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TM 11-5820-773-15

TECHNICAL MANUAL

1.75

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST

RADIO REPEATER SET AN/TRC-138

(NSN 5820-00-133-8841)

This copy is a reprint which includes current pages from Changes 1 through 4.

HEADQUARTERS, DEPARTMENT OF THE ARM

OCTOBE

WARNING

HIGH VOLTAGE

Is used in this equipment

DEATH ON CONTACT MAY RESULT IF SAFETY PRECAUTIONS ARE NOT OBSERVED

Maintenance adjustments of this equipment are made with power applied. Be careful when working near the interior of the equipment, or near the ac power distribution.

WARNING

VENTILATION IS ESSENTIAL

To prevent asphyxiation, ventilate the AN/TRC-138 at all times when it is occupied.

DON'T TAKE CHANCES!

Operator and maintenance personnel should be familiar with the requirements of the TB SIG291 before attempting installation or operation of the equipment covered in this manual. Failure to follow requirements of TB SIG 291 could result in injury or DEATH. Prior to erecting the antenna, read the WARNING and SAFETY pages in chapter 2.

138 →
TM 11-5820-773-24P
Shelter only Technical Manual

WARNING
AVOID INJURY TO PERSONNEL

When lifting or loading assemblages on a truck, only personnel engaged in the actual loading operation should be permitted near the truck, lifting device, and assemblage.

When installing the antenna masts, do not release the handbrake when the elevator platform is not flush with the mast section (para 2-4).

Make sure the assemblage is properly grounded before the input power is connected (para 2-3).

If a Radio Set AN/VRC-46 is used in the assemblage, dangerous RF voltages exist on the AS-1729 antenna components while transmitting. Prior to installation of the AS-1729/VRC whip antenna, survey the area carefully for location of power lines, their height above the ground level and their proximity to the installation site. The AS-1729/VRC must be installed as far away as possible from Electric Power lines, but never closer than twice its height. Failure to follow these requirements could result in injury or death.

Technical Manual
No. 11-5820-773-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *13 October 1971*

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT AND DEPOT MAINTENANCE MANUAL

RADIO REPEATER SET AN/TRC-138 (NSN 5820-00-133-8841)

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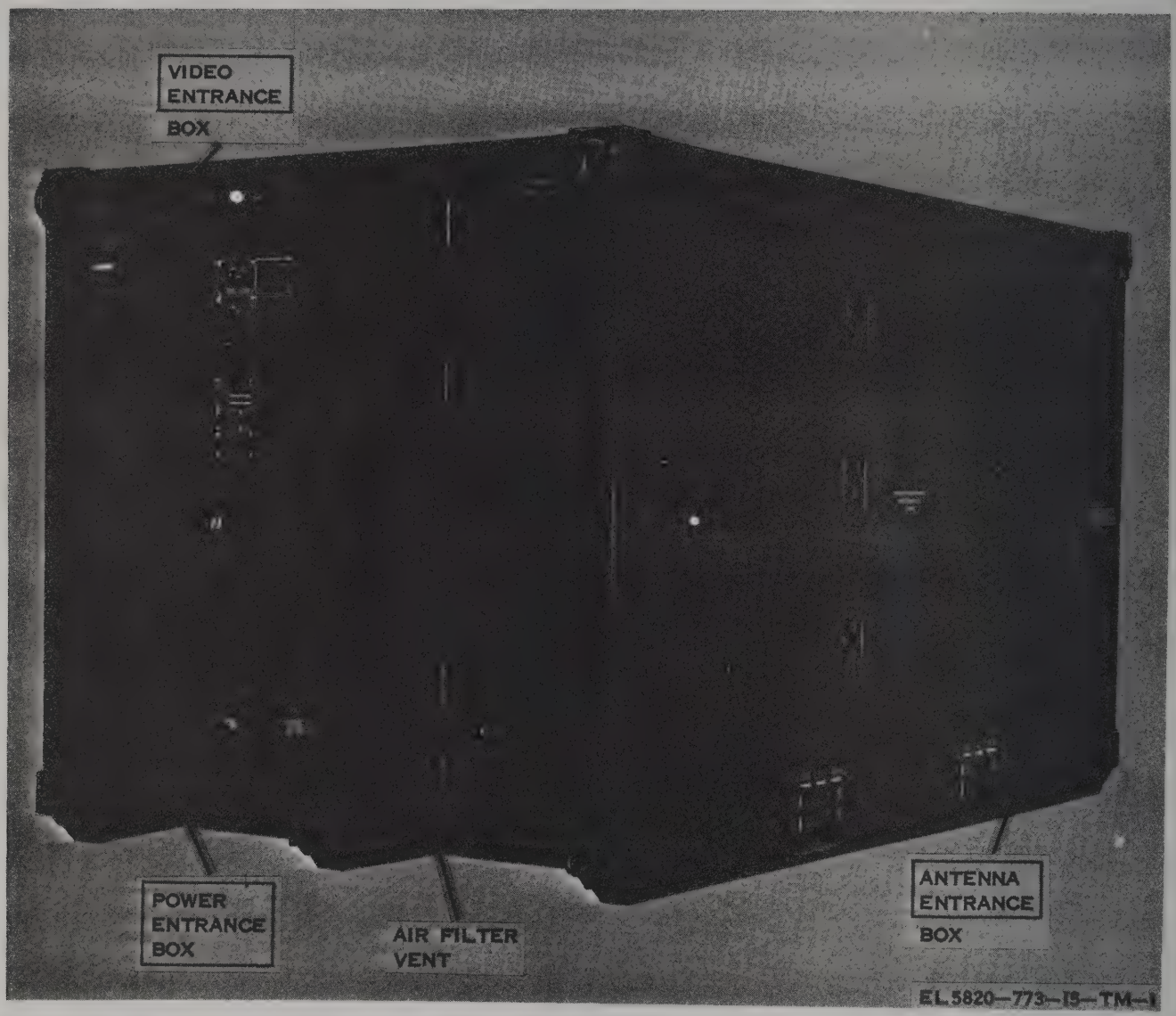


Figure 1-1. Radio repeater Set AN/TRC-138, rear curbside view.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes Radio Repeater Set AN/TRC-138 (fig. 1-1 and 1-2) and covers the installation; operation; and operator, organizational, direct, and general support maintenance.

NOTE

The AN/TRC-138 is modified to provide facilities for the installation of Radio Set AN/VRC-46 and Power Supply PP-2953/U. Radio Set AN/VRC 46 and Power Supply PP-2953/U are Table of Organization (s) and Equipment (TOE) components and are not supplied with the AN/TRC-138. For the installation procedures for the AN/VRC-46 and the PP-2953/U, refer to paragraphs 5-4 and 5-5 in this publication. For the operational procedure refer to paragraphs 5-6 through 5-14. For maintenance procedures for Radio Set AN/VRC-46, refer to TM 11-5820-401-12 and TM 11-5820-401-35. For maintenance procedures for Power Supply PP-2953/U refer to TM 11-6130-233-12 and TM 11-6130-233-35.

b. Throughout this manual, where appropriate, references are made to other publications which cover the installation, operation and maintenance of the equipments installed in the AN/TRC-138. A complete listing of applicable reference publications is provided in appendix A.

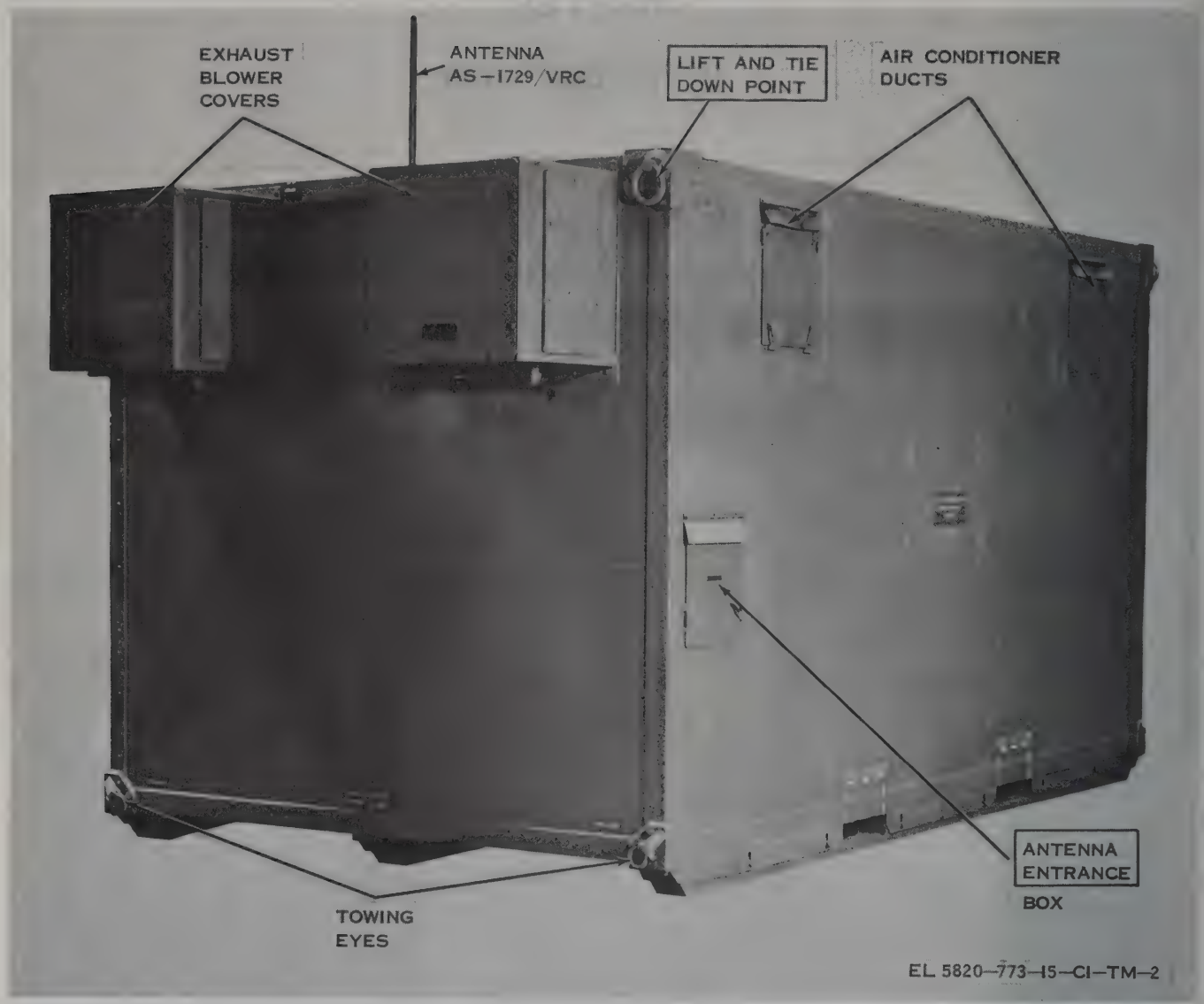


Figure 1-2. Radio repeater set AN/TRC-138, front roadside view.

c. The maintenance allocation chart appears in appendix D.

1-2. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) 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 described by TM 38-750, The Army Maintenance Management System.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/ NAVSUPINST 4030.29/AFR 7.1-13/MCO 4030.29A, and DLAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/ NAVSUPINST 4610.33B/AFR 75-18/MCO P4610.19C and DLAR 4500.15.

1-3.1. 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 pro-

cedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), direct to: Commander, US Army Communications and Electronic Material Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. A reply will be furnished direct to you.

1-3.2. Reporting Equipment Improvement Recommendations (EIR)

If your Radio Repeater Set AN/TRC-138 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 your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put in on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. We'll send you a reply.

1-3.3. Administrative Storage

Instructions for administrative storage of the radio transmitting set is in paragraph 4-18.

1-3.4. Destruction of Army Electronic Materiel

Destruction of electronic equipment will be under the direction of the commander. Demolition and destruction will be performed in accordance with TM 750-244-2.

Section II. DESCRIPTION AND DATA

1-4. Purpose and Use

a. Purpose. Radio Repeater Set AN/TRC-138 is an air- qr vehicular-transportable assemblage used to provide radio-cable converter or repeater facilities for Army area pulse code modulation (pcm) communications systems.

b. Use. The use of the AN/TRC-138 is governed by the tactical situation and the requirements set down by the system planner. Although the AN/TRC-138 is primarily a 48-channel radio repeater, it may be used as a 48-channel radio-cable converter. Refer to figure 1-3 for typical applications of the AN/TRC-138. Two of the equipment sets in the AN/TRC-138 may be used as a 48-channel radio repeater and the third equipment set may be used as a radio-cable converter.

NOTE

The AN/TRC-138 is often used in 12/24 channel mode. The operating procedures are the same as for 48-channel operation.

1-5. Technical Characteristics

a. Power Requirements.

Input voltage	120 volts (50/60 hertz, single phase).
Consumption:	
Fluorescent lights (17)	340 watts.
Incandescent lights (8)	200 watts.
POWER DISTRIBUTION BOX	4 watts.
Exhaust blowers (2)	500 watts.
Heaters (2)	3,000 watts.
T-1054/GRC-144 (3)	825 watts.
R-1467/GRC-144 (3)	525 watts.
CV-425/U (3)	75 watts.
LS-147C/FI	40 watts.

b. Pcm Cable Characteristics.

Pulse type	Binary dipulse.
To cable	2 volts peak.
From cable	30 mv nominal.
Input and output impedance	62 ohms.
Bit rate	2,304 kHz.
Pulse width	180 to 230 nsec.
Cable type	CX-4245/U or CX-11230/U.
Maximum distance to TD-204/U	20 miles.
Order-wire:	
Facility	Baseband channel independent of pcm traffic.
Frequency response	300 to 1,700 hertz.
Signaling frequency	1,600 hertz.
Transmit level	9 volts rms minimum at 880 ohms.
Receiver level	Adjustable 150 mv rms to 16 volts rms across 880 ohms.

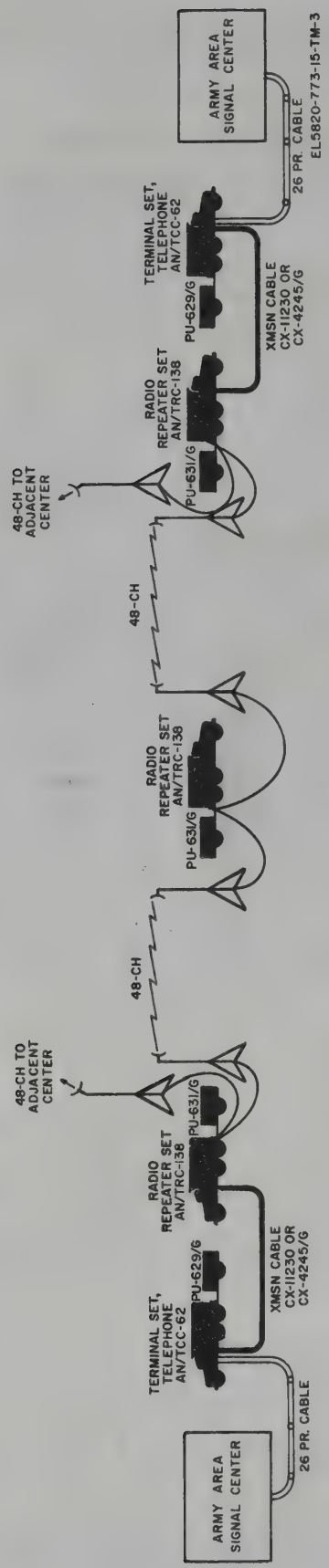


Figure 1-3. Typical applications of AN/TRC-138.

c. PCM Radio Characteristics.

Modulation	Frequency modulation (fm).
Frequency range	4,400 to 5,000 Mhertz.
Rf. Channels	6001.
Channel separation	100 Khertz.
Transmitter power	250 mwatts nominal.
Minimum transmitter-to-receiver frequency separation required	75 Mhertz.
Noise figure	5.5 db maximum.
Order wire:	
Output signal:	
Handset	−18 ± 3 dbm.
Remote telephone	−14 ± 3 dbm.
Output impedance:	
Handset	150 ohms.
Remote telephone	600 ohms.
Input signal:	
Handset	0 dbm.
Remote telephone	0 dbm.
Input impedance:	
Handset	50 ohms.
Remote telephone	600 ohms.
Frequency response	300 to 1,800 Hertz.

d. Mechanical Characteristics.

Dimensions:	
Length	147 in. (less exhaust blowers).
Width	87 in.
Height	83 in.
Volume	614 cu. ft.
Gross weight	4588 lb.
Load per skid	2 lb per sq. in.

1-6. Components of the AN/TRC-138.

The components that make up an operable AN/TRC-138 are identified in appendix B, Components of End Items List (COEIL) and appendix C, Additional Authorization List (AAL). Appendix B identifies the components that make up the end item while appendix C identifies those components required for operation that are not issued with the AN/TRC-138.

1-7. Description

(figs. 1-1, 1-2, and 1-4 through 1-15 and FO-1)

All components of the AN/TRC-138 are housed in Shelter, Electrical Equipment S-393/TRC-138 except certain antenna parts (para 1-6), which are stored in the PU-631/G (fig. 1-9). The S-393/TRC-138 is fully insulated and weatherproofed, and can be transported by air or ground vehicle. Equipment racks are secured to the floor and walls of the S-393/TRC-138, and mountings are provided for storing spare parts and accessories.

a. Lighting. Seventeen flourescent light fixtures are mounted on the ceiling of the assemblage (fig. FO-1) to provide primary lighting. Eight incandescent lights provide lighting when the temperature is too low for the flourescent light to operate. The lighting may be controlled by a door interlock for blackout operations, or bypassed if blackout conditions are not required.

b. Power Connections. Watertight ac power receptacles are provided in the POWER ENTRANCE BOX on the roadside rear wall of the assemblage (fig. 1-1) for connection to an external power source. The ac power is routed through the POWER DISTRIBUTION PANEL and the wall ducts to the various ac receptacles and the ceiling lights. Ac power may be provided by an engine generator set, such as the PU-631/G, or from a central power source. A generator switchbox is provided with the PU-631/G (fig. 1-9) to provide uninterrupted operation when utilizing power from the generator sets of the PU-631/G. The POWER ENTRANCE BOX also contains binding posts for remote order wire field telephone connections, standard field telephone line connections, and local intercommunication connections.

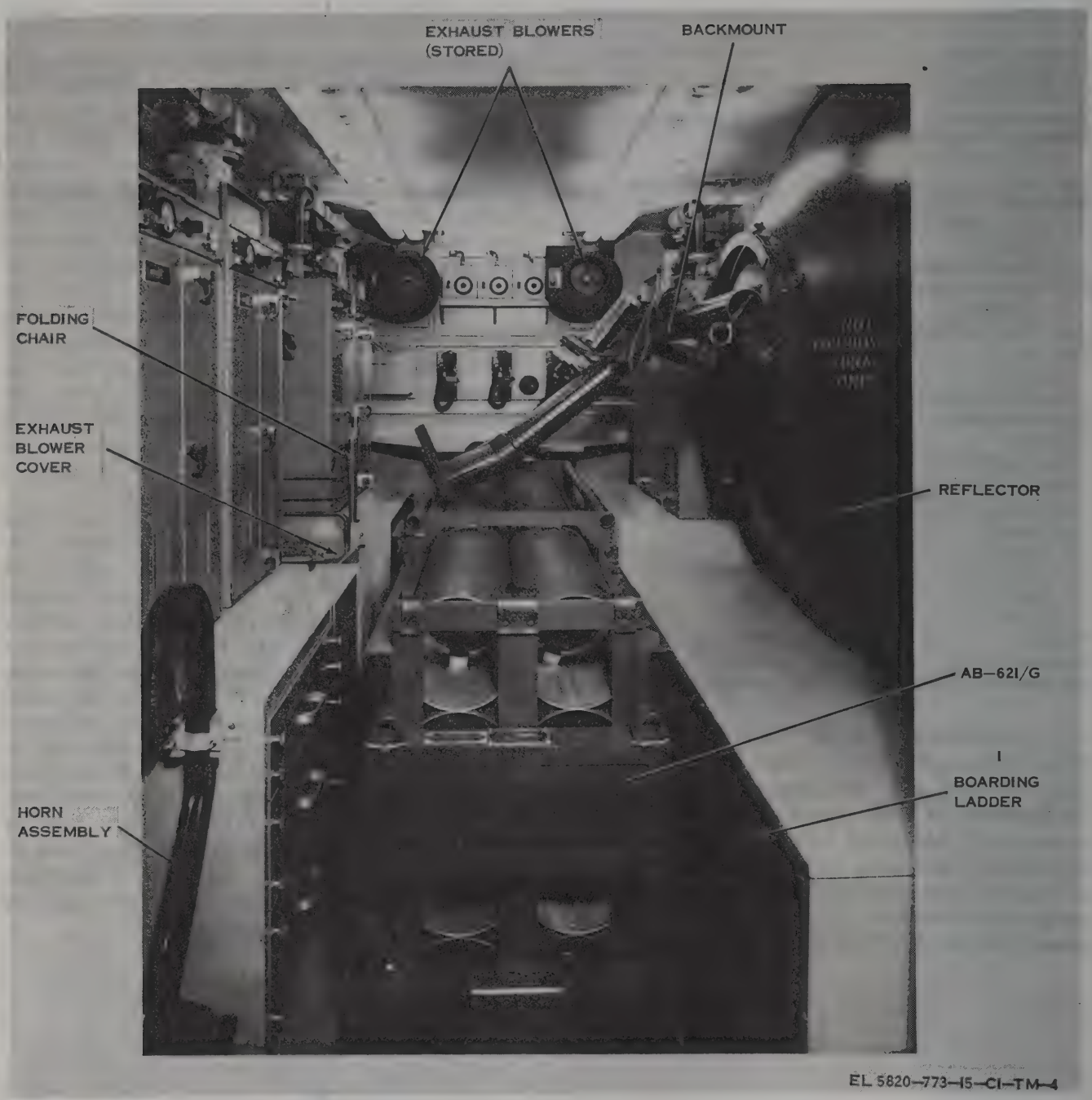


Figure 1-4. Radio Repeater Set AN/TRC-138, interior front view, packaged for shipment.

c. Signal Connections. Pcm connections are made to the AN/TRC-138 through receptacles in the VIDEO ENTRANCE box on the rear roadside wall of the assemblage (fig. 1-1). The rf waveguide connections from the antenna assemblies are made to the ANTENNA ENTRANCE boxes on the curbside wall and the roadside wall (fig. 1-2) of the assemblage.

d. Antenna Assemblies. Three antenna assemblies, each consisting of Mast Assembly AB-621/G and Antenna AS-1425/GRC, are provided for the three equipment systems in the assemblage. The components for the antenna assemblies are stored in the S-393/TRC-138 and the PU-631/G. The components that make up the AS-1425/GRC are illustrated in figures 1-14 and 1-15.

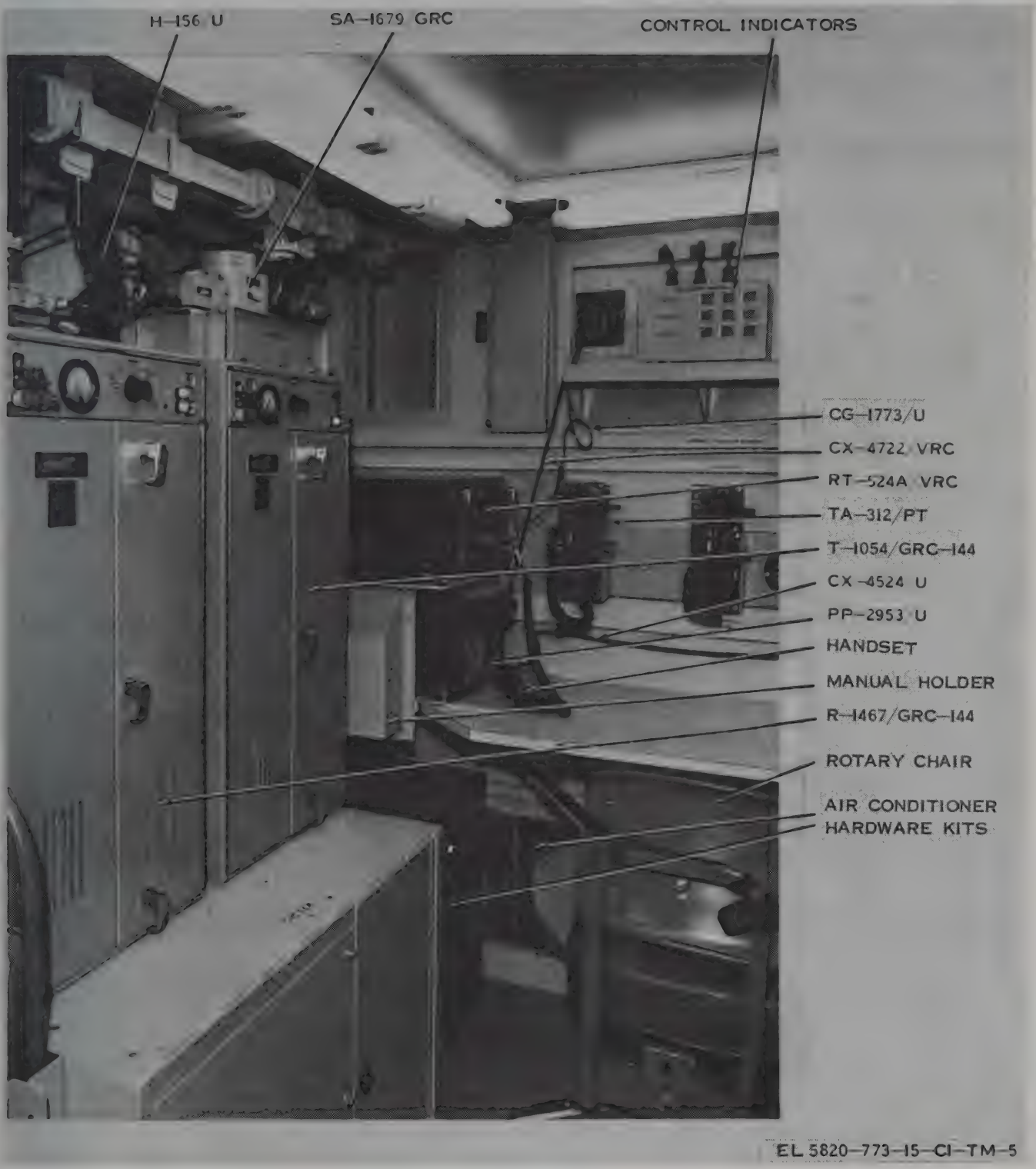


Figure 1-5. Radio Repeater Set AN/TRC-138, interior front roadside view.

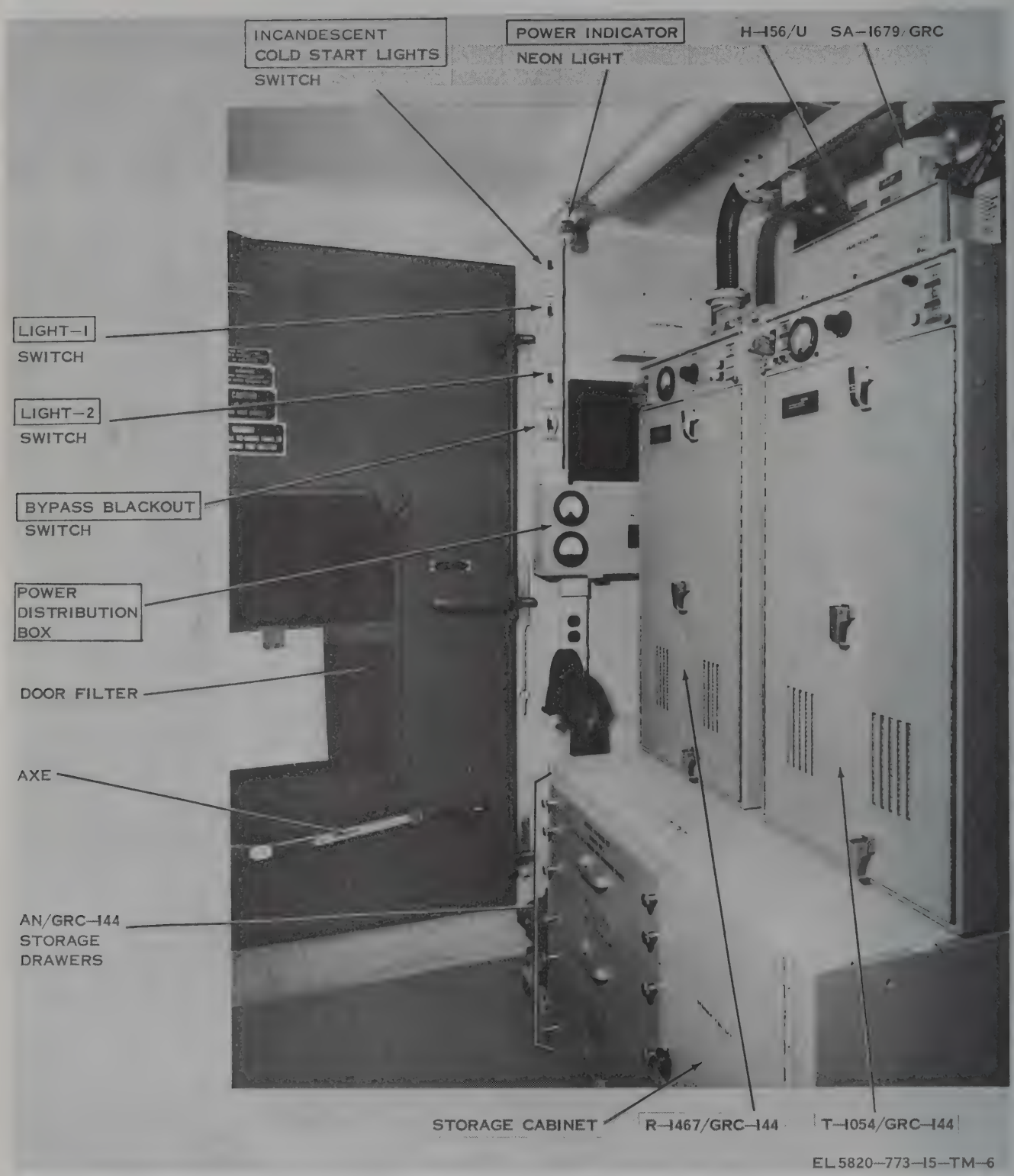


Figure 1-6. Radio Repeater Set AN/TRC-138, interior rear roadside view.

