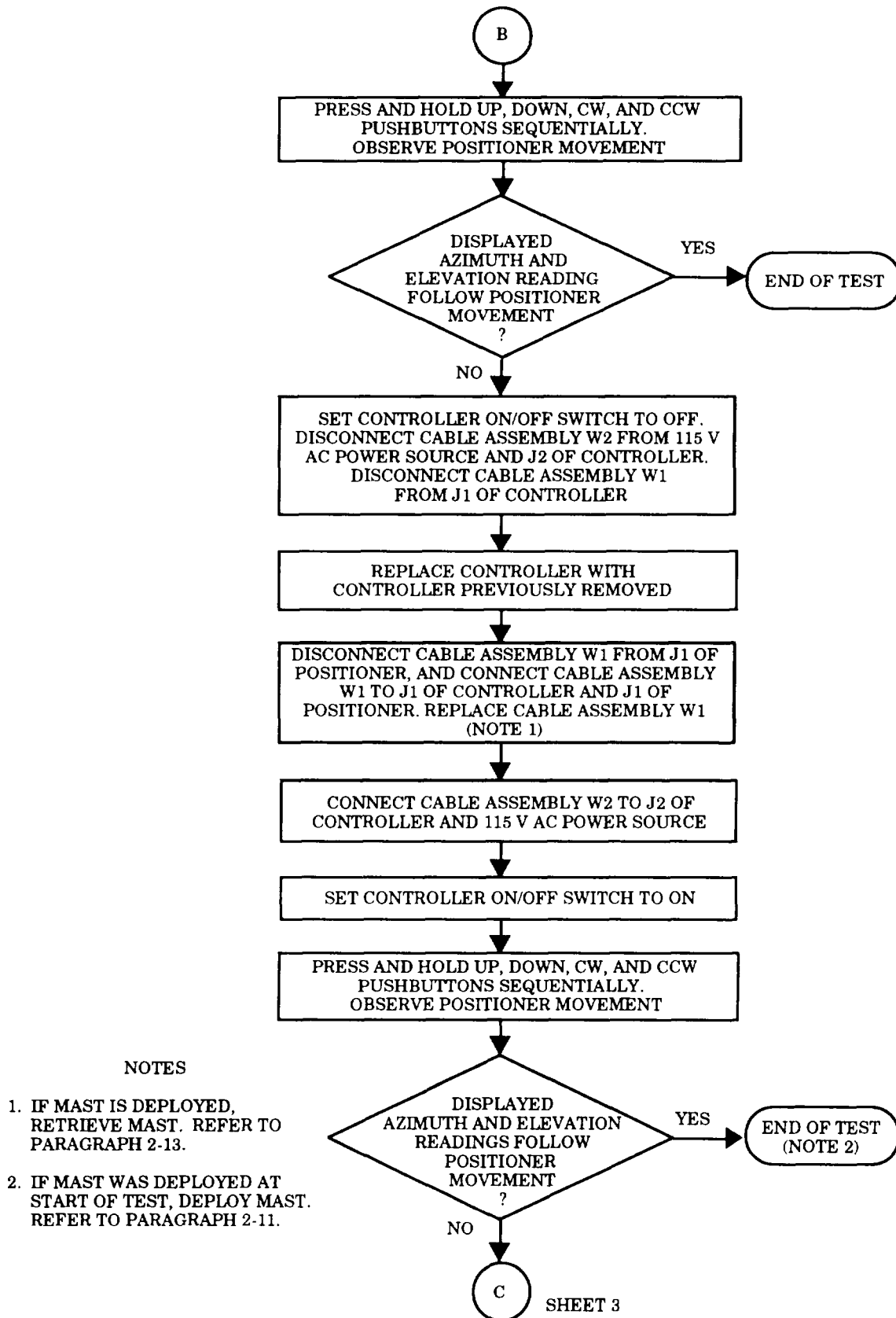
WARNING

HIGH VOLTAGE

115 V AC IS PRESENT AT CABLE ASSEMBLIES W1, W2, AND AT POWER SOURCE. FAILURE TO OBSERVE SAFETY PRECAUTIONS MAY RESULT IN PERSONAL INJURY OR DEATH.

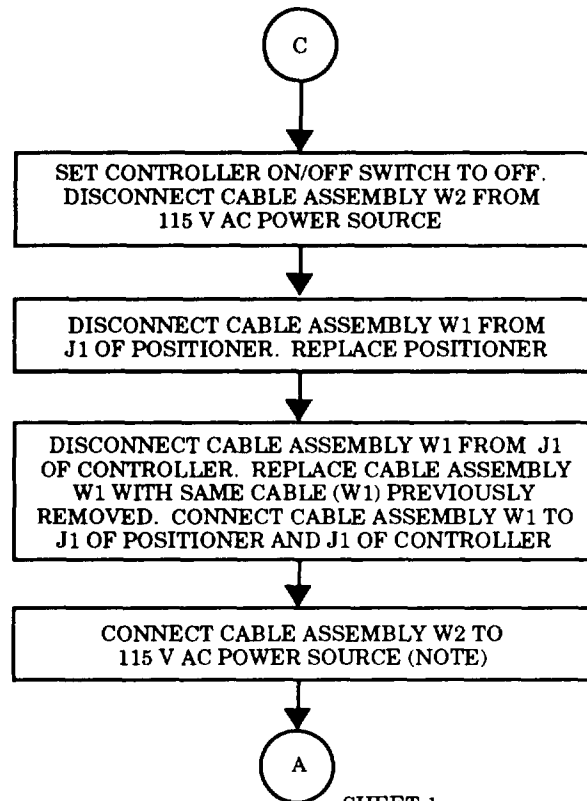


SHEET 2



SHEET 3

Flowchart 4-3 (Sheet 2 of 3)



NOTE

IF MAST WAS DEPLOYED AT START
OF TEST, DEPLOY MAST. REFER
TO PARAGRAPH 2-11.

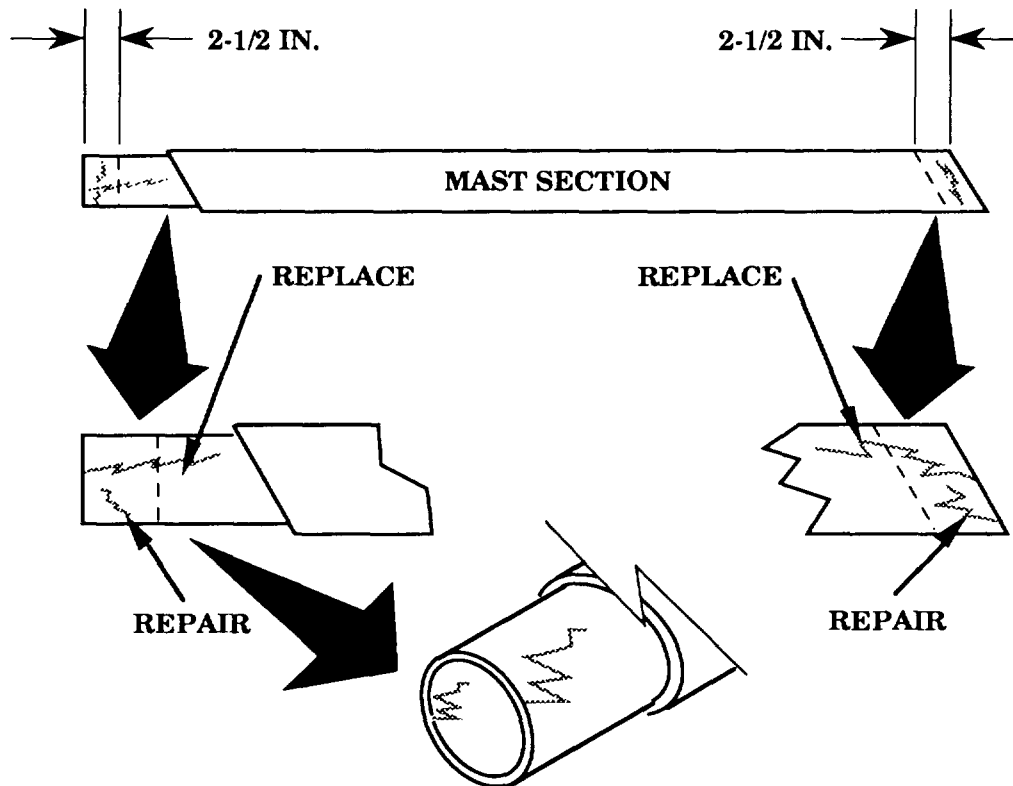
SHEET 1

Flowchart 4-3 (Sheet 3 of 3)

Section V. MAINTENANCE PROCEDURES

<u>Subject</u>	<u>Para</u>	<u>Page</u>
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Upper Leg Removal and Replacement.....	4-14	4-26
Lower Leg Removal and Replacement	4-15	4-28
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Leg Assembly Lanyard Removal and Replacement (One Locking Pin).....	4-17	4-31
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Lifting Winch Lanyard Removal and Replacement (Locking Pins).....	4-19	4-33
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4-10. MAST SECTION CRACK REPAIR

**NOTE**

Refer to TB 11-5985-394-25 for warranty information on Mast AB-1373/TRC.

A mast section that develops a crack (inside or out) extending beyond a band 2-1/2 inches from either end is unsafe and must be replaced. Mast sections containing cracks within 2-1/2 inch band can be repaired using the following procedure:

- a. Inspect crack in mast section for extent of damage, using the above illustration as a guide.
- b. Sand damaged area using sandpaper to smooth rough areas and to remove all splinters.

4-10. MAST SECTION CRACK REPAIR - Continued

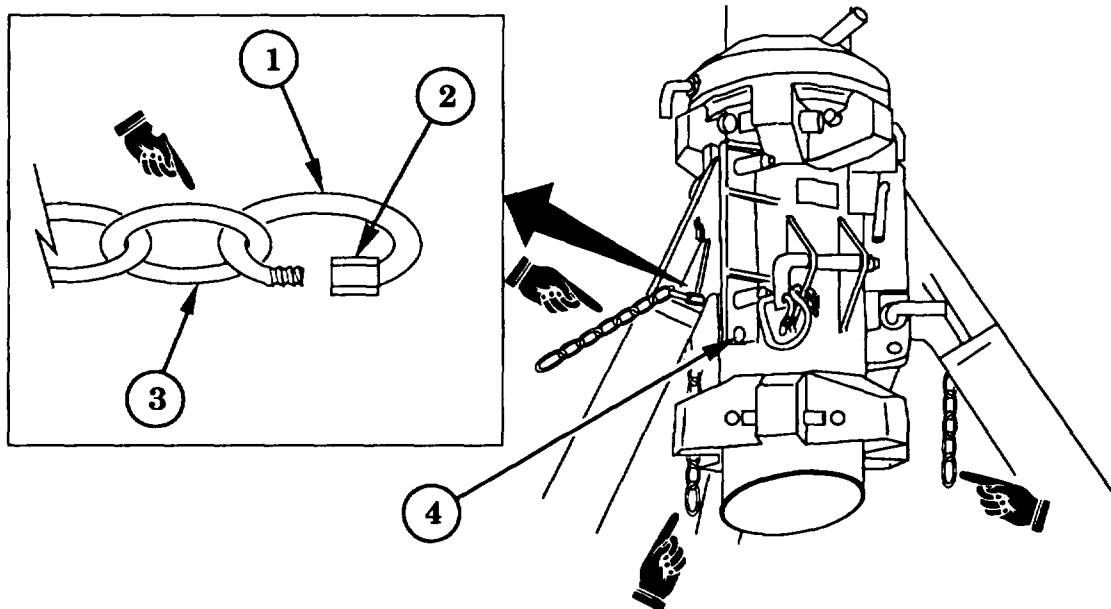
WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Avoid prolonged breathing of vapor. The solvent should not be used near heat or flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, avoid prolonged contact with skin. The use of chemical gloves (solvent resistant), chemical splash goggles and full face shield are required when using TRICHLOROTRIFLUOROETHANE. DO NOT use compressed air to dry parts when TRICHLOROTRIFLUOROETHANE has been used. TRICHLOROTRIFLUOROETHANE is an ozone-depleting substance.

- c. Wearing gloves, moisten cloth with trichlorotrifluoroethane. Use moistened cloth to clean damaged area on mast section.
- d. Apply small amount of epoxy resin and hardener on cardboard and mix thoroughly.
- e. Immediately apply very thin coat of epoxy mixture to damaged area on exterior of mast section.
- f. Allow epoxy to cure approximately 6 to 10 minutes or until hardened.
- g. Use sandpaper to remove any buildup of epoxy.
- h. Using undamaged mast section, mate with repaired mast section to ensure fit. Remove additional epoxy from repaired mast section as needed to provide correct fit.
- i. Wearing gloves, moisten clean cloth with trichlorotrifluoroethane. Use moistened cloth to clean repaired area on mast section.
- j. Use paint brush to apply light coating of paint. Allow paint to dry in clean, dry area.

4-11. TRIPOD KNEELING LANYARD REMOVAL AND REPLACEMENT**a. Removal**

- (1) Use 1/2-inch open end wrench to loosen nut (2).
- (2) Remove quick link (1) from barrel assembly.
- (3) Remove lanyard (3) from quick link (1).

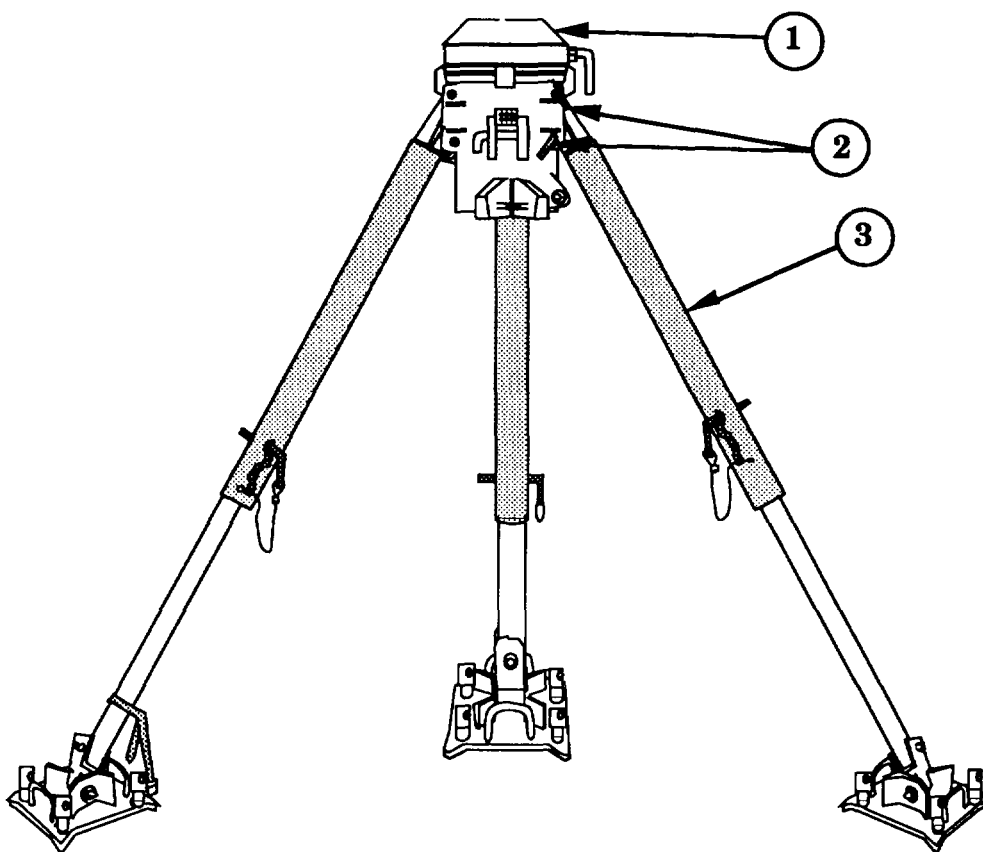
**WARNING**

Do not replace kneeling lanyard with substitute part. Stress on lanyard may cause substitute to snap resulting in equipment damage or personal injury.

b. Replacement

- (1) Place replacement lanyard (3) on quick link (1).
- (2) Insert quick link (1) into hole (4) in barrel assembly.
- (3) Using 1/2-inch open end wrench, tighten nut (2) on quick link (1).

Change 1 4-15

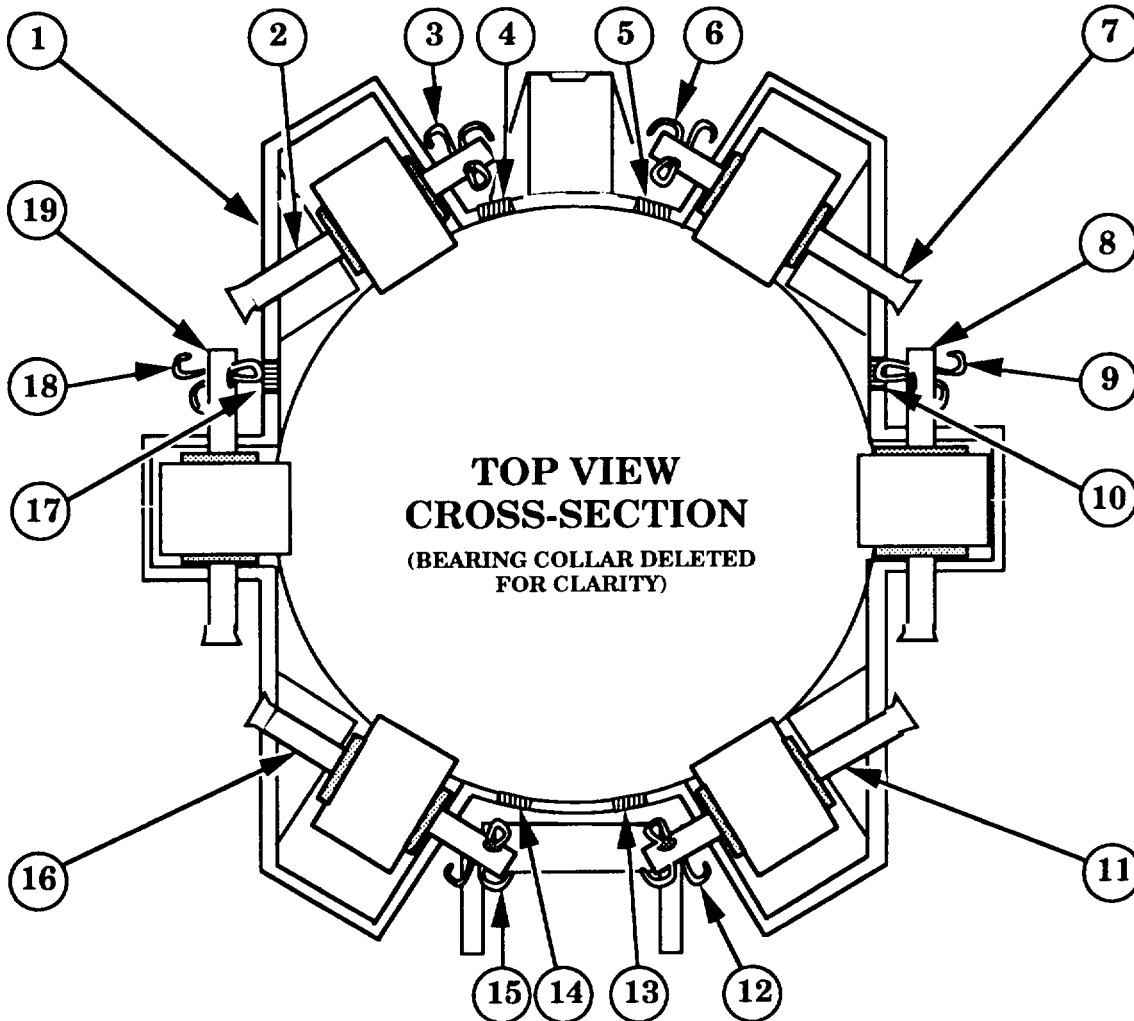
4-12. BARREL ASSEMBLY ROLLER REMOVAL AND REPLACEMENT**a. Removal****NOTE**

Lay tripod down before removing barrel assembly.

- (1) Remove two locking pins (2) securing leg assembly (3) to barrel assembly (1).
- (2) Repeat step 1 for remaining two leg assemblies.

4-12. BARREL ASSEMBLY ROLLER REMOVAL AND REPLACEMENT - Continued

a. Removal - Continued

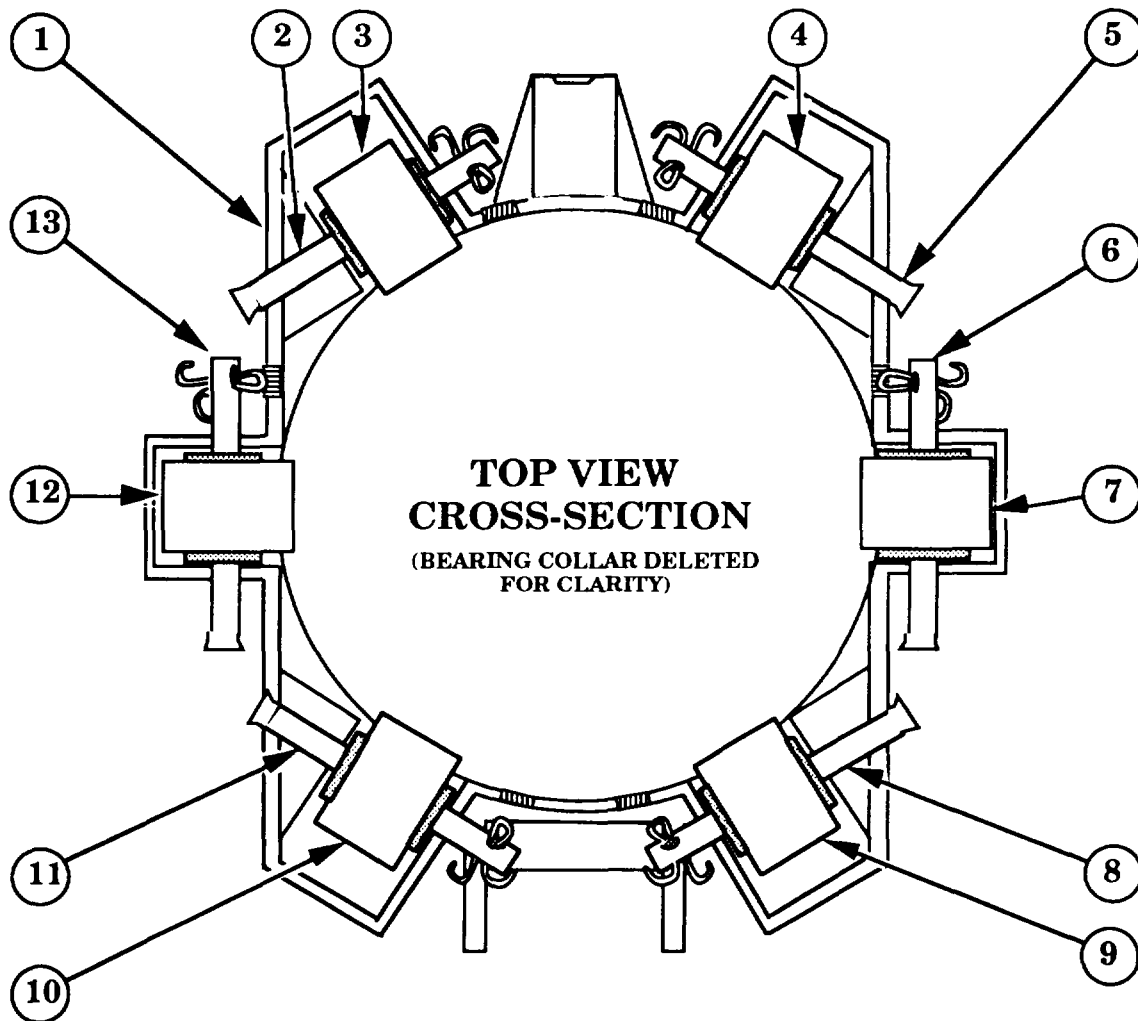
**NOTE**

Cotter pins securing the six rollers in the top of the barrel assembly must be removed from spindles through access holes in barrel assembly. Cotter pins are removed from inside the barrel assembly.

(3) At top of barrel assembly (1), use round nose pliers to straighten six cotter pins (3, 6, 9, 12, 15, and 18) for removal. Remove cotter pins from six spindles (2, 7, 8, 11, 16, and 19) through six access holes (4, 5, 10, 13, 14, and 17).

4-12. BARREL ASSEMBLY ROLLER REMOVAL AND REPLACEMENT - Continued

a. Removal - Continued



(4) Use punch and hammer to drive cotter pin end of spindle (11) out of barrel assembly (1). If adjacent spindle (13) is in way, use hammer and punch to drive spindle (13) into casting. Remove roller assembly (10) from barrel assembly (1).

(5) Use punch and hammer to drive cotter pin end of spindle (8) out of barrel assembly (1). If adjacent spindle (6) is in way, use hammer and punch to drive spindle (6) into casting. Remove roller assembly (9) from barrel assembly (1).

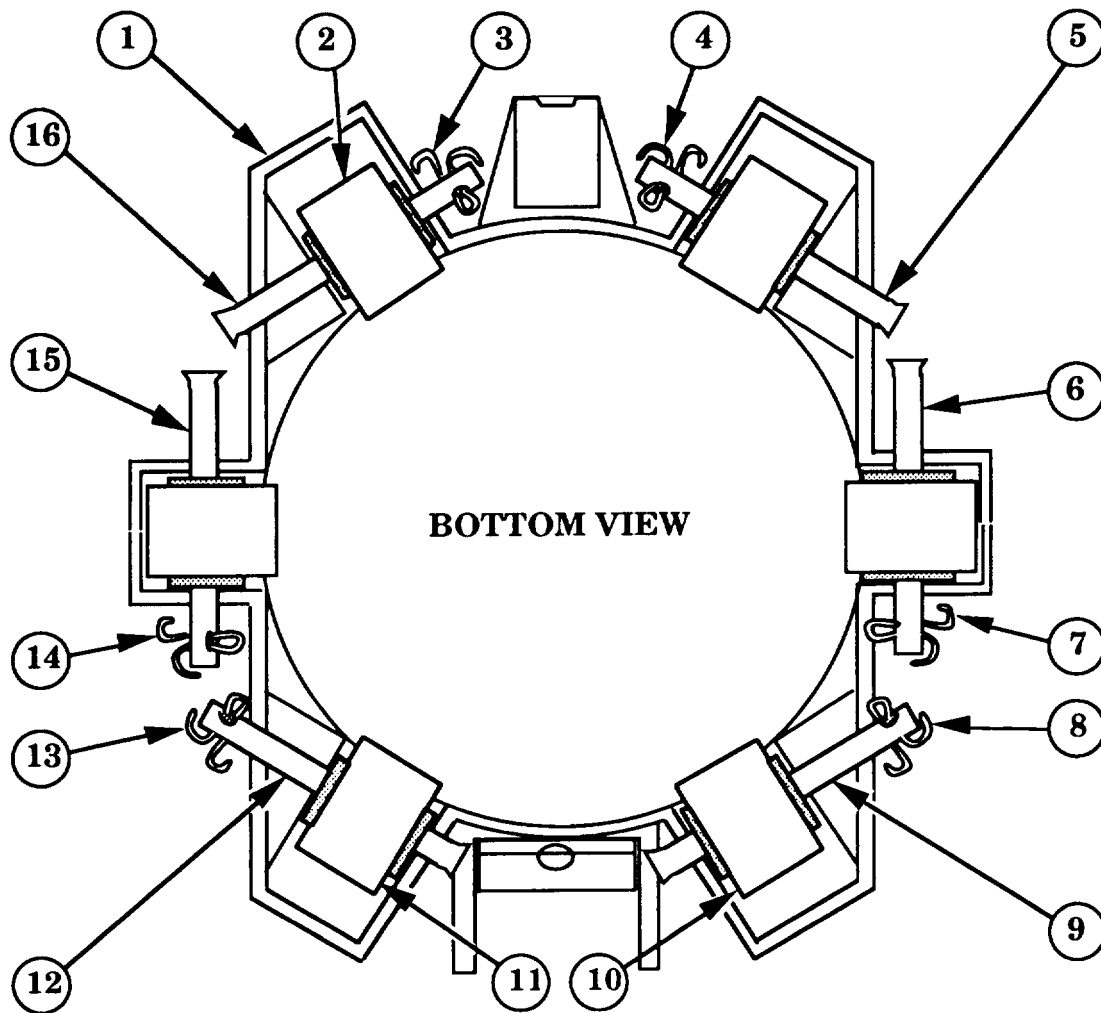
(6) Use punch and hammer to drive cotter pin end of spindle (2) out of barrel assembly (1). If adjacent spindle (13) is in way, use hammer and punch to drive spindle (13) into casting. Remove roller assembly (3) from barrel assembly (1).

(7) Use punch and hammer to drive cotter pin end of spindle (5) out of barrel assembly (1). If adjacent spindle (6) is in way, use hammer and punch to drive spindle (6) into casting. Remove roller assembly (4) from barrel assembly (1).

(8) Use punch and hammer to drive cotter pin end of spindles (6 and 13) out of barrel assembly (1). Remove roller assemblies (7 and 12) from barrel assembly (1).

4-12. BARREL ASSEMBLY ROLLER REMOVAL AND REPLACEMENT - Continued

a. Removal - Continued

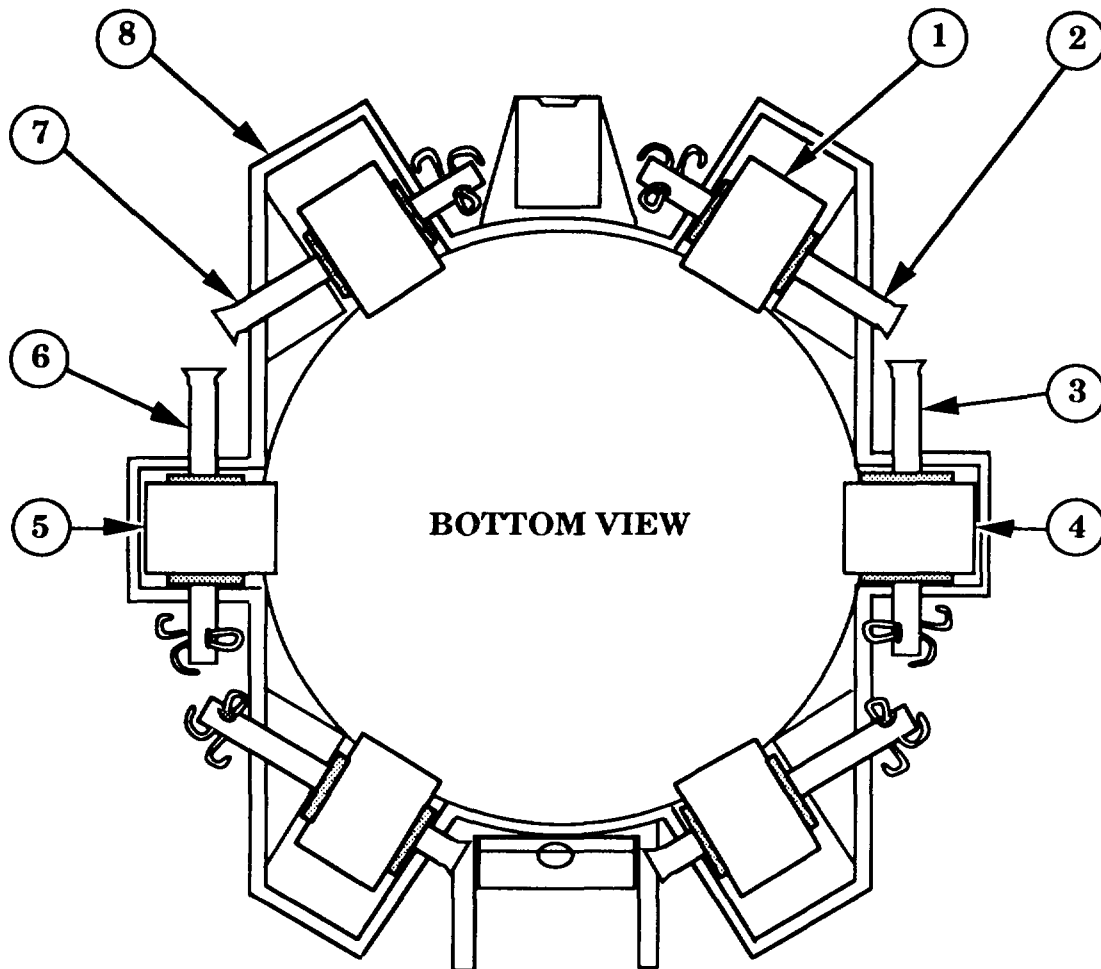


(9) At bottom of barrel assembly, use round nose pliers to straighten cotter pins (3, 4, 7, 8, 13 and 14) for removal. Remove cotter pins from six spindles (16, 5, 6, 9, 12, and 15).

(10) Use punch and hammer to drive cotter pin end of spindle (12) out of barrel assembly (1). If adjacent spindle (9) is in way, use hammer and punch to drive spindle (9) into casting. Remove roller assembly (11) from barrel assembly (1).

(11) Use punch and hammer to drive cotter pin end of spindle (9) out of barrel assembly (1). Remove roller assembly (10) from barrel assembly (1).

(12) Use punch and hammer to drive cotter pin end of spindle (16) out of barrel assembly (1). If adjacent spindle (15) is in way, use hammer and punch to drive spindle into casting. Remove roller assembly (2) from barrel assembly (1).

4-12. BARREL ASSEMBLY ROLLER REMOVAL AND REPLACEMENT - Continued**a. Removal - Continued**

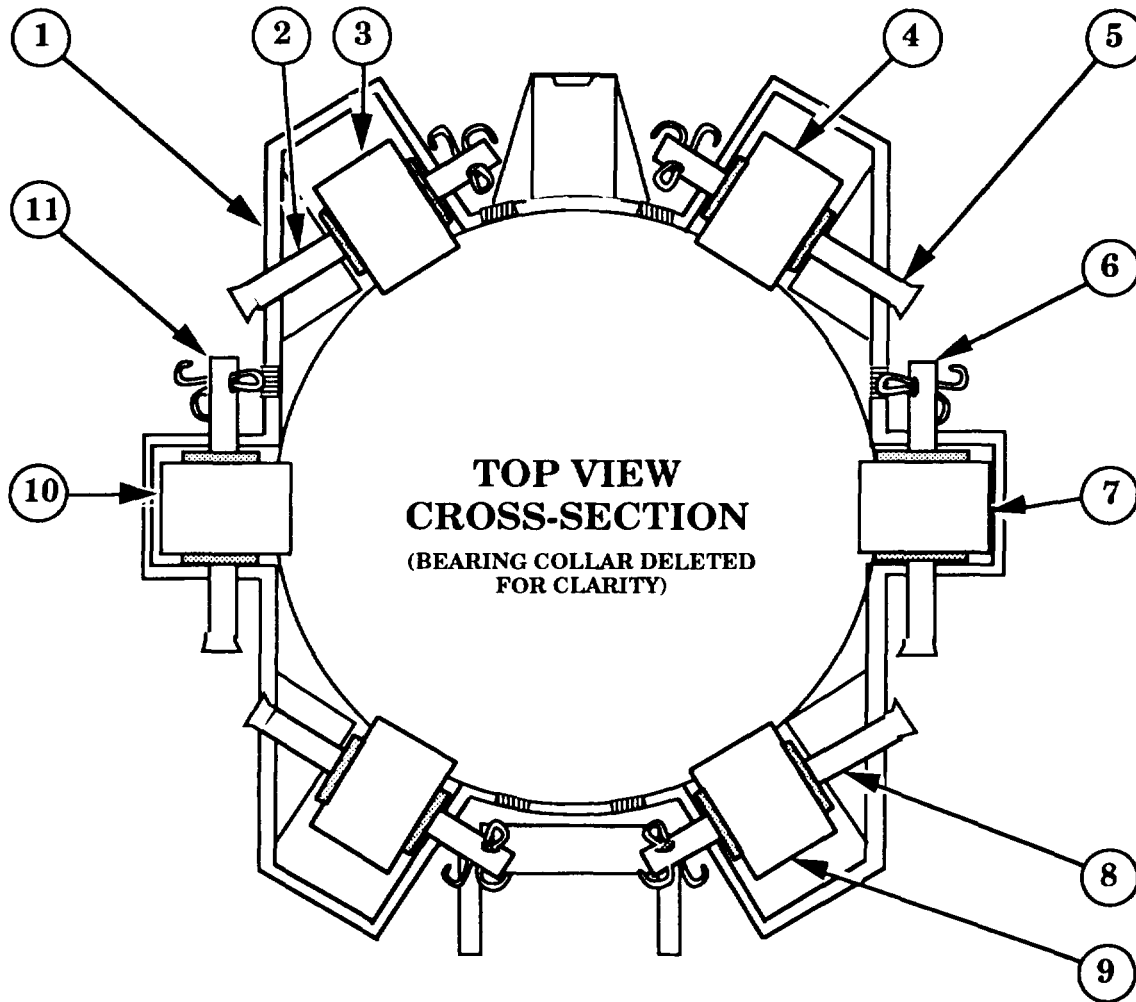
(13) Use punch and hammer to drive cotter pin end of spindle (2) out of barrel assembly (8). If adjacent spindle (3) is in way, use hammer and punch to drive spindle (3) into casting. Remove roller assembly (1) from barrel assembly (8).

(14) Use punch and hammer to drive cotter pin end of spindles (3 and 6) out of barrel assembly (8). Remove roller assemblies (4 and 5) from barrel assembly (8).

(15) Remove barrel assembly lanyard (refer to para 4-13a).

4-12. BARREL ASSEMBLY ROLLER REMOVAL AND REPLACEMENT - Continued

b. Replacement



- (1) Replace barrel assembly lanyard (refer to para 4-13b).

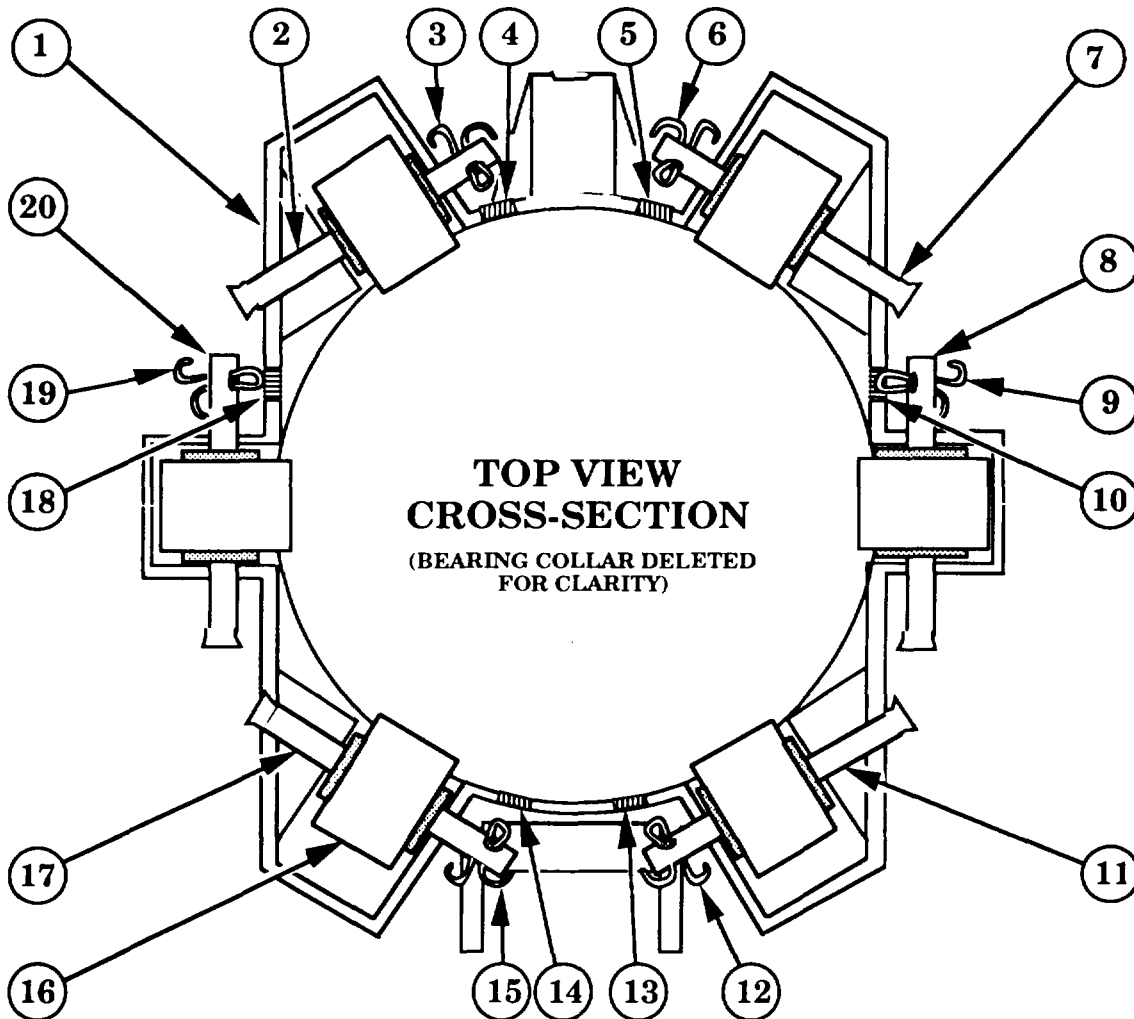
NOTE

In steps (2) thru (5), ensure that the cotter pin holes in the spindles are aligned with the access holes. In the following steps, if the adjacent spindle is in the way, use a hammer and punch to drive the adjacent spindle into the casting.

- (2) Place roller assemblies (7 and 10) into barrel assembly (1). Use punch and hammer to drive cotter pin end of spindles (6 and 11) through barrel assembly (1).
- (3) Place roller assembly (4) into barrel assembly (1). Use punch and hammer to drive cotter pin end of spindle (5) into barrel assembly (1).
- (4) Place roller assembly (3) into barrel assembly (1). Use punch and hammer to drive cotter pin end of spindle (2) into barrel assembly (1).
- (5) Place roller assembly (9) into barrel assembly (1). Use punch and hammer to drive cotter pin end of spindle (8) into barrel assembly (1).

4-12. BARREL ASSEMBLY ROLLER REMOVAL AND REPLACEMENT - Continued

b. Replacement - Continued



NOTE

In step (6), ensure that the cotter pin hole in the spindle is aligned with the access hole.

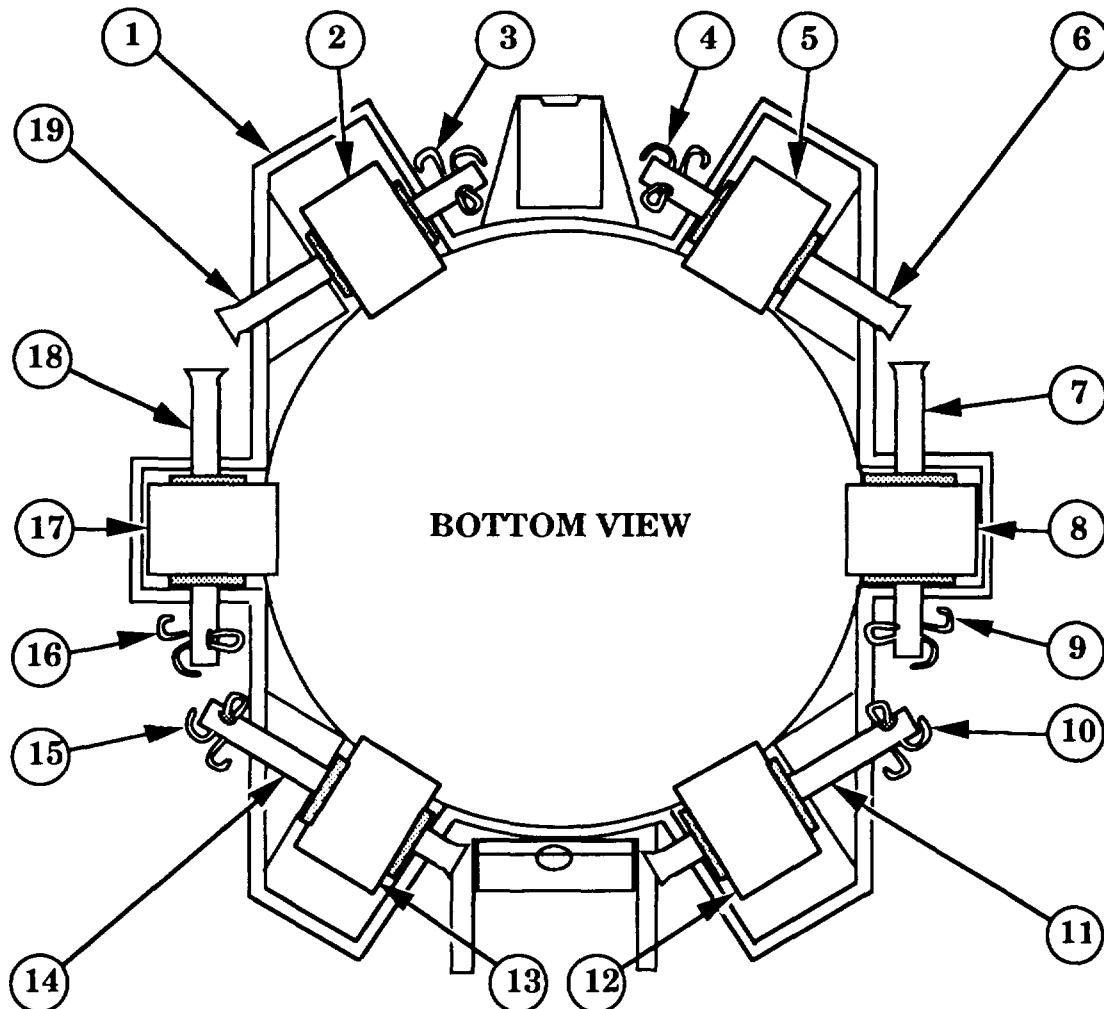
- (6) Place roller assembly (16) into barrel assembly (1). Use punch and hammer to drive cotter pin end of spindle (17) into barrel assembly (1).

NOTE

Cotter pins on the six rollers in the top of the barrel assembly must be placed into spindles through holes in side of barrel assembly. Cotter pins are inserted from inside the barrel assembly.

- (7) At top of barrel assembly, insert six cotter pins (3, 6, 9, 12, 15, and 19) through six access holes (4, 5, 10, 13, 14, and 18) in barrel assembly (1) into six respective spindles (2, 7, 8, 11, 17, and 20).
- (8) Secure six cotter pins (3, 6, 9, 12, 15, and 19) to six spindles (2, 7, 8, 11, 17, and 20) using round nose pliers to bend cotter pins.

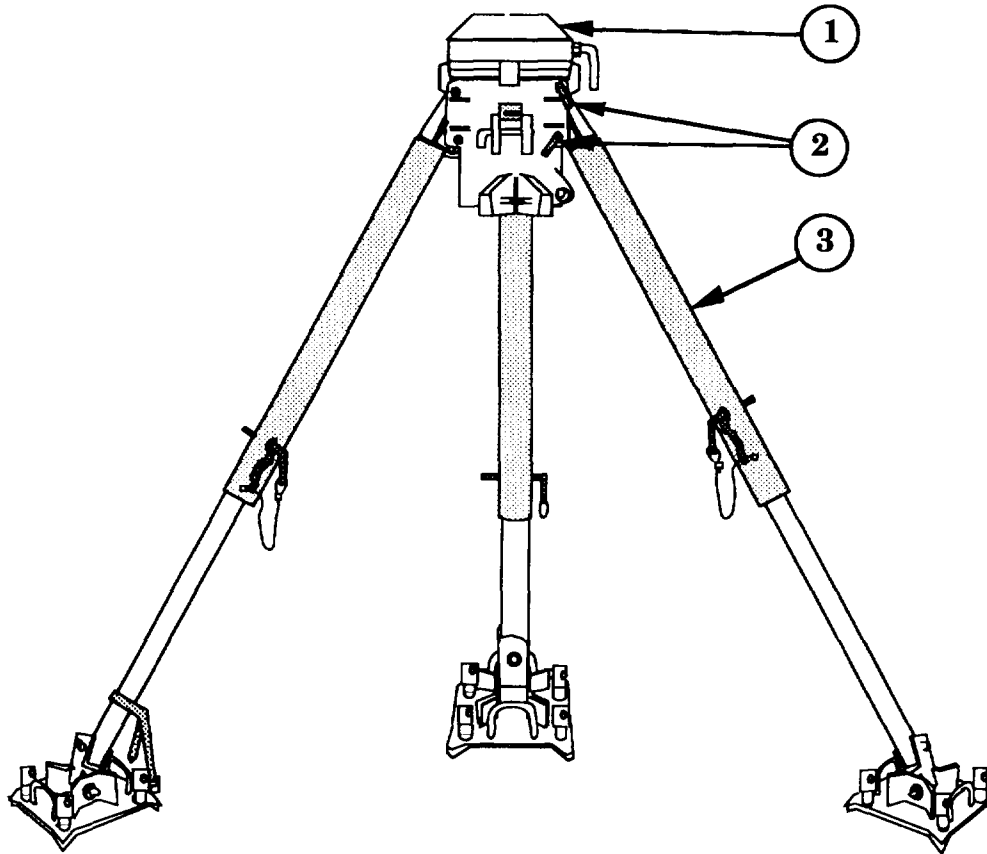
4-12. BARREL ASSEMBLY ROLLER REMOVAL AND REPLACEMENT - Cont inued
 b. Replacement - Continued



- (9) Place roller assemblies (8 and 17) into barrel assembly (1). Use punch and hammer to drive cotter pin end of spindles (7 and 18) into barrel assembly (1).
- (10) Place roller assembly (5) into barrel assembly (1). Use punch and hammer to drive cotter pin end of spindle (6) into barrel assembly (1).
- (11) Place roller assembly (2) into barrel assembly (1). Use punch and hammer to drive cotter pin end of spindle (19) into barrel assembly (1).
- (12) Place roller assembly (12) into barrel assembly (1). Use punch and hammer to drive cotter pin end of spindle (11) into barrel assembly (1).
- (13) Place roller assembly (13) into barrel assembly (1). Use punch and hammer to drive cotter pin end of spindle (14) into barrel assembly (1).
- (14) At bottom of barrel assembly, use round nose pliers to insert cotter pins (3, 4, 9, 10, 15, and 16) into six respective spindles (19, 6, 7, 11, 14, and 18).
- (15) Secure six cotter pins (3, 4, 9, 10, 15, and 16) to six spindles (19, 6, 7, 11, 14, and 18) using round nose pliers to bend cotter pins.

4-12. BARREL ASSEMBLY ROLLER REMOVAL AND REPLACEMENT - Continued

b. Replacement- Continued



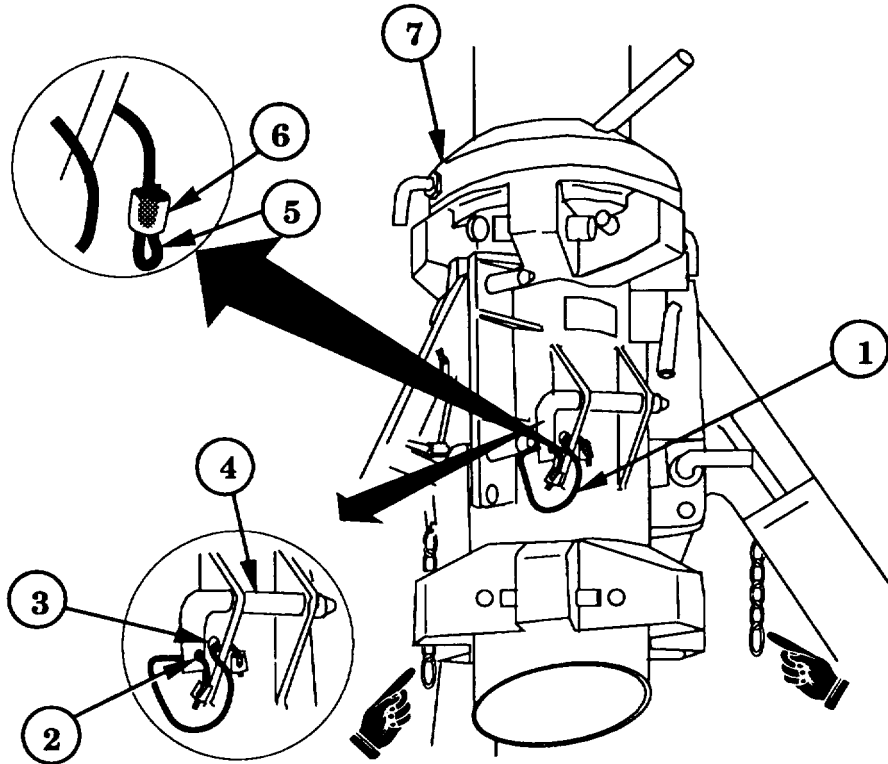
(16) Position leg assembly (3) on barrel assembly (1) and secure with two locking pins (2).

(17) Repeat step 16 for remaining two leg assemblies.

4-13. BARREL ASSEMBLY LANYARD REMOVAL AND REPLACEMENT

a. Removal

- (1) Using diagonal cutting pliers, cut lanyard (1) attaching locking pin (4) to barrel assembly (7).
- (2) Remove lanyard (1).

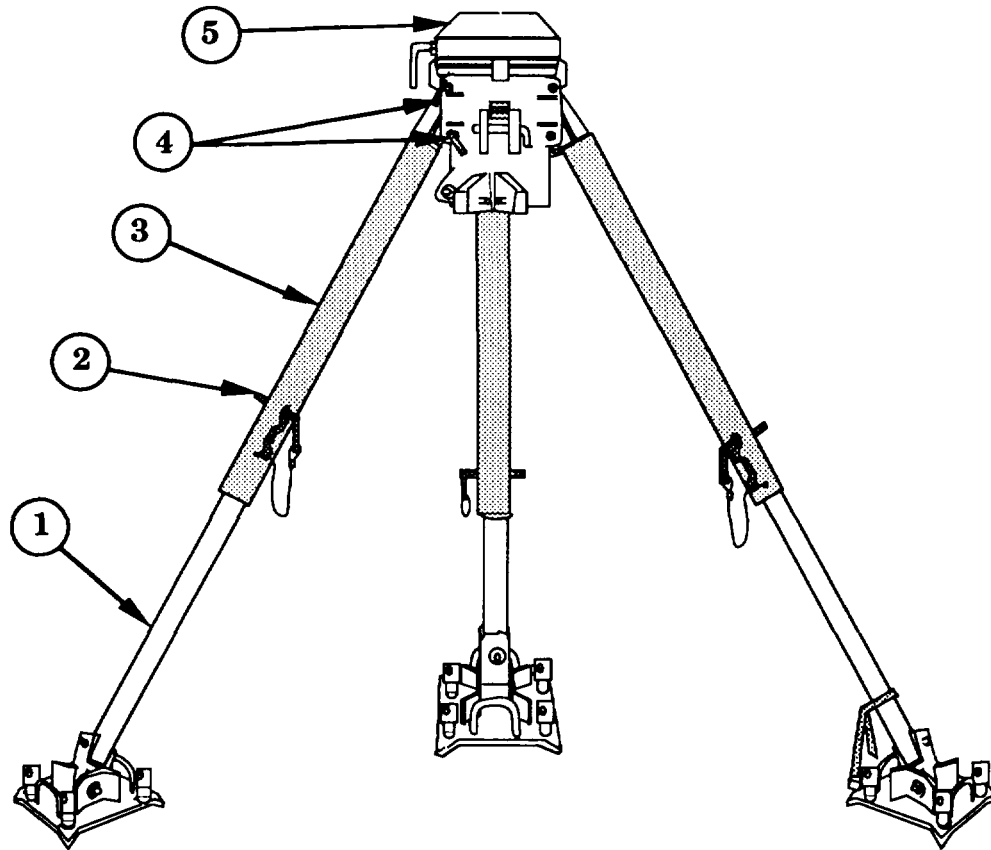


b. Replacement

- (1) Using 10 inches of lanyard cable, form 3/4-inch loop (5) at one end.
- (2) Place strain relief (6) around loop (5) and crimp with slip joint pliers.
- (3) Thread end of lanyard (1) through eyelet (3) and through lanyard hole (2).
- (4) Form end of lanyard (1) into 3/4-inch loop.
- (5) Place strain relief around loop and crimp with slip joint pliers.

4-14. UPPER LEG REMOVAL AND REPLACEMENT

a. Removal

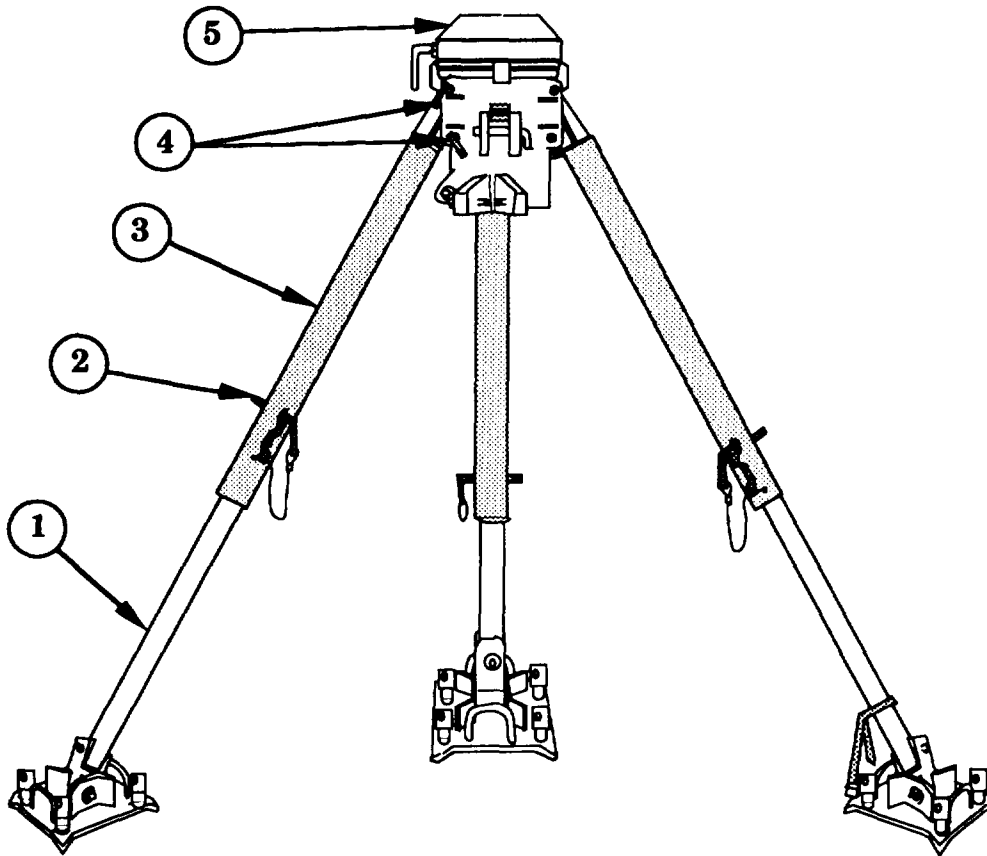
**NOTE**

Lay tripod down before removing upper leg assembly.

- (1) Remove locking pin (2) securing lower leg (1) to upper leg (3) and remove lower leg (1).
- (2) Remove two locking pins (4) securing upper leg (3) to barrel assembly (5).
- (3) Remove tripod kneeling lanyard (refer to para 4-11a).
- (4) Remove leg assembly lanyard (two locking pins) (refer to para 4-18a).
- (5) Remove leg assembly lanyard (one locking pin) (refer to para 4-17a).
- (6) Save three locking pins and kneeling lanyard for use with replacement upper leg.

4-14. UPPER LEG REMOVAL AND REPLACEMENT - Continued

b. Replacement

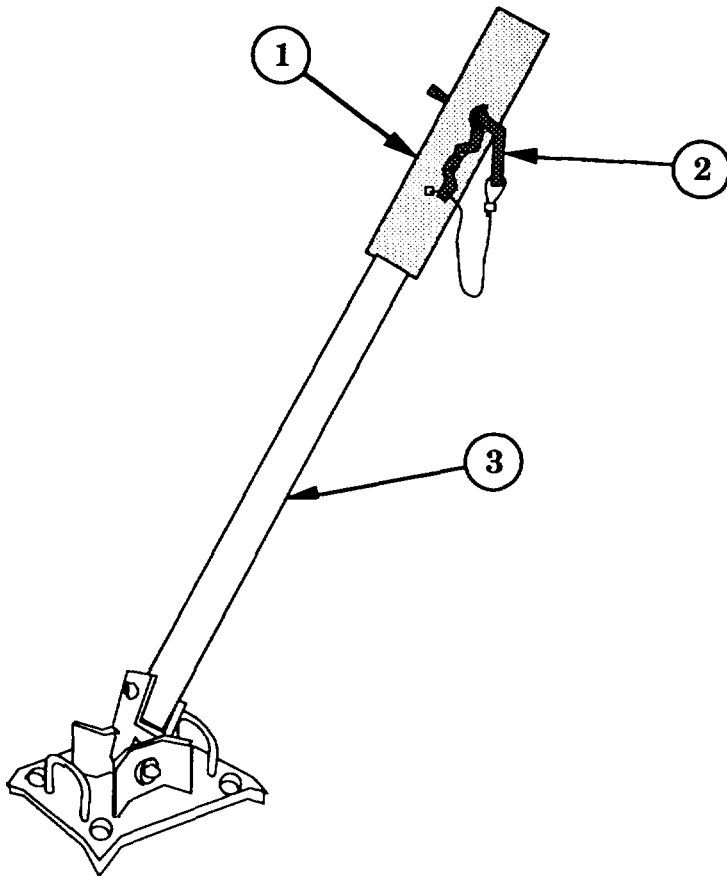


- (1) Replace leg assembly lanyard (one locking pin) (refer to para 4-17b).
- (2) Replace leg assembly lanyard (two locking pins) (refer to para 4-18b).
- (3) Replace tripod kneeling lanyard (refer to para 4-11 lb).
- (4) Insert lower leg (1) into upper leg (3) and secure with locking pin (2).
- (5) Position replacement upper leg (3) on barrel assembly (5) and secure with two locking pins (4).
- (6) Return tripod to standing position.

4-15. LOWER LEG REMOVAL AND REPLACEMENT**a. Removal****NOTE**

Lay tripod down before removing lower leg assembly.

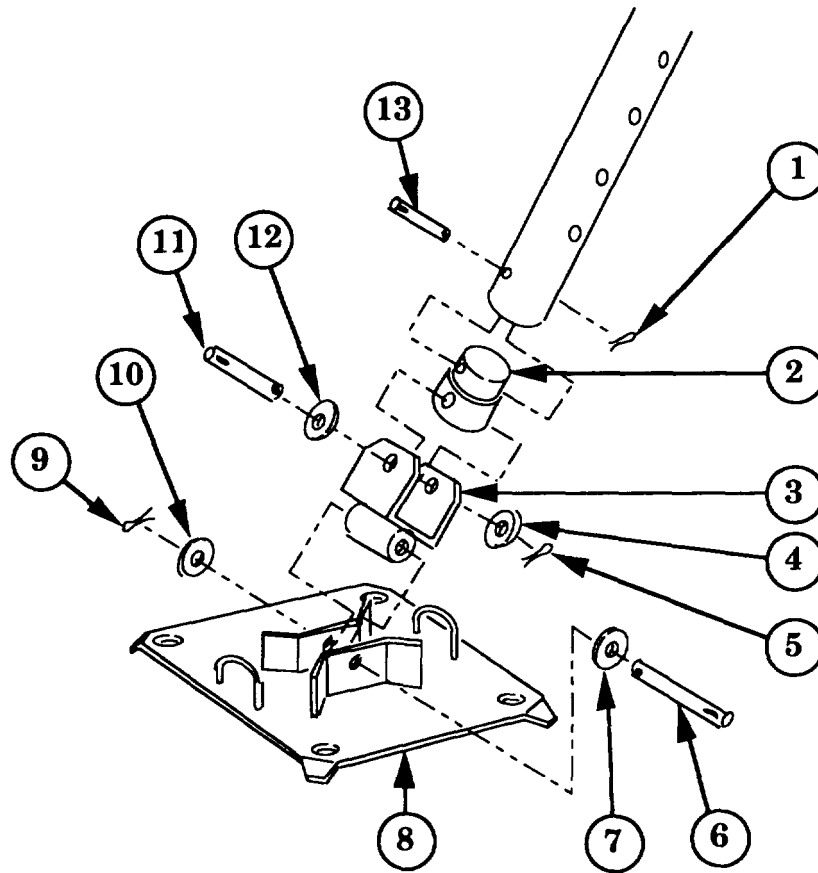
- (1) Remove baseplate (refer to para 4-16a).
- (2) Remove locking pin (2) securing lower leg (3) to upper leg (1).

**b. Replacement**

- (1) Insert lower leg (3) into upper leg (1), secure with locking pin (2).
- (2) Replace baseplate (refer to para 4-16b).

4-16. BASEPLATE REMOVAL AND REPLACEMENT

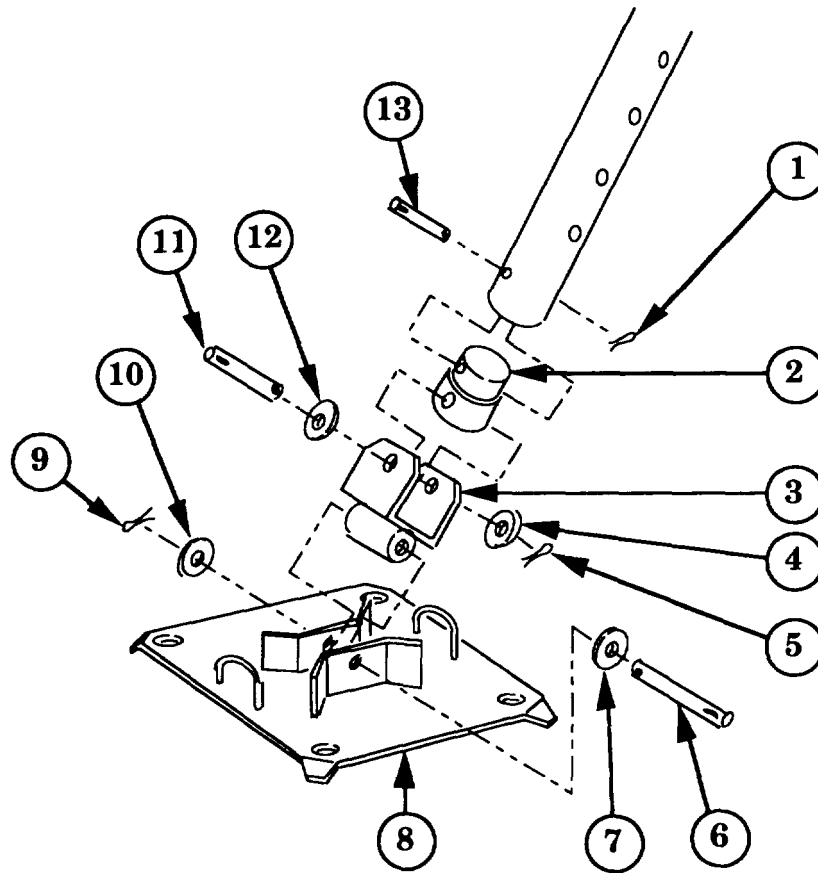
a. Removal



- (1) Hold spindle (6) with slip joint pliers and use round nose pliers to remove cotter pin (9).
- (2) Remove spindle (6) and two flat washers (7 and 10).
- (3) Remove baseplate (8).
- (4) Hold spindle (11) with slip joint pliers and use round nose pliers to remove cotter pin (5).
- (5) Remove spindle (11) and two flat washers (4 and 12).
- (6) Remove bracket yoke (3).
- (7) Hold spindle (13) with slip joint pliers and use round nose pliers to remove cotter pin (1).
- (8) Remove swivel cap (2).

4-16. BASEPLATE REMOVAL AND REPLACEMENT - Continued

b. Replacement

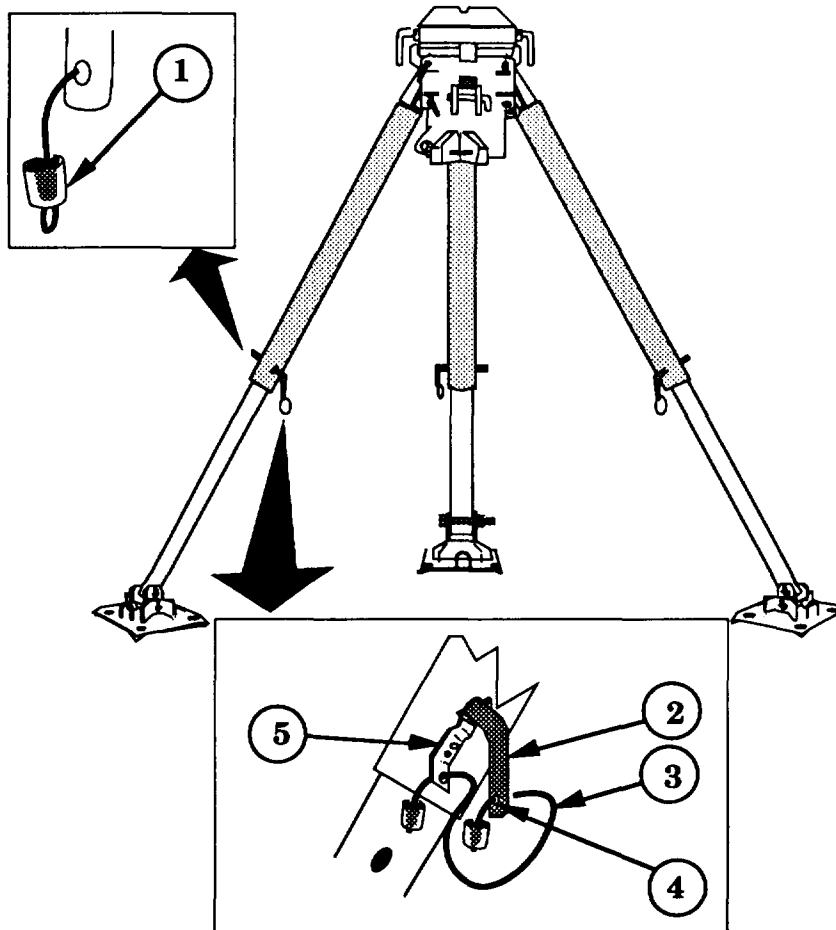


- (1) Replace swivel cap (2) and spindle (13).
- (2) Use round nose pliers to replace cotter pin (1).
- (3) Replace bracket yoke (3).
- (4) Replace flat washer (4), spindle (11), and flat washer (12).
- (5) Use round nose pliers to replace cotter pin(5).
- (6) Replace baseplate (8).
- (7) Replace flat washer (7), spindle (6), and flat washer (10).
- (8) Use round nose pliers to replace cotter pin (9) into spindle (6).

4-17. LEG ASSEMBLY LANYARD REMOVAL AND REPLACEMENT (One Locking Pin)

a. Removal

- (1) Using diagonal cutting pliers, cut lanyard (3) attaching locking pin (2) to locking bracket (5).
- (2) Remove lanyard (3).

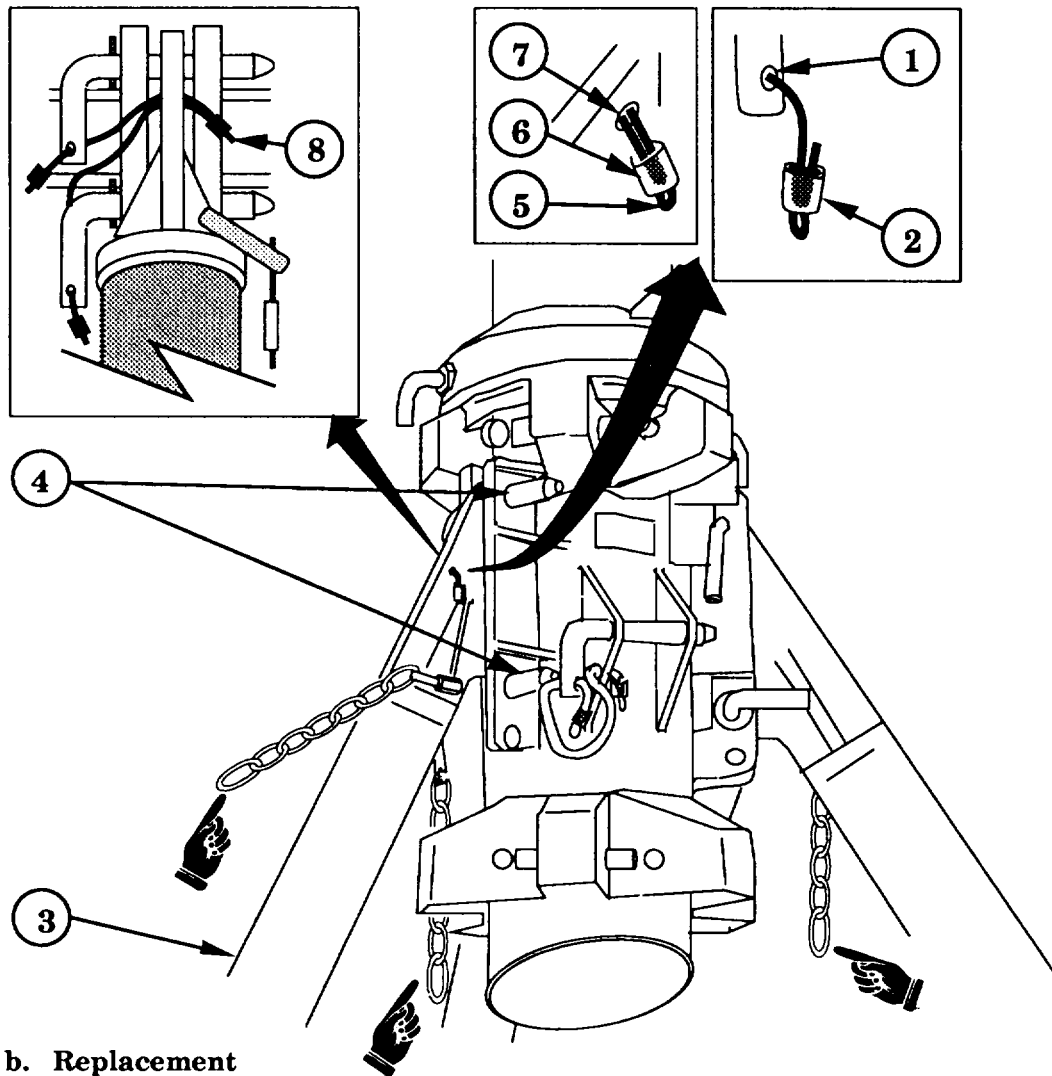


b. Replacement

- (1) Using 10 inches of lanyard cable, form 3/4-inch loop at one end.
- (2) Place strain relief (1) around loop and crimp with slip joint pliers.
- (3) Thread end of lanyard (3) through locking bracket (5) and through lanyard hole (4) in locking pin (2).
- (4) Form end of lanyard (3) into 3/4-inch loop.
- (5) Place strain relief (1) around loop and crimp with slip joint pliers.

4-18. LEG ASSEMBLY LANYARD REMOVAL AND REPLACEMENT (Two Locking Pins)**a. Removal**

- (1) Using diagonal cutting pliers, cut lanyard (8).
- (2) Remove lanyard (8) from leg assembly (3) and two locking pins (4).

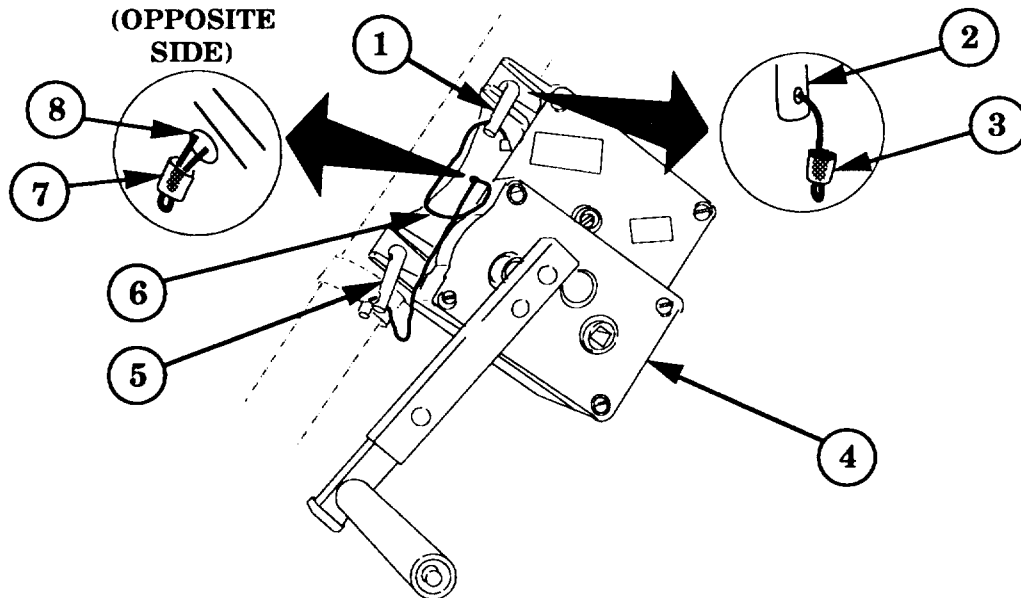
**b. Replacement**

- (2) Place strain relief (6) over loop (5) at folded end of lanyard and crimp with slip joint pliers.
- (3) Thread both ends of lanyard (8) through lanyard hole (7) in leg assembly (3).
- (4) Thread one end of lanyard (8) through lanyard hole (1) in locking pin (4). Thread other end of lanyard (8) through lanyard hole (1) in second locking pin (4).
- (5) Form 3/4-inch loop in end of one lanyard (8).
- (6) Place strain relief (2) over loop and crimp with slip joint pliers.
- (7) Repeat steps 5 and 6 for other lanyard.

4-19. LIFTING WINCH LANYARD REMOVAL AND REPLACEMENT (Locking Pins)

a. Removal

- (1) Using diagonal cutting pliers, cut lanyard (6) attaching locking pins (1 and 5) to lifting winch (4).
- (2) Remove lanyard (6).



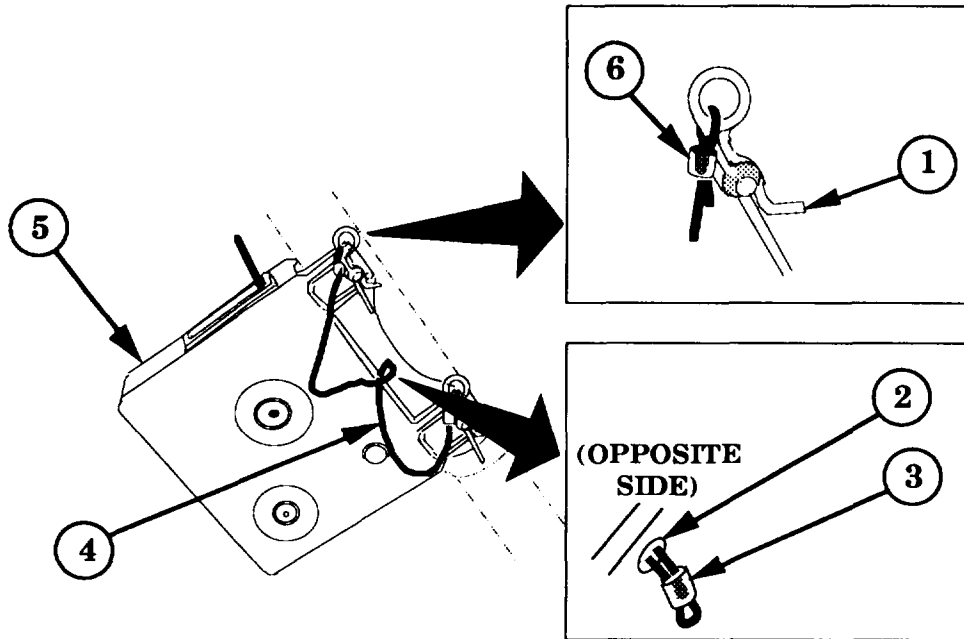
b. Replacement

- (1) Fold 24 inches of replacement lanyard cable in half.
- (2) Place strain relief (7) over loop at folded end of lanyard (6) and crimp with slip joint pliers.
- (3) Thread two ends of lanyard (6) through lanyard hole (8) in lifting winch (4).
- (4) Thread one end of lanyard (6) through lanyard hole (2) in one locking pin (1). Thread other end of lanyard (6) through lanyard hole in second locking pin (5).
- (5) Form 3/4-inch loop in one end of lanyard (6).
- (6) Place strain relief (3) over loop and crimp with slip joint pliers.
- (7) Repeat steps 5 and 6 for other end of lanyard.

4-20. LIFTING WINCH LANYARD REMOVAL AND REPLACEMENT (Double Spring Cotter Pins)

a. Removal

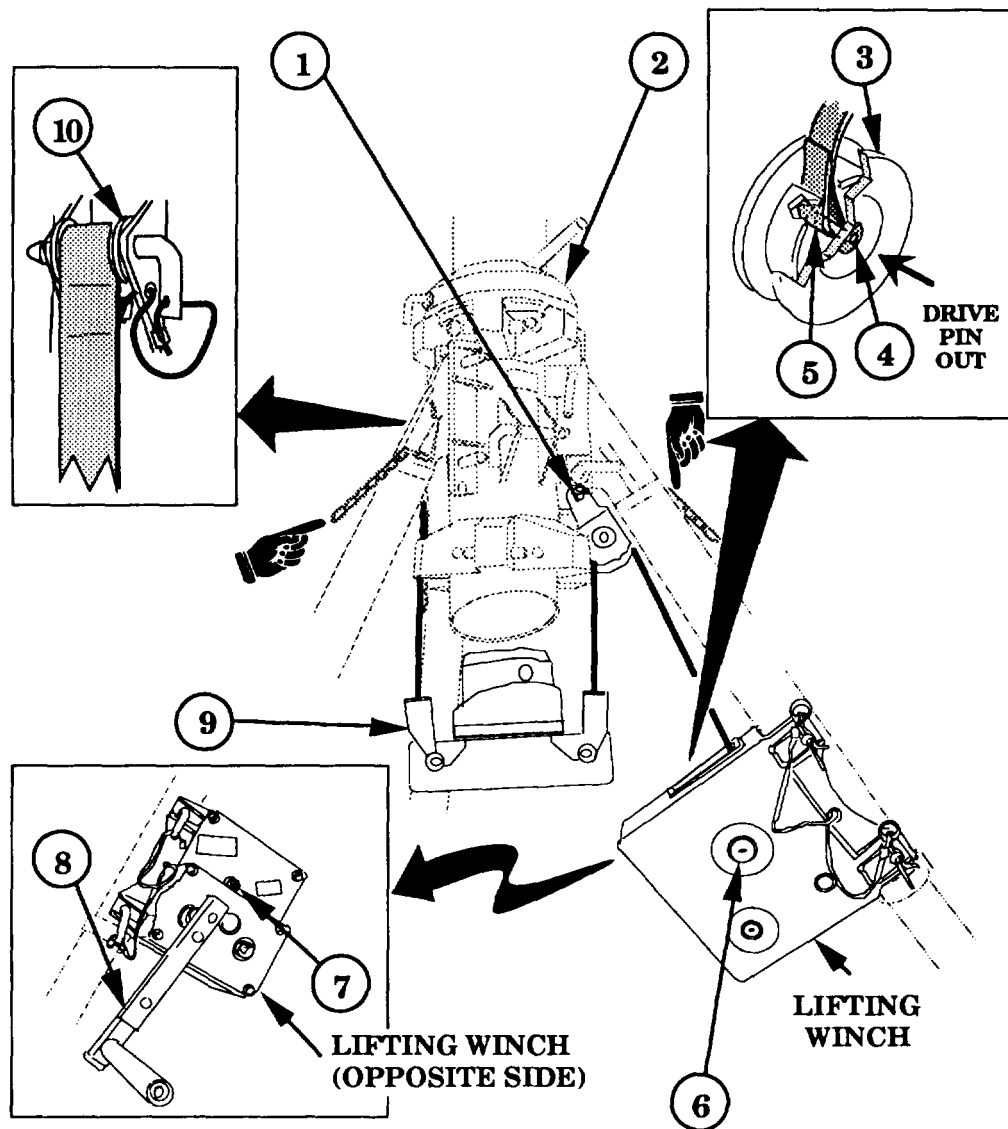
- (1) Using diagonal cutting pliers, cut lanyard (4) from two double spring cotter pins (1) and lifting winch (5).
- (2) Remove lanyard (4).



b. Replacement

- (1) Fold 18 inches of replacement lanyard cable in half.
- (2) Place strain relief (3) over loop at folded end of lanyard (4) and crimp with slip joint pliers.
- (3) Thread both ends of lanyard (4) through lanyard hole (2) in lifting winch (5).
- (4) Place strain relief (6) over one end of lanyard (4) and thread lanyard through eye in double spring cotter pin (1). Loop end of lanyard (4) back through strain relief (6) forming 3/4-inch loop around eye of double spring cotter pin (1).
- (5) Use pliers to crimp strain relief (6).
- (6) Repeat steps 4 and 5 for other end of lanyard.

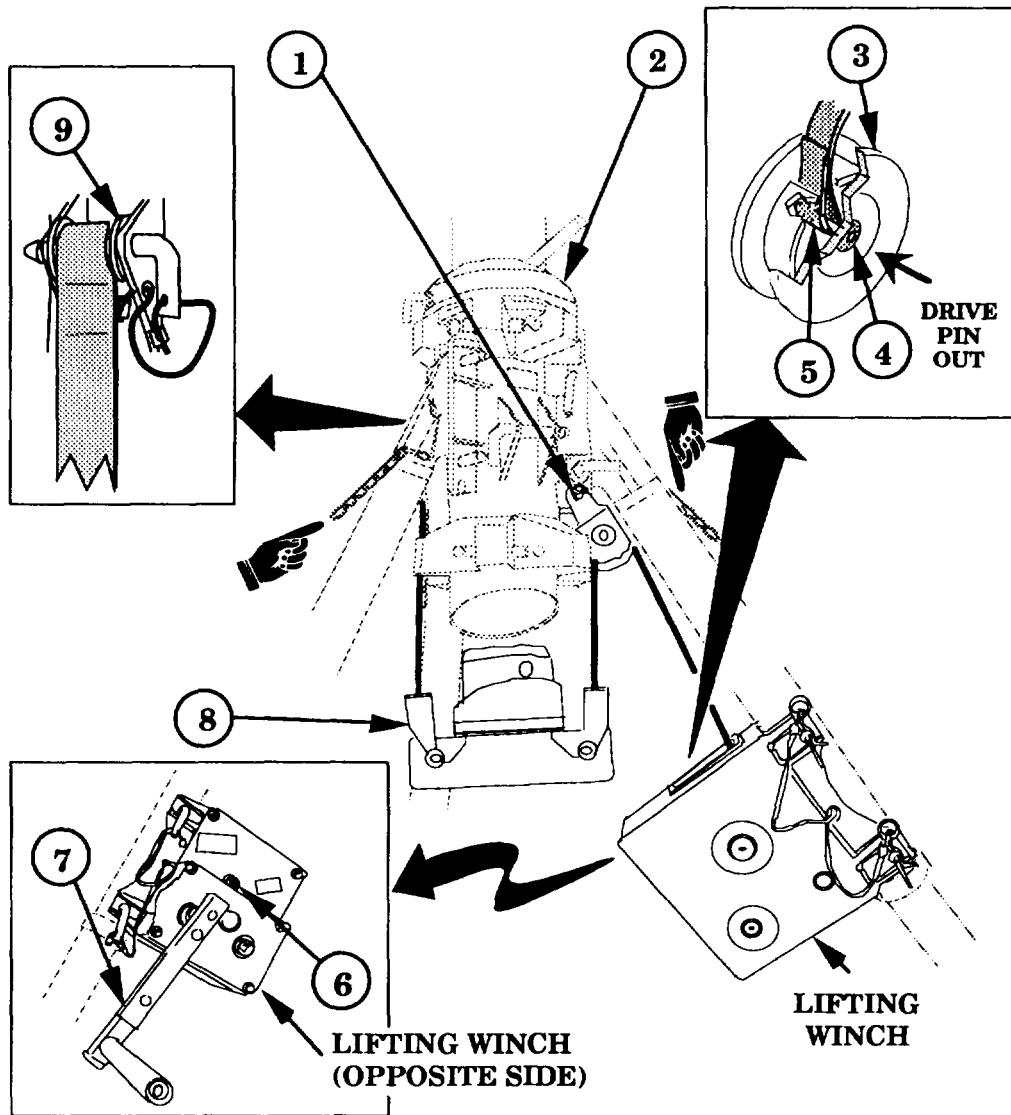
4-21. LIFTING WINCH BELT REMOVAL AND REPLACEMENT



- (2) Using flat-tip screwdriver, remove slotted screw (7) located on side of lifting winch.
- (3) Align metal dowel pin (4) with dowel pin hole (6).
- (4) Insert punch into dowel pin hole (6) and use hammer to drive out metal dowel pin (4) securing lifting winch belt (5) to winch reel assembly (3).
- (5) Remove lifting winch belt (5) from winch reel assembly (3), lifting belt pulley (1), and shoe assembly (9).
- (6) Release belt attachment spool (10) from barrel assembly (2).

4-21. LIFTING WINCH BELT REMOVAL AND REPLACEMENT - Continued

b. Replacement



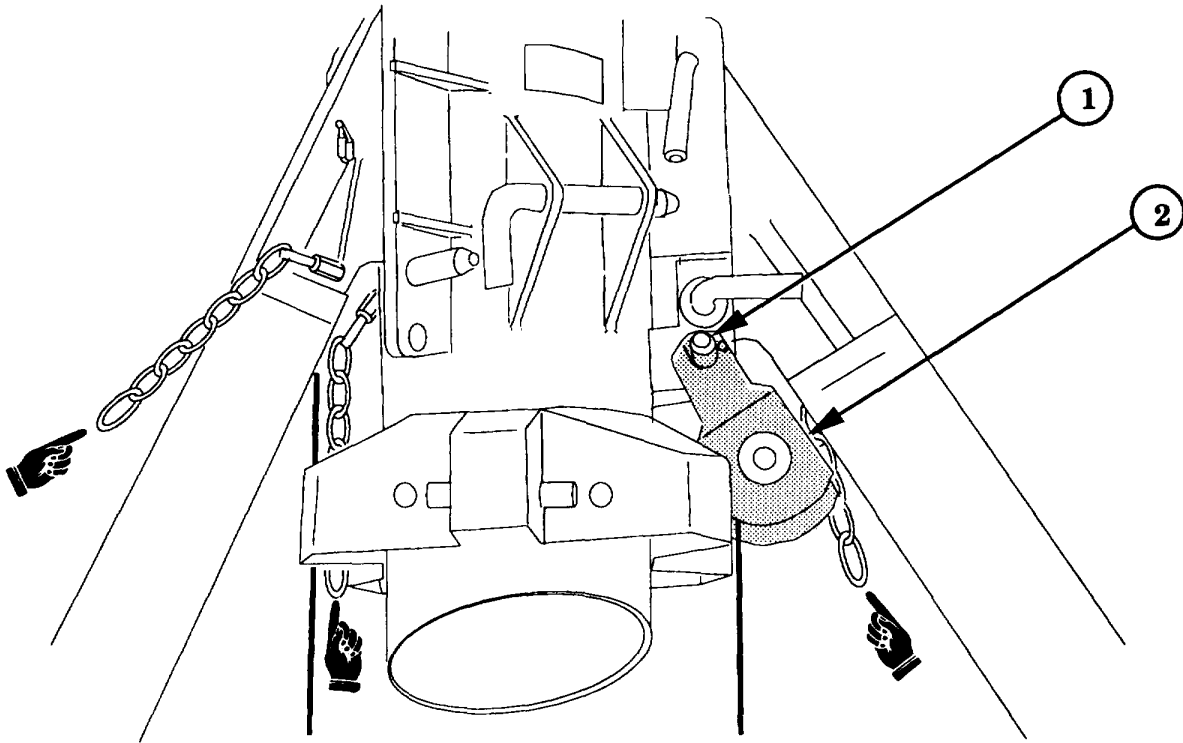
NOTE

Ensure lifting winch belt is not twisted.

- (1) Thread replacement lifting winch belt through shoe assembly (8) and lifting belt pulley (1).
- (2) Insert lifting winch belt (5) end loop into winch reel assembly (3). Align dowel pin holes in reel and housing, and secure by inserting metal dowel pin (4). Use flat-tip screwdriver to install slotted screw (6).
- (3) Place lifting winch in vertical position.
- (4) Attach belt attachment spool (9) to barrel assembly (2).
- (5) Use crank (7) to wind up slack in lifting winch belt (5).

4-22. LIFTING WINCH BELT PULLEY REMOVAL AND REPLACEMENT**a. Removal**

- (1) Remove lifting winch belt (refer to para 4-21a).
- (2) Remove lifting winch belt pulley (2) by removing locking pin (1).

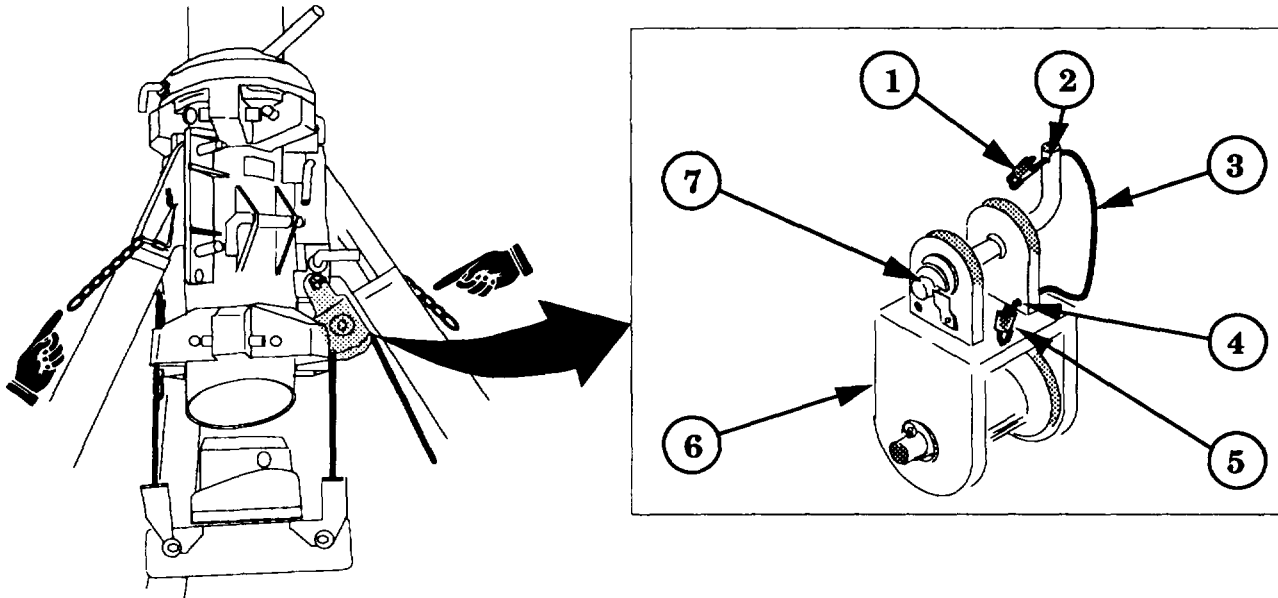
**b. Replacement**

- (1) Place replacement lifting winch belt pulley (2) on barrel assembly bracket and secure using locking pin (1).
- (2) Replace lifting winch belt (refer to para 4-21b).

Change 1
4-37

4-23. LIFTING WINCH BELT PULLEY LANYARD REMOVAL AND REPLACEMENT**a. Removal**

- (1) Using diagonal cutting pliers, cut lanyard (3) attaching locking pin (7) to lifting winch belt pulley (6).
- (2) Remove lanyard (3).

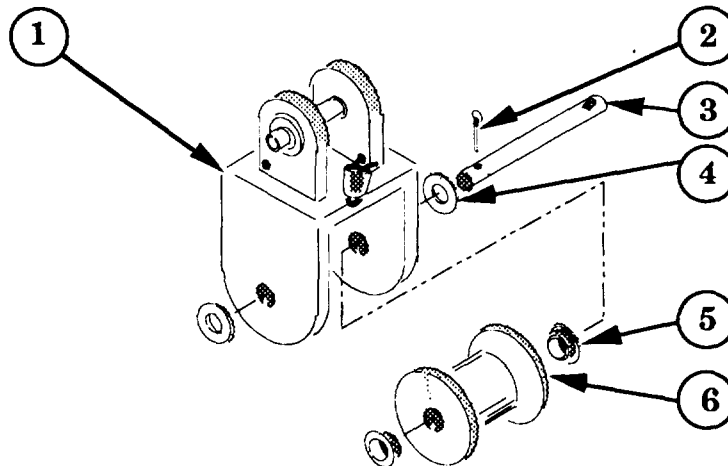
**b. Replacement**

- (1) Using 10 inches of lanyard cable, form 3/4-inch loop at one end.
- (2) Place strain relief (1) around loop and crimp with slip joint pliers.
- (3) Thread end of lanyard (3) through lanyard hole (2) in locking pin (7) and lanyard hole (4) in lifting winch belt pulley (6).
- (4) Form end of lanyard (3) into 3/4-inch loop.
- (5) Place strain relief (5) around loop and crimp with slip joint pliers

Change 1
4-38

4-24. LIFTING WINCH BELT PULLEY DISASSEMBLY AND REASSEMBLY**a. Disassembly**

- (1) Remove lifting winch belt (refer to para 4-21a).
- (2) Remove lifting winch belt pulley (refer to para 4-22a, step 2).
- (3) Remove lifting winch belt pulley lanyard (refer to para 4-23a).
- (4) Using round nose pliers, remove cotter pin (2) from spindle (3).
- (5) Slide spindle (3) from housing (1) freeing two flat washers (4), two bushings (5), and belt pulley (6).

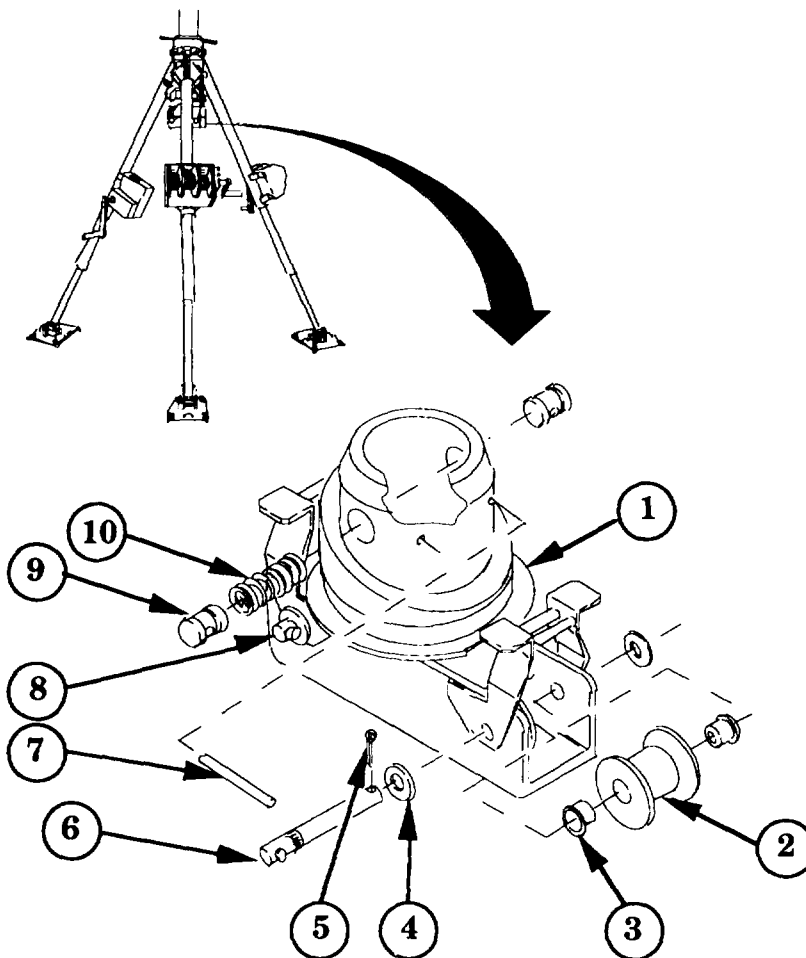
**b. Reassembly**

- (1) Place belt pulley (6) with two bushings (5) in housing (1).
- (2) Insert spindle (3) through flat washer (4), housing (1), and belt pulley with two bushings.
- (3) Install remaining flat washer on spindle (3) and use round nose pliers to install cotter pin (2).
- (4) Replace lifting winch belt pulley lanyard (refer to para 4-23b).
- (5) Replace lifting winch belt pulley (refer to para 4-22b, step 1).
- (6) Replace lifting winch belt (refer to para 4-21b).

4-25. SHOE ASSEMBLY DISASSEMBLY AND REASSEMBLY

a. Disassembly

- (1) Remove lifting winch belt (refer to para 4-21a).
- (2) Using round nose pliers, remove cotter pin (5) from spindle (6). Remove spindle (6) from shoe (1) freeing two flat washers (4), two bushings (3), and belt pulley (2).
- (3) Repeat step 2 for remaining spindle (8).
- (4) Press and hold pressure pin (9) and use punch and hammer to drive serrated pin (7) from shoe (1).
- (5) Using punch and hammer, drive remaining serrated pin (7) from shoe (1).
- (6) Remove two pressure pins (9) and spring (10) from shoe (1).

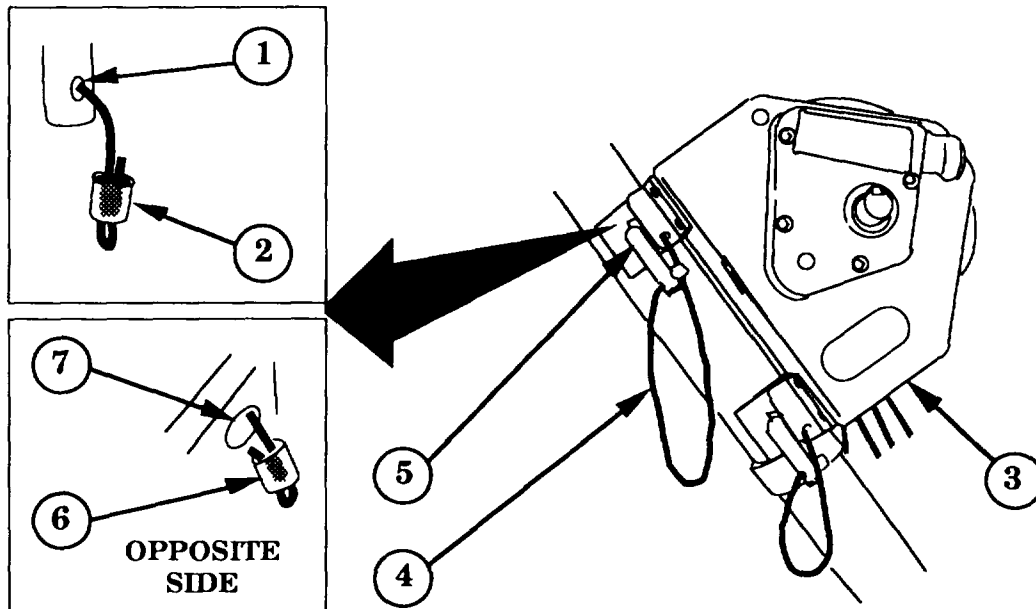


4-25. SHOE ASSEMBLY DISASSEMBLY AND REASSEMBLY - Continued**b. Reassembly**

- (1) Place one pressure pin (9) in shoe (1). Use punch and hammer to drive serrated pin (7) into shoe (1) and pressure pin (9).
- (2) Insert spring (10) and remaining pressure pin into shoe (1).
- (3) Press and hold pressure pin and secure using punch and hammer to drive serrated pin (7) through shoe (1) and pressure pin (9).
- (4) Insert belt pulley (2) with two bushings (3) into shoe (1).
- (5) Insert spindle (6) through flat washer (4), shoe(1), and belt pulley with two bushings.
- (6) Install remaining fiat washer on spindle (6) and use round nose pliers to install cotter pin (5).
- (7) Repeat steps 4 thru 6 for remaining spindle (8).
- (8) Replace lifting winch belt (refer to para 4-21b).

4-26. GUY WINCH LANYARD REMOVAL AND REPLACEMENT (LOCKING PINS)**a. Removal**

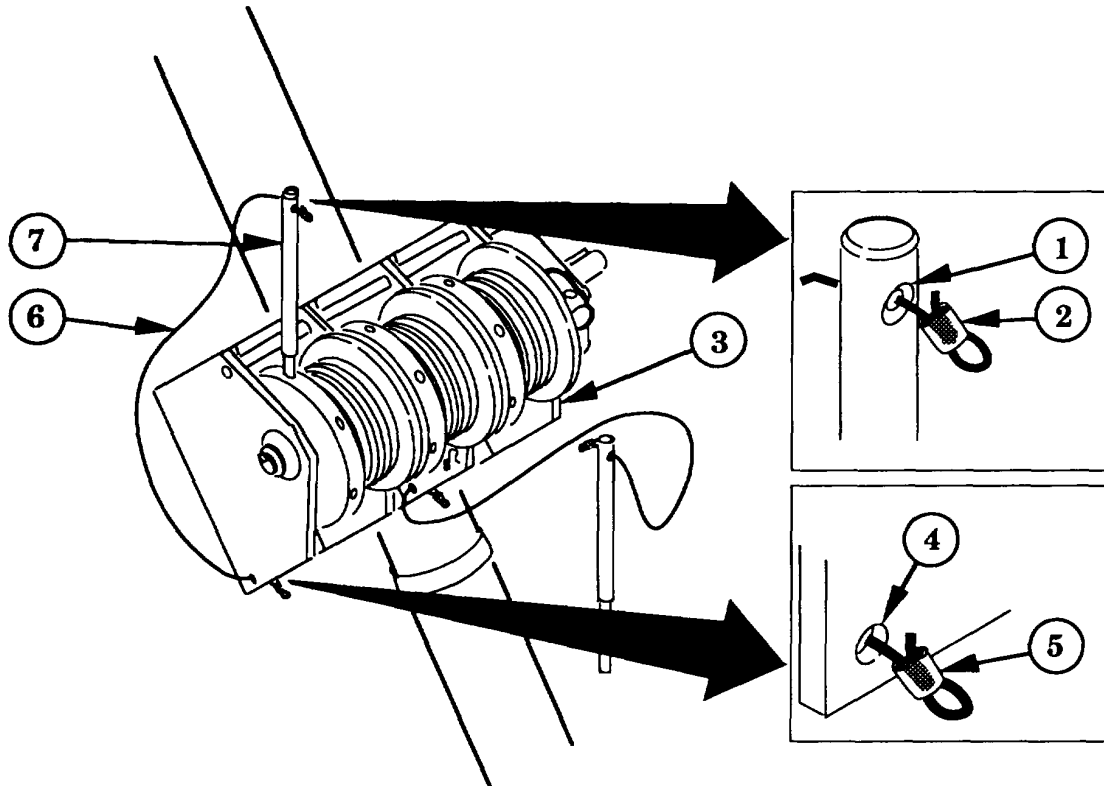
- (1) Using diagonal cutting pliers, cut lanyard (4) attaching locking pin (5) to guy winch (3)
- (2) Remove lanyard (4).

**b. Replacement**

- (1) Using 12 inches of lanyard cable, form 3/4-inch loop at one end.
- (2) Place strain relief (6) around loop and crimp with slip joint pliers.
- (3) Thread end of lanyard (4) through lanyard hole (7) in guy winch (3) and through lanyard hole (1) in locking pin (5).
- (4) Form end of lanyard into 3/4-inch loop.
- (5) Place strain relief (2) around loop and crimp with slip joint pliers.

4-27. GUY WINCH LANYARD REMOVAL AND REPLACEMENT (TENSIONING ROD)**a. Removal**

- (1) Using diagonal cutting pliers, cut lanyard (6) attaching tensioning rod (7) to guy winch (3).
- (2) Remove lanyard (6).

**b. Replacement**

- (1) Using 24 inches of lanyard cable, form 3/4-inch loop at one end.
- (2) Place strain relief (5) around loop and crimp with slip joint pliers.
- (3) Thread end of lanyard (6) through lanyard hole (4) in guy winch (3) and through lanyard hole (1) in tensioning rod (7).
- (4) Form end of lanyard into 3/4-inch loop.
- (5) Place strain relief (2) around loop and crimp with slip joint pliers.

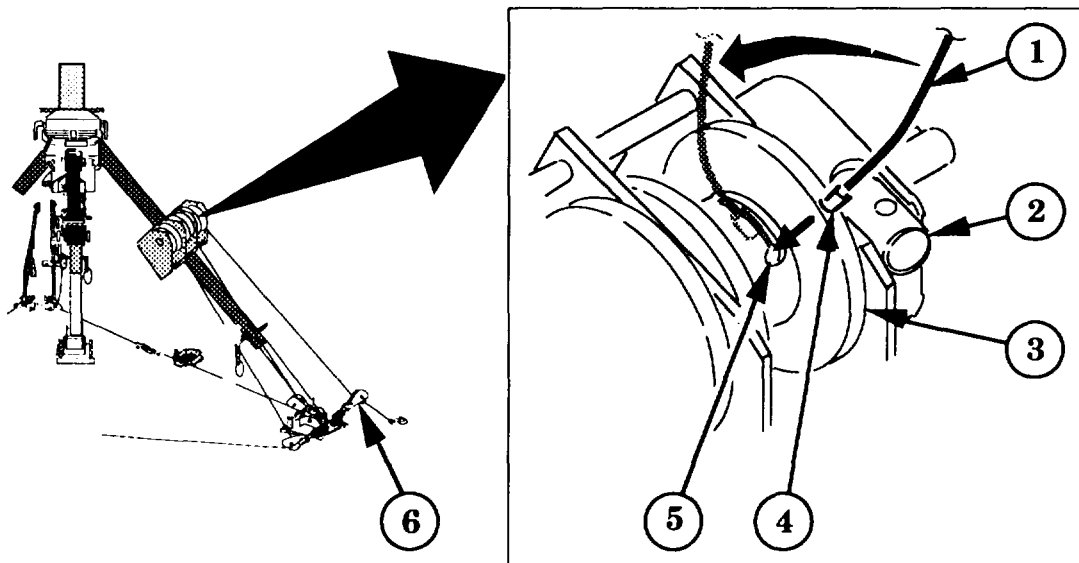
4-28. GUY WINCH EXTENSION CABLE REMOVAL AND REPLACEMENT

a. Removal

WARNING

Always grasp guy winch crank before pressing safety release. Failure to comply may topple mast resulting in serious personal injury or death.

- (1) Insert tensioning rods into reels not being repaired to prevent unwinding of extension cables.
- (2) Press and hold safety release (2) on guy winch.
- (3) Fully unwind extension cable (1) from guy winch cable reel (3).
- (4) Slide extension cable (1) forward until strain relief (4) rests in wide end of cable retention slot (5).
- (5) Remove extension cable (1) from guy winch cable reel (3).
- (6) Thread extension cable (1) through deflection pulley (6)



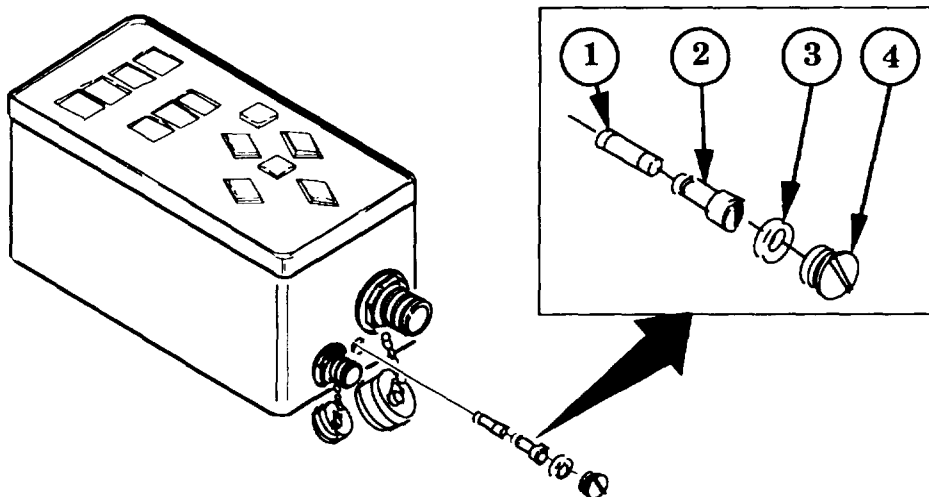
b. Replacement

- (1) Thread extension cable (1) through deflection pulley (6).
- (2) Insert strain relief (4) of extension cable into wide end of cable retention slot (5) on guy winch cable reel (3).
- (3) Secure extension cable (1) to guy winch cable reel (3) by sliding upwards until strain relief (4) rests in narrow end of cable retention slot (5).
- (4) Rotate cable reel (3) downward by hand to wind extension cable (1) onto cable reel.

4-29. CONTROLLER FUSE REMOVAL AND REPLACEMENT**a. Removal****WARNING**

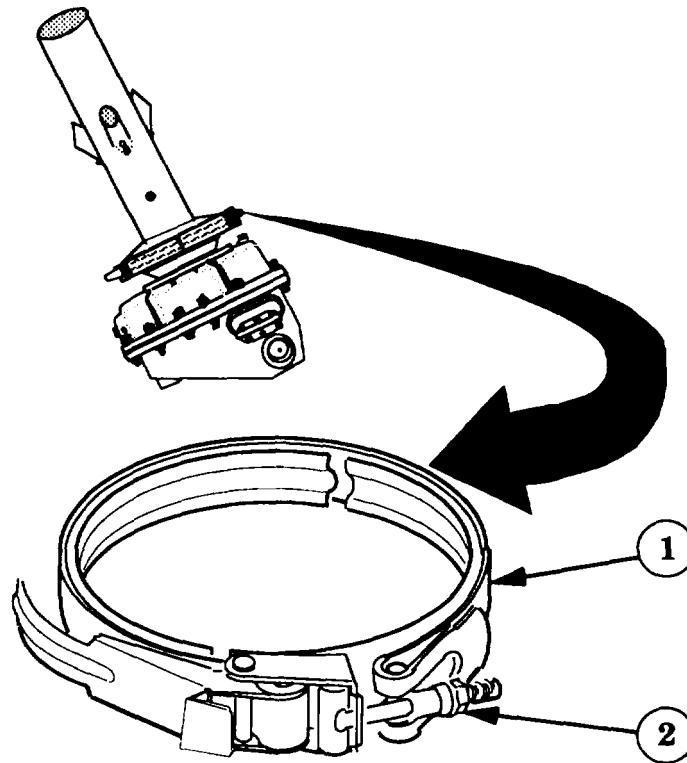
High voltage. 115 V ac is present at the controller. Ensure that power is disconnected from controller before removing fuse. Failure to comply may cause personal injury or death.

- (1) Set controller ON/OFF switch to OFF.
- (2) Disconnect cable assembly W2 from 115 V ac power source.
- (3) Using flat-tip screwdriver, remove seal screw (4) with attached O-ring (3).
- (4) Loosen internal fuse holder cap (2) with small flat-tip screwdriver.
- (5) Tip controller so that fuse (1) and fuse holder cap (2) fall out.
- (6) Remove fuse (1) from fuse holder cap (2).

**b. Replacement**

- (1) Insert replacement fuse (1) into fuse holder cap (2).
- (2) Insert fuse holder cap (2) with fuse (1) into controller and secure with small flat-tip screwdriver.
- (3) Check for presence and condition of O-ring (3). Replace if O-ring (3) contains nicks, cuts, or cracks.
- (4) Insert seal screw (4) in controller and tighten with flat-tip screwdriver.
- (5) Reconnect cable assembly W2 to 115 V ac power source.

4-30. RETAINING RING ADJUSTMENT PROCEDURE



- a. Grasp retaining ring (1) with both hands and attempt to turn.

NOTE

Do not over tighten adjustment nut.

- b. If retaining ring (1) turns, use 1/2-inch open end wrench to tighten adjustment nut (2) until ring cannot be turned.

Section VI. PREPARATION FOR STORAGE OR SHIPMENT

<u>Subject</u>	<u>Para</u>	<u>Page</u>
Preparation for Storage or Shipment	4-31	4-46

4-31. PREPARATION FOR STORAGE OR SHIPMENT

Antenna Support Group OE-481/TRC is the storage and transport container for Mast AB-1373/TRC and ancillary equipment during normal operational use. Perform PMCS on the AB-1373/TRC before storage or shipment.

For shipment of the AB-1373/TRC separately, ensure all the mast components are removed from the OE-481/TRC and packed in the appropriate equipment bags as shown in paragraphs 2-9 and 2-14.

Instruct the appropriate transportation office to package all the AB-1373/TRC components in one package or crate. Dry storage will avoid deterioration.

CHAPTER 5

DIRECT SUPPORT MAINTENANCE

<u>Subject</u>	<u>Section</u>	<u>Page</u>
Lubrication Instructions	I	5-1
Repair Parts; Special Tools; Test, Measurement, and Diagnostic Equipment (TMDE); and Support Equipment.....	II	5-4
Functional Description	III	5-5
Troubleshooting	IV	5-10
Maintenance Procedures	V	5-45

Section I. LUBRICATION INSTRUCTIONS

<u>Subject</u>	<u>Para</u>	<u>Page</u>
Lubrication	5-1	5-1

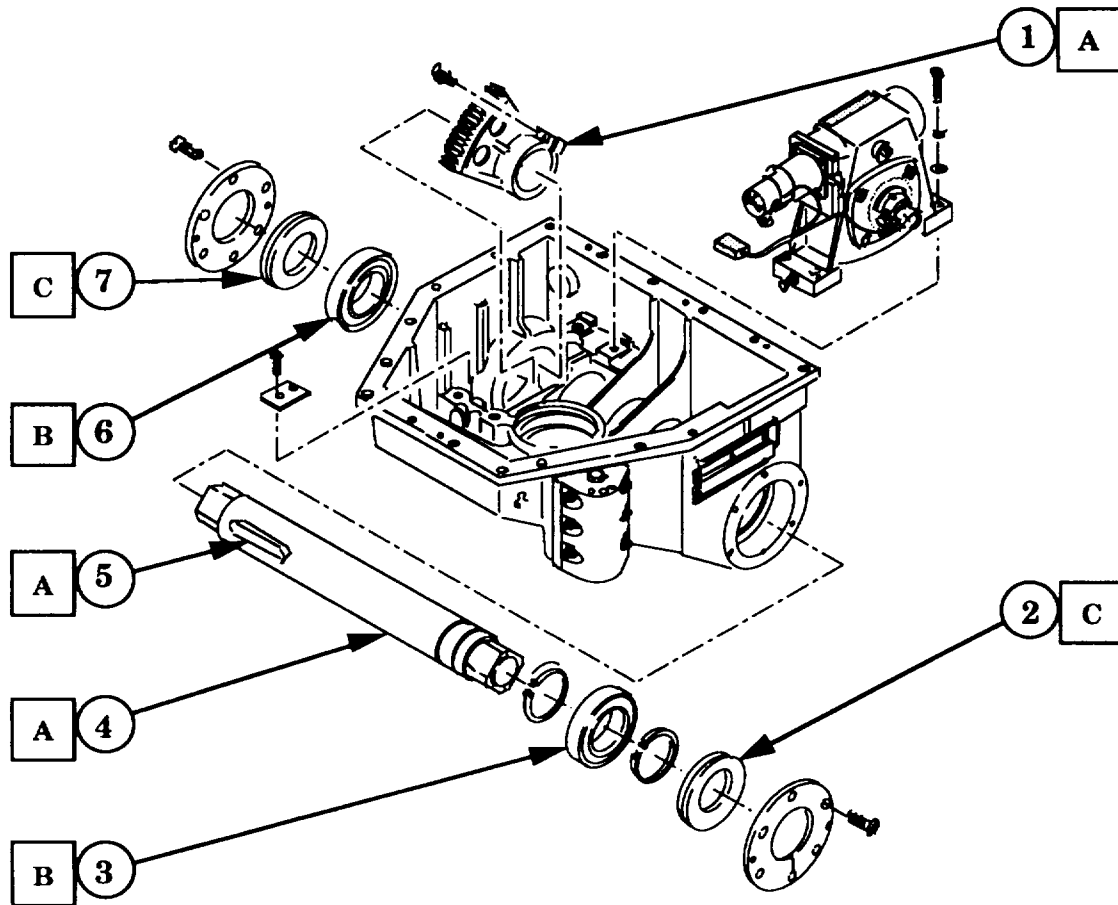
5-1. LUBRICATION

The positioner must be lubricated. All items should be lubricated after replacement of parts.

Table of Lubricants

Identification Letter	Specification	Type of Lubricants
A	MIL-C-16173 Grade IV	Corrosion Preventive Compound 3410
B	MIL-G-4343	TTF 52 Grease
C	-----	Isoflex Topas NB-52
D	MIL-G-81322	Aero Grease 22 Shell

5-1. LUBRICATION - Continued

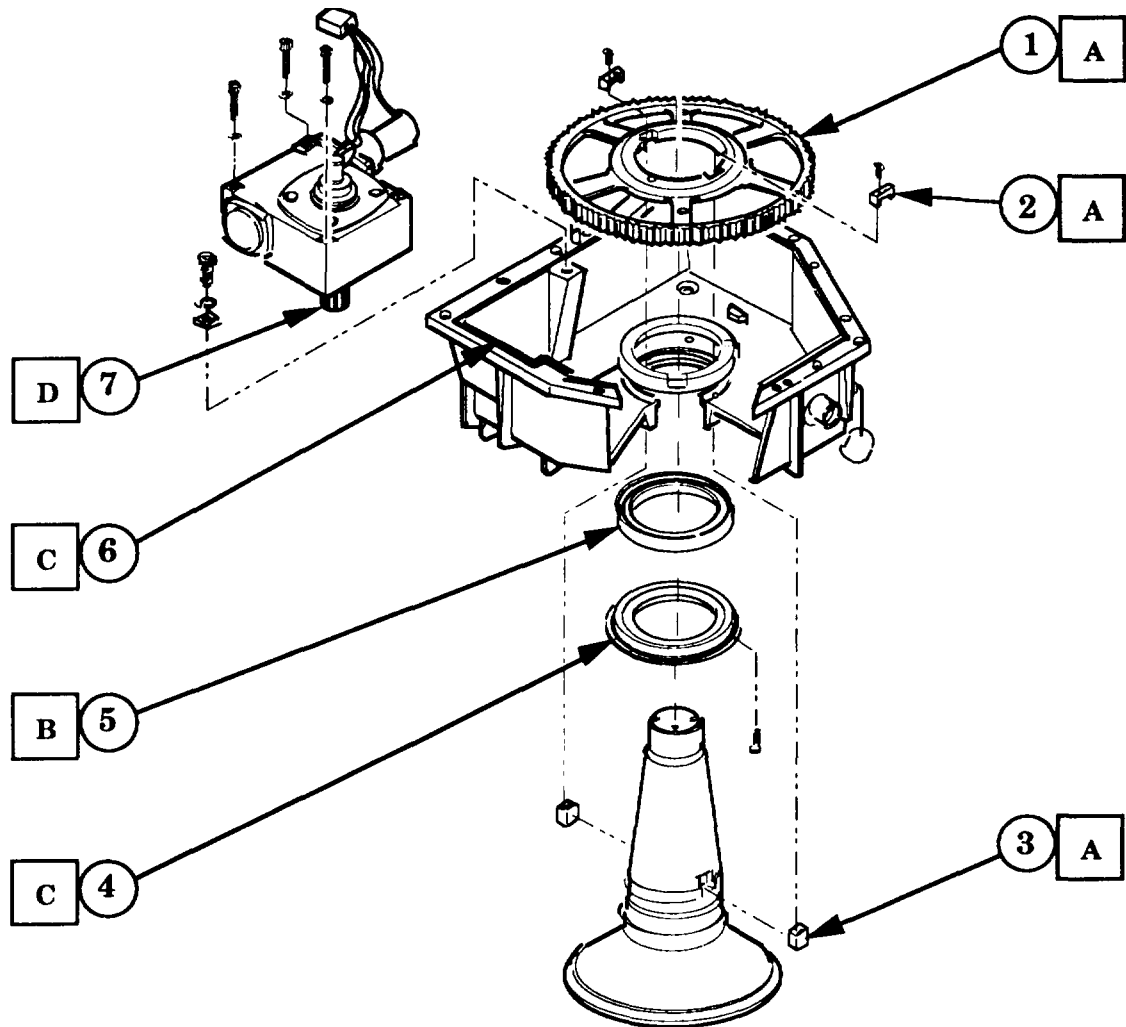


NOTES:

1. APPLY THIN FILM ON ALL SURFACES
2. LUBRICATE INTERNAL SURFACE (INSIDE DIAMETER) WASH AND CLEAN EXISTING GREASE FROM BEARING.
3. DRY ONE HOUR AND RELUBRICATE

1. ELEVATION SEGMENT GEAR (NOTE 1)
2. OIL SEAL (NOTE 2)
3. BEARING (NOTE 3)
4. ELEVATION SHAFT (NOTE 1)
5. PARALLEL KEY (NOTE 1)
6. BEARING (NOTE 3)
7. OIL SEAL (NOTE 2)

5-1. LUBRICATION - Continued



NOTES:

1. APPLY THIN FILM ON ALL SURFACES
2. WASH AND CLEAN EXISTING GREASE FROM BEARING. DRY ONE HOUR AND RELUBRICATE
3. LUBRICATE INTERNAL SURFACE (INSIDE DIAMETER)
4. LUBRICATE THOROUGHLY
5. GREASE GEARS THOROUGHLY

1. AZIMUTH GEAR (NOTE 1)
2. GEAR CLAMP (NOTE 1)
3. KEY (NOTE 1)
4. OIL SEAL (NOTE 3)
5. BEARING (NOTE 2)
6. O-RING (NOTE 4)
7. MESHING SURFACE (NOTE 5)

Section II. REPAIR PARTS; SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

<u>Subject</u>	<u>Para</u>	<u>Page</u>
Common Tools and Equipment.....	5-2	5-4
Special Tools, TMDE, and Support Equipment.....	5-3	5-4
Repair Parts	5-4	5-4

5-2. COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

5-3. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

All tools, TMDE, and support equipment required to perform maintenance procedures in this chapter are listed in the Maintenance Allocation Chart (MAC) in Appendix B of this manual.

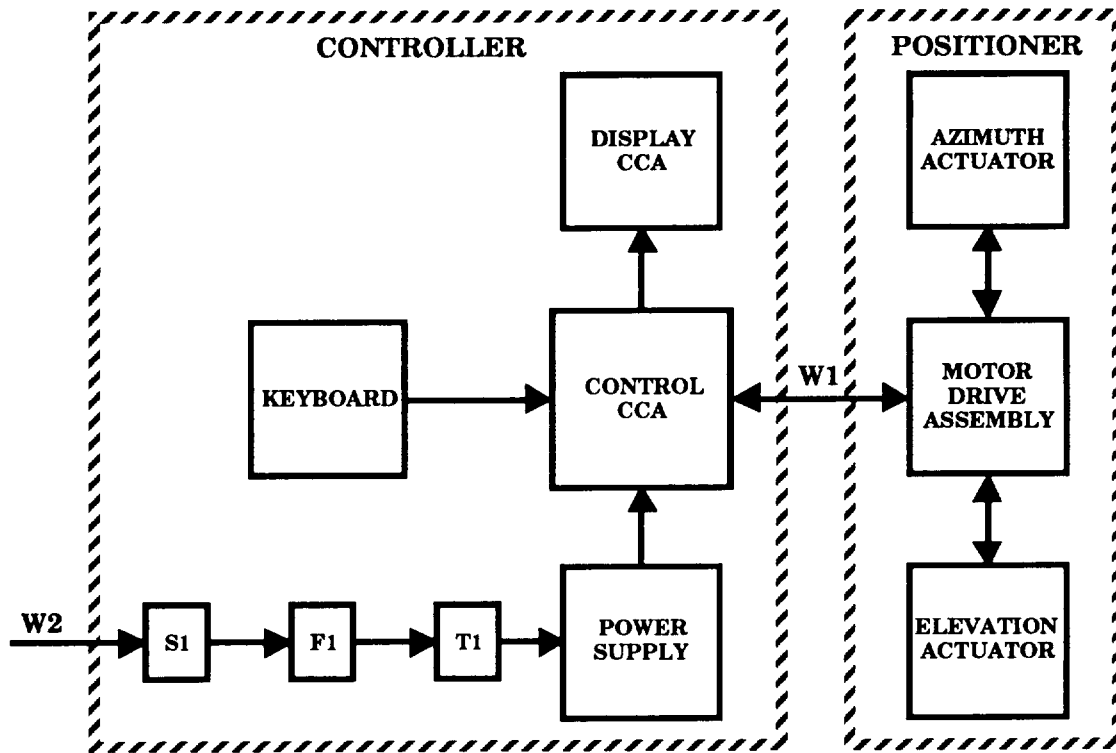
5-4. REPAIR PARTS

Repair parts are listed and illustrated in the repair parts and special tools list, TM 11-5985-394-23P.

Section III. FUNCTIONAL DESCRIPTION

<u>Subject</u>	<u>Para</u>	<u>Page</u>
Positioner System.....	5-5	5-5
Controller	5-5a	5-6
Positioner	5-5b	5-8

5-5. POSITIONER SYSTEM

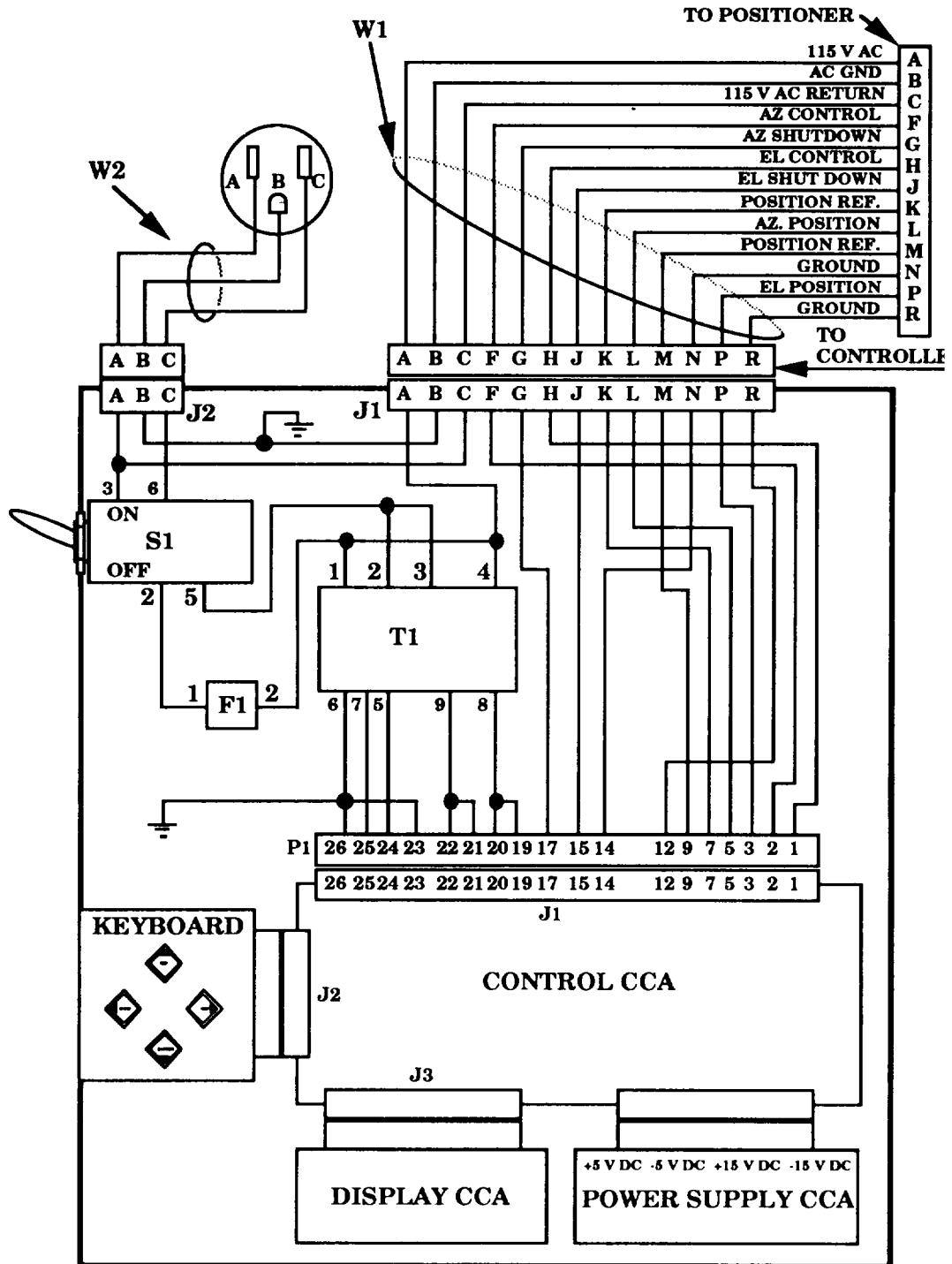


The controller is an operator interface used to remotely control positioner movement and pointing. The positioner accepts operator axis commands from the controller and points the antenna in the desired direction.

Cable assembly W1 connects power and control signals from the controller to the positioner. Cable assembly W2 connects the controller to a 115 V ac power source.

5-5. POSITIONER SYSTEM - Continued

a. Controller



5-5. POSITIONER SYSTEM - Continued**a. Controller - Continued****(1) Power**

115 V ac is supplied to the positioner system through cable assembly W2 to connector J2 of the controller.

Switch S1 controls power to transformer T1 through fuse F1.

AC voltages from transformer T1 are routed through the control circuit card assembly (CCA) to the power supply CCA.

The power supply CCA provides +5 V dc, -5 V dc, +15 V dc, and -15 V dc. These voltages are utilized throughout the controller. In addition, +5 V dc and -5 V dc are used in the positioner.

(2) Keyboard

The keyboard provides two-axis positioner control. Keyboard commands are passed to the control CCA through connector J2.

(3) Control CCA

The control CCA consists of all logic circuitry to run the controller and provide signals to drive the positioner. Inputs to the control CCA consist of dc voltages from the power supply CCA, direction commands from the keyboard, and antenna position signals from the positioner.

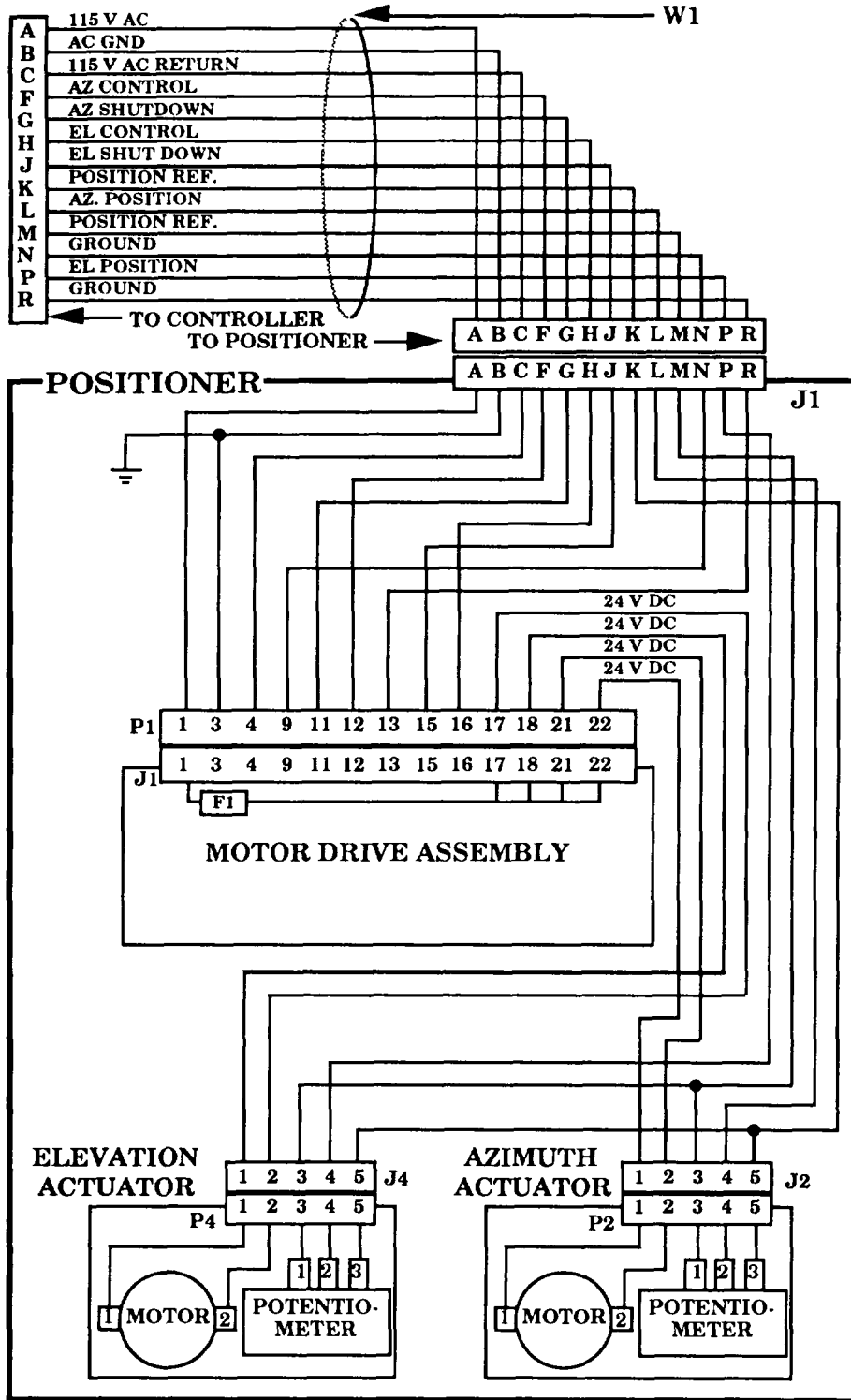
Outputs from the control CCA consist of a digital representation of the antenna position for the display CCA and two-axis drive signals for the positioner. In addition, shut down signals are provided for the positioner when the azimuth or elevation actuators are at limits.

(4) Display CCA

The display CCA accepts digital antenna position signals from the control CCA and provides azimuth and elevation readouts at the front panel.

5-5. POSITIONER SYSTEM - Continued

b. Positioner



5-5. POSITIONER SYSTEM- Continued**b. Positioner - Continued****(1) Motor Drive Assembly**

Positioner external connector J1 is connected to the controller by cable assembly W1. 115 V ac is provided to the motor drive assembly, which converts 115 V ac to +24 V dc and - 24 V dc to drive the azimuth and elevation actuator motors.

The motor drive assembly accepts two-axis drive signals from the controller. These control signals are used to turn the ± 24 V dc azimuth and elevation drive voltages on and off.

An azimuth or elevation shut down signal, from the controller, causes the drive voltage to be turned off. This protects the motor(s) from damage.

(2) Actuators

The azimuth and elevation actuators are electrically identical, consisting of a drive motor and a potentiometer.

The drive motors turn in response to the +24 V dc drive voltage from the motor drive assembly.

The potentiometer is a variable resistor. The potentiometer is provided with two reference signals from the controller. The voltage developed across the potentiometer is output as a position dependent variable voltage to the controller.

The azimuth and elevation drive actuators consist of 50:1 gear mechanisms. The drive actuators convert drive motor shaft inputs to positioner azimuth and elevation shaft movement. This movement points the antenna in the direction selected at the controller.

c. Operational Description

When one of the controller pushbuttons is pressed, a switch closure occurs in the keyboard which alters the resistance to ground felt at the control CCA. The control CCA produces a change in the control voltage applied to the motor drive assembly. The motor drive assembly applies either plus or minus 24 V dc to the actuator motor (azimuth or elevation) which moves the antenna in the desired direction. This movement causes a change in resistance at the actuator potentiometer resulting in a change in position voltage. The control CCA converts the position voltage to digital signals and applies them to the display CCA. The display CCA indicates the selected azimuth and elevation of the antenna.