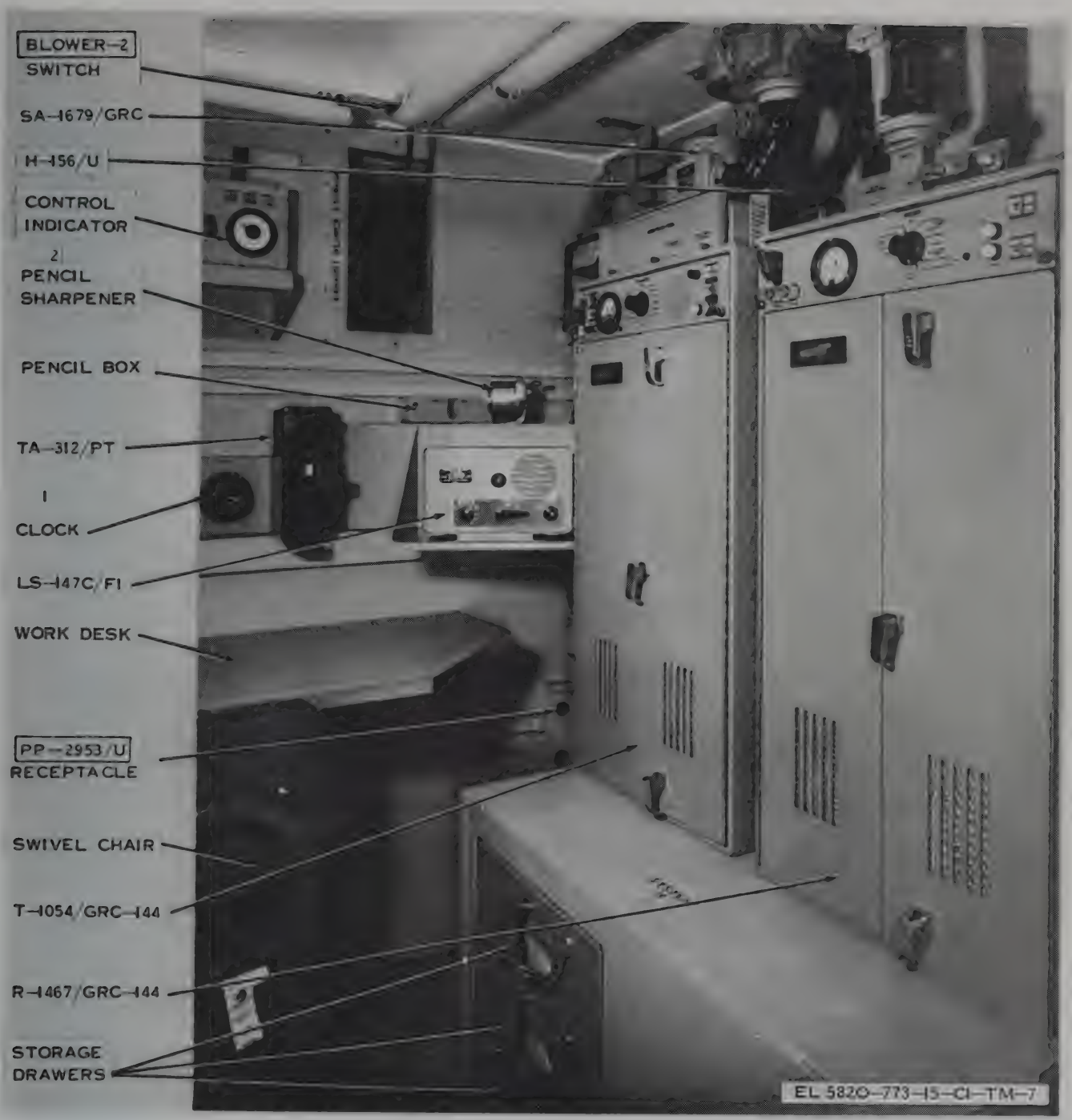


Figure 1-7. Radio Repeater Set AN/TRC-138, interior front curbside view.

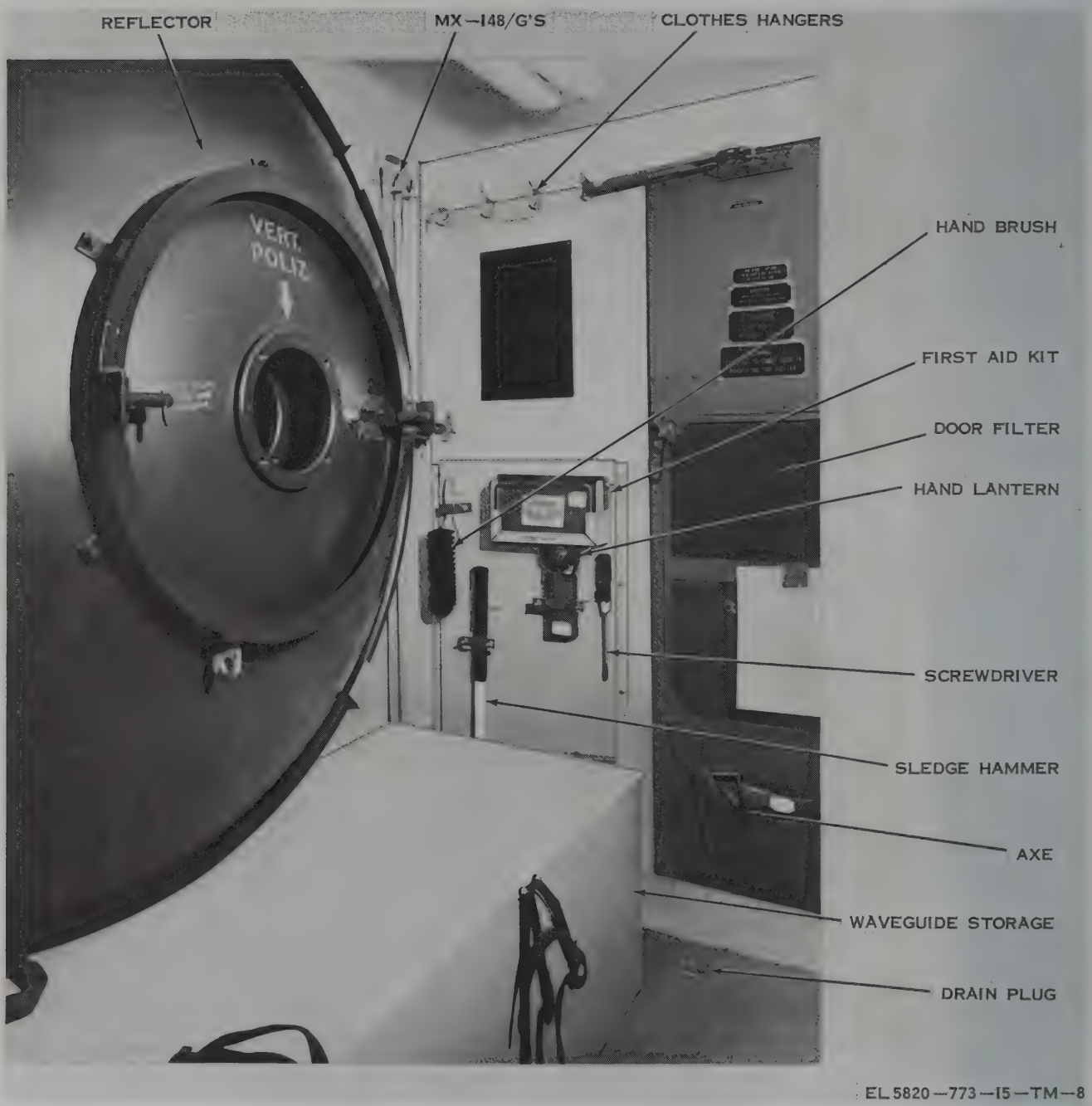


Figure 1-8. Radio Repeater Set AN/TRC-138, interior rear curbside view.

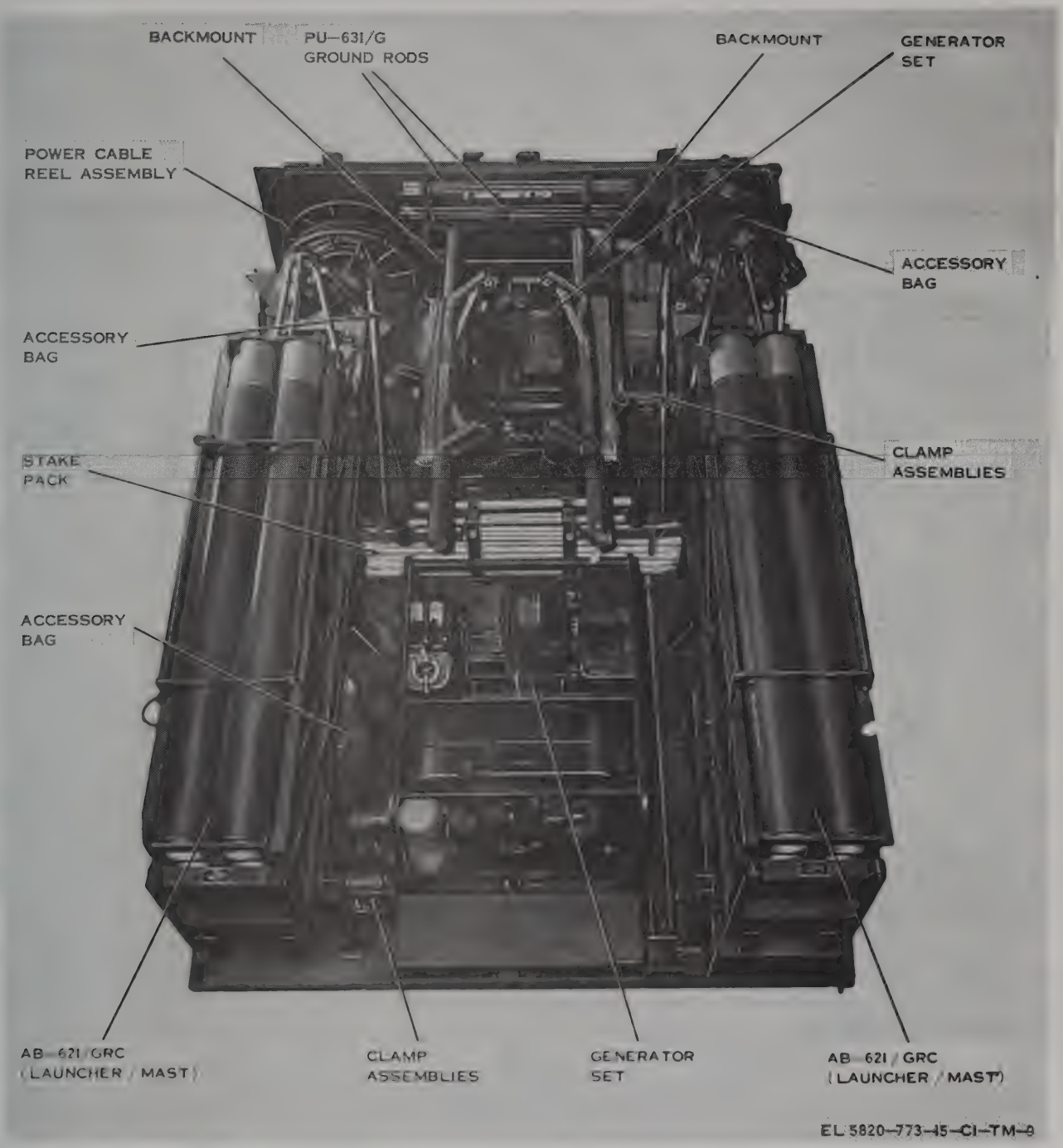


Figure 1-9. Generator Set, Gasoline Engine, Trailer Mounted PU-631/G, components and storage area, top view.

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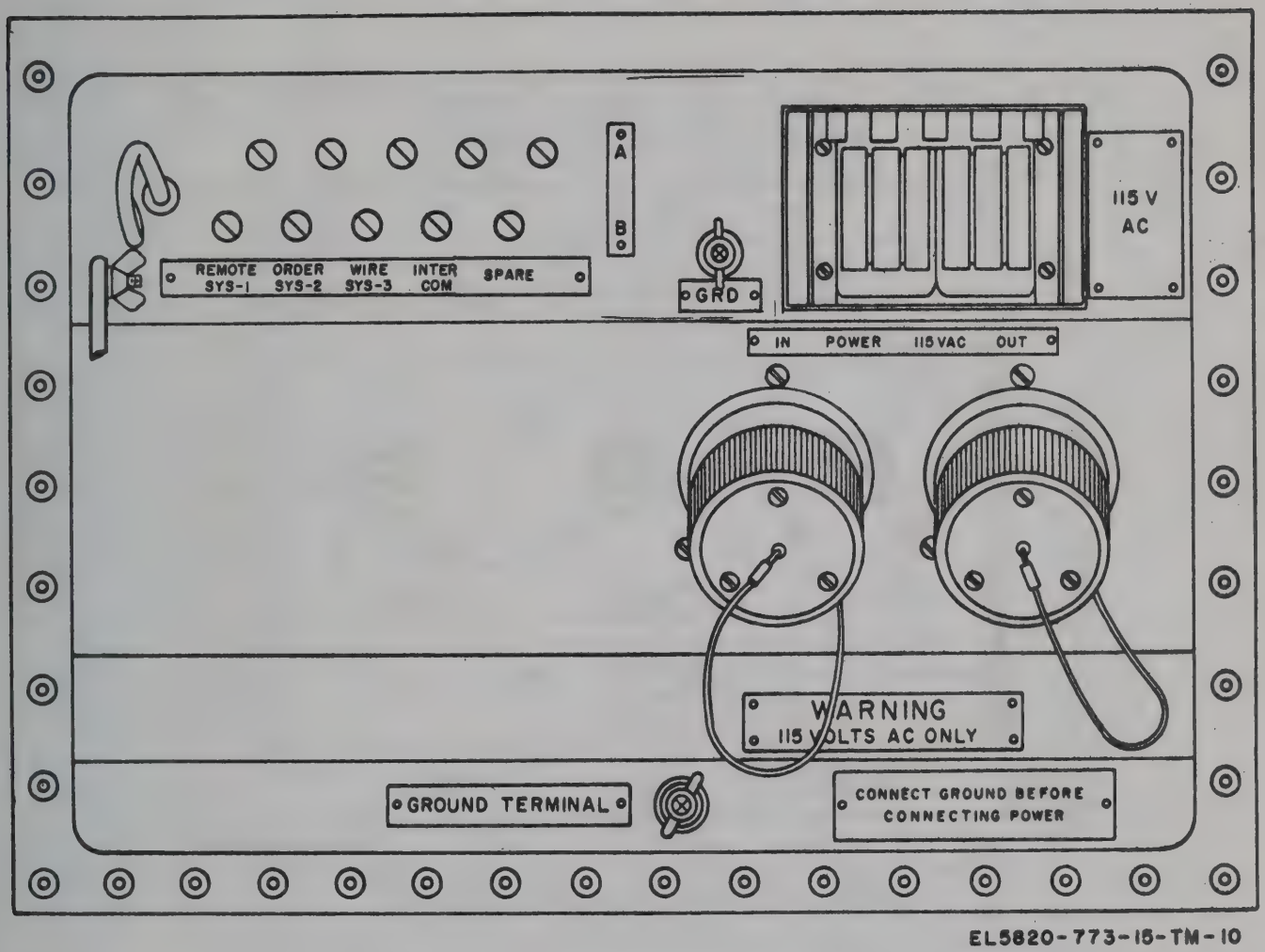


Figure 1-10. POWER ENTRANCE BOX, enterior view, less cover.

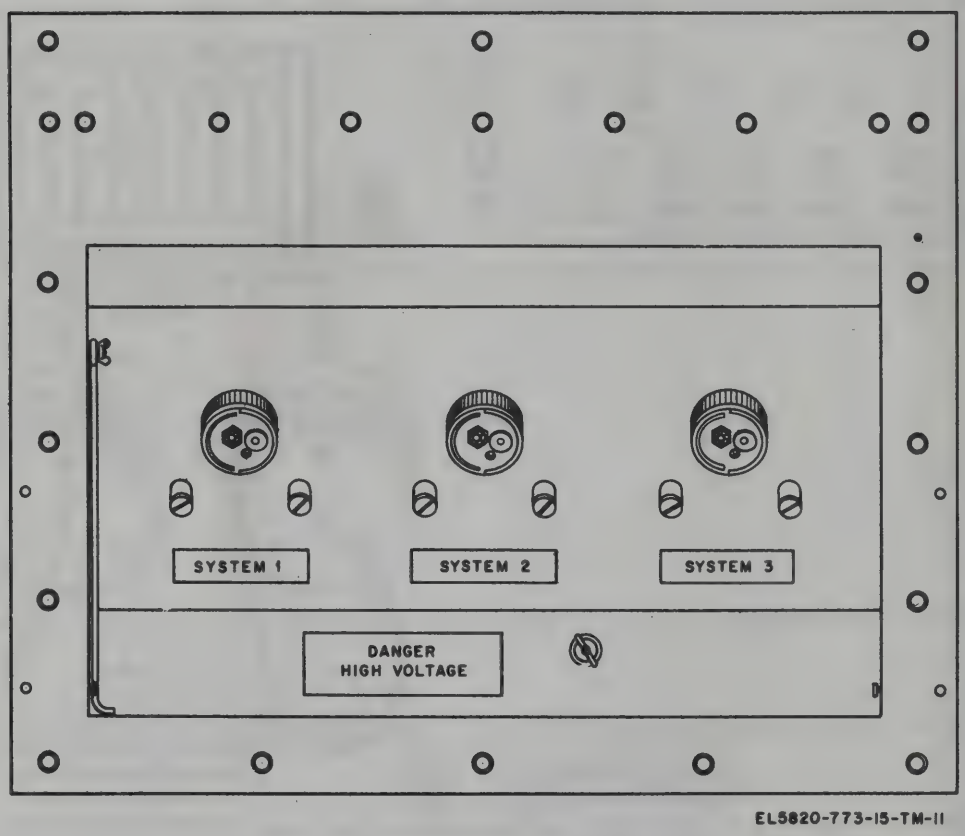


Figure 1-11. VIDEO ENTRANCE box, exterior view, less cover.

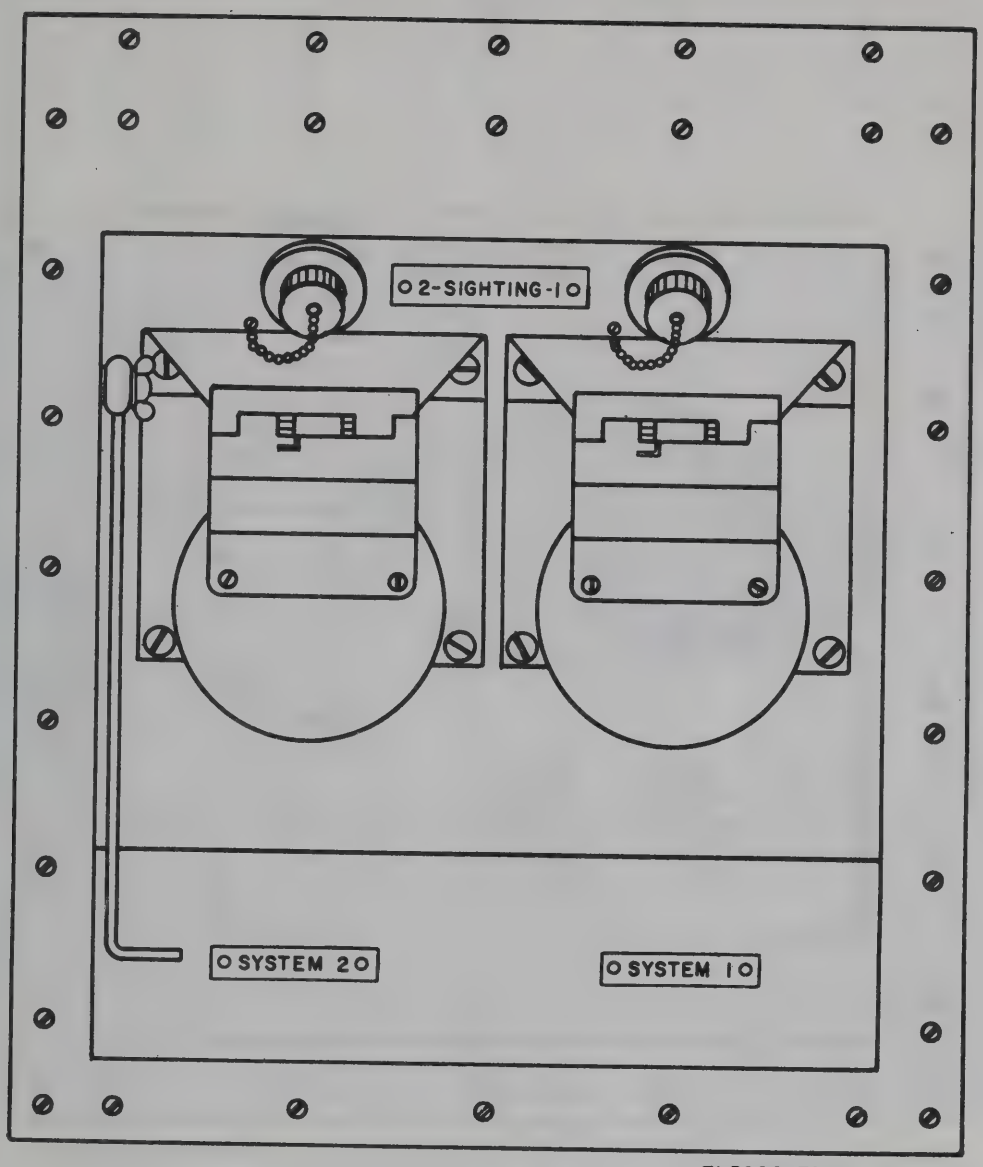


Figure 1–12. Roadside ANTENNA ENTRANCE box, enterior view, less cover.

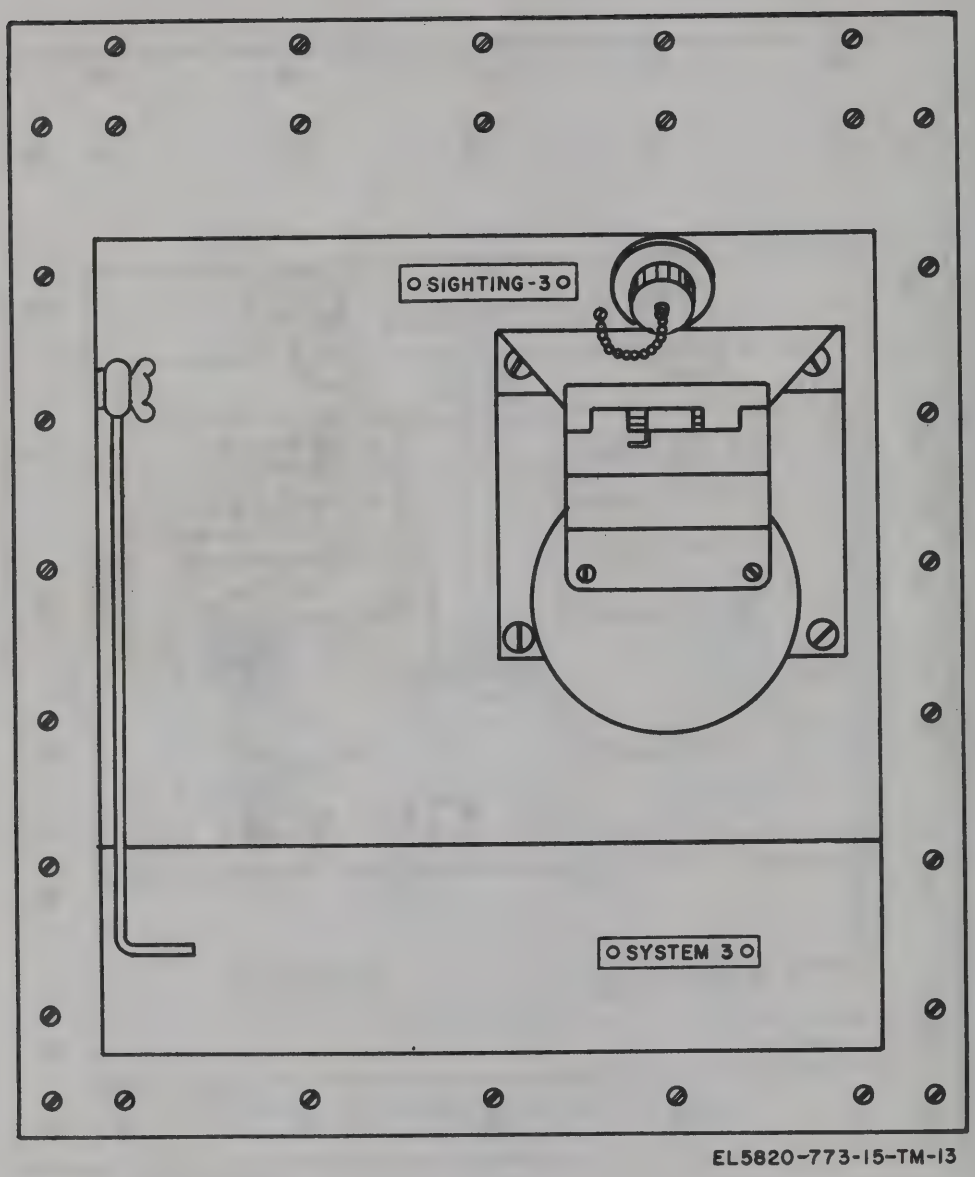


Figure 1-13. Curbside ANTENNA ENTRANCE box, enterior view, less cover.