Section IV. TROUBLESHOOTING

<u>Subject</u>	<u>Para</u>	<u>Page</u>
Testing and Troubleshooting Controller and Positioner.....	5-6	5-10
Controller Fault Symptom Index	5-6a	5-10
Positioner Fault Symptom Index.....	5-6b	5-10
Testing and Troubleshooting Cable Assembly W2.....	5-7	5-44

5-6. TESTING AND TROUBLESHOOTING CONTROLLER AND POSITIONER

Testing and troubleshooting the controller or positioner is performed using a test bed, which consists of an operational controller, positioner, and cable assemblies W1 and W2. Items referred from lower maintenance levels (controller or positioner) are inserted into the test bed and fault isolated. To begin troubleshooting, refer to the appropriate fault symptom index.

a. Controller Fault Symptom Index

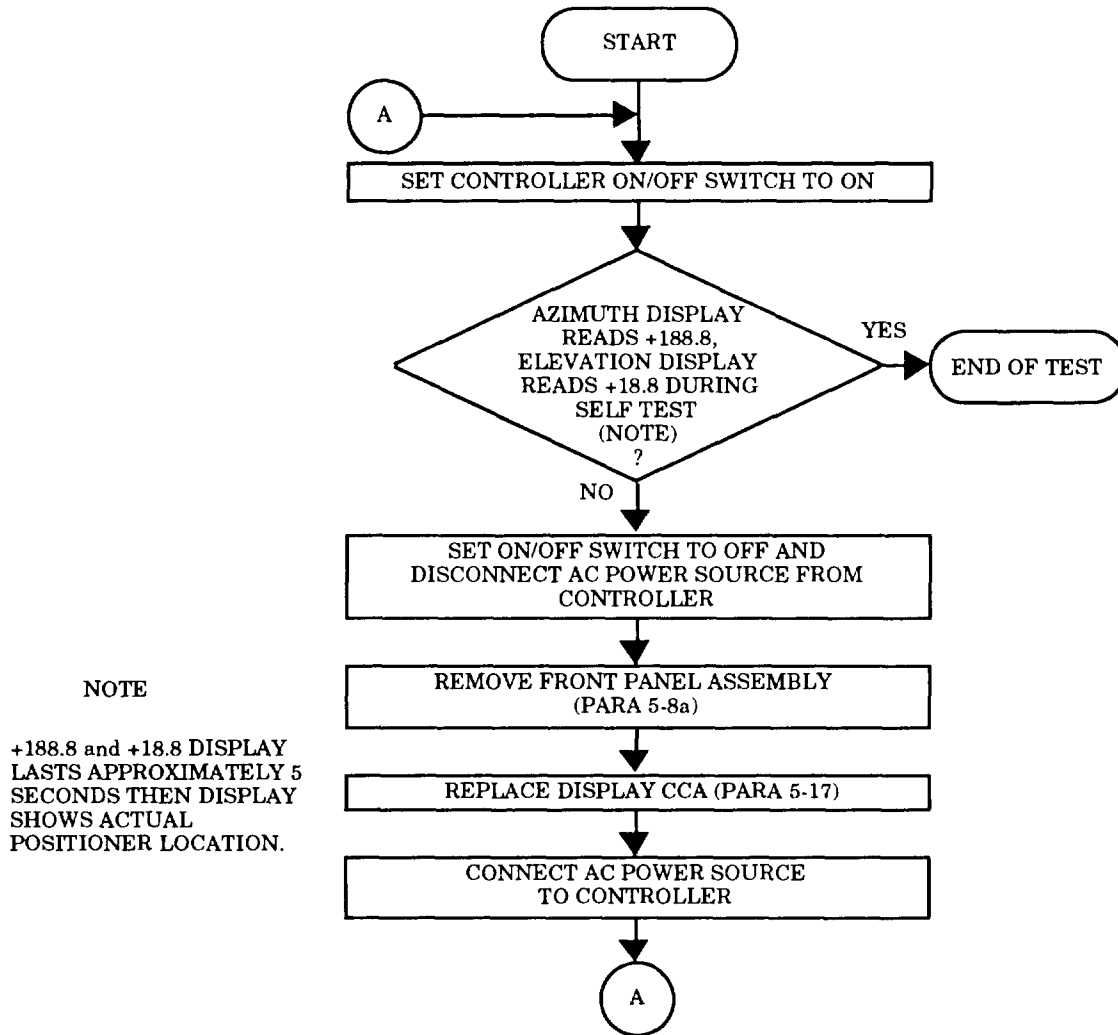
TM 11-5820-1088-12

4.14. SYMPTOM FAULT INDEX - Continued

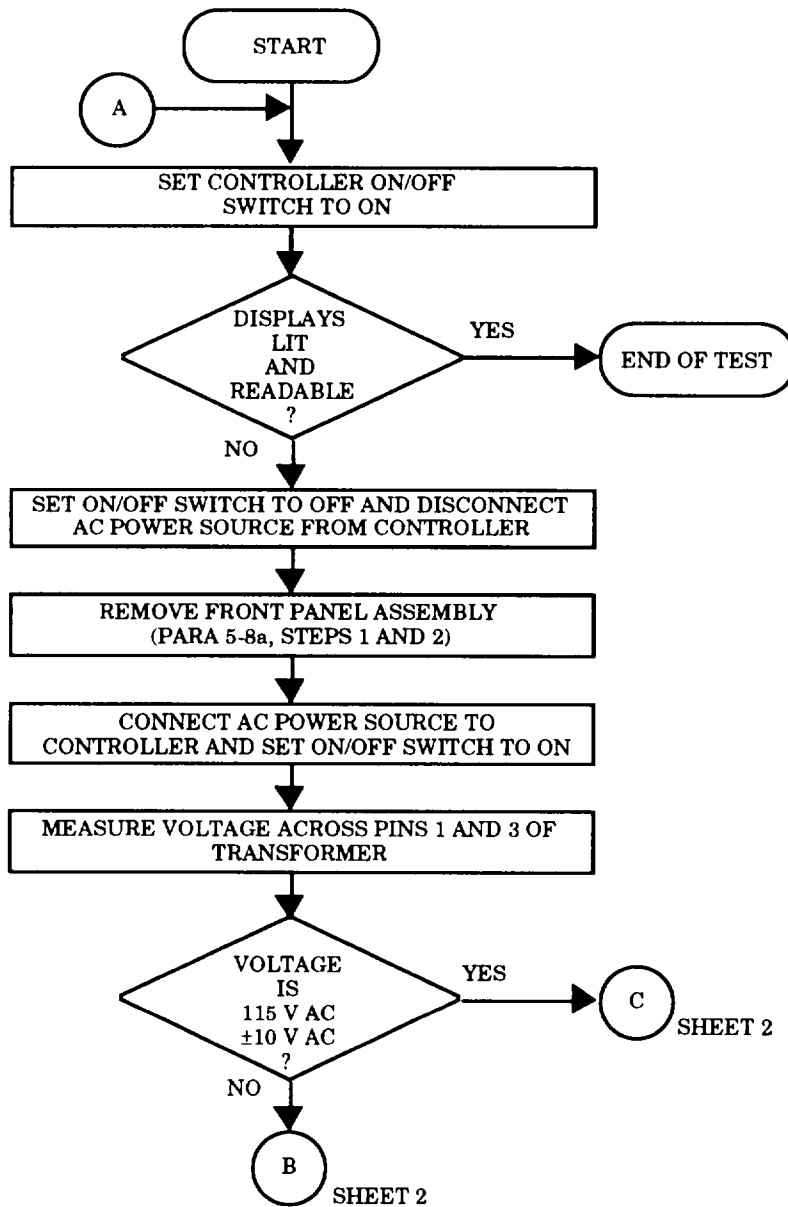
Symptom	Action	Reference
Controller displays light but not readable.	Perform test procedures as indicated in Flowchart 5-1.	Page 5-11
Controller display does not light. (ON/OFF switch is set to ON and 115 V ac power source connected to controller.)	Perform test procedures as indicated in Flowchart 5-2.	Page 5-12
Controller displays change randomly when UP, DOWN, CW, or CCW pushbutton is pressed.	Perform test procedures as indicated in Flowchart 5-3.	Page 5-16
Controller displays do not change when positioner responds to controller commands.	Perform test procedures as indicated in Flowchart 5-4.	Page 5-17
Positioner does not respond to controller commands.	Perform test procedures as indicated in Flowchart 5-5.	Page 5-21

b. Positioner Fault Symptom Index

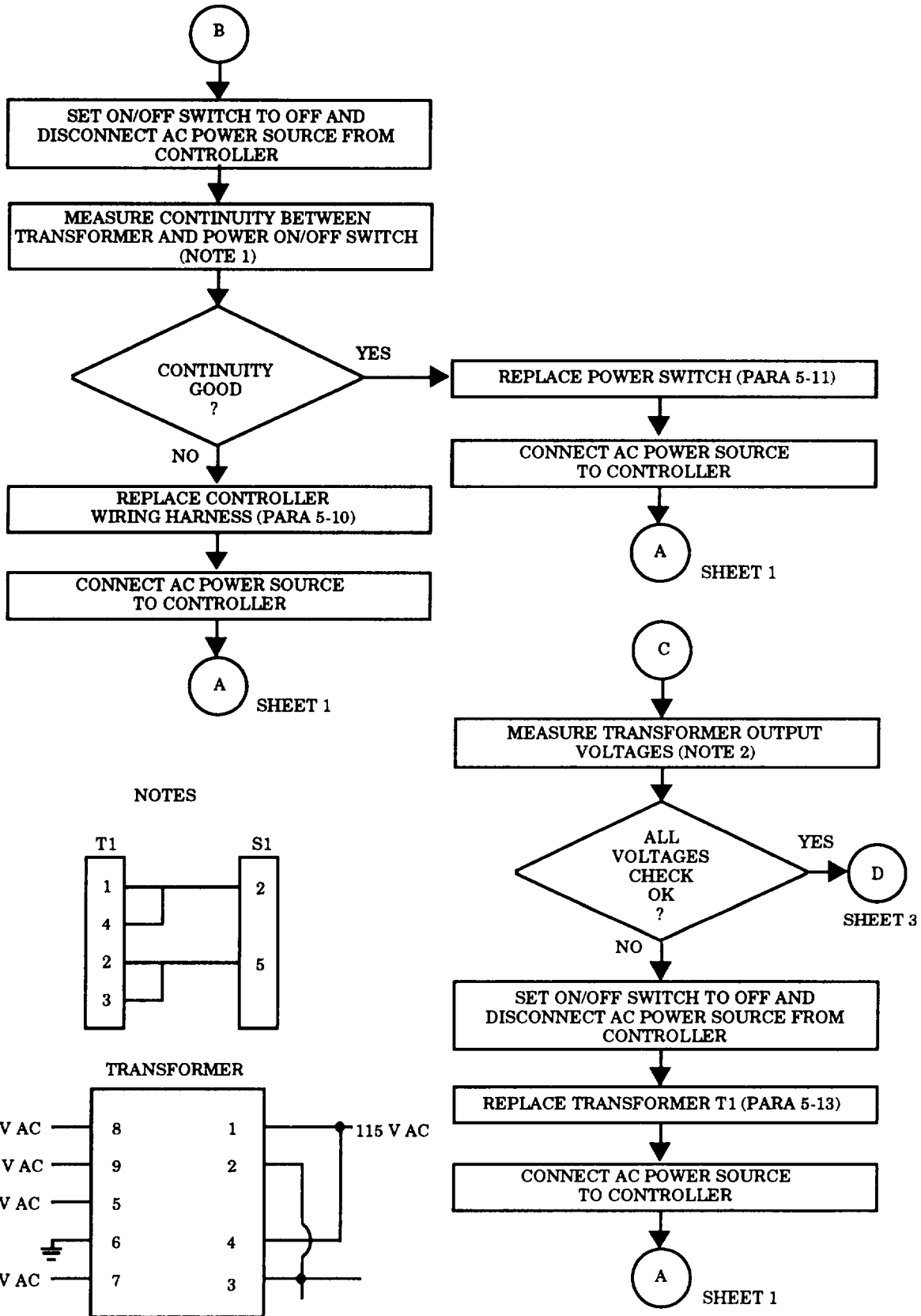
Symptom	Action	Reference
Controller displays change randomly when UP, DOWN, CW, or CCW pushbutton is pressed.	Perform test procedures as indicated in Flowchart 5-6.	Page 5-26
Controller displays do not change when UP, DOWN, CW, or CCW pushbutton is pressed.	Perform test procedures as indicated in Flowchart 5-7.	Page 5-29
Positioner does not respond to controller commands.	Perform test procedures as indicated in Flowchart 5-8.	Page 5-33



Flowchart 5-1

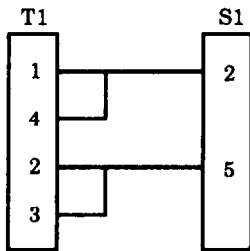


Flowchart 5-2 (Sheet 1 of 4)

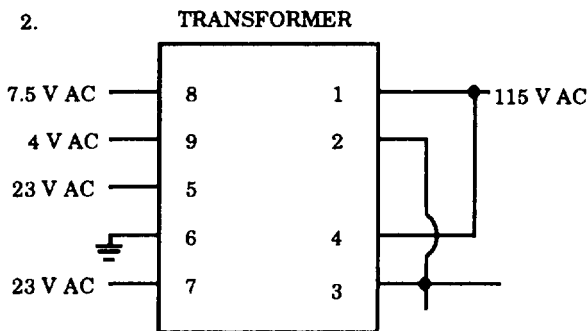


NOTES

1.



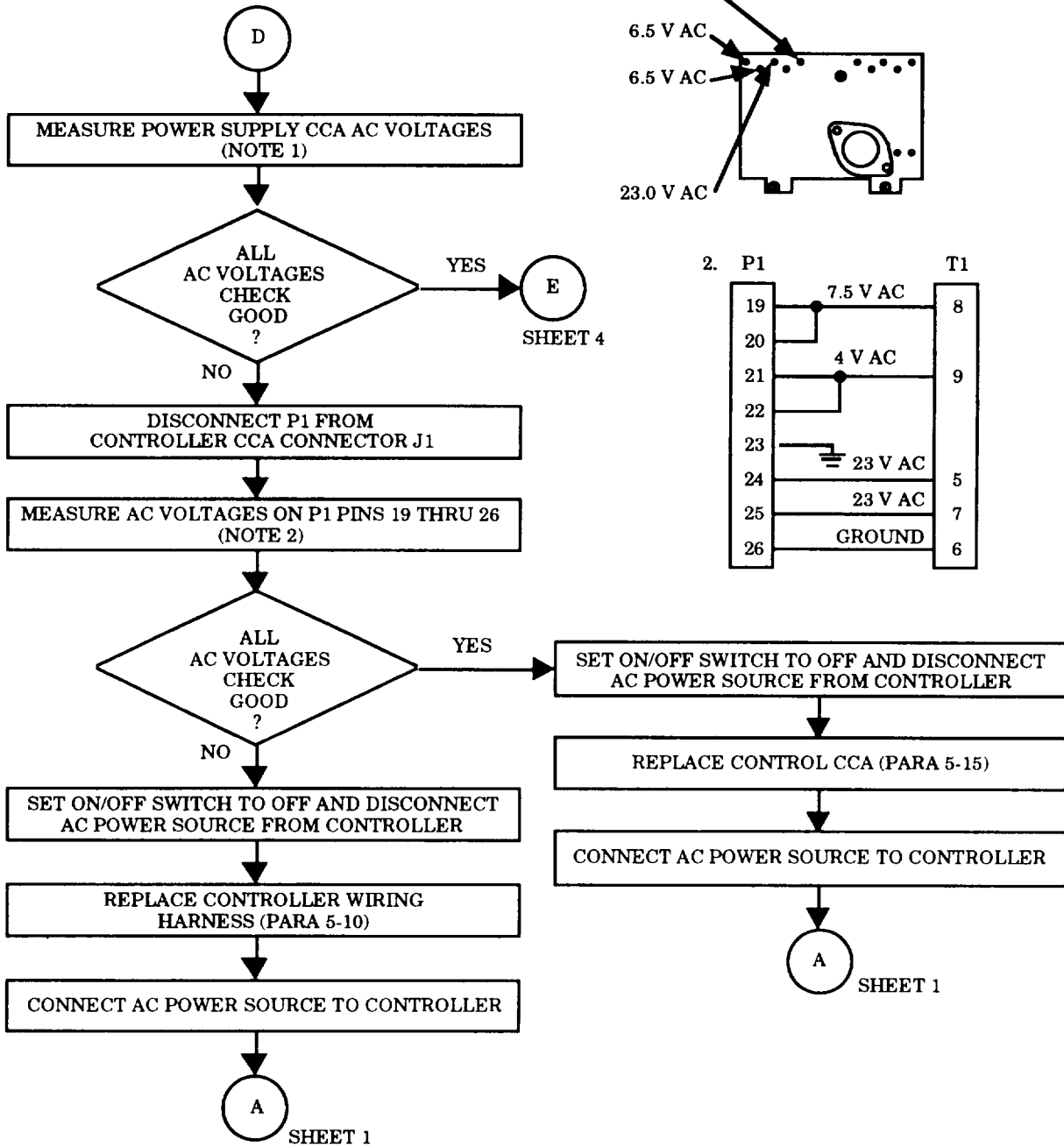
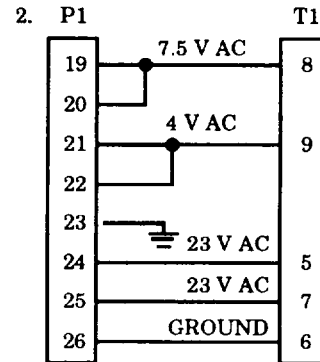
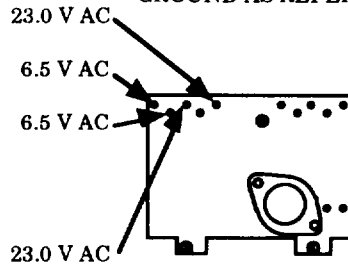
2.



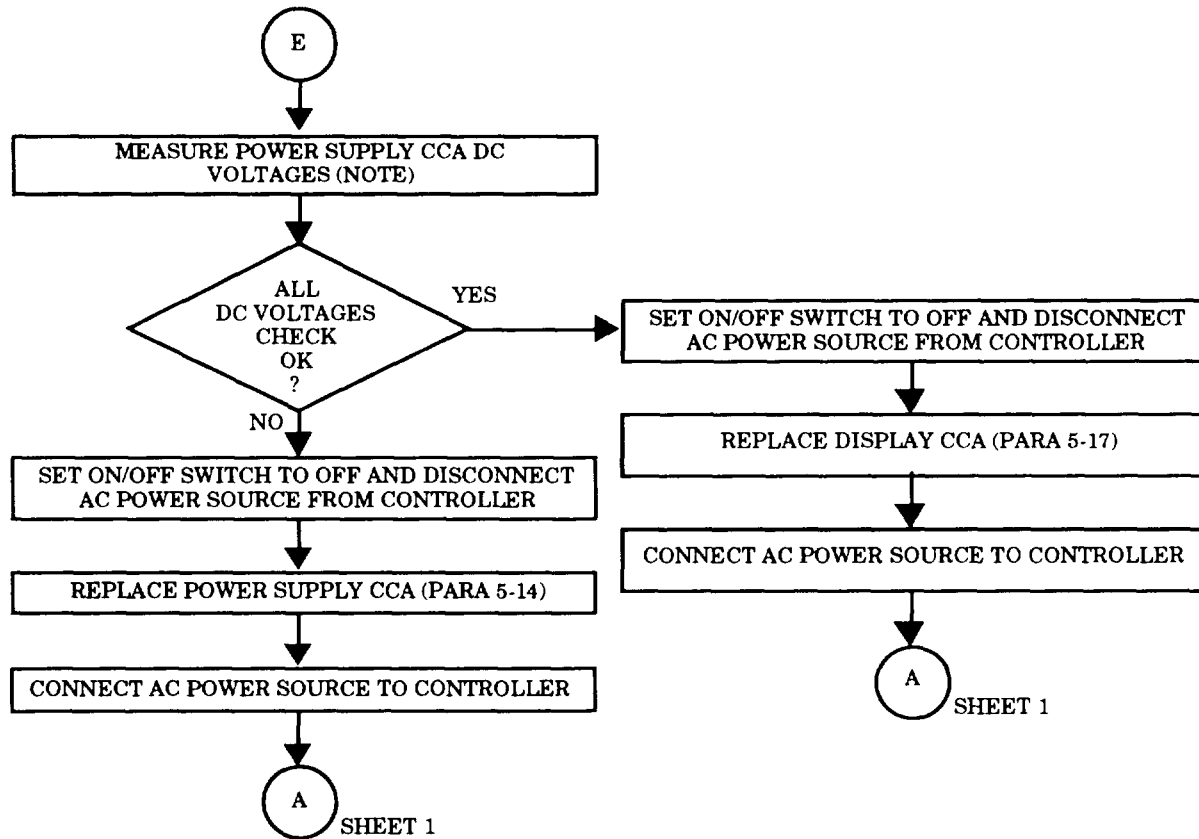
Flowchart 5-2 (Sheet 2 of 4)
5-13

NOTES:

1. VERIFY POWER SUPPLY CCA VOLTAGES USING CHASSIS GROUND AS REFERENCE:

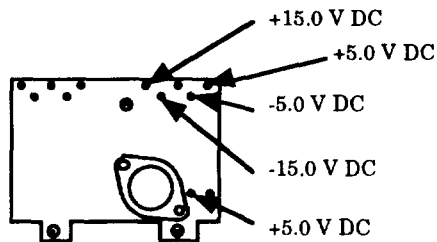


Flowchart 5-2 (Sheet 3 of 4)

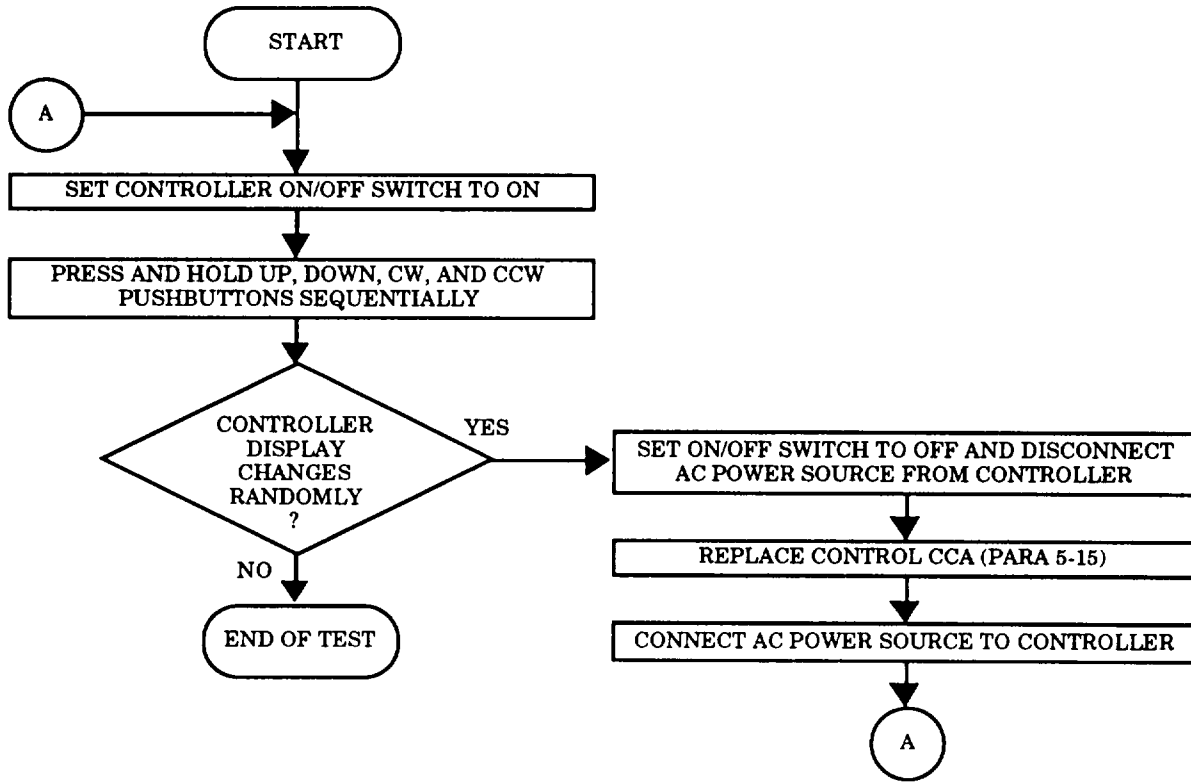


NOTE

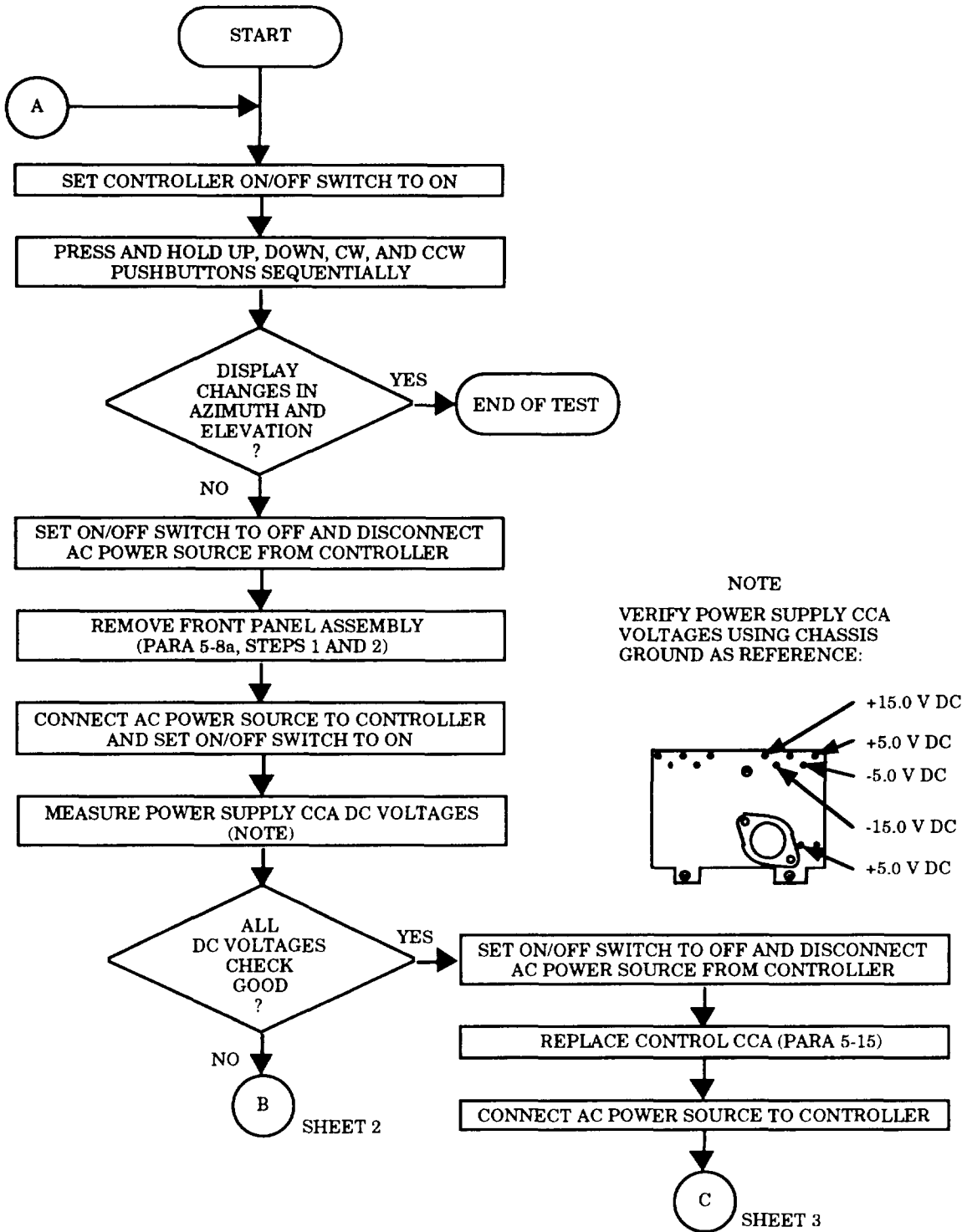
VERIFY POWER SUPPLY CCA VOLTAGES USING CHASSIS GROUND AS REFERENCE:



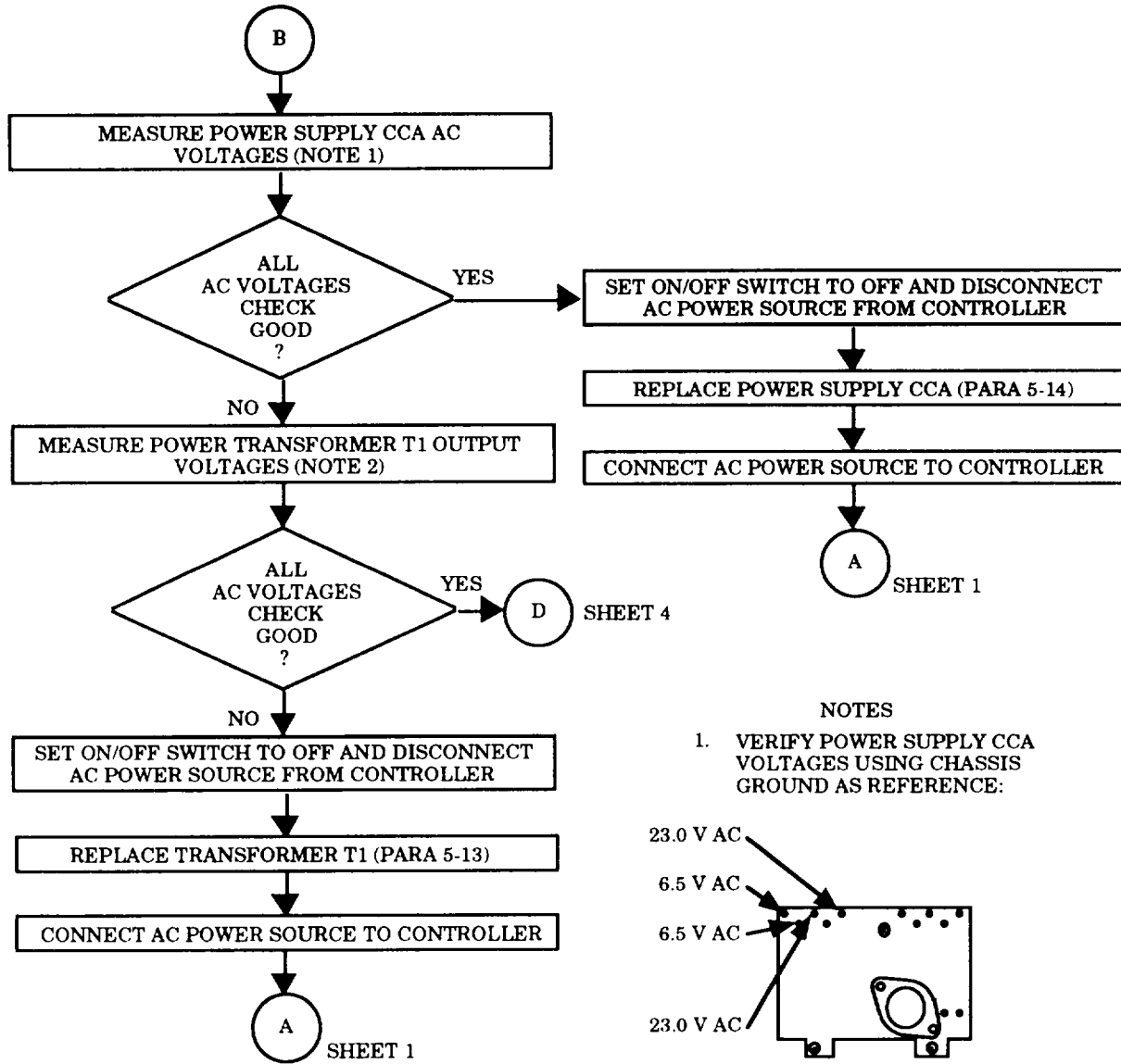
Flowchart 5-2 (Sheet 4 of 4)



Flowchart 5-3

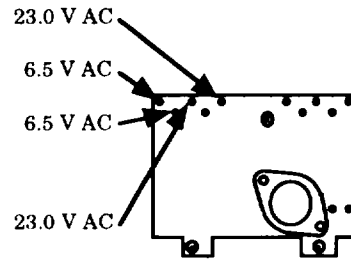


Flowchart 5-4 (Sheet 1 of 4)

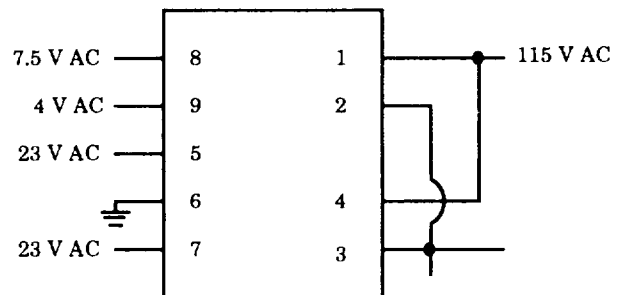


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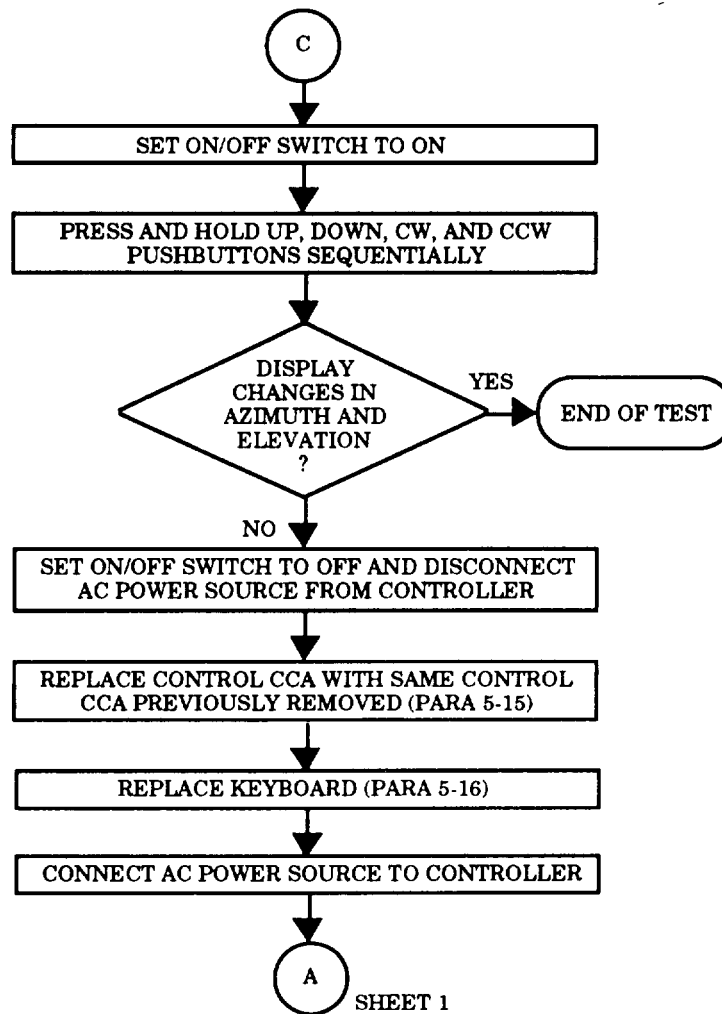
1. VERIFY POWER SUPPLY CCA VOLTAGES USING CHASSIS GROUND AS REFERENCE:



2. TRANSFORMER

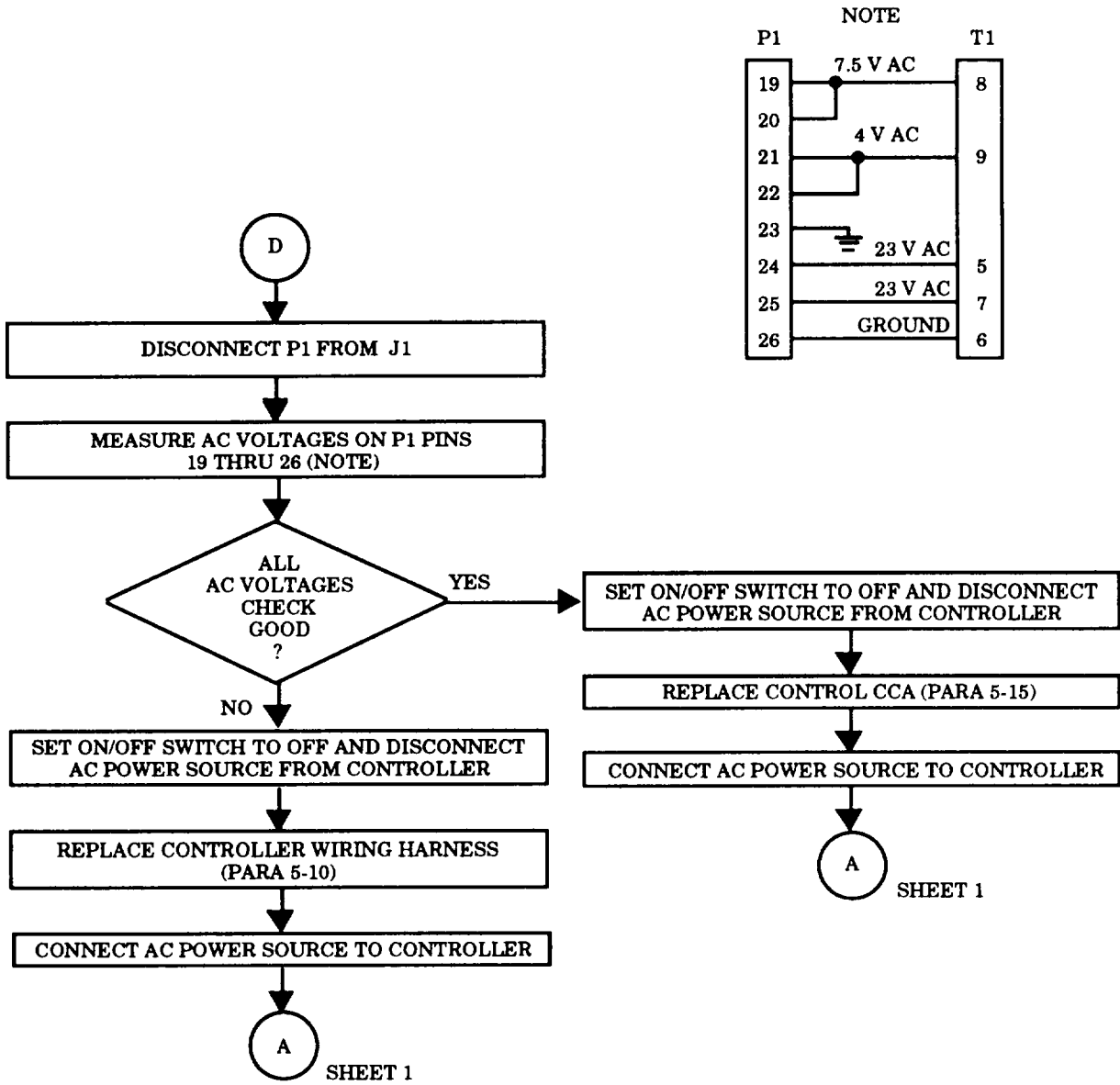


Flowchart 5-4 (Sheet 2 of 4)

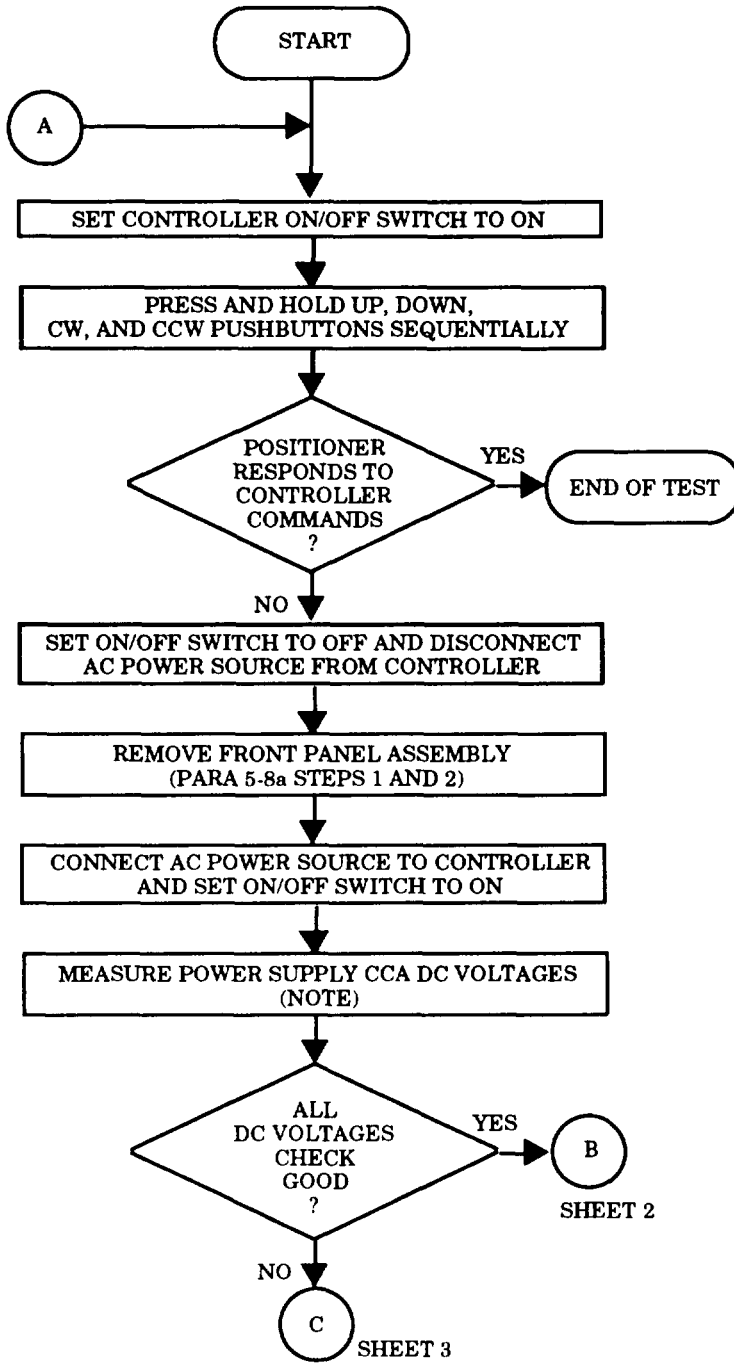


SHEET 1

Flowchart 5-4 (Sheet 3 of 4)

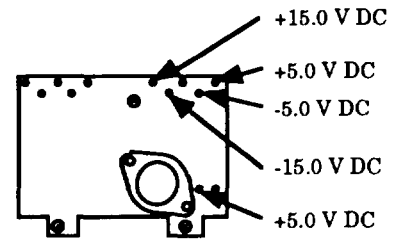


Flowchart 5-4 (Sheet 4 of 4)

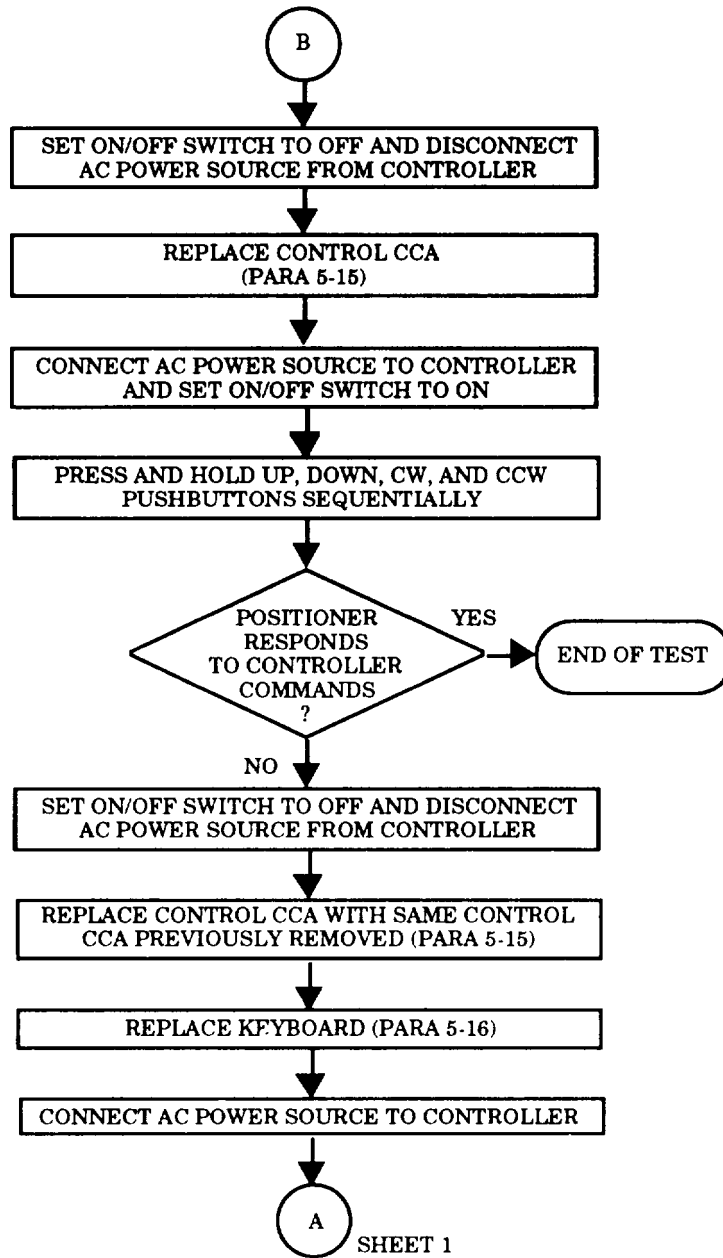


NOTE

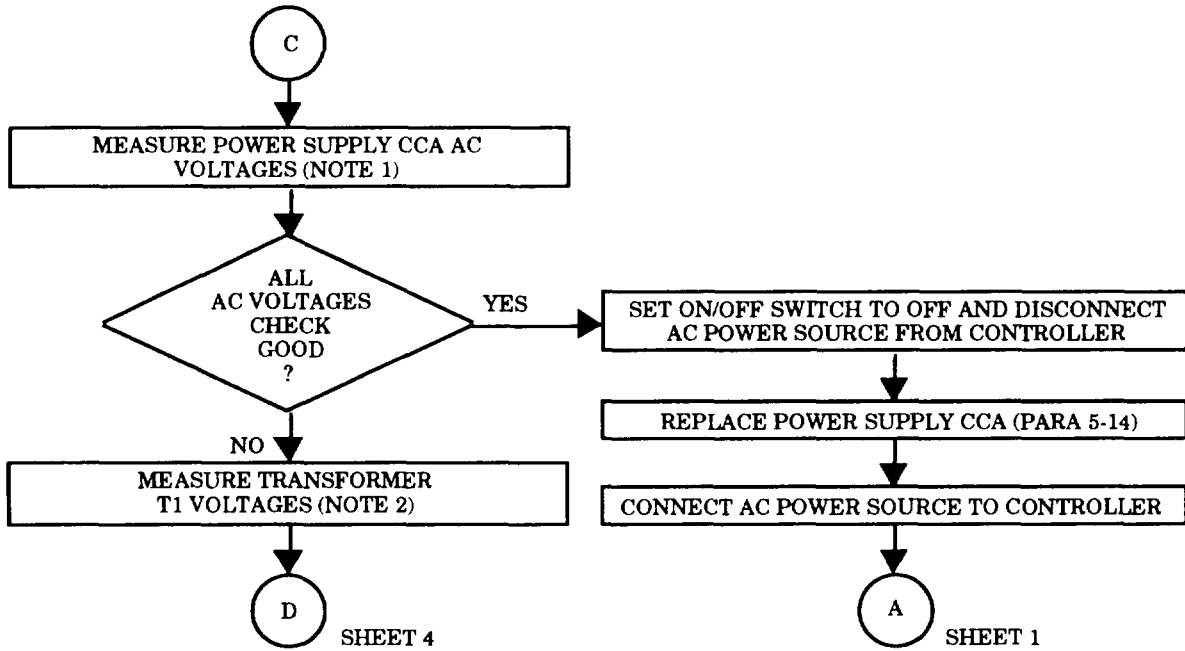
VERIFY POWER SUPPLY CCA VOLTAGES USING CHASSIS GROUND AS REFERENCE:



Flowchart 5-5 (Sheet 1 of 5)

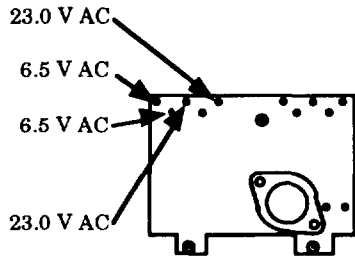


Flowchart 5-5 (Sheet 2 of 5)

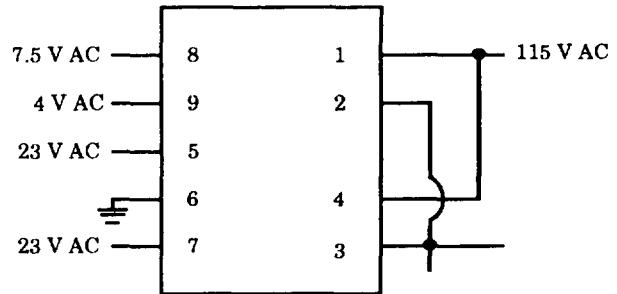


NOTES

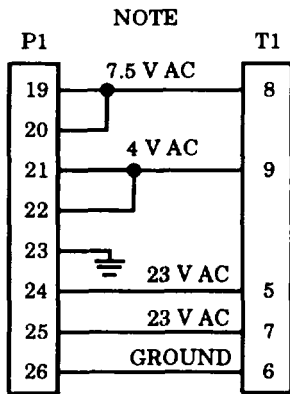
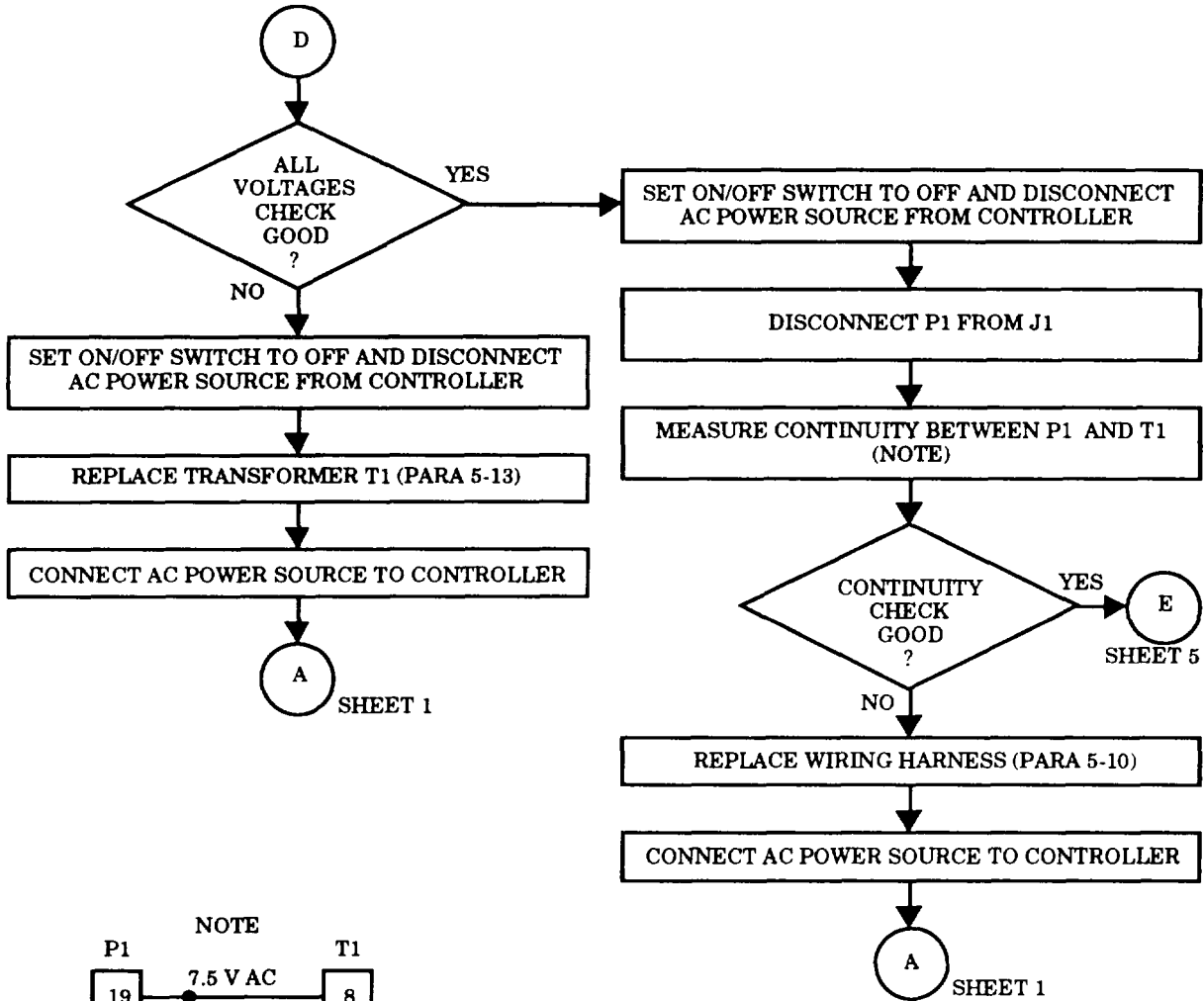
1. VERIFY POWER SUPPLY CCA VOLTAGES USING CHASSIS GROUND AS REFERENCE:



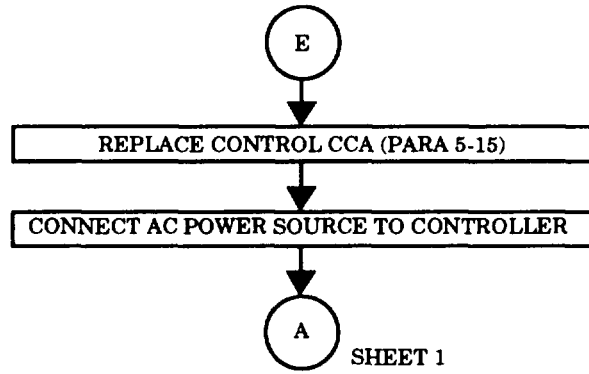
2. TRANSFORMER



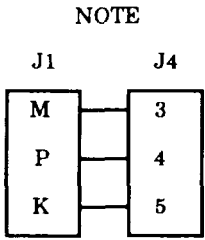
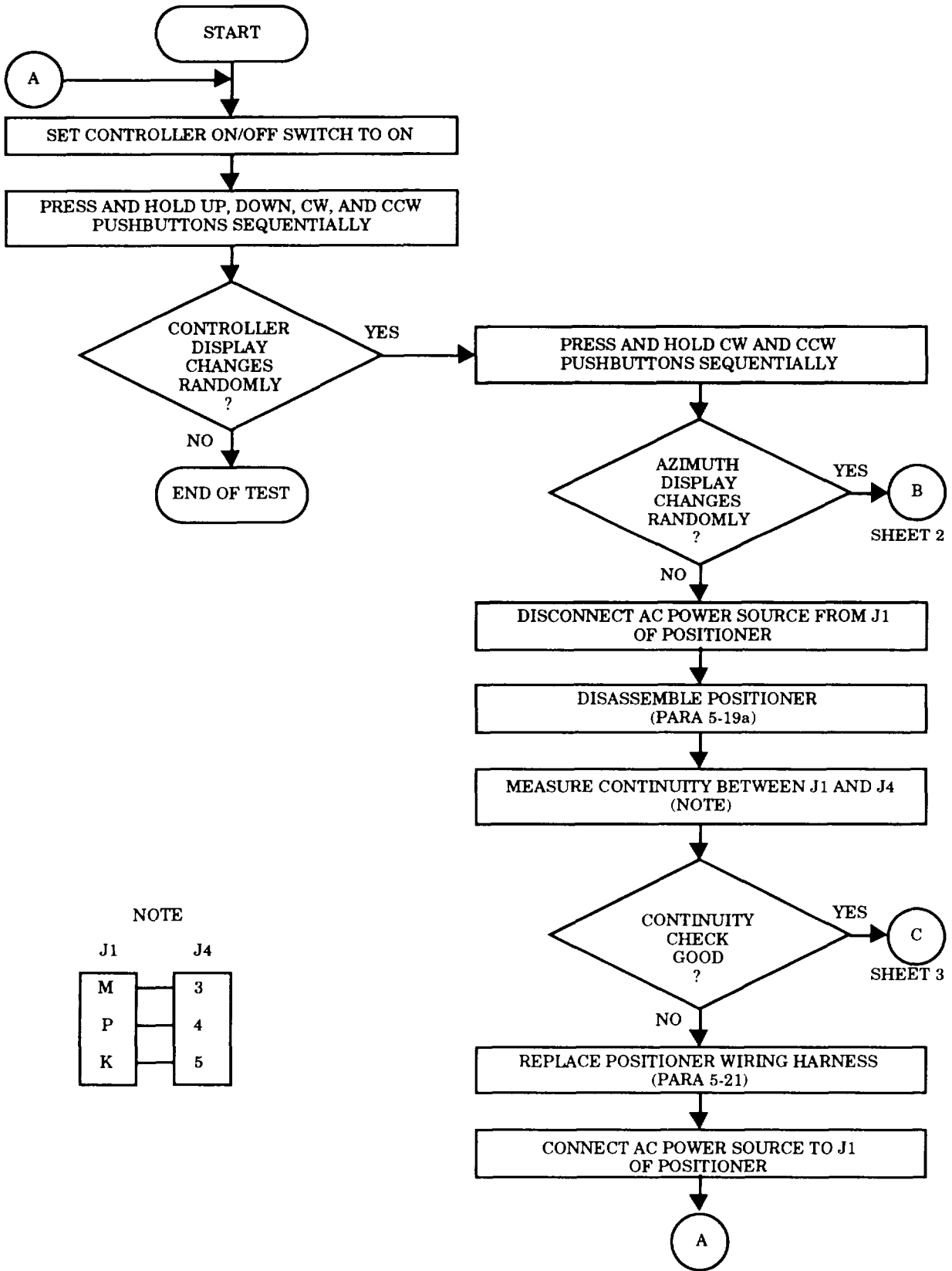
Flowchart 5-5 (Sheet 3 of 5)



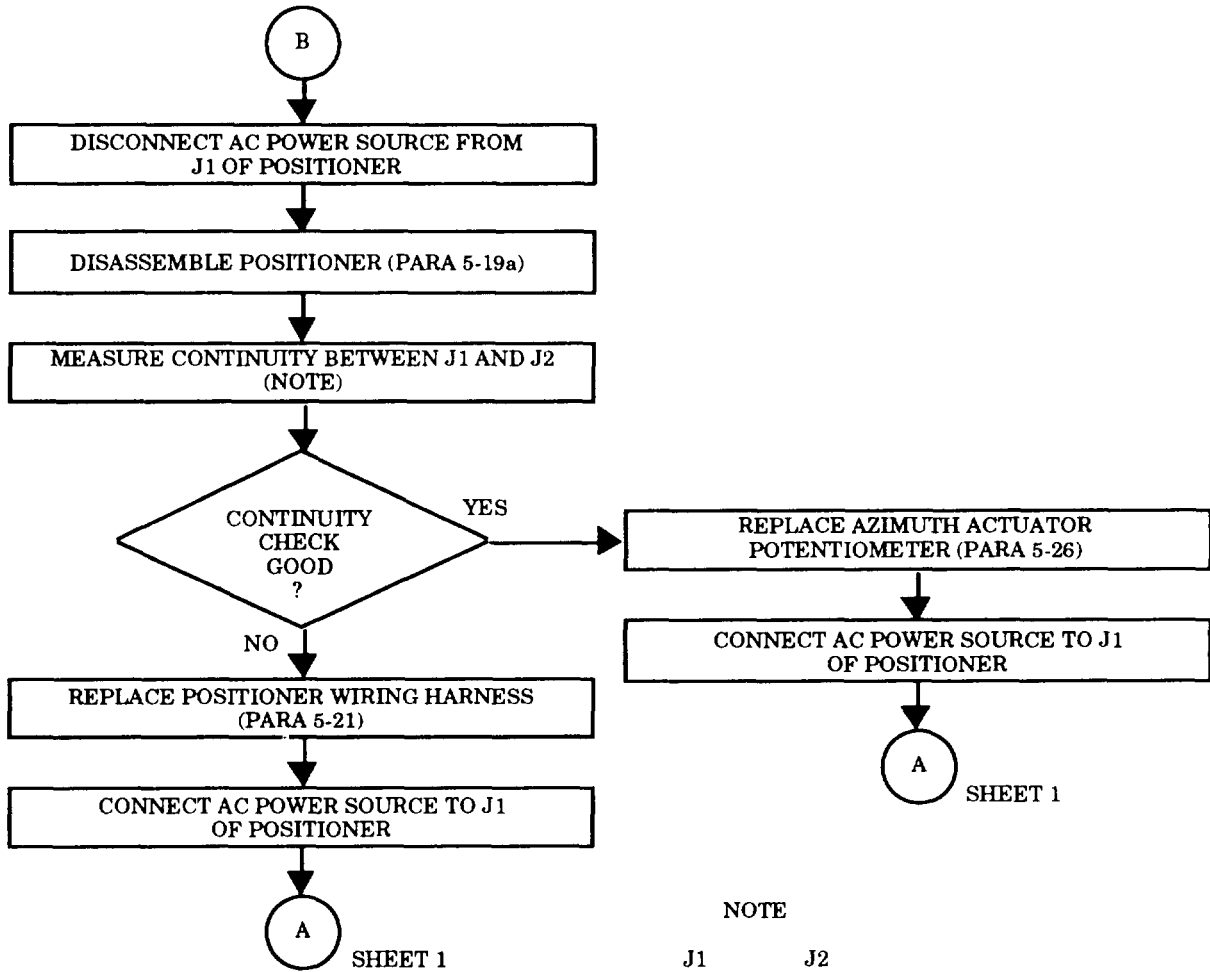
Flowchart 5-5 (Sheet 4 of 5)



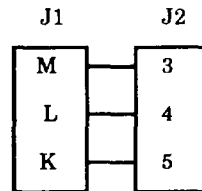
Flowchart 5-5 (Sheet 5 of 5)



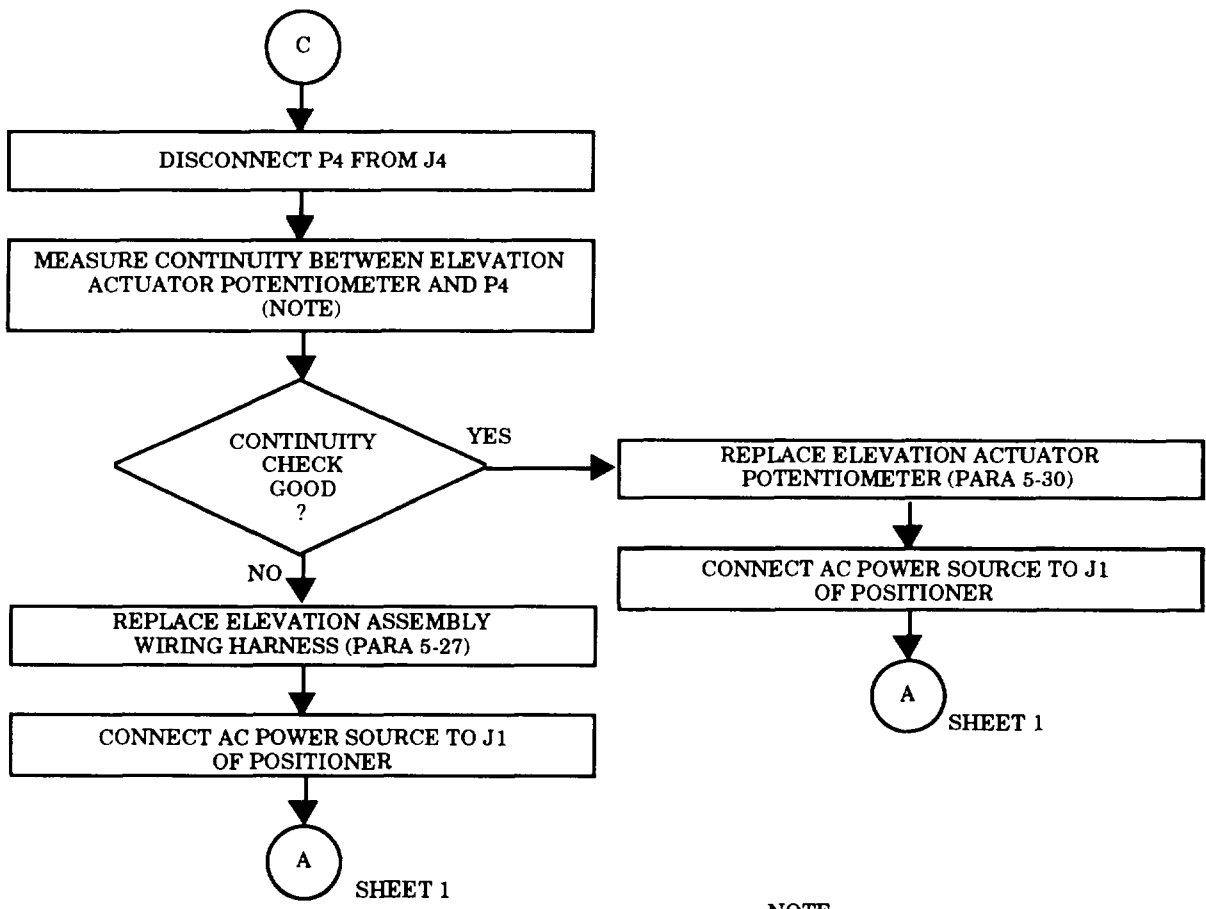
Flowchart 5-6 (Sheet 1 of 3)



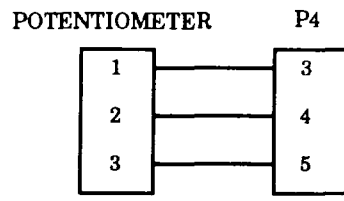
NOTE



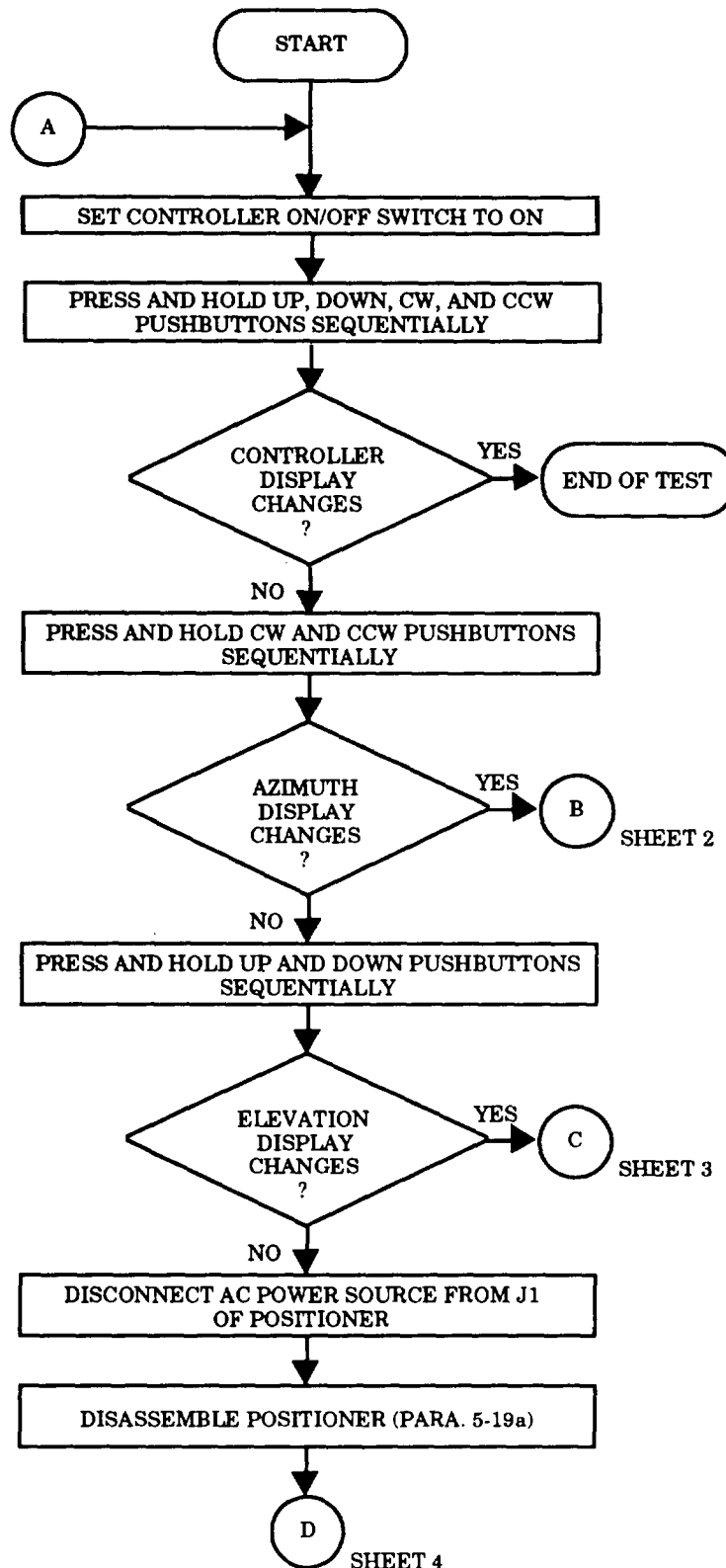
Flowchart 5-6 (Sheet 2 of 3)



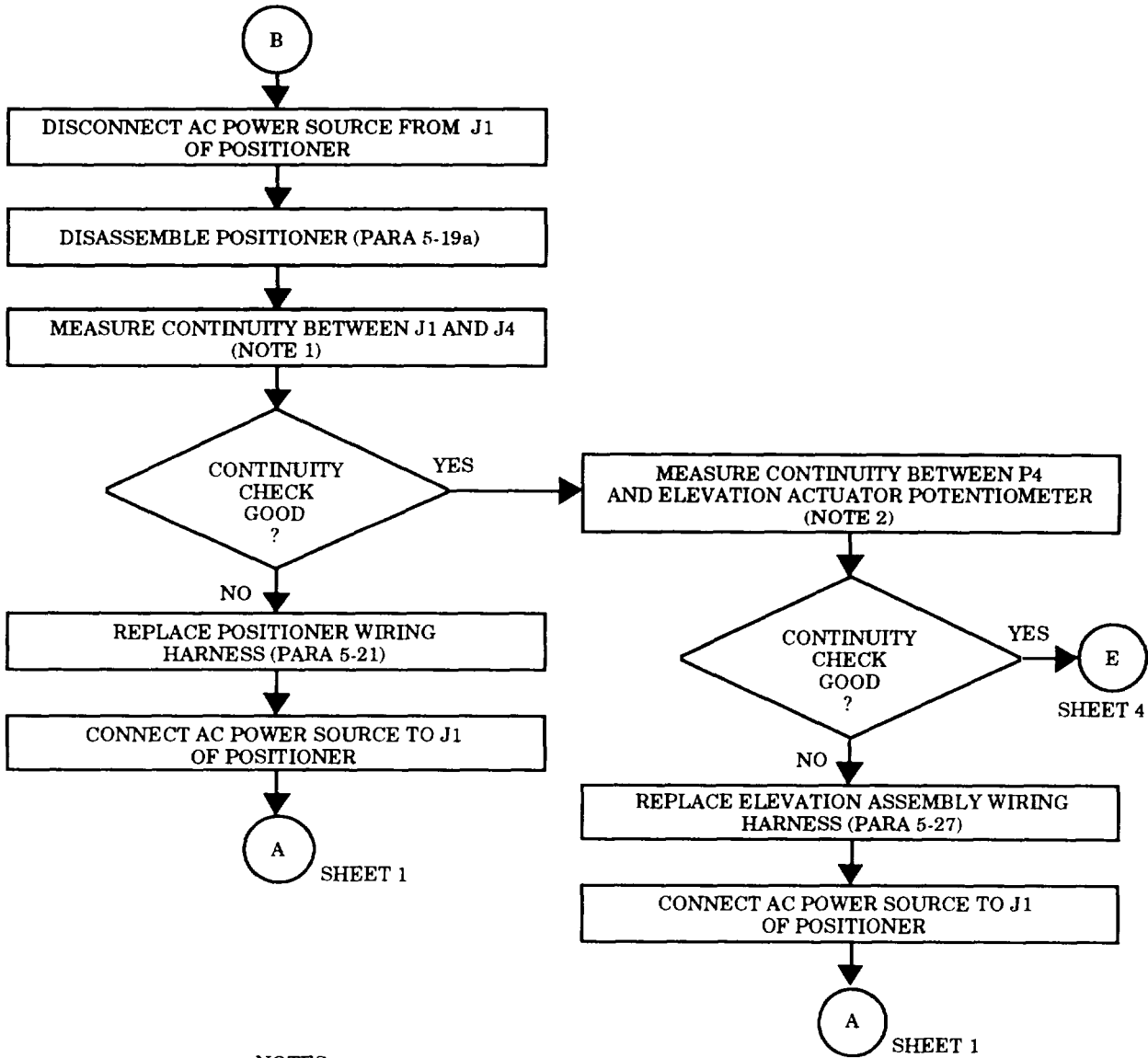
NOTE



Flowchart 5-6 (Sheet 3 of 3)

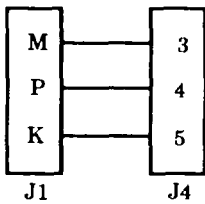


Flowchart 5-7 (Sheet 1 of 4)

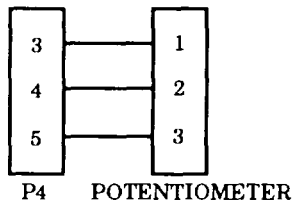


NOTES

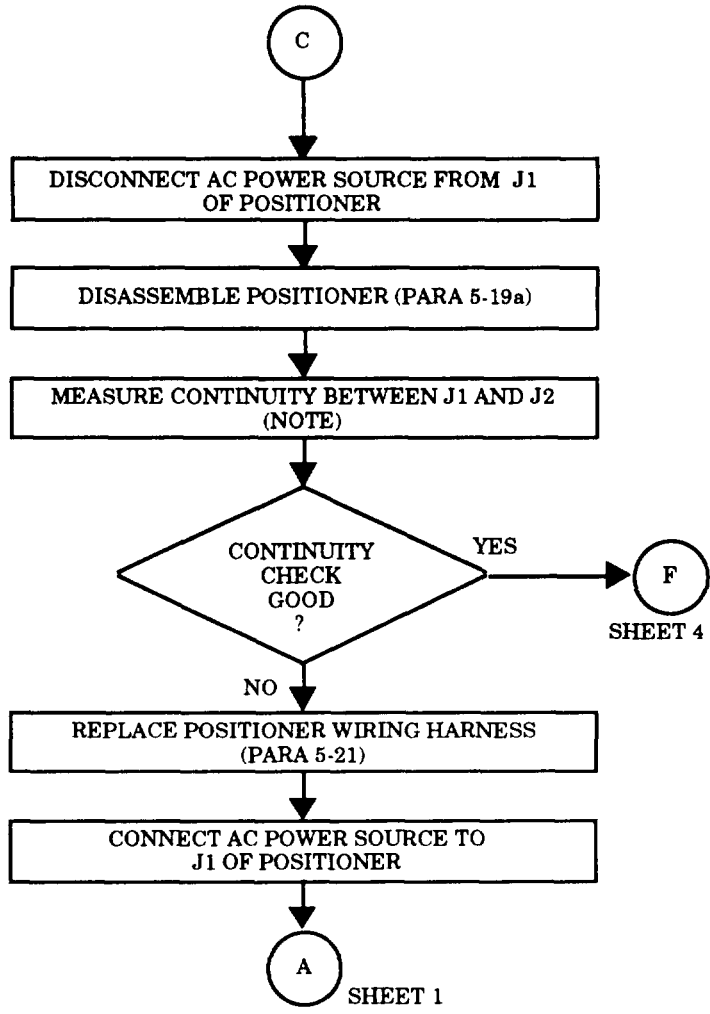
1.