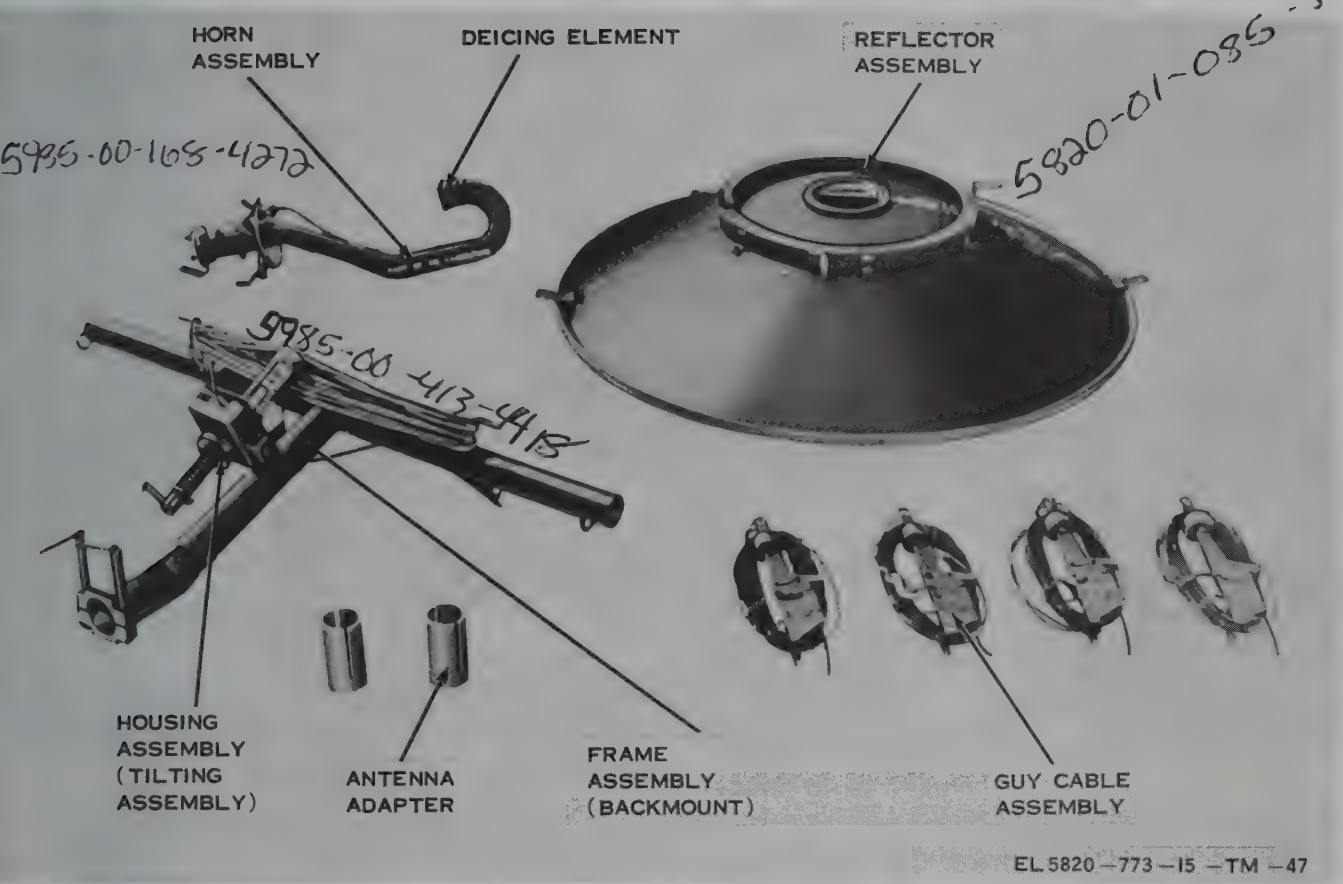


Figure 1-14. Antenna AS-1425/GRC (part 1 of 2).

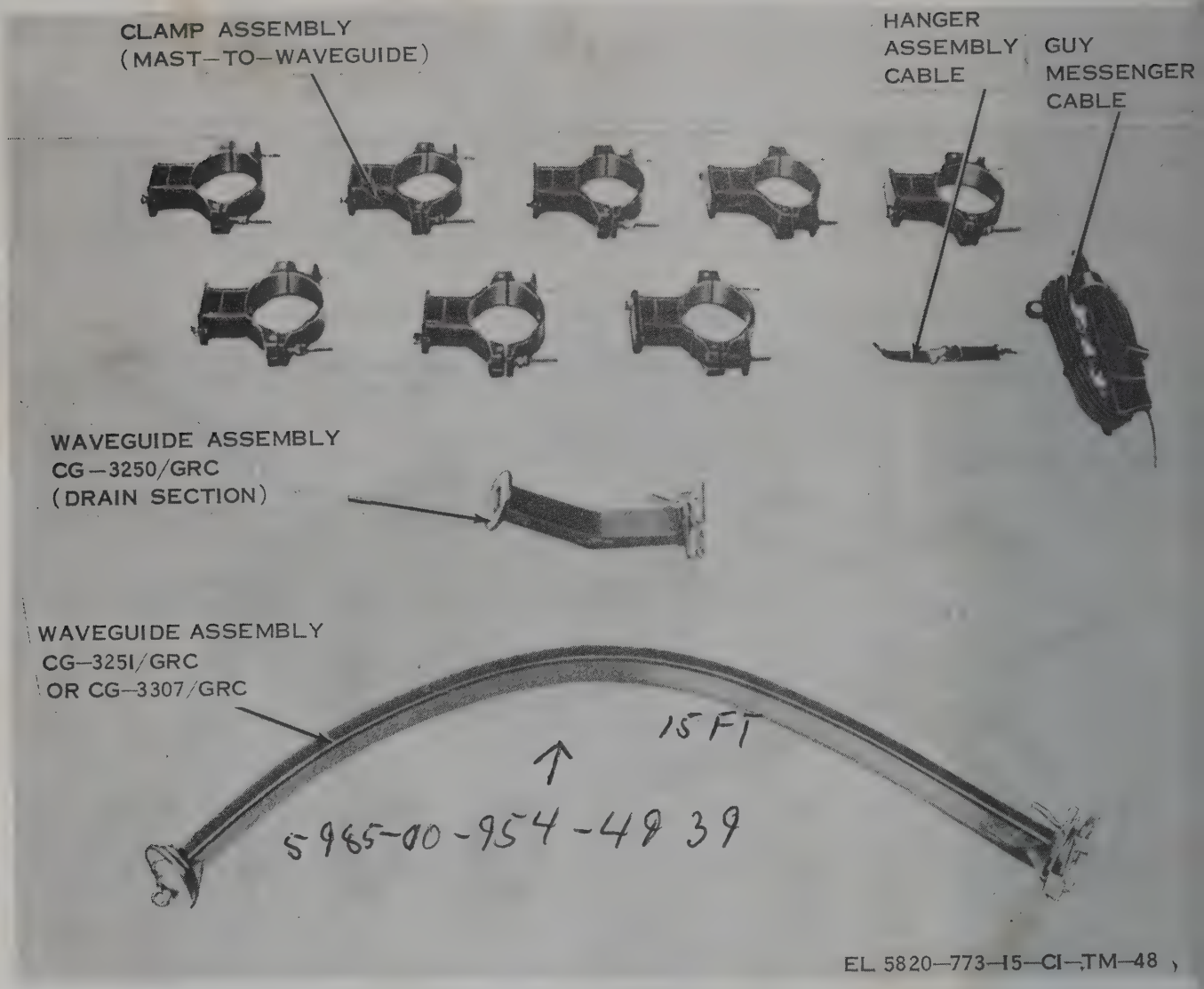


Figure 1–15. Antenna AS–1425/GRC (part 2 of 2).

Wave Guide 4 FT

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CHAPTER 2

INSTALLATION

2-1. Unpackaging and Checking

a. Packaging Data. The AN/TRC-138 is packed in a reusable wooden crate. The S-393/TRC-138, which houses the equipment, is anchored to eyebolts in the skid base of the crate and is blocked at the sides and ends with lumber. The skid base has entries for handling with a forklift. The dimensions of the crate are 144 by 93 by 94 inches. The volume is 874 cubic feet, and the weight of the crated AN/TRC-138 is approximately 5,625 pounds.

b. Removal of Contents (fig. 2-1)

CAUTION

Do not thrust any tools into the interior of any pack or package.

(1) Unfasten the lag bolts with wrenches, and remove the top, front, rear, and side panels from the crate base.

(2) Detach the tiedowns from the eyebolts in the base of the crate. When cable or tiedown rods are used for anchoring, loosen the turnbuckles.

(3) Remove the wood blocking from the sides and ends of the assemblage.

CAUTION

Be careful when handling tools, because the aluminum skin of the S-393/TRC-138 can be easily damaged.

(4) Remove the assemblage from the crate base. Use overhead lifting equipment whenever available; if it is not available, remove the headers from the crate base, lift the shelter from either side with a forklift, using the two holes in each skid labeled "fork lift here." If a fork lift is not available, drag the assemblage from the crate base by the towing eyes.

(5) Send the crate to a local storage area, if practical, for reuse.

c. Checking Assemblage Contents. Check the contents of the assemblage against the packing list. If the packing list is not available, use the table of components (para 1-6).

*d. Installation of Exhaust Blowers (*fig. 2-2).

NOTE

The procedures for installing either exhaust blower assembly are identical. Perform the following procedures for both exhaust blower assemblies.

The exhaust blower assemblies are secured to the front wall of the assemblage and the exhaust blower covers are secured to the floor during shipment (fig. 1-4). Install the exhaust blower assemblies as follows:

(1) Remove the exhaust blower assemblies and the exhaust blower covers (box assembly with attached cover assembly) from the assemblage floor.

(2) Loosen the hex-head cap screws and remove the cover from the outside front wall of the assemblage.

(3) Position the channel support assembly against the outside front wall and secure it with the cap screws.

(4) Position the cover (remove in (2) above) on the box assembly and secure it with the hex-head cap screws.

(5) Remove the hex-head cap screws that secure the cover assembly to the box assembly and remove the cover assembly.

(6) Position the box assembly against the assemblage front wall (surrounding the blower assembly) and secure it with the hex-head cap screws.

(7) Install the flexible joint and clamp assemblies between the blower assembly and box assembly.

(8) Position the cover assembly against the outside of the box assembly and secure it with the hex-head cap screws.

(9) Open the slide panel at the bottom of each exhaust blower cover.

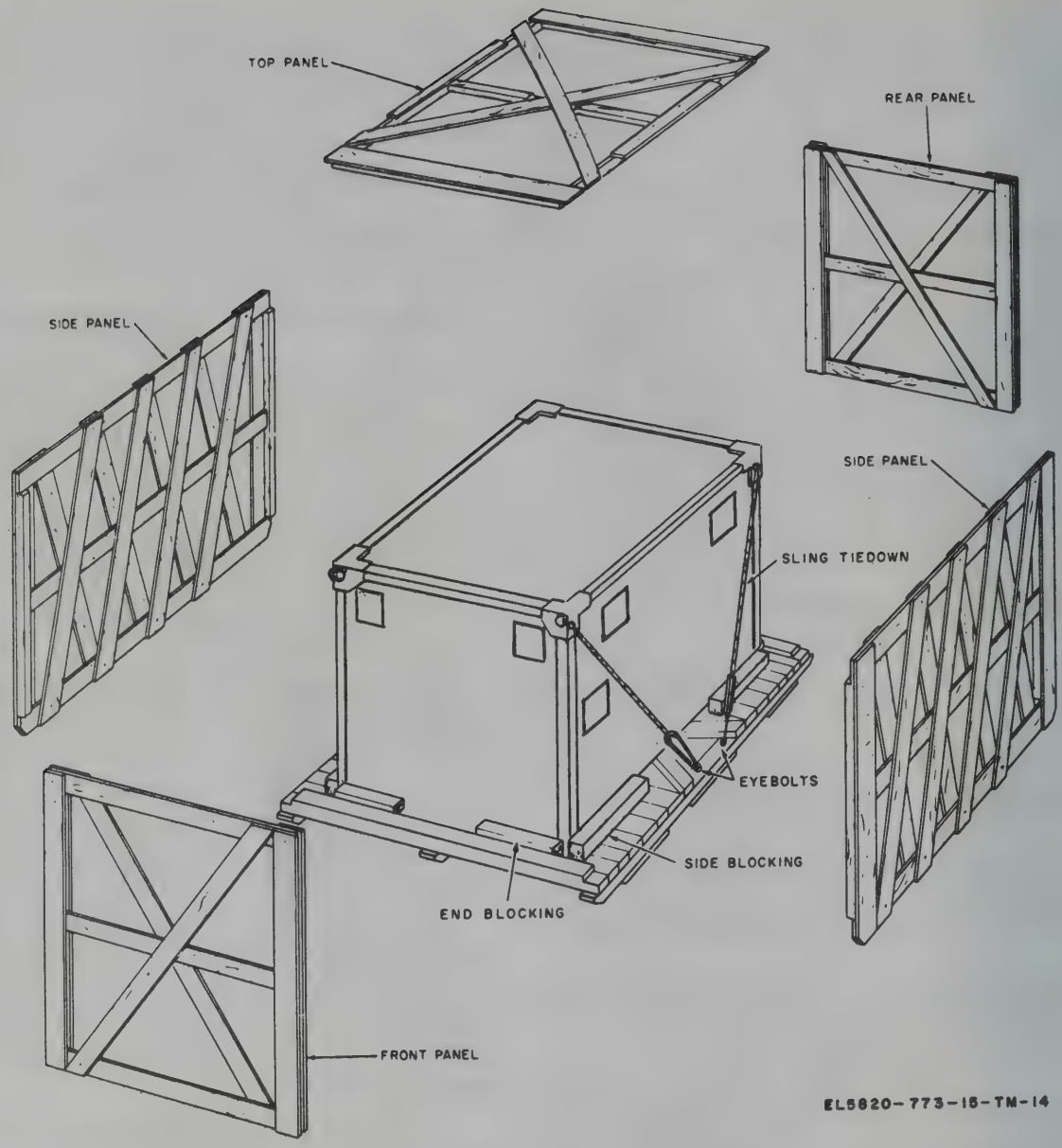


Figure 2-1. Typical packaging diagram.

(10) Inside the assemblage, connect the ac power cable of each exhaust blower to its associated BLOWER receptacle.

2-2. Siting

Select the best possible operating site for the AN/TRC-138 using the site requirements in *a* below and then install the assemblage on the ground (*b* below) or truck (*c* below) as determined by the required application.

a. Site Requirements.

(1) Select a site that has a 20 by 20 foot level area for each antenna assembly (preferably an elevated area).

NOTE

An antenna assembly consists of a complete mast, a dish, a horn, etc.

(2) Be sure that conditions are suitable for anchoring the antenna assemblies.

(3) Locate the site as far away as possible from buildings, roads, and power lines or any source of electrical interference.

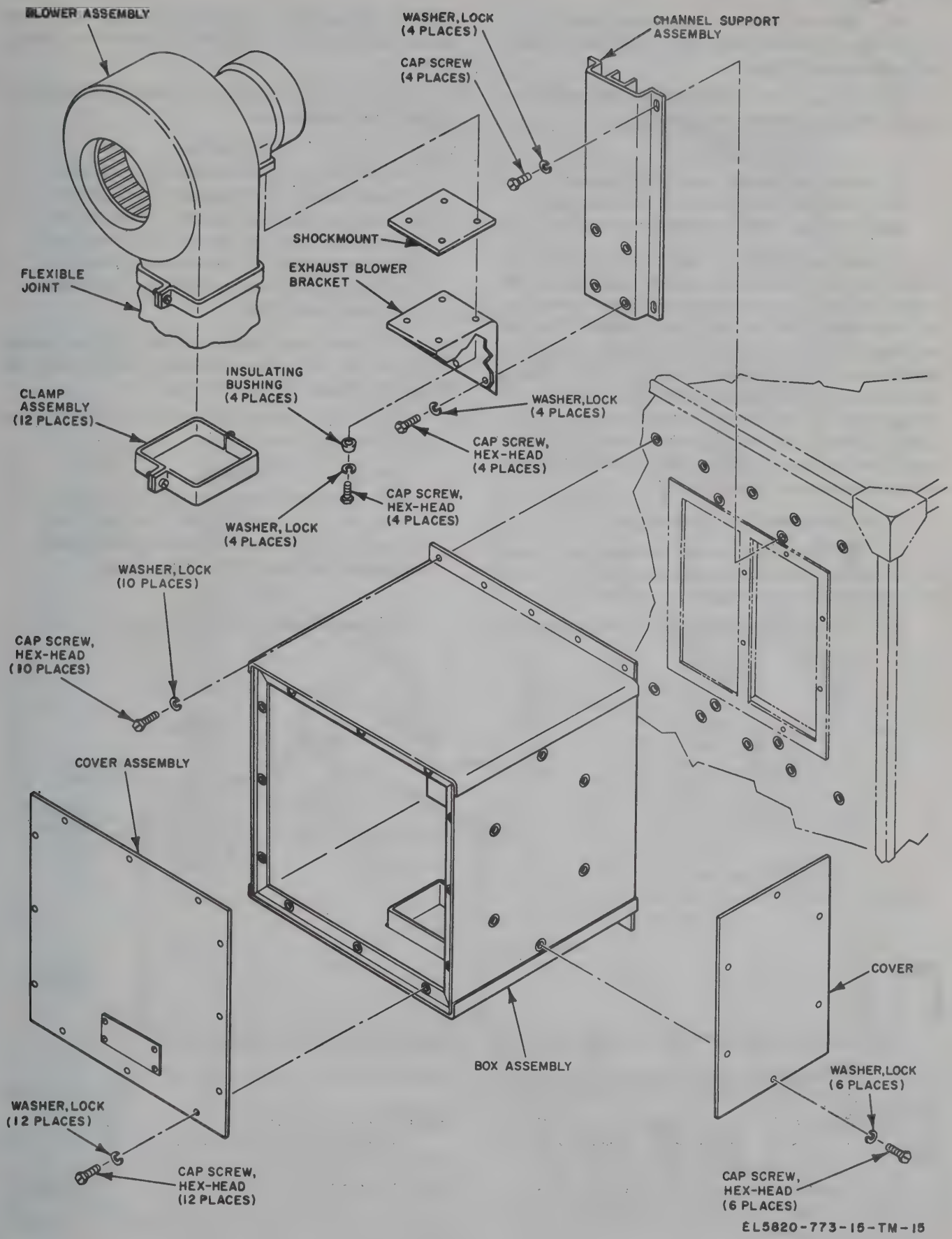


Figure 2–2. Exhaust blower installation.

(4) Check to see that there is at least 1,000 feet of unobstructed view in the direction that each antenna will face.

(5) Be sure that the site is accessible for transporting equipment and supplies.

NOTE

To install the assemblage on the ground, or on a truck, four men and a device capable of lifting 4,425 pounds are required.

b. Ground Installation of Assemblage. When installed on the ground, the assemblage should be placed on a firm, dry surface with good drainage; the site should be prepared and leveled. The assemblage should be placed on concrete blocks or wooden beams, if possible, and positioned to facilitate connections of power, and signal cables and waveguides. If a generator set is used to provide power, it should be located approximately 75 feet away from the assemblage to minimize fire hazard and generator noise interference.

c. Truck Installation of Assemblage.

(1) Use the sling hooks (nearest turnbuckles) to connect the sling assemblies to the lift and tie down points of the assemblage (fig. 2-3).

(2) Connect the sling hooks, at the opposite ends of the cables, to the lifting ring, and place the lifting ring over the lifting hook of the lifting device.

(3) Tie a 1/2-inch rope (at least 15 feet long) to each rear towing eye.

WARNING

To avoid injury to personnel, or damage to equipment, only personnel engaged in the actual loading operation should be permitted near the truck, lifting device, and assemblage. To eliminate confusion, all instruction must come from the loading crew supervisor.

(4) Lower the tailgate of the truck and make sure that all tools and equipment have been removed from the body of the truck.

(5) Slowly lift the assemblage high enough to clear the body of the truck.

NOTE

The entrance door of the assemblage must be at the rear of the truck, and the front end of the assemblage must be flush against the front of the truck body.

WARNING

All personnel must remain clear of the

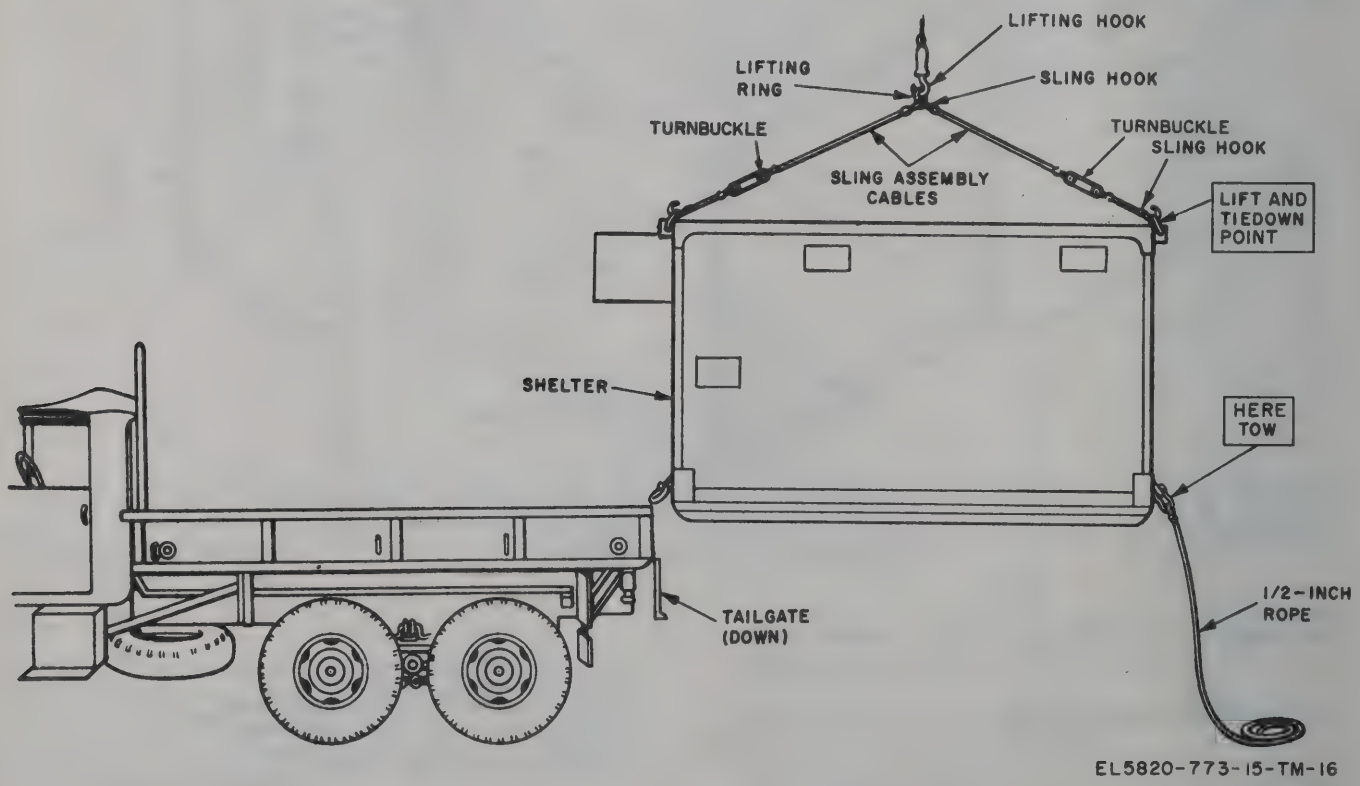


Figure 2-3. Lifting and loading assemblage on truck.

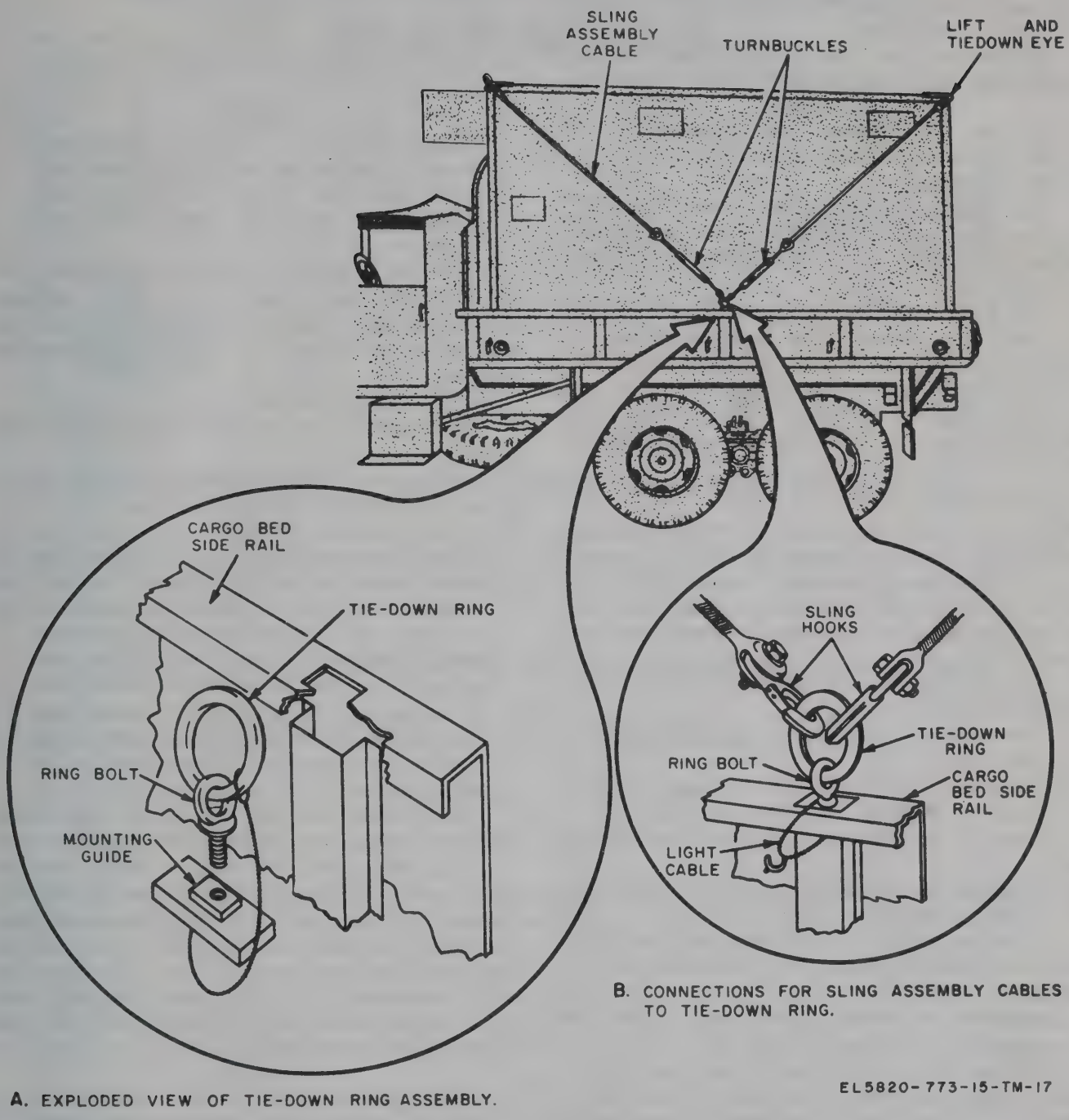


Figure 2–4. Securing Assemblage on truck.

truck while the assemblage is being lowered onto the truck.

(6) Position a man at the free end of each of the 1/2-inch ropes to guide the assemblage.

(7) Back the truck slowly into position under the assemblage and slowly lower the assemblage into the truck.

(8) Remove the lifting ring from the lifting hook and disassemble the lifting ring and the sling hooks.

(9) Remove the sling hooks from the lift and tie down points.

(10) Disconnect the 1/2-inch ropes from the rear towing eyes.

(11) Raise and secure the truck tailgate.

(12) Install a tiedown ring assembly (part of the sling assembly) above the center support of each cargo bed side rail of the truck (A, fig. 2–4).

(13) At each side of the assemblage, use the

hook at the end farthest from the turnbuckle to hook each sling assembly to a lift and tiedown point of the assemblage.

(14) Secure the sling hooks at the opposite end of the cables to the tie down ring (B, fig. 2–4).

CAUTION

Do not overtighten the turnbuckles. Overtightening turnbuckles will damage the assemblage.

(15) Tighten all turnbuckles evenly by hand, and then turn each turnbuckle an additional one-half turn with a bar or rod inserted into the slot of the turnbuckle.

(16) After the truck is driven to the operating site, lower the tailgate to the horizontal position; then remove the ladder from the assemblage and secure it to the left side of the tailgate.

d. Unloading Assemblage. To unload the assemblage from the truck, reverse the procedures given in *c* above.

2–3. Grounding

The AN/TRC–138 must be properly grounded before input power is connected. Select a grounding site (within 6 feet of the POWER ENTRANCE BOX) that is low and damp, and that will not interfere with the entrance door, power or signal cables.

a. Loosen and lift the cover of the POWER ENTRANCE BOX (fig. 1–1).

b. Use the cover support to secure the cover in the open position.

c. Remove a ground rod and the sledge hammer from their mountings in the assemblage (fig. 1–8).

d. Remove any dirt or grease from the ground rod.

e. Scoop out a small hole, about 6 inches deep, at the selected grounding site.

f. Drive the ground into the hole until the top of the ground rod is approximately 3 inches above the bottom of the hole.

g. Remove a 10-foot ground strap from the storage cabinet in the assemblage.

h. Connect one end of the ground strap to the ground rod, and the other end to the lower GROUND TERMINAL in the POWER ENTRANCE BOX (fig. 1–9).

i. Saturate the ground around the rod with water to keep it moist.

j. If a generator is used to supply ac power, ground it in the same manner as the assemblage.