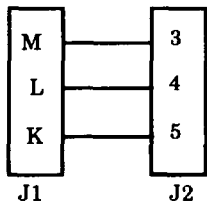
2.



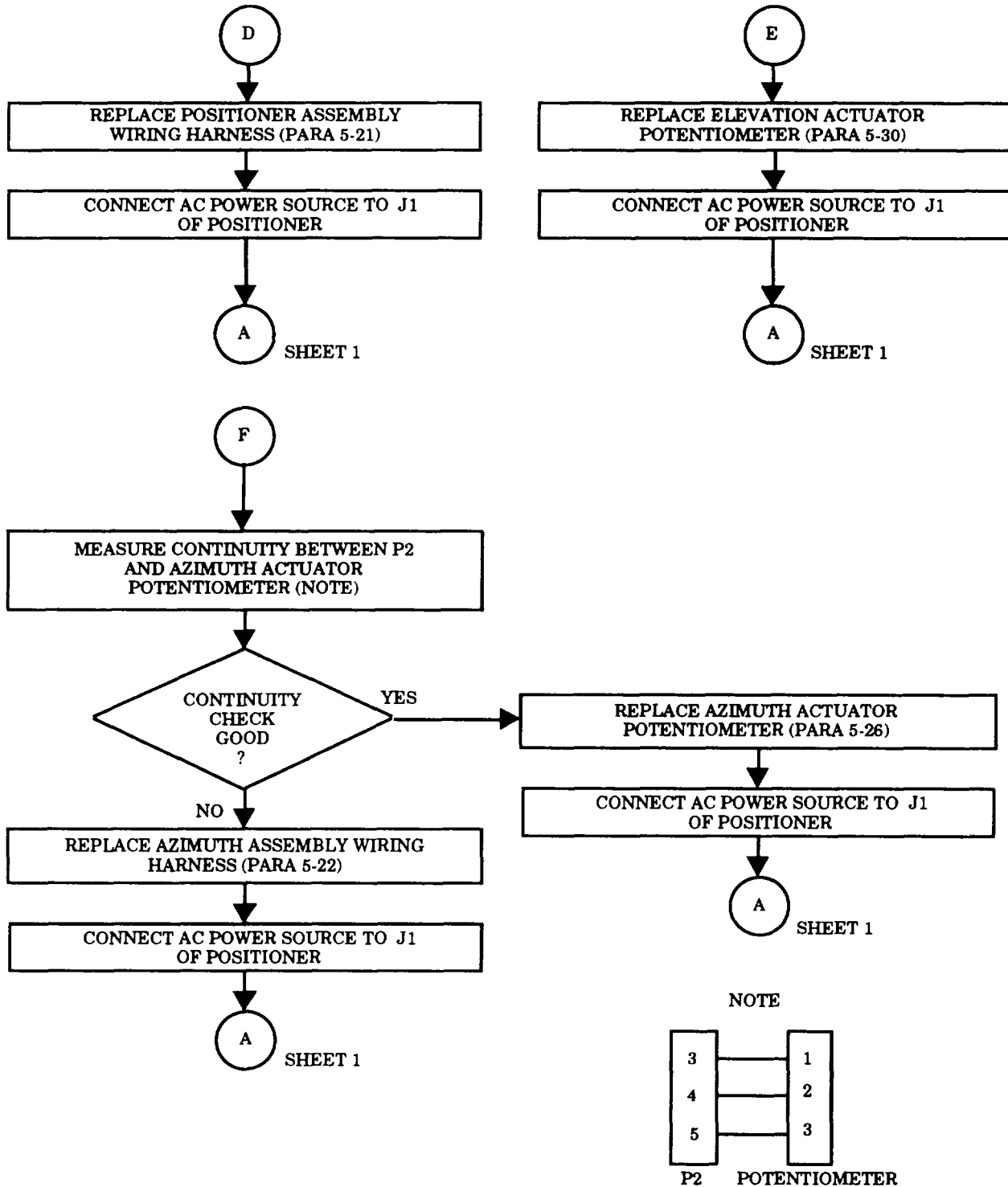
Flowchart 5-7 (Sheet 2 of 4)



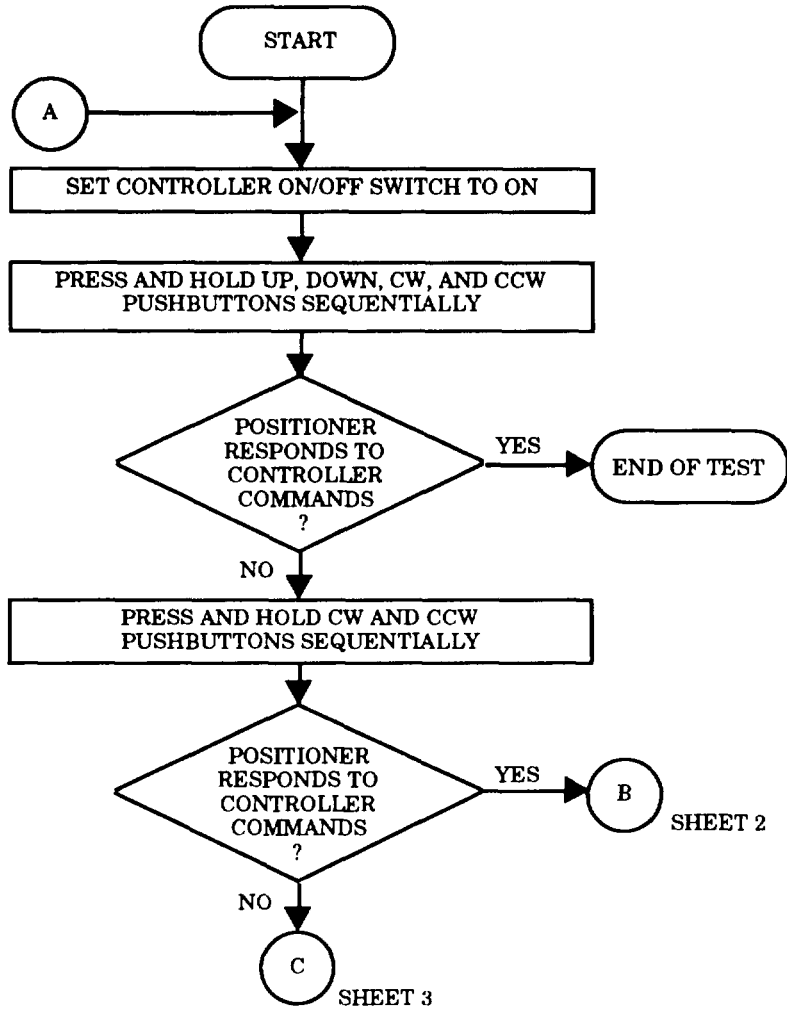
NOTE



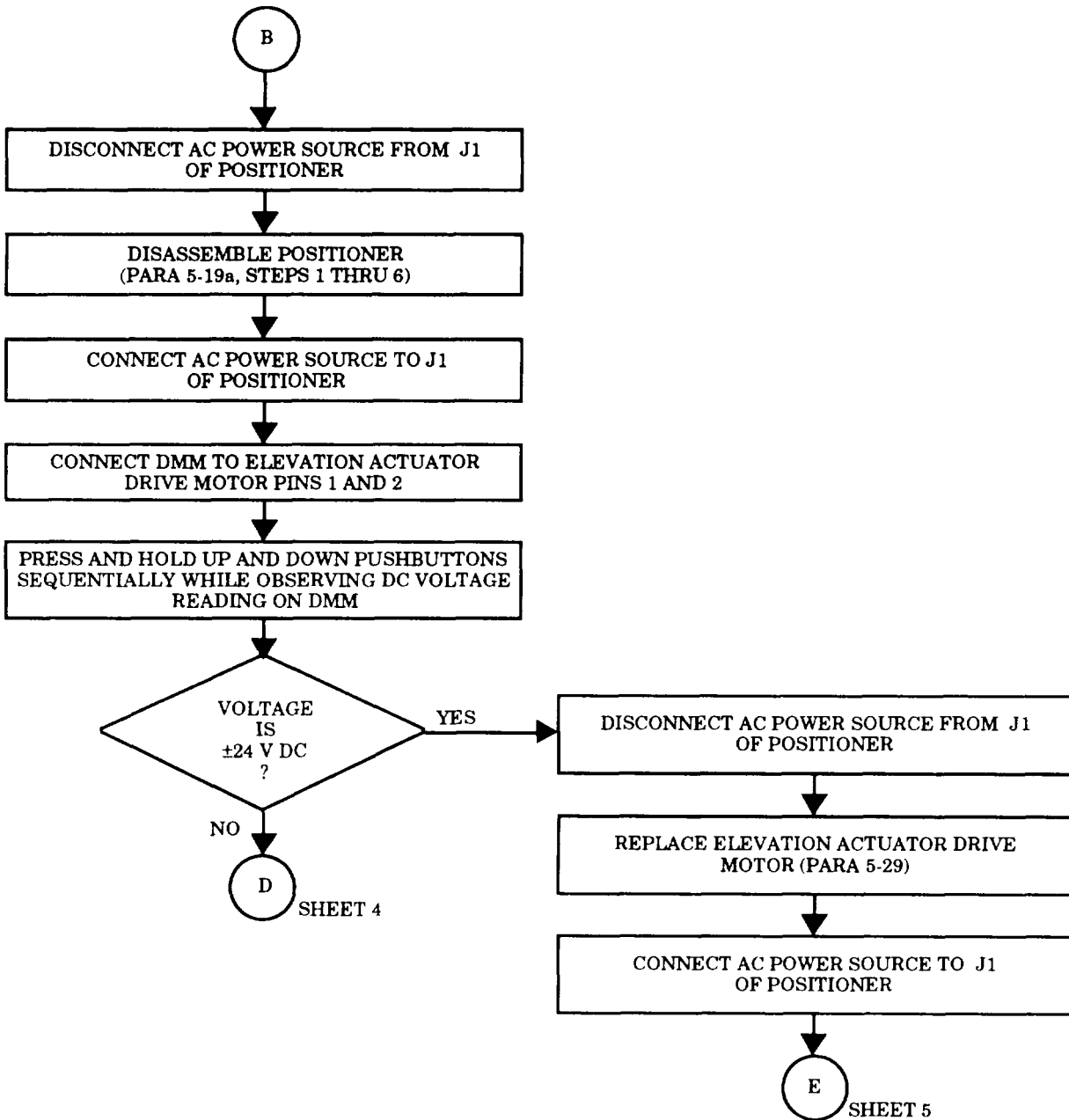
Flowchart 5-7 (Sheet 3 of 4)



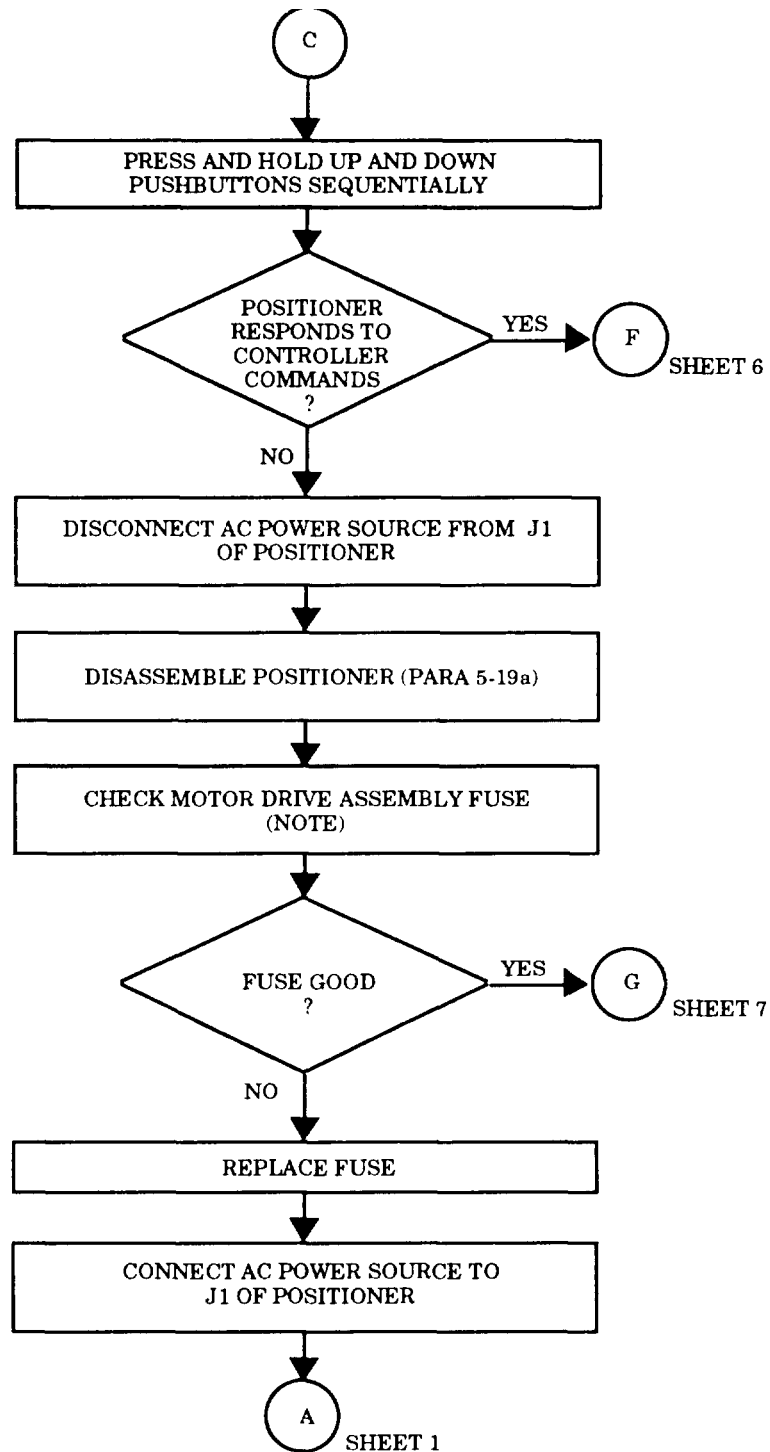
Flowchart 5-7 (Sheet 4 of 4)



Flowchart 5-8 (Sheet 1 of 11)

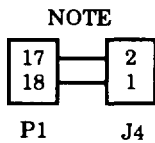
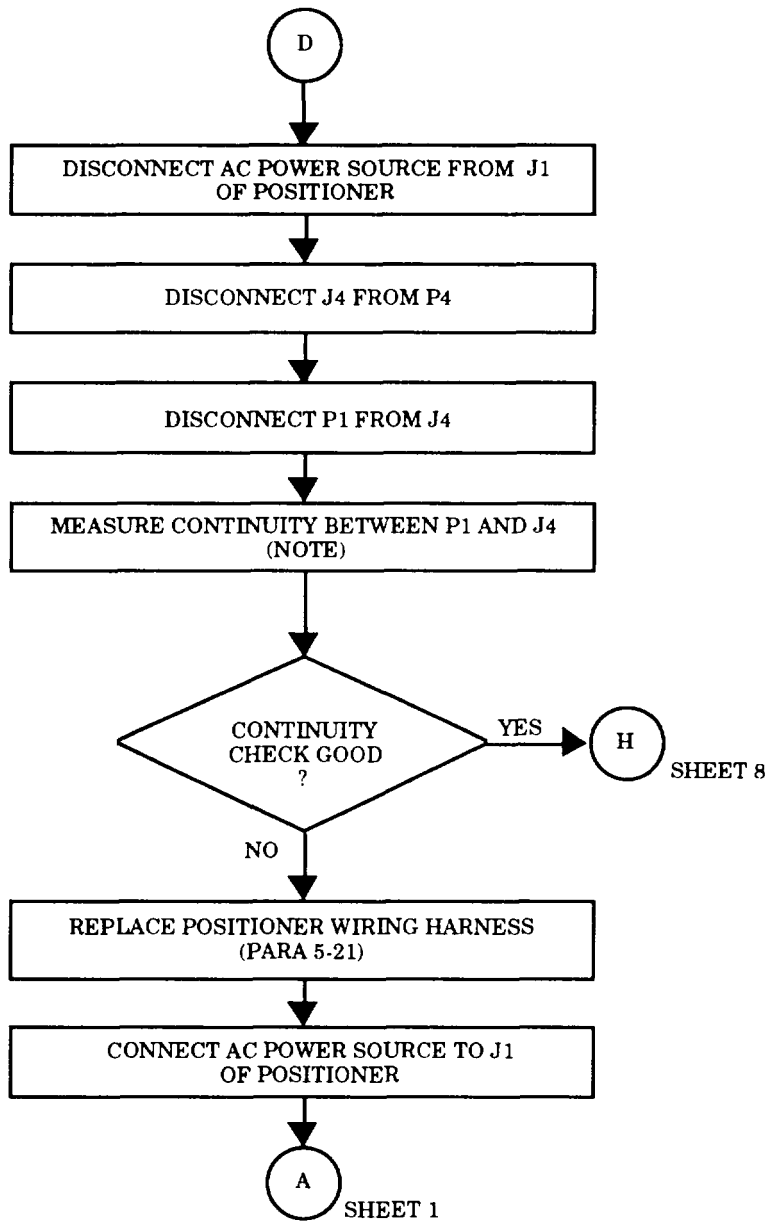


Flowchart 5-8 (Sheet 2 of 11)

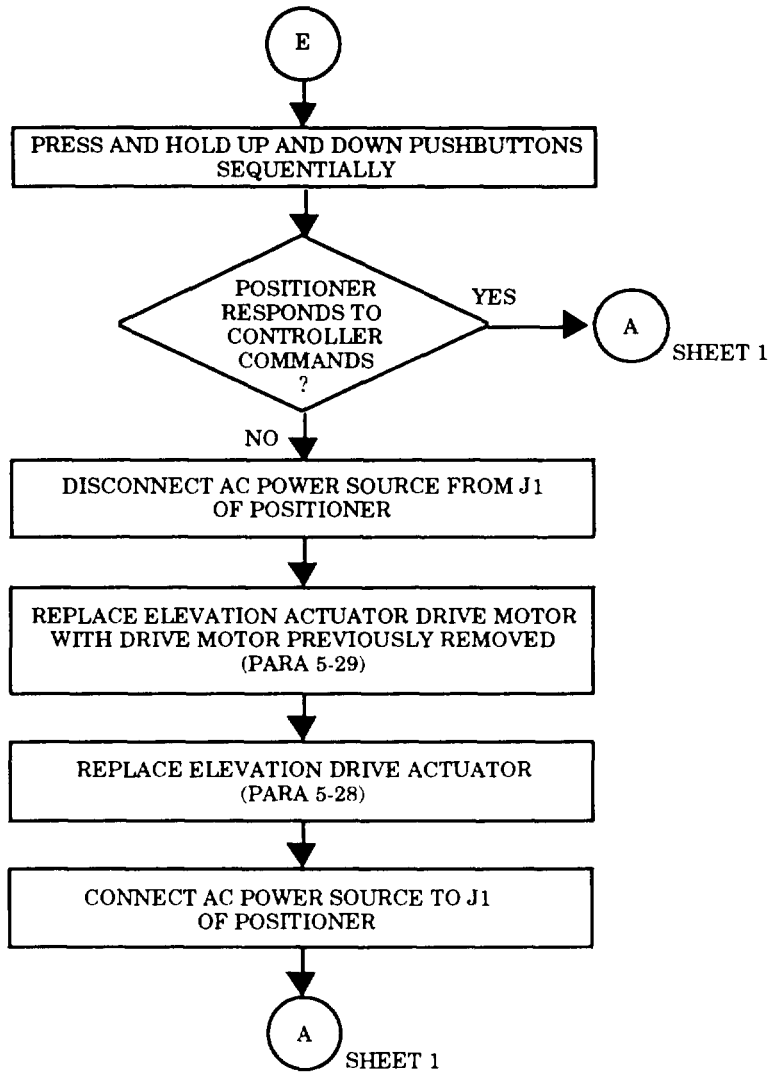


NOTE
 FUSE IS LOCATED ON
 TOP OF MOTOR DRIVE
 ASSEMBLY
 (REFER TO PARA 5-24a).

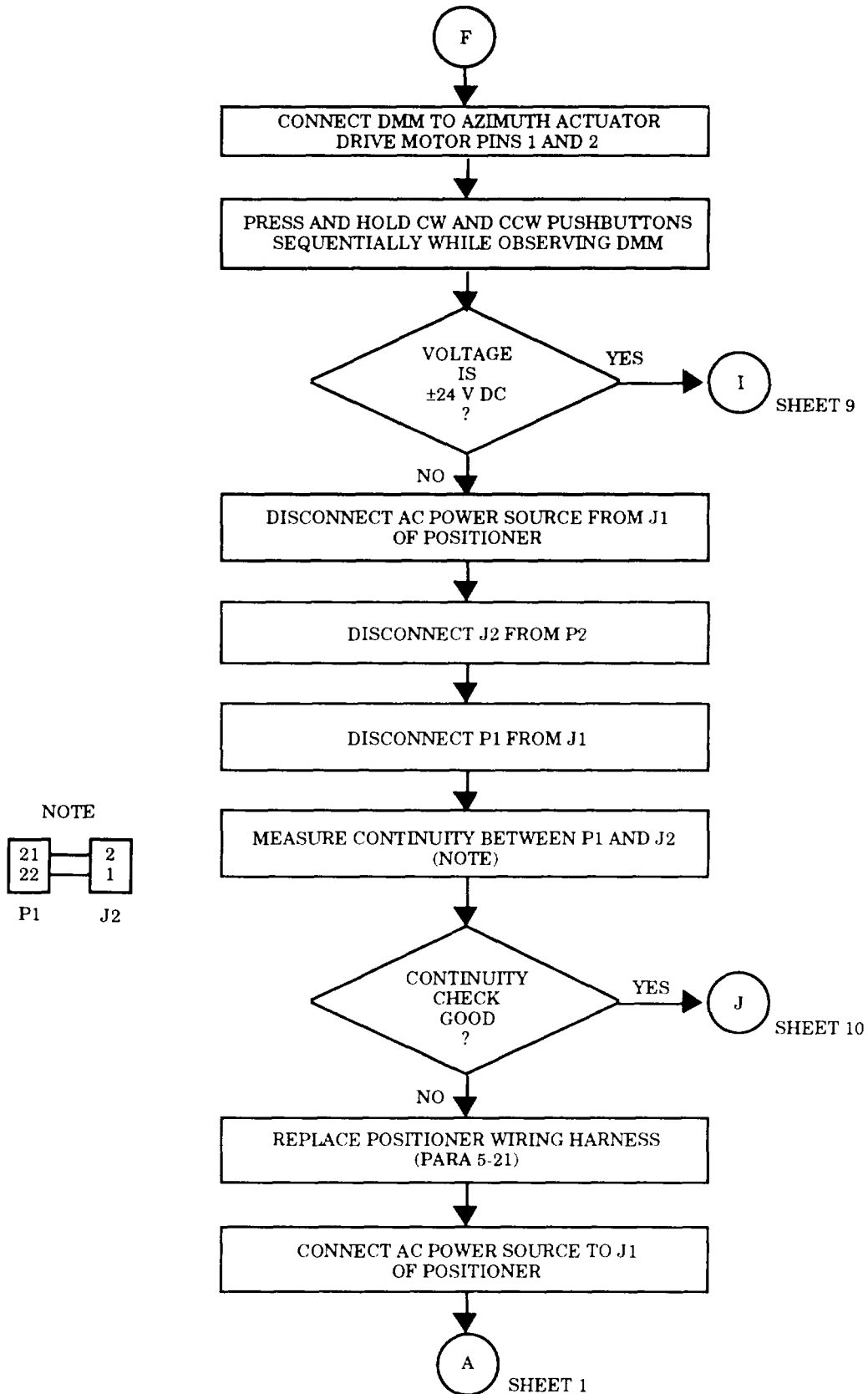
Flowchart 5-8 (Sheet 3 of 11)



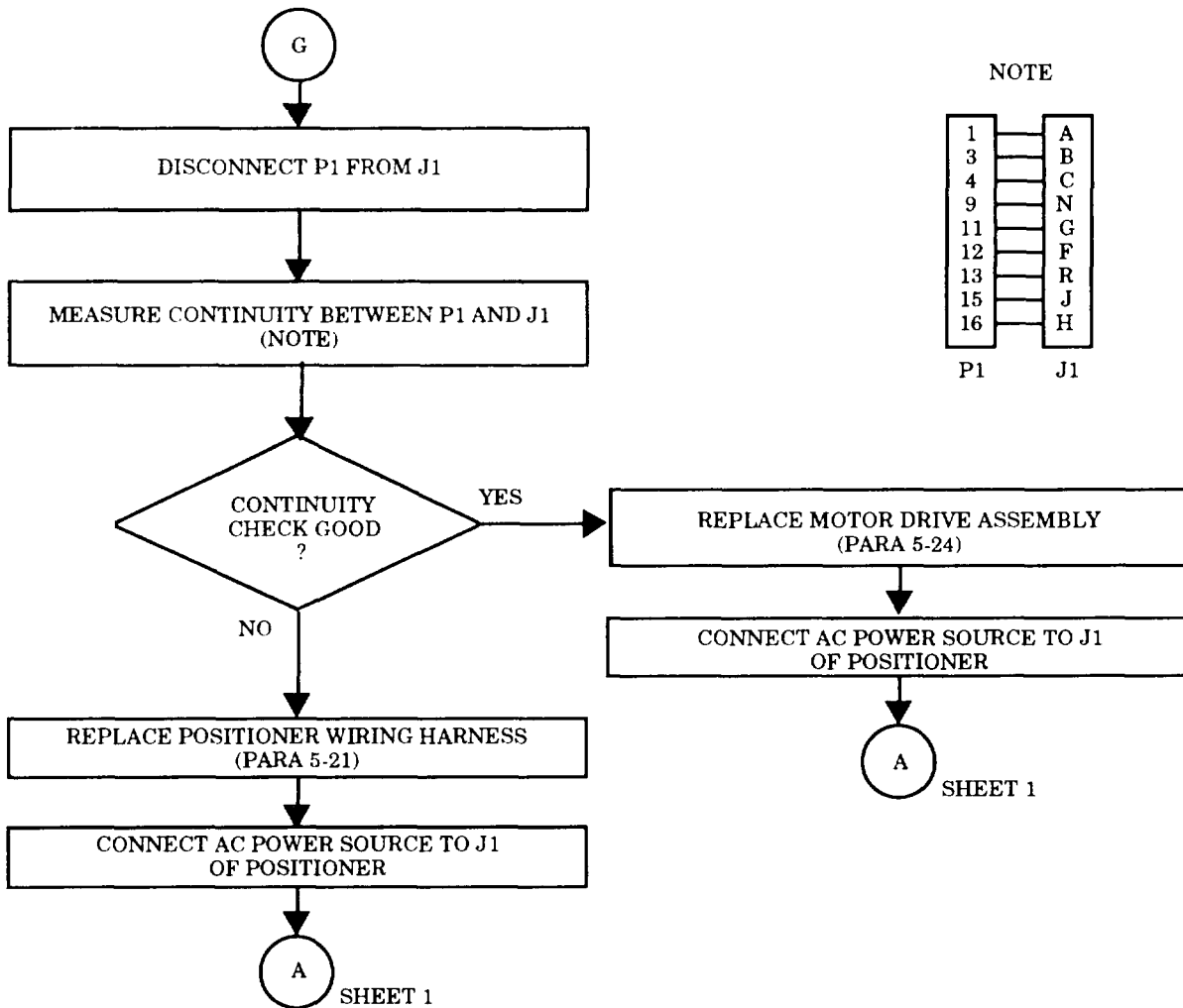
Flowchart 5-8 (Sheet 4 of 11)



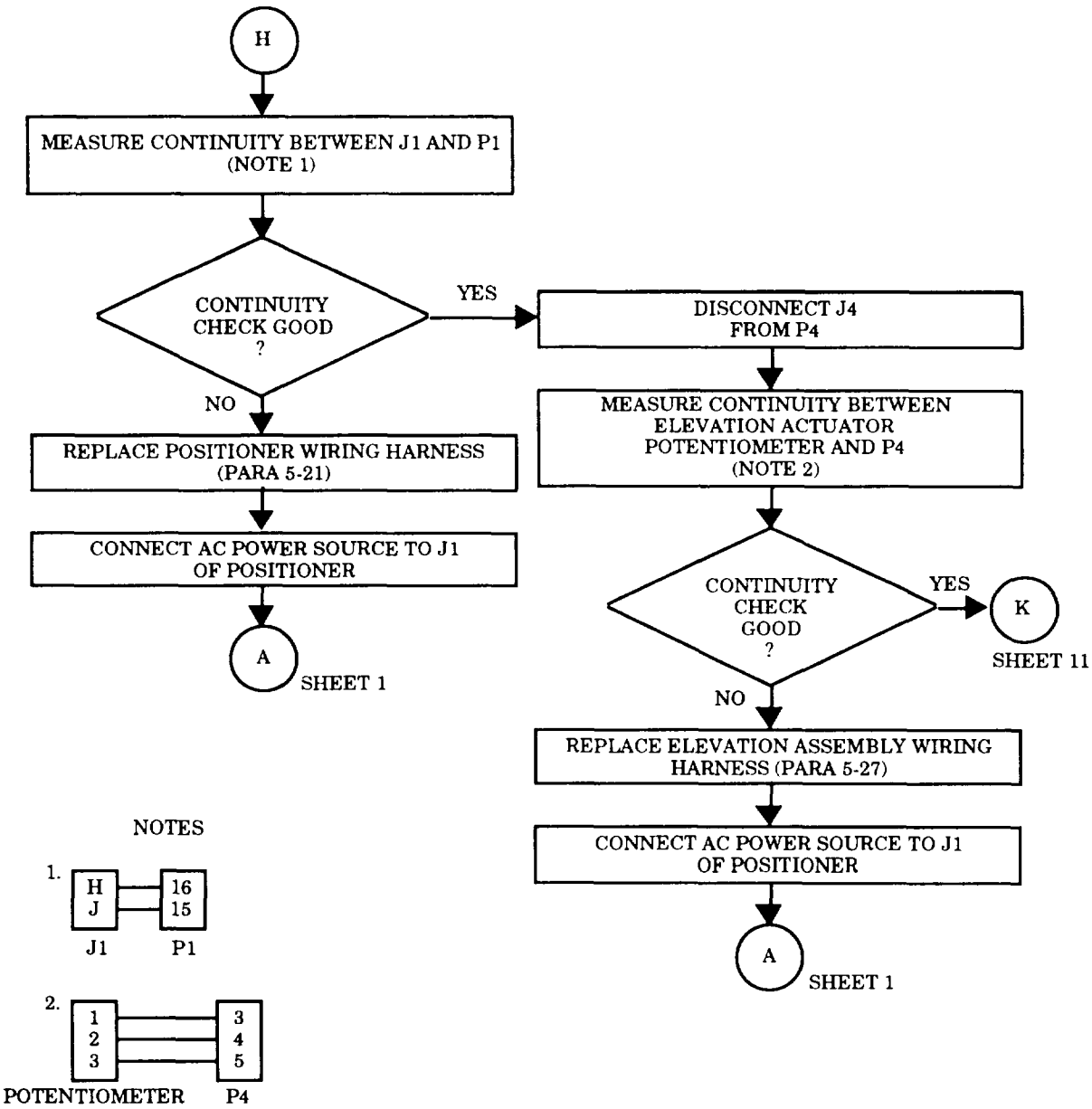
Flowchart 5-8 (Sheet 5 of 11)



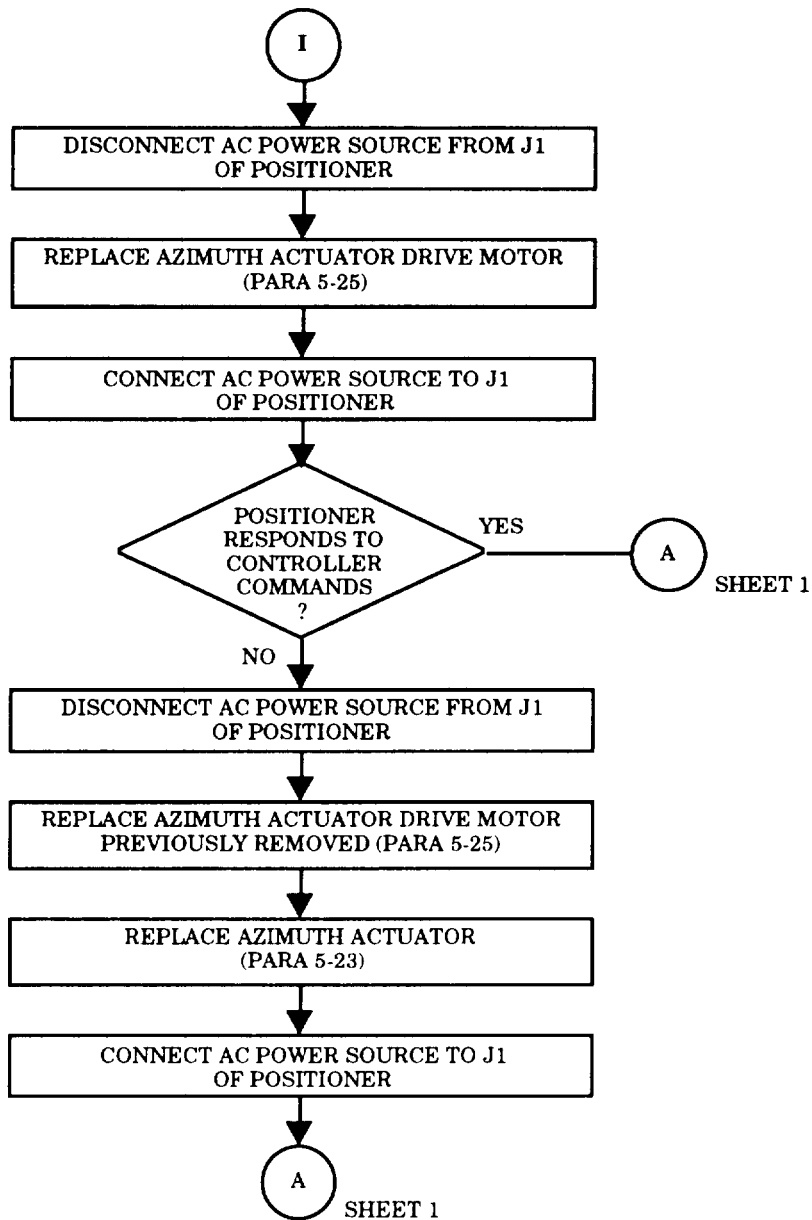
Flowchart 5-8 (Sheet 6 of 11)



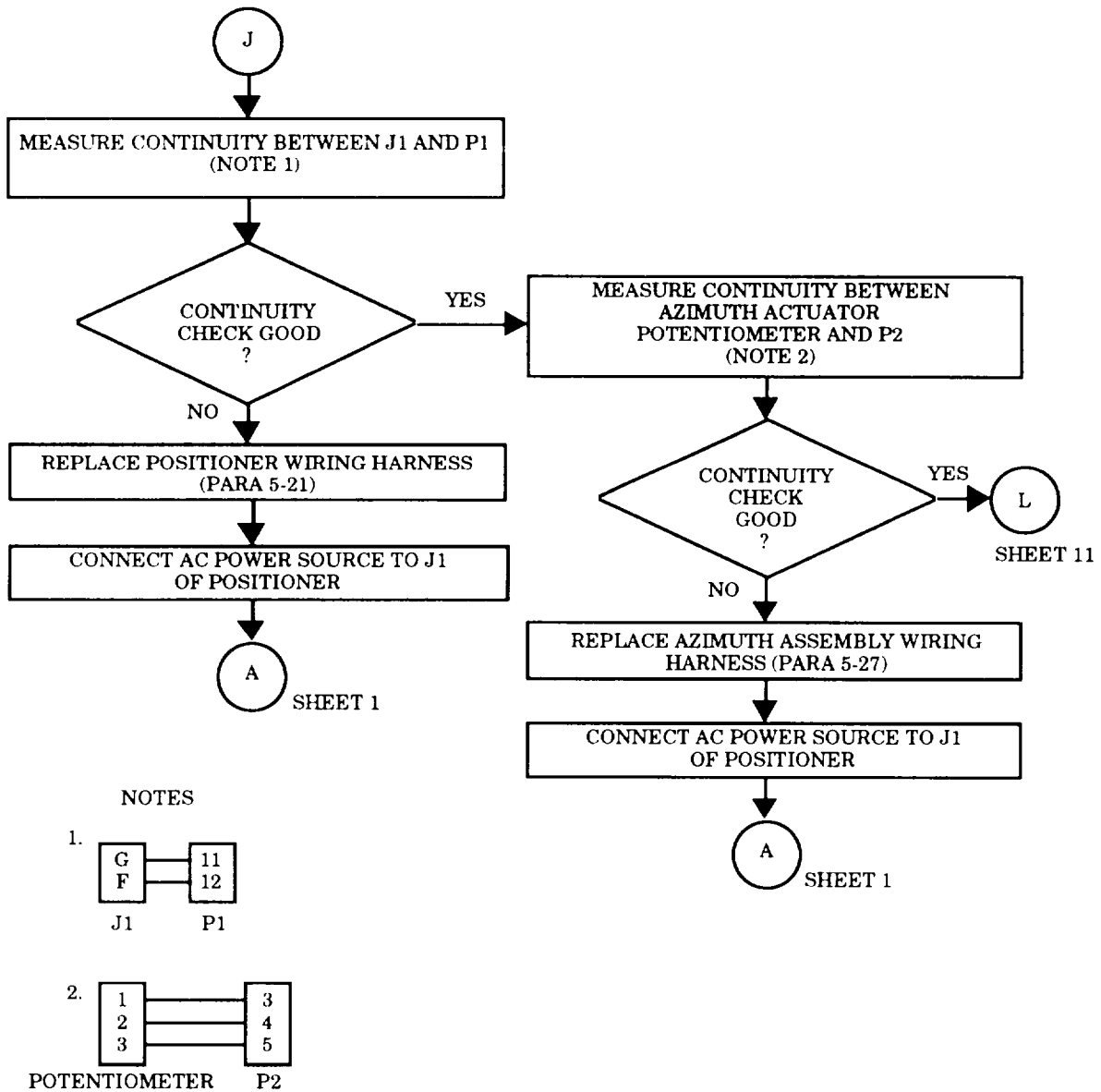
Flowchart 5-8 (Sheet 7 of 11)



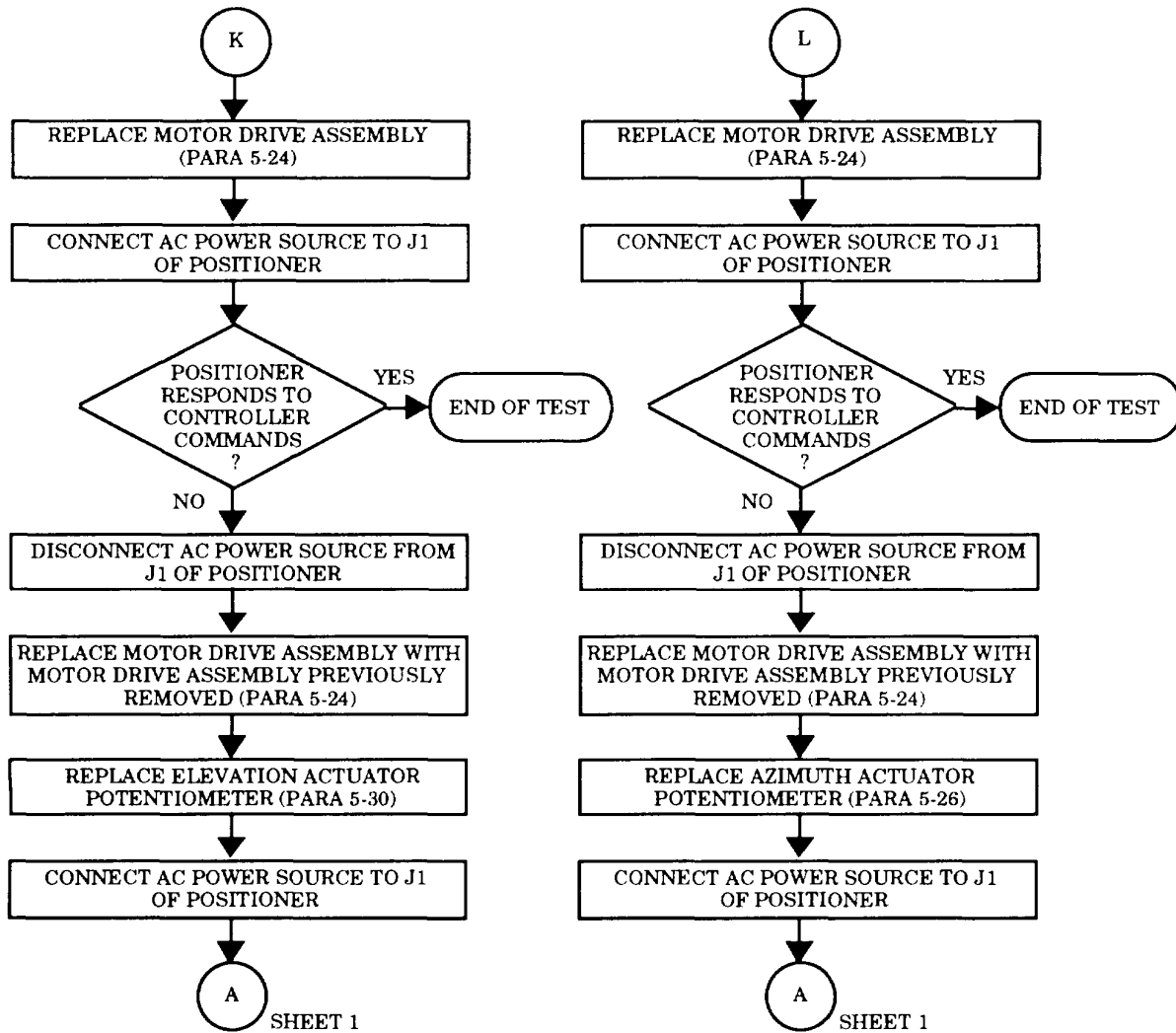
Flowchart 5-8 (Sheet 8 of 11)



Flowchart 5-8 (Sheet 9 of 11)

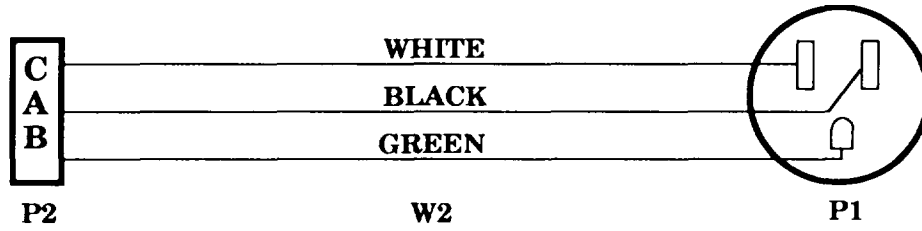


Flowchart 5-8 (Sheet 10 of 11)



Flowchart 5-8 (Sheet 11 of 11)

5-7. TESTING AND TROUBLESHOOTING CABLE ASSEMBLY W2



- a. Using multimeter, perform continuity checks to determine faulty component.
- b. After faulty component is determined, refer to paragraph 5-35 for repair procedures.

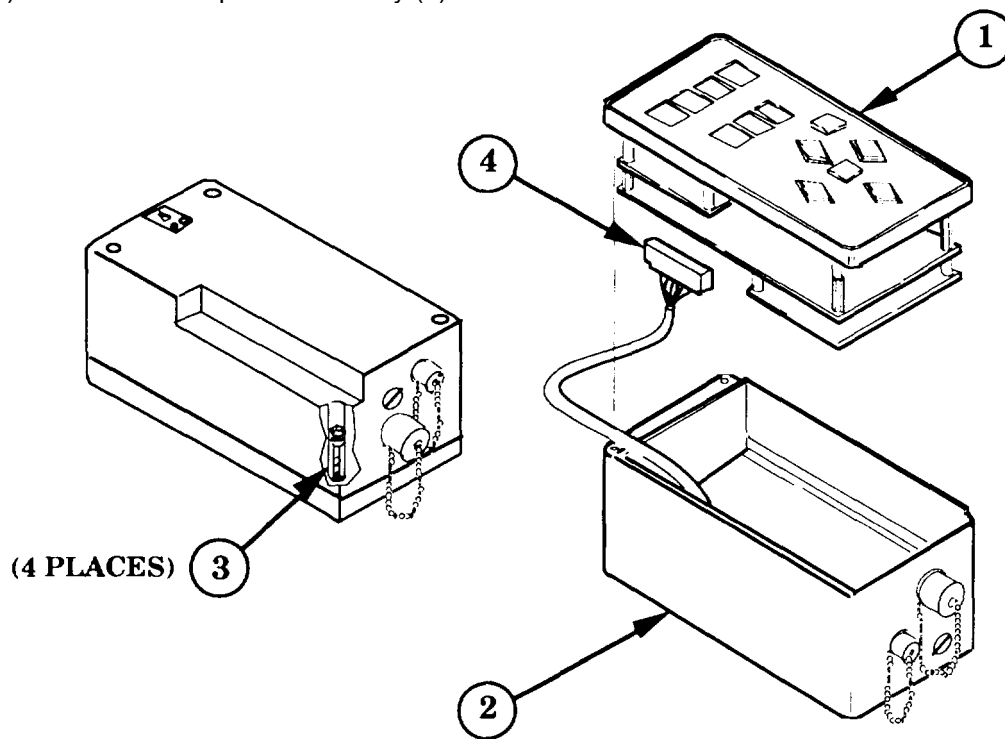
Section V. MAINTENANCE PROCEDURES

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5-8. CONTROLLER FRONT PANEL ASSEMBLY REMOVAL AND REPLACEMENT

a. Removal

- (1) Lay controller on work surface with front panel facing down.
- (2) Using flat-tip screwdriver, disengage four captive screws (3) in bottom of controller housing (2).
- (3) Turn controller so that front panel is facing up.
- (4) Lift front panel assembly (1) approximately 3 inches to gain access to cable connector (4) attaching front panel assembly (1) to controller housing (2).
- (5) Using diagonal cutting pliers, cut cable tie wrap securing cable connector (4) and manually disconnect cable connector.
- (6) Remove front panel assembly (1).

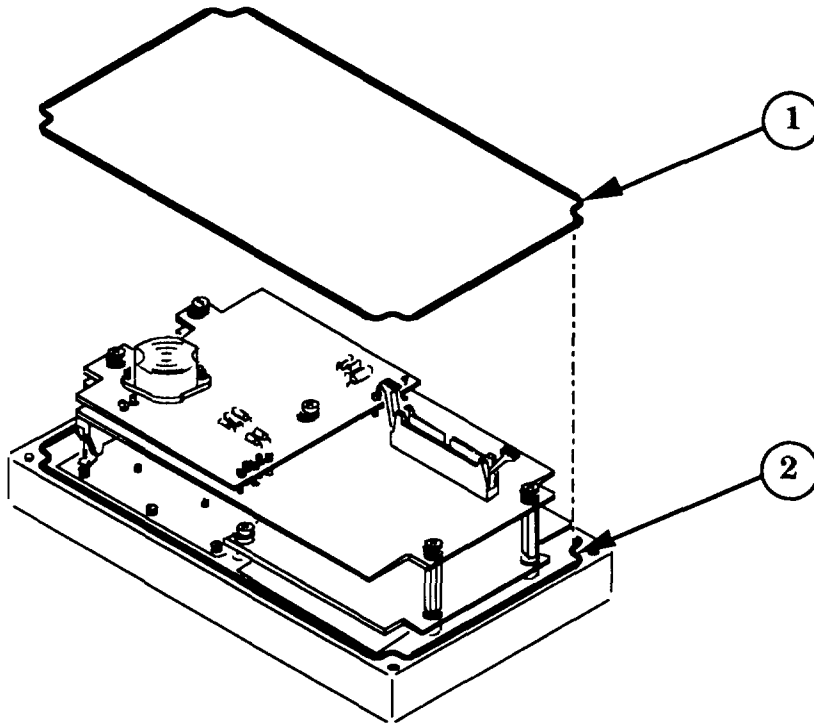


b. Replacement

- (1) Coat O-ring with 55M silicon grease.
- (2) Attach cable connector (4) to front panel assembly (1) and secure using cable tie wrap.
- (3) Gently mate front panel assembly (1) with controller housing (2).
- (4) Lay controller (2) on work surface with front panel facing down.
- (5) Using flat-tip screwdriver, tighten four captive screws (3).

5-9. CONTROLLER O-RING REMOVAL AND REPLACEMENT**a. Removal**

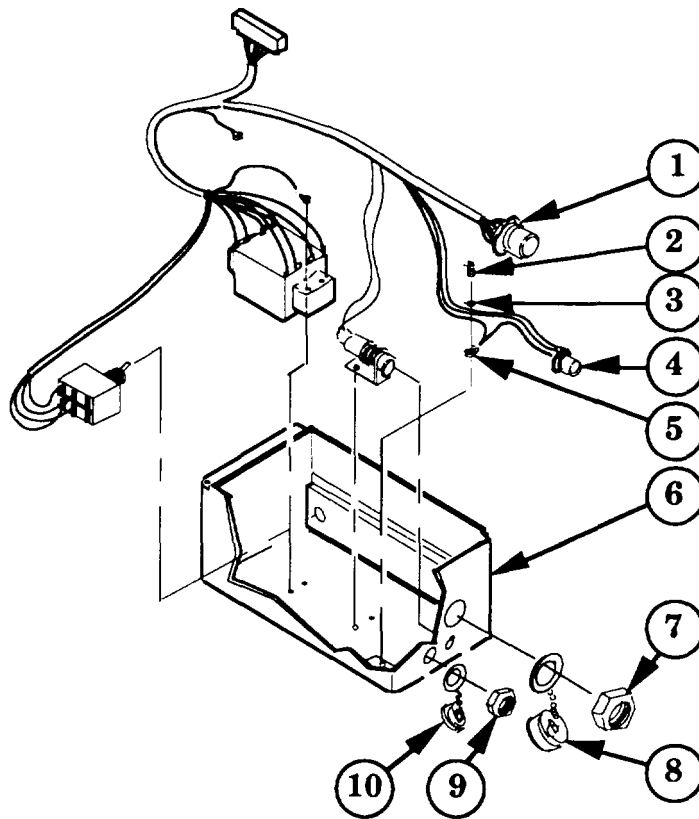
- (1) Remove front panel assembly (refer to para 5-8a).
- (2) Remove O-ring (1) from groove (2) in front panel assembly.

**b. Replacement**

- (1) Coat O-ring (1) with 55M silicon grease.
- (2) Insert O-ring (1) into groove (2) in front panel assembly.
- (3) Replace front panel assembly (refer to para 5-8b).

5-10. CONTROLLER WIRING HARNESS REMOVAL AND REPLACEMENT**a. Removal**

- (1) Remove front panel assembly (refer to para 5-8a).
- (2) Remove power switch (refer to para 5-11a, steps 2 and 3).
- (3) Remove fuse holder (refer to para 5-12a, steps 2, 3, 5, and 6).
- (4) Remove transformer (refer to para 5-13a, step 3).
- (5) Using 1-5/16-inch socket and ratchet, remove nut (7) securing connector J1 (1) and cover (8).
- (6) Remove connector J1 (1) from controller housing (6).
- (7) Using cross-tip screwdriver, remove screw (2) and washer (3) securing ground lug (5) to controller housing (6).
- (8) Using 7/8-inch socket and ratchet, remove nut (9) securing connector J2 (4) and cover (10).
- (9) Remove connector J2 (4) from controller housing (6).



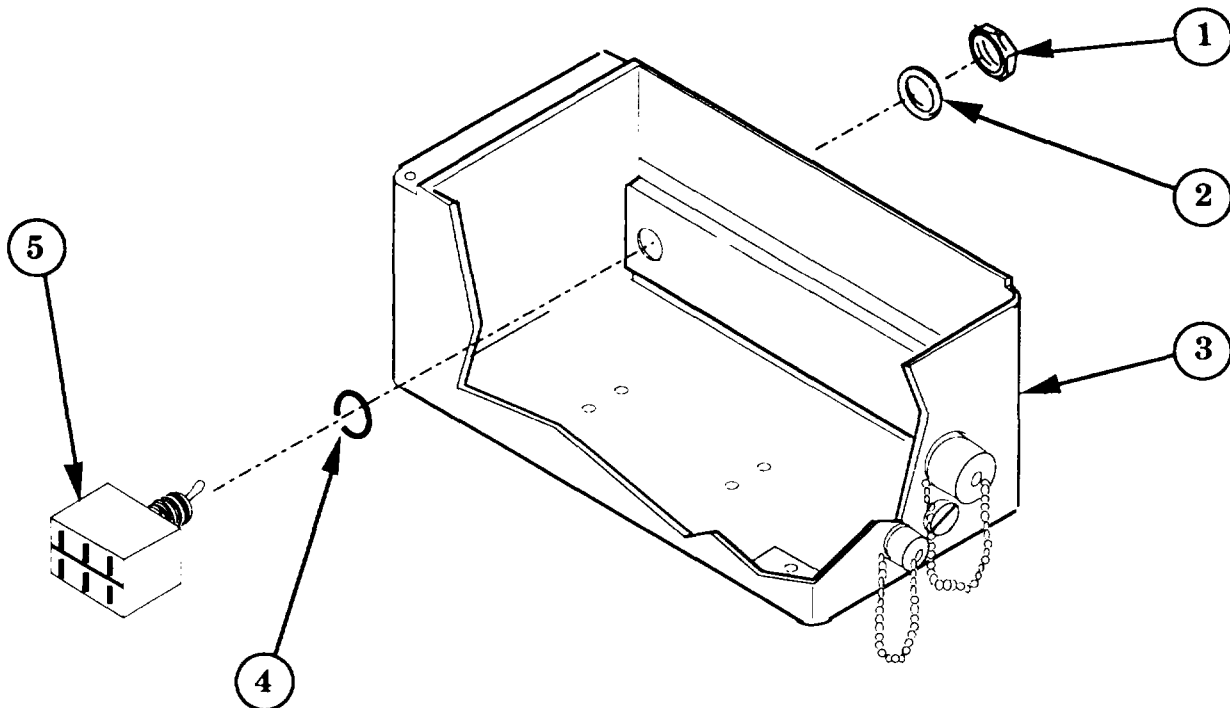
5-10. CONTROLLER WIRING HARNESS REMOVAL AND REPLACEMENT - Continued**b. Replacement**

- (1) Place wiring harness over controller housing (6) as shown.
- (2) Coat O-ring on connector J2 (4) with 55M silicon grease and install J2 in controller housing (6).
- (3) Install cover (10) and nut (9) on connector J2 (4). Using 7/8-inch socket and ratchet, tighten nut (9).
- (4) Using cross-tip screwdriver, install screw (2), washer (3), and ground lug (5) to controller housing (6).
- (5) Coat O-ring on connector J1 (1) with 55M silicon grease and install J1 in controller housing (6).
- (6) Install cover (8) and nut (7) on connector J1 (1). Using 1-5/16-inch socket and ratchet, tighten nut (7).
- (7) Replace transformer (refer to para 5-13b, step 1).
- (8) Replace fuse holder (refer to para 5-12b, steps 1, 2, 4, 5, and 6).
- (9) Replace power switch (refer to para 5-11b, steps 2 and 3).
- (10) Replace front panel assembly (refer to para 5-8b).

5-11. CONTROLLER POWER SWITCH REMOVAL AND REPLACEMENT

a. Removal

- (1) Remove front panel assembly (refer to para 5-8a).
- (2) Using 5/16-inch nutdriver, remove nut (1) and washer (2) securing power switch (5) to controller housing (3).
- (3) Remove power switch (5) and O-ring (4).
- (4) Tag and desolder wires attached to power switch (5).

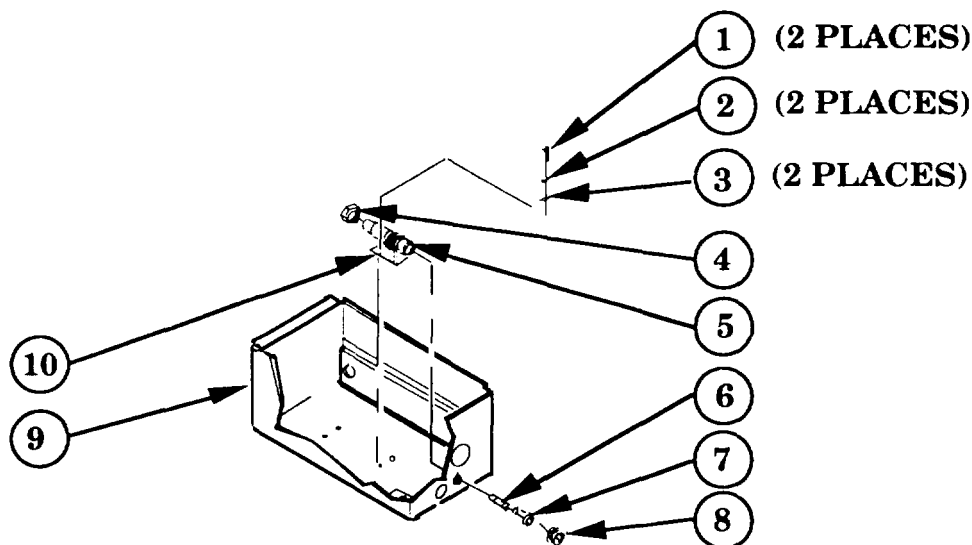


b. Replacement

- (1) Observe tags and solder wires to power switch (5).
- (2) Coat O-ring (4) on power switch (5) with 55M silicon grease.
- (3) Insert power switch (5) with O-ring (4) into controller housing (3). Using 5/16-inch nutdriver, install nut (1) and washer (2) securing power switch (5).
- (4) Replace front panel assembly (refer to para 5-8b).

5-12. CONTROLLER FUSE HOLDER REMOVAL AND REPLACEMENT**a. Removal**

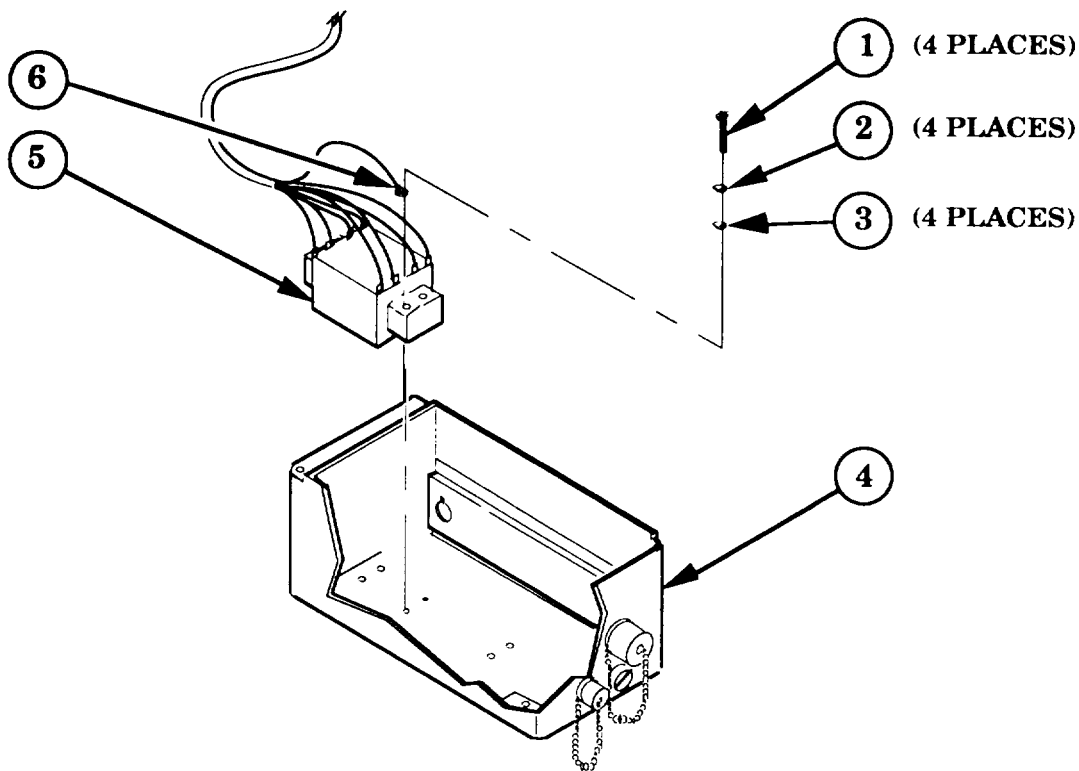
- (1) Remove front panel assembly (refer to para 5-8a).
- (2) Using flat-tip screwdriver, remove seal screw (8) with attached O-ring from controller housing (9).
- (3) Using small flat-tip screwdriver, remove fuse holder cap (7) and fuse (6) from fuse holder (5).
- (4) Tag and desolder three wires attached to fuse holder (5).
- (5) Using cross-tip screwdriver, remove two screws (1), lock washers (2), and flat washers (3) securing fuse holder bracket (10) to controller housing (9).
- (6) Using 9/16-inch wrench, remove plastic nut (4) attaching fuse holder (5) to fuse holder bracket (10).

**b. Replacement**

- (1) Using 9/16-inch wrench, attach fuse holder (5) to fuse holder bracket (10) with plastic nut (4).
- (2) Using cross-tip screwdriver, install two screws (1), lock washers (2), and flat washers (3) securing fuse holder bracket (10) to controller housing (9).
- (3) Observe tags and solder three wires to fuse holder (5).
- (4) Using small fiat-tip screwdriver, install fuse (6) and fuse holder cap (7).
- (5) Coat O-ring on seal screw (8) with 55M silicon grease and install using flat-tip screwdriver.
- (6) Using small flat-tip screwdriver, install fuse holder (7) and fuse (6) into fuse holder (5).
- (7) Replace front panel assembly (refer to para 5-8b).

5-13. CONTROLLER TRANSFORMER REMOVAL AND REPLACEMENT**a. Removal**

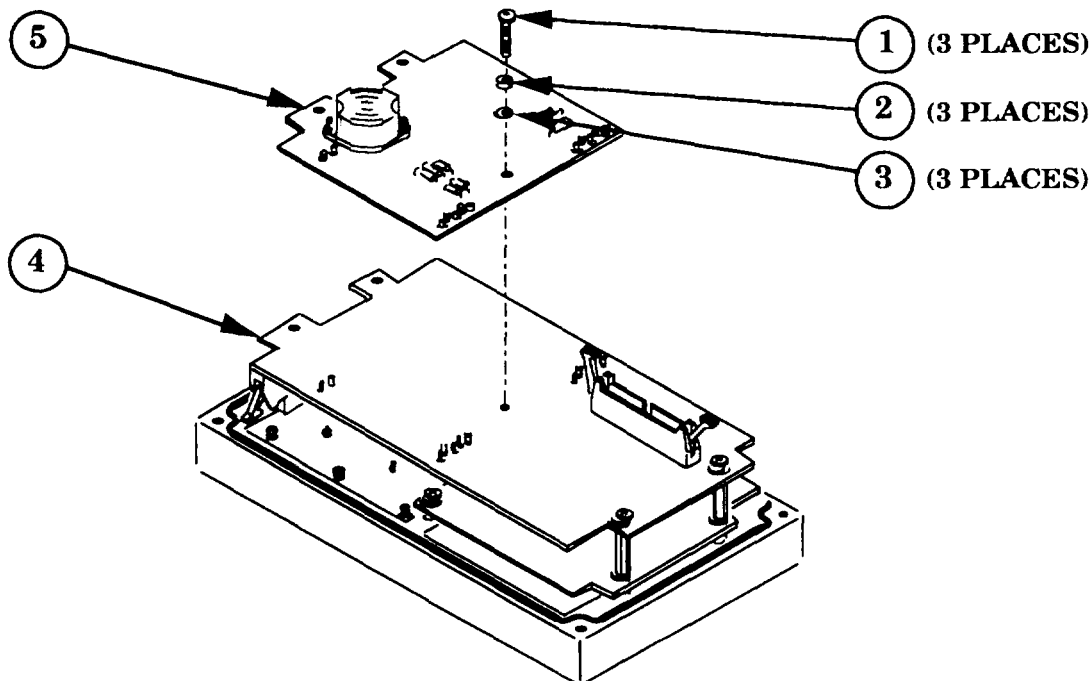
- (1) Remove front panel assembly (refer to para 5-8a).
- (2) Tag and desolder wires attached to transformer (5).
- (3) Using cross-tip screwdriver, remove four screws (1), lock washers (2), and flat washers (3) securing ground lug (6) and transformer (5) to controller housing (4).

**b. Replacement**

- (1) Using cross-tip screwdriver, install four screws (1), lock washers (2), and flat washers (3) securing ground lug (6) and transformer (5) to controller housing (4).
- (2) Observe tags and solder wires to transformer (5).
- (3) Replace front panel assembly (refer to para 5-8b).

5-14. CONTROLLER POWER SUPPLY CIRCUIT CARD ASSEMBLY (CCA) REMOVAL AND REPLACEMENT**a. Removal**

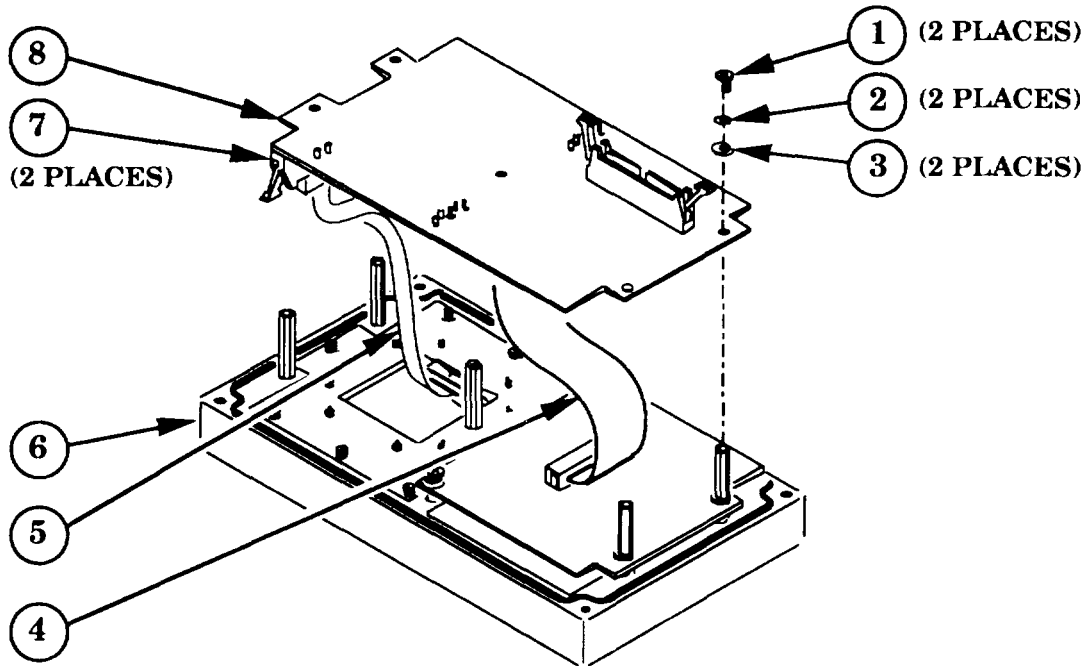
- (1) Remove front panel assembly (refer to para 5-8a).
- (2) Place front panel assembly on workbench with display facing down.
- (3) Using cross-tip screwdriver, remove three screws (1), lock washers (2), and flat washers (3) attaching power supply CCA (5) to control CCA (4).
- (4) Hold control CCA (4) with one hand, while gently lifting power supply CCA (5) with second hand. Rock power supply CCA (5) from side to side until connector pins release.