NOTE

For the AN/VRC–46 installation procedures in those shelters that have been modified for that radio, refer to paragraphs 5–4, 5–5, and 5–6.

2–4. Antenna Installation

NOTE

For the antenna installation procedure for Radio Set AN/VRC–46 refer to paragraph 5–5.

WARNING

During installation of this equipment conform to all safety requirements set forth in TB SIG 291. Injury or DEATH can result from failure to comply with safe practices.

a. General. Depending upon the application, the AN/TRC–138 may require up to three antenna assemblies. The following instructions provide the procedure to be followed for each antenna assembly required.

b. Antenna Installation.

(1) Determine the required antenna guy stake positions (fig. 2–5).

(2) Drive the center marking stake (GP–2) at the selected baseplate position (M, fig. 2–5).

NOTE

Visually survey the area to insure that trees, brush, wires or structures will not interfere with guy and anchor layout. Also, to permit the antenna to be adjusted after installation, insure that two of the four antenna guy stakes are positioned so that the antenna reflector will be located and aimed at a midpoint between these stakes and in the direction of the station to be contacted.

(3) Position the four GP–113/G guy stakes with a measuring rope (fig. 2–5) as follows:

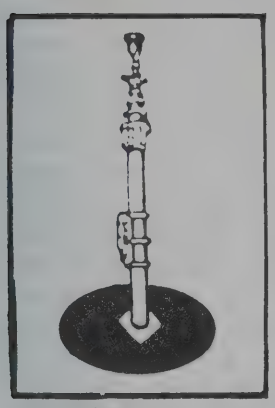
(*a*) Slide the 0-foot ring (0 meter) over the GP–2 stake at position M. Take the 35-foot (10.6680 meters) segment of the measuring rope and walk along line M–A until the rope is taut to locate the first guy stake (A, dig. 2–5). Drive the GP–113/G stake at a 30 degree angle (fig. 2–6) from vertical; the top of the stakes should be tilted away from the center (M, fig. 2–5).

NOTE

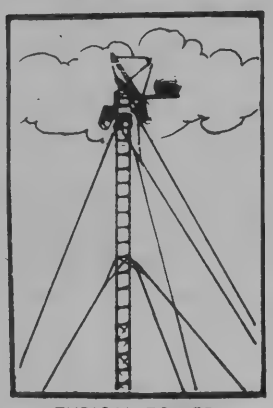
If the ground is composed of shale, sandstone, soft rocks, hardpan, ice, etc, use the GP–112/G stakes as rock anchors. Install the rock anchors by driving holes (only as wide and as deep as necessary for the stake) into the earth; use a digging bar and a sledge hammer. The holes should be approximately a 60 degree angle, slanted away from the mast location. Drive the GP–112/G stakes into the hole until the eyelet is at ground level. If the stake fits loose into the hole, pack the hole with loose earth or rubble.

FIXED OPERATION WITH LONG RANGE ANTENNAS

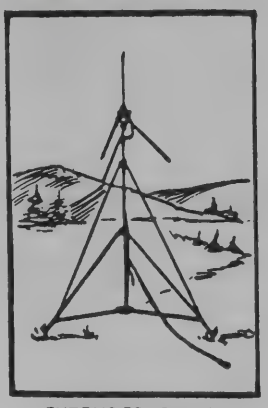
WARNING



TELESCOPING ANTENNA MAST



TYPICAL TOWER



EXTENDED RANGE ANTENNA



DOUBLET ANTENNA

NEVER ERECT THESE LONG RANGE ANTENNAS DIRECTLY UNDER POWER LINES.

IF YOU MUST ERECT THESE LONG RANGE ANTENNAS NEAR POWERLINES, POWERLINE POLES OR TOWERS, OR BUILDINGS WITH OVERHEAD POWERLINE CONNECTIONS, NEVER PUT THE ANTENNA CLOSER THAN TWO TIMES THE ANTENNA HEIGHT FROM THE BASE OF THE POWERLINE, POLE, TOWER OR BUILDINGS.

NEVER ATTEMPT TO ERECT ANY LONG RANGE ANTENNA WITHOUT A FULL TEAM.

BEFORE ERECTING ANY LONG RANGE ANTENNA, INSPECT ALL THE PARTS MAKING UP THE ANTENNA KIT. DO NOT ERECT THE ANTENNA IF ANY PARTS ARE MISSING OR DAMAGED.

DO AS MUCH OF THE ASSEMBLY WORK AS POSSIBLE ON THE GROUND.

WHEN ERECTING THE ANTENNA, ALLOW ONLY TEAM PERSONNEL IN THE ERECTION AREA.

MAKE SURE THAT THE AREA FOR THE ANCHORS IS FIRM. IF THE GROUND IS MARSHY OR SANDY, GET SPECIFIC INSTRUCTIONS FROM YOUR CREW CHIEF OR SUPERVISOR ON HOW TO REINFORCE THE ANCHORS.

WHEN SELECTING LOCATIONS FOR ANCHORS, AVOID TRAVELED AREAS AND ROADS. IF YOU CANNOT AVOID THESE AREAS, GET SPECIFIC INSTRUCTIONS FROM YOUR SUPERVISOR AS TO WHAT CLEARANCE YOUR GUY WIRES AND ROPES MUST HAVE OVER THE TRAVELED AREAS AND ROAD.

CLEARLY MARK ALL GUY WIRES AND ROPES WITH THE WARNING FLAGS OR SIGNS SUPPLIED BY YOUR UNIT. IN AN EMERGENCY, USE STRIPS OF WHITE CLOTH AS WARNING STREAMERS.

IF YOU SUSPECT THAT POWERLINES HAVE MADE ACCIDENTAL CONTACT WITH YOUR ANTENNA, STOP OPERATING, ROPE OFF THE ANTENNA AREA, AND NOTIFY YOUR SUPERIORS.

IF THE WEATHER IN YOUR AREA CAN CAUSE ICE TO FORM ON YOUR LONG RANGE ANTENNA AND ITS GUY WIRES AND ROPES, ADD EXTRA GUYS TO SUPPORT THE SYSTEM. ROPE OFF THE AREA AND POST IT WITH WARNING SIGNS LIKE "BEWARE OF FALLING ICE."

DO NOT TRY TO ERECT ANY ANTENNA DURING AN ELECTRICAL STORM.

KEEP A SHARP EYE ON YOUR ANCHORS AND GUYS. CHECK THEM DAILY AND IMMEDIATELY BEFORE AND AFTER BAD WEATHER.



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 WOODEN POLE OR A 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

(*b*) Grasp the ring at the 84 1/2 foot (25.76 meters) mark and slide it over stake A. Hold the rope at the 35-foot mark and, starting at stake M, walk along line M–B until both sections of the rope are taut. Drive the GP–113/G stake at a 30 degree angle from vertical into the ground to locate the second guy stake (B).

(*c*) Remove the 35-foot segment of the rope from stake B and walk to point C to locate the third guy stake (C). Drive the GP–113/G stake at a 30 degree angle from the vertical position.

(*d*) Remove the 84 1/2 foot section of the rope from stake A and slide it over stake C. Hold the 35-foot mark on the rope; starting at point C, locate the position of the fourth guy stake (D) by walking along line C–D until both sections of the rope are taut. Drive the GP–113/G stake at a 30 degree angle from vertical into the ground and sight along lines D–M–A and C–M–B to be sure that the stakes are in line.

(4) Install the guy stake attachments on the tops of the A, B, C, and D guy stakes (fig. 2–6).

(5) Separate the mast carrier from the launcher and remove the mast sections from the mast carrier.

(6) Lay the launcher across the mast carrier as shown in figure 2–13 with the base at the center stake and the other end pointing equidistant between the two guy stakes and in the direction of the station to be contacted (fig. 2–7).

(7) Attach the hand winch to the launcher. Be sure that the elevator cable is properly threaded through the elevator cable pulley. Use the slide latches on the launcher to secure the winch assembly.

(8) Remove the lockpins at the rear of the elevator platform, handbrake, and winch sections so that the platform and the winch are free to move. Insert the pins in the pin stowage holes to prevent tangling.

(9) Release the handbrake on the launcher.

(10) With the winch assembly, lower the elevator platform.

(11) Position one mast section on the elevator thrust plate as shown in figure 2–13.

NOTE

Masts are poitioned on the launcher elevator thrust plate with the UP arrow end toward the top of the launcher. The key on the bottom inside shoulder of the mast must engage into the keyway on the elevator thrust plate.

(12) With the winch, elevate the mast to 1 foot above the top of the launcher.

(13) Engage the handbrake.

(14) Slide the mast cap assembly over the mast section; align the index key on the cap with tha arrow mark on the mast (fig. 2–8).

(15) Slide the upper guy ring over the mast cap assembly (fig. 2–13).

(16) Locate one reflector assembly, one horn assembly, and the waveguide assemblies (both 15 foot and 4 1/2 foot, as required) at the center of the antenna site.

(17) Attach the backmount to the reflector assembly with the pins provided in the reflector assembly (fig. 2–8).

(18) Use two men to lift the reflector assembly and slide it onto the mast cap assembly. Check to see that the index keys on the two units align (fig. 2–9).

(19) Tighten the crosshandle bolts on the backmounts (fig. 2–10).

(20) Insert the horn assembly through the circular opening from the back side of the reflector assembly (fig. 2–11). Turn the horn assembly so that the index arrow on the horn assembly mounting plate matches the appropriate polarization index arrow on the reflector assembly.

(21) Mount the horn assembly to the reflector assembly with the four wingbolts supplied (fig. 2–12). Use the stowage bolt near the flange to captivate the horn assembly flange cover plate.

(21.1) If use of the deicer equipment is anticipated, connect ac power (115 volts, 60 Hz) at the power connector (shown covered on fig. 2–12) on the feedhorn assembly.

(22) Clamp one 4 1/2 foot section of waveguide assembly to the horn assembly (fig. 2–14). Use the clamp provided on the waveguide section. Captivate the waveguide assembly cover by slipping it on the waveguide assembly with the stowage clip on the inside face.

(23) Attach four yellow-coded guy cables to the eyebolts on the backmount (fig. 2–13 and 2–16); two cables attach to each bolt.

(24) Attach two blue-coded guy cables on opposite sides of the launcher top, and the snubber ends of the blue-coded guy cables to the bottom holes in the guy clamps on the in-line GP–113/G guy stakes (fig. 2–6 and 2–16).

(25) Remove the center marking stake. Over this mark, raise the launcher to the vertical position and drive three small GP–2 stakes into the three holes in the launcher base.

(26) Attach the remaining two blue-coded guy cables on the opposite sides of the launcher top, and the snubber ends to the guy stake attachments on the remaining GP–113/G guy stakes (fig. 2–6 and 2–16).

(27) Check the vertical position of the antenna

mast by holding the level assembly against the mast section; then tighten the blue-coded guy cable snubber assemblies (fig. 2–6).

(28) Orient the reflector assembly in the approximate direction of transmission.

CAUTION

Be sure that the guy cables are manned when raising the antenna during windy conditions. Avoid raising the antenna when wind speed exceeds 25 miles per hour.

(29) Climb the launcher and attach the four red-coded guy cables to the upper guy ring (fig. 2–16). Clamp one section of the waveguide assembly to the 4 1/2 foot section of waveguide assembly; the clamp is provided on the waveguide section (fig. 2–15).

WARNING

Do not release the handbrake when the elevator platform is not flush with the mast sections.

(30) Crank the winch until the elevator platform is snugly against the mast section. Hold the winch handle and release the handbrake.

(31) Crank up the elevator platform; allow space for adding the next mast section.

(32) Lock the handbrake.

(33) Crank the elevator platform all the way down.

(34) Insert the next mast section on the elevator platform; check to see that the index keys are aligned.

(35) Crank up the elevator platform until the mast sections close.

(36) Release the handbrake and continue to crank up the mast sections until the bottom mast section is approximately 3 feet above the ground.

(37) Lock the handbrake.

(38) Climb the launcher and attach the clamp assembly to the center of the first mast section above the launcher; secure the waveguide assembly to the clamp assembly. Position the clamp assemblies so that the waveguide assembly is equidistant between the adjacent guy cables.

(38.1) If the deicer equipment is being installed, fasten the deicing kit extension cord (fig. 2–5.1) to the mast section with the self clinching tiedown strap.

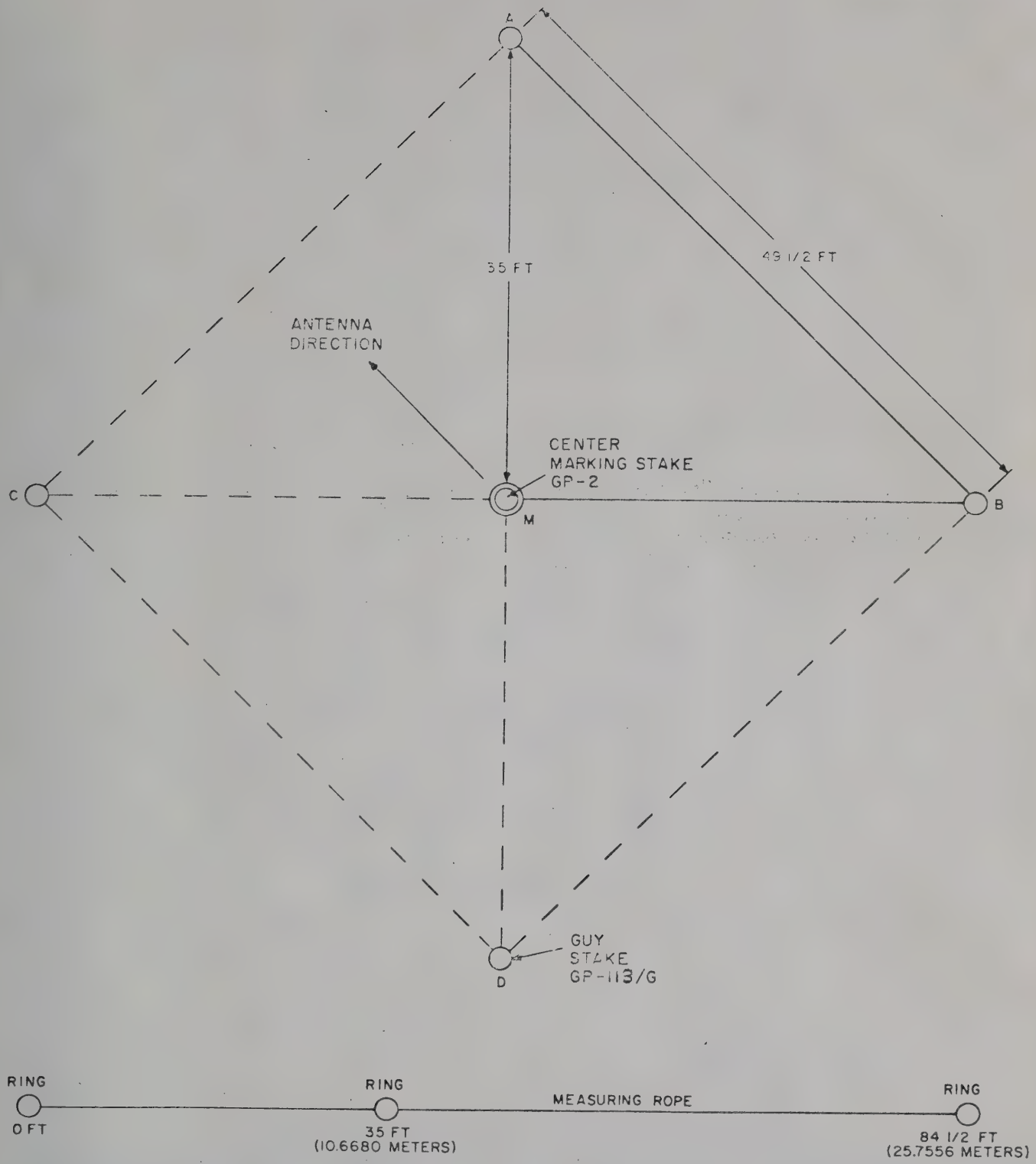


Figure 2–5. Mast Assembly AB–621/G, location of anchor guy stakes.

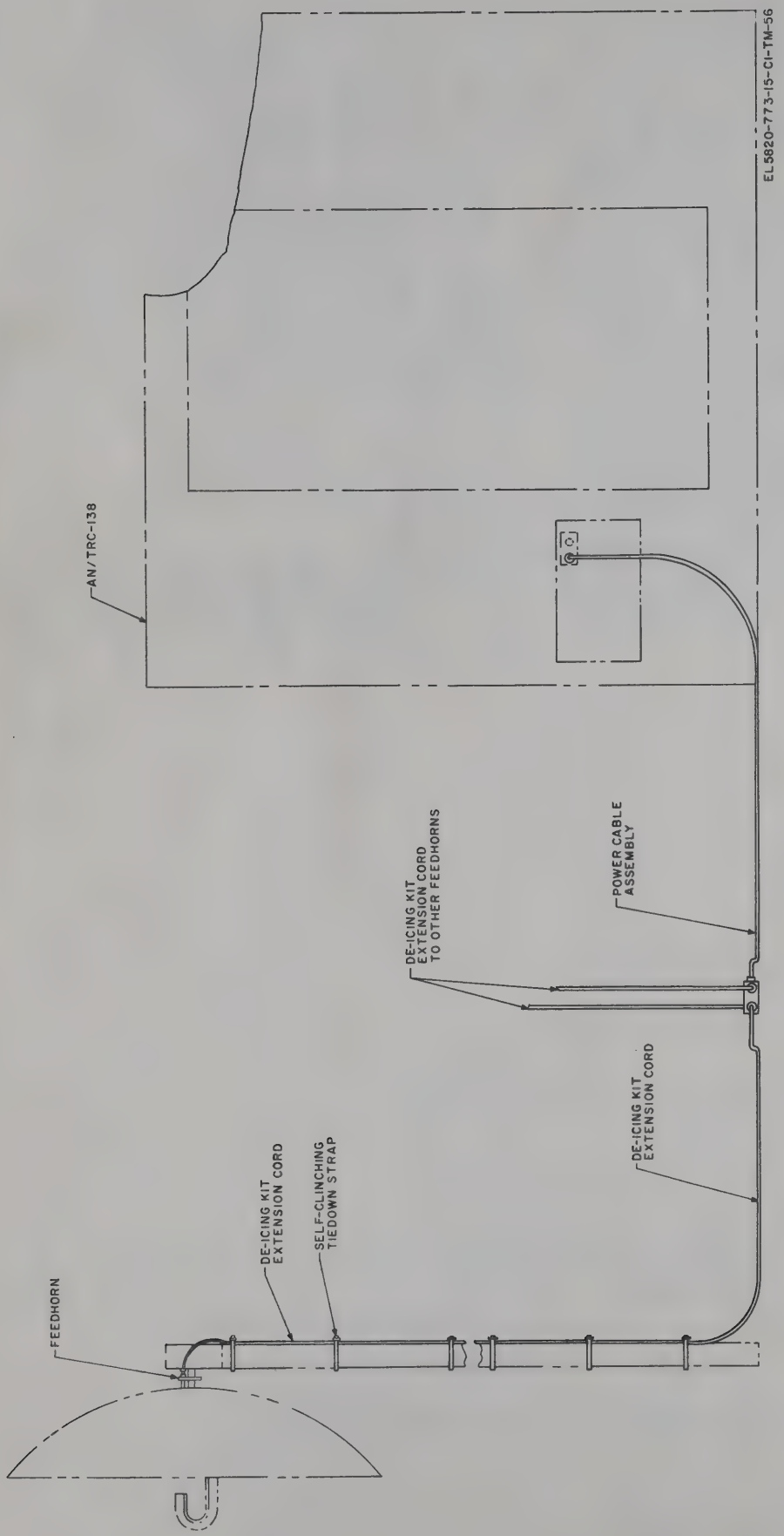


Figure 2-5.1. Deicing kit installed.

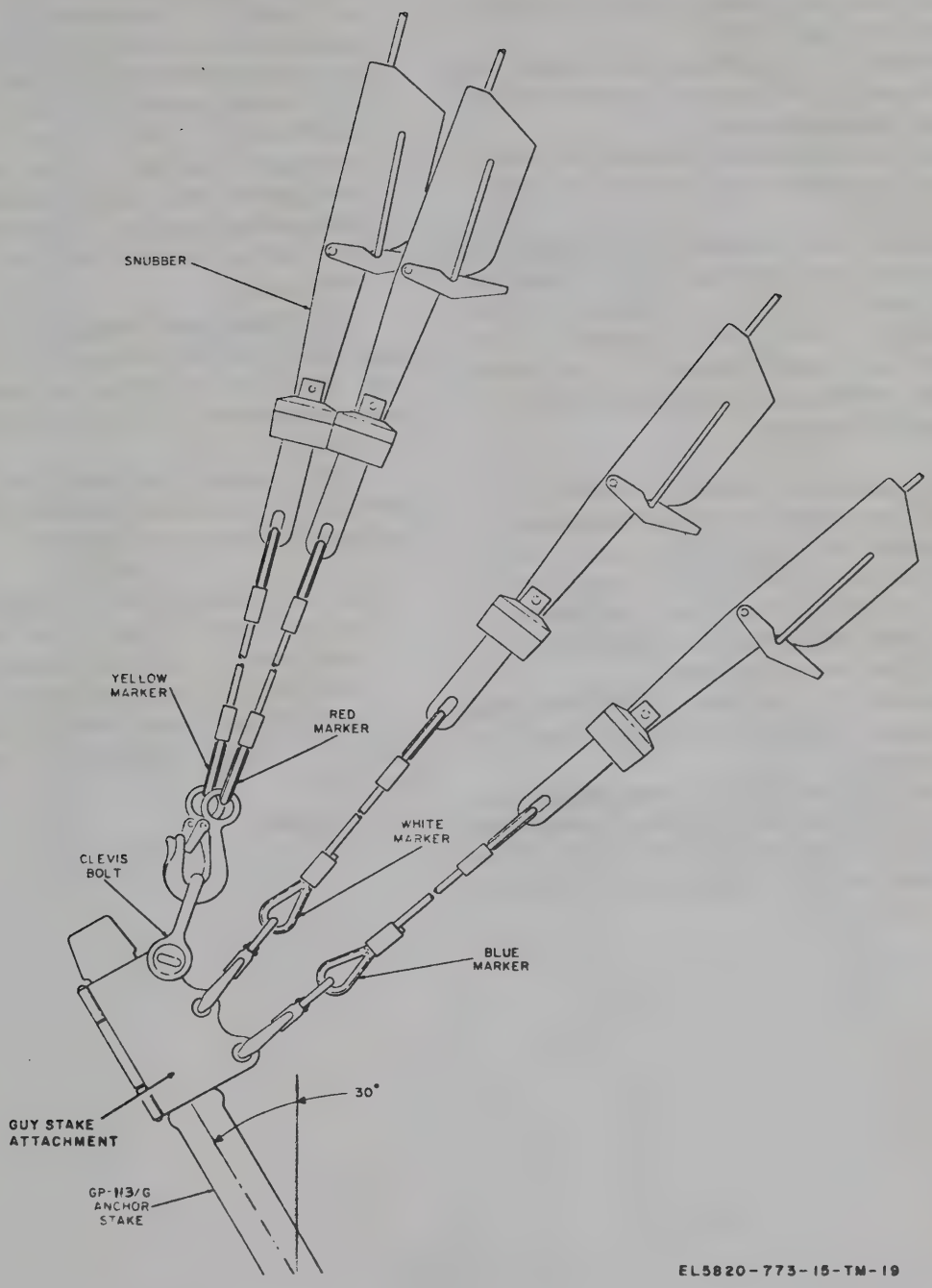


Figure 2–6. Mast Assembly AB–621/G, stake and anchor guy arrangement.

(39) Release the handbrake and crank up the elevator platform; allow space for adding the next mast section.

(40) Lock the handbrake.

(41) Repeat the procedures given in (33) through (40) above with each additional mast section and perform the following procedures for section five:

(*a*) When mast section five is elevated and the procedures in (38) above have been accomplished, attach the lower (hinged-type) guy ring between mast sections four and five.

(*b*) Connect the four white-coded guy cables to the lower guy ring and attach the snubber ends of these cables to the middle holes in the guy clamps on the GP–113/G stakes (fig. 2–6 and 2–16).

(42) When the last mast section is raised, lock the handbrake.

(43) Slide the mast carrier into the launcher and lock it in place (fig. 2–16).

(44) Release the handbrake and lower the elevator platform until it rests on the mast carrier.

(45) Lock the handbrake.

(46) Attach a clevis bolt to each top hole in the guy stake attachments on the four GP–113/G guy stakes (fig. 2–6).

(47) Connect the red-coded guy cables and yellow-coded cable (snubber ends) to the respective clevis bolt on the GP–113/G guy stakes (fig. 2–6).

(48) Visually check the alignment of the antenna mast, and equally tighten all guy cables to hold a true vertical mast installation and a true reflector assembly direction.

NOTE

When adjustment is required, release the handbrake and slaken the four backmount (yellow-coded) cables; then rotate the antenna mast. After the antenna is correctly positioned, lock the handbrake; then, without disturbing the adjustment, equally tighten the four cables.

(49) Recheck the antenna orientation and rotate as required; use the spanner wrench to rotate the antenna.

(50) Attach one end of the messenger cable to the top of the launcher assembly and connect the other end to the lift and tiedown point of the assemblage nearest the appropriate ANTENNA ENTRANCE box.

CAUTION

If the waveguide drain section, which may be used if condensation or rain accumulation is found in the system, is used in the waveguide installation do not attach the drain section to the ANTENNA ENTRANCE box. The weight and movement caused by the wind of the waveguide will cause damage to the pressurizing section. Refer to paragraph 2–7 before attempting to hookup the waveguide.

(51) Clamp and hang the 15–foot waveguide assembly on the messenger cable. Check to be sure that there are no kinks or sharp bends in the waveguide assembly. Complete the power cable run if used (fig. 2–5.1).

(52) Connect the end of the waveguide assembly to the end of the waveguide assembly at the base of the antenna assembly.

NOTE

Do not remove the waveguide assembly covers until ready to connect the waveguide assemblies to the ANTENNA ENTRANCE box connectors.

(53) Repeat the procedures in (1) through (52) above for each additional antenna assembly required.

2–5. Deleted

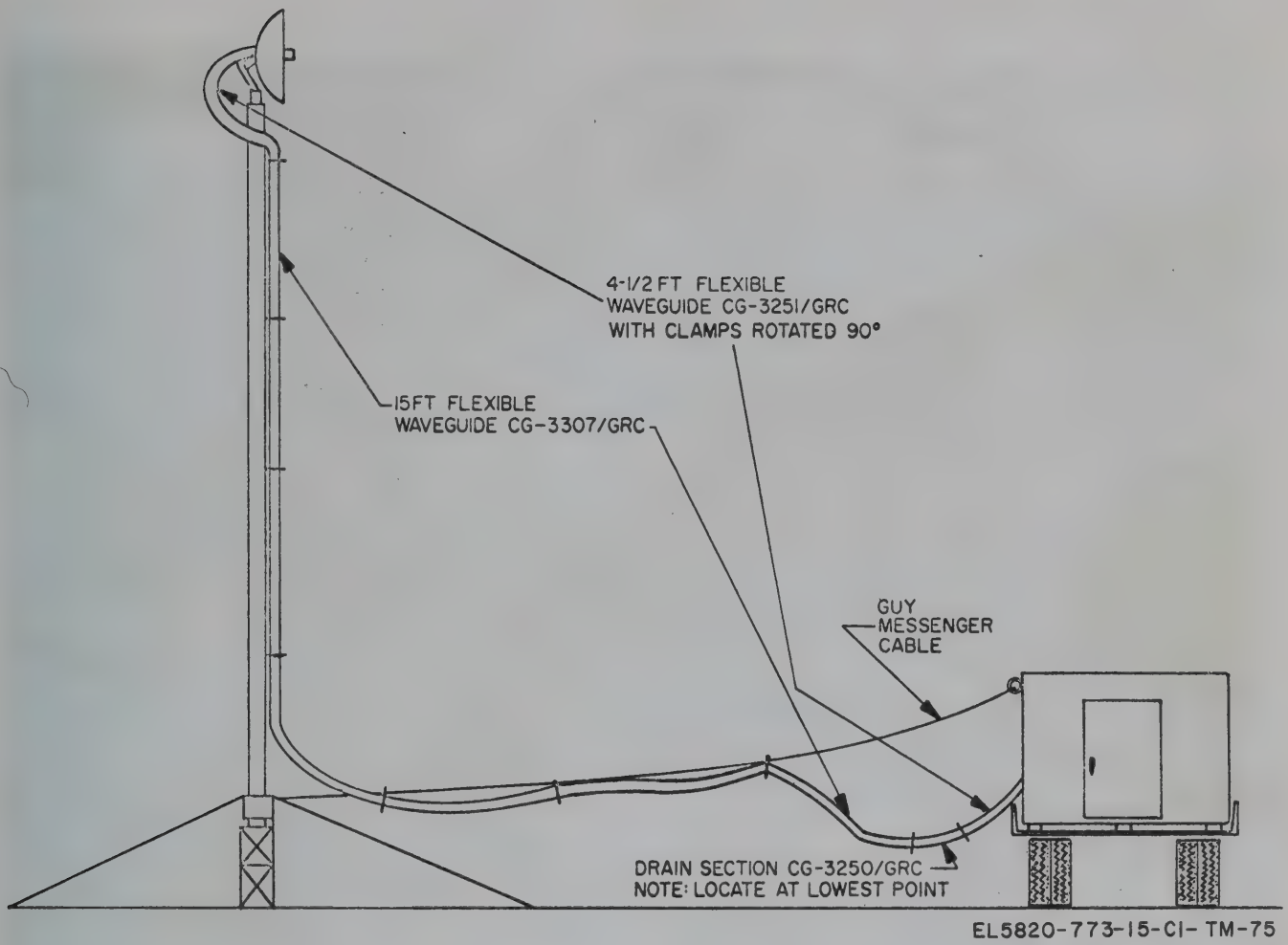


Figure 2-6.1. Waveguide run using drain section.

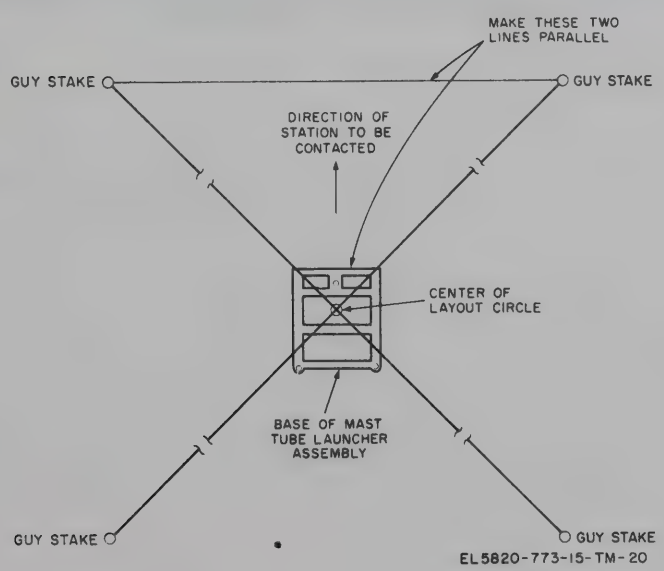


Figure 2-7. Antenna launcher positioning.

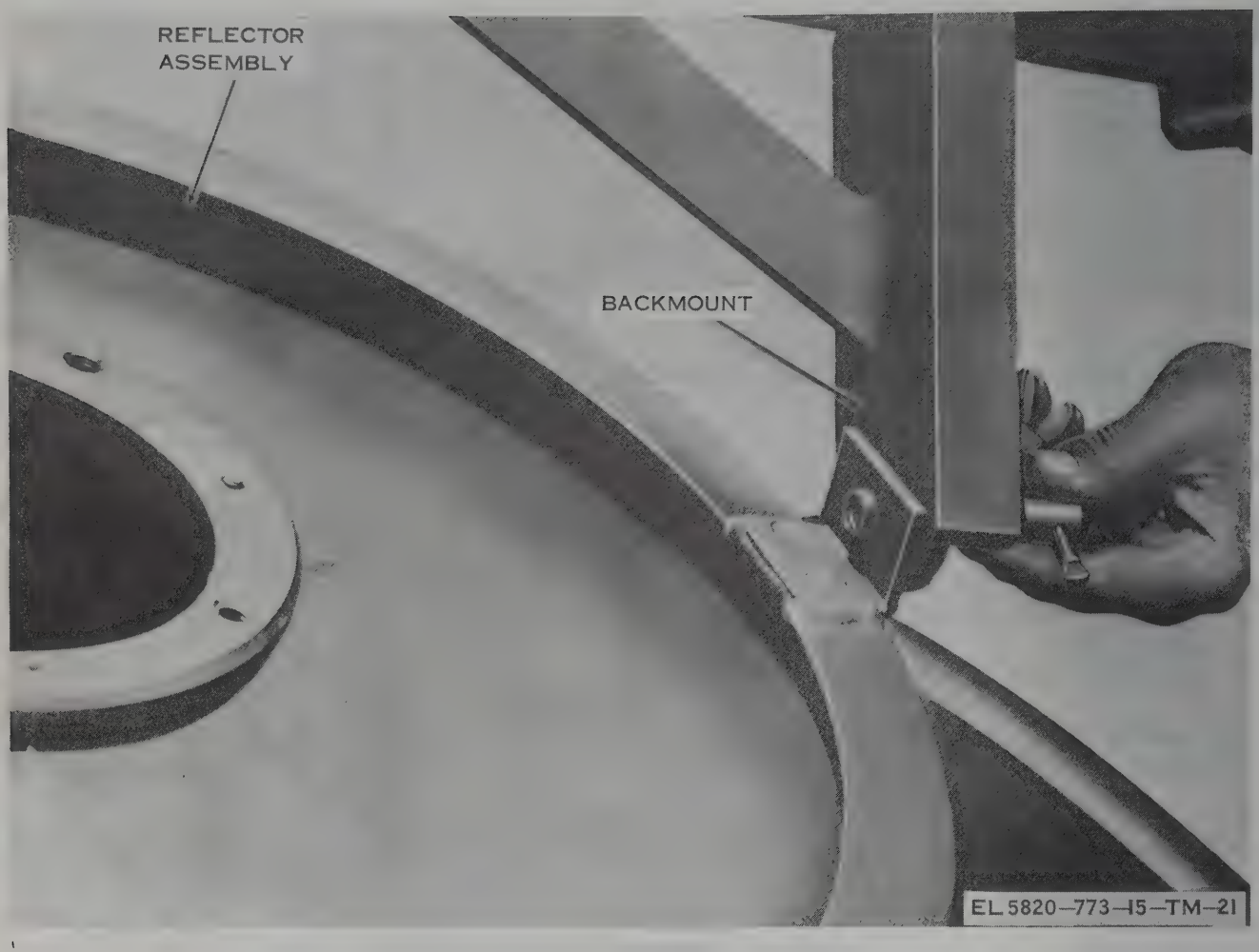


Figure 2-8. Attaching antenna backmount.

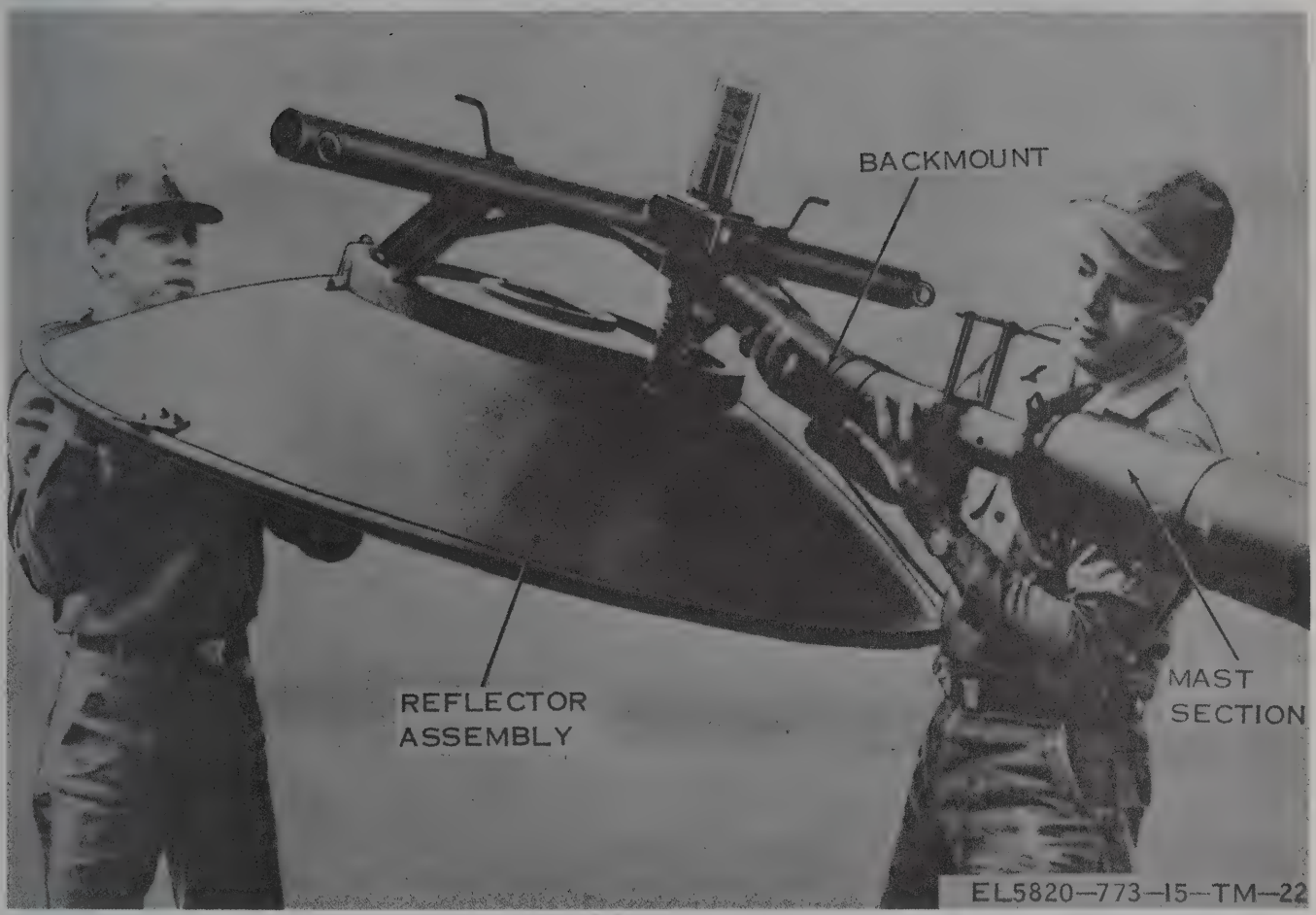


Figure 2-9. Mounting reflector assembly on mast.

2-5. Quick Reaction Antenna Installation (Deleted)



Figure 2-10. Tightening cross-handle bolts.

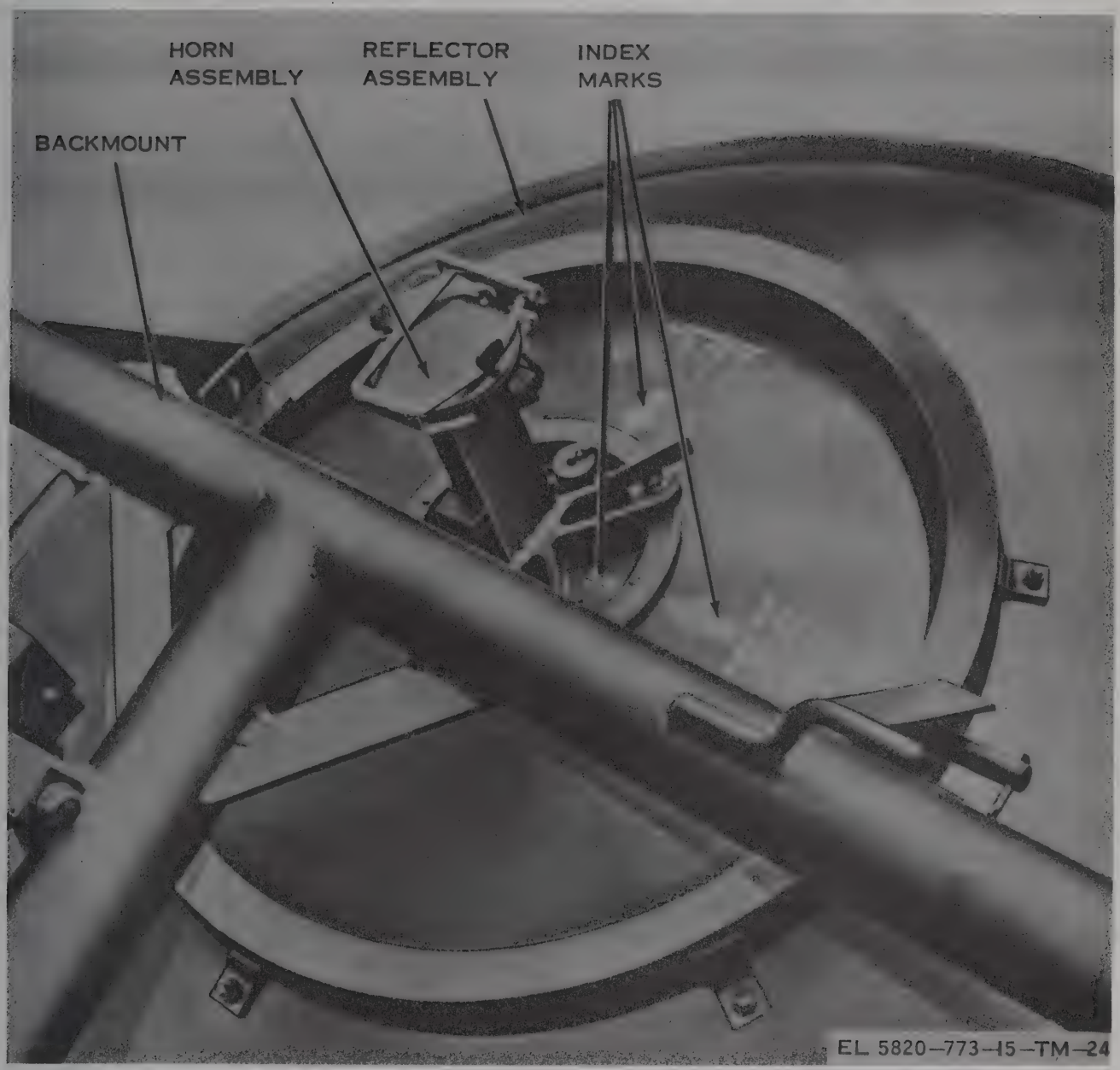


Figure 2-11. Setting antenna polarization.

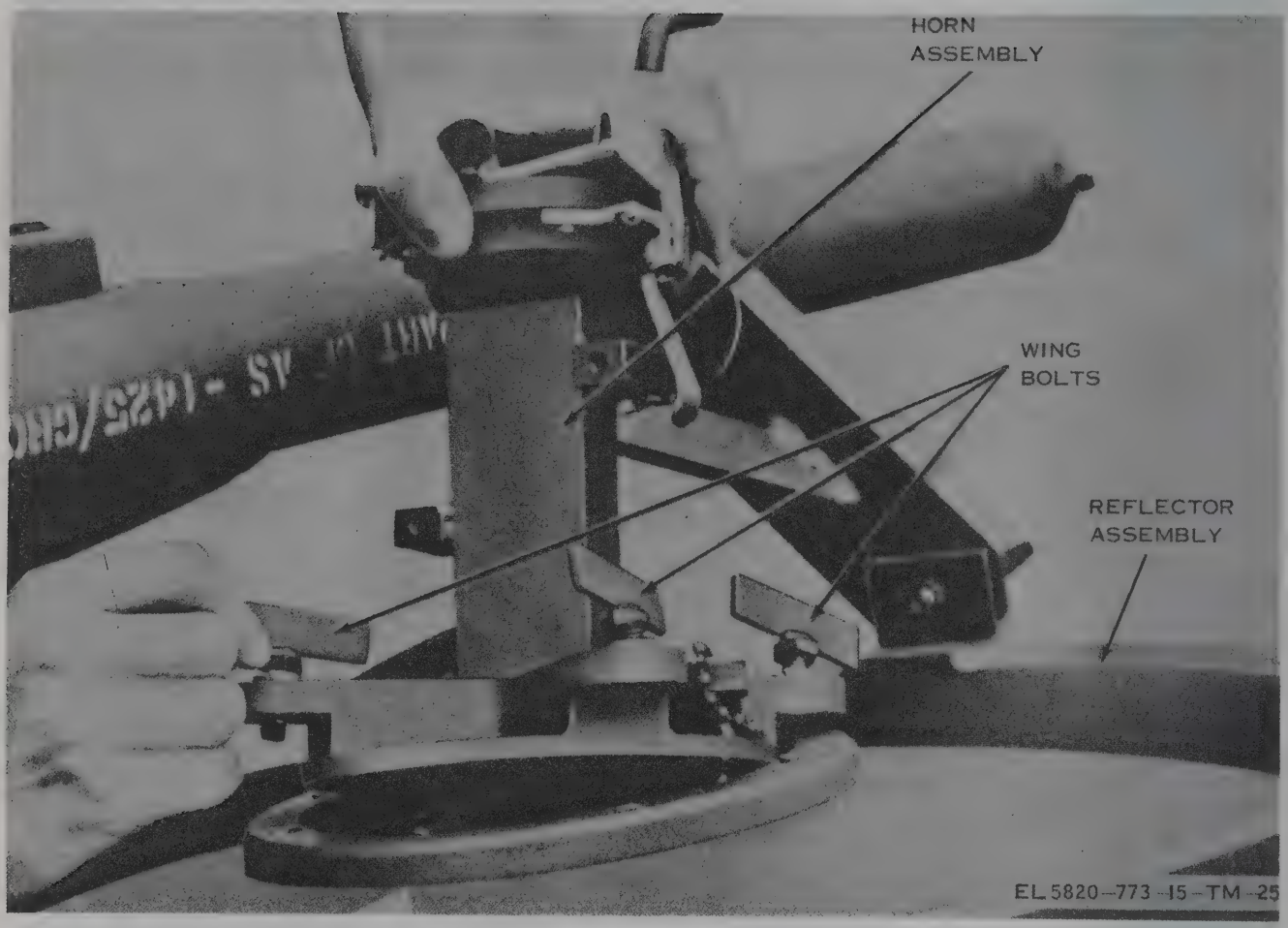


Figure 2-12. Mounting feedhorn to reflector.

11-5985-335-15 Antenna 138 only

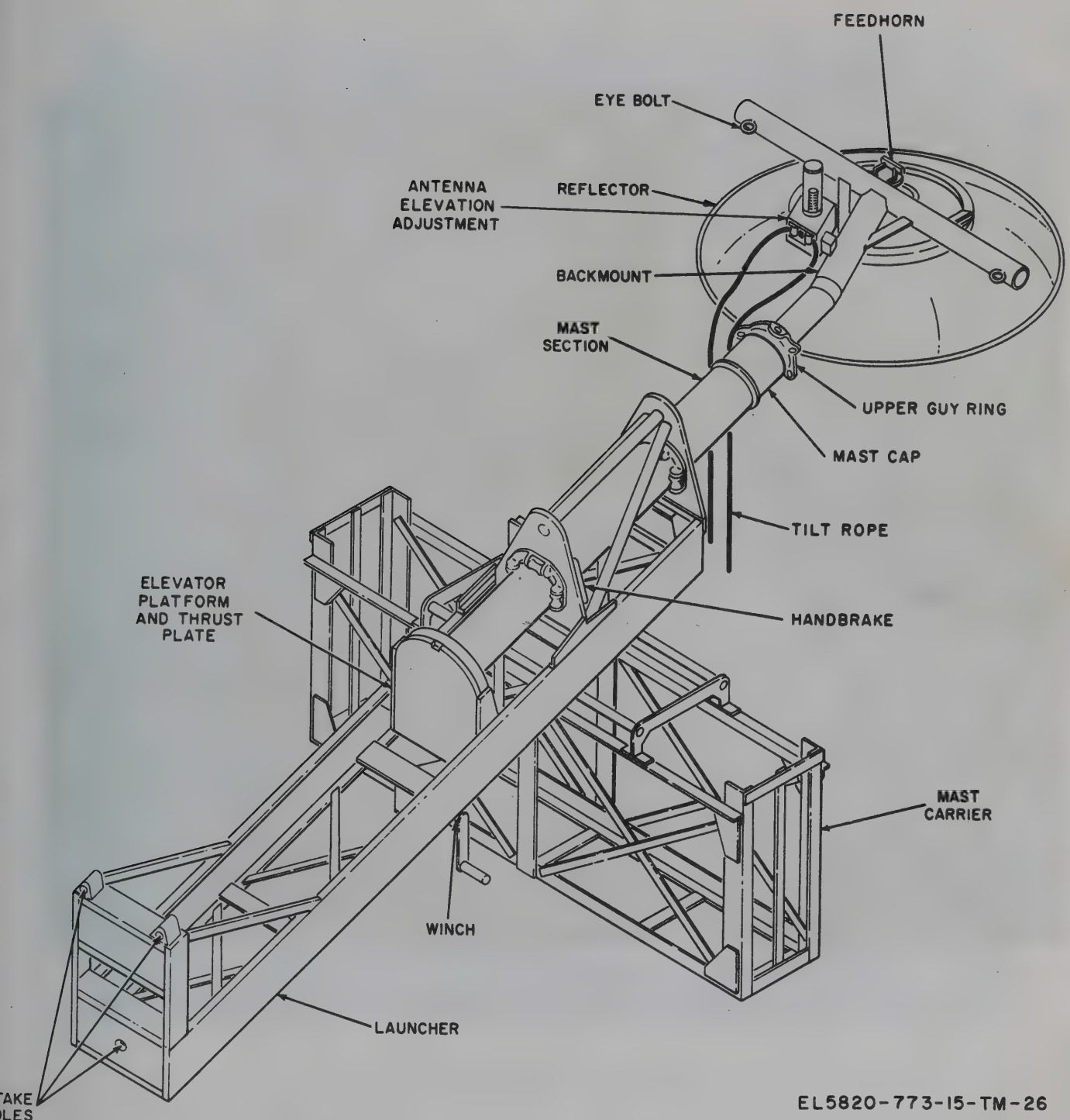


Figure 2-13. Antenna AS-1425/GRC installed on Mast Assembly AB-621/G.

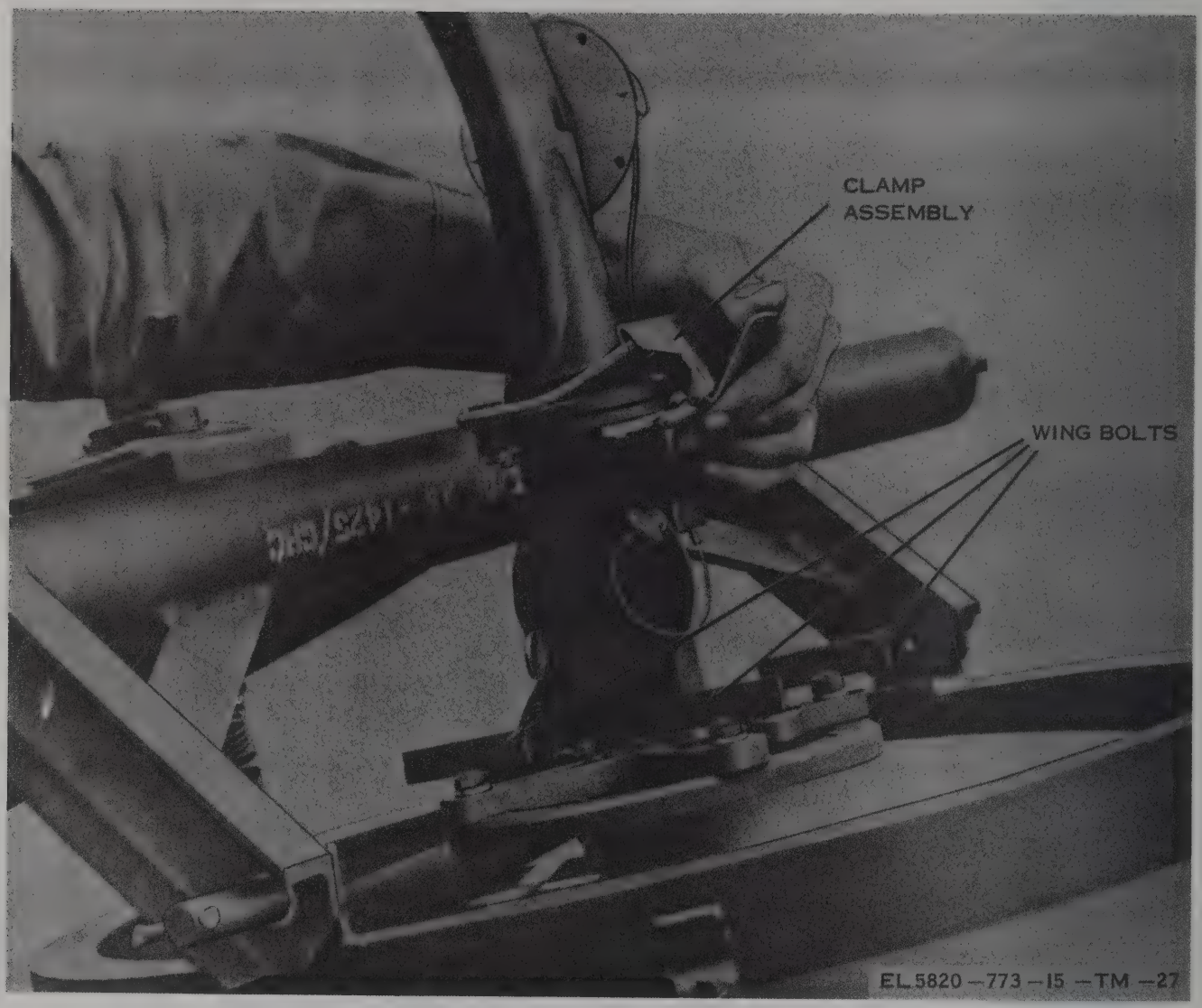


Figure 2-14. Attaching waveguide to feedhorn.

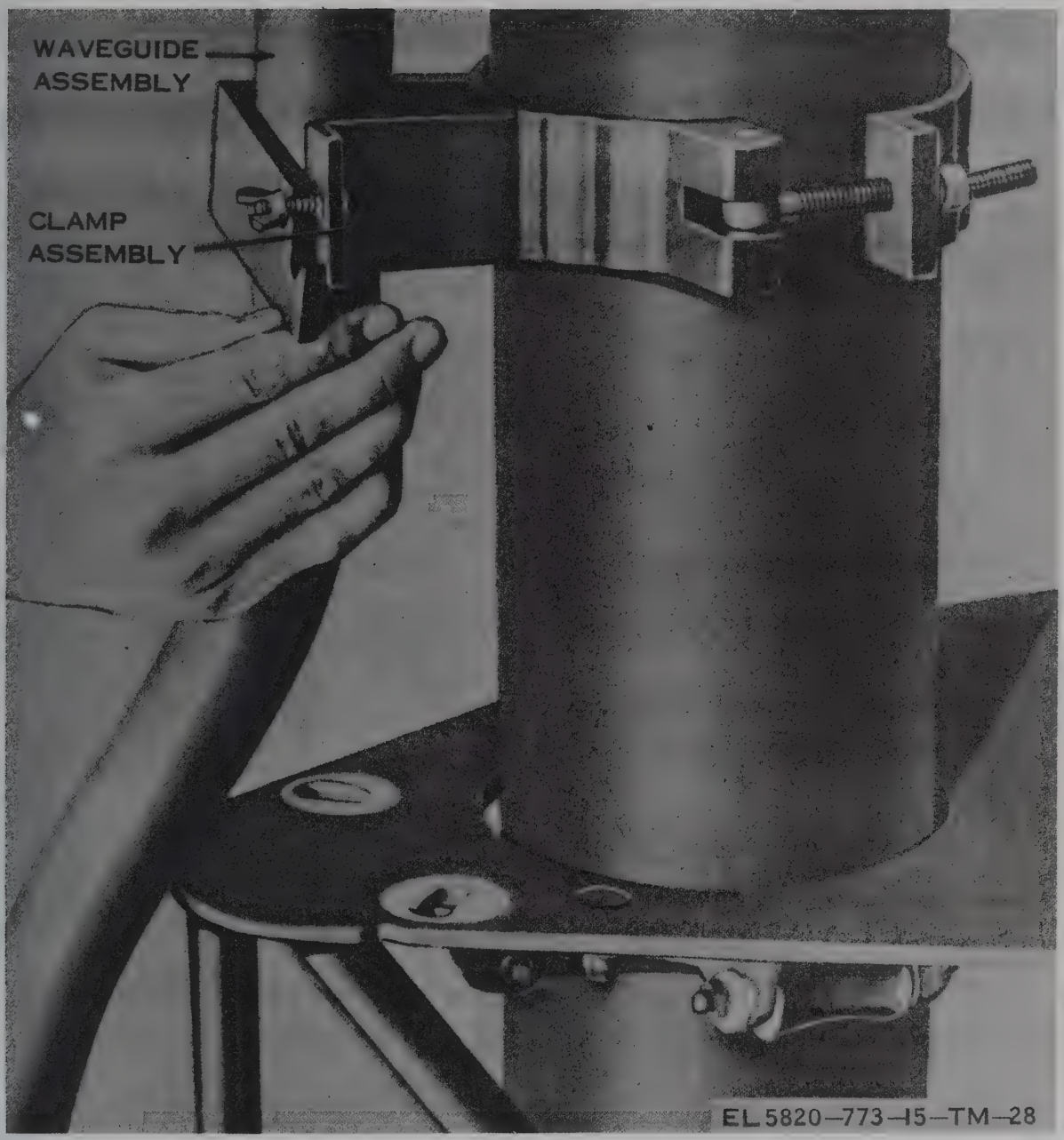


Figure 2-15. Attaching waveguide clamp.