**b. Replacement**

- (1) Visually match connector on power supply CCA (5) with respective pins on control CCA (4).
- (2) Hold control CCA (4) with one hand and gently press power supply CCA (5) with second hand. Rock both CCAs gently from side to side until connector pins engage.
- (3) Using cross-tip screwdriver, install and tighten three screws (1), lock washers (2), and flat washers (3) securing power supply CCA (5) to control CCA (4).
- (4) Replace front panel assembly (refer to para 5-8b).

5-15. CONTROLLER CONTROL CIRCUIT CARD ASSEMBLY (CCA) REMOVAL AND REPLACEMENT**a. Removal**

- (1) Remove front panel assembly (refer to para 5-8a).
- (2) Remove power supply CCA (refer to para 5-14a).
- (3) Using cross-tip screwdriver, remove two screws (1), lock washers (2), and flat washers (3).
- (4) Using diagonal cutting pliers, cut cable tie wraps securing two cable connectors (7) and disconnect two cables (4 and 5) connecting control CCA (8) to front panel assembly (6).

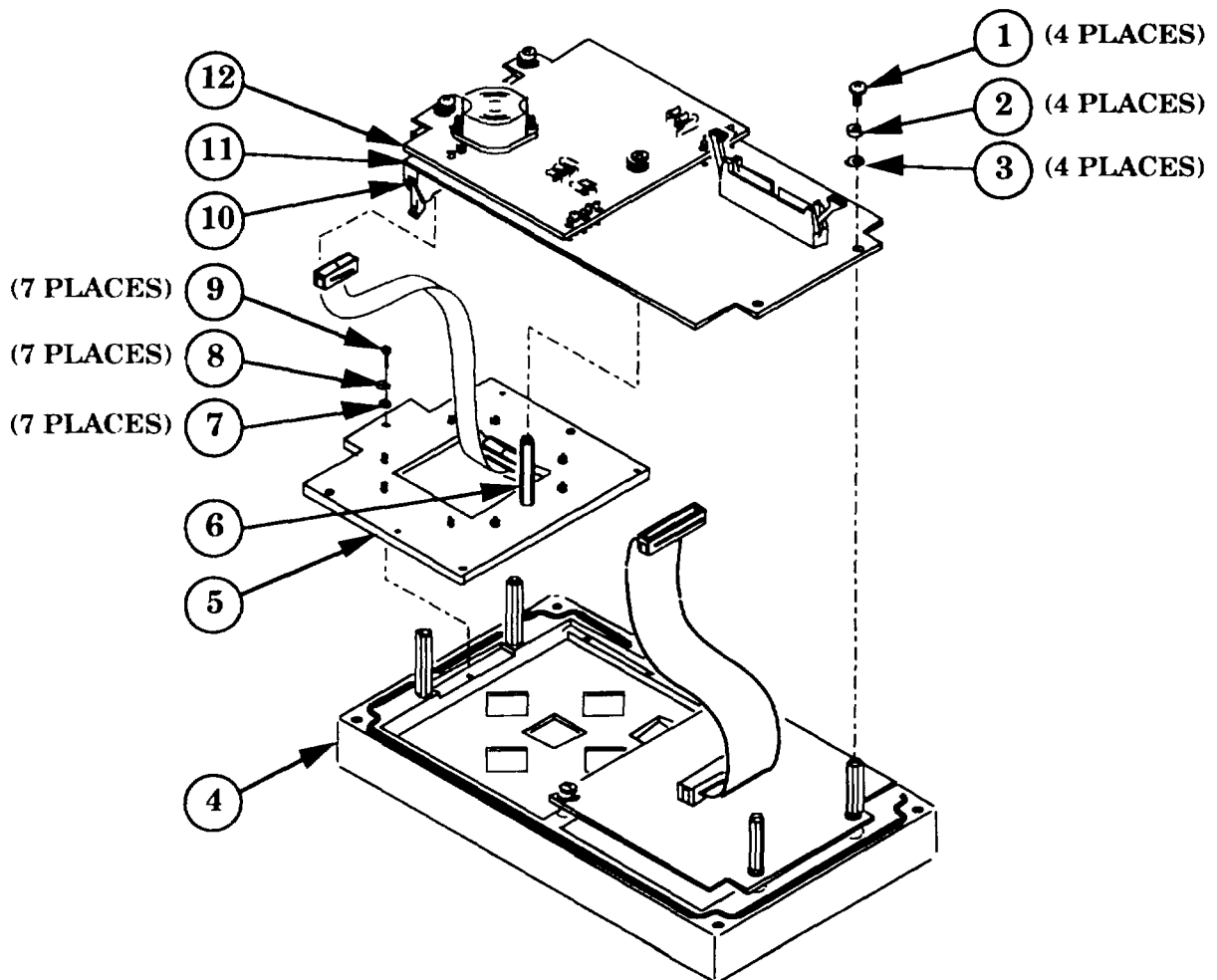
**b. Replacement**

- (1) Connect two cables (4 and 5) from front panel assembly (6) to control CCA (8) and secure using cable tie wraps.
- (2) Using cross-tip screwdriver, install two screws (1), lock washers (2), and flat washers (3) securing control CCA (8) to front panel.
- (3) Replace power supply CCA (refer to para 5-14b).
- (4) Replace front panel assembly (refer to para 5-8b).

5-16. CONTROLLER KEYBOARD REMOVAL AND REPLACEMENT

a. Removal

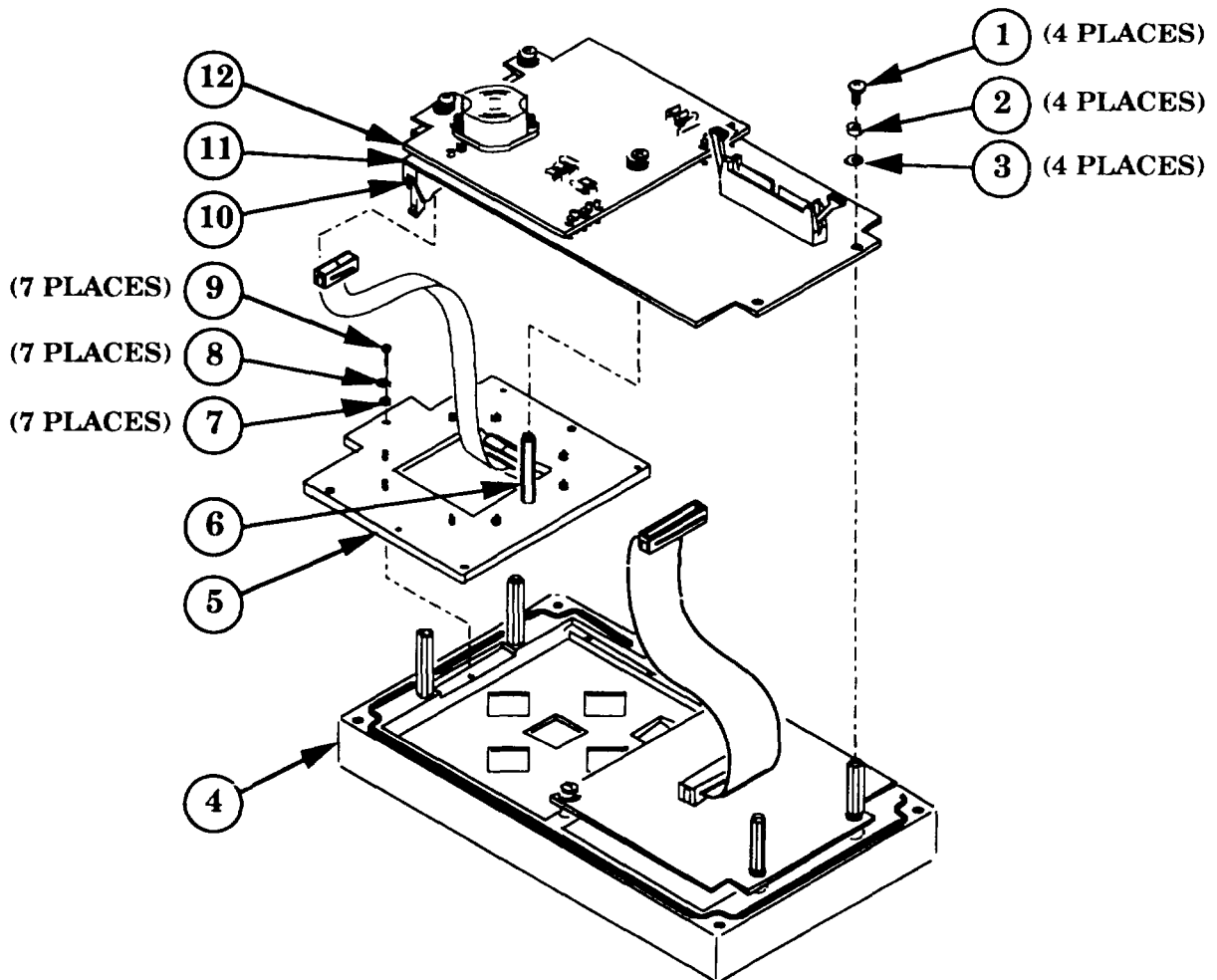
- (1) Remove front panel assembly (refer to para 5-8a).
- (2) Using cross-tip screwdriver, remove four screws (1), lock washers (2), flat washers (3) securing control CCA (11) and power supply CCA (12) to front panel assembly (4).
- (3) Allow power supply CCA (12) to remain attached to control CCA (11).
- (4) Using diagonal cutting pliers, cut cable tie wraps securing two cable connectors (10), and disconnect two cables connecting control CCA (11) to front panel assembly (4).
- (5) Remove control CCA (11) with attached power supply CCA (12).
- (6) Using 1/4-inch nutdriver, remove electromechanical post (6) from back of keyboard (5).
- (7) Using cross-tip screwdriver, remove seven screws (9), lock washers (8), and flat washers (7) attaching keyboard (5) to front panel assembly (4).



5-16. CONTROLLER KEYBOARD REMOVAL AND REPLACEMENT - Continued

b. Replacement

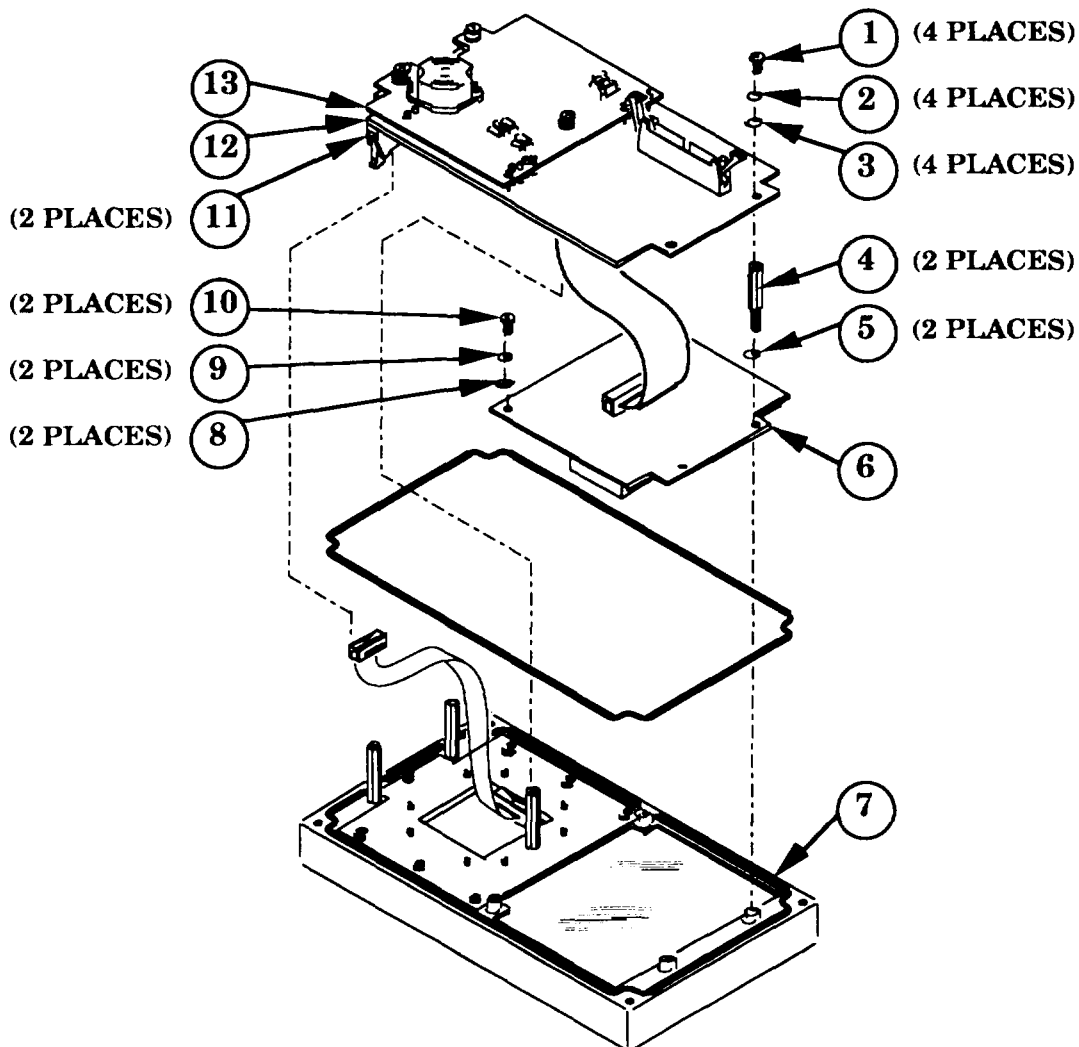
- (1) Apply 55M silicon grease to sealing surfaces of keyboard (5).
- (2) Place keyboard (5) on front panel assembly (4).
- (3) Using cross-tip screwdriver, install seven screws (9), lock washers (8), and flat washers (7) securing keyboard (5) to front panel assembly (4).
- (4) Using 1/4-inch nutdriver, install electromechanical post (6) on front panel assembly (4).
- (5) Connect two cables to control CCA (11) and secure using cable tie wraps.
- (6) Using cross-tip screwdriver, install four screws (1), lock washers (2), and flat washers (3) securing control CCA (11) and power supply CCA (12) to front panel assembly (4).
- (7) Replace front panel assembly (refer to para 5-8b).



5-17. CONTROLLER DISPLAY CIRCUIT CARD ASSEMBLY (CCA) REMOVAL AND REPLACEMENT

a. Removal

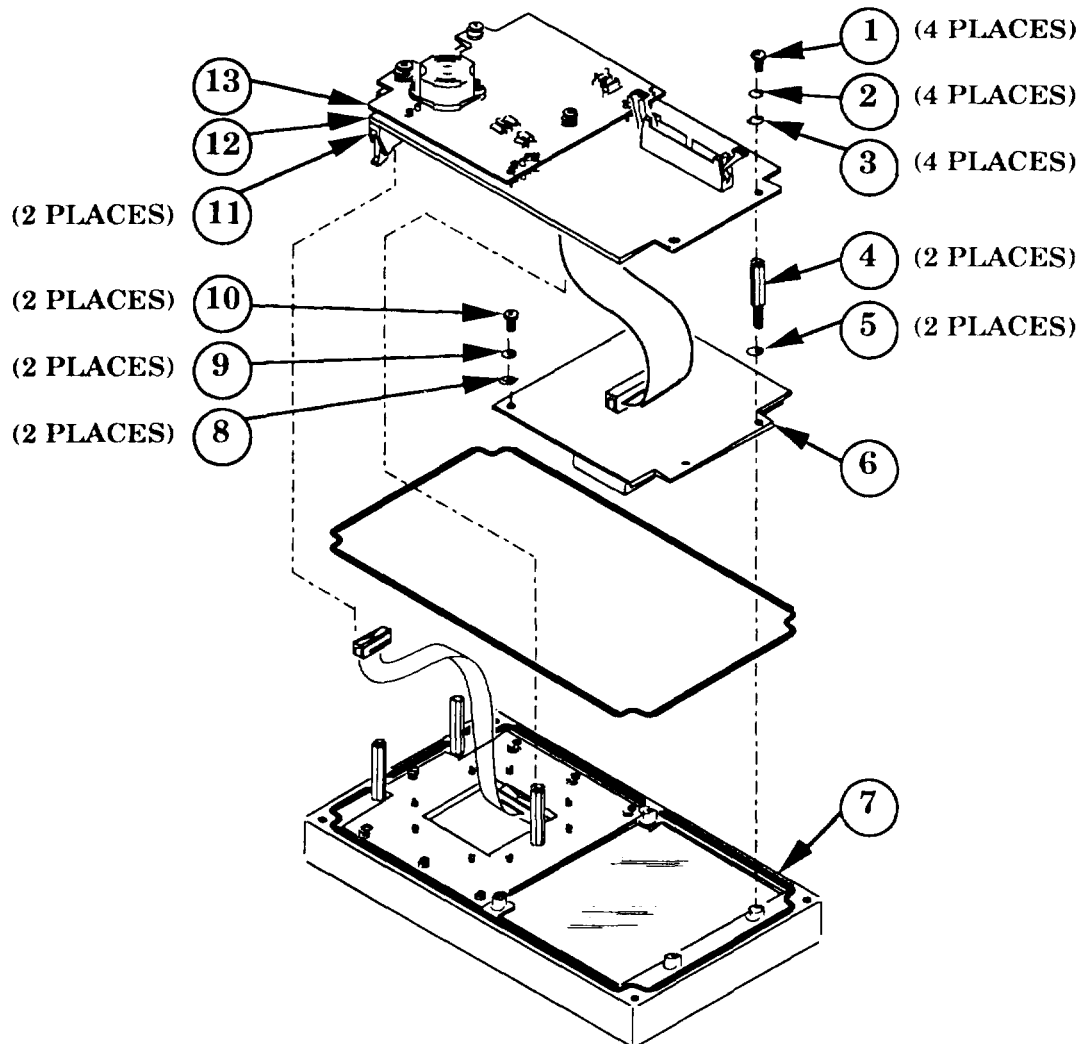
- (1) Remove front panel assembly (refer to para 5-8a).
- (2) Using cross-tip screwdriver, remove four screws (1), lock washers (2), and flat washers (3) securing control CCA and power supply CCA (13) to front panel assembly (7).
- (3) Allow power supply CCA (13) to remain attached to control CCA (12).
- (4) Using diagonal cutting pliers, cut cable tie wraps securing two cable connectors (11) and disconnect two cables connecting control CCA (12) to front panel assembly (7). Remove control CCA (12) with attached power supply CCA (13).
- (5) Using 1/4-inch nutdriver, remove two electromechanical posts (4) and flat washers (5) from display CCA (6).
- (6) Using cross-tip screwdriver, remove two screws (10), lock washers (9), and flat washers (8) securing display CCA (6) to front panel assembly (7).



5-17. CONTROLLER DISPLAY CIRCUIT CARD ASSEMBLY (CCA) REMOVAL AND REPLACEMENT - Continued

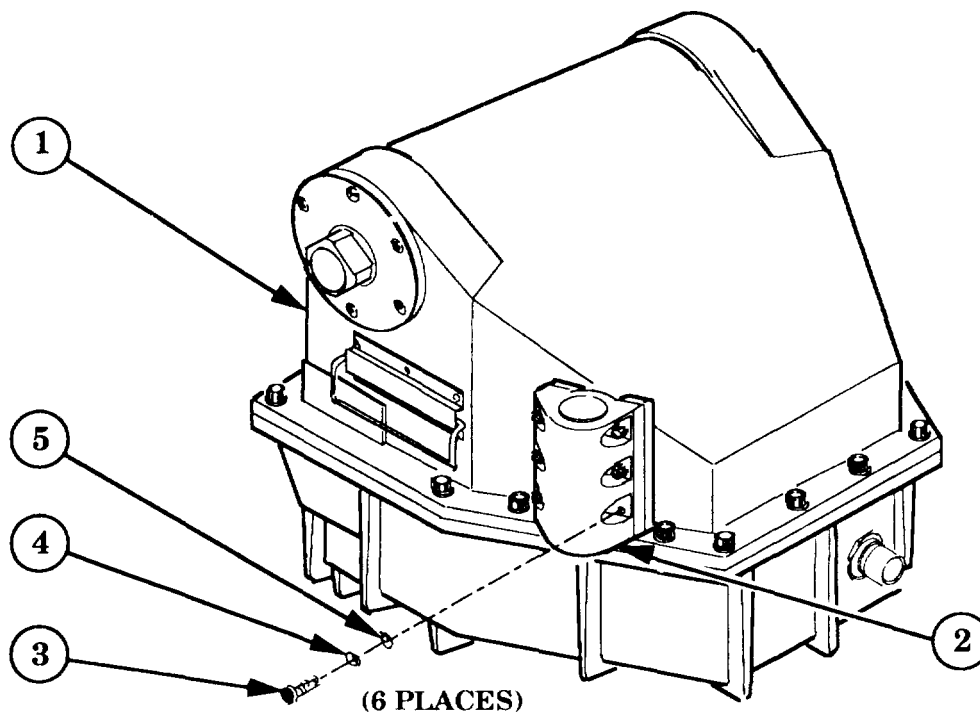
b. Replacement

- (1) Replace display CCA (6) in front panel assembly (7).
- (2) Using cross-tip screwdriver, install two screws (10), lock washers (9), and flat washers (8) attaching display CCA (6) to front panel assembly (7).
- (3) Using 1/4-inch nutdriver, install two electromechanical posts (4) and flat washers (5) securing display CCA (6) to front panel assembly (7).
- (4) Connect two cables connecting control CCA (12) to front panel assembly (7) and secure using cable tie wraps.
- (5) Using cross-tip screwdriver, replace four screws (1), lock washers (2), and flat washers (3) securing control CCA (12) and power supply CCA (13) to front panel assembly (7).
- (6) Replace front panel assembly (refer to para 5-8b).



5-18. LIGHTNING ROD MOUNT REMOVAL AND REPLACEMENT**a. Removal**

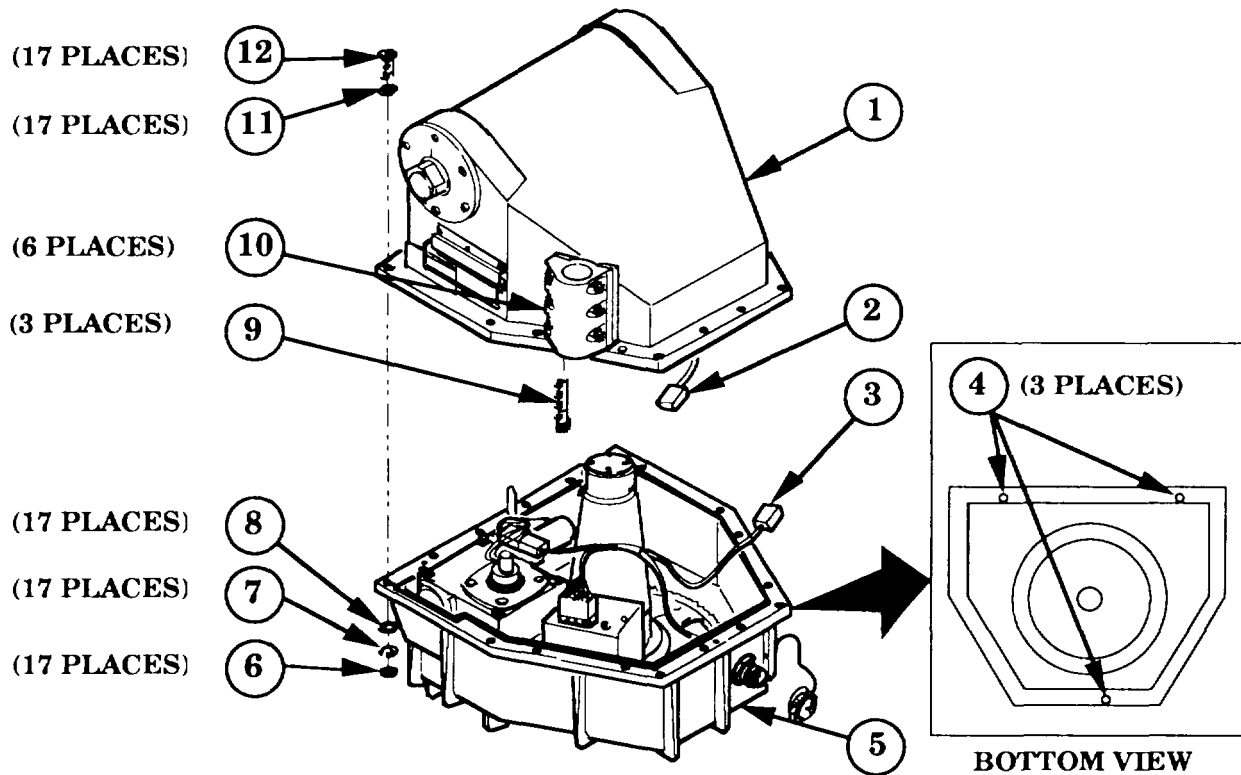
- (1) Using 3/16-inch hex key, remove six hex head screws (3), lock washers (4), and flat washers (5) securing lightning rod mount (2) to positioner (1).
- (2) Remove lightning rod mount.

**b. Replacement**

- (1) Insert six hex head screws (3), lock washers (4), and flat washers (5) through lightning rod mount (2).
- (2) Secure lightning rod mount (2) to positioner (1) using 3/16-inch hex key.

5-19. POSITIONER DISASSEMBLY AND REASSEMBLY

a. Disassembly



- (1) Using 3/16-inch hex key and 7/16-inch open end wrench, remove 17 hex head screws (12), flat washers (8 and 11), lock washers (7), and nuts (6) securing azimuth assembly (5) to elevation assembly (1).
- (2) Using 9/64-inch hex key, remove three hex head screws (9) located in lightning rod mount (10) on elevation assembly (1).
- (3) Insert three hex head screws (9) into case separator holes (4) at three places on azimuth assembly (5). Finger tighten three screws.
- (4) Using 9/64-inch hex key, tighten three hex head screws (9) no more than two full turns at a time.

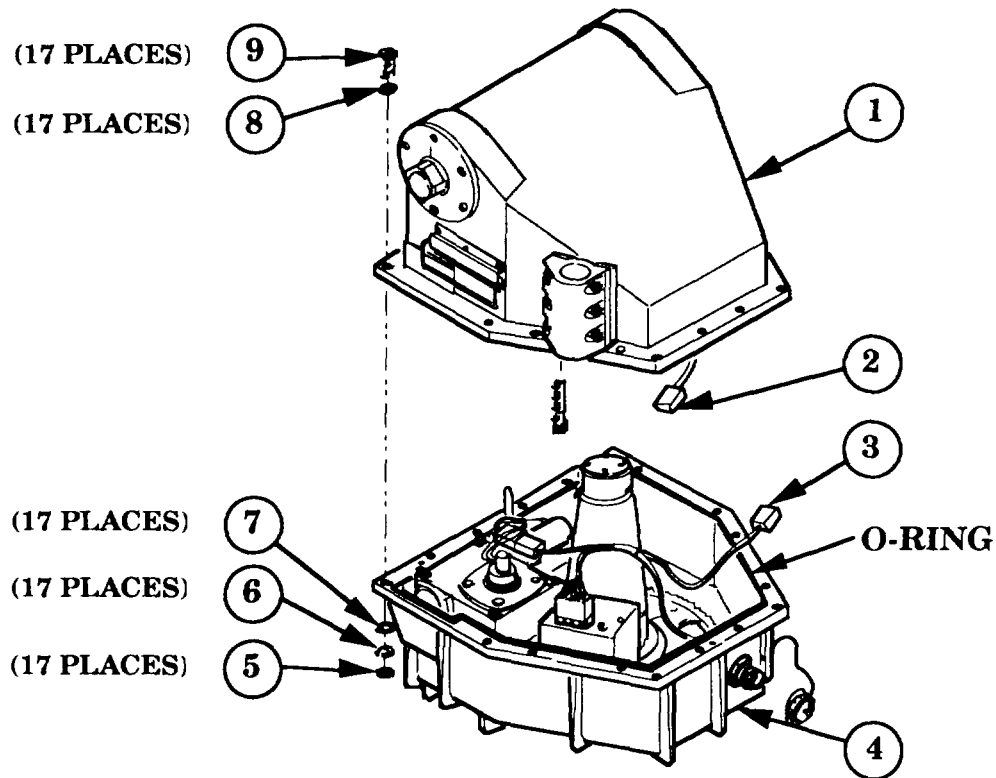
CAUTION

Use care when separating case halves. Cable harnesses connecting azimuth and elevation assemblies may be damaged.

- (5) Carefully lift elevation assembly (1) from azimuth assembly (5).
- (6) Disconnect connector P4 (2) from positioner wiring harness at connector J4 (3) by squeezing tabs on P4 and removing P4 from J4.
- (7) Using 9/64-inch hex key, remove three hex head screws (9) from case separator holes (4) in azimuth assembly (5). Install screws in lightning rod mount (10).

5-19. POSITIONER DISASSEMBLY AND REASSEMBLY - Continued

b. Reassembly



CAUTION

Ensure that O-ring is properly seated in flange on azimuth assembly. Failure to do so may result in damage to equipment.

- (1) Check O-ring seal for nicks, tears, or rot. Replace O-ring seal if faulty (refer to para 5-20).
- (2) Connect positioner wiring harness at connector J4 (3) to connector P4 (2).

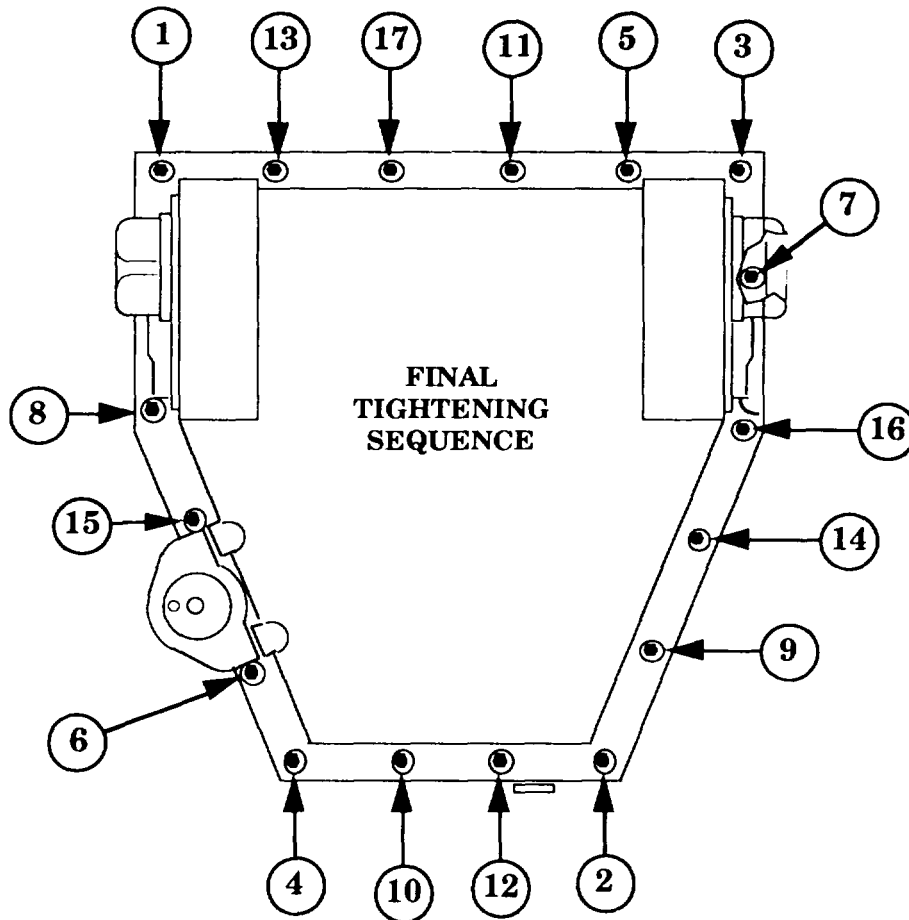
NOTE

Ensure that flanges on azimuth and elevation assemblies are free of grease and foreign materials prior to reassembling positioner.

- (3) Carefully position elevation assembly (1) on azimuth assembly (4).
- (4) Insert and finger tighten 17 hex head screws (9), flat washers (8 and 7), lock washers (6), and nuts (5) through flanges on azimuth and elevation assemblies (1 and 4).

5-19. POSITIONER DISASSEMBLY AND REASSEMBLY - Continued

b. Reassembly - Continued

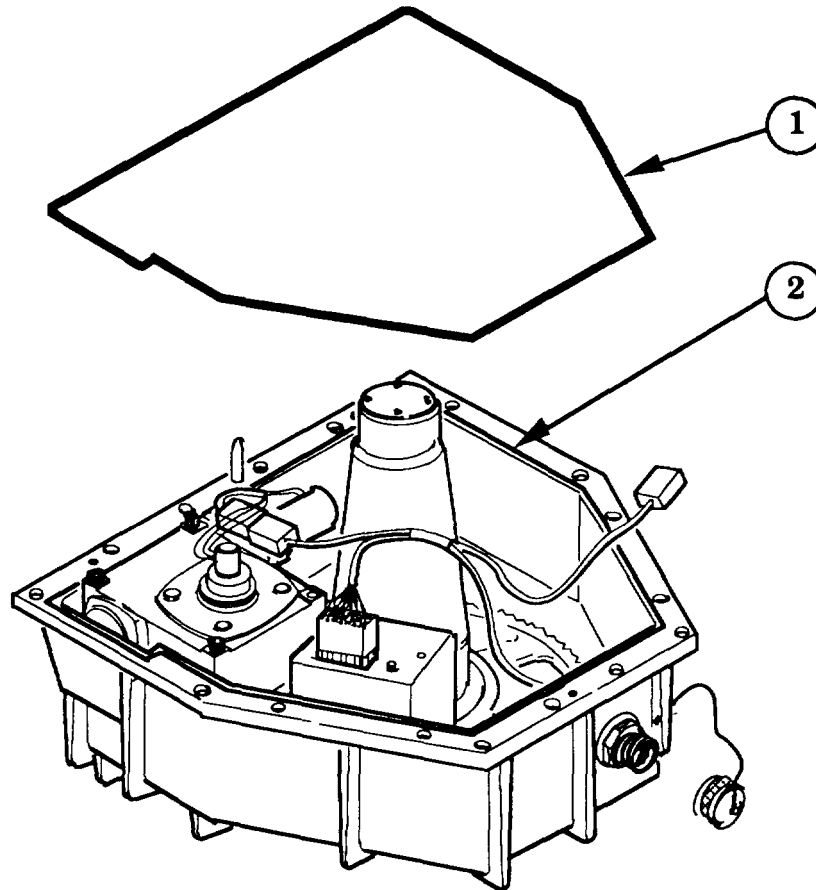


- (5) Using 7/16-inch open end wrench, 3/16-inch hex key, and torque wrench, begin at corners (1, 2, 3, and 4) of positioner and tighten hardware installed in step 4, to 90-inch pounds. Continue until all hardware (5 thru 17) has been tightened.

5-20. POSITIONER SEAL REMOVAL AND REPLACEMENT

a. Removal

- (1) Disassemble positioner (refer to para 5-19a).
- (2) Remove O-ring seal (1) from azimuth assembly flange (2).



b. Replacement

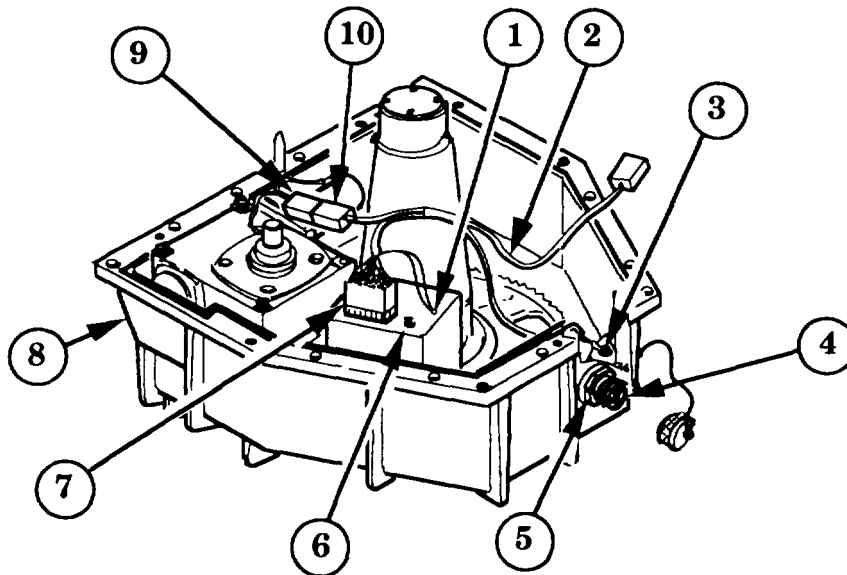
NOTE

Ensure that flange on azimuth assembly is free of dirt, grease, or other foreign materials prior to installing replacement O-ring seal.

- (1) Coat O-ring seal (1) with 55M silicon grease.
- (2) Carefully position O-ring seal (1) on azimuth flange (2). Press O-ring seal into flange.
- (3) Reassemble positioner (refer to para 5-19b).

5-21. POSITIONER WIRING HARNESS REMOVAL AND REPLACEMENT**a. Removal**

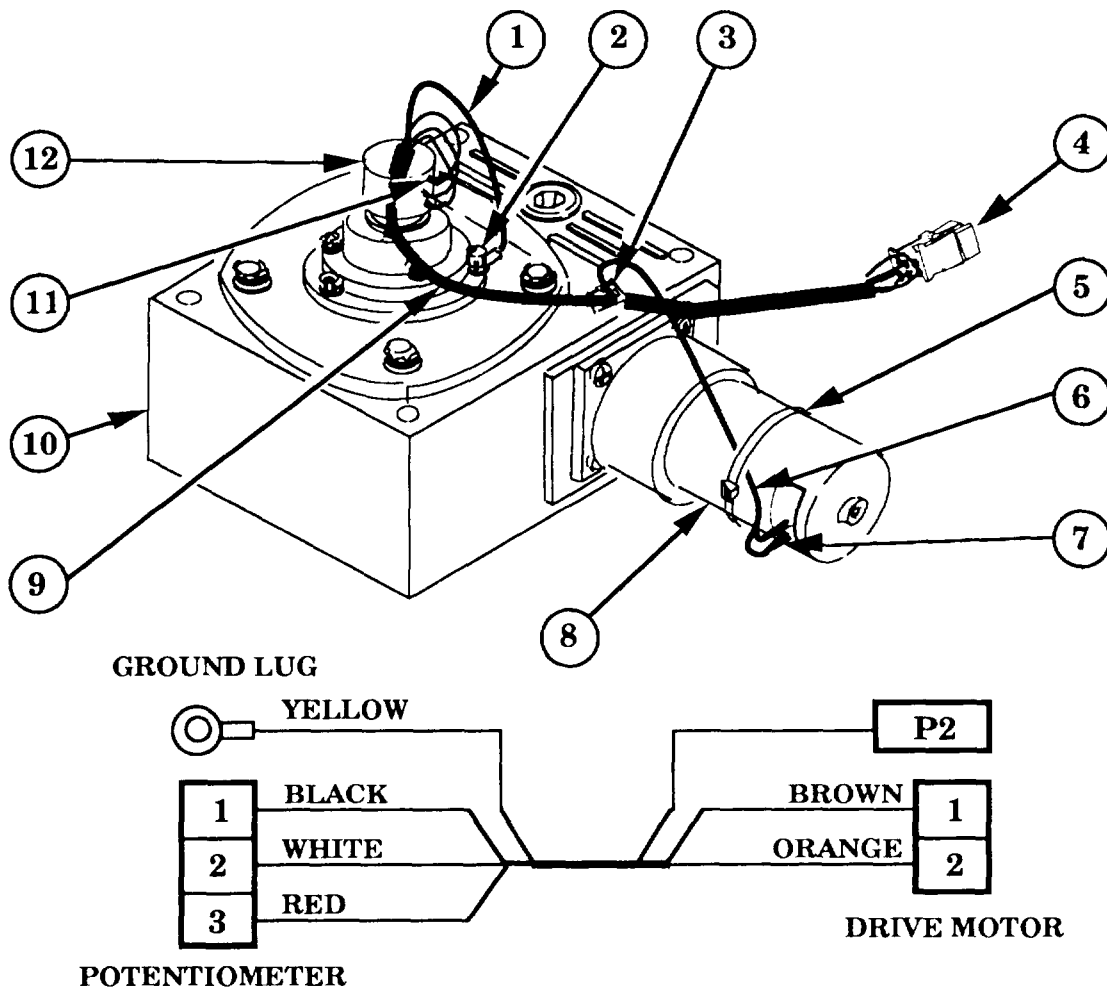
- (1) Disassemble positioner (refer to para 5-19a).
- (2) Using cross-tip screwdriver, remove ground lug (3) from azimuth assembly (8).
- (3) Using 1-5/16-inch socket with 1/2-inch drive ratchet, remove retaining nut (5) securing J1 (4) to azimuth assembly (8).
- (4) Disconnect P1 (7) from motor drive assembly (6) by squeezing tabs on P1.
- (5) Disconnect J2 (10) from P2 (9) by squeezing tabs on P2 and remove wiring harness (2) from azimuth assembly (8).
- (6) Using diagonal cutting pliers, cut cable tie wrap (1) securing wiring harness to motor drive assembly.

**b. Replacement**

- (1) Position replacement wiring harness (2) in azimuth assembly (8).
- (2) Observe keying and connect J2 (10) to P2 (9).
- (3) Observe keying and connect P1 (7) to motor drive assembly (6).
- (4) Insert J1 (4) through hole in azimuth assembly (8).
- (5) Secure J1 (4) to azimuth assembly (8) using retaining nut (5) and 1-5/16-inch socket with 1/2-inch drive ratchet.
- (6) Insert screw through ground lug (3) and secure to azimuth assembly (8) using cross- tip screwdriver.
- (7) Reassemble positioner (refer to para 5-19b).

5-22. AZIMUTH ASSEMBLY WIRING HARNESS REMOVAL AND REPLACEMENT

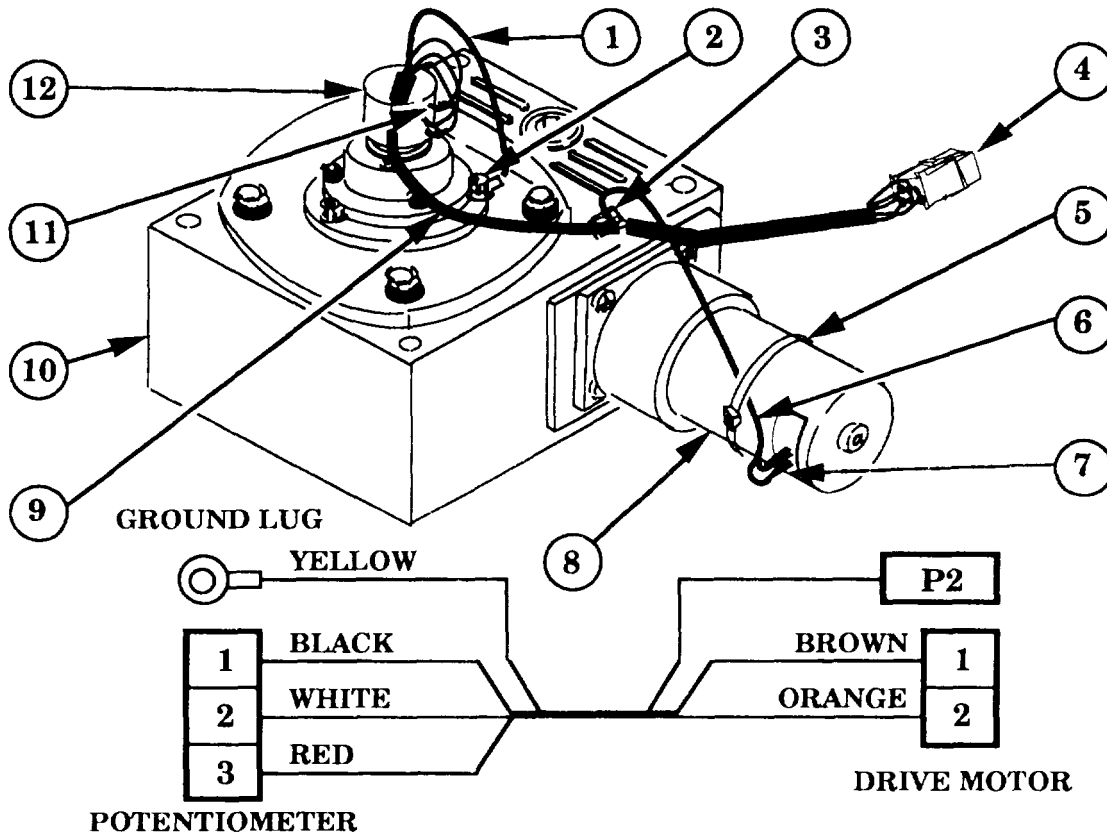
a. Removal



- (1) Disassemble positioner (refer to para 5-19a).
- (2) Remove azimuth actuator (refer to para 5-23a, step 2).
- (3) Disconnect P2 (4) from J2 by squeezing tabs on P2.
- (4) Using diagonal cutting pliers, remove cable ties (3) and (5) securing wiring harness (9) to azimuth actuator (10).
- (5) Using knife, carefully remove heat shrink sleeve (7) from two wires (6) at drive motor (8) and three wires (11) at potentiometer (12).
- (6) Desolder two wires (6) at drive motor (8) and three wires (11) at potentiometer (12).
- (7) Using 7/64-inch hex key, remove hex head screw (2) securing ground wire (1) to azimuth actuator (10).

5-22. AZIMUTH ASSEMBLY WIRING HARNESS REMOVAL AND REPLACEMENT - Continued

b. Replacement



- (1) Cut five 1/2-inch sections of heat shrink sleeve and slide over five wires (6) and (11).

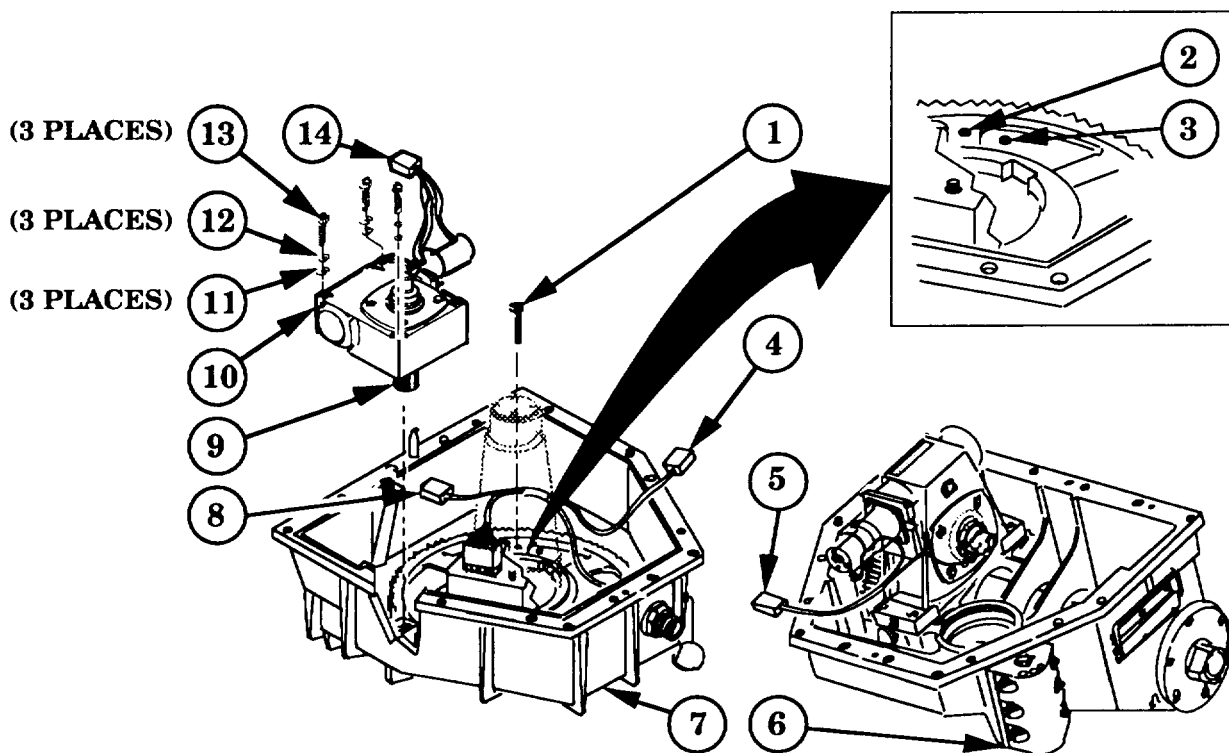
NOTE

Solder wires to terminals on drive motor and potentiometer as shown in diagram.

- (2) Solder two wires (6) to terminals on drive motor (8) and three wires (11) to terminals on potentiometer (12).
- (3) Slide heat shrink sleeve (7) over terminals on drive motor (8) and potentiometer (12) and use heat gun to shrink all sleeves.
- (4) Insert hex head screw (2) through lug on ground wire (1) and install on azimuth actuator (10). Tighten hex head screw (2) with 7/64-inch hex key.
- (5) Replace cable ties (3) and (5) securing wiring harness (9) to azimuth actuator (10) and use diagonal cutting pliers to trim excess cable tie material.
- (6) Observe keying and connect P2 (4) to J2.
- (7) Replace azimuth actuator (refer to para 5-23b, steps 2 thru 15).
- (8) Reassemble positioner (refer to para 5-19b).

5-23. AZIMUTH ACTUATOR REMOVAL AND REPLACEMENT**a. Removal**

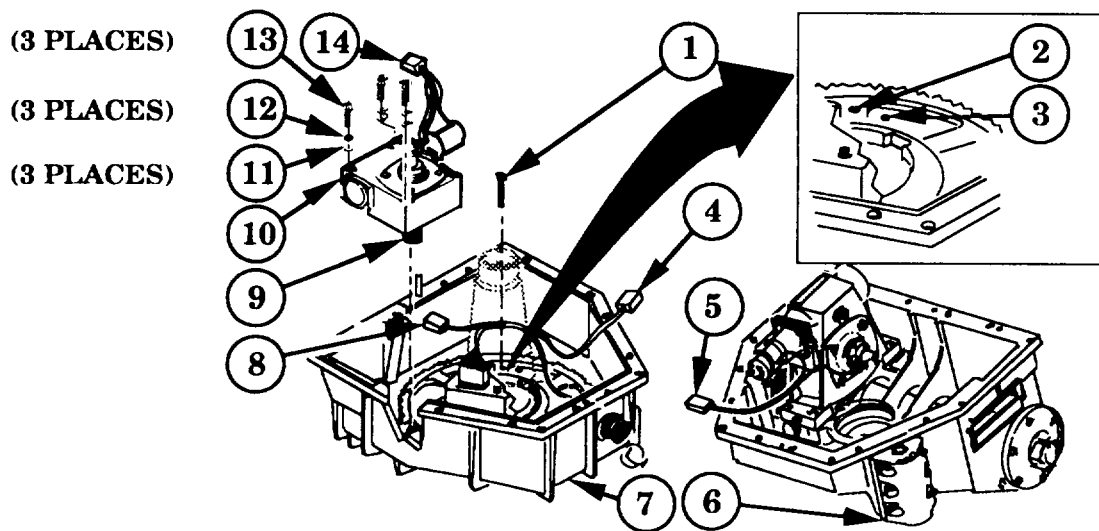
- (1) Disassemble positioner (refer to para 5-19a).
- (2) Using 3/16-inch hex key, remove three hex head screws (13), lock washers (12), and flat washers (11) securing actuator (10) to azimuth assembly (7).
- (3) Disconnect J2 (8) from azimuth assembly wiring harness at P2 (14).
- (4) Remove azimuth assembly wiring harness (refer to para 5-22a).
- (5) Remove azimuth actuator (10) from azimuth assembly (7).

**b. Replacement**

- (1) Replace azimuth assembly wiring harness (refer to para 5-22b).
- (2) Position azimuth gear (9) so that alignment hole (2) is directly over zero reference hole (3).
- (3) Using 9/64-inch hex key, insert one hex head screw (1), removed from bottom of lightning rod mount (6), into alignment hole (2) and zero reference hole (3).
- (4) Observe keying and connect P4 (5) to positioner wiring harness at J4 (4).

5-23. AZIMUTH ACTUATOR REMOVAL AND REPLACEMENT - Continued

b. Replacement - Continued



(3 PLACES)

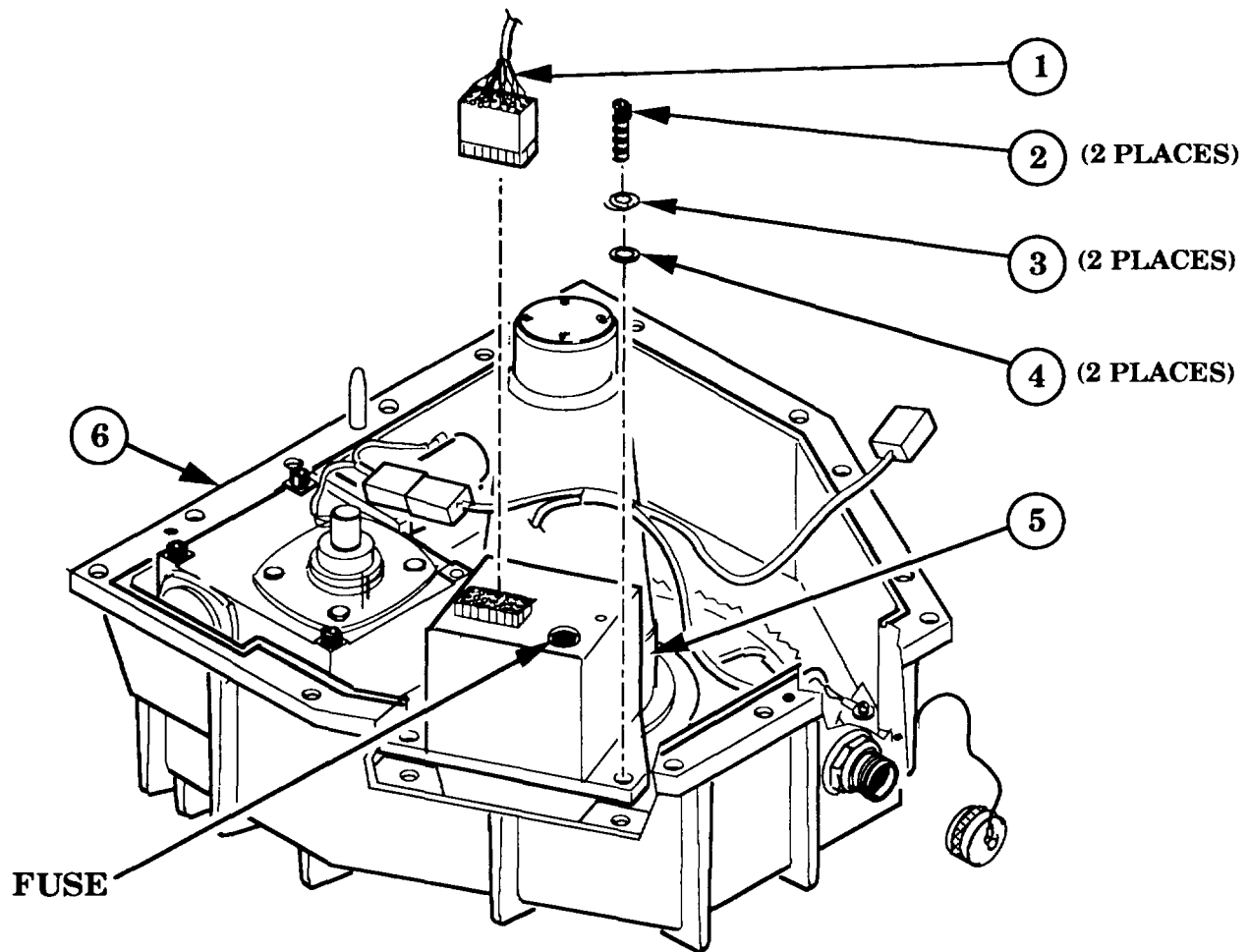
(3 PLACES)

(3 PLACES)

- (5) Connect end of cable assembly W1 labelled TO POSITIONER to positioner connector J1. Connect end of W1 labelled TO CONTROLLER to controller connector J1.
- (6) Connect one end of cable assembly W2 to controller connector J2 and other end to 115 V ac 60 Hz power source.
- (7) Set controller ON/OFF switch to ON position.
- (8) Press and hold controller CW or CCW pushbutton until controller azimuth indication is zero.
- (9) Set controller ON/OFF switch to OFF position.
- (10) Disconnect cable assembly W2 from 115 V ac 60 Hz power source.
- (11) Disconnect cable assembly W2 from controller connector J2.
- (12) Disconnect cable assembly W1 from controller connector J1 and positioner connector J1.
- (13) Disconnect P4 (5) on elevation assembly from positioner wiring harness at J4 (4).
- (14) Place lock washer (12) and flat washer (11) on each of three hex head screws (13). Insert screws through azimuth actuator (10) and secure to azimuth assembly (7) using 3/16-inch hex key.
- (15) Using 9/64-inch hex key, remove one hex head screw (1) from alignment hole (2) and zero reference hole (3). Return hex head screw to threaded hole in bottom of lightning rod mount (6) and secure with hex key.
- (16) Reassemble positioner (refer to para 5-19b).

5-24. MOTOR DRIVE ASSEMBLY REMOVAL AND REPLACEMENT**a. Removal**

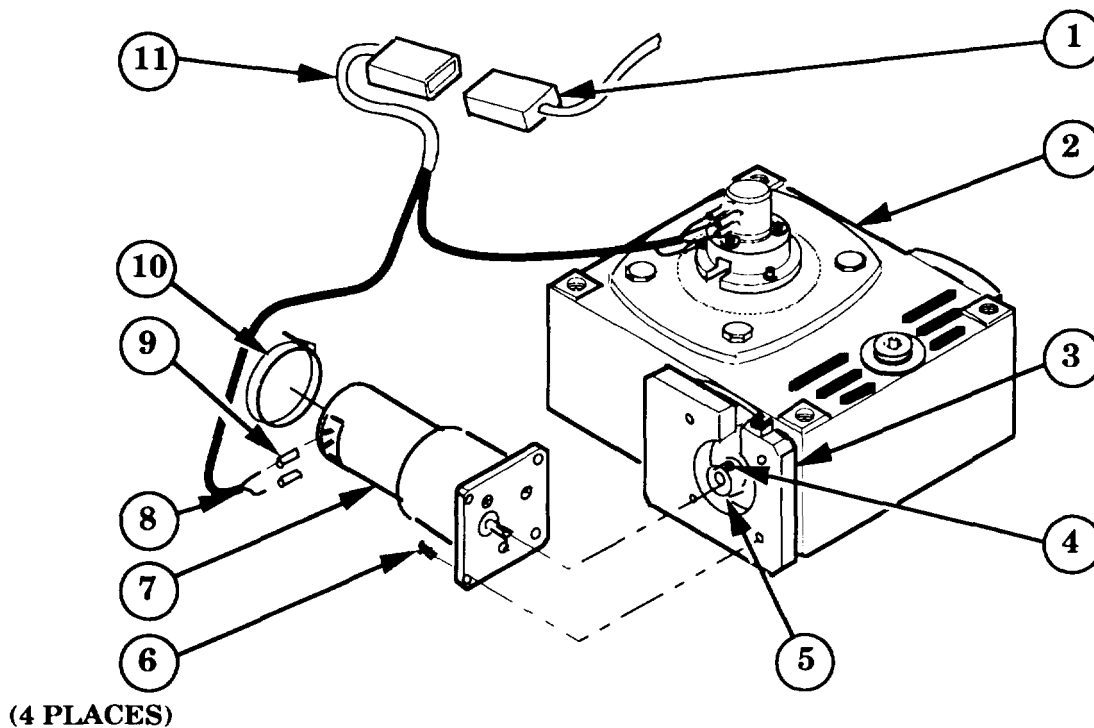
- (1) Disassemble positioner (refer to para 5-19a).
- (2) On connector P1 (1), squeeze tabs and disconnect from motor drive assembly (5).
- (3) Using 9/64-inch hex key, remove two hex head screws (2), lock washers (3), and flat washers (4) securing motor drive assembly (5) to azimuth assembly (6). Remove motor drive assembly (5).

**b. Replacement**

- (1) Position replacement motor drive assembly (5) in azimuth assembly (7).
- (2) Using 9/64-inch hex key, insert two hex head screws (2), lock washers (3), and flat washers (4) through motor drive assembly (5) mounting flange. Tighten two screws.
- (3) Observe keying and connect P1 (1) to motor drive assembly (5).
- (4) Reassemble positioner (refer to para 5-19b).

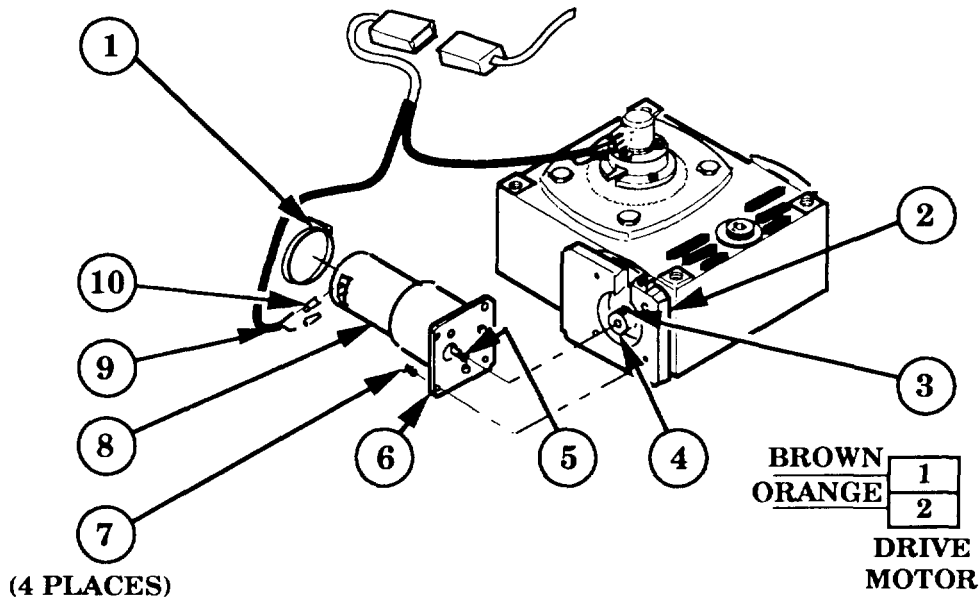
5-25. AZIMUTH ACTUATOR DRIVE MOTOR REMOVAL AND REPLACEMENT**a. Removal**

- (1) Disassemble positioner (refer to para 5-19a).
- (2) Remove azimuth actuator (2) (refer to para 5-23a, step 2).
- (3) Disconnect P2 (11) from positioner connector J2 (1).
- (4) Using diagonal cutting pliers, remove cable tie (10).
- (5) Using 9/64-inch hex key, remove four hex head screws (6) securing drive motor (7) to mounting bracket (3).
- (6) Using knife, carefully remove heat shrink sleeve (9) from two wires (8) at drive motor (7).
- (7) Desolder two wires (8) at drive motor (7).
- (8) Rotate drive motor (7) until set screw (4) is visible through slot in mounting plate (3).
- (9) Using 3/32-inch hex key, loosen set screw (4).
- (10) Pull drive motor (7) from azimuth actuator coupling (5).



5-25. AZIMUTH ACTUATOR DRIVE MOTOR REMOVAL AND REPLACEMENT - Continued

b. Replacement



- (1) Position replacement drive motor (8) on mounting bracket (2) so that drive motor shaft (5) rests in azimuth actuator coupling (4).
- (2) Using 3/32-inch hex key, tighten set screw (3) on azimuth actuator coupling (4).
- (3) Rotate drive motor (8) to align holes in mounting flange (6) with holes in mounting plate (2).
- (4) Insert four hex head screws (7) through holes in mounting flange (6) into threaded holes in mounting plate (2).
- (5) Using 9/64-inch hex key, tighten four hex head screws (7).
- (6) Cut two 1/2-inch sections of heat shrink sleeve and place over two wires (9).
- (7) Solder wires (9) to terminals on drive motor (8) as shown in diagram.
- (8) Slide heat shrink sleeves (10) over terminals on drive motor (8), and use heat gun to shrink sleeves.
- (9) Secure wires (9) to drive motor (8) with cable tie (1). Cut excess cable tie material with diagonal cutting pliers.
- (10) Replace azimuth actuator (refer to para 5-23b).
- (11) Reassemble positioner (refer to para 5-19b).

5-26. AZIMUTH ACTUATOR POTENTIOMETER REMOVAL AND REPLACEMENT

a. Removal

- (1) Disassemble positioner (refer to para 5-19a).
- (2) Using knife, carefully remove heat shrink sleeve (11) from three wires (10) on azimuth actuator potentiometer (12).

NOTE

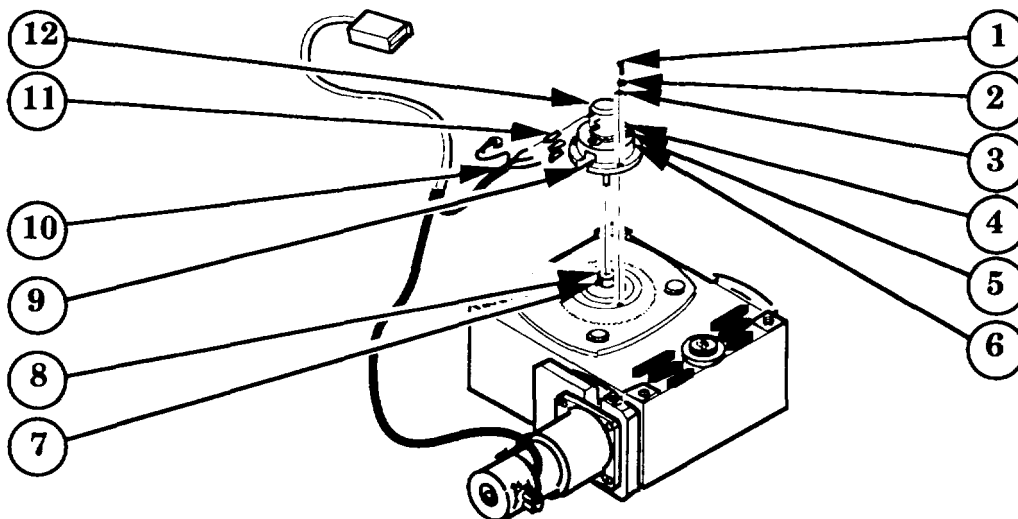
One of three hex head screws secures lug on yellow ground wire to potentiometer mounting plate.

- (3) Desolder three wires (10) attached to potentiometer (12).
- (4) Using 7/64-inch hex key, remove three hex head screws (1), lock washers (2), and flat washers (3) from potentiometer mounting plate (6).
- (5) Rotate potentiometer (12) until set screw (7) is visible through slot (9) in mounting plate (6).
- (6) Using flat-tip screwdriver, loosen set screw (7).
- (7) Using cross-tip screwdriver, loosen three screws (4) with clamp washers (5). Rotate clamp washers (5) so that flat side faces potentiometer (12).
- (8) Pull potentiometer (12) from actuator coupling (8).

NOTE

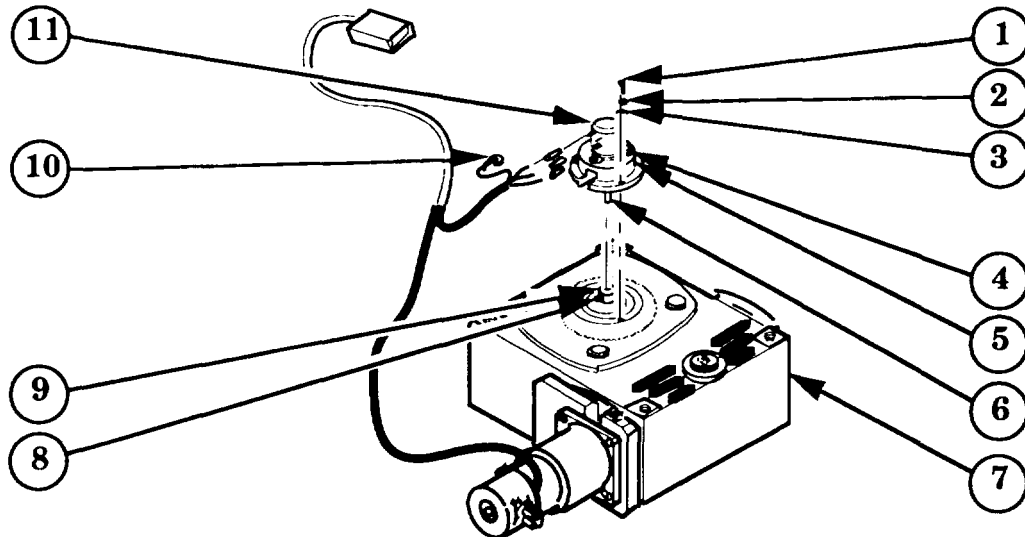
Azimuth actuator must be removed to ensure proper zero alignment of new azimuth actuator potentiometer.

- (9) Remove azimuth actuator (refer to para 5-23a, step 2).