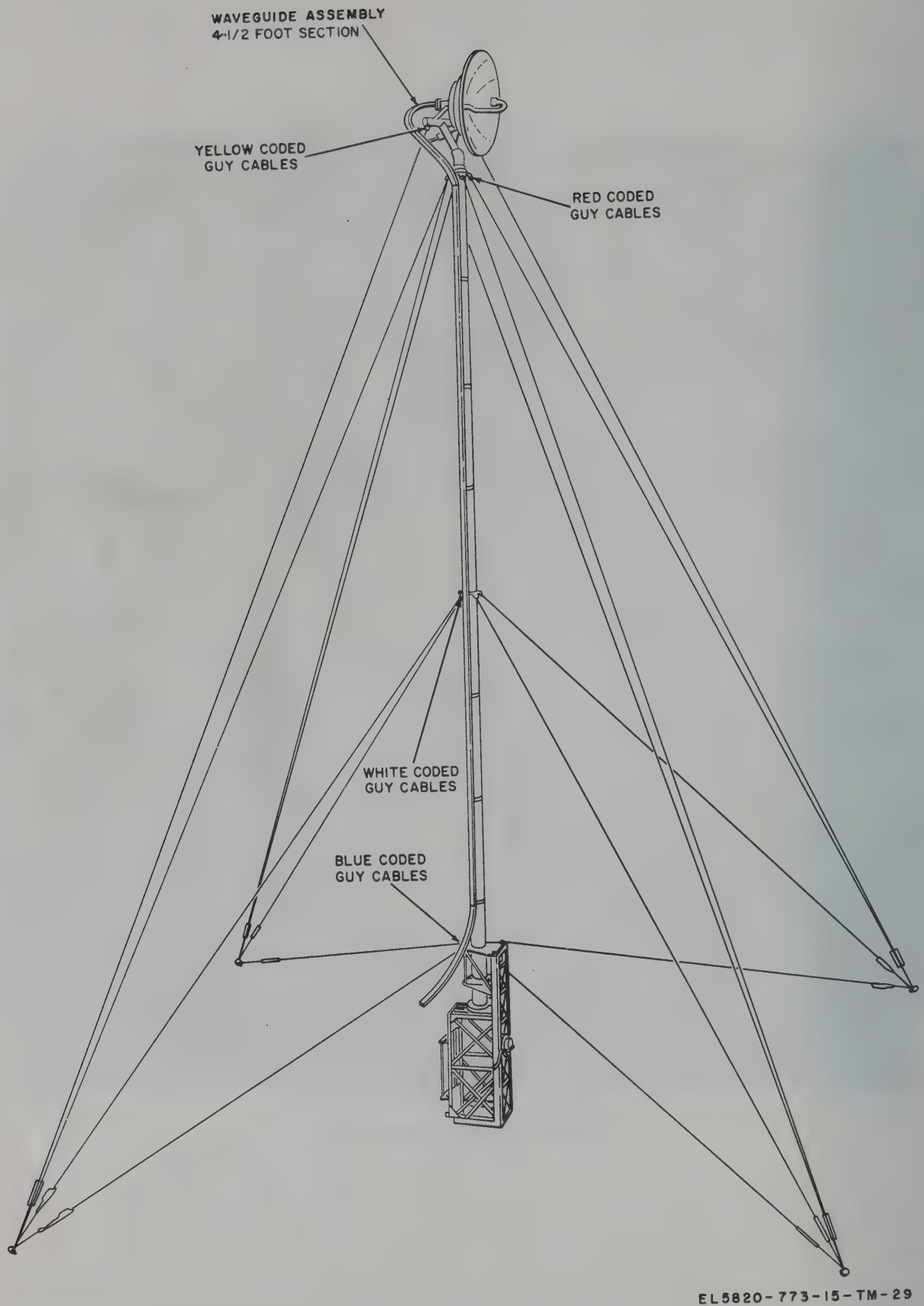


Figure 2-16. Antenna AS-1425/GRC and Mast Assembly AB-621/G completely installed.

Figure 2-17. Deleted.

2-6. Power Connections

CAUTION

Grounding connections (para 2-3) must be completed before power is connected to the AN/TRC-138.

a. Preliminary Procedures

(1) Make sure that all circuit breakers and equipment power switches in the assemblage are in the *off* position.

(2) Remove the power cable reel from the PU-631/G (fig. 1-9) and unwind the power cable assembly and power cable stub from the cable reel.

CAUTION

Power for the AN/TRC-138 normally is supplied through the POWER 115V AC IN connector. The POWER 115V AC OUT connector is provided to supply power to another assemblage, or to supply power to the AN/TRC-138 if the POWER 115V AC IN connector is damaged. When the POWER 115V AC OUT connector is used to supply power to another assemblage, do not allow the current drain to exceed 60 amperes (current rating of power cable assembly between the AN/TRC-138 and the power source).

Before placing the Engine Generator PU-631/G in service, check that the output selector switch behind the generator front panel (located internally) is positioned to the 120 volt single phase, two wire position. Failure to check this may lead to major equipment damage should the power be applied with the wrong switch setting.

(3) Open the cover on the POWER ENTRANCE BOX and prop it in the open position with the support.

(4) Remove the cover from the POWER 115V AC IN connector on the POWER ENTRANCE BOX and the cover from one end of the power cable assembly.

(5) Connect the power cable assembly to the POWER 115V AC IN connector on the POWER ENTRANCE BOX.

(6) Attach a cable grip to the power cable assembly and secure the other end of the cable grip to the hook on the POWER ENTRANCE BOX.

b. Connections to Generator Set. If the PU 631/G is used to supply power to the AN/TRC-138, follow the procedures in (1) through (4) below:

(1) Refer to the manual on the generator set (TM 5-6115-365-15) and insure that the generator output selector switch is positioned for 120 volt AC single phase operation, and note that L2 and L3 on the generator terminal board are designed as the two wire power feed.

(2) Remove the cover on the generator selector switchbox and the cover from the free end of the power cable assembly.

(3) Connect the power cable assembly to the connector on the generator selector switchbox.

(4) Insure that the generator selector switchbox power cable stub is connected as illustrated in figure 2-18.

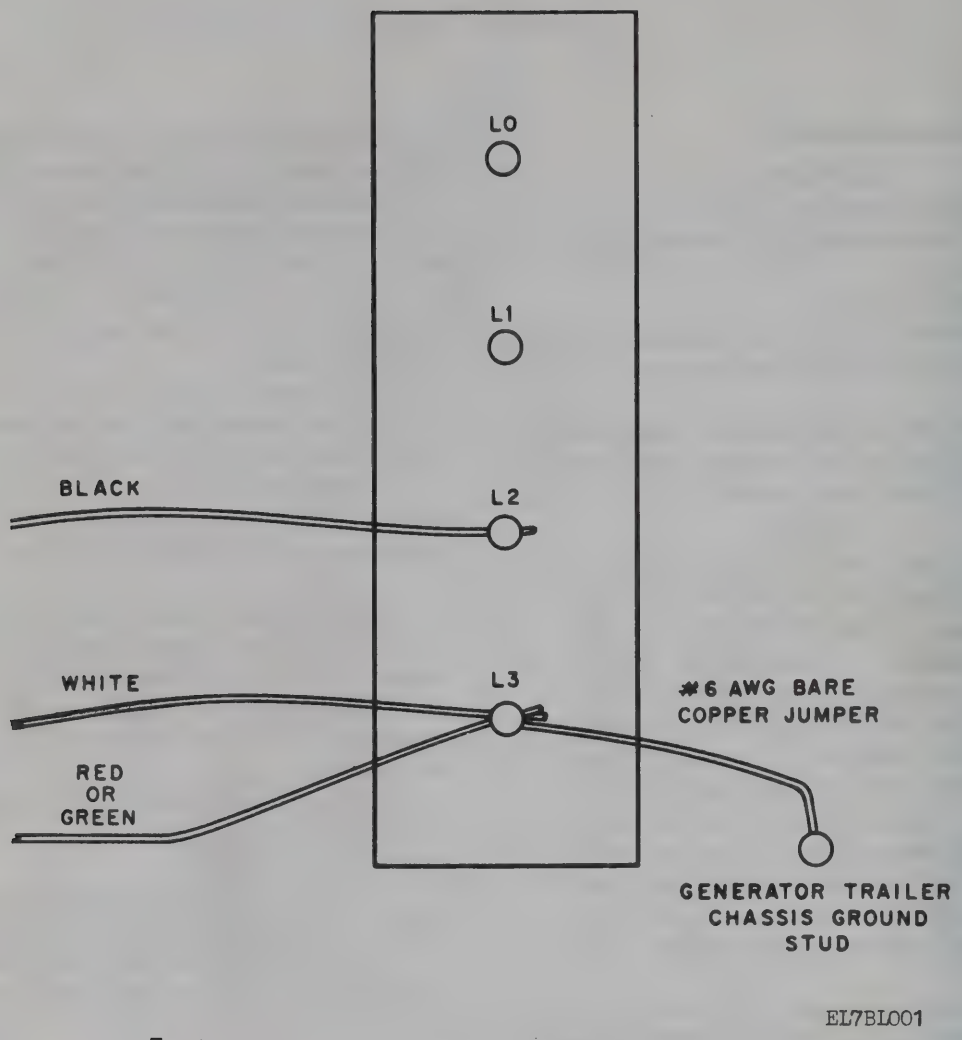


Figure 2-18. PU-631/G generator line terminal board connections.

c. Connections to Central Power Source.

(1) Turn off, or disconnect, the central power source before making any connections.

(2) If the power source is a 115-volt, 50 to 60-Hertz (hz), single-phase, two-wire source, connect the red and white wires of the power cable stub to the neutral wire, and the black wire of the power cable stub to the hot wire.

(3) If the power source is a 115- to 230-volt, 50- to 60-Hz, single-phase or two-phase, three wire distribution system, connect the red and white wires of the power cable stub to the neutral terminal, and the black wire to either of the two hot terminals.

(4) If the power source ia a 115- to 230-volt, 50- to 60-Hz, three-phase, four-wire distribution system, connect the red and white wires of the power cable stub to the neutral bus bar, and the black wire of the power cable stub to the phase 1, phase 2, or phase 3 bus bar.

(5) Remove the cover from the free end of the power cable stub and the cover from the free end of the power cable assembly.

(6) Connect the power cable stub to the power cable assembly.

(7) Position the hood shield on each side of the POWER ENTRANCE BOX cover in the open position, disconnect the cover support from the cover and lower the cover. Secure the hood shields in place.

2-7. Signal Connections

a. Antenna Waveguide Connections (fig. 1-12 or 1-13). The antenna waveguide connections for systems 1 and 2 are made at the roadside ANTENNA ENTRANCE box and the antenna waveguide connections for system 3 are made at the curbside ANTENNA ENTRANCE box. To connect the waveguides to either box, follow the procedures below:

CAUTION

Damage will result to the pressurizing waveguide section if the drain section CG-3250/GRC is attached directly to the pressurizing section because of the weight and wind movement of the flexible waveguide. Also damage can be caused by the mechanical interference between the two connectors used for systems 1 and 2. This mechanical interference is caused by the position of the lever on the waveguide clamp. The levers on these clamps may require repositioning in order to prevent one lever from interfering with the other. Refer to (4) below for the procedure to reposition the lever on the waveguide clamp.

NOTE

The waveguide connectors are deliberately mounted with a downward exterior slant to provide a rain drip loop in the waveguides. Do not attempt to pull the waveguides tight to the LIFT AND TIE DOWN POINT where they are secured.

(1) Loosen the swivel latches and remove the cover from the ANTENNA ENTRANCE box.

(2) Remove the cover from the appropriate SYSTEM connector in the ANTENNA ENTRANCE box.

(3) Remove the cover from the end of the 4½-foot waveguide section, CG-3251/GRC or CG-3207/GRC (fig. 1-15).

(4) Do not couple the 4½-foot waveguide section to the SYSTEM connector at this time. First check to see if the lever on the clamp on the flexible waveguide section is in a position to cause mechanical interference with the flexible waveguide clamp on another SYSTEM connector. If the lever on the waveguide clamp requires repositioning, follow the procedure in (5) below. If the lever on the waveguide clamp is on the long side of the clamp (does not require repositioning) then attach the waveguide to the SYSTEM connector as detailed in (6), (7), and (8) below:

(5) Rotate the quick acting clamps on the 4½-foot flexible waveguide assemblies 90 degrees by following the procedure in *(a)* through *(h)* below:

(a) Remove two thumbscrews from protective cover.

(b) Reinstall two thumbscrews from protective cover in reverse side so cap storage clip will face outward with cover installed.

(c) Remove six nuts, lockwashers retaining the waveguide clamp assembly.

(d) Remove clamp assembly.

(e) Remove two studs centered on long side.

(f) Relocate two studs so they are centered on short side.

(g) Reinstall clamp rotated 90 degrees so that clamp actuating lever is located on long side.

(h) Reinstall six lockwashers and nuts and tighten.

NOTE

Cover lanyard is installed on long stud with flat washer.

(6) Couple a 4½-foot flexible waveguide section directly to the pressurizing section at the antenna entrance box. Use a vehicle boarding ladder if the AN/TRC-138 is mounted on a prime

mover to prevent applying unnecessary force to the pressurizing section.

(7) Couple the drain section CG-3250/GRC, if required, between the 4½-foot and the 15-foot waveguide sections.

(8) Allow the waveguide to follow the path shown in figure 2-6.1. This will allow the drain section to be at the lowest point.

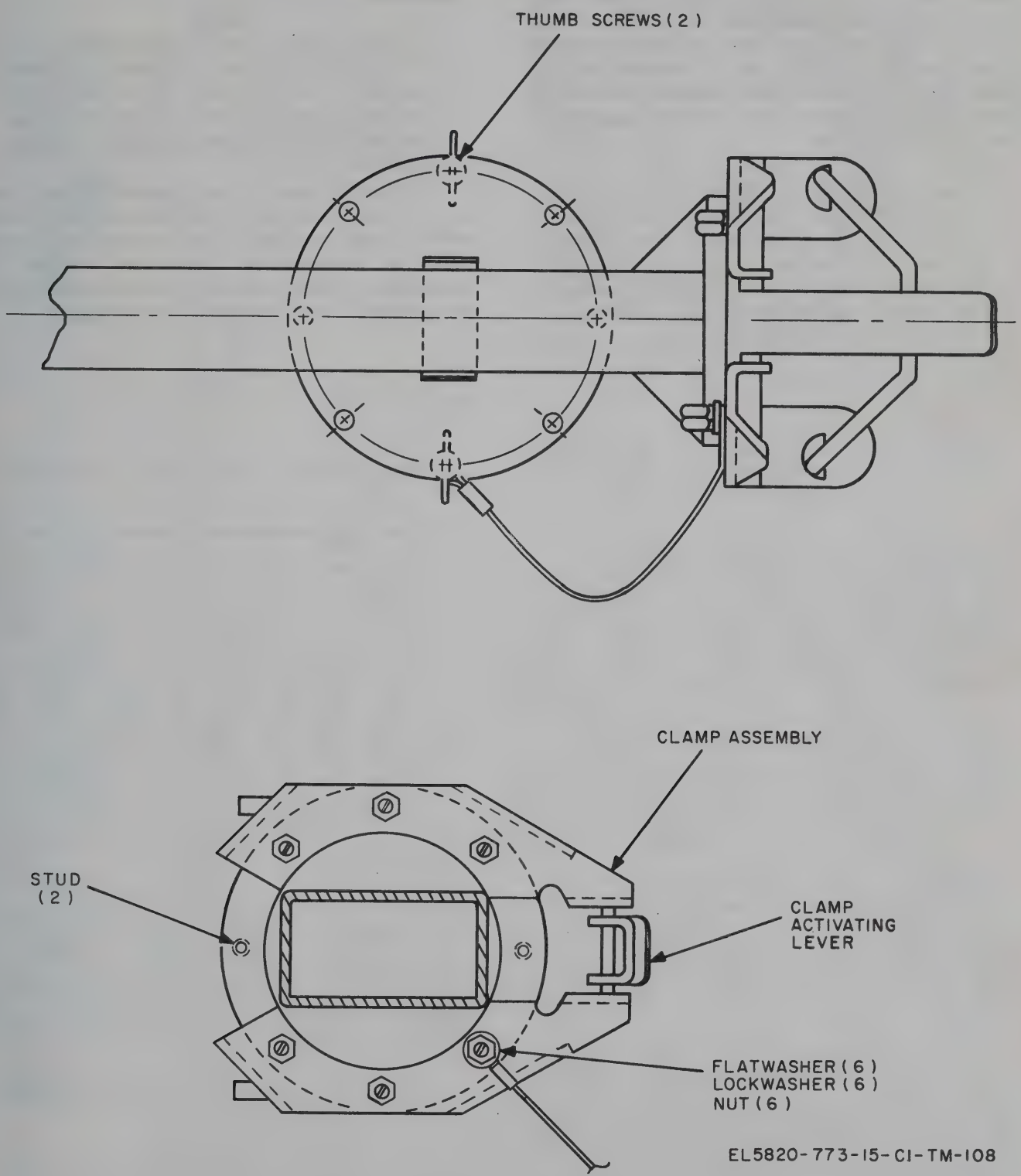


Figure 2-19.1. Waveguide connector assembly.

b. Video Cable Connections (fig. 1–11). The AN/TRC–138 may be used as one 48–channel radio repeater set with one 48–channel radio-to-cable converter, or as three 48–channel radio-to-cable converters. If the AN/TRC–138 is to be used as three separate 48–channel radio-to-cable converters, follow the procedures in (1) below. If the AN/TRC–138 is to be used as one 48–channel radio repeater set with one 48–channel radio-to-cable converter, follow the procedures in (2) below. Make the appropriate patch panel connections as described in (3) below.

NOTE

When connecting a video cable to the VIDEO ENTRANCE box, use the cable grip to provide the necessary strain relief. Connect the free end of the cable grip to the LIFT AND TIE DOWN POINT above the VIDEO ENTRANCE box allowing a sufficient rain drip loop (fig. 2–20).

(1) *Radio-to-cable converters.* The video cable connections are made at the VIDEO ENTRANCE box. Connect the system 1 cable to the SYSTEM 1 connector, the system 2 cable to the SYSTEM 2 connector, and the system 3 cable to the SYSTEM 3 connector.

NOTE

If a CX–4245/G cable is used instead of a CX–11230/G cable, Adapter, Cable Assembly CX–10734/G is required for connection between the CX–4245/G cable and the SYSTEM connector on the VIDEO ENTRANCE box.

(2) *Radio repeater and radio-to-cable converter.* Determine which system to use for the radio-to-cable converter, and connect the video cable as described in (1) above. Follow the procedures in (3)(b) below to connect the remaining two systems as a 48–channel radio repeater.

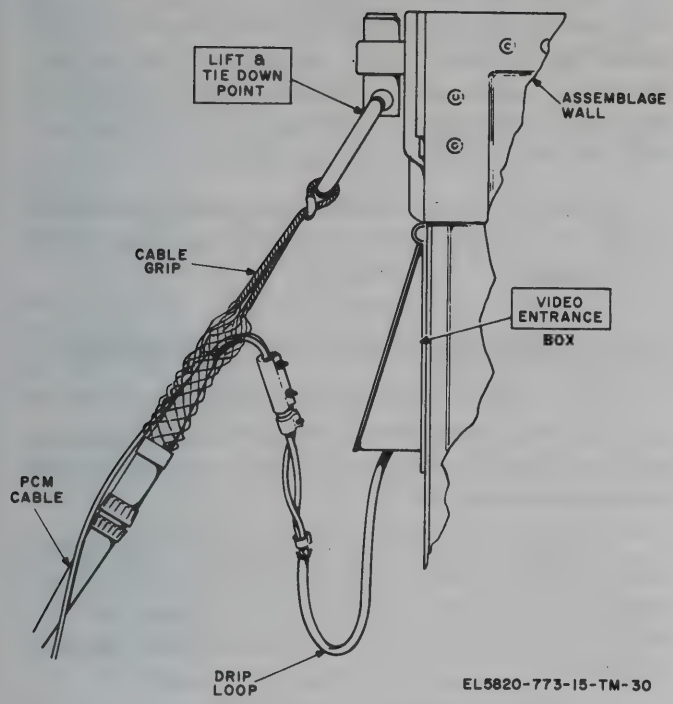


Figure 2–20. Video cable strain relief installation.

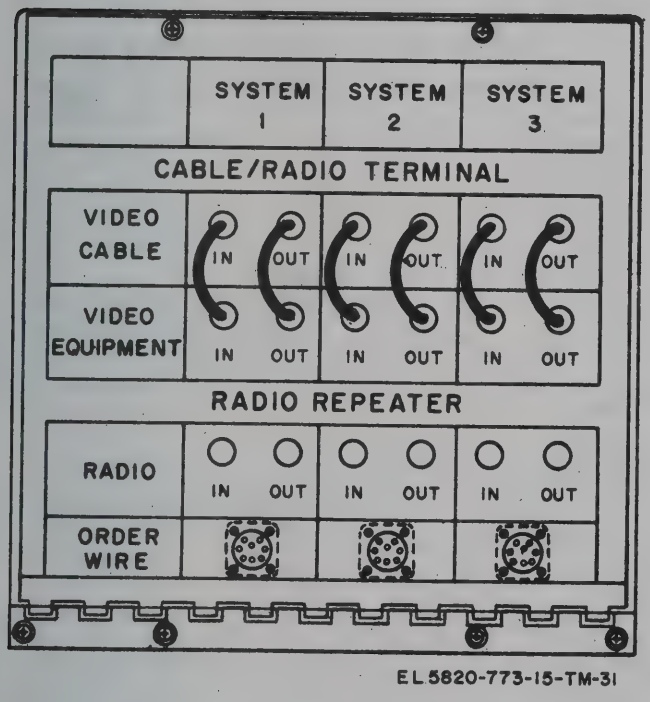


Figure 2–21. Patch panel, each system arranged for radio-to-cable conversion.

(3) *Patch panel connections.*

(*a*) *Three radio-to-cable coverters.* Connect the patch cords on the patch panel as indicated in figure 2–21.

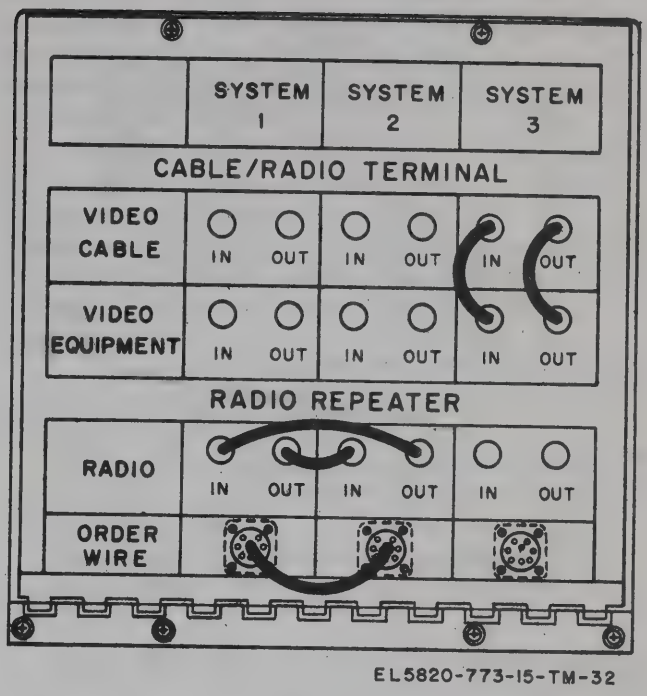


Figure 2–22. Patch panel, system 1 and 2 arranged for radio repeater and system 3 arranged for radio-to-cable conversion.

(*b*) *Radio repeater and radio-to-cable converter.* Connect the patch cords on the patch panel as indicated in figure 2–22. System 3 is shown connected as the radio-to-cable converter, but any one of the three systems may be used by appropriately rearranging the patch panel connections.

c. Remote Telephone Sets. Three pairs of binding posts, one pair for each system, are located in the POWER ENTRANCE BOX. A TA–312/PT may be connected to each pair for remote order-wire operation.

d. Intercommunications. The INTERCOM binding posts facilitate intercommunications connections to another assemblage utilizing the LS–147C/FI. The SPARE binding posts may be used for intercommunications utilizing the TA–312/PT.

2–8. Air Conditioner Connections

Two air-conditioner ducts are provided on the roadside wall of the assemblage (fig. 1–1) for connection to an external air conditioner. Connect an external air conditioner to the assemblage as follows:

a. Loosen the top and bottom mounting lat-

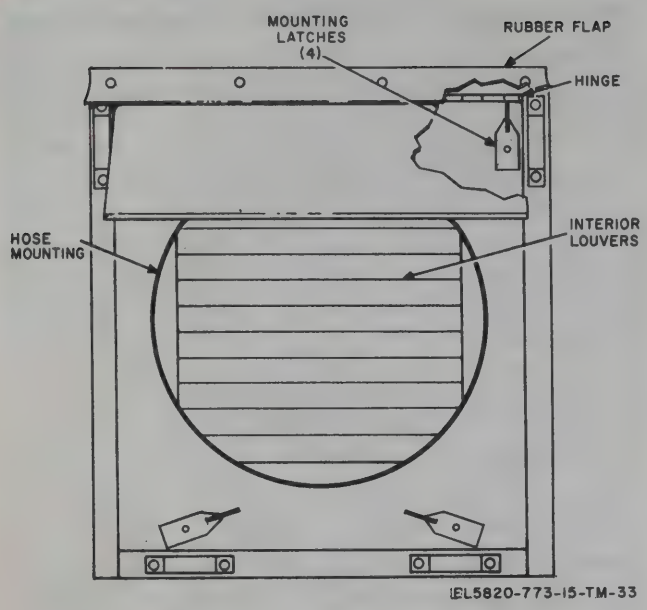


Figure 2–23. Air conditioner hardware kit mounted in air conditioner duct.

ches on the air conditioner vent covers and remove the covers.

b. Remove the air conditioner hardware kits from their mounting brackets inside the assemblage.

c. Install an air conditioner hardware kit in each air conditioner duct by inserting the fixed mounting latches in the retaining slots at the bottom of each air conditioner duct and secure each air conditioner hardware kit in position with the mounting latches (fig. 2–23).

d. Connect the air conditioner hoses (fig. 2–24) to the air conditioner mounting hardware kits and tighten the hose clamps.

2–9. Preliminary Checks and Adjustments

a. Assemblage Power and Lighting.

(1) Check to see that all circuit breakers on the POWER DISTRIBUTION PANEL are operated to OFF.

(2) Energize the ac circuits in the assemblage and turn on the lights following the procedures in paragraph 3–2. Check to see that all assemblage lights, blowers, and heaters operate properly.

b. TA–312/PT and CV–425/U.

(1) Install two Batteries BA–30 in the TA–312/PT battery case, one facing up and one facing down.

(2) Operate the CB–LB–CBS switch to LB.

(3) Connect the TA–312/PT to the appro-

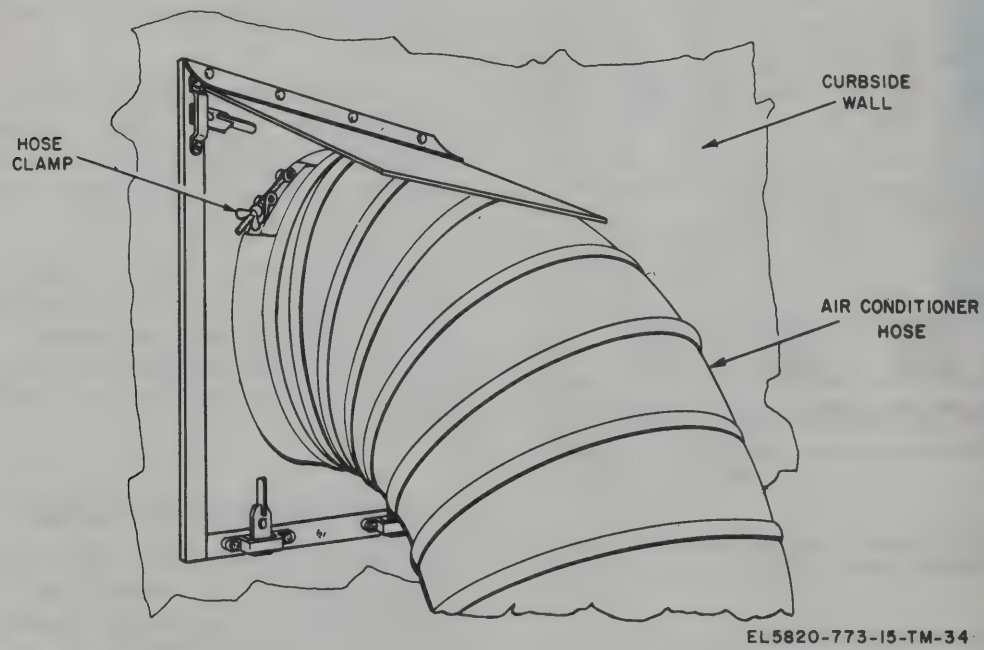


Figure 2–24. Air conditioner hose secured to air conditioner hardware kit.

priate pair of PHONE binding posts in the POWER ENTRANCE BOX.

(4) Operate the CV-425/U TP-TG switch to TP and the 2W-4W switch to 2W.

c. AN/GRC-144.

(1) Operate the T-1054/GRC-144 POWER switch to OFF.

(2) Operate the R-1467/GRC-144 POWER switch to OFF.

(3) If the AN/GRC-144 is to be used as a radio-to-cable converter, determine the length of pcm transmission cable between the assemblage and the nearest TD-206/G or TD-204/U and make the cable length adjustment as follows:

(*a*) Round off the determined cable length to the nearest ¼ mile interval (¼-, ½-, ¾-, or 1-mile) and record the cable length.

(*b*) Loosen the captive screws securing the T-1054/GRC-144 digital data modem 1A12 cover in place and lower the cover.

(*c*) Remove plug-in card assemblies 1A12A2 and 1A12A10.

(*d*) Check the position of jumper plug P2 on the cable length connector of both plug-in card assemblies, and if necessary, reposition jumper plug P2 to correspond to the recorded cable length ((*a*) above).

(*e*) Replace plug-in card assemblies 1A12A2 and 1A12A10 in digital data modem 1A12.

(*f*) Close the digital data modem 1A12 cover and secure it with the captive screws.

(4) Check that the frequency plan meets the following requirements.

(*a*) Be sure the transit and receive frequency for each system has a minimum separation of 75 MHz.

(*b*) Be sure the transmitting frequency is not within 10 MHz of the R-1467/GRC-144 image frequency for each system. Image frequency is determined as follows:

1. Image frequency = received frequency - 140 MHz if the received frequency is between 4400 and 4699.9 MHz.

2. Image frequency = received frequency + 140 MHz if the received frequency is between 4700 and 5000 MHz.

(*c*) Be sure the transmit frequency of one system and the receive frequency of the other two systems has a minimum of 20 MHz separation.

(*d*) Be sure that there is a minimum receive frequency separation of 7.0 MHz between systems receiving from the same distant site (parellel systems).

(5) Preset the T-1054/GRC-144 as indicated in the following chart.

Control	*Location*	*Position*
POWER switch	Meter panel (P/O 1A15)	OFF
Meter selector switch	Meter panel (P/O 1A15)	OFF (TRANSIT)
OUTPUT LEVEL selector	Radio test set (P/O 1A16)	LOW
ON/OFF switch	100 MHz oscillator 1A2	OFF
48 CH/96 CH selector	Attenuator assembly 1A3	48 CH
PUSH TO TURN knob	Rf bandpass filter 1FL3	Required transmission frequency
ADDM TRAFFIC SELECT switch	Digital data modem 1A12	48 CHAN
CABLE LOOP TEST switch	Digital data modem 1A12	NORMAL
MODULE TEST selector switch	Order wire assembly 1A13	1
Thumbwheel switches (4)	Frequency synthesizer 1A14	Required transmission frequency

(6) Preset the R-1467/GRC-144's as indicated in the following chart.

Control	*Location*	*Position*
POWER switch	Meter panel (P/O 2A15)	OFF
Meter selector switch	Meter panel (P/O 2A15)	OFF (TRANSIT)
PUSH TO TURN knob	Preselector bandpass filter 2FL4	Required receiving frequency
PUSH TO TURN knob	Local oscillator bandpass filter 2FL6	Required receiving frequency
AGC SEL switch	If amplifier 2A5	DIV OFF
Thumbwheel switches (4)	Frequency synthesizer 2A14	Required receiving frequency

(7) Operate each Waveguide Switch SA-1679/GRC (fig. 1-5) on the waveguide assemblies to TO LOAD (TEST).

2-10. System Lineup

The lineup procedures for the AN//TRC-138 consist of antenna directional adjustments in the radio link, traffic level adjustments in the cable link, and order wire level adjustments. Perform the procedures in paragraph 3-2 and 3-3 and then perform the following procedures.

a. Antenna Directional Adjustments.

NOTE

The external cables of the ID-1708/GRC have been fraying and dispersing bits of fiberglass type material which is irritating to users of the device. Wrap the cables with electrical tape such as NSN 5970-926-7218 until improved cables are available. Stow the cables after use inside the unit.

(1) Remove the ID-1708/GRC and TA-312/PT from the ssemblage and place them near the antenna mast.

(2) Open the ID-1708/GRC and turn the cable spool lock key one-quarter turn and unwind the cable from the cable spool.

(3) Connect the free end of the ID-1708/GRC cable to the SIGHTING connector on the AN-antenna requiring adjustment.
antenna requiring adjustent.

(4) Connect the ID-1708/GRC field telephone cable to the binding posts of the TA-312/PT.

(5) Start and tune the AN/FRC-144's at each end of the radio link (para 3-4).

(6) Operate the Waveguide Switch SA-1679/GRC to ANT (NORMAL).

(7) Use the orderwire facility (para 3-5) to establish contact with the distant radio site operator and notify the distant operator that you are ready to start the antenna directional adjustments.

(8) Operate the ID-1708/GRC TRANSIT switch to ON.

(9) Adjust the antenna azimuth and elevation controls for a maximum meter indication.

(10) Notify the distant operator that the antenna directional adjustments are completed.

(11) When the distant operator indicates completion of the antenna directional adjustment, operate the ID-1708/GRC TRANSIT switch to OFF.

(12) Disconnect the ID-1708/GRC cable from the SIGHTING connector on the ANTENNA ENTRANCE box.

(13) Disconnect the TA-312/PT from the ID-1708/GRC field telephone cable.

(14) Wind the cables on the ID-1708/GR-cable spool, and turn the cable spool lock key one-quarter turn to secure the spool.

(15) Close the ID-1708/GRC cover and secure it with the latches.

(16) Replace the ID-1708/GRC and TA-312/PT in the assemblage (fig. FO-1).

b. Traffic Level Adjustment.

(1) Use the orderwire to establish contact with the distant cable site operator (para 3-5) and request traffic.

(2) Operate the waveguide switch to TO LOAD (TEST) at both ends of the radio link.

NOTE

Before proceeding with the following step, record the T-1054/GRC-144 and R-1467/GRC-144 operating frequencies.

(3) Operate the R-1467/GRC-144 PUSH TO TURN knob on the 2FL4, 2FL5, and 2FL6 filters for FREQ MHZ dial indications of 4700.

(4) Operate the R-1467/GRC-144 thumbwheel switches on electrical frequency synthesizer 2A14 for a FREQ MHZ dial indication of 4700.

(5) Operate the T-1054/GRC-144 PUSH TO TURN knob on filter 1FL3 for a FREQ MHZ dial indication of 4800.

(6) Operate the T-1054/GRC-144 thumbwheel switches on electrical frequency synthesizer 1A14 for a FREQ MHZ dial indication of 4800.

(7) Operate the T-1054/GRC-144 mhz radio frequency oscillator 1A2 ON-OFF switch to ON.

(8) Operate the T-1054/GRC-144 radio test set meter switch to OSC LEVEL and adjust the 100 mhz radio frequency oscillator 1A2 LEVEL ADJ control for a SET OSC LEVEL ADJ indication on the meter.

(9) Operate the T-1054/GRC-144 radio test set OUTPUT LEVEL selector switch to LOW.

(10) Operate the R-1467/GRC-144 meter panel assembly 2A15A2 selector switch to TRAFFIC.

(11) Adjust the R-1467/GRC AF-RF amplifier. 2A11 TRAFFIC LEVEL ADJ control for a meter indication of 100.

(12) Operate the T-1054/GRC-144 radio frequency oscillator 1A2 ON-OFF switch to OFF.

(13) Reset the T-1054/GRC-144 and R-1467/GRC-144 controls to their original operating frequencies.

c. Orderwire Level Adjustment.

NOTE

For a radio repeater application, the following procedures must be performed on both T-1054/GRC-144's. The test tone must be received from the station on the "A" side to adjust the "B" side T-1054/GR-C-144, and then reversed for the "A" side T-1054/FRC-144 adjustment.

(1) Operate the T–1054/GRC–144 meter panel assembly 1A15A8 meter selector to OW TEST.

(2) Depress the T–1054/GRC–144 orderwire assembly 1A13 TEST TONE pushbutton, remove the green cap and adjust the attenuator assembly 1A3 OW LEVEL ADJ control for a meter indication of 100.

(3) Release the T–1054/GRC–144 orderwire assembly 1A13 TEST TONE pushbutton and replace the green cap on the attenuator assembly 1A3 OW LEVEL ADJ control.

(4) Request the cable site operator to operate the TD–204/U TONE-OFF switch to TONE.

(5) Adjust the T–1054/GRC–144 digital data modem 1A12 THRU OW RECEIVE LEVEL ADJ control for a meter indication of 100.

(6) Request the cable site operator to operate the TD–204/U TONE-OFF switch to OFF.

(7) Check that the following conditions exist on the T–1054/GRC–144:

Indicator	*Indication*
RADIO TEST SET	Green
WAVEGUIDE SW	Green
RING	Green or amber
CNTRL ALARM	Green
TRAF	Green
RF POWER	Green
SYNTH LOCK	Green
REFL RF POWER	Green
CABLE TO RADIO MODEM	Green
RADIO TO CABLE MODEM	Green

(8) Check that the following conditions exist on the R–1467/GRC–144:

Indicator	*Indication*
CARR (IF)	Green
SPARE	Green
SYNTH LOCK	Green
TRAF	Green

(9) Check the control indicator(s) for the following conditions:

Indicator	*Indication*
TRAF IN*	Green
TRAF OUT*	Green
ANT (ANTENNA)	Green

* Extinguished during radio repeater operation.

(10) If the AN/TRC–138 is not to be put to immediate use, perform the stopping procedures in paragraph 3–7.

NOTE

If the AN/TRC–138 is left in operation, close the T–1054/GRC– 144 and R–1467/GRC–144 cabinet doors. The doors must be left closed during operation to enable the blower system to function properly.

CHAPTER 3

OPERATION

3-1. Controls and Indicators

Except for the controls and indicators listed below, all controls and indicators for the components of the assemblage are covered in appropriate technical manuals (app A).

a. POWER DISTRIBUTION BOX (fig. 3-1).

Control	*Description*	*Function*
MAIN circuit breaker	60-ampere	Provides overload protection and control of ac power to tributary circuit breakers.
Circuit breakers (tributary):		Controls following circuits:
LIGHTS	15-ampere	Ceiling lights (fluorescent and incandescent).
BLOWERS	15-ampere	Controls ac power to BLOWER-1 and BLOWER-2 receptacles.
HTR-1	20-ampere	Controls ac power to HEATER-1 receptacle.
HTR-2	20-ampere	Controls ac power to HEATER-2 receptacle.
CONV	20-ampere	Controls ac power to all CONVENIENCE receptacles and 115 V AC receptacle in POWER ENTRANCE BOX.
IND	15-ampere	Controls ac power to control indicator (three units Serial No's. 1 through 25. One unit serial No's. 26 and above).
EQUIP	30-ampere	Controls ac power to XMTR, RCVR, and CV425 receptacles.
SPARE	15-ampere	Spare.
AMPERES AC meter	0-100 ampere	Indicates current drain in assemblage.
VOLTS AC meter	0-150 vac	Indicates input voltage applied to assemblage.
Indicators 1-8	NE-51	Glow when associated circuit breaker is operated to ON.

Wave Guide
16 FT 5985-00-954-4939

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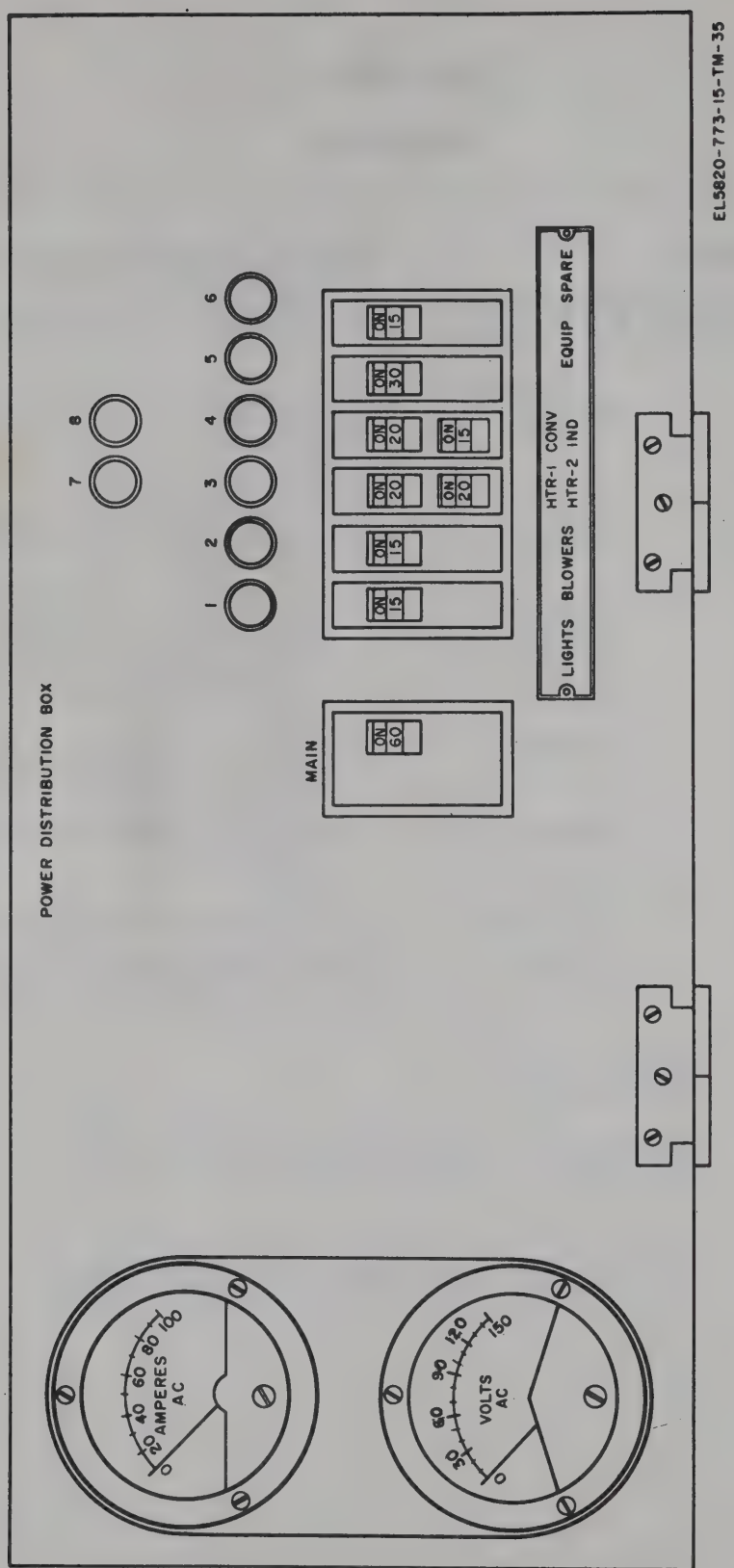


Figure 3-1. POWER DISTRIBUTION BOX exterior front view.

b. Control Indicators (fig. 3-2 and 3-3).

Control or indicator	*Description*	*Function*
ALARM DISABLED indicator and switch	24-volt tungsten with momentary action switch.	When depressed, lights and flashes red to indicate T-1054/GRC-144 alarm is disabled.
ANT-DUMMY LOAD indicator	24-volt tungsten	*Position* / *Function* ANT — Lights green when SA-1679/GRC is at ANT (NORMAL). DUMMY LOAD — Lights red when SA-1679/GRC is at TO LOAD (TEST).
TRAF IN-TRAF OUT indicator	24-volt tungsten	Indicates when incoming traffic and outgoing traffic is available on pcm cable (green with traffic, red without).

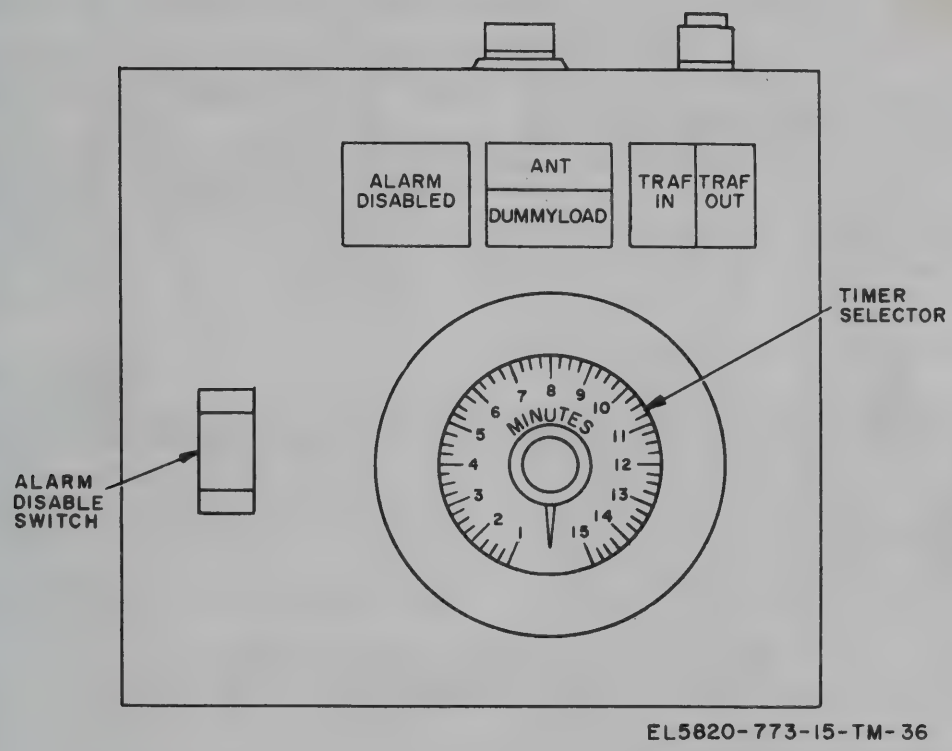


Figure 3-2. Control indicator, front panel (Serial No's. 1 through 25).

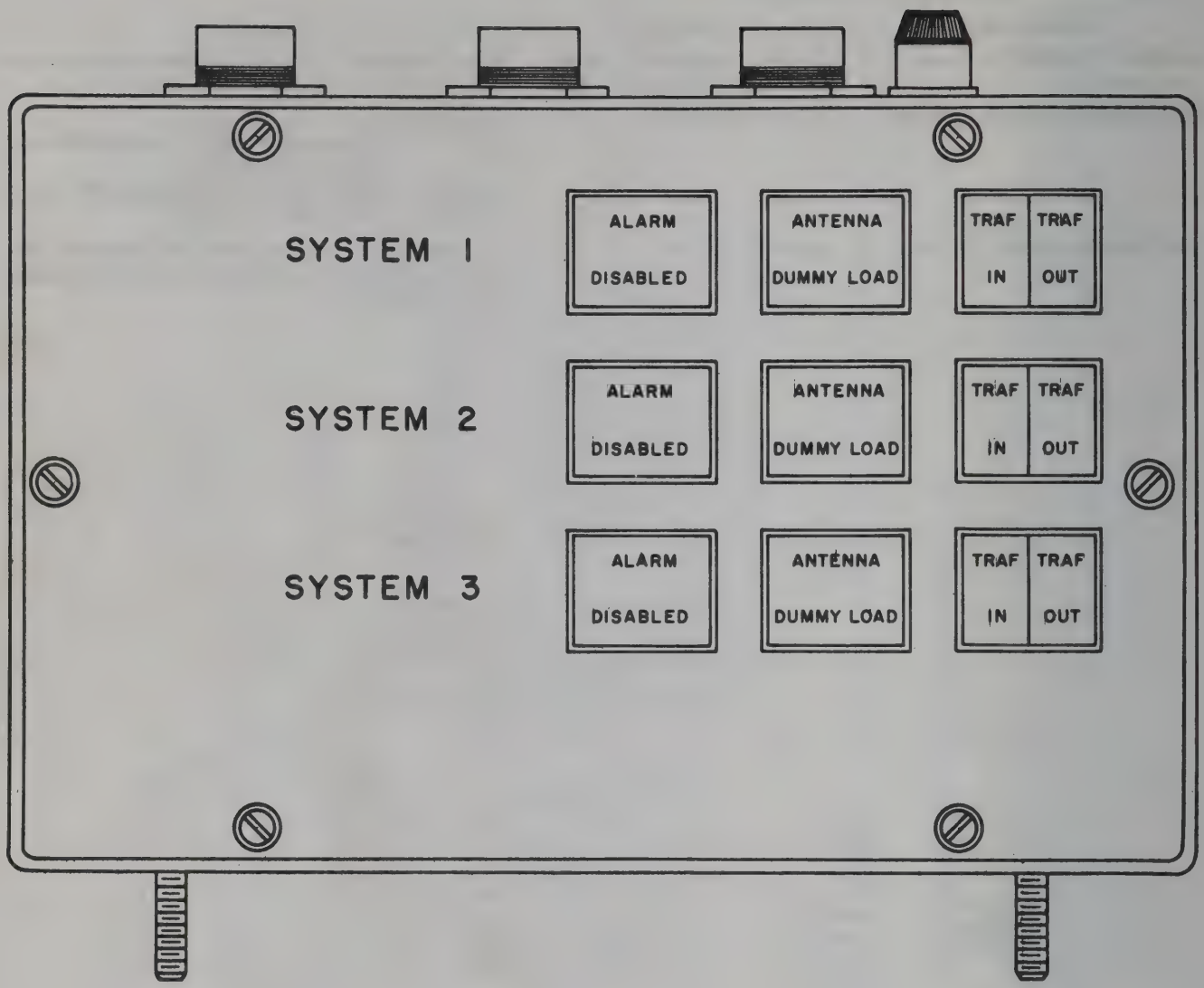


Figure 3-3. Control indicator, front panel (Serial No's. 26 and above).

c. Miscellaneous Controls and Indicators (fig. FO-1).

Control or indicator	*Description*	*Function*
POWER INDICATOR neon lamp	NE-34	Glows when ac power is applied to POWER ENTRANCE BOX.
INCANDESCENT COLD START LIGHTS switch	Two-position	Controls associated incandescent ceiling lights.
LIGHT-1 switch	Two-position	Controls roadside band of fluorescent ceiling lights on each dual strip.
LIGHT-2 switch	Two-position	Controls curbside band of fluorescent ceiling lights on each dual strip.
BYPASS BLACKOUT switch	Two-position	Controls assemblage lights as follows: ON position—Permits assemblage light circuits to be controlled by LIGHT-1 and -2 and INCANDESCENT COLD START LIGHTS switch. OFF position—Permits assemblage light circuits to be controlled by interlock switch.

c. Miscellaneous Controls and Indicators(fig. FO–11) (cont).

Control or indicator	*Description*	*Function*
Interlock switch	Microswitch	Extinguishes assemblage lights when assemblage door is open and BYPASS BLACKOUT switch is at OFF.
BLOWER–1 switch	Two-position	Controls roadside blower.
BLOWER–2 switch	Two-position	Controls curbside blower.

CAUTION

Damage to the communications equipment in shelter can be experienced if all circuit breakers are not turned off after a power interuption. Allow sufficient time for the power source to stabilze, if not commercial, and then turn on the main circuit breaker. Make sure that the ac volt and ammeter on the power distribution box show a normal steady indication prior to applying power to each item listed below. If there is a fluctuation in meter readings, check the power unit operation. If the meter indications are steady, apply power to the equipment in the following sequence: the heater and/or air conditioner; blowers; lights; convenience outlets and finally the communication equipment.

3–2 Energizing Ac Circuits

a. If a generator set is used to supply power, start the generator; if a central power source is used, turn on the central power source. The POWER INDICATOR neon light will glow and the POWER DISTRIBUTION BOX VOLTS AC meter will indicate 115 volts ac ±11.5.

b. Operate the POWER DISTRIBUTION BOX MAIN circuit breaker to ON.

c. Operate the POWER DISTRIBUTION BOX LIGHTS circuit breaker to ON; the associated neon indicator will light.

d. If blackout conditions are required, operate the BYPASS BLACKOUT switch to OFF; otherwise operate it to ON.

e. Operate the LIGHT–1 switch on the rear roadside entrance wall (fig. 1–6) to ON to operate the roadside banks of fluorescent ceiling lights in each dual strip. The AMPERES AC meter on the POWER DISTRIBUTION BOX should have a small indication.

NOTE

If temperature in the assemblage is too low for the fluorescent ceiling lights to operate, operate the INCANDESCENT, COLD START LIGHTS switch to ON to operate the incandescent ceiling lights. When the assemblage is heated sufficiently for the fluorescent lights to operate, operate the INCANDESCENT COLD START LIGHTS switch to OFF.

f. Operate the LIGHT–2 switch on the rear roadside entrance wall to ON to operate the curbside banks of fluorescent ceiling lights in each dual strip. The AMPERES AC meter on the POWER DISTRIBUTION BOX should have a slightly greater increase then in *f* above, but should not exceed 2 amperes.

g. Operate the CONV circuit breaker on the POWER DISTRIBUTION BOX to ON; the associated neon indicator will light.

NOTE

For the operating procedure used with the Radio Set AN/VRC–46 refer to paragraph 5–8.

3–3. Operating Heaters Blowers and LS–147C/Fl

a. Electric Heater No. 1.

(1) Insert the heater power connector into the HEATER–1 receptacle.

(2) Operate the HTR–1 circuit breaker on the POWER DISTRIBUTION BOX to ON; the associated neon indicator will light.

(3) Operate the heater switch to ON, and adjust the TEMPERATURE control on the heater to the desired temperature.

b. Electric Heater No. 2.

(1) Insert the heater power connector into the the HEATER–2 receptacle.

(2) Operate the HTR–2 circuit breaker on the POWER DISTRIBUTION BOX to ON; the associated neon indicator will light.

(3) Operate the heater switch to ON, and adjust the TEMPERATURE control on the heater to the desired temperature.

c. Exhaust Blowers.

(1) Open the vents on the exhaust blower covers (fig. 1–2) on the outside front wall of the assemblage.

(2) Open the air filter vent cover on the outside of the entrance door (fig. 1–1).

(3) Operate the BLOWERS circuit breaker on the POWER DISTRIBUTION BOX to ON; the associated neon indicator will light.

(4) Operate the BLOWER-1 switch on the rear roadside ceiling duct (fig. 1-6) to ON to operate exhaust blower No. 1.

(5) Operate the BLOWER-2 switch on the rear curbside ceiling duct (fig. 1-8) to ON to operate exhaust blower No. 2.

d. LS-147C/FI.