5-26. AZIMUTH ACTUATOR POTENTIOMETER REMOVAL AND REPLACEMENT - Continued

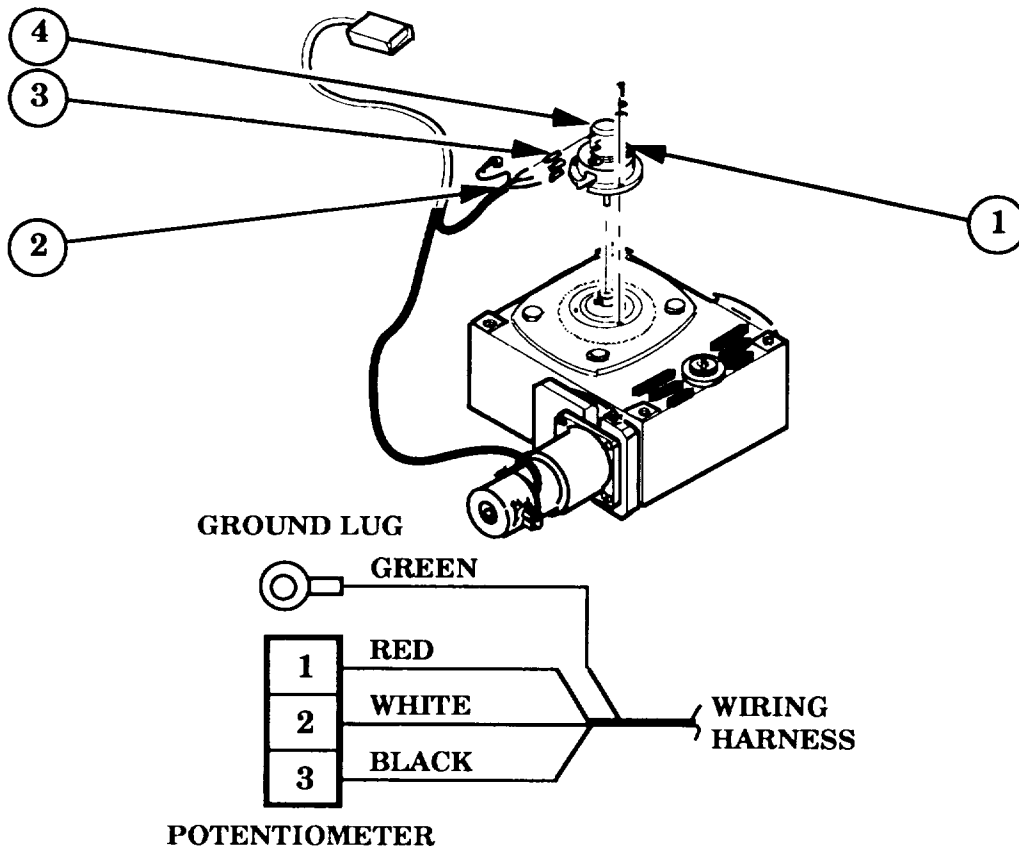
b. Replacement



- (1) Position replacement potentiometer (11) on actuator (7) so that potentiometer shaft (6) rests in actuator coupling (9). Rotate clamp washers (4) so that rounded side of washer mates with potentiometer (11).
- (2) Using flat-tip screwdriver, tighten set screw (8) on actuator coupling (9).
- (3) Rotate potentiometer (11) to align holes in mounting plate (5) with corresponding holes in actuator (7).
- (4) Install one hex head screw (1), lock washer (2), flat washer (3), and ground lug (10) through holes in actuator mounting plate (5). Install two hex head screws (1), lock washers (2), and flat washers (3) through holes in mounting plate (5) into actuator (7).
- (5) Using 7/64-inch hex key, tighten three hex head screws (1).
- (6) Replace azimuth actuator (refer to para 5-23b, steps 2 thru 15).

5-26. AZIMUTH ACTUATOR POTENTIOMETER REMOVAL AND REPLACEMENT - Continued

b. Replacement - Continued

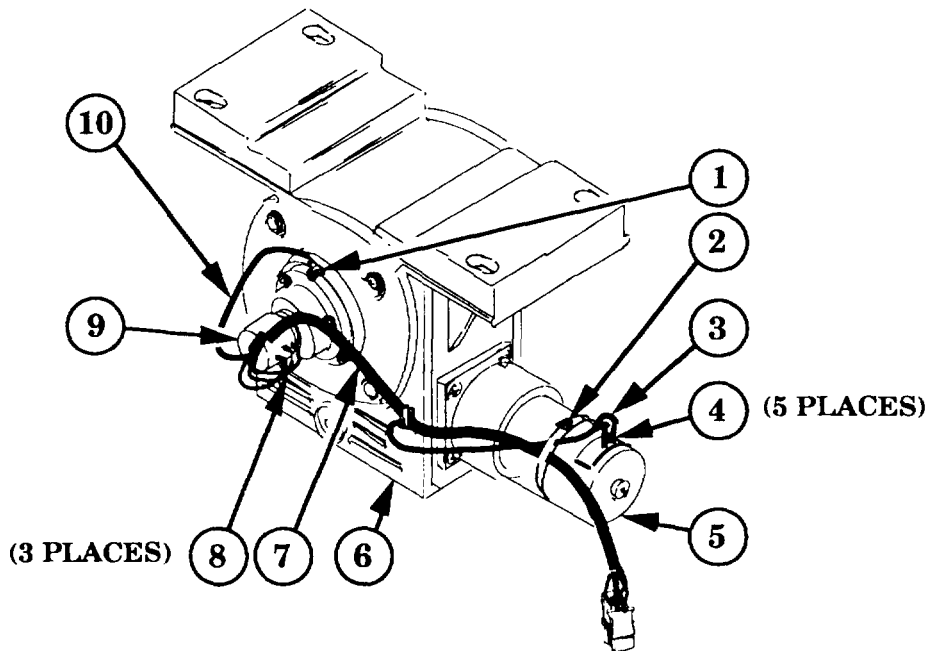


- (7) Measure resistance between pins 1 and 2 on potentiometer (4). Rotate potentiometer (4) to obtain a reading of 1 kK2 +50 I2.
- (8) Using cross-tip screwdriver, tighten three screws (1).
- (9) Cut three 1/2-inch sections of heat shrink sleeve and place one over each of three wires (2).
- (10) Solder three wires (2) to terminals on potentiometer (4) as shown in diagram.
- (11) Slide heat shrink sleeves (3) over terminals on potentiometer (4) and use heat gun to shrink sleeves.
- (12) Reassemble positioner (refer to para 5-19b).

5-27. ELEVATION ASSEMBLY WIRING HARNESS REMOVAL AND REPLACEMENT

a. Removal

- (1) Disassemble positioner (refer to para 5-19a).
- (2) Remove elevation actuator (refer to para 5-28a, steps 2 thru 4).
- (3) Using diagonal cutting pliers, remove cable tie (2) securing wiring harness (7) to elevation actuator (6).
- (4) Using knife, carefully remove heat shrink sleeve (4) from two wires (3) on drive motor (5) and three wires (8) on potentiometer (9).
- (5) Desolder two wires (3) at motor (5) and three wires (8) at potentiometer (9).
- (6) Using 7/64-inch hex key, remove hex head screw (1) securing ground wire (10) to elevation actuator (6).



5-27. ELEVATION ASSEMBLY WIRING HARNESS REMOVAL AND REPLACEMENT - Continued

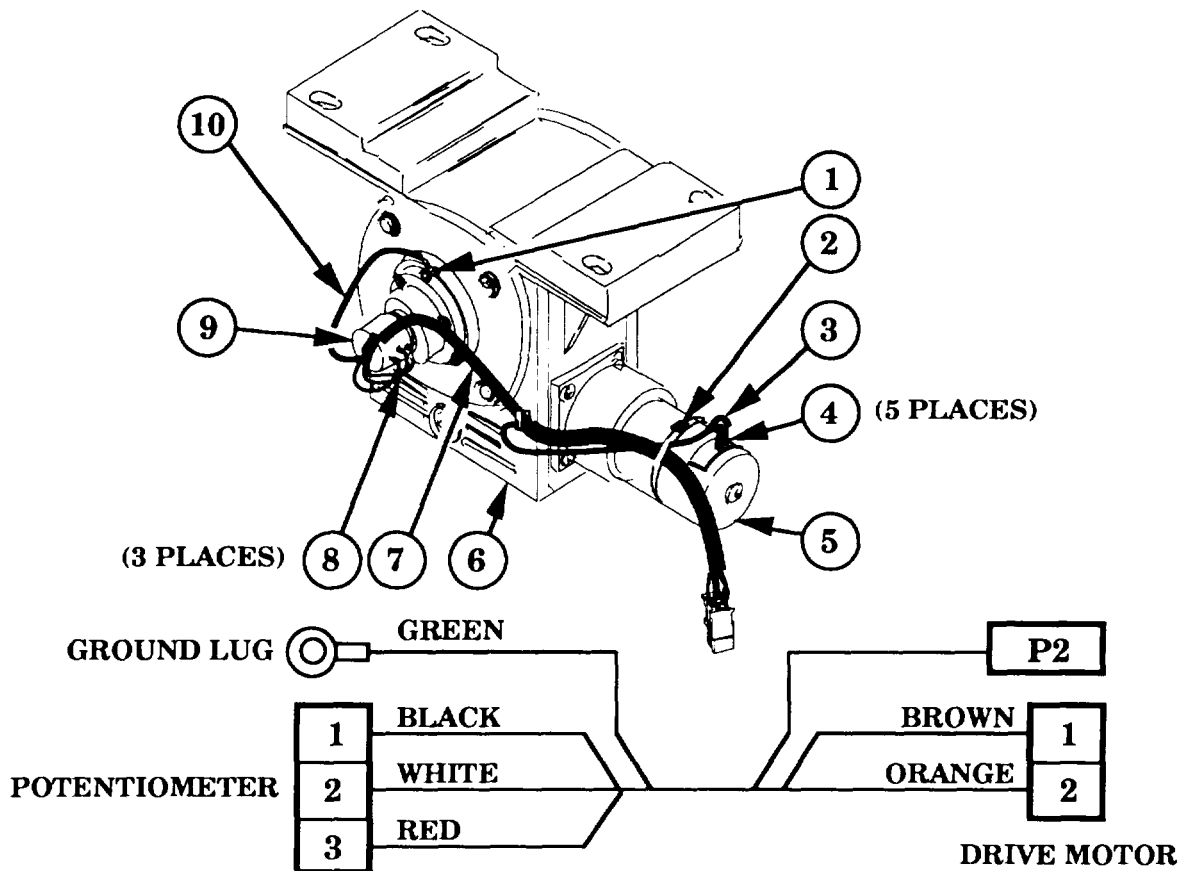
b. Replacement

- (1) Cut five 1/2-inch sections of heat shrink sleeve and place on wires.

NOTE

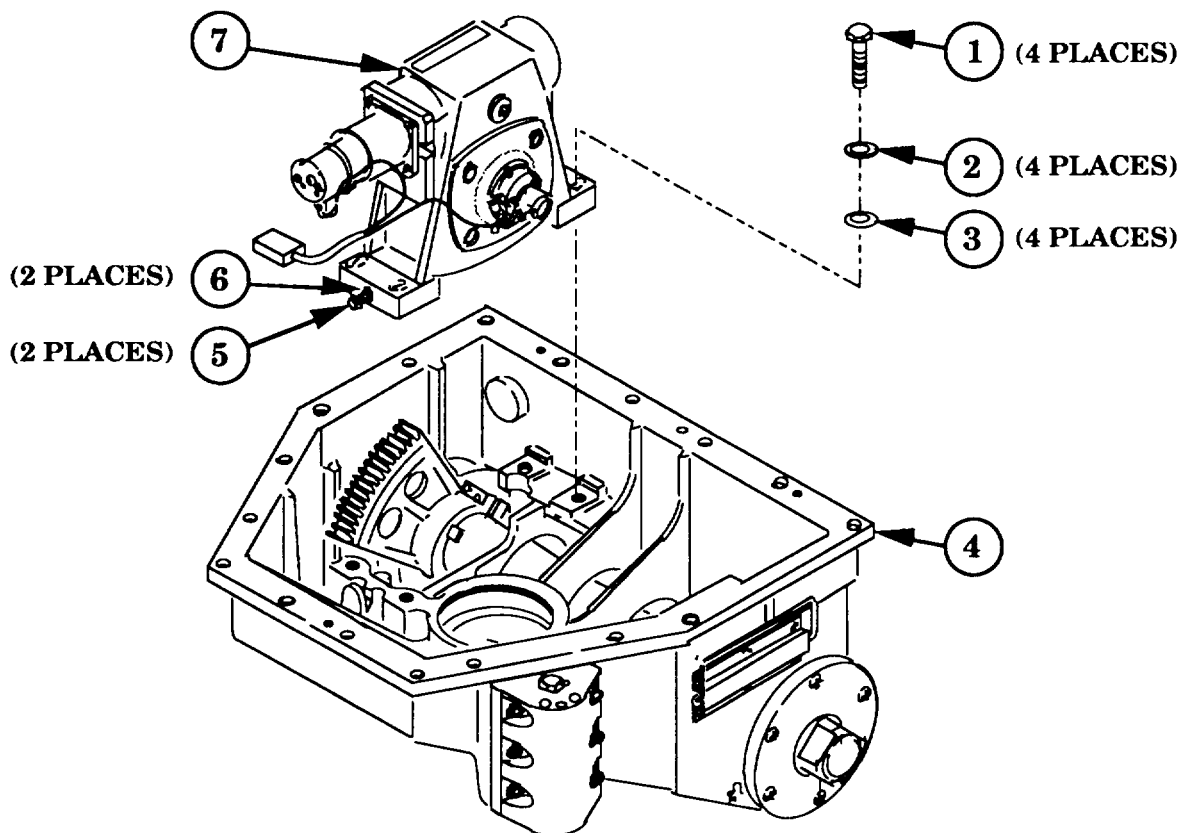
Solder wires to terminals on motor and potentiometer as shown in diagram.

- (2) Solder two wires (3) to terminals on drive motor (5) and three wires (8) to terminals on potentiometer (9).
- (3) Slide heat shrink sleeve (4) over terminals and use heat gun to shrink all sleeves.
- (4) Insert hex head screw (1) through lug on ground wire (10), and install on elevation actuator (6). Using 7/64-inch hex key, tighten hex head screw (1).
- (5) Place cable tie (2) over wiring harness (7) and around motor (5). Tighten cable tie (2) and trim excess with diagonal cutting pliers.
- (6) Replace elevation actuator (refer to para 5-28b, steps 2 thru 19).
- (7) Reassemble positioner (refer to para 5-19b).



5-28. ELEVATION DRIVE ACTUATOR REMOVAL AND REPLACEMENT**a. Removal**

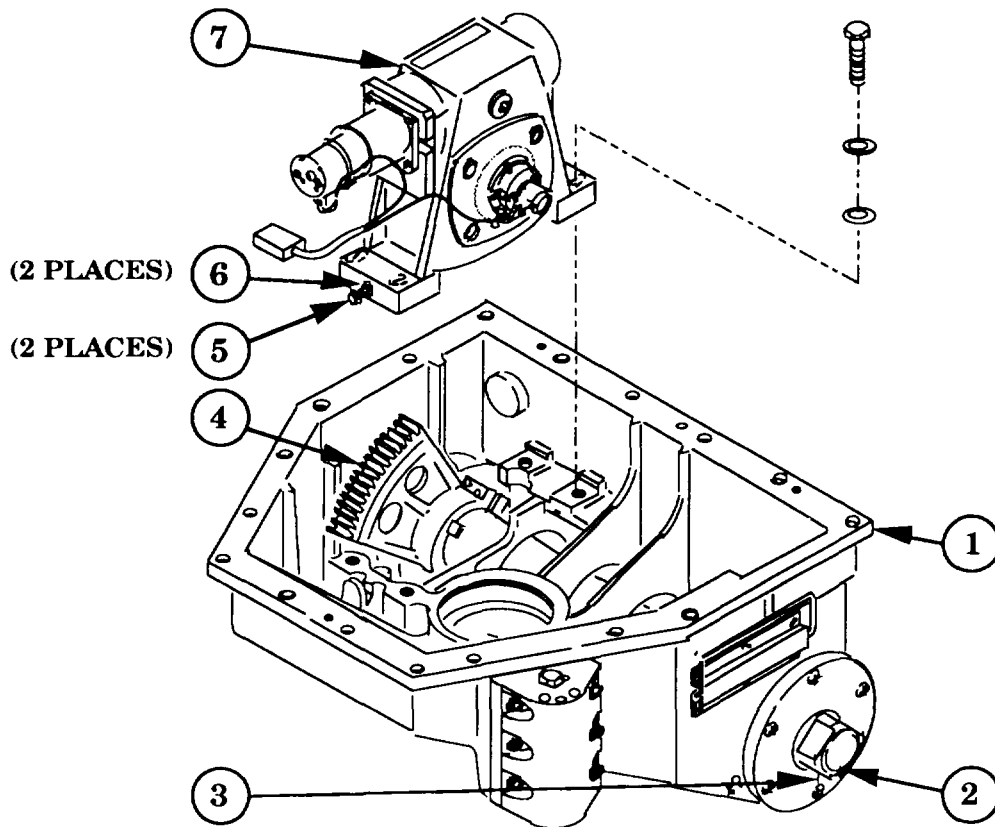
- (1) Disassemble positioner (refer to para 5-19a).
- (2) Using 7/16-inch open end wrench, loosen locking nuts (6) then loosen alignment bolts (5) at each end of actuator (7).
- (3) Remove elevation assembly wiring harness (refer to para 5-27a, steps 3 thru 6).
- (4) Using 1/2-inch socket with extension and ratchet, remove four mounting bolts (1), lock washers (2), and flat washers (3) securing actuator (7) to elevation assembly (4).
- (5) Remove actuator assembly from housing.

**b. Replacement**

- (1) Install wiring harness on replacement actuator (refer to para 5-27b).
- (2) Observe connector keying and connect positioner assembly wiring harness at J4 to elevation assembly connector P4.
- (3) Connect end of cable assembly W1 labelled TO POSITIONER to J1 of positioner. Connect end of W1 labelled TO CONTROLLER to J1 of controller.

5-28. ELEVATION DRIVE ACTUATOR REMOVAL AND REPLACEMENT - Continued

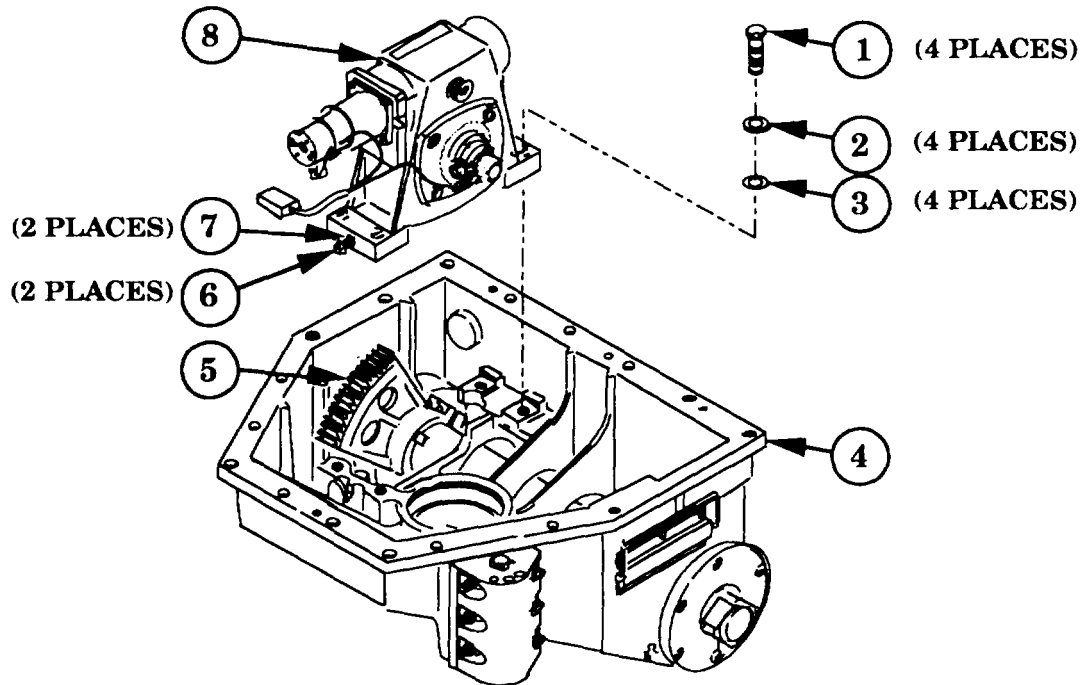
b. Replacement - Continued



- (4) Connect cable assembly W2 to controller connector J2 and 115 V ac 60 Hz power source.
- (5) Set controller ON/OFF switch to ON.
- (6) Press and hold controller UP or DOWN pushbutton until elevation display is zero.
- (7) Set controller ON/OFF switch to OFF.
- (8) Disconnect cable assembly W1 from positioner connector J1 and controller connector J1.
- (9) Disconnect W2 from controller connector J2 and 115 V ac 60 Hz power source.
- (10) Disconnect positioner wiring harness at J4 from elevation assembly at P4.
- (11) Loosen alignment lock nuts (6) and adjust alignment bolts (5) to properly position elevation actuator (7) in elevation assembly (1).
- (12) On elevation assembly (1), align elevation shaft zero position mark (2) with elevation assembly zero position mark (3) by rotating elevation segment gear (4).

5-28. ELEVATION DRIVE ACTUATOR REMOVAL AND REPLACEMENT - Continued

b. Replacement - Continued



- (13) Position elevation actuator (8) into elevation assembly (4) so that drive gear on actuator meshes with elevation gear segment (5).
- (14) Place lock washer (2) and flat washer (3) on each of four mounting bolts (1). Insert four mounting bolts through actuator (8) and secure to elevation assembly (4), finger tight.
- (15) Move elevation actuator (8) until actuator drive gear and elevation segment gear (5) mesh smoothly.
- (16) Using 1/2-inch socket with extension and ratchet, slightly increase tightness of four bolts (1).
- (17) Using 7/16-inch wrench, loosen locking nuts (7) and adjust alignment bolts (6) at each end of elevation assembly (4) until bolt heads are snug against elevation assembly and gears mesh smoothly.
- (18) Using 7/16-inch wrench, tighten locking nuts (7) against elevation actuator (8).
- (19) Using 1/2-inch socket with extension and torque wrench, tighten four bolts securing actuator (8) to elevation assembly to 90 inch-pounds.

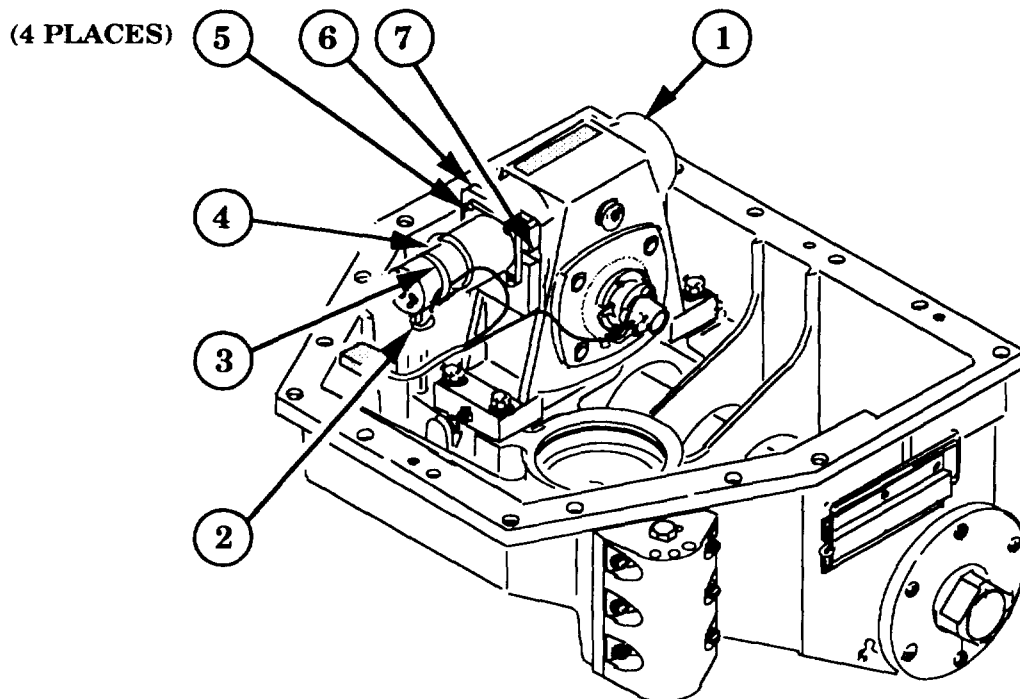
NOTE

Check that actuator drive gear and elevation segment gear mesh smoothly.

- (20) Reassemble positioner (refer to para 5-19b).

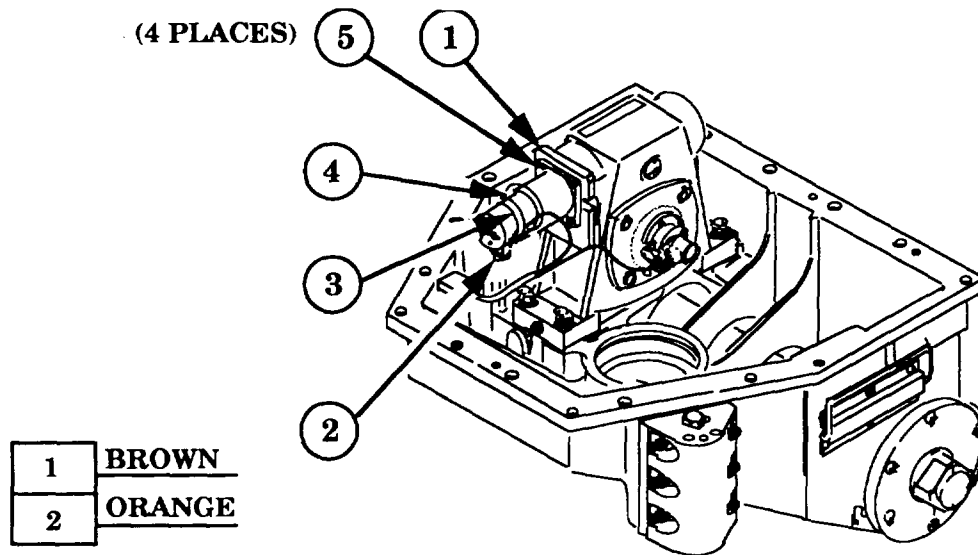
5-29. ELEVATION ACTUATOR DRIVE MOTOR REMOVAL AND RE PLACEMENT**a. Removal**

- (1) Disassemble positioner (refer to para 5-19a).
- (2) Cut cable tie wrap (3) securing two wires (2) to drive motor (4).
- (3) Using 9/64-inch hex key, remove four hex screws (5) securing drive motor (4) to mounting plate (6).
- (4) Using diagonal cutting pliers, cut two wires (2) as close to drive motor (4) as possible.
- (5) Rotate drive motor (4) until a set screw is visible in slot (7) on side mounting plate (6).
- (6) Using 3/32-inch hex key, loosen hex head set screw attaching drive motor (4) to elevation actuator (1). Remove drive motor.



5-29. ELEVATION ACTUATOR DRIVE MOTOR REMOVAL AND REPLACEMENT -
Continued

b. Replacement



- (1) Using wire stripper, remove 1/4-inch of insulation from two wires (2).
- (2) Cut two 1/2-inch sections of heat shrink sleeve and place sleeve over each wire.
- (3) Position replacement drive motor (4) on mounting plate (1) so that drive motor shaft rests in elevation actuator coupling.

NOTE

When installing motor into actuator coupling, be sure that flat side of motor shaft faces set screw.

- (4) Using 3/32-inch hex key, tighten hex head set screw securing drive motor shaft to elevation actuator coupling.
- (5) Solder two wires (2) to motor as shown in diagram.
- (6) Slide heat shrink sleeves over terminals and use heat gun to shrink sleeves installed in step 2.
- (7) Rotate drive motor (4) to align holes in mounting flange with mounting plate (1).
- (8) Insert four hex head screws (5) through drive motor mounting plate (1). Finger tighten hex head screws (5).
- (9) Using 9/64-inch hex key, tighten four hex head screws (5).
- (10) Secure two wires (2) to drive motor (4) with cable tie wrap (3). Using diagonal cutting pliers, cut excess cable tie wrap.
- (11) Reassemble positioner (refer to para 5-19b).

5-30. ELEVATION ACTUATOR POTENTIOMETER REMOVAL AND REPLACEMENT

a. Removal

- (1) Disassemble positioner (refer to para 5-19a).
- (2) Using knife, carefully remove heat shrink sleeve from three wires (7) on elevation actuator potentiometer (6).
- (3) Desolder three wires (7) attached to elevation actuator potentiometer (6).

NOTE

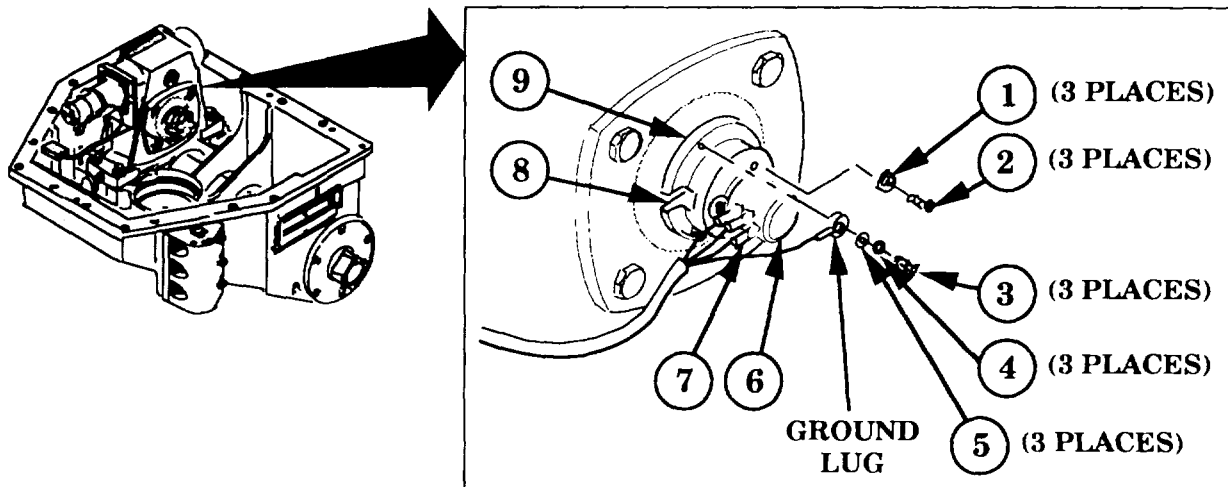
One of three hex head screws secures lug on yellow ground wire to potentiometer mounting plate.

- (4) Using 7/64-inch hex key, remove three hex head screws (3), lock washers (4), and flat washers (5) from potentiometer mounting plate (9).
- (5) Rotate potentiometer mounting plate (9) until potentiometer shaft set screw is visible through set screw access slot (8).
- (6) Using flat-tip screwdriver, loosen set screw.
- (7) Using cross-tip screwdriver, loosen three screws (2) with clamp washers (1). Rotate clamp washers so that flat side faces potentiometer (6). Remove potentiometer.

NOTE

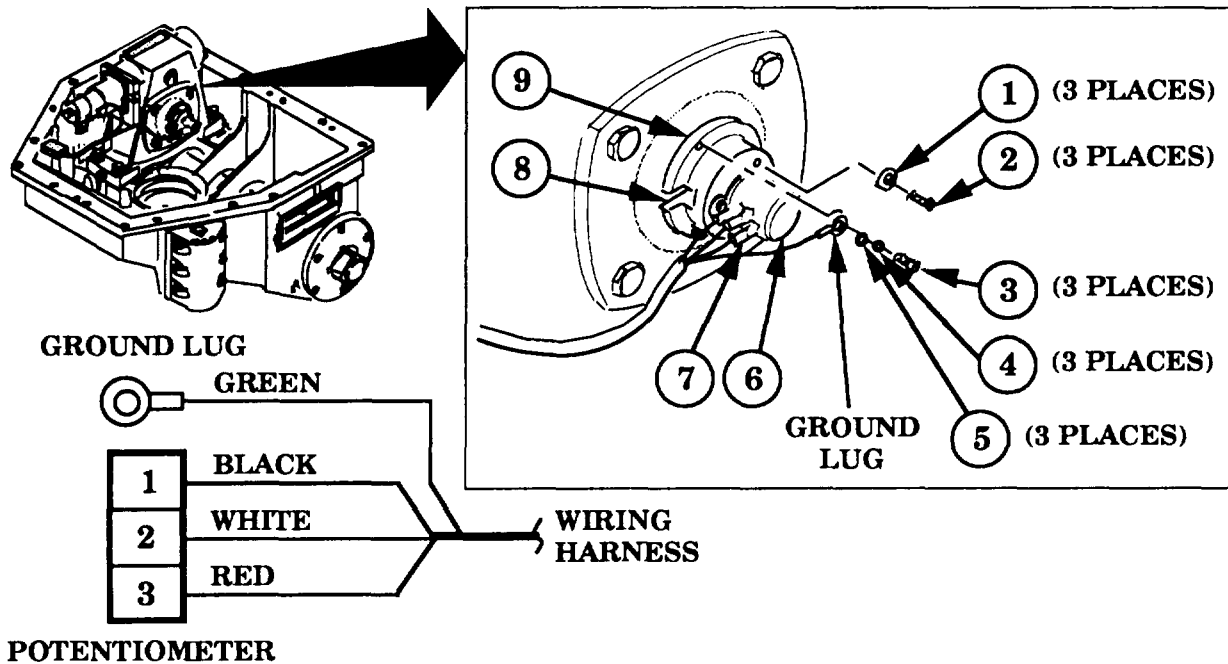
Elevation actuator must be removed to ensure proper zero alignment of new elevation actuator potentiometer.

- (8) Remove elevation actuator (refer to para 5-28a, steps 2 and 3).



5-30. ELEVATION ACTUATOR POTENTIOMETER REMOVAL AND REPLACEMENT -Continued

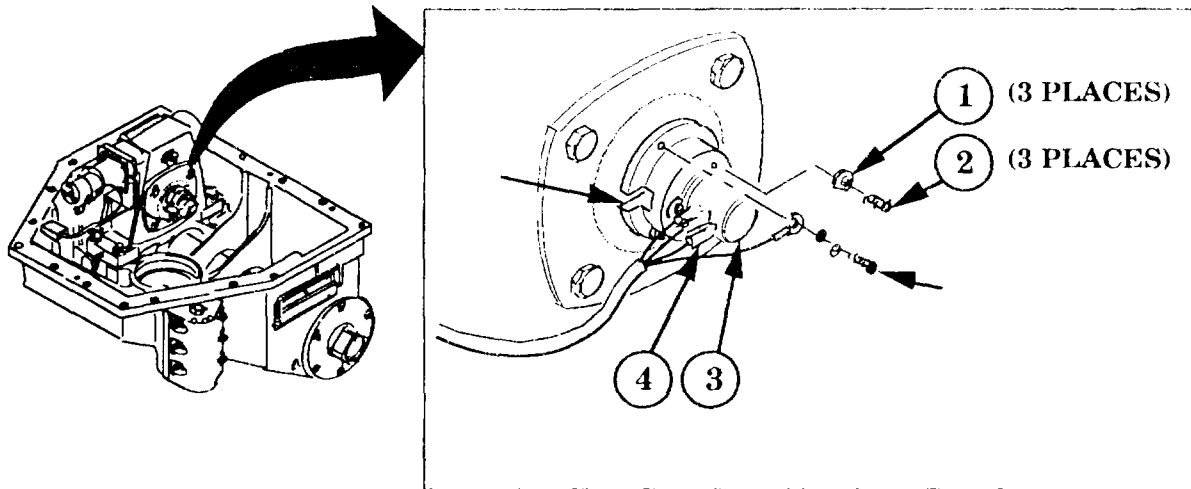
b. Replacement



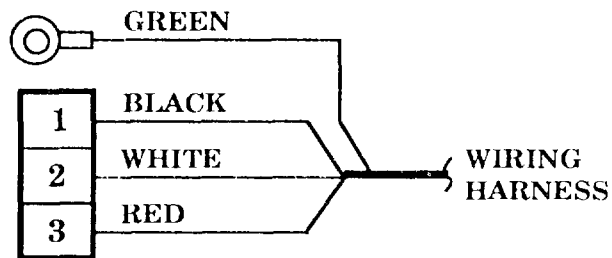
- (1) Position replacement potentiometer (7) on potentiometer mounting plate (9).
- (2) Rotate clamp washers (1) so that rounded side of washer mates with potentiometer (7).
- (3) Using flat-tip screwdriver, tighten potentiometer shaft set screw, visible through set screw access slot (8).
- (4) Rotate potentiometer mounting plate (9) to align screw holes and install two hex head screws (3), lock washers (4), and flat washers (5) in mounting plate (9). Install one hex head screw (3), lock washer (4), flat washer (5), and ground lug (6) in mounting plate (9). Using 7/64-inch hex key, tighten three hex head screws (3).
- (5) Replace elevation actuator (refer to para 5-28b, steps 2 thru 19).

5-30. ELEVATION ACTUATOR POTENTIOMETER RELRIOVAL, AND) REEI'LACEMENT -Continued

b. Replacement - Continued



GROUND LUG

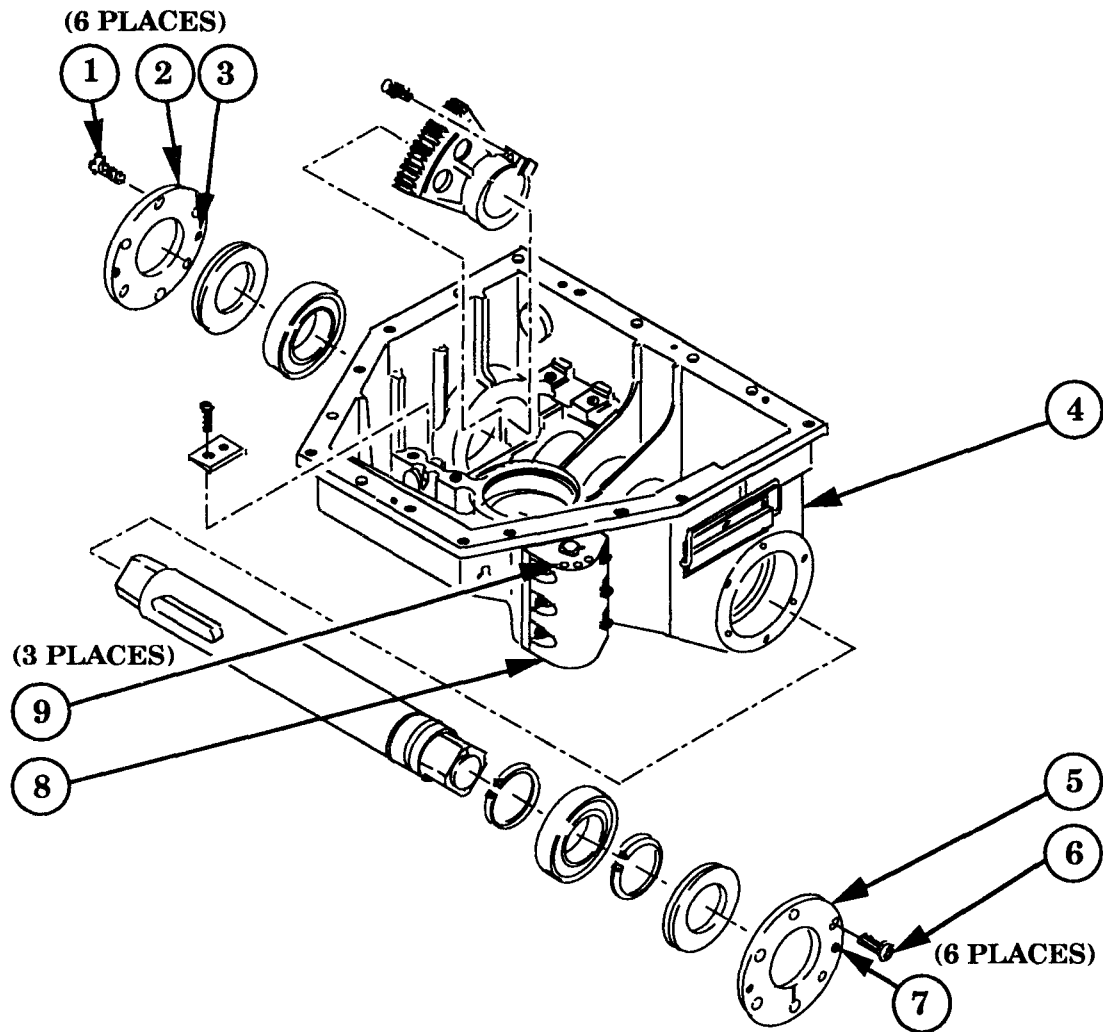


POTENTIOMETER

- (6) Measure resistance between pins 1 and 2 on potentiometer (3). Rotate potentiometer to obtain a reading of 1K 52 +50 52 between pins 1 and 2.
- (7) Rotate clamp washer (1) so that rounded side of washer mates with potentiometer.
- (8) Using cross-tip screwdriver, tighten three screws (2).
- (9) Cut three 1/2-inch sections of heat shrink sleeving and place one section over each of three wires (4).
- (10) Observe wiring diagram and solder three wires (4) to potentiometer (3).
- (11) Slide heat shrink sleeving over terminals on potentiometer (3) and use heat gun to shrink sleeves.
- (12) Reassemble positioner (refer to para 5-19b).

5-31. ELEVATION BEARING ASSEMBLY REMOVAL AND REPLACEMENT

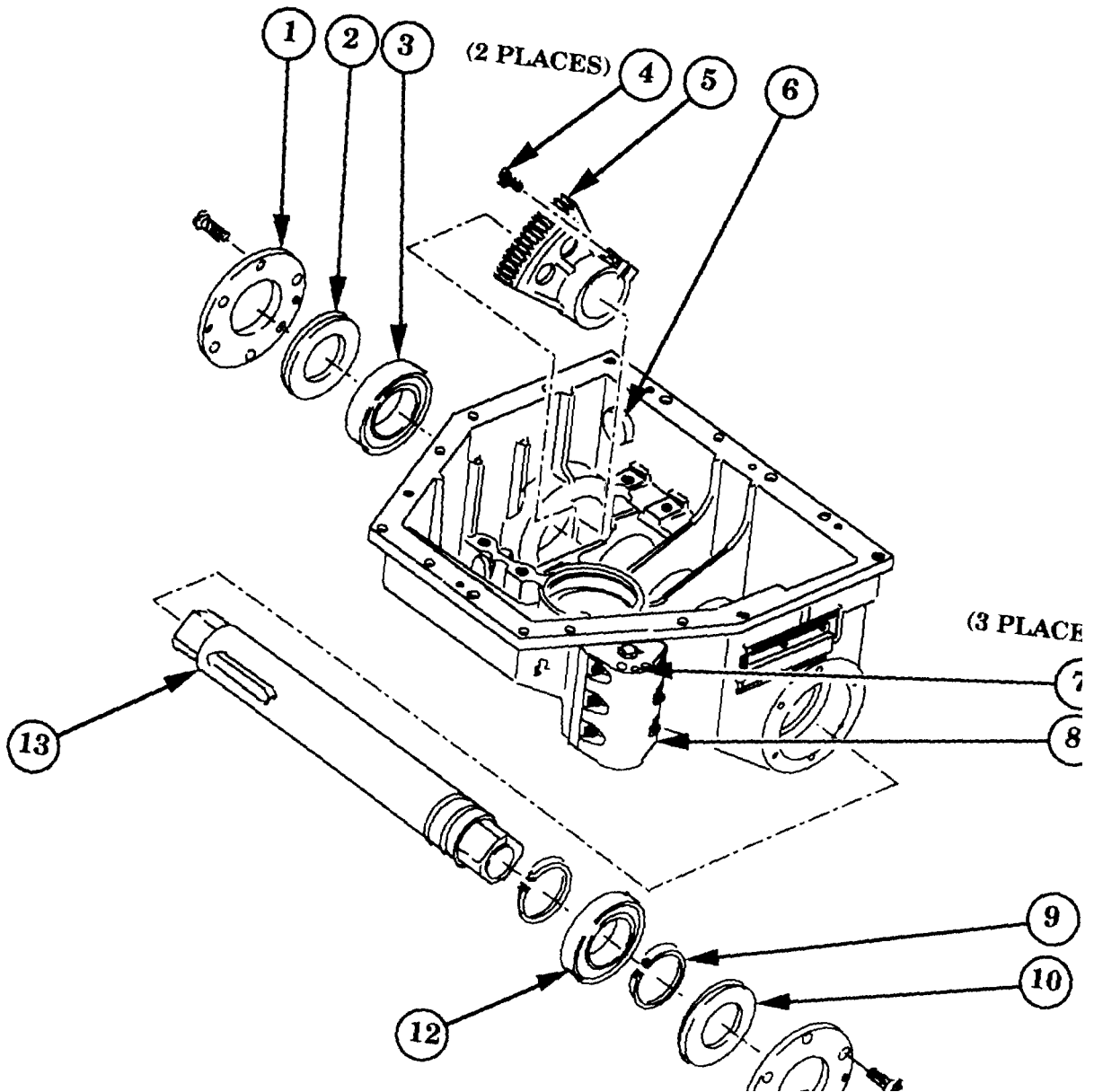
a. Removal



- (1) Disassemble positioner (refer to para 5-19a).
- (2) Remove elevation actuator (refer to para 5-28a, steps 2 and 3).
- (3) Using cross-tip screwdriver, remove 12 screws (1 and 6) securing bearing covers (2 and 5) at each end of elevation assembly (4).
- (4) Using 9/64-inch hex key, remove two hex head screws (9) from lightning rod mount (8).
- (5) Insert two hex head screws (9) into threaded holes (3 and 7) in bearing covers (2 and 5).
- (6) Using 9/64-inch hex key, turn each of 12 screws (1 and 6) approximately one complete revolution. Continue until bearing covers (2 and 5) are loosened from elevation assembly.

5-31. ELEVATION BEARING ASSEMBLY REMOVAL AND REPLACEMENT

a. Removal - Continued



5-31. ELEVATION BEARING ASSEMBLY REMOVAL AND REPLACEMENT - Continued**a. Removal - Continued**

- (7) Using 9/64-inch hex key, remove two hex head screws (7) from bearing cover (1 and 11). Install screws (7) in lightning rod mount (8).
- (8) Remove bearing covers (1 and 11) with attached oil seals (2 and 10) from elevation shaft (13).
- (9) Using 5/16-inch hex key, loosen two hex head screws (4) securing elevation segment gear (5) to elevation shaft (13).

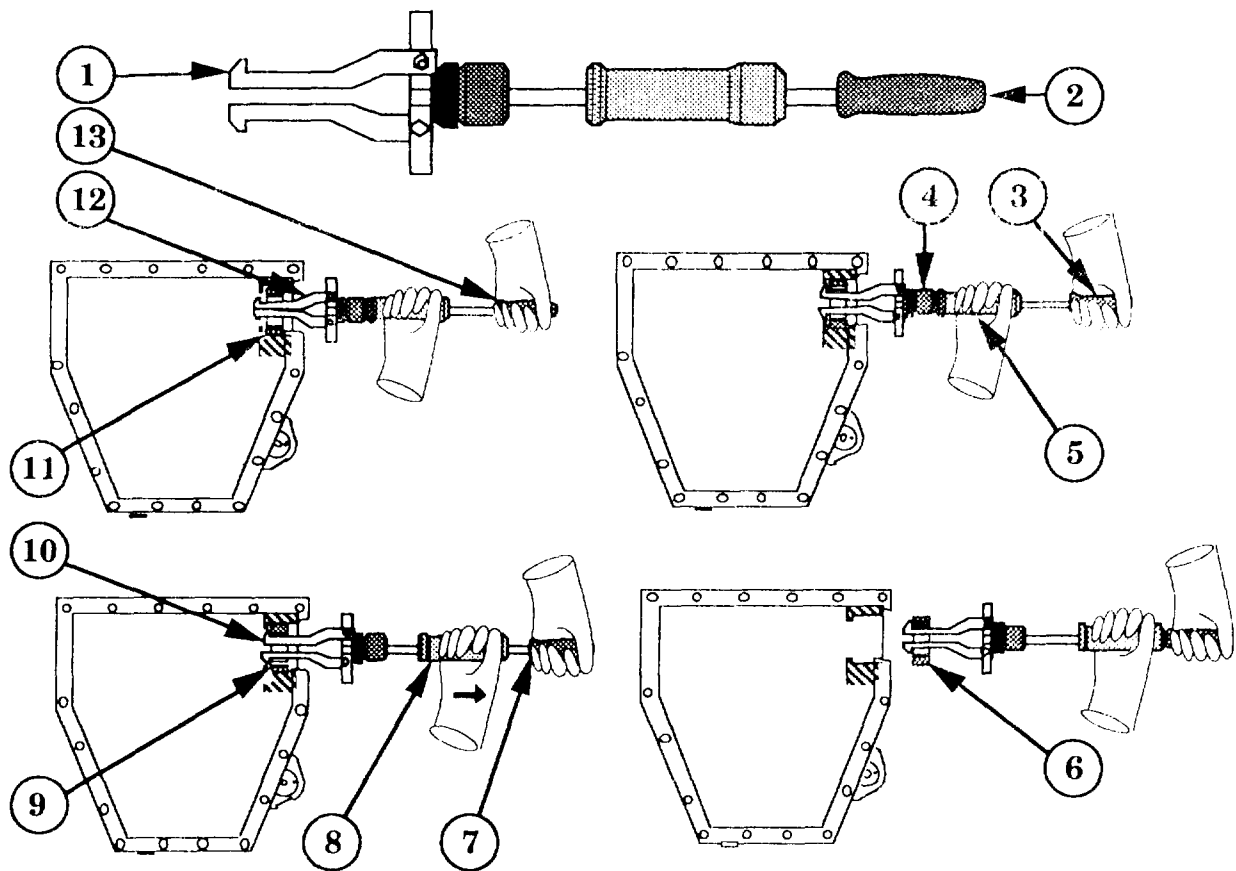
WARNING

Wear eye protection when removing retaining rings. Failure to comply may result in personal injury.

- (10) Open handles of retaining ring pliers fully by squeezing handle trigger repetitively and pulling handles apart. Insert two prongs at nose of pliers into two holes in ends of retaining ring (9). Squeeze handles together to open retaining ring. Using retaining ring pliers, remove retaining ring (9) from end of elevation shaft (13).
- (11) At end of elevation shaft (13) from which retaining ring (9) was removed, use plastic hammer and tap elevation shaft until bearing (3) can be removed from opposite end of elevation shaft.
- (12) Using ball peen hammer, tap bearing (12) to remove bearing from elevation shaft (13).

5-31. ELEVATION BEARING ASSEMBLY REMOVAL AND REPLACEMENT - Continued

a. Removal - Continued



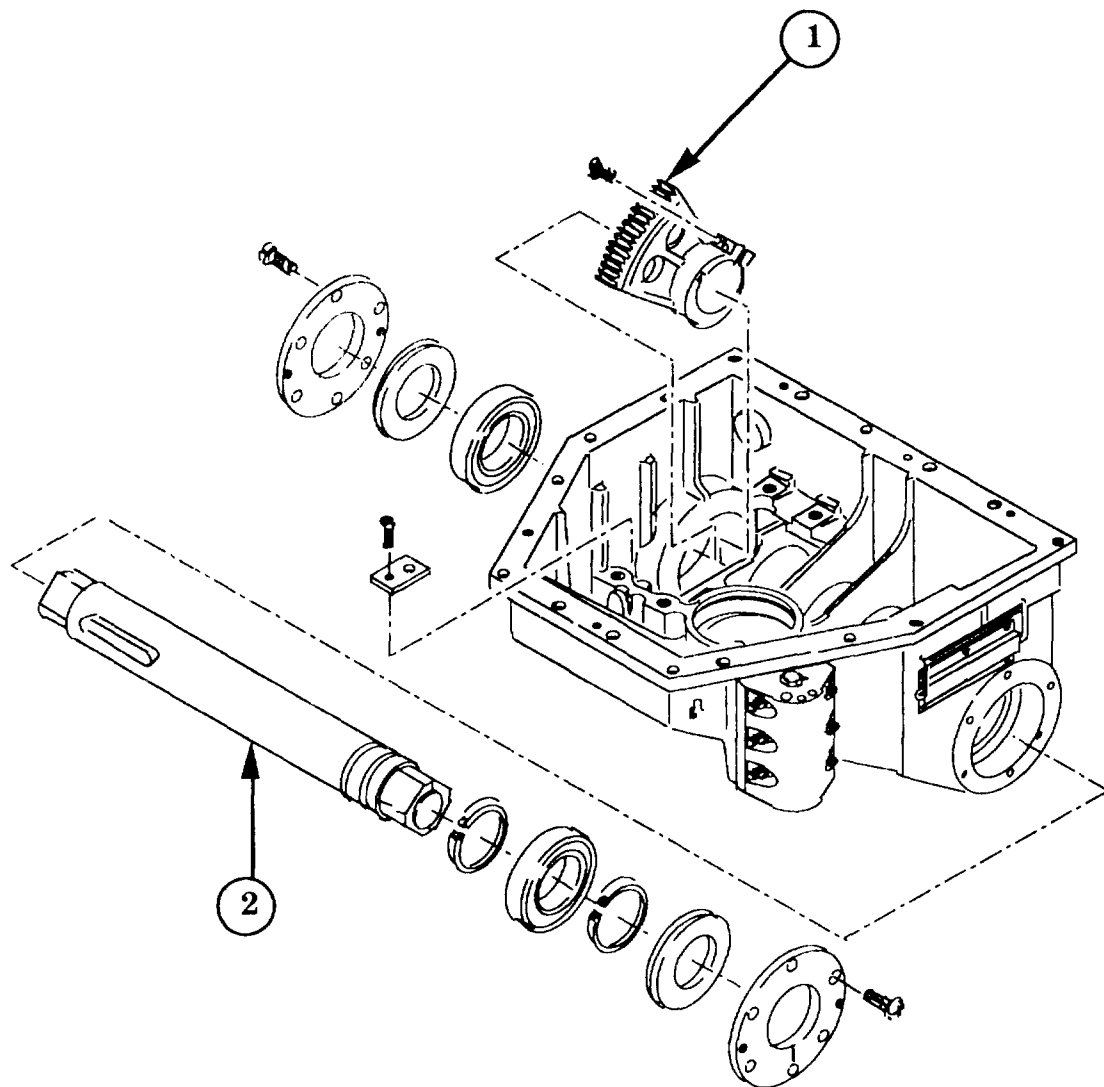
(13) Assemble bearing puller (2) with two jaws (1) set for internal grip.

(14) Insert bearing puller jaws (12) into elevation bearing (11) while holding handle (13) straight outward from elevation bearing (11).

(15) Continue to support handle (3) while moving slide hammer (5) to stop (4).

(16) Check that jaws (10) are still engaged with elevation bearing (9) and continue to hold outward on handle (7). Move slide hammer (8) outward sharply to impact handle (7).

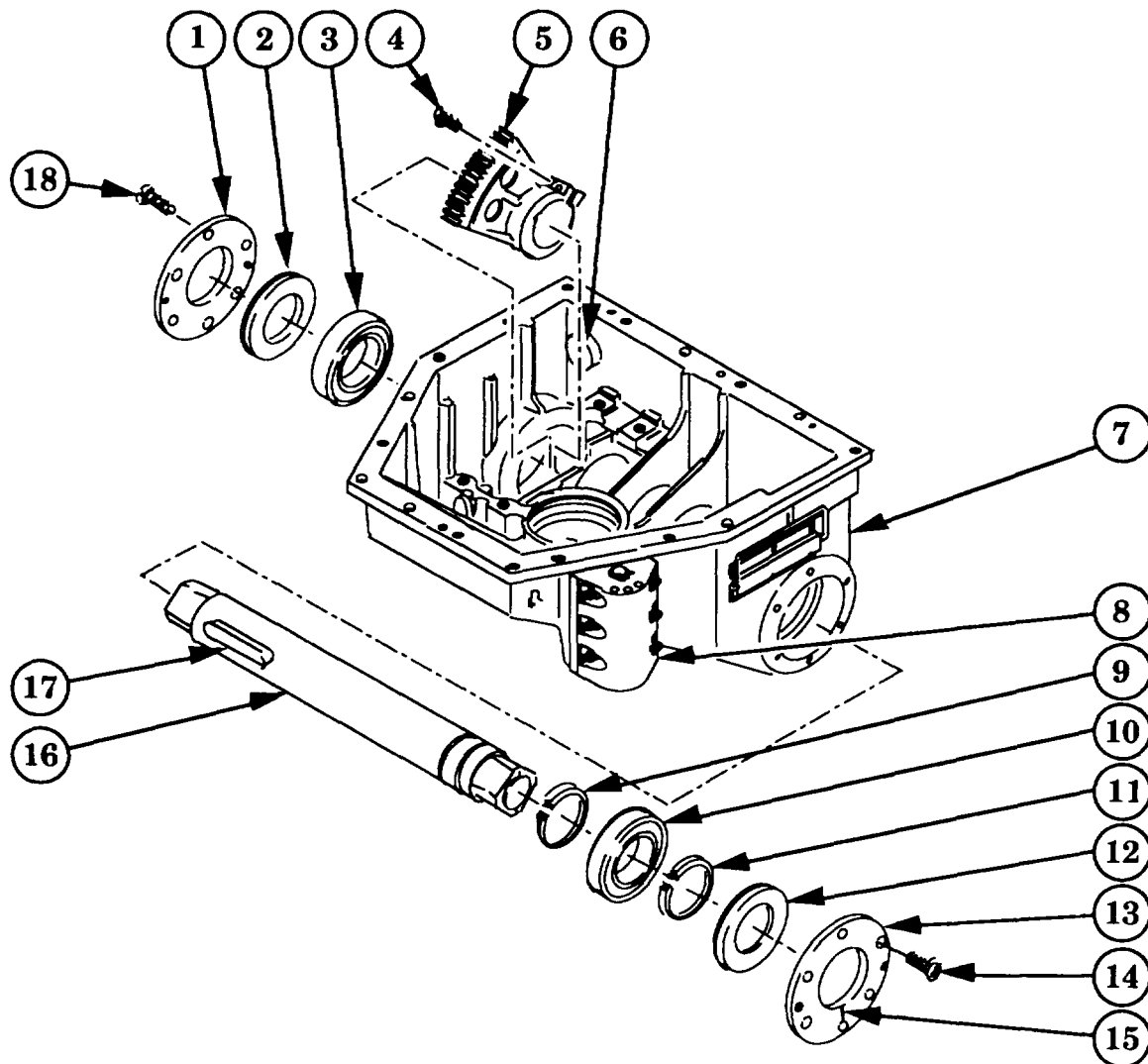
(17) Repeat steps 15 and 16 until elevation bearing (6) is removed.

5-31. ELEVATION BEARING ASSEMBLY REMOVAL AND REPLACEMENT - Continued**a. Removal - Continued**

- (18) Using plastic hammer, drive elevation shaft (2) from elevation assembly through opening opposite elevation gear (1) until elevation gear is free of elevation shaft.

5-31. ELEVATION BEARING ASSEMBLY REMOVAL AND REPLACEMENT - Continued

b. Replacement



- (1) Place elevation shaft (16) into elevation assembly (7) so that key (17) on elevationshaft is positioned opposite lightning rod mount (8).
- (2) Place elevation segment gear (5) in elevation assembly (7).
- (3) Rotate elevation shaft (16) to align key (17) with key way in elevation segment gear (5) and slide elevation gear onto elevation shaft (16).

5-31. ELEVATION BEARING ASSEMBLY REMOVAL AND REPLACEMENT - Continued**b. Replacement - Continued**

- (4) Place bearing (10) over end of elevation shaft (16). Slide bearing (10) into elevation assembly (7) until bearing (10) is fully seated against retaining ring (9).
- (5) Place bearing (3) over end of elevation shaft (16), opposite bearing installed in step 4, press bearing (3) into elevation assembly (7) until fully seated.

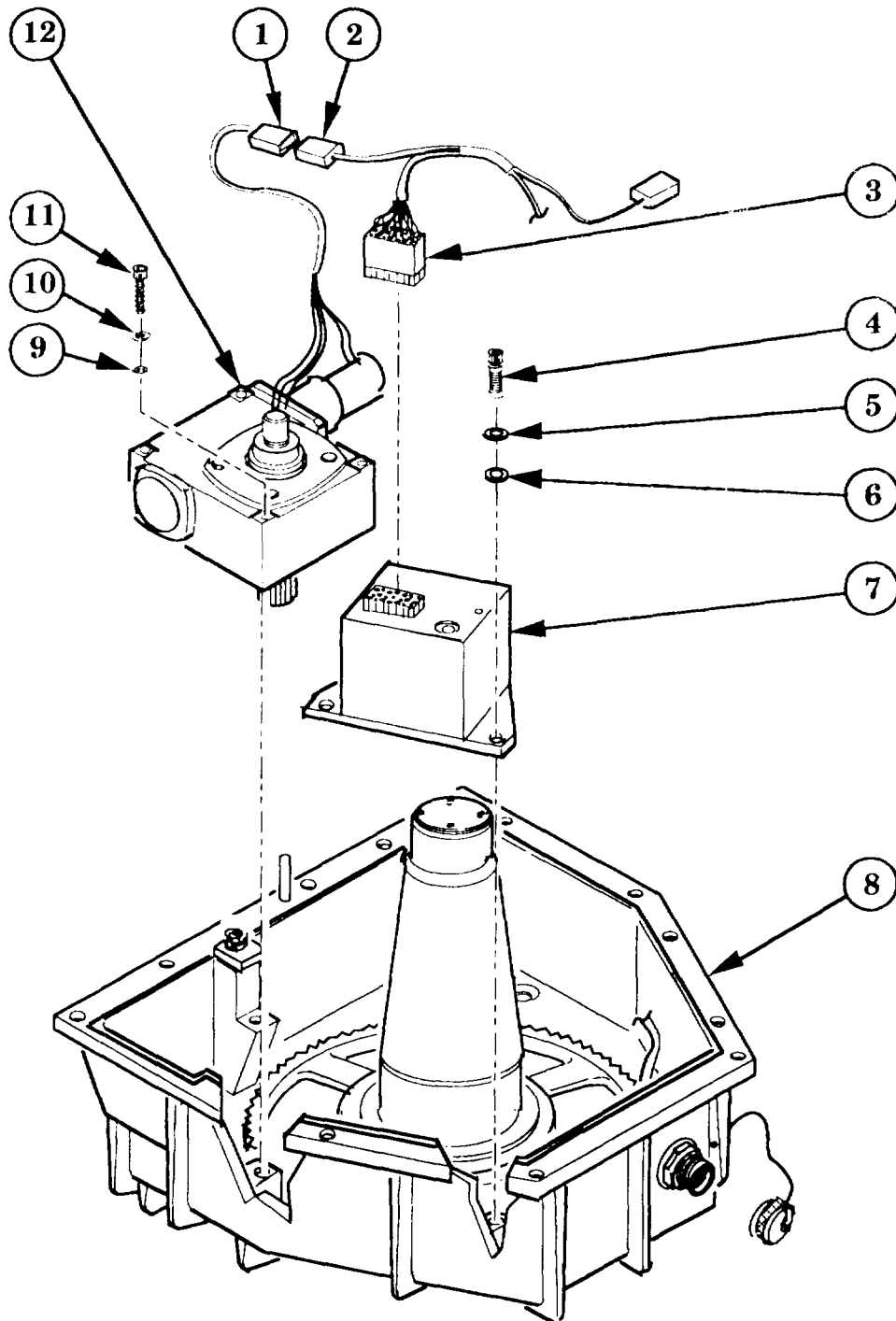
WARNING

Wear eye protection when replacing retaining rings. Failure to comply may result in personal injury.

- (6) Open handles of retaining ring pliers fully by squeezing handle trigger repetitively and pulling handles apart. Insert two prongs at nose of pliers into two holes in ends of retaining ring (11). Squeeze handles together to open retaining ring (11). Using retaining ring pliers, install retaining ring (11) on end of elevation shaft (16).
- (7) Insert two hex head screws (4) into elevation segment gear (5). Finger tighten screws (4). Using 5/16-inch hex key and torque wrench, tighten screws (4) to 30 foot-pounds of torque.
- (8) Rotate elevation shaft (16) and elevation segment gear (5) and position against limit pad (6).
- (9) Coat mating surface of bearing covers (1 and 13) with Loctite 241. Insert oil seals (2 and 12) into bearing covers (1 and 13) and slide bearing covers (1 and 13) over elevation shaft (16).
- (10) Rotate bearing cover until index slot (15) on bearing cover (13) points to top of elevation assembly (5). Repeat this step for other bearing cover (1).
- (11) Install 12 screws (14 and 18) attaching bearing covers (1 and 13) to elevation assembly (7). Finger tighten screws (14 and 18).
- (12) Using 5/64-inch hex key, secure screws (14 and 18) installed in step 11.
- (13) Replace elevation actuator (refer to para 5-28b, steps 2 thru 19).
- (14) Reassemble positioner (refer to para 5-19b).

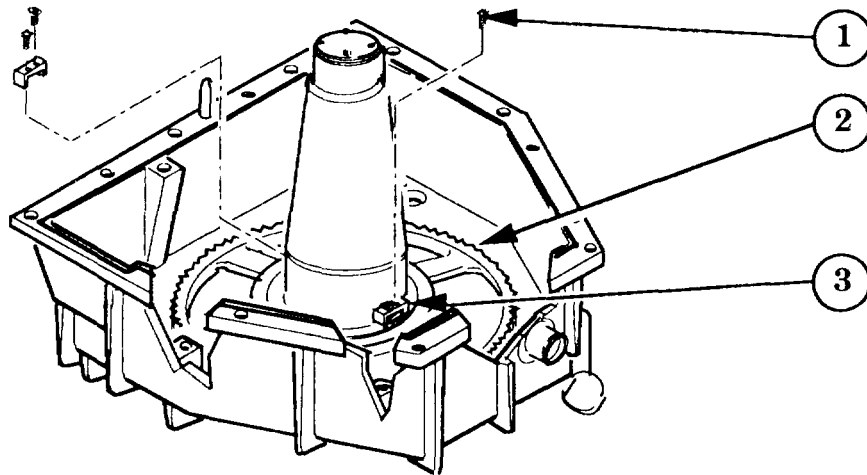
5-32. AZIMUTH ASSEMBLY DISASSEMBLY AND REASSEMBLY

a. Disassembly



5-32. AZIMUTH ASSEMBLY DISASSEMBLY AND REASSEMBLY - Continued**a. Disassembly - Continued**

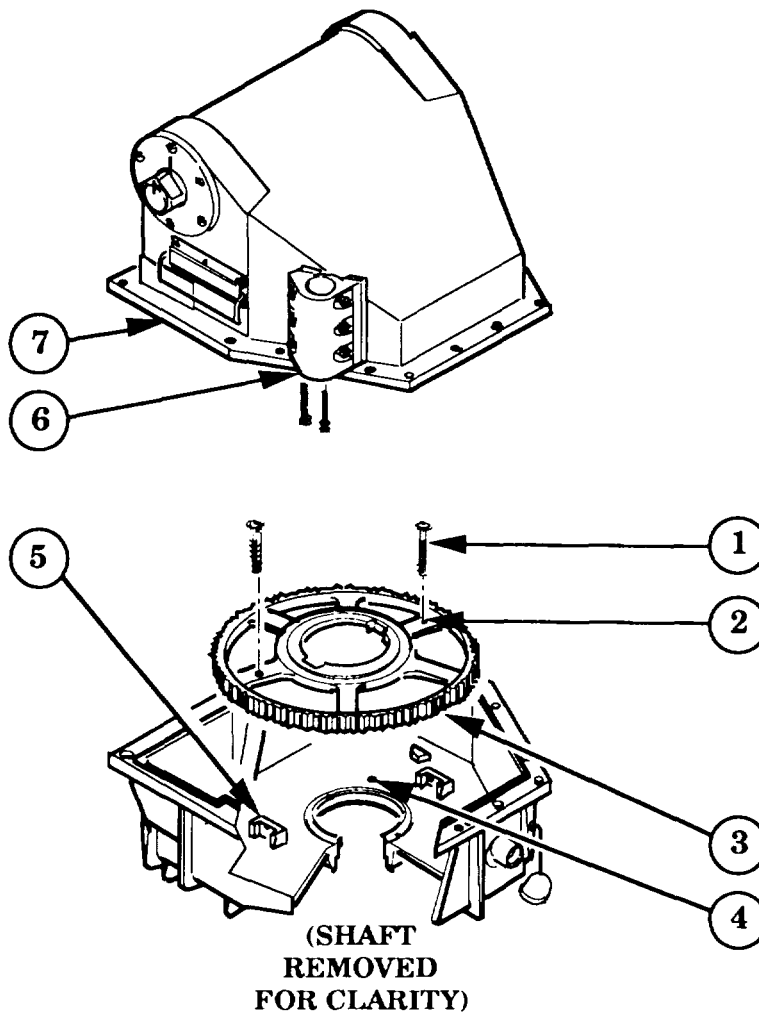
- (1) Disassemble positioner (refer to para 5-19a).
- (2) Disconnect plug P1 (3) from motor drive electronics module (7) in azimuth assembly (9).
- (3) Disconnect connector J2 (2) from azimuth assembly wiring harness at Terminal 1)
- (4) Using 3/16-inch hex key, remove three hex head screws (11), lock washers (10), and flat washers (9) securing azimuth drive actuator (12) to azimuth assembly (8). Remove actuator assembly (8).
- (5) Using 9/64-inch hex key, remove two hex head screws (4), lock washers (5), and flat washers (6) securing motor drive assembly (7) to azimuth assembly (8). Remove motor drive assembly (7).



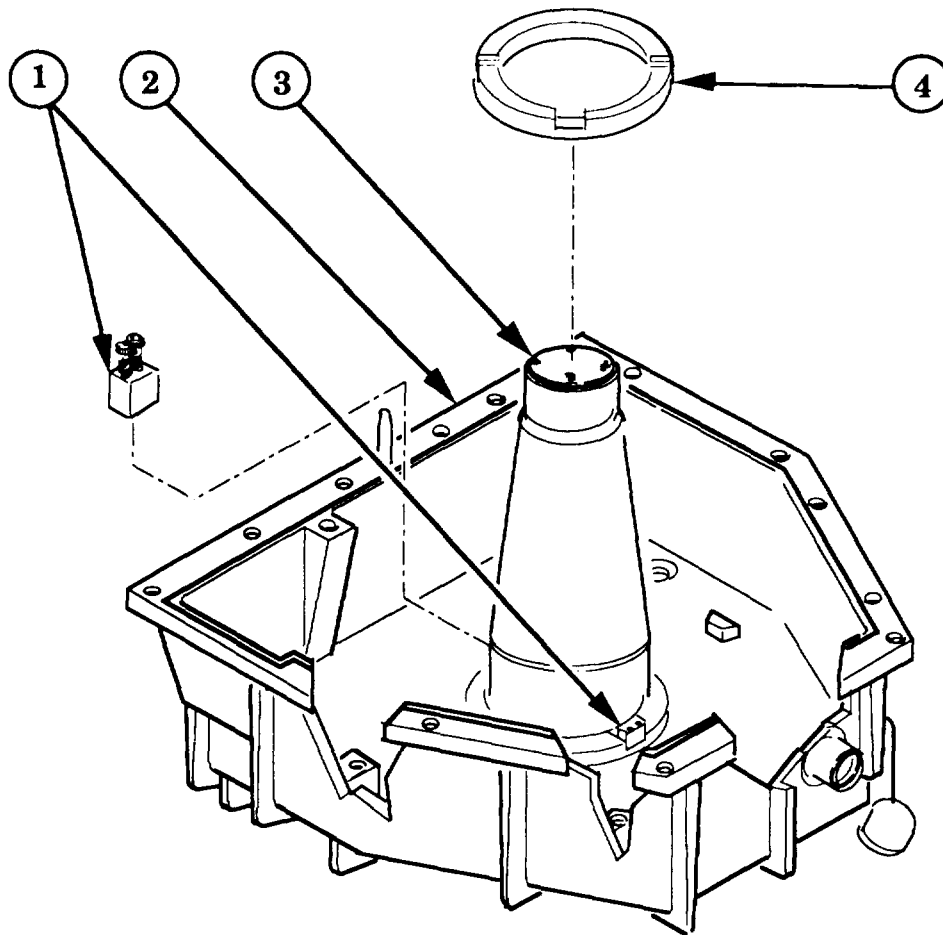
- (6) Using 5/32-inch hex key, remove four hex head screws (1) securing two gear clamps (2) to azimuth gear (3). Remove clamps and reinstall screws.

5-32. AZIMUTH ASSEMBLY DISASSEMBLY AND REASSEMBLY - Continued

a. Disassembly - Continued



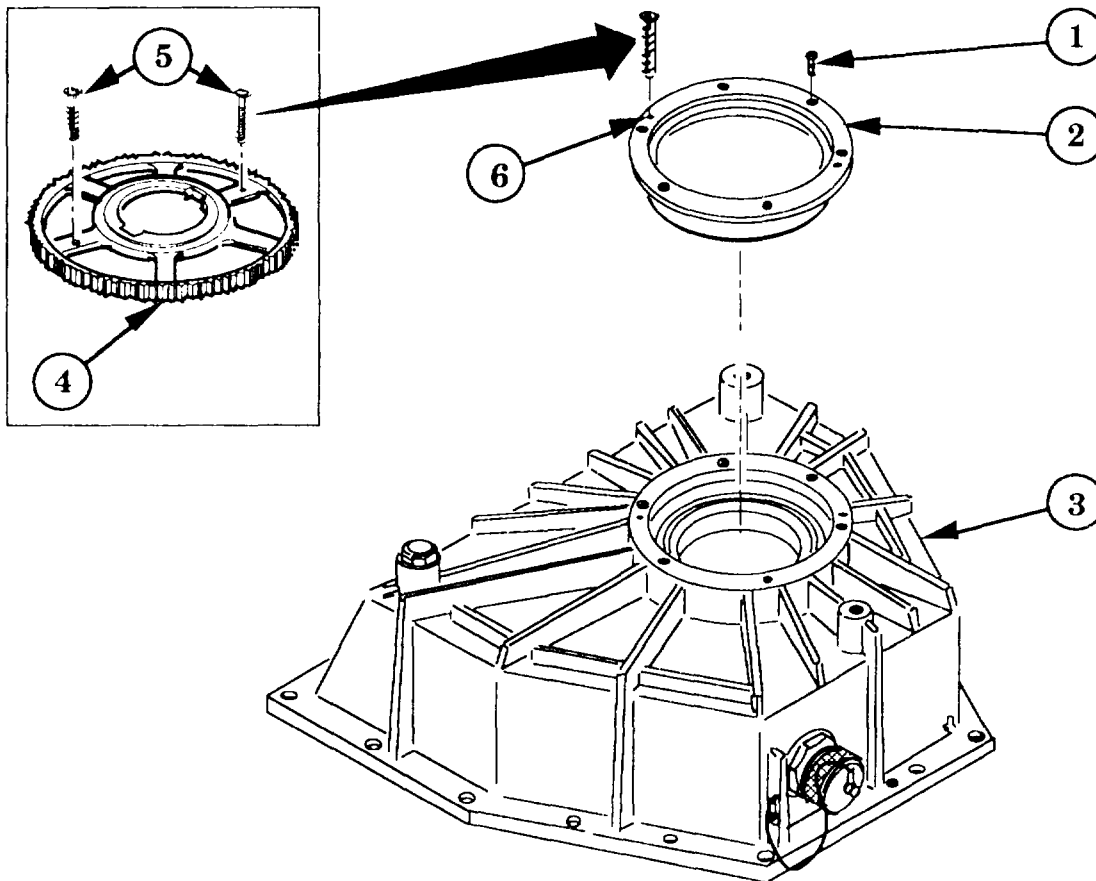
- (7) Using 9/64-inch hex key, remove two hex head screws (1) from lightning rod mount (6) on elevation assembly (7).
- (8) Insert two screws (1) removed in step 7 into threaded holes (2) on azimuth gear (3). Rotate gear so that threaded holes are not directly over zero reference hole (4).
- (9) Position two gear clamps (5) directly under screws inserted in step 8, with tabs facing sideways.
- (10) Using 9/64-inch hex key, tighten screws (1) one turn at a time, alternating between screws until azimuth gear can be removed. Remove gear.

5-32. AZIMUTH ASSEMBLY DISASSEMBLY AND REASSEMBLY - Continued**a. Disassembly - Continued**

- (11) Using flat-tip screwdriver, pry azimuth gear keys (1) from azimuth gear shaft (3).
- (12) Remove locking collar (4) from azimuth gear shaft (3).
- (13) Place azimuth assembly on its side. Using plastic hammer, tap upper end of azimuth gear shaft (3) to dislodge gear shaft from azimuth assembly (2).

5-32. AZIMUTH ASSEMBLY DISASSEMBLY AND REASSEMBLY - C ontinued

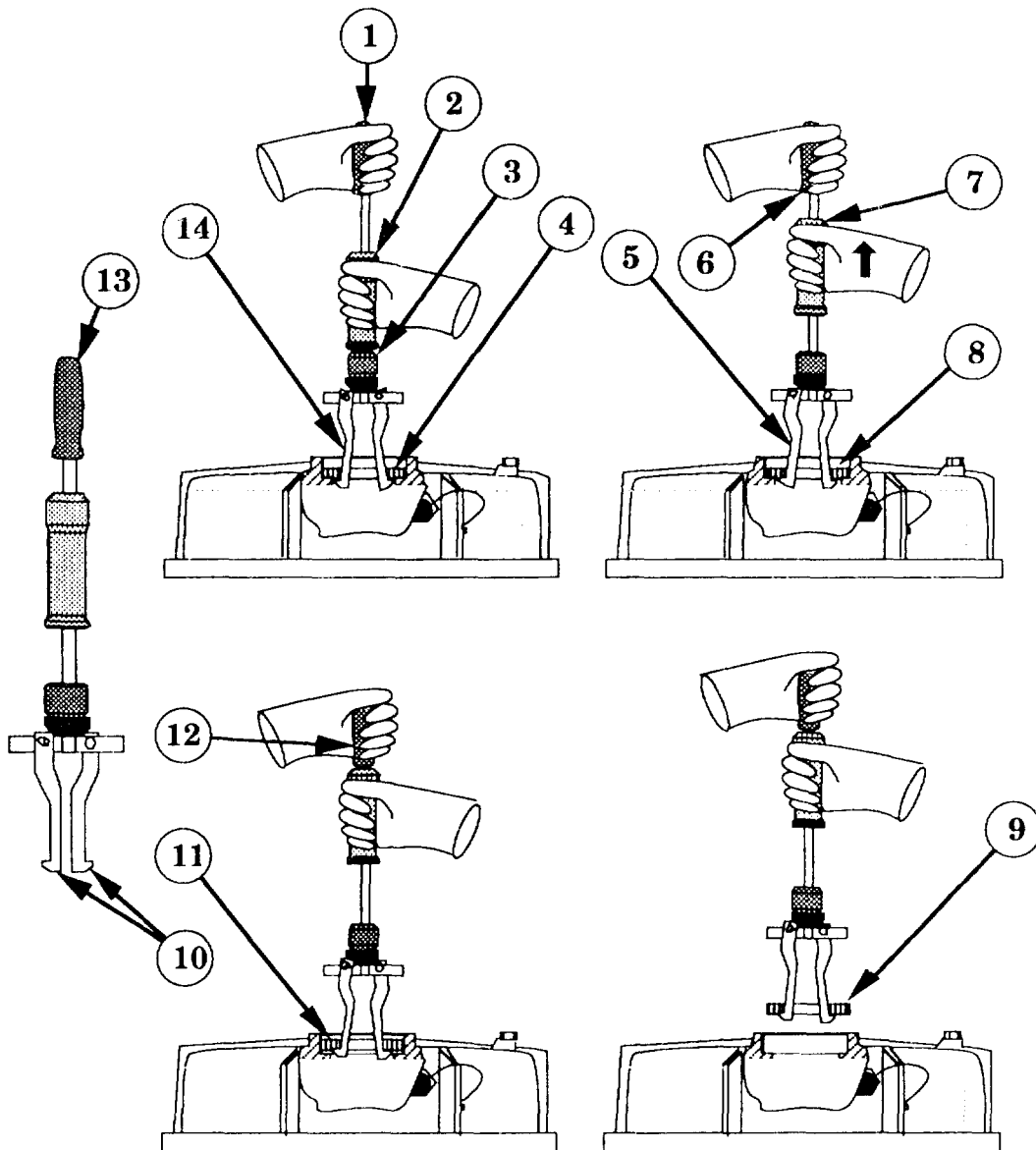
a. Disassembly - Continued



- (14) Place azimuth assembly upside down. Using cross-tip screwdriver, remove six screws (1) securing azimuth bearing cover (2) to azimuth assembly (3).
- (15) Remove two screws (5) from azimuth gear (4) and insert into holes (6) on bearing cover (2).
- (16) Using 9/64-inch hex key, tighten screws (5) one turn at a time, alternating between screws until bearing cover (2) can be removed. Remove bearing cover (2).

5-32. AZIMUTH ASSEMBLY DISASSEMBLY AND REASSEMBLY - Continued

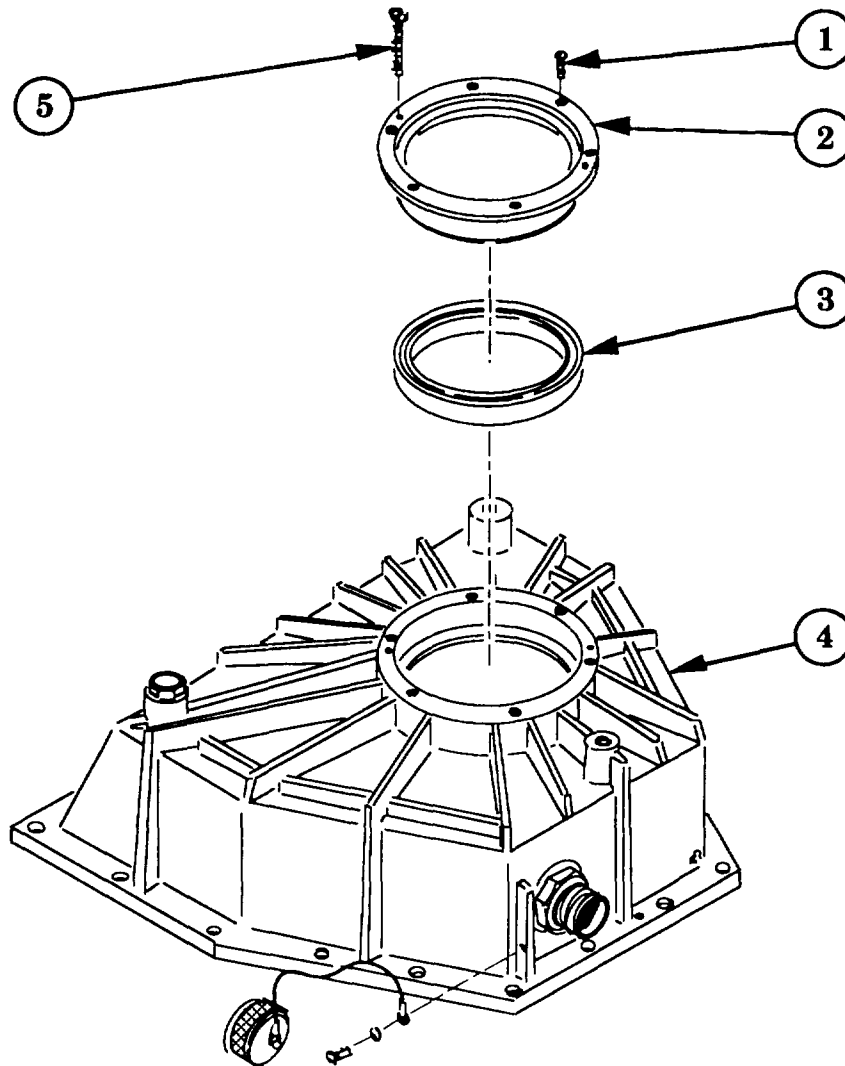
a. Disassembly - Continued



- (17) Assemble bearing puller (13) with two jaws (10) set for internal grip.
- (18) Insert bearing puller jaws (14) into azimuth bearing (4) while holding handle (1) straight up.
- (19) Continue to hold up on handle (1) while lowering slide hammer (2) to stop (3).
- (20) Check that jaws (5) are still engaged with bearing (8) and continue to hold up on handle (6). Raise slide hammer (7) upward sharply to impact handle (12).
- (21) Repeat steps 19 and 20 until bearing (11) moves and finally comes loose (9).

5-32. AZIMUTH ASSEMBLY DISASSEMBLY AND REASSEMBLY - Continued

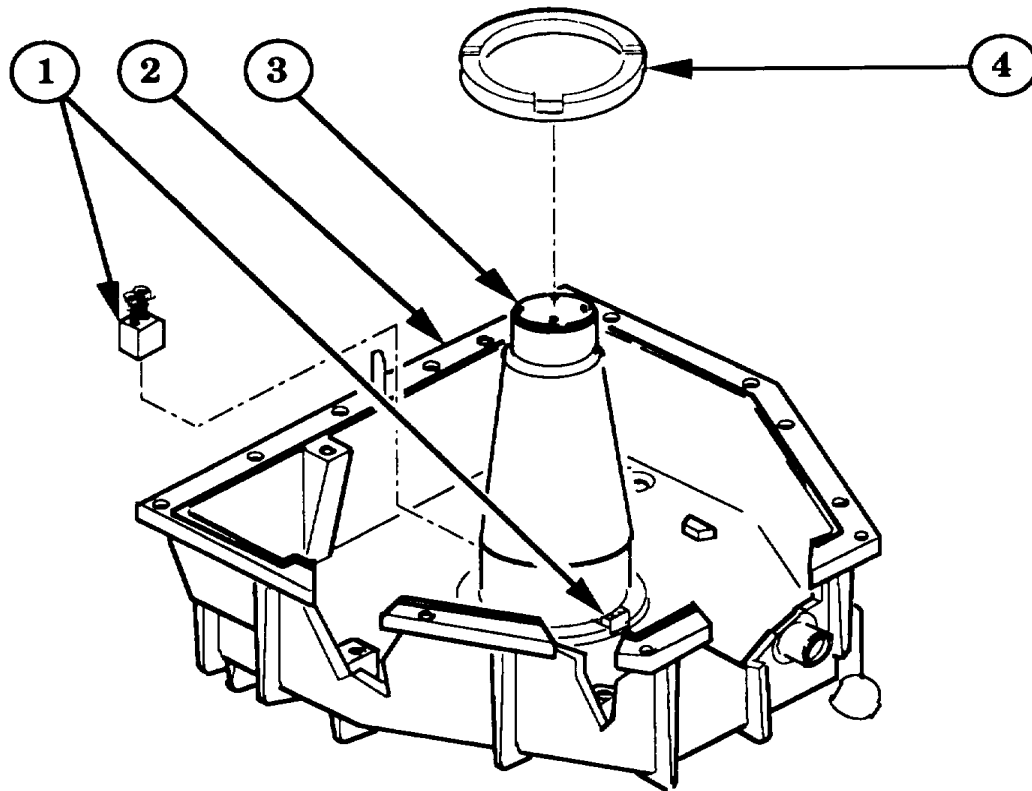
b. Reassembly



- (1) Apply coating of grease to azimuth bearing (3). Insert bearing into bottom of azimuth assembly (4). Ensure that bearing is fully seated.
- (2) Using 9/64-inch hex key, remove two screws (5) from bearing cover. Reinstall screws in bottom of lightning rod mount on elevation assembly.
- (3) Apply coating of grease to oil seal on bearing cover (2).
- (4) Place bearing cover (2) on azimuth assembly (4).
- (5) Insert six screws (1) in bearing cover (2) and use cross-tip screwdriver to tighten.

5-32. AZIMUTH ASSEMBLY DISASSEMBLY AND REASSEMBLY - Continued

b. Reassembly- Continued

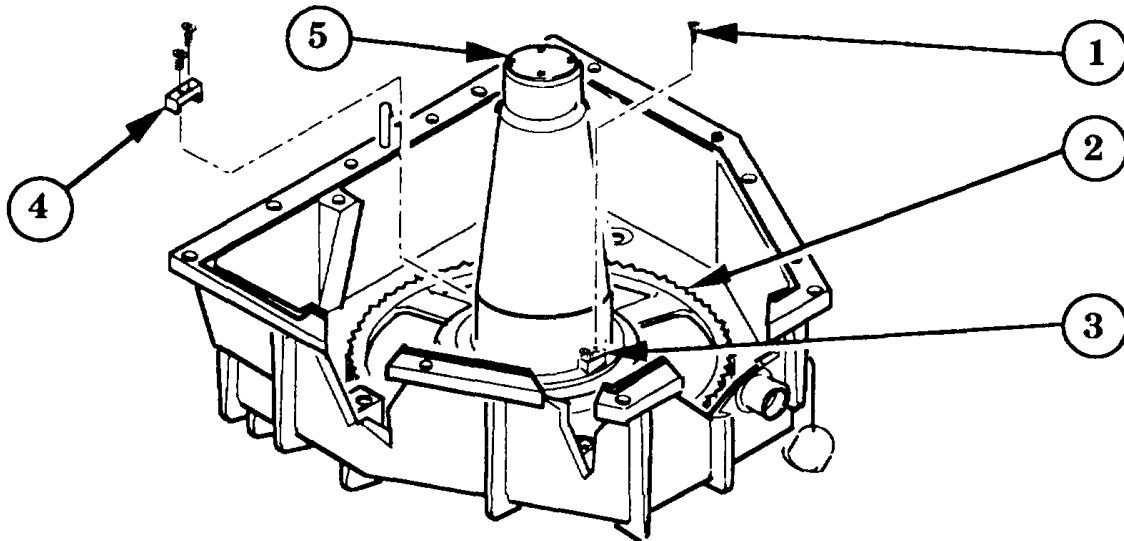


- (6) Place azimuth assembly (2) on its side. Insert azimuth gear shaft (3) through bottom of azimuth assembly. Using plastic hammer, tap lower end of azimuth gear shaft, until shaft is fully seated in azimuth assembly.
- (7) Place azimuth assembly (2) upright, so that assembly is resting on azimuth gear shaft (3).

NOTE

Azimuth gear keys are inserted so that screw holes are nearest the edge facing away from the azimuth gear shaft.

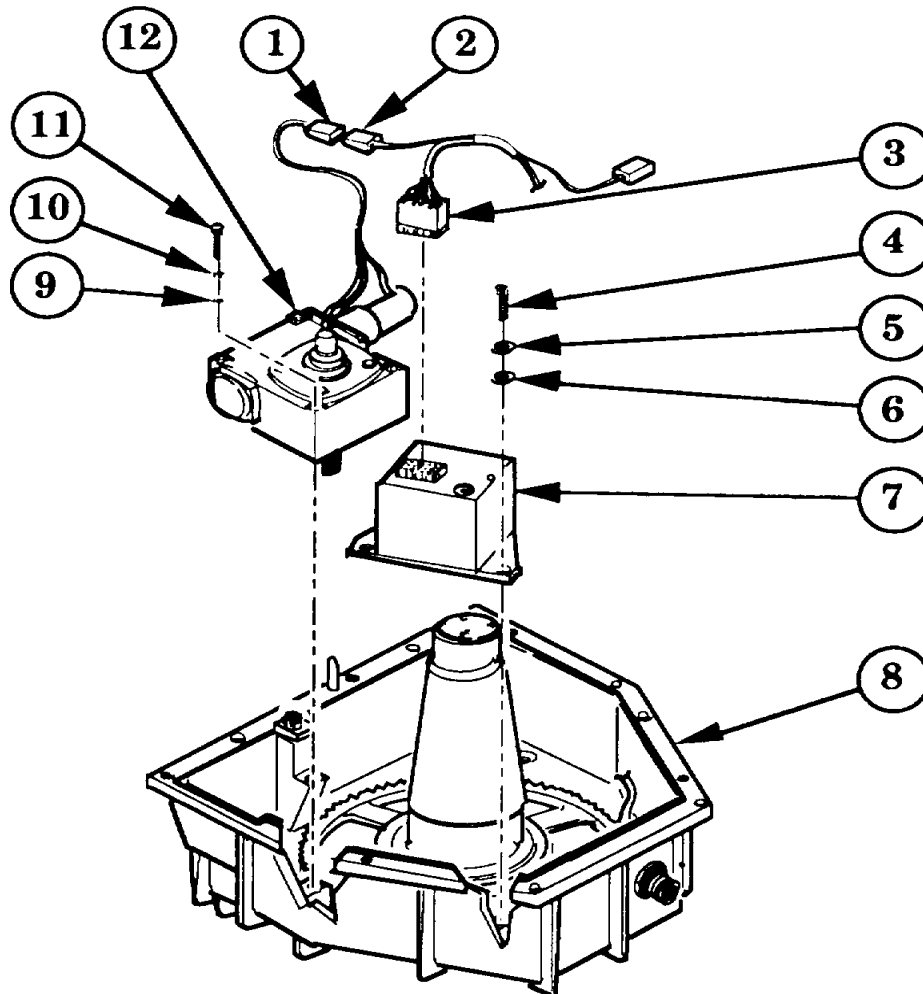
- (8) Place locking collar (4) over azimuth gear shaft (3).
- (9) Place two azimuth gear keys (1), with screws facing upward, into azimuth gear shaft(3).
- (10) Using 5/32-inch hex key, remove four screws from azimuth gear keys (1).

5-32. AZIMUTH ASSEMBLY DISASSEMBLY AND REASSEMBLY - Continued**b. Reassembly - Continued**

- (11) Place azimuth gear (2) with stop pad facing downward over azimuth gear shaft (5).
- (12) Align azimuth gear (2) so that slots in gear engage azimuth gear keys (3) and stop pad is directly over slot in locking collar.
- (13) Place two gear clamps (4) with tabs facing downward, directly over azimuth gear keys (3).
- (14) Insert four hex head screws (1) through gear clamps (4) into azimuth gear keys (3).
- (15) Using 5/32-inch hex key, tighten four hex head screws (1).

5-32. AZIMUTH ASSEMBLY DISASSEMBLY AND REASSEMBLY - Continued

b. Reassembly - Continued

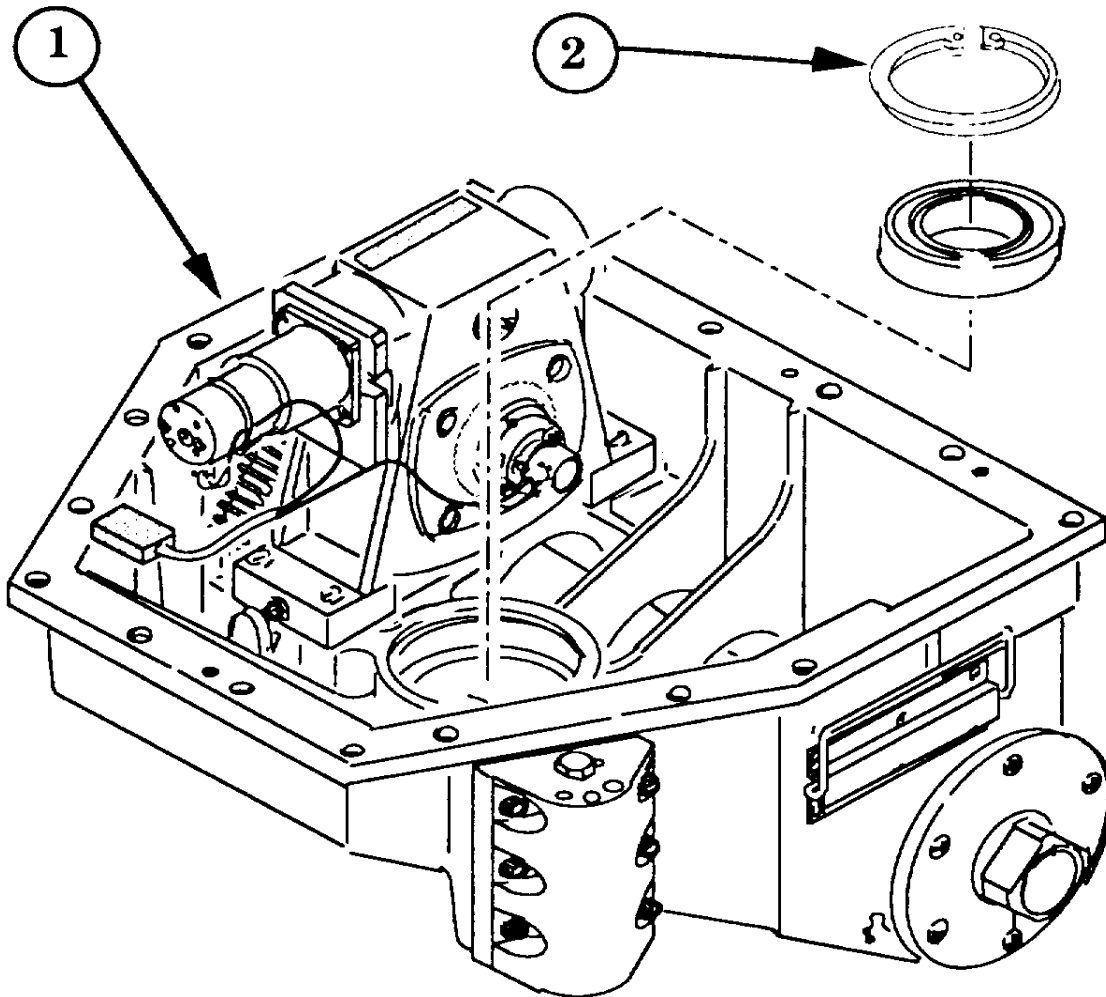


- (16) Position motor drive assembly (7) into azimuth assembly (8).
- (17) Insert two hex head screws (4), lock washers (5), and flat washers (6) through mounting flange on motor drive assembly into azimuth assembly. Use 9/64-inch hex key to tighten two screws.
- (18) Position azimuth actuator (12) in azimuth assembly (8).
- (19) Insert three hex head screws (11), lock washers (10), and flat washers (9) through holes in actuator into azimuth assembly. Use 3/16-inch hex key to tighten three screws.
- (20) Connect J2 (2) to azimuth assembly wiring harness at P2 (1).
- (21) Connect P1 (3) to motor drive assembly (7).
- (22) Reassemble positioner (refer to para. 5-19b).

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5-33. UPPER AZIMUTH BEARING REMOVAL AND REPLACEMENT

a. Removal



- (1) Disassemble positioner (refer to para. 5-19a).

WARNING

Wear eye protection when removing retaining ring. Failure to comply may result in personal injury.

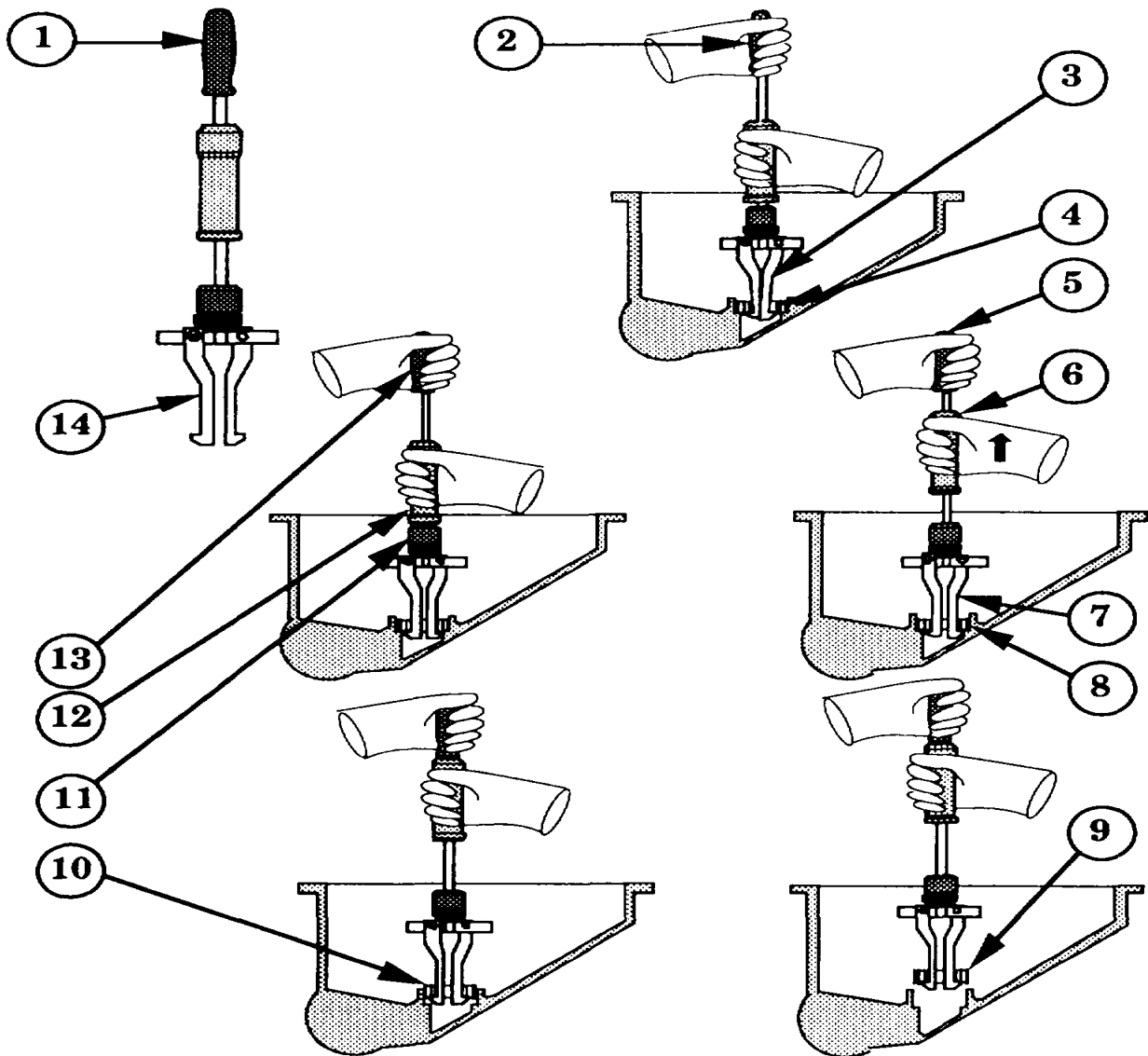
NOTE

The upper azimuth bearing is located in the elevation assembly.

- (2) Open handles of retaining ring pliers fully by squeezing handle trigger repetitively and pulling handles apart. Insert two prongs at nose of pliers into two holes in ends of retaining ring (2). Squeeze handles together to open retaining ring (2). Using retaining ring pliers remove azimuth bearing retaining ring (2) from elevation assembly (1).

5-33. UPPER AZIMUTH BEARING REMOVAL AND REPLACEMENT - Continued

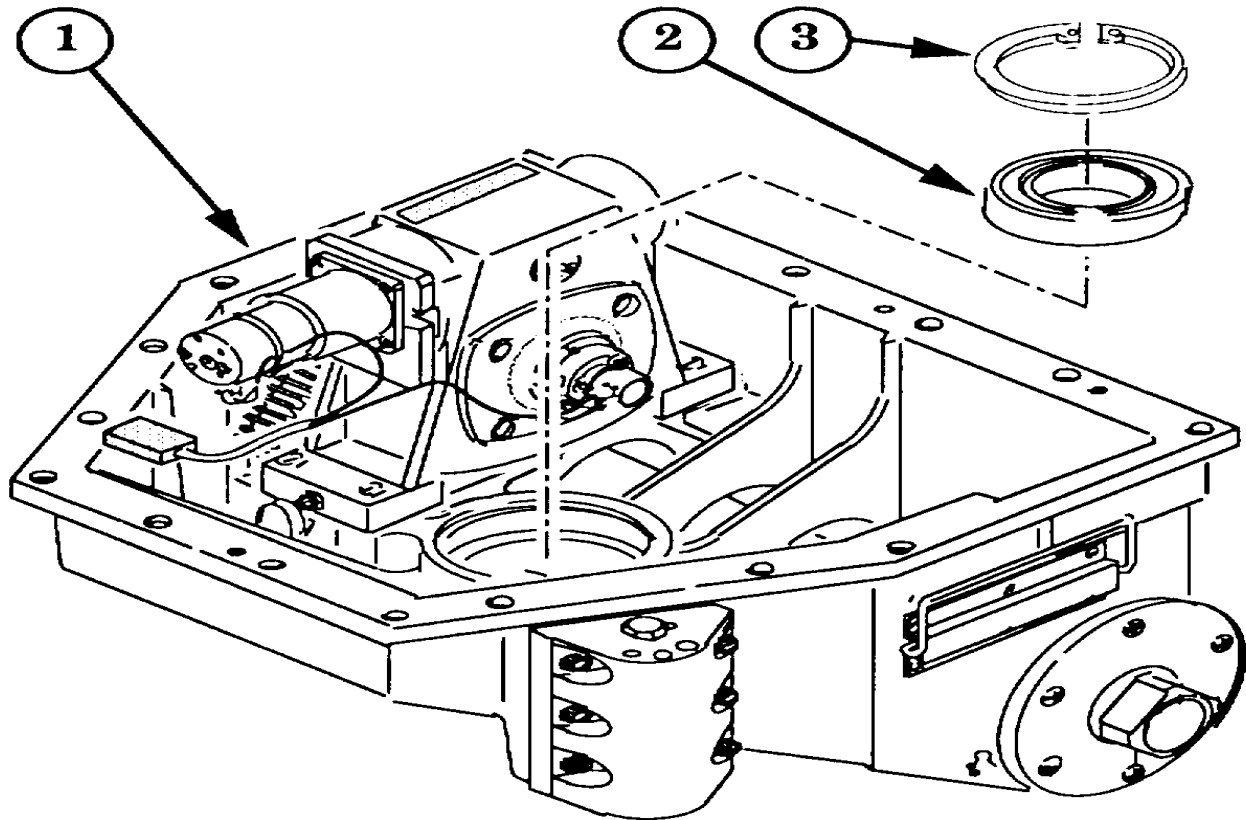
a. Removal - Continued



- (3) Assemble bearing puller (1) with two jaws (14) set for internal grip.
- (4) Insert bearing puller jaws (3) into azimuth bearing (4) while holding handle (2) straight up.
- (5) Continue to hold up on handle (13) while lowering slide hammer (12) to stop (11).
- (6) Check that jaws (7) are still engaged with bearing (8) and continue to hold up on handle (5). Raise slide hammer (6) upward sharply to impact handle (5).
- (7) Repeat steps 5 and 6 until bearing (10) moves and finally comes loose (9).

5-33. UPPER AZIMUTH BEARING REMOVAL AND REPLACEMENT - Continued

b. Replacement



- (1) Position replacement upper azimuth bearing (2) in elevation assembly (1).
- (2) Press azimuth bearing (2) into elevation assembly (1) until fully seated. If necessary, use plastic hammer and gently seat bearing.

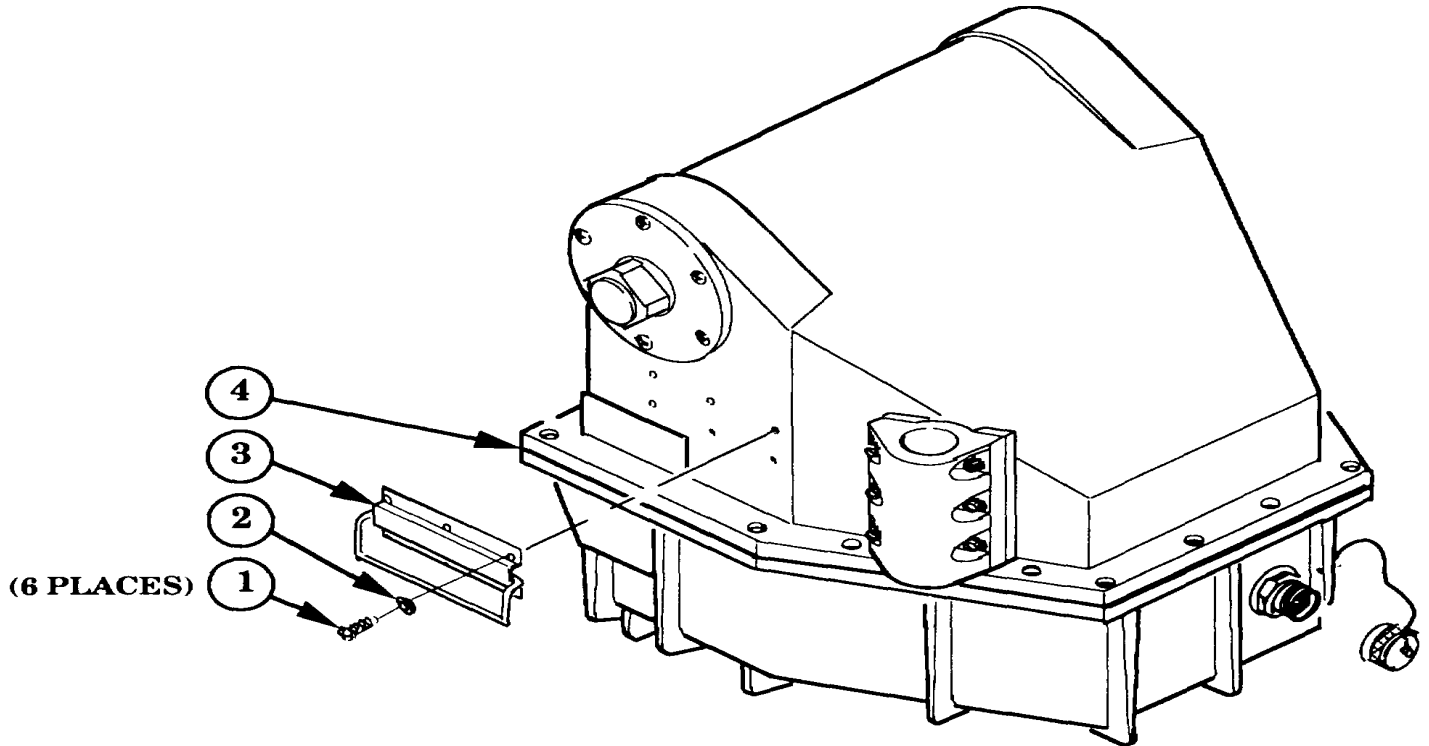
WARNING

Wear eye protection when installing retaining ring. Failure to comply may result in personal injury.

- (3) Open handles of retaining ring pliers fully by squeezing handle trigger repetitively and pulling handles apart. Insert two prongs at nose of pliers into two holes in ends of retaining ring (3). Squeeze handles together to open retaining ring (3). Using retaining ring pliers, install retaining ring (3) into groove in elevation assembly (1).
- (4) Reassemble positioner (refer to para. 5-19b).

5-34. POSITIONER HANDLE REMOVAL AND REPLACEMENT**a. Removal**

- (1) Using cross-tip screwdriver, remove six screws (1) and lock washers (2) securing handle (3) to positioner assembly (4).

**b. Replacement**

- (1) Insert six screws (1) through lock washers (2), replacement handle (3), and into positioner assembly (4).
- (2) Using cross-tip screwdriver, secure six screws (1).

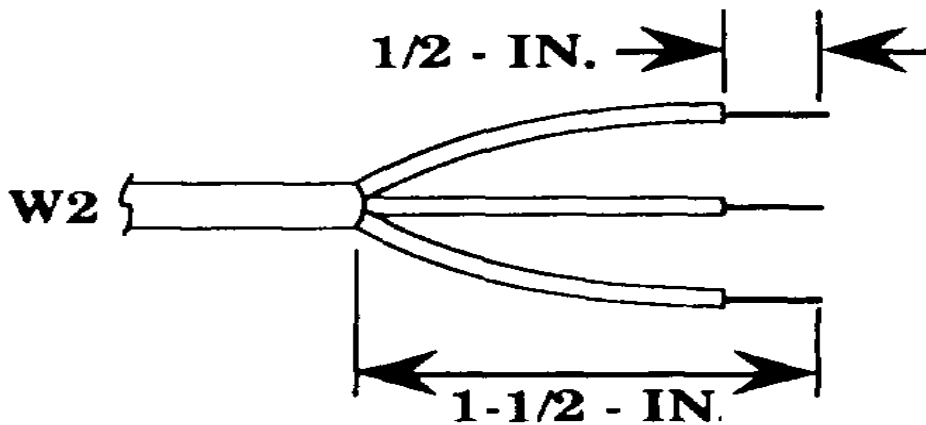
5-35. CABLE ASSEMBLY W2 REPAIR PROCEDURE

Power cable W2 is repaired by replacement of connector P1, connector P2, or the cable. If cable replacement is required, use 60 feet of replacement cable and install P1 and P2. a. Replace P1 as follows:

a. Replace P1 as follows:

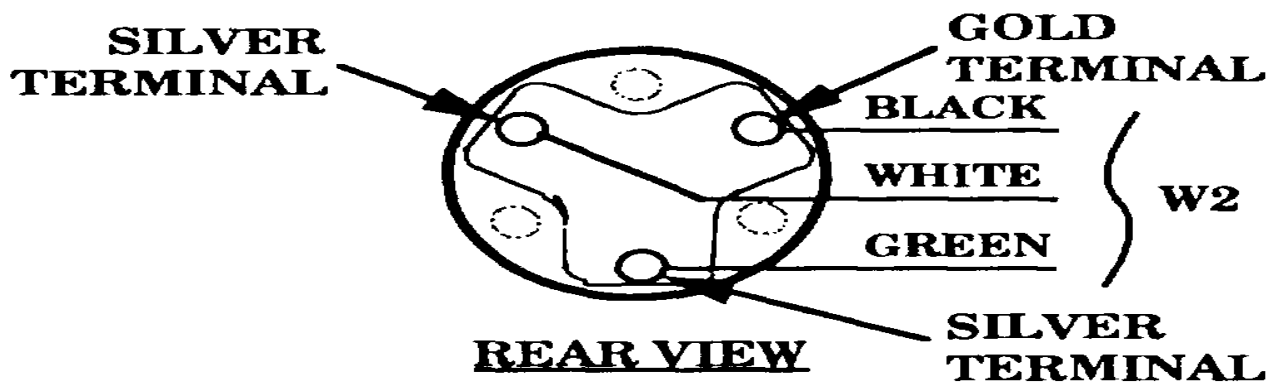
- (1) Insert cable in plug shell at strain relief end and push cable through shell until approximately 6 inches are protruding from shell.

P1 WIRE STRIPPING DATA



- (2) Using wire strippers, carefully remove 1-1/2 inches of outer insulation from cable and 1/2 inch of insulation from each of three wires.

P1 CONNECTION DIAGRAM

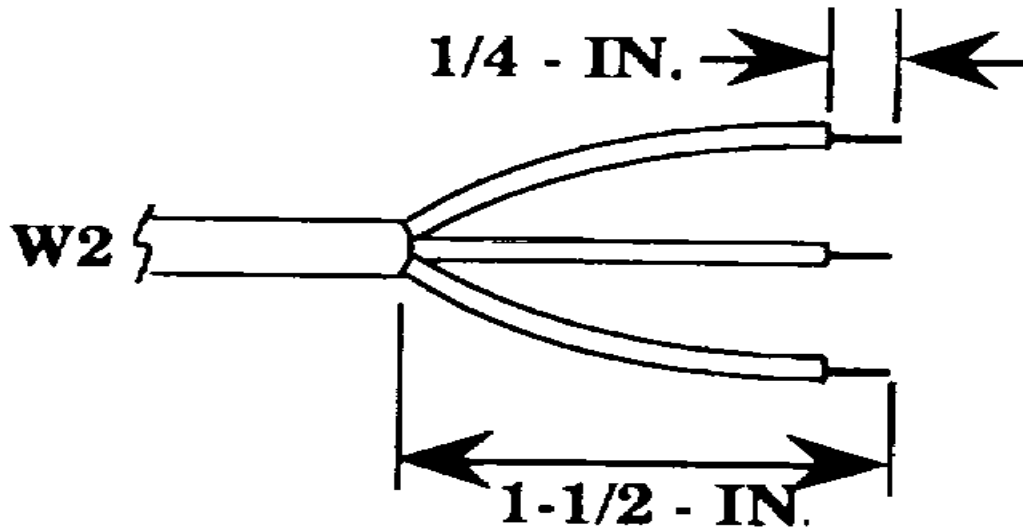


- (3) Twist braid on each of three wires. Observing diagram, insert wires into plug. Using flat-tip screwdriver, secure each wire in plug.
- (4) Using flat-tip screwdriver, secure three screws in plug to plug shell.
- (5) Using flat-tip screwdriver, tighten two screws securing strain relief to plug shell.

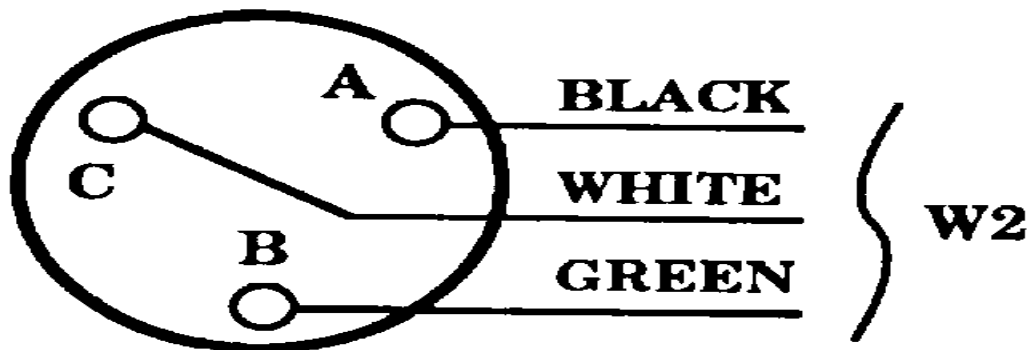
5-35. CABLE ASSEMBLY W2 REPAIR PROCEDURE - Continued

b. Replace P2 as follows:

- (1) Insert cable through backshell at strain relief and push cable through backshell until approximately 6 inches are protruding from shell



- (2) Using wire stripper, carefully remove 1-1/2 inches of outer insulation from cable and ¼ inch of insulation from each of three wires.
- (3) Twist braid on each of three wires. Insert wires, one at a time, into connector pins. Using crimping tool, crimp each pin/



- (4) Observing diagram, insert pins one at a time into backside of connector.
- (5) using insertion tool, push pins into backside of connector. Continue pushing pins until pins are fully seated and cannot be pulled out of connector
- (6) Assemble connector by securing backshell into connector body.

APPENDIX A**REFERENCES****A-1. SCOPE**

This appendix lists forms and publications that are referenced in this manual.

A-2. PAMPHLETS

DA Pam 25-30 Consolidated Index of Army Publications and Blank Forms

DA Pam 738-750 The Army Maintenance System (TAMMS)

A-3. FORMS

DA Form 2404 Equipment Inspection and Maintenance Worksheet

DA Form 2028 Recommended Changes to Publications and Blank Forms

DA Form 2028-2 Recommended Changes to Equipment Technical Publications

SF 361 Transportation Discrepancy Report

SF 364 Report of Discrepancy (ROD)

SF 368 Product Quality Deficiency Report

A-4. SUPPLY BULLETINS

SB 11-573 Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment

A-5. TECHNICAL BULLETINS

TB 11-5895-394-25 Warranty Program for Mast AB-1373/TRC

TB 43-0118 Field Instructions for Painting and Preserving Communications - Electronics Equipment

TB 43-0125 Installation of Communications - Electronic Equipment:
Hookup of Electrical Cables to Mobile Generator Sets on Fielded Equipment to Meet Electrical Safety Standards

TB 43-0129 Safety Measures to be observed When Installing and Using Whip Antennas, Field-Type Masts, Towers, Antennas and Metal Poles that are used with Communications, Radar, and Direction Finder Equipment

Change 2 A-1

A-5. TECHNICAL BULLETINS - Continued

TB 385-4 Safety Requirements for Maintenance of Electrical and Electronic Equipment

A-6. TECHNICAL MANUALS

TM 43-0139 Painting Instructions for Army Materiel

TM 750-244-2 Procedures for Destructions of Electronics Materiel to Prevent Enemy Use (Electronics Command)

TM 11-5985-392-13 Operator's, Unit, and Direct Support Maintenance Manual: Antenna Support Group OE-481/TRC

TM 11-5985-394-10-HR Hand Receipt for Mast AB-1373/TRC

TM 11-5985-394-23P Unit and Direct Support Maintenance Repair Parts and Special Tools List: Mast AB-1373/TRC

A-7. FIELD MANUALS

FM 21-11 First Aid for Soldiers

A-8. MISCELLANEOUS PUBLICATIONS

CTA 50-970 Expendable Items (Except: Medical, Class V, Repair Parts and Heraldic Items)

SC 5180-91-CL-R07 Sets, Kits, and Outfits Components List: Tool Kit, Electronic Equipment TK-105/G (NSN 5180-00-610-8177)

SC 5180-91-CL-R13 Sets, Kits, and Outfits Components List: Tool Kit, Electronic Equipment TK-101/G (NSN 5180-00-064-5178)

SC 5180-91-CL-S21 Sets, Kits, and Outfits Components List: Tool Kit, Electronic Equipment TK-100/G (NSN 5180-00-605-0079)

Change 2 A-2

APPENDIX B**MAINTENANCE ALLOCATION CHART****Section I. INTRODUCTION****B-1. GENERAL**

This appendix provides a summary of the maintenance operations for Mast AB-1373/TRC. It authorizes levels of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

B-2. MAINTENANCE FUNCTIONS

Maintenance functions will be limited to and defined as follows.

- a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).
- b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.
- c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical, or gases.
- d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.
- e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.
- f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons 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.
- g. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.
- h. Replace. To remove an unserviceable item and install a serviceable counterpart in its place.

B-2. MAINTENANCE FUNCTIONS - Continued

- i. **Repair.** The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly) end item, or system.
- j. **Overhaul.** That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.
- k. **Rebuild.** Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipment/components.

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II

- a. **Column (1) - Group Number.** Column 1 lists functional group code numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules within the next higher assembly.
- b. **Column (2) - Component/Assembly.** Column 2 contains the names of components, assemblies subassemblies, and modules for which maintenance is authorized.
- c. **Column (3) - Maintenance Function.** Column 3 lists the functions to be performed on the item listed in column 2.
- d. **Column (4) - Maintenance Level.** Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition and typical field operating conditions. This time includes preparation time, (including necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance function authorized in the maintenance allocation chart. The symbol designations for the various maintenance levels are as follows:

C - Operator/Crew (Unit Level Maintenance)
 O - Organizational (Unit Level Maintenance)
 F - Direct Support
 H - General Support
 D - Depot

B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II - Continued

- e. **Column (5) - Tools and Equipment** . Column 5 specifies by code, those common tool sets, (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.
- f. **Column (6) - Remarks** Column 6 identifies remarks defined in section IV of the MAC.

B-4 EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III

- a. **Column 1 Reference Code.** The tool and test equipment reference code correlates with a code used in the MAC, Section II, column 5.
- b. **Column 2 Nomenclature.** This column lists the name and nomenclature of the tools and test equipment required to perform the maintenance function.
- c. **Column 3 Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.
- d. **Column 4 National/NATO Stock Number .** This column lists the National/NATO stock number of the specific tool or test equipment.
- e. **Column 5 Tool Number.** This column lists the manufacturer's part number of the tool followed by the Federal Supply Code For Manufacturers code (five digit) in parenthesis.

B-5 EXPLANATION OF COLUMNS IN REMARKS, SECTION IV.

- a. **Column 1 Reference Code.** This code refers to the appropriate item in Section II, Column 6 of the MAC.
- b. **Column 2 Remarks.** This column provides the required explanatory information necessary to clarify items appearing in Section II of the MAC.

SECTION II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
00	Mast AB-1373/TRC A3156800-001	Inspect Service Repair		0.07 0.50 0.11				1	
01	Mast Assembly A3156801-001	Inspect Repair		0.07 0.14				1	
0101	Antenna Tripod A3156804-001	Inspect Repair		0.04 0.10				1	
010101	Barrel Assembly A3156835-001	Inspect Repair Replace		0.03 0.06 0.05				1	
010102	Leg Assembly A3156834-001	Inspect Repair Replace		0.03 0.04 0.05	1				
0102	Lifting Winch Assembly A3156805-001	Inspect Repair Replace		0.03 0.12 0.05				1,21,22	
010201	Lifting Winch, 2-Speed A3156839-001	Inspect Repair Replace		0.02 0.08 0.03				1,21,22	
010202	Shoe Assembly A3156863-001	Inspect Repair Replace		0.02 0.10 0.03				1,21,22	
0103	Guy Winch Assembly A3157140-001	Inspect Repair Replace		0.10 0.20 0.03				1	
02	Positioning System A3157300-001	Inspect Repair Test		0.06 0.08 0.13				4	
0201	Controller A3157302-001	Inspect Replace Repair repair Test		0.01 0.02 0.03 0.37 0.50				1,4 3 4	A
020101	Front Panel A3157424-001	Repair Test Replace		0.33 0.2 0.05				3 4 3	
0202	Positioner Assembly A3157301-001	Inspect Replace Repair Test		0.05 0.12 0.50 0.10				2, 3 4	
020201	Azimuth Assembly A3157:340-001	Repair Test		0.83 0.12				2,3,4,9, 10,13,15 4	

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
02020101	Azimuth Drive Actuator Assembly A3157307-001	Repair Align Test Replace		0.50 0.17 0.12 0.10				2,3,4,6, 11,20 3,4,6,7 4 3	
02020102	Wiring Harness Assembly A3157491-001	Test Repair Replace		0.17 0.50 0.08				4 3,4,12 9,10	
020202	Elevation Assembly A3157341-001	Repair Test		0.75 0.80				2,3,4,5,8, 13,14,15, 16,17,18 4	
02020201	Elevation Drive Actuator Assembly A3157308-001	Repair Align Test Replace		0.50 0.17 0.07 0.10				2,3,4,8, 11,20 4,8,20 4 2,3,8	
0203	Cable Assembly W1 A3157303-001	Inspect Replace Test		0.06 0.04 0.17				4	
0204	Cable Assembly W2 A3156763-001	Inspect Replace Repair Test		0.06 0.04 0.33 0.17				3,11,12 4	

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) Tool or Test Equipment Reference Code	(2) Nomenclature	(3) Maintenance Level	(4) National/NATO Stock Number	(5) Tool Number
1	Tool Kit, Electronic Equipment TK-101/G	O	5180-00-064-5178	
2	Tool Kit, Electronic Equipment TK-100/G	F	5180-00-605-0079	
3	Tool Kit, Electronic Equipment TK-105/G	F	5180-00-610-8177	
4	Multimeter, Digital AN/PSM-45	O, F	6625-01-139-2512	
5	Puller, Bearing	F	5120-00-293-1429	
6	Socket Set, Socket Wrench 3/8-Inch Drive	F	5120-01-195-0640	
7	Wrench, Torque	F	5120-00-720-1975	
8	Wrench, Torque	F	5120-00-640-6364	
9	Wrench, Ratchet	F	5120-00-230-6385	
10	Socket Wrench Socket, 1/2-Inch Drive	F	5120-01-053-7927	
11	Gun, Heat	F	4940-01-028-7493	
12	Installing/Removal Tool	F	5120-00-915-4587	
13	Pliers, Retaining Ring (Internal)	F	5120-01-155-8357	
14	Pliers, Retaining Ring (External)	F	5120-01-156-4662	
15	Tip Pliers, Retaining Ring (45 Degree)	F	5120-01-156-4542	
16	Tip Pliers, Retaining Ring (90 Degree)	F	5120-01-156-4540	
17	Extension, 5 Inches (1/2-Inch Drive)	F	5120-00-243-7326	
18	Adapter, 1/2-Inch - 3/8-Inch	F	5120-00-240-8703	
19	Socket, Socket Wrench, 7/8-Inch (1/2-Inch Drive)	F	5120-00-935-7451	
20	Wrench, Hex 7/64-Inch	F	5120-00-889-2162	
21	Punch, Aligning	O	5120-01-335-1439	
22	Hammer, Hand, Machinist	O	5120-00-243-2985	
		B-6		

Section IV. REMARKS

(1) Reference Code	(2) Remarks
A	Repair limited to replacement of fuse.

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APPENDIX C**COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS****Section I. INTRODUCTION****C-1. SCOPE**

This appendix lists components of end item and basic issue items for Mast AB-1373/TRC 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

This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation and shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III. Basic Issue Items

These are the minimum essential items required to place the AB-1373/TRC in operation, to operate it, and perform emergency repairs. Although shipped separately, packaged BII must be with the AB-1373/TRC during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard to identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

C-3. EXPLANATION OF COLUMNS

The following provides an explanation of columns found in the tabular listings.

a. Column (1) - Illustration Number (Illus No.)

This column indicates the number of the illustration in which the item is shown.

b. Column (2) - National Stock Number

Indicates the national stock number assigned to the item and will be used for requisitioning purposes.

C-3. EXPLANATION OF COLUMNS - Continued

c. Column (3) - Description (Description (CAGEC) and Part Number)

Indicates the national 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. If items needed differs for different models of this equipment, the model is shown under the Usable On heading in this column.

<u>CODE</u>	<u>USABLE ON</u>
PAA	Model XX1
PAB	Model XX2
PAC	Model XX3

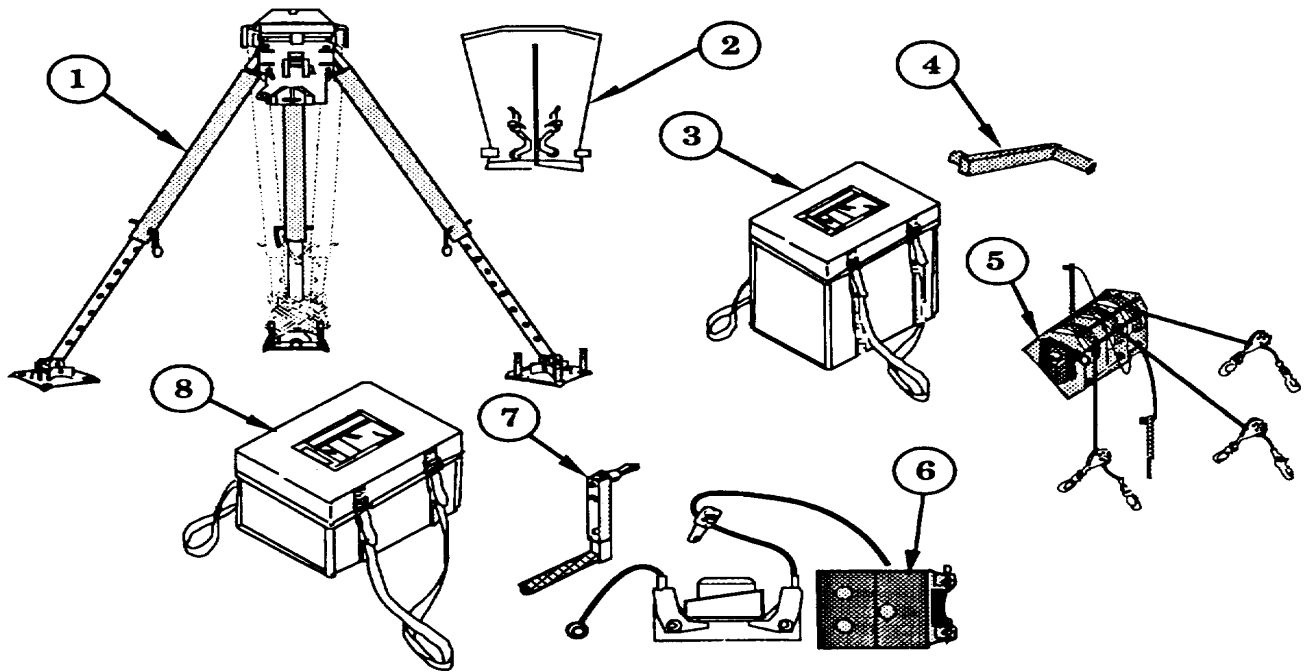
d. Column (4) - Unit of Measure (U/M)

Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., EA, IN, PR).

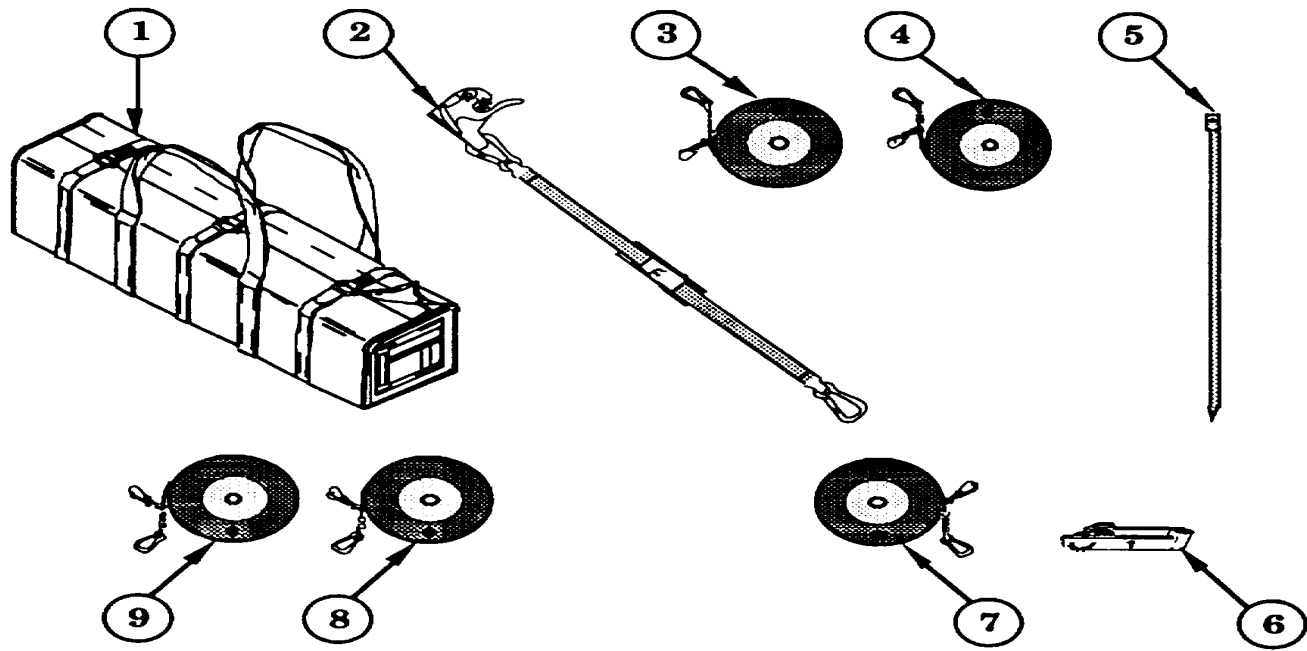
e. Column (5) - Quantity Required (Qty Reqd)

Indicates the quantity of the item authorized to be used with/on the equipment.

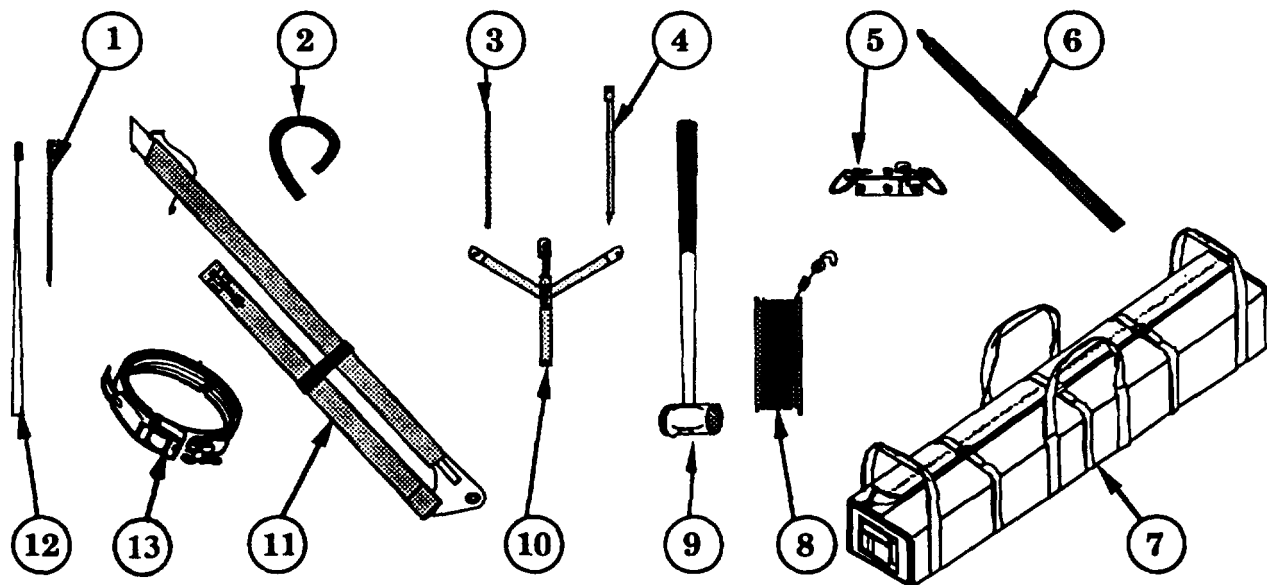
Section II COMPONENTS OF END ITEM



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	Usable On Code	(4) U/M	(5) QTY Reqd
1		Tripod Assembly (80063) A3156804-001		EA	1
2	8105-01-348-4105	Tripod Barrel Bag (80063) A3156830-001		EA	1
3	8105-01-348-4102	Guy Winch Bag (80063) A3157140-001		EA	2
4	5340-01-348-2370	Crank (80063) A3157140-001		EA	2
5	3950-01-349-2445	Guy Winch (80063) A3157140-001		EA	2
6	3950-01-349-9432	Lifting Winch (80063) A3156805-001		EA	1
7	5340-01-348-4113	Crank (80063) A3156826-001		EA	1
8	8105-01-348-4103	Lifting Winch Bag (80063) A3156826-001		EA	1

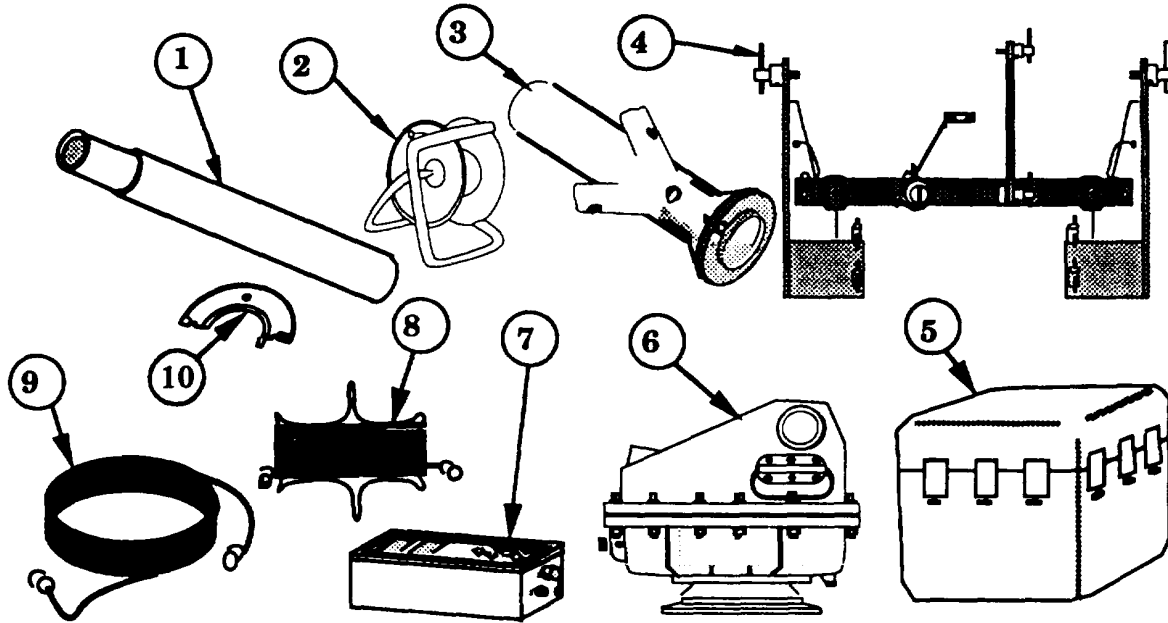


(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	Usable On Code	(4) U/M	(5) QTY Reqd
1	8105-01-348-4104	Guy Accessories Bag (80063) A3156828-001		EA	3
2	4730-01-348-2352	Fast Tensioning System (80063) A3156822-001		EA	18
3	4010-01-348-2300	Guy, 111.9 Feet (80063) A3157151-001		EA	3
4	4010-01-348-2301	Guy, 152.5 Feet (80063) A3156820-001		EA	12
5	4030-01-348-2304	Guy Stake (80063) A3156820-001		EA	12
6	4030-01-348-2305	Guy Stake Couplet (80063) A3156821-001		EA	6
7	4010-01-348-2298	Lower Intermediate Guy assembly (80063) A3156816-001		EA	3
8	4010-01-348-2302	Starbar Guy Assembly (80063) A3156816-001		EA	6
9	4010-01-348-2299	Upper Intermediate Guy Assembly (80063) A3156814-001		EA	3



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC and Part Number	(4) Usable On Code	(5) U/M	QTY Reqd
1	4030-01-348-2303	Anchor Stake (80063) A13156803-01		EA	21
2	8315-0041-3587	Cable Strap (81349) MIF-21840		EA	8
3	5315-01-349-9230	Crosspin (80063) A3156808-001		EA	3
4	5975-01-348-2247	Ground Rod (80063) A3157032-401		EA	2
5	5985-01-348-2321	Guy Ring Assembly (80063) A3156912-001		EA	4
6		Lightning Rod Support (80063) A3157042-001		EA	2
7	8105-01-348-4106	Mast Accessory Bag (88063) A3156831-001		EA	1
8	402-041-349-5327	Radius Rope (80063) A3156811-001		EA	1
9	5120-01-349-2687	Sledge Hammer (80063) A3156807-001		EA	1
10	6635-01-350-5843	Tensiometer (80063) A3156823-001		EA	1
11	5985-01-349-2663	Starbar Assembly (80063) A3156818-001		EA	3
12	5920-01-353-9932	Lightning Rod (80063) A3157041-001		EA	1
13	5365-01-359-3565	Retaining Ring (80063) A3156778-001		EA	1

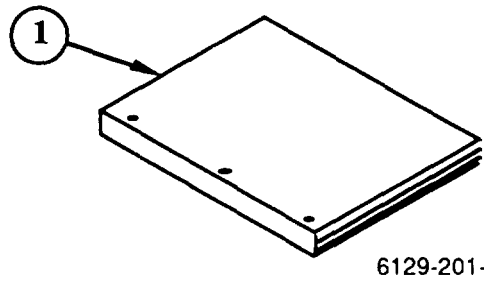
Change 3 C-5



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER Part Number	(3) DESCRIPTION CAGEC and On Code	Usable	(4) U/M	(5) QTY Reqd
1	5985-01-349-2683	Mast Section (80063) A3156813-001		EA	21
2	5995-01-350-5878	Lightning Cable Assembly (80063) A3157043-001		EA	1
3	5985-01-348-2320 (80063) A3157166-001	Top Section		EA	1
4	5340-01-349-2671	Mounting Bracket (80063) A3157201-001		EA	1
5		Transit Case (80063) A3156776-001		EA	1
6		Positioner (80063) A3157301-001		EA	1
7	5985-01-348-2342	Controller (80063) A3157302-001		EA	1
8	5995-01-348-2263	Cable Assembly W2 (80063) A3156763-001		EA	1
9	5995-01-348-2265	Cable Assembly W1 (80063) A3157303-001		EA	1
10	534-01-353-9905	Barrel Cover (80063) A3157158)001		EA	1

Change 1 C-6

Section III. BASIC ISSUE ITEMS



(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION CAGEC and Part Number	(4) Usable On Code	(5) QTY Reqd
1		Technical Manual TM-11-5985-394-13	EA	1

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APPENDIX D
ADDITIONAL AUTHORIZATION LIST

(NOT APPLICABLE)

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APPENDIX E

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

E-1. SCOPE

This appendix lists the expendable supplies and materials you will need to operate and maintain the Mast AB-1373/rRC. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts and Heraldic Items).