(1) Insert the LS-147C/FI power cord connector in the INTERCOM conven receptacle of the power duct.

(2) Connect the patch cord of the LS-147C/FI to the INTERCOM jack.

(3) Operate the LS-147C/FI OFF-SEND switch to 5 (about midpoint); the glowlamp will light.

(4) Operate the PRESS-TO-TALK switch and speak into the speaker-microphone on the front panel. Release the PRESS-TO-TALK switch to listen.

NOTE

The OFF-SEND switch does not have to be turned on to receive a call.

(5) Adjust the RECEIVE control to regulate the volume of incoming calls.

3-4. Operating Rack Equipment

a. T-1054/GRC-144.

(1) Operate the T-1054/GRC-144 POWER switch to ON.

(2) Check the following T-1054/GRC-144 panel indicators to see that they are extinguished.

(*a*) Panel 1A15A8 5 AMP SLO-BLO neon indicator.

(*b*) Panel 1A14 fault indicator lamps.

(3) Check the T-1054/GRC-144 panel 1A14 5V and 28V indicators and power supply 1A1 DS1 through DS4 and DS6 through 12; they should be lighted.

(4) Press the T-1054/GRC-144 panel 1A14 TEST switch; all fault indicator lamps will light.

(5) Check the T-1054/GRC-144 RADIO PATCH PANEL; the RADIO REPEATER OPERATION, or CABLE TERMINAL OPERATION indicator should indicate the operational mode selected in paragraph 2-6b.

b. R-1467/GRC-144.

(1) Operate the R-1467/GRC-144 POWER switch to ON.

(2) Check the following R-1467/GRC panel indicators to see that they are extinguished.

(*a*) Panel 2A15A2 SLO-BLO 5 AMP and TDA 1 AMP neon indicators.

(*b*) Panel 2A14 fault indicator lamps.

(3) Check the following R-1467/GRC panel indicators to see that they are lighted.

(*a*) Power supply 2A1 DS1 through DS4.

(*b*) Panel 2A14 5V and 28V indicator lamps.

(4) Press the R-1467/GRC panel 2A14 TEST switch; all fault indicator lamps will light.

NOTES

Communications may be established 5 to 10 minutes after the AN/GRC-144 is started provided the assemblage temperature is maintained above 70 degrees fahrenheit.

Close the cabinet doors of the T-1054/GRC-144 and R-1467/GRC-144 to insure proper operation of the blower system.

c. CV-425/U.

(1) Be sure the CV-425/U ac power cable is connected to the CV-425 receptacle in the ac power duct.

(2) Operate the CV-425/U POWER switch to ON; the POWER indicator will light.

(3) Operate the SENSITIVITY switch to HIGH for weak ringing signals or low for strong ringing signals.

3-5. Order-Wire Communications

For local order-wire communications, follow the procedures in *a* below. For remote order-wire communications, follow the procedures in *b* below.

a. Local.

(1) *Initiating a call.*

(*a*) Lift the H-156/U from its cradle and listen to see if the order-wire circuit is in use.

(*b*) If the circuit is not in use, press the T-1054/GRC-144 RING switch for about 2 seconds; a tone will be heard from the T-1054/GRC-144 speaker and the RING indicator will light amber.

NOTE

If identification codes are assigned to the terminal or repeater being called, operate the T-1054/GRC-144 RING switch corresponding to the identification codes.

(*c*) When the distant terminal or receiver answers, adjust the T-1054/GRC-144 SPEAKER VOLUME control for a comfortable level.

(*d*) Converse with the distant operator by operating the push-to-talk switch on the H-156/U.

(*e*) When the call is terminated, replace the H-156/U in its cradle.

(2) *Answering a call.*

(*a*) When a ring signal is heard and the T-1054/GRC-144 RING indicator changes from green to amber, lift the H-156/U from it cradle and operate the push-to-talk switch to answer the call.

NOTE

If identification codes have been assigned,

answer only those calls corresponding to the assigned identification code.

(*b*) When the call is terminated, replace the H-156/U in its cradle.

NOTE

Due to the party line concept of the order-wire circuit, order-wire conversations between other operators will be heard over the T-1054/GRC-144 speaker. These conversations may be silenced by adjusting the SPEAKER VOLUME control. If this option is utilized, it will be necessary to readjust the SPEAKER VOLUME during each order-wire use.

b. Remote. Remote order-wire facilities utilizing the TA-312/PT connected through field wire to the PHONE binding posts in the POWER ENTRANCE BOX (fig. 1-10) is as follows:

(1) *Initiating a call.*

(*a*) Lift the TA-312/PT handset from its cradle.

(*b*) Turn the hand crank on the side of the case to send a ring signal to the distant terminal or repeater.

(*c*) Listen to the handset for a response and operate the push-to-talk switch to converse with the distant operator.

(*d*) When the call is terminated, replace the handset in its cradle.

(2) *Answering a call.*

(*a*) When a ring signal sounds in the TA-312/PT, lift the handset out of its cradle.

(*b*) Press the push-to-talk switch to acknowledge the call and operate the push-to-talk switch to converse with the distant operator.

(*c*) When the call is terminated, replace the handset in its cradle.

3-6. Operation Under Unusual Conditions

The AN/TRC-138 is fully insulated and weatherproofed for operation in hot, cold, or moderate climates. The shelter facility provides complete protection from the elements for personnel and equipment; however, under extreme conditions, the following precautions are necessary:

a. Cold Climates. Extreme cold causes cables and wires to become hard, brittle, and difficult to handle. Be careful when handling the cables and connecting them to the assemblage so that kinks and unnecessary loops will not result in permanent damage. Make sure that the binding posts and the connectors in the entrance boxes are free of frost, snow, and ice. Replace the covers on the receptacles, and close the entrance box covers when they are not in use. Open the hood shields and lower the covers when the entrance boxes are open. Replace the connector cover as soon as a cable is disconnected. Never drag or place an open connector in the snow. Use the deicing equipment (para 2-4) in freezing temperatures.

b. Hot Climates. In hot, dry climates, connectors, receptacles, and binding posts are subject to damage from dust and dirt. Replace the covers on the connectors and the receptacles, and close the covers on entrance boxes when the entrance boxes are not in use. Never place an open connector on the ground.

e. Warm Damp Climates. In warm, damp climates, the equipment is subject to damage from moisture and fungi. Wipe all moisture and fungi from the equipment with a lint free cloth. A waveguide drain section may be used if condensation or rain accumulation is found in the waveguide system.

CAUTION

If the waveguide drain section CG-3250/GRC is used in the waveguide installation, do not attach the drain section to the ANTENNA ENTRANCE BOX. This will damage the connections on the ANTENNA ENTRANCE BOX. Install the drain section at the lowest point in the waveguide run. Refer to figure 2-6.1 Couple a 4-½ foot flexible waveguide section directly to the pressuring section at the antenna entrance box. Use a vehicle boarding ladder if the AN/TRC-138 is mounted on a prime mover to prevent the operator from applying unnecessary force to the pressurizing section. Couple the drain section, CG-3250/GRC, if required, between the 4-½ foot flexible waveguide section, CG-3251/GRC and a 15 foot flexible waveguide section, CG-3307/GRC. Allow the 4-½ foot flexible waveguide section to follow the path shown on figure 2-6.1. This will allow the drain section to be at the lowest point. The drain section should be used only when necessary.

3-7. Stopping Procedures

a. AN/GRC-144.

(1) Operate the T-1054/GRC-144 POWER switch to OFF.

(2) Operate the R-1467/GRC-144 POWER switch to OFF.

b. CV-425/U. Operate the CV-425/U POWER switch to OFF.

c. LS-147C/FI. Operate the LS-147C/FI OFF-SEND switch to OFF.

c.1 AN/VRC-46 and PP-2953. Perform the following if Radio Set AN/VRC-46 and Power Supply PP-2953 are installed.

(1) On the receiver-transmitter set the POWER switch (fig. 5–11) to OFF.

(2) On the Power Supply PP–2953/U set the POWER switch (fig. 5–4) to OFF.

d. POWER DISTRIBUTION BOX. Sequentially operate the circuit breakers to OFF as follows:

(1) EQUIP.
(2) IND.
(3) HTR–1.
(4) HTR–2.
(5) BLOWERS.
(6) CONV.
(7) MAIN.

CAUTION

Do not use the emergency stopping procedures unless mandatory. If the equipment is turned off by using the emergency stopping procedure, operate all circuit breakers and equipment power switches to OFF before attempting to restart it to avoid excessive initial current drain on the power source, and damage to the equipment. Allow sufficient time for the power source to stabilize, if not commercial, and then turn on the main circuit breaker. Make sure that the ac volt and ammeter on the power distribution box show a normal steady indication prior to applying power to each item listed below. If there is a fluctuation in meter readings, check the power unit operation. If the meter indications are steady, apply power to the equipment in th following sequence: the heater and/or air conditioner; blowers; lights; convenience outlets and finally the communications equipment.

e. Emergency Stopping Procedure. To turn off the equipment in an emergency, operate the MAIN circuit breaker on the POWER DISTRIBUTION BOX (fig. 3–1) to OFF.

3–8. Disassembly of Equipment

Perform the following procedures when the AN/TRC–138 is moved to a different location or placed in storage.

a. Preparing Assemblage.

(1) Perform the stopping procedures (para 3–7), except for the LIGHTS and MAIN circuit breakers on the POWER DISTRIBUTION BOX.

(2) Secure all components in their cases, racks, mountings, or holders.

(3) Place all miscellaneous items in storage drawers and compartments and secure the drawers and compartments for transit.

(4) Remove the batteries from the TA–312/PT and the hand lantern for prolonged storage or for long distance shipment. Disconnect the TA–312/PT's from the REMOTE ORDER WIRE SYS binding posts and secure them in their mounting racks on the inside front wall.

(5) Disconnect the pcm transmission cables from the VIDEO ENTRANCE box, replace the connector covers, then close and secure the VIDEO ENTRANCE box cover (fig. 1–1).

(6) Disconnect the antenna waveguides from the ANTENNA ENTRANCE boxes, replace the protective covers on the connectors, then close and secure the ANTENNA ENTRANCE box covers (fig. 1–1 and 1–2).

(7) If an air conditioner unit was installed, disconnect the air conditioner hoses from the air conditioner hardware kits, remove the air conditioner hardware kits, and then close and secure the air conditioner duct covers.

(8) Place the air conditioner hardware kits in their storage mounts (fig. FO–1) and secure them in place.

(9) If power was obtained from a generator set, proceed as follows:

(*a*) Stop the generator set as described in the appropriate technical manual.

(*b*) Disconnect the ac power cable from the POWER 115 VAC receptacle in the POWER ENTRANCE BOX. Replace both receptacle covers.

(*c*) Disconnect the ac power cable from the output connector on the generator selector switch box. Replace the both connector covers.

(*d*) Wind the power cable and power cable stub on the cable reel and store the cable reel assembly in the PU–631/G (fig. 1–9).

(10) If power was obtained from a commercial power source, proceed as follows:

(*a*) Turn off or disconnect the commercial power source.

(*b*) Disconnect the power cable from the POWER 115 VAC receptacle in the POWER ENTRANCE BOX. Replace both receptacle covers.

(*c*) Disconnect the ac power cable from the power cable stub and replace the connector covers. Wind the power cable on the cable reel.

(*d*) Disconnect the power cable stub from the power source and wind the power cable stub on the cable reel, and store the cable reel assembly in the PU–631/G (fig. 1–9).

(11) Disconnect the ground strap from the GROUND TERMINAL in the POWER ENTRANCE BOX. Close and secure the cover on the POWER ENTRANCE BOX (fig. 1–1).

(12) Disconnect the ground strap from the ground rod, clean, and store in the assemblage storage drawers.

(13) Disconnect the ground straps from the generator sets (if used), clean them and store them in the assemblage.

(14) Remove the ground rods, clean them and store them in the assemblage (fig. 1–8).

(15) Disconnect the ac power cables from the BLOWER receptacles in the ac power duct.

(16) Close and secure the slide panel at the bottom of each exhaust blower cover.

(17) Remove the hex-head cap screws and the cover assembly from the box assembly (fig. 2–2).

(18) Loosen the clamp assemblies and remove the flexible joint.

(19) Remove the hex-head cap screws and the box assembly from the front wall of the assemblage.

(20) Position the cover assembly on the box assembly and secure it with the hex-head cap screws.

(21) Loosen the cap screws and remove the channel support assembly from the front wall of the assemblage.

(22) Loosen the cap screws, remove the covers from the sides of the box assemblies, and then position and secure the covers to the front wall of the assemblage with the cap screws.

(23) Position the blower assemblies and channel support assemblies against the inside front wall of the assemblage and secure them with the cap screws (fig. 1–4).

(24) Position and secure one exhaust blower cover on the interior front roadside floor and then position and secure the second exhaust blower cover on the roadside floor of the assemblage between the SYSTEM 1 and 2 equipment racks (fig. 1–4).

(25) Roll up the floor mat, tie it securely and store it in the front curbside corner of the assemblage.

(26) Position and secure the rotary chair in its storage position against the work bench (fig. FO–1).

(27) Position and secure the folding chair in its storage position against the SYSTEM 2 equipment rack (fig. 1–5).

(28) Disconnect the H–156/U's from the T–1054/GRC–144's and store them in a storage drawer.

b. Disassembly of Antennas.

(1) Disconnect the 15-foot waveguide assembly hanging on the messenger cable, replace the connector covers, wind and store the waveguide assembly in the waveguide storage compartment (fig. 1–8).

(2) Disconnect the messenger cable from between the lift and tiedown point on the assemblage and the top of the launcher. Wind and store the messenger cable in the PU–631/G.

(3) Relieve the tension on the upper and middle antenna guy assemblies by unscrewing the knurled rings on the guy tensioners.

(4) Release the handbrake and raise the elevator platform clear of the mast carrier.

(5) Lock the handbrake.

(6) Release the catches securing the mast carrier and remove the mast carrier from the launcher.

(7) Position the mast carrier approximately 6 feet to the rear of the launcher to support the launcher when lowered.

(8) Release the handbrake and lower the elevator to approximately 1 foot from the base of the launcer and lock the handbrake.

(9) Continue to lower the elevator and remove the first mast section.

NOTE

Disconnect the waveguide sections and remove the waveguide clamps as the mast is being lowered. Replace the protective covers on the waveguide sections as they are removed.

(10) Raise the elevator to the bottom of the next mast section and repeat the procedures in (8) and (9) above for the next two mast sections.

(11) Lower the fourth mast section until the middle guy ring is one foot above the launcher.

(12) Climb the launcher, disconnect the middle guy assemblies from the middle guy ring and remove the middle guy ring.

(13) Raise the elevator to the bottom of the next mast section and repeat the procedures in (8) and (9) above for all but the last mast section.

(14) Lower the final mast section until the top of the mast section is approximately one foot from the top of the launcher and lock the handbrake.

(15) Releive the tension on the launcher guy assemblies by rotating the knurled collars on the tensioners. Unlock the tensioners to let the guys slack and relock the tensioners.

(16) Rock the launcher to loosen the GP–2 stakes in the base of the launcher and remove the stakes.

(17) Disconnect the launcher guys from the guy stakes.

(18) Lower the launcher backwards until it rests on the carrier.

(19) Disconnect the guy snaps from the launcher, the upper guy ring, and the antenna.

(20) Reel the guys into their respective tensioner storage hooks and clean the guys by running them through a cloth as they are reeled.

(21) Disconnect the reflector guy cables from the eyebolts in the backmount (fig. 2–13 and 2–16).

(22) Repeat the procedures in (2) above for the reflector guys.

(23) Disconnect the flexible waveguide from the feedhorn (fig. 2–14).

(24) Disconnect the horn assembly from the reflector assembly (fig. 2–12) and remove the horn assembly by pulling it out through the circular opening in the reflector assembly (fig. 2–11).

(25) Loosen the crosshandle bolts on the backmount (fig. 2–10) and, using two men, remove the backmount and attached reflector assembly from the mast cap assembly.

(26) Disconnect the backmount from the reflector assembly.

(27) Lift the upper guy ring and mast cap from the last mast section.

(28) Release the brake, lower the elevator by pulling it toward the base while operating the winch and remove the remaining mast section.

(29) Crank the elevator to the top of the launcher and insert the locking pin in the stowage hole.

(30) Insert the reel locking pin with the elevator cable taut.

(31) Remove the brake handle locking pin, push the brake handle into position and insert the pin to lock the handle in place.

(32) Place the launcher on its back on the ground.

(33) Place the mast section carrier into the launcher and fasten it in place with the toggle fasteners.

(34) Remove the locking pins holding the hinged handle of the mast section carrier. Fold back the handle.

(35) Thoroughly clean the mast sections and replace them in the mast section carrier.

(36) Close the mast section carrier handles onto the mast section. Press down hard on the handle and replace the two locking pins.

(37) Rock each guy stake back and forth in the ground with the sledge hammer and remove the stakes.

(38) Thoroughly clean the guy stakes and the GP–2 stakes.

(39) Place the guy rings, guy stake attachment, mast cap assembly, winch assembly, mast level, radius rope, peepsight, and spanner wrench in the accessory bag.

(40) Place the sledge hammer, GP–113/G, and GP–2 stakes in the stake pack. If the GP–112/G stakes were used, place them in the stake bag.

(41) Place the guy assemblies in the guy bag.

(42) Perform the procedures in (1) through (41) above for each antenna assembly.

c. Repacking Antenna Parts.

(1) Place all of the waveguide sections in the waveguide storage compartment (fig. 1–8).

(2) Position the three reflector assemblies on the curbside wall of the assemblage (fig. 1–8) and secure them in place.

(3) Place on launcher/mast assembly on the inside of the assemblage and secure it in place (fig. 1–4).

(4) Place the remaining launcher/mast assemblies in the PU–631/G and secure them in place.

(5) Place the accessory bags in the PU–631/G and secure them in place.

(6) Place the stake packs in position between the generator sets of the PU–631/G and secure them in place.

CAUTION

During transportation the back mount should be strapped to the rail or the launcher assembly using strap, webbing NSN 5340–00–177–3917 (self-locking, 24 inch strap) to prevent breaking the backmount.

(7) Position one backmount on each side of the forward generator set in the PU–631/G and secure them in place.

(8) Position the remaining backmount in the assemblage and secure it to the reflector as shown in figure 1–4.

(9) Place the waveguide clamp assemblies in the PU–631/G and secure them as shown in figure 1–9.

(10) Place the boarding ladder against the waveguide storage (fig. 1–4) and secure it in place with the web strapping.

(11) Recheck the area for loose items. If a generator set was used to supply power, prepare it for shipment or limited storage as described in the appropriate technical manual.

(12) Clean the shelter facility thoroughly. Make sure that the drain plug is tightly closed (fig. 1–8).

NOTE

If the assemblage is to be transported by aircraft, loosen the drain plug to insure equalization of pressure during transportation.

(13) Close and lock the door.

(14) If the AN/TRC–138 is truck mounted, secure the tailgate in the upright position.

CHAPTER 4
MAINTENANCE

Section I. OPERATOR/CREW AND ORGANIZATIONAL MAINTENANCE

4-1. Scope of Operator/Crew and Organizational Maintenance

a. Operator/Crew preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to maintain the equipment in serviceable condition. To be sure that your Radio Terminal Set AN/TRC-138 is always ready for your mission, you must do scheduled preventive maintenance checks and services (PMCS).

(1) BEFORE OPERATION, perform your B PMCS to be sure that your equipment is ready to go.

(2) DURING OPERATION, perform your D PMCS. This should help you spot small troubles before they become big problems.

(3) AFTER OPERATION, perform your A PMCS. This should help you keep your equipment in top shape.

(4) WEEKLY AND MONTHLY PMCS are important checks you make to keep serious problems from suddenly happening. Perform WEEKLY as well as BEFORE OPERATION PMCS if:

(*a*) You are the assigned operator and have not operated the item since the last WEEKLY.

(*b*) You are operating the item for the first time.

(5) When an item of equipment is reinstalled after removal for any reason, perform the necessary B PMCS, paragraph 4-2, to be sure the item meets the readiness reporting criteria.

(6) Use the *Item No.* Column in the PMCS table to get the number to be used in the *TM Item No.* column on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) when you fill out the form.

b. Organizational preventive maintenance procedures are designed to help maintain equipment in serviceable condition. They include what items should be checked and how to check them. These checks and services described in paragraph 4-3, outline inspections that are to be made at specific (W) weekly, (M) monthly, (Q) quarterly, (S) semiannually and (A) annual intervals.

c. Routine checks like cleaning, dusting, washing, checking for frayed cables, stowing items not in use, covering unused receptacles and checking for loose nuts and bolts are not listed as PMCS checks. They are things that you should do anytime you see they must be done. If you find a routine check like one of those listed, in your PMCS, it was listed because other operators reported problems with this item.

WHEN YOU ARE DOING ANY PMCS OR ROUTINE CHECKS, KEEP IN MIND THE WARNINGS AND CAUTIONS.

WARNINGS

Never operate the generator or shelter until it has been properly grounded. Electrical defects in the load lines or equipment can cause DEATH by electrocution when contact is made with an ungrounded system.

The fumes of TRICHLOROETHANE are toxic. Provide thorough ventilation whenever it is used; avoid prolonged or repeated breathing of vapor. Do not use near an open flame or hot metal surface; trichloroethane is nonflammable but heat converts the fumes to highly toxic phosgene gas the inhalation of which could result in serious injury or DEATH. Prolonged or repeated skin contact with trichloroethane can cause skin inflammation. When necessary, use gloves, sleeves and aprons which the solvent cannot penetrate.

Compressed air is dangerous and can cause serious bodily harm if protective means or methods are not observed to prevent a chip or particle (of whatever size) from being blown into the eyes or unbroken skin of the operator or other personnel. Compressed air shall not be used for cleaning purposes except where reduced to 29 psi or less and then only with effective chip guarding and personal protective equipment. Do not use compressed air to dry parts when trichloroethane has been used.

NOTES

The PROCEDURES column in your PMCS charts instruct you how to perform the required checks and services. Carefully follow these instructions and if tools are needed or the chart instructions tell you, get organizational maintenance to do the necessary work.

If your equipment must be in operation all the time, check those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

4-2. Operator/Crew Preventive Maintenance Checks and Services

NOTE

The checks in the interval column are to be performed in the order listed.

B—Before Operation D—During Operation A—After Operation W—Weekly M—Monthly

Item No.	Interval B	D	A	W	M	Item to be inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/ available if:
						Radio Terminal Set AN/TRC-138.	Check the completeness and operational efficiency of the entire unit.	Upon completion of PMCS checks, available equipment is insufficient to support the unit mission.
							EXTERIOR	
1	*	*		*		External condition.	Check for skin punctures, cracks, or open seams that could permit moisture to enter wall.	Moisture saturates electrical wiring.
2	*	*				Grounding system.	*a.* Check grounding system to see that it is properly installed. *b.* Tighten loose ground lead connections.	Efficient ground is not provided.
3	*		*			Sling assembly (if installed in truck).	Tighten turnbuckles to remove slack in sling assembly.	If sling cables are frayed or turnbuckles rusted.
4	*		*	*		Entrance boxes.	*a.* Clean area around receptacles. *b.* Put covers on unused receptacles.	
5	*	*				Exhaust blower covers.	See that exhaust blower covers are open and not obstructed.	
6	*	*				Air filter vent cover.	See that air filter vent cover on assemblage door is open and not clogged or obstructed.	
7	*		*	*		Power and signal cable assemblies.	*a.* Clean cable insulation and connectors (if not connected). *b.* Tighten loose connections. *c.* Put covers on unused cable connectors.	
8	*		*	*		Generator set (if used).	Perform appropriate preventive maintenance checks and services in applicable technical manual.	If generator engine doesn't start, or if governor fails to hold line frequency steady.
							INTERIOR	
9	*	*	*	*		Ceiling lights.	Inspect and replace if necessary.	
10	*	*			*	Walls, ceiling, and floor.	Check for holes, open seams, or signs of seepage or leaks.	Moisture saturates electrical wiring.
11	*		*	*		Signal and power cables, cords, wires, and harnesses.	*a.* Tighten loose connections of plugs and connectors. *b.* See that cable insulation is not cut or cracked; remove kinks and strain.	If replacement cable or connectors are unavailable.
12	*		*		*	Storage compartments.	Remove unauthorized articles.	
13	*		*		*	Unused components.	Inspect unused components for damage, dirt, grease, moisture, or fungi accumulation. Clean as required. Check to see that covers (if available) are on unused components.	
							OPERATION NOTE Perform following procedures only during authorized downtime if they will interfere with the normal operation of the equipment.	
14	*	*				Knobs, dials, and switches.	While making operational checks, make sure that knobs, dials, and switches are free from internal and external binding.	
15	*	*				POWER INDICATOR neon light and VOLTS AC meter on POWER DISTRIBUTION BOX.	Apply power to assemblage by starting generator set or turning on central power source; POWER INDICATOR neon light lights and VOLTS	No power available (damaged source).

B—Before Operation D—During Operation A—After Operation W—Weekly M—Monthly

Item No.	Interval B	D	A	W	M	Item to be inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/ available if:
							AC meter indicates 115 volts ± 11.5.	
16	*	*		*		POWER DISTRIBUTION BOX circuit breakers.	*a.* Operate MAIN circuit breaker to ON; AMPERES AC meter indicates 0. *b.* Sequentially operate each circuit breaker to ON; associated indicator lights.	
17	*	*		*		Ceiling lights.	*a.* Operate LIGHT 1 switch to ON; roadside bank of fluorescent ceiling lights on each strip light. *b.* Operate LIGHT 2 switch to ON; curbside bank of fluorescent ceiling lights on each strip light. *c.* Operate INCANDESCENT COLD START LIGHTS switch to ON; incandescent ceiling lights light. *d.* Check POWER DISTRIBUTION BOX; AMPERES AC meter will indicate slight drain (not exceeding 2 amperes).	
18	*	*		*		Light tightness.	Close door, but leave vents open; inspect for light tightness.	In combat zone, if light not tight.
19	*	*		*		Door microswitch (interlock).	Operate BYPASS-BLACKOUT switch to OFF and open door; assemblage lights extinguish.	Microswitch does not operate properly (applicable only under blackout conditions).
20	*	*		*		BYPASS-BLACKOUT switch.	Operate BYPASS-BLACKOUT switch to ON with door open; assemblage lights light.	
21	*	*		*		Exhaust blower No. 1.	Operate BLOWER-1 switch to ON; exhaust blower No. 1 will operate.	Blower fails to operate, providing proper ventilation.
22	*	*		*		Exhaust blower No. 2.	Operate BLOWER-2 switch to ON; exhaust blower No. 2 will operate.	Blower fails to operate providing proper ventilation.
23	*	*		*		Electric heaters.	*a.* Operate HEAT-OFF-FAN switch to HEAT, operate TEMPERATURE control and note that warm air blows from front of heater. *b.* Operate HEAT-OFF-FAN switch to FAN; fan blows air and heating element ceases to glow. *c.* Operate HEAT-OFF-FAN switch to OFF.	Heater fails to heat or draws excessive current causing circuit breaker to cut out (if mission essential).
24	*	*		*		CV-425/U POWER switch.	Operate to ON; associated POWER indicator will light.	
25		*		*		AN/GRC-144 order wire.	*a.* Check that T-1054/GRC-144 and R-1467/GRC-144 PUSH TO TURN knobs and thumbwheels are at required frequencies. *b.* Operate T-1054/GRC-144 and R-1467/GRC-144 POWER switches to ON. *c.* Lift H-156/U from cradle and depress T-1054/GRC-144 RING switch for 2 seconds or activate in accordance with called terminal or repeater identification code; RING indicator will light amber. *d.* When distant operator answers, converse by operating push-to-talk switch on H-156/U and check T-1054/GRC-144 SPEAKER VOLUME control by adjusting and listening for volume change.	All steps in this check do not meet requirements.

B—Before Operation D—During Operation A—After Operation W—Weekly M—Monthly

Item No.	Interval B	D	A	W	M	Item to be inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/ available if:
							e. Request distant terminal or repeater to signal by order wire and replace H-156/U in cradle. *f.* When T-1054/GRC-144 buzzer sounds and RING indicator lights, lift H-156/U from cradle and operate push-to-talk switch to converse with distant operator. *g.* Replace H-156/U in cradle when call is terminated.	
26				*		TA-312/PT remote order wire.	*a.* Lift TA-312/PT handset from cradle. *b.* Turn handcrank on side of case to send ring signal to distant terminal or repeater. *c.* Operate push-to-talk switch on handset to converse with distant operator. *d.* Request distant terminal or repeater to signal by order wire, and replace handset in cradle. *e.* When TA