E-2. FORMS

a. Column (1) - Item Number

This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "use cleaning compound, item 1, app D").

b. Column (2) - Level

This column identifies the lowest level of maintenance that requires the listed item. One of the following codes appears in column (2).

C - Operator/Crew (Unit)

O - Organizational (Unit)

F - Direct Support

c. Column (3) - National Stock Number

This is the national stock number assigned to the item. Use it to request or requisition the item.

d. Column (4) - Description

Indicates Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. Column (5) - Unit of Measure (U/M)

Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., EA, IN, PR). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

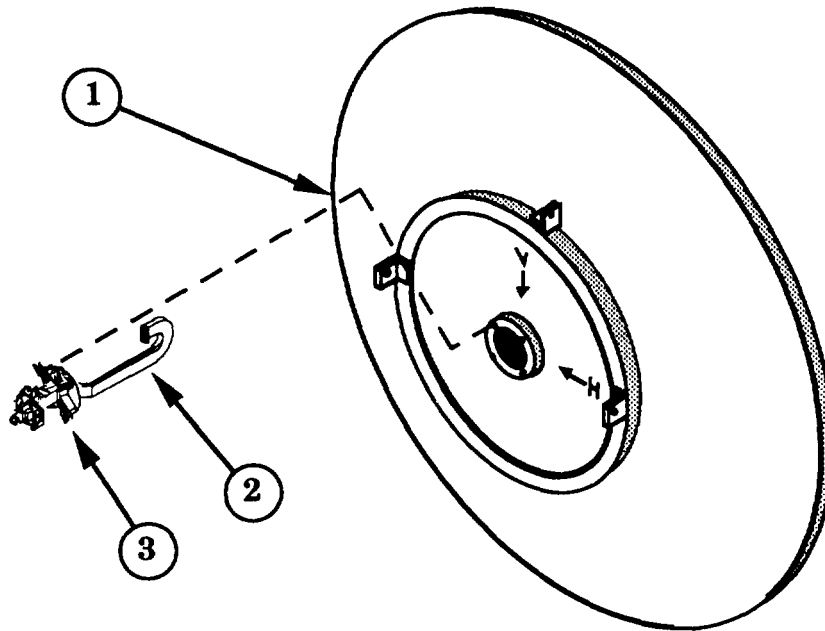
(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) Item name, description, CAGEC, PART NUMBER	(5) U/M
1	F	8020-00-721-9657	Brush, Paint	EA
2	O	8040-00-952-3520	Gasket, Adhesive	
3	C	9150-00-021-8533	Oil, Lubrication, GP	QT
4	F		Epoxy, Adhesive (2-Part) 3M-18388/A, SM-A-916403-40	TU
5	F		Paint, Green (Color #383) (81349) MIL-C-46168	2 GL
6	F	6850-00-105-3084	Trichlorotrifluoroethane	PT
7	F	8415-00-266-8673	Gloves, Chemical Protective	PR
8	C	6850-00-927-9461	Silicone Grease	TU
9	F		OKS-416 Grease	QT
10	F		Loctite #222	
11	F		TTF 52 Grease, MIL-G-4343	QT
12	F		Corrosion Preventive Compound 3410, MIL-C-16173, Grade IV	QT
13	F		Aero Grease 22 Shell, MIL-6-81322	QT
14	F		Isoflex Topas NB-52	QT
15	C	6260-00-106-7478	Chemiluminescent Light	EA
16	F		Sandpaper	EA
17	O		Gloves, Utility	PR
18	O		Goggles	PR

APPENDIX F

MOUNTING OF ANTENNAS

This appendix provides assembly, mounting, and cabling instructions for the AS-1425/GRC antenna (large antenna) and AS-3047/GRC-103(V) antenna (small antenna) used with Mast AB-1373/TRC. Disassembly, dismounting, and decabling instructions are also provided.

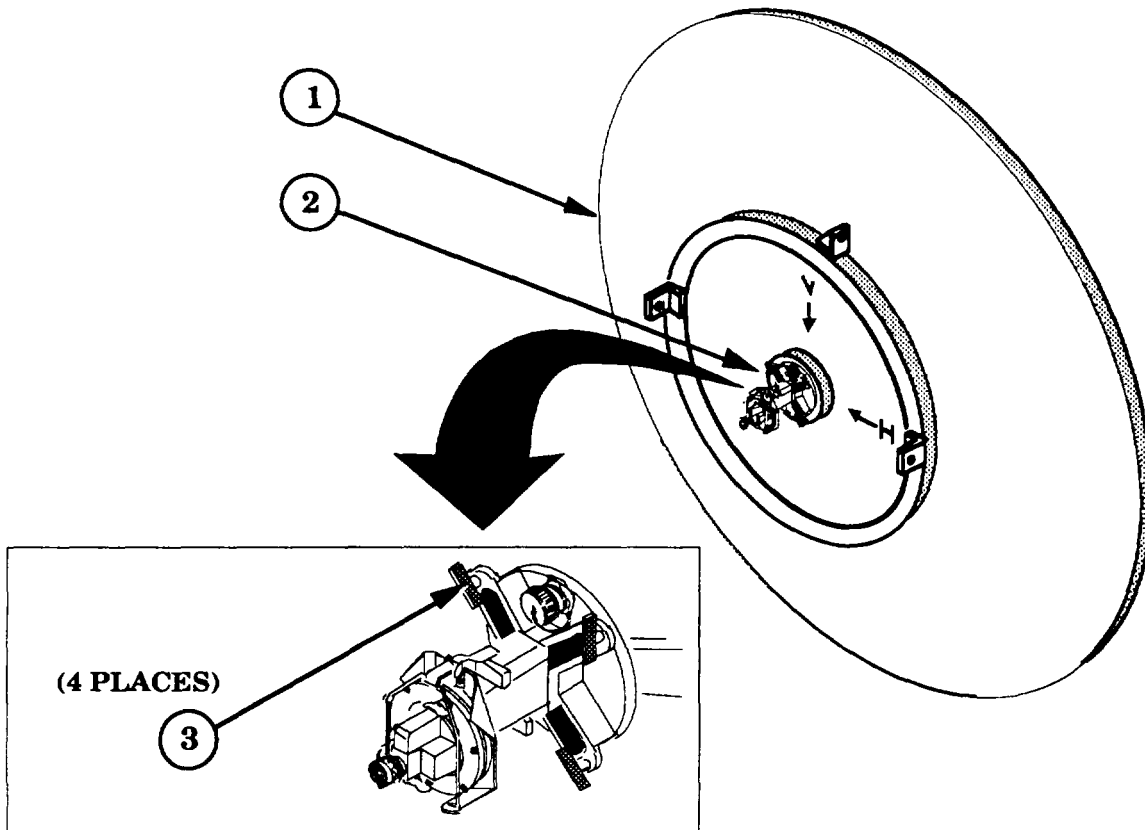
F-1. ASSEMBLY OF AS-1425/GRC ANTENNA (LARGE ANTENNA)

**CAUTION**

To prevent possible damage to antenna reflector, three operators are recommended when performing this procedure.

- a. Remove AS-1425/GRC antenna reflector (1) from OE-481/TRC storage brackets (refer to TM 11-5985-392-13).
- b. Hook and insert front of antenna feedhorn (2) through rear of antenna reflector (1) until mounting plate (3) is flush with antenna reflector (1).

F-1. ASSEMBLY OF AS-1425/GRC ANTENNA (LARGE ANTENNA) - Continued



CAUTION

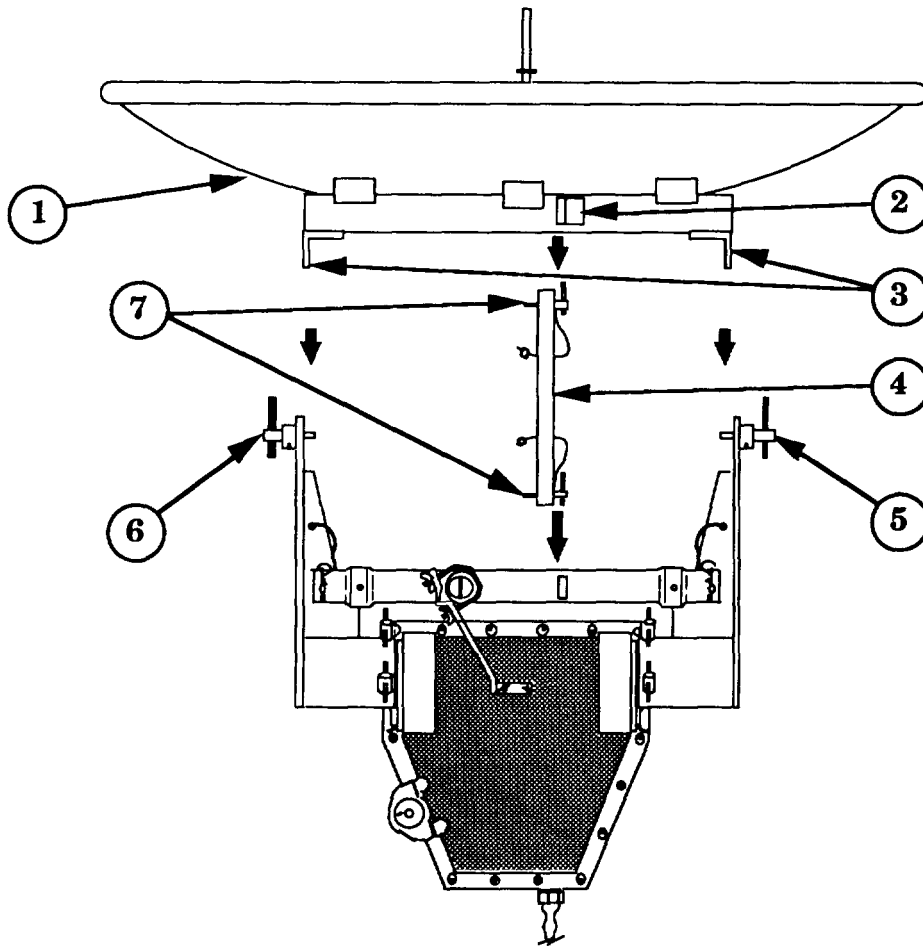
When installing waveguide to coaxial adapter, ensure the interior walls of the adapter and the rear of the feedhorn are aligned correctly. Damage can result to the radio set if waveguide walls are not aligned.

NOTE

Rotate antenna feedhorn assembly for horizontal or vertical polarization as indicated by arrow on antenna for specific radio system. Arrow on feedhorn points in same direction as arrow on antenna reflector.

- c. Secure antenna feedhorn (2) to antenna reflector (1) by tightening four wing nuts (3).
- d. Set antenna assembly aside in secure place. Keep feedhorn and RF coupling clean.

F-2. INSTALLATION OF AS-1425/GRC ANTENNA ASSEMBLY (LARGE ANTENNA)

**NOTE**

Orient antenna so that tab faces up and stenciling is upside down.

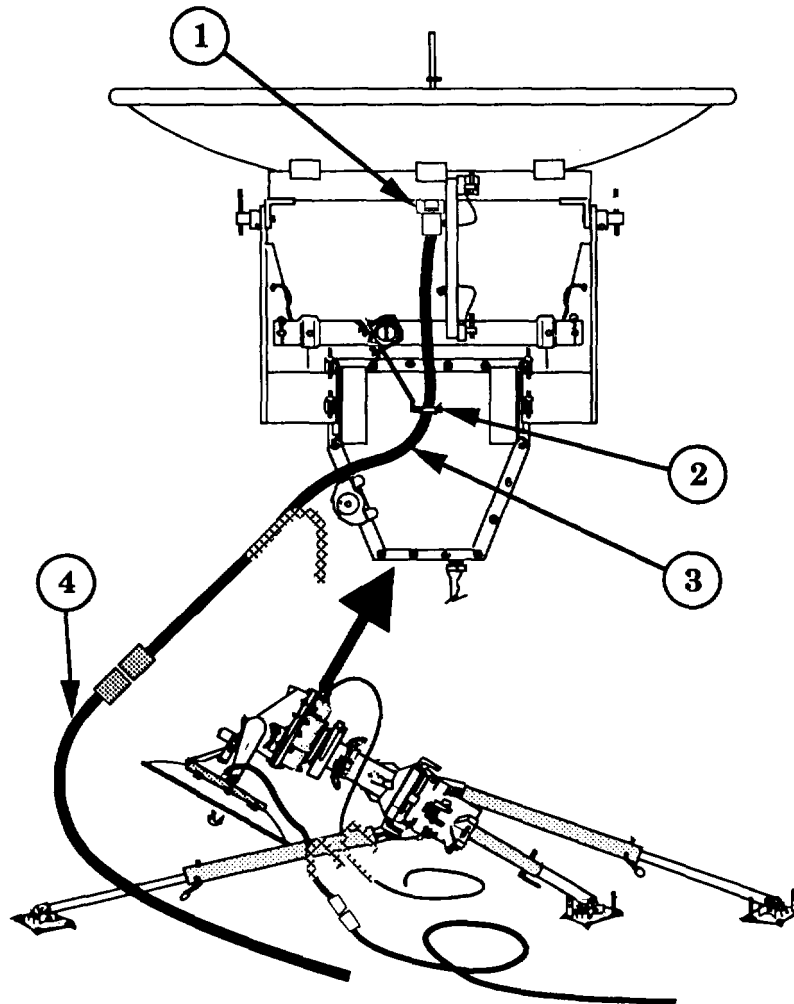
- a. While two operators lift antenna (1) into position, attach captive thumbscrews (5 and 6) to threaded bosses (3) on antenna (1).
- b. Insert captive thumbscrew (7) through tab (2) on antenna mounting bracket assembly (4) and thread into stabilizer bar.

WARNING

Failure to ensure that all thumbscrews are tightened may result in damage to the antenna or personal injury.

- c. Tighten all captive thumbscrews (5, 6, and 7).

F-3. INSTALLATION OF RF CABLE ASSEMBLIES WITH AS-1425/GRC ANTENNA ASSEMBLY (LARGE ANTENNA)

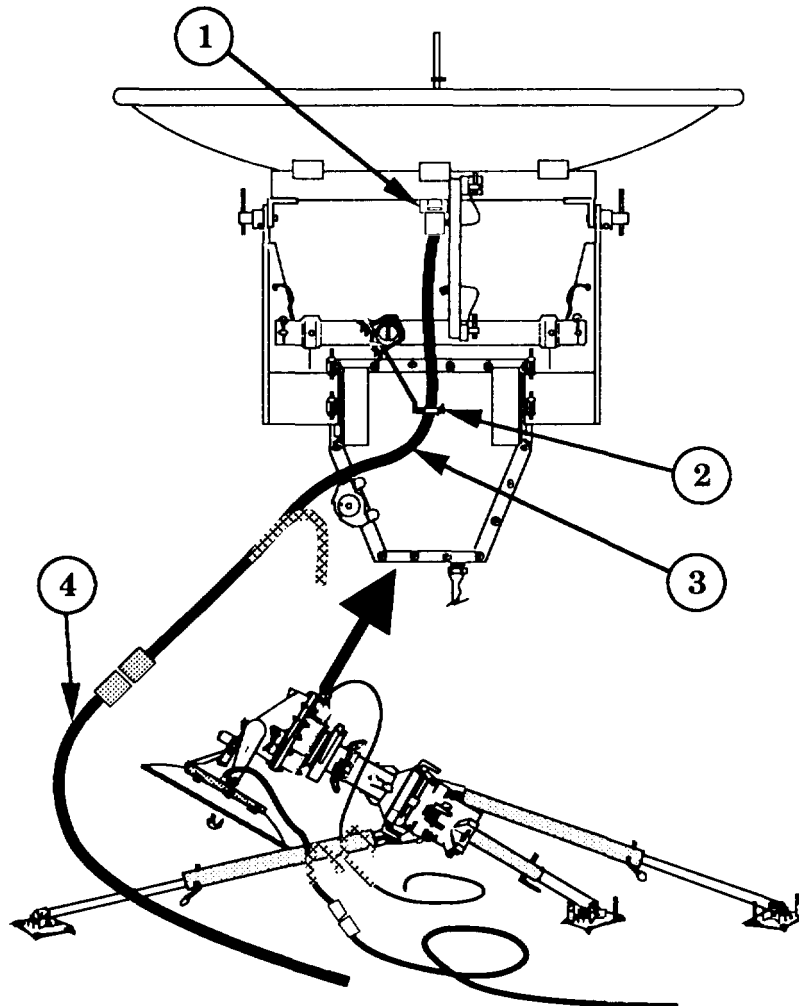


CAUTION

Provide enough slack in RF cable to allow 180 degree rotation of antenna. Failure to comply may result in damage to RF cable, antenna, mounting bracket, or positioner.

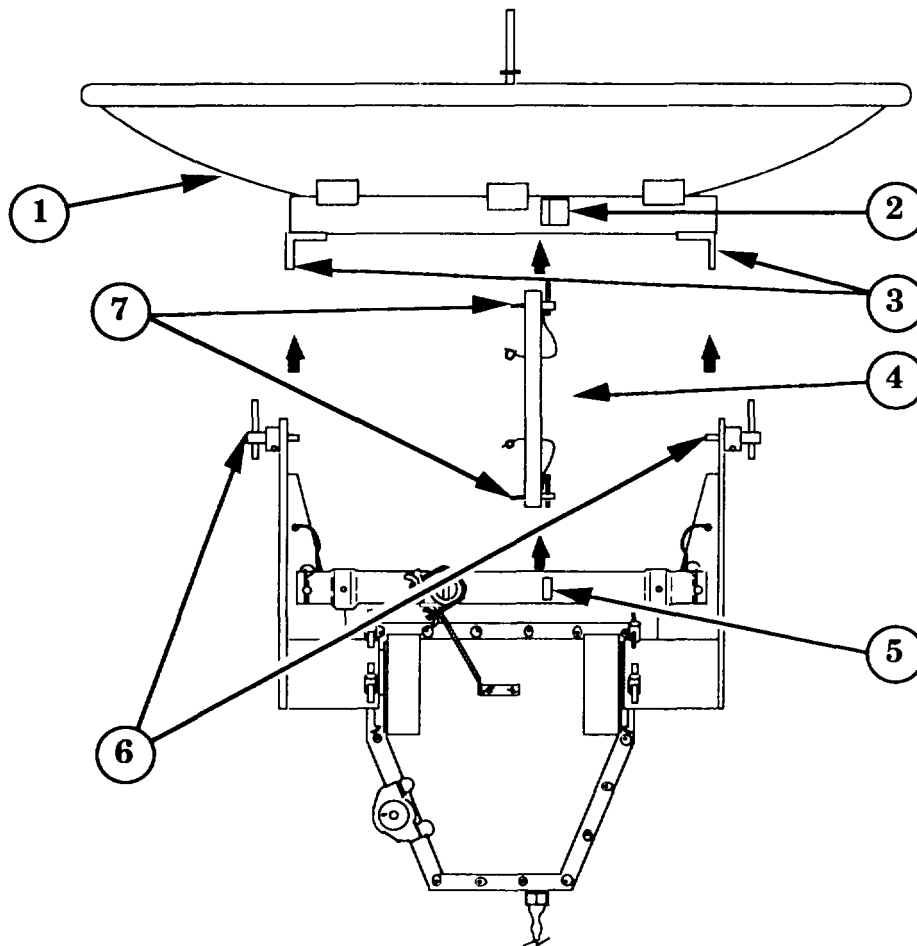
- a. Loosen two wing nuts on cable relief bracket (2) and open latch.
- b. Feed RF cable (3) through slot in cable relief bracket (2).
- c. Connect RF cable (3) to waveguide to coax adapter (1).
- d. Close latch on cable relief bracket (2) and tighten two wing nuts.
- e. Connect second RF cable (4) in series with first RF cable (3).

F-4. REMOVAL OF RF CABLE ASSEMBLIES FROM AS-1425/GRC ANTENNA ASSEMBLY (LARGE ANTENNA)



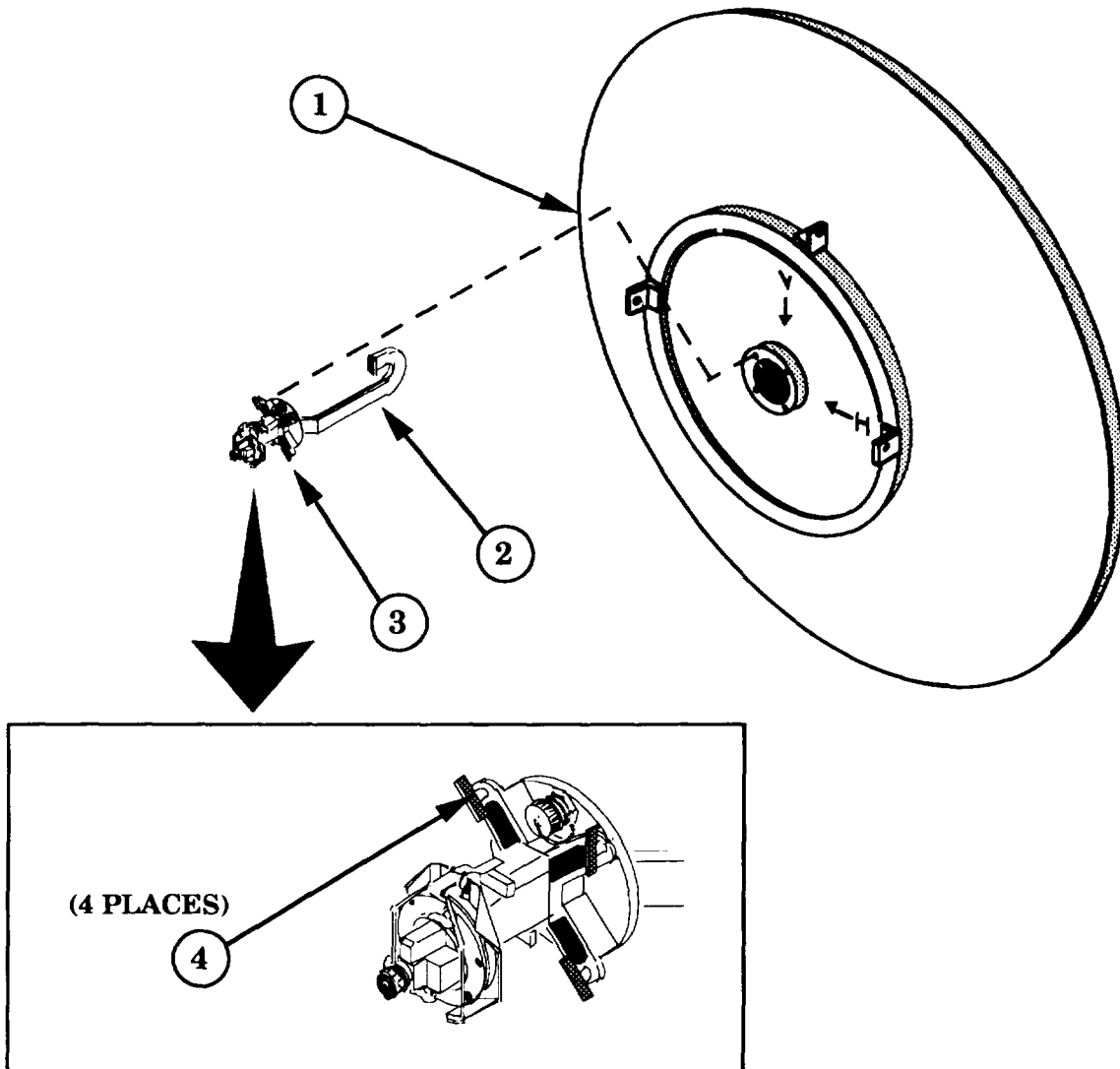
- a. Disconnect second RF cable (4) that is in series with first RF cable (3).
- b. Disconnect RF cable (3) from waveguide to coax adapter (1).
- c. Loosen two wing nuts on cable relief bracket (2) and open latch.
- d. Remove RF cable (3) from slot in cable relief bracket (2).
- e. Close latch on cable relief bracket (2) and tighten two wing nuts.

F-5. REMOVAL OF AS-1425/GRC ANTENNA ASSEMBLY (LARGE ANTENNA)



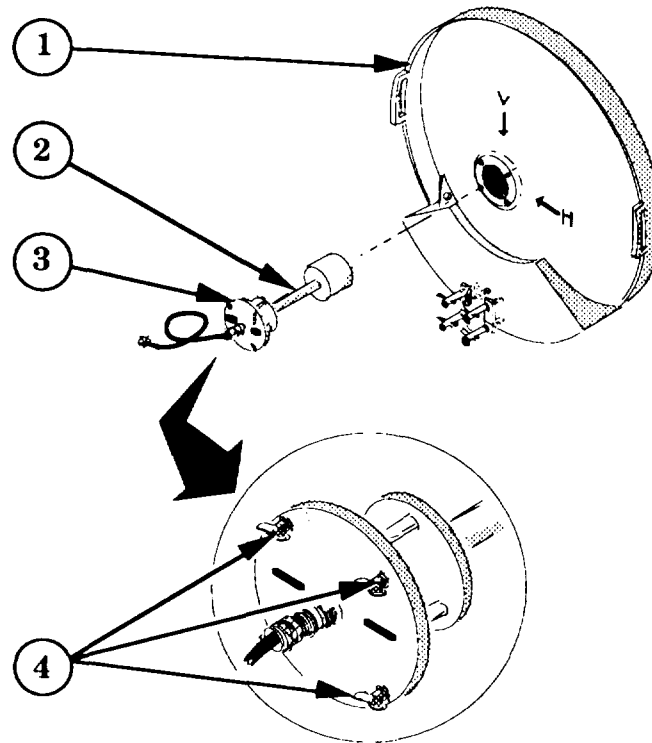
- a. Release thumbscrew (7) attaching stabilizer bar (4) to tab on antenna (2).
- b. Release thumbscrew (7) attaching stabilizer bar (4) to tab on antenna mounting bracket assembly (5).
- c. While two operators support antenna (1), detach captive thumbscrews (6) from threaded bosses (3) on antenna (1).
- d. Remove antenna (1) from bracket assembly (5).
- e. Set antenna assembly aside in secure place. Keep feedhorn and RF coupling clean.

F-6. DISASSEMBLY OF AS-1425/GRC ANTENNA (LARGE ANTENNA)



- a. Loosen four thumbscrews (4) securing antenna feedhorn mounting plate (3) to antenna reflector (1).
- b. Remove antenna feedhorn (2) from antenna reflector (1).
- c. Return AS-1425/GRC antenna reflector to OE-481/TRC retaining brackets (refer to TM 11-5985-392-13).

F-7. ASSE,B;U PF AS-3047/GRC-103(V) ANTENNA (SMALL ANTENNA)

**NOTE**

The AS-3047 antenna assembly consists of AS-3414/GRC-103(V) antenna reflector and AS-3415/GRC -103(V) antenna feed.

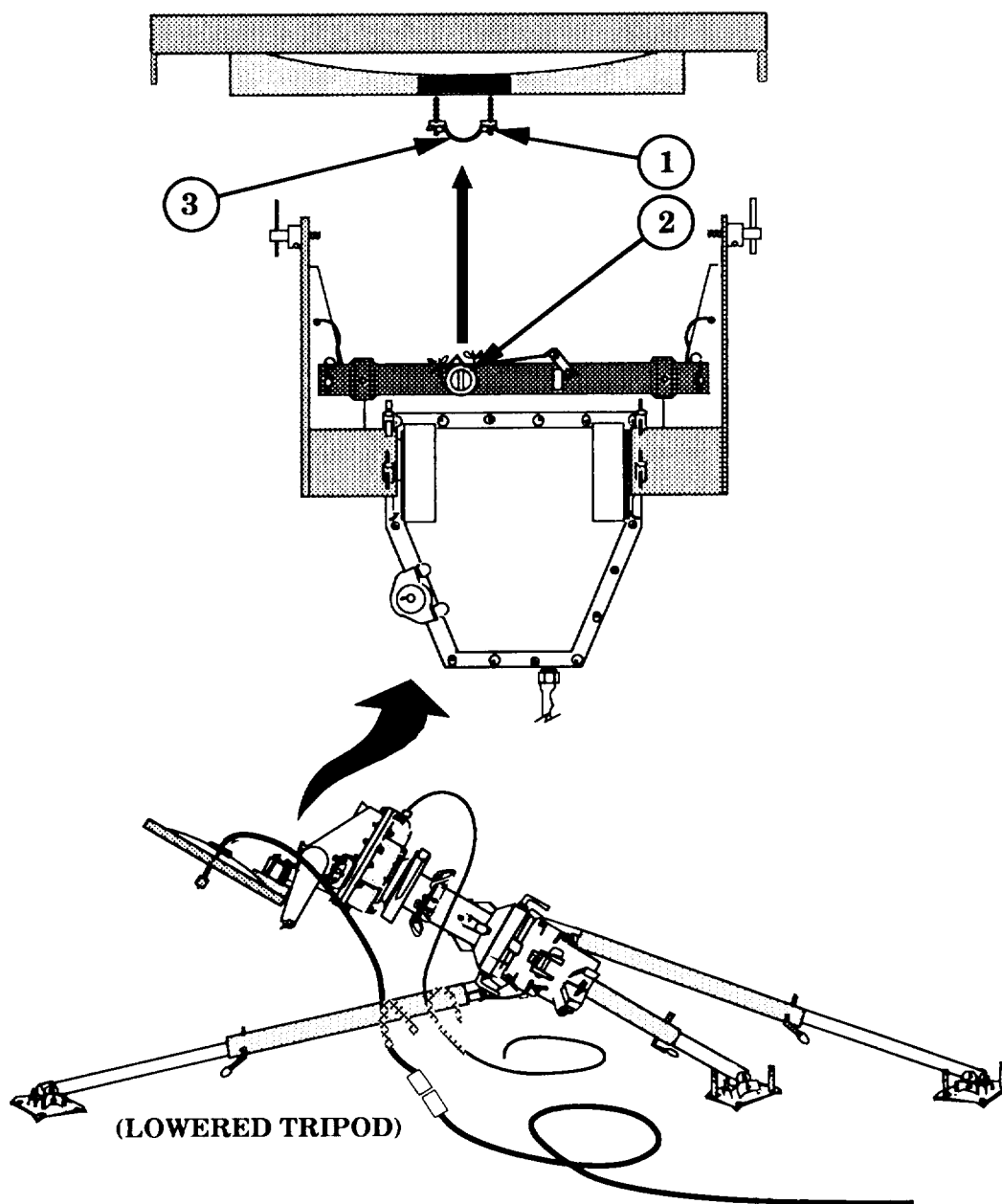
- a. Remove antenna reflector from OE-481/TRC support bracket (refer to TM 11-5985-392-13).
- b. Remove antenna feedhorn (2) from OE-481/TRC storage rack.
- c. Insert front end of antenna feedhorn (2) through rear of antenna reflector (1) until mounting plate (3) comes in contact with antenna reflector(1).

Note

Rotate the antenna feedhorn for horizontal or vertical polarization as directed.

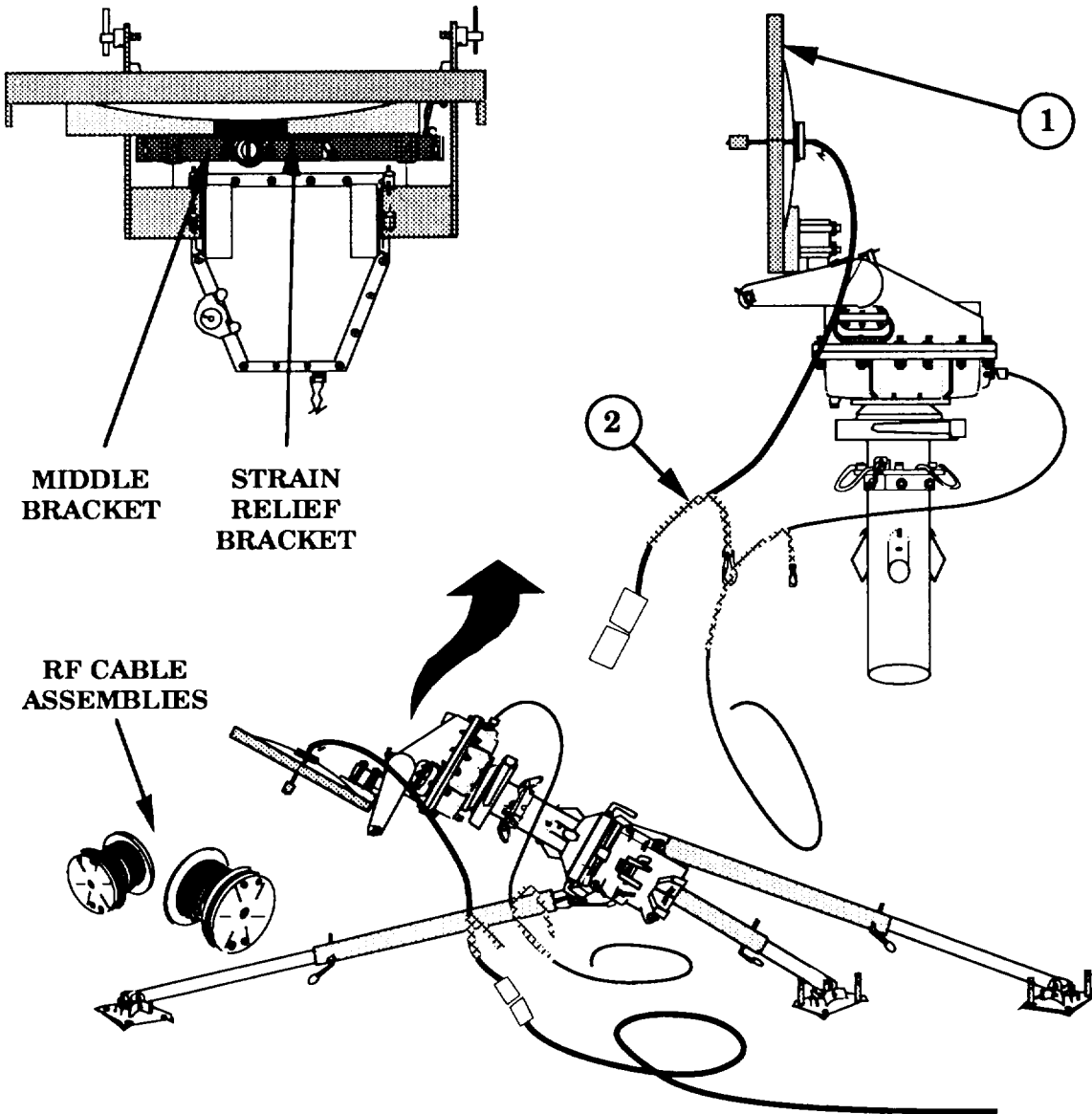
- d. Attach antenna feedhorn (2) to antenna reflector (1) by locking four ¼-turn fasteners (4).

F-8. INSTALLATION OF AS-3047/GRC-103(V) ANTENNA ASSEMBLY (SMALL ANTENNA)



- Loosen four thumbscrews (1) on back of antenna reflector.
- Set antenna mounting clamp (3) onto AB-1373/TRC upright post (2).
- Tighten four thumbscrews.

F-9. INSTALLATION OF RF CABLE ASSEMBLY WITH AS-3047/GRC-103(V) ANTENNA ASSEMBLY (SMALL ANTENNA)



CAUTION

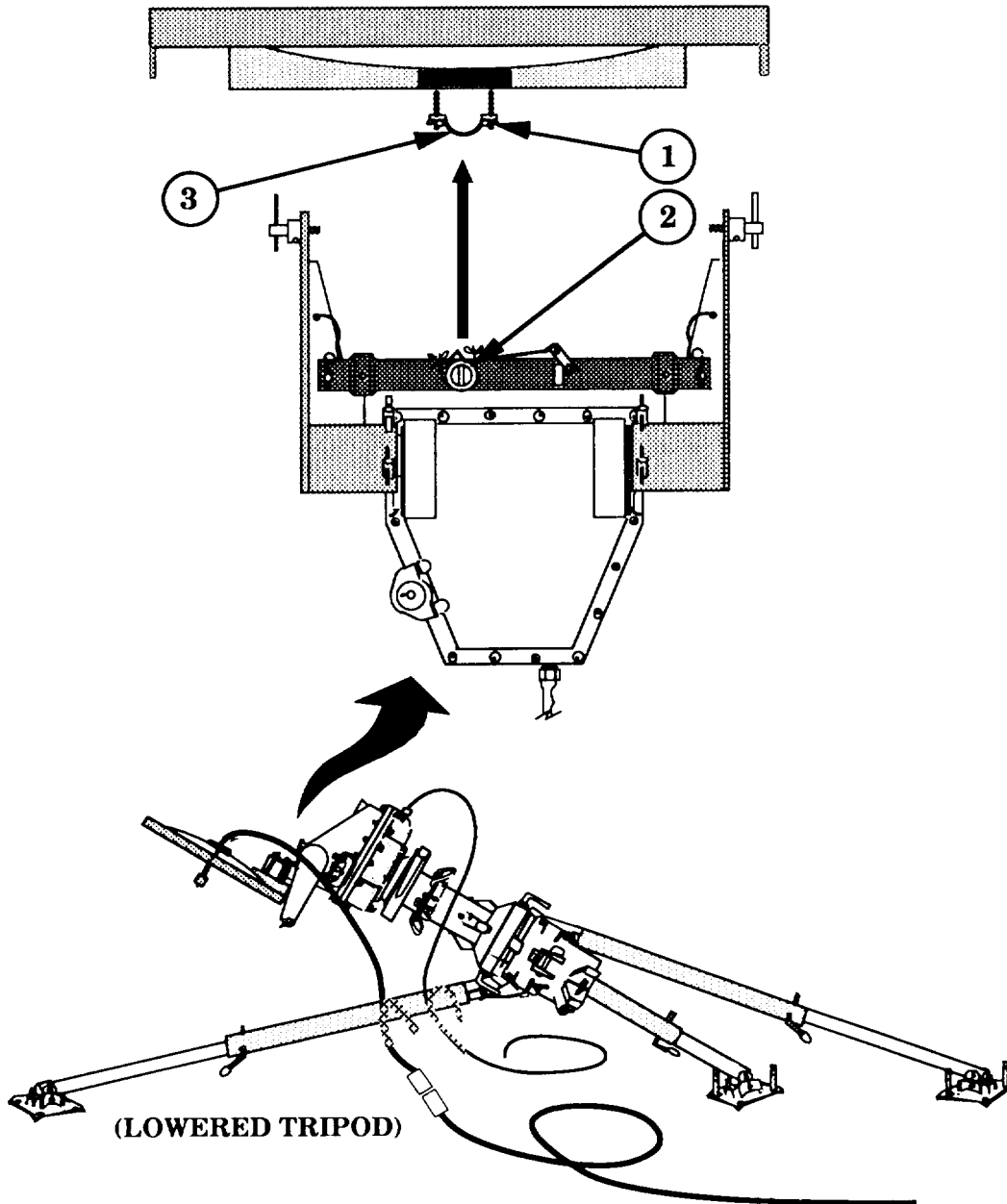
Provide enough slack in RF cable to allow 180 degree rotation of antenna. Failure to comply may result in damage to RF cable, antenna, mounting bracket, or positioner.

- a. Remove protective cover from RF cable.
- b. Connect RF cable (2) to AS-3047/GRC-103(V) antenna assembly (1).

F-10. REMOVAL OF RF CABLE ASSEMBLY FROM AS-3047/GRC-103(V) ANTENNA ASSEMBLY (SMALL ANTENNA)

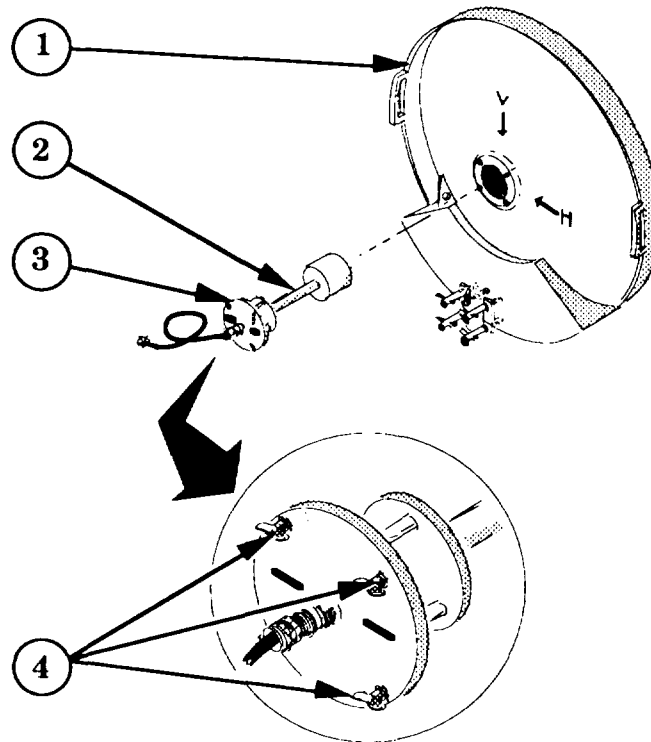
- a. Disconnect RF cable from AS-3047/GRC-103(V) antenna assembly.
- b. Replace protective cover and roll up on cable reel on pallet assembly.

F-11. REMOVAL OF AS-3047/GRC-103(V) ANTENNA ASSEMBLY (SMALL ANTENNA)



- a. Loosen four clamp wing nuts (1).
- b. Remove antenna mounting clamp (3) from upright post (2).

F-12. DISASSEMBLY OF AS-3047/GRC-103(V) ANTENNA (SMALL ANTENNA)



- a. Disconnect antenna feedhorn (2) from antenna reflector (1) by releasing four 1/4-turn fasteners (4) on mounting plate (3).
- b. Remove antenna feedhorn (2) from rear of antenna reflector (1).
- c. Return feed horn (2) to OE-481/TRC storage rack.
- d. Place antenna reflector into OE-481/TRC support bracket (refer to TM 11-5985-392-13).

APPENDIX G**MULTIPLE MAST SITE LAYOUT****G-1. GENERAL**

Multiple mast deployments require that all mast tripods be within reach of the RF cables supplied. A maximum of three masts may be installed together.

G-2. SITE LAYOUT

Orientation of masts in a three-mast deployment is critical. The three masts must be sited so as to allow clearance for the shelter truck to get in and out without running over ground-running guy cables, etc.. However, if ground-running guy cables are eliminated after deployment of a mast, the truck can maneuver in and around the masts more easily.

Multiple mast deployment at a single site requires that each mast (A, B and C) be within 50 feet of the shelter assembly. A maximum of three masts may be installed, with each shelter assembly. For deployment of two masts, use mast locations A and B.

NOTE

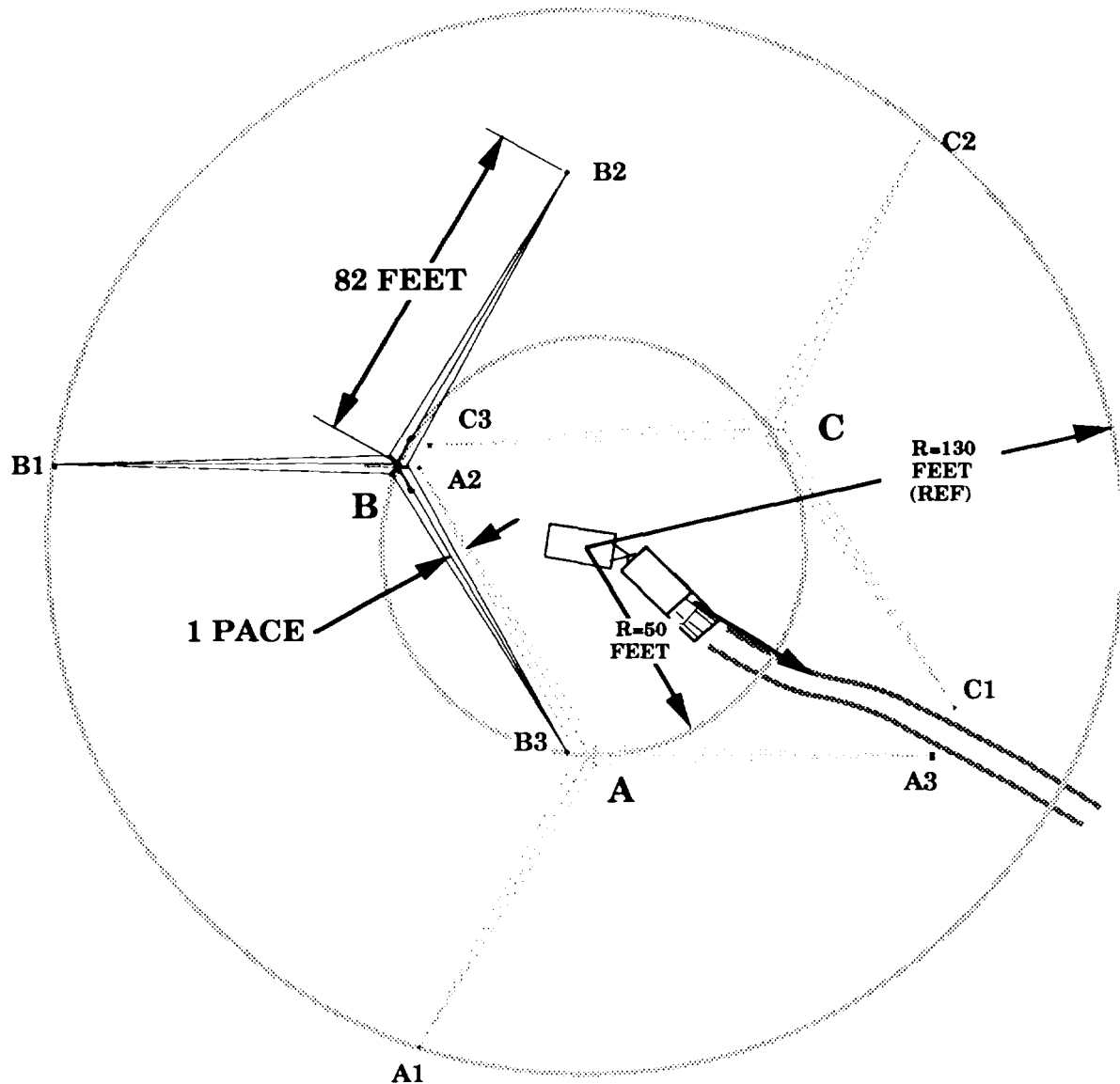
In a two or three mast system, terrain, trees, or other obstacles may require adjustment in the locations of the masts.

Suggested site layouts for two and three-mast deployments are shown in paragraph G-4. Site layouts are arranged to prevent guy cable assemblies from overlapping.

G-3. CABLING

The primary consideration regarding cabling is the reach of the RF cable (50 feet), which must run from the tripod base to the shelter hookup. Cabling diagrams for multiple mast installations follow the site layout illustrations.

G-4. SITE LAYOUT FOR DEPLOYMENT OF MULTIPLE MASTS



- a. Select deployment site with an approximate radius of 130 feet.

NOTE

Cable assembly W1 is marked in 2-foot increments up to 100 feet

- b. Connect two 82-foot radius ropes together. Mark length of rope to 130 feet using cable assembly W1.
- c. Park truck at center of deployment site
- d. Remove Mast AB-1373/TRC equipment from OE-481/TRC in accordance with instructions in TM 115985-392-13
- e. Approximate location desired for truck to exit multiple mast site.

G-4. SITE LAYOUT FOR DEPLOYMENT OF MULTIPLE MASTS -Continued

- f. Walk 10 paces toward truck from truck exit point located on 130 foot radius and mark this location with a ground rod as a temporary marker
- g. Locate anchor position A3 four paces from ground rod located in step f. Lay out guy stake couplers in accordance with paragraph 2-11.
- h. Operator 1: Stand at guy anchor position A3 holding end of radius rope.

NOTE

Cable assembly W1 from A1373/TRC is marked with blue marker strips every two feet.

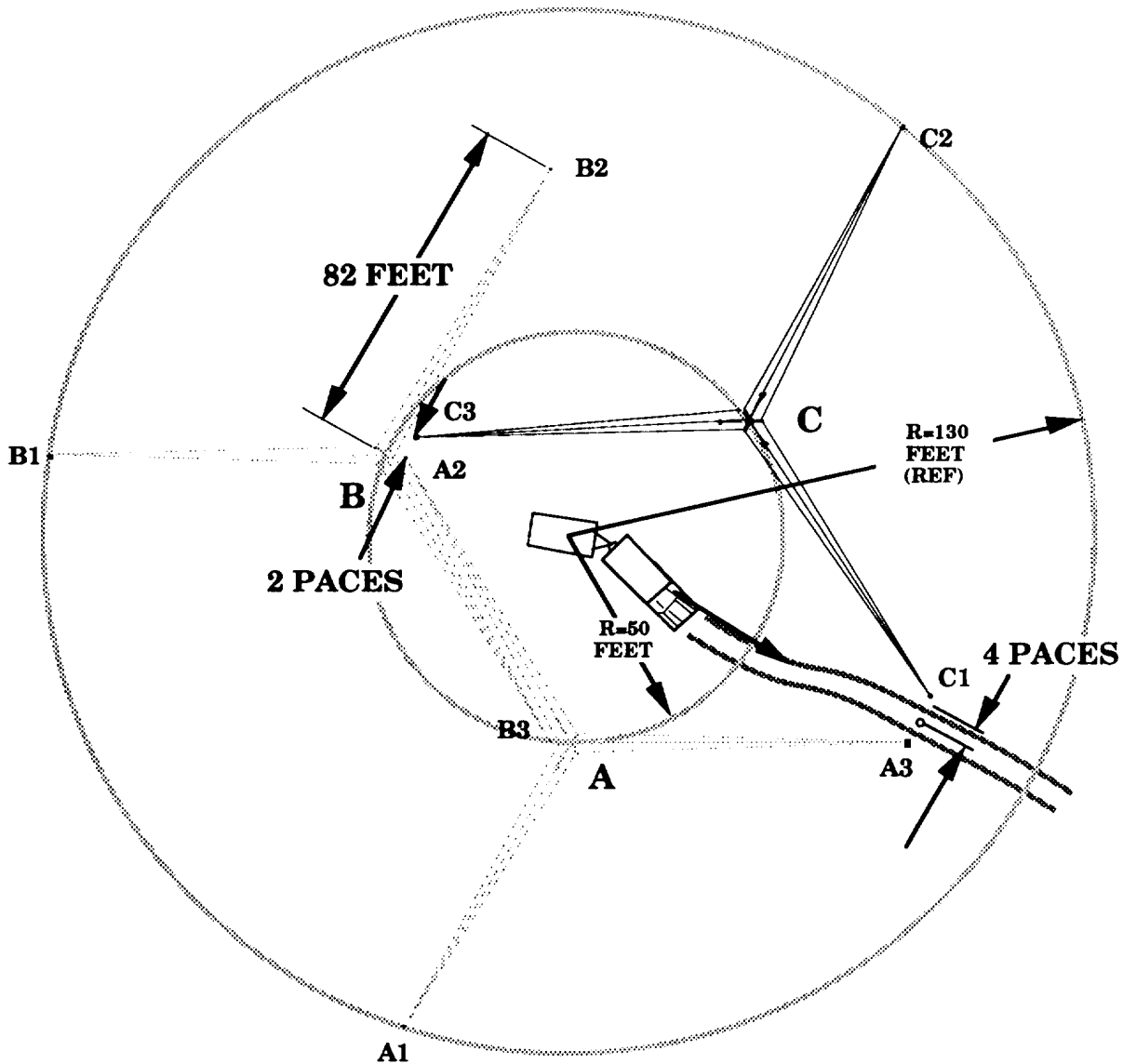
Operator 2: Stand at shelter video entrance box holding one end of cable assembly W1.

Operator 3: Hold opposite end of radius rope in one hand and cable assembly W1 in other hand at the 50 foot marker. Locate center for tripod A by walking away from shelter and guy anchor position A3 until both lines are taut

- i. Set up tripod A with one leg in line with guy anchor position.
- j. Use radius rope to determine guy anchor positions A1 and A2. Lay out guy stake couplers in accordance with paragraph 2-11.

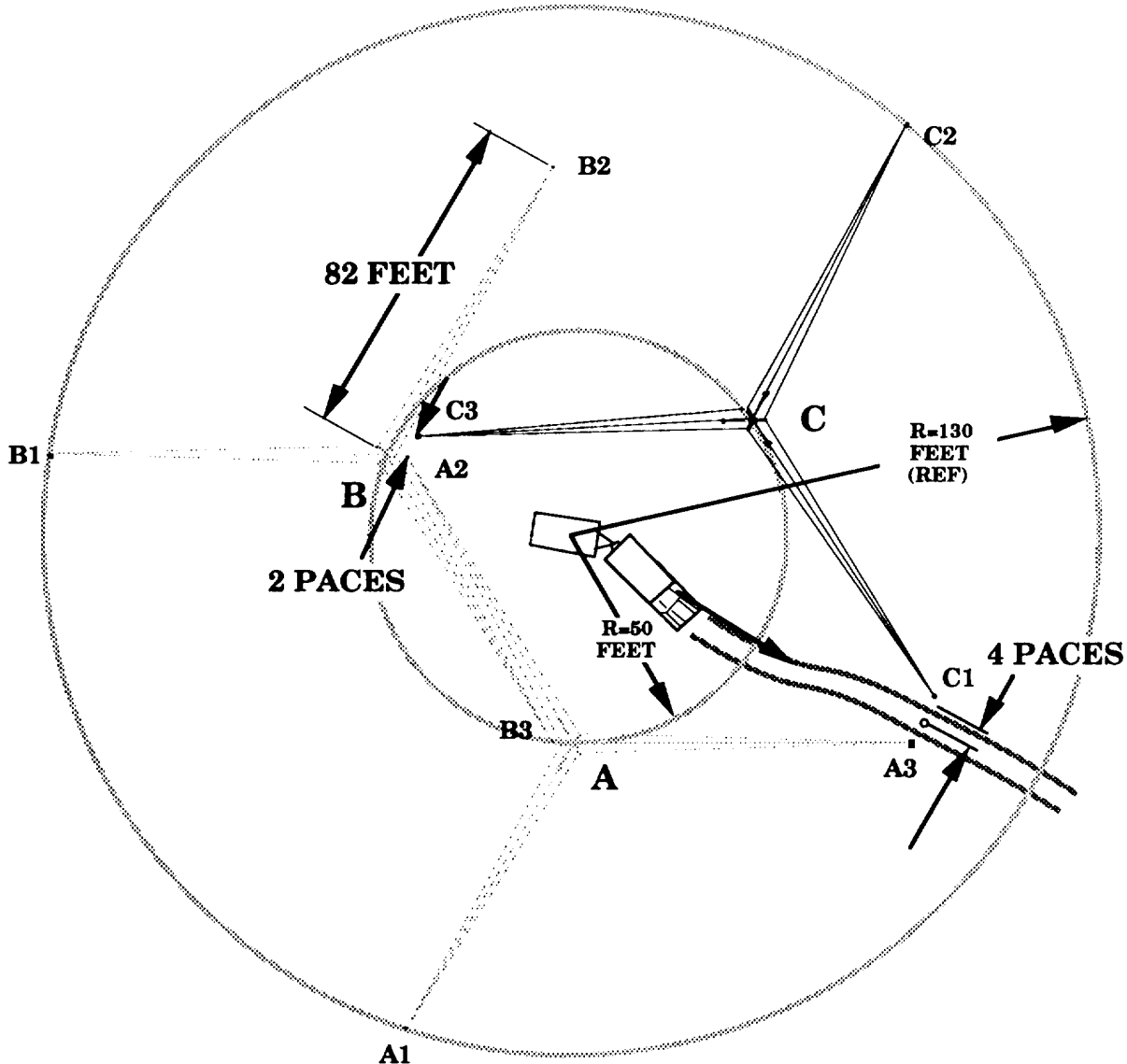
G-3

G-4. SITE LAYOUT FOR DEPLOYMENT OF MULTIPLE MASTS -Continued



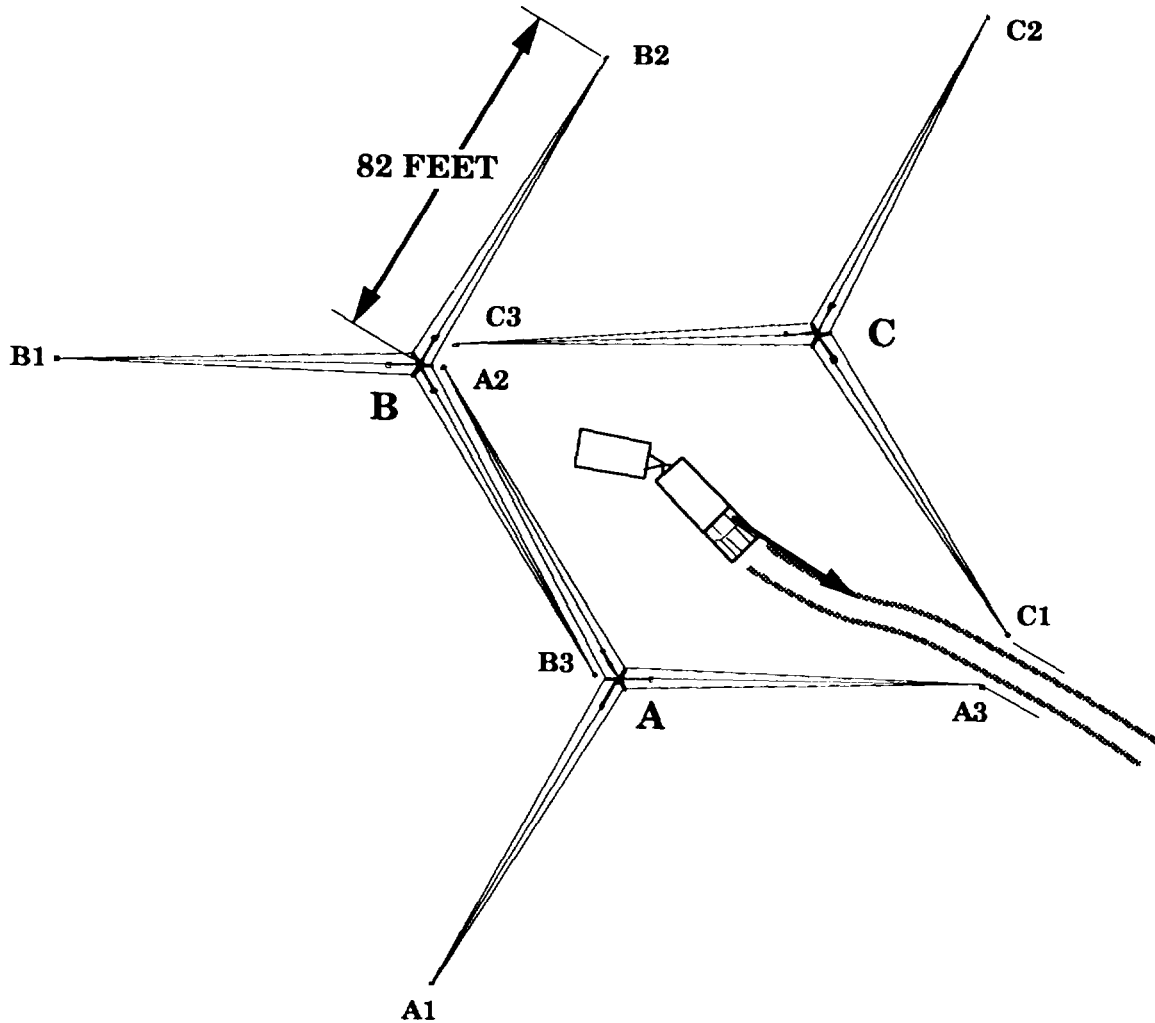
- k. Locate tripod B one pace beyond guy anchor position A2 and at a distance of 50 to 52 feet from the shelter video entrance box, using cable assembly W1 as a measuring tool.
- l. Use radius rope to determine guy anchor position B3, one pace away from line between tripod A and guy anchor position A2.
- m. Position tripod B until one leg is in line with anchor position B3.
- n. Use radius rope to determine guy anchor positions B1 and B2.
- o. For two mast deployment, go to step v.

G-4. SITE LAYOUT FOR DEPLOYMENT OF MULTIPLE MASTS - Continued



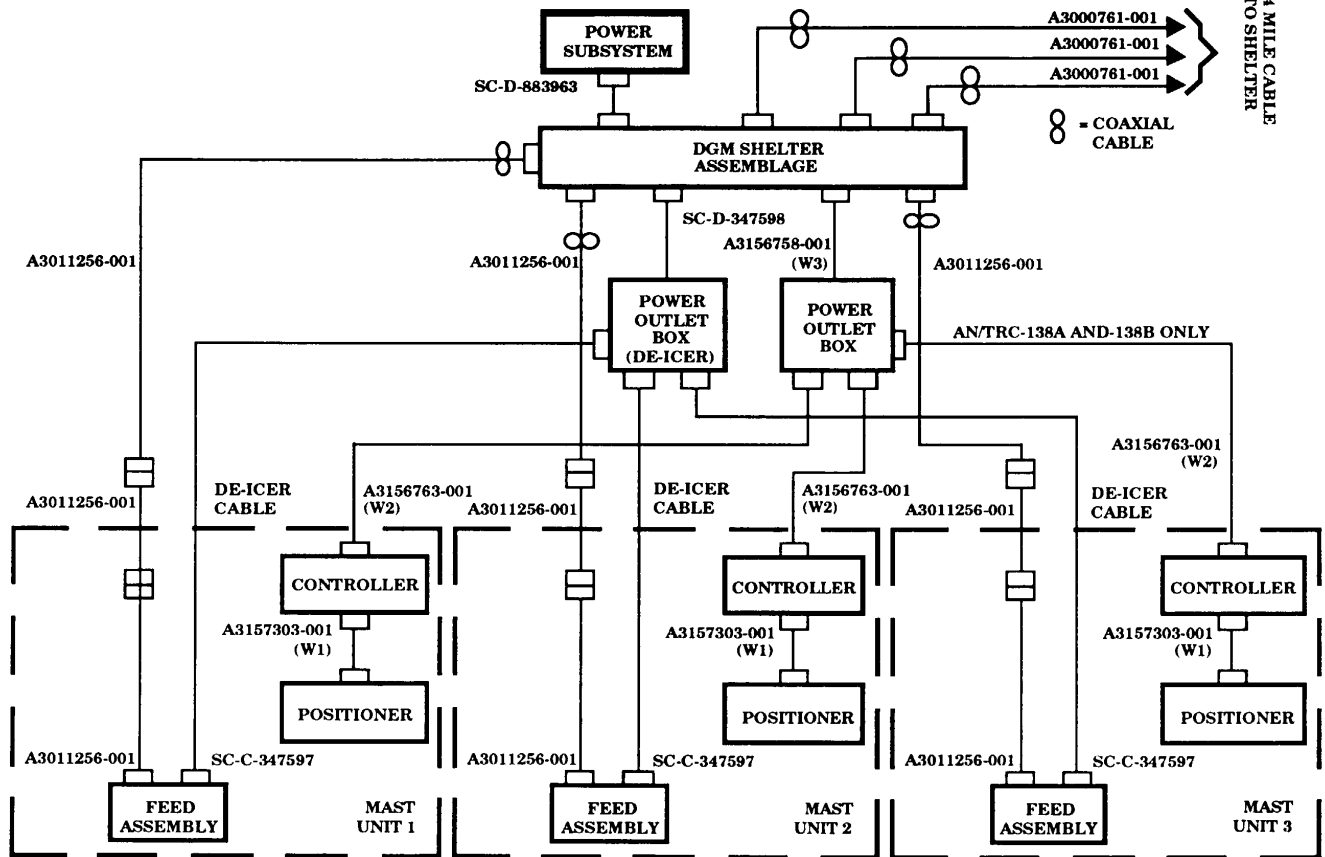
- p. Locate guy anchor position C3, two paces from Tripod B. Layout guy stake couplers in accordance with paragraph 2-11.
- q. Locate guy anchor position C1, four paces from ground rod located in step f. Layout guy stake couplers in accordance with paragraph 2-11.
- r. Operator 1: Stand at guy anchor position C1, holding end of radius rope. Operator 2: Stand at guy anchor position C3 holding end of second radius rope.
Operator 3: Grasp opposite ends of radius rope held by operators 1 and 2; locate center of tripod C by walking away from shelter until both lines are taut.

G-4. SITE LAYOUT FOR DEPLOYMENT OF MULTIPLE MASTS - Continued



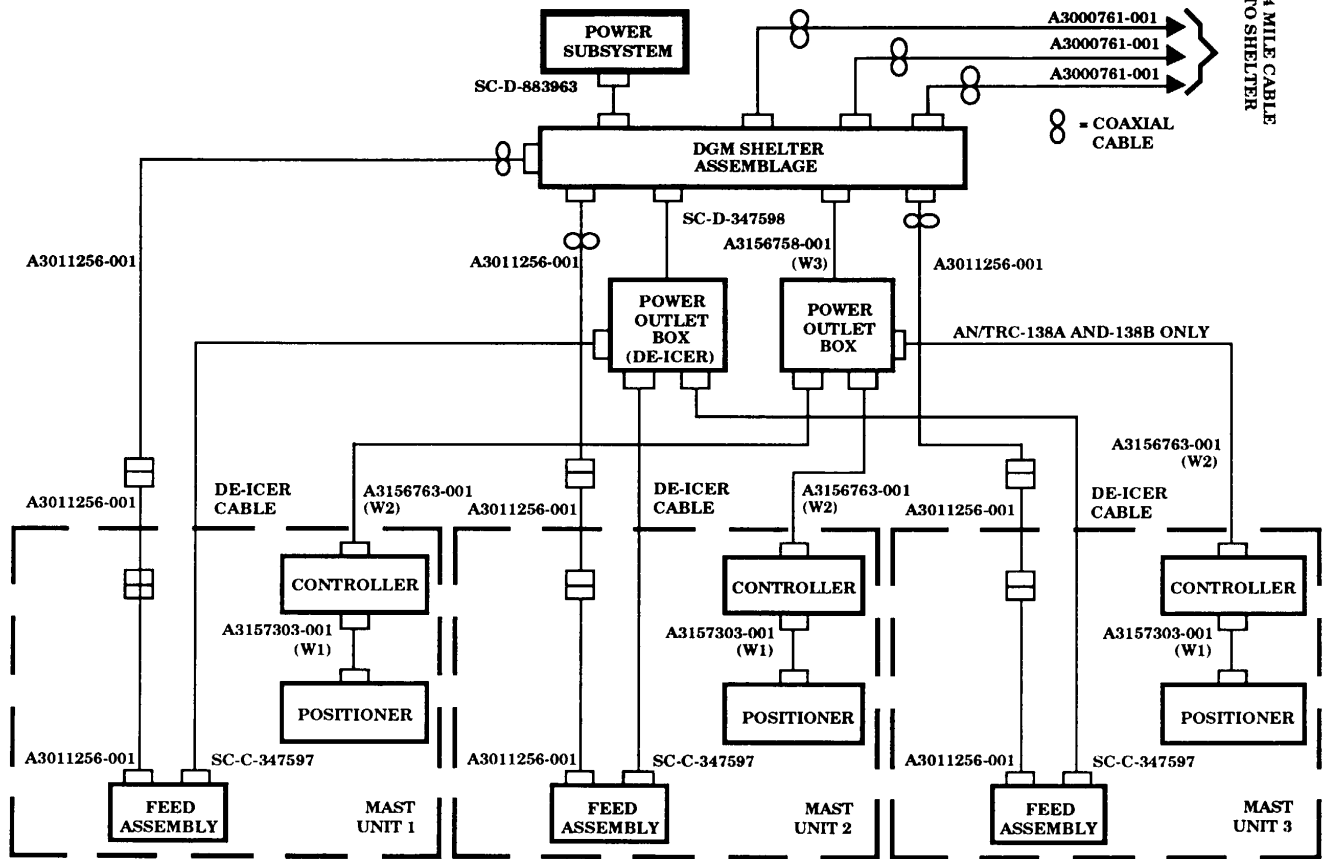
- s. Verify tripod C to shelter video entrance box distance is 50 to 52 feet using cable assembly W1 as a measuring device.
- t. Set up tripod C with one leg in line with guy anchor position C3.
- u. Use radius rope to determine guy anchor position C2. Layout guy stake couplers in accordance with paragraph 2-11.
- v. Erect masts A, B, and C, each in accordance with instructions in Chapter 2.

G-4. SITE LAYOUT FOR DEPLOYMENT OF MULTIPLE MASTS - Continued



Typical Cabling Diagram for AN/TRC-173, -173A, -174 and -174A

G-4. SITE LAYOUT FOR DEPLOYMENT OF MULTIPLE MASTS - Continued



Typical Cabling Diagram for AN/TRC-138A, -138B, -175 and -175B

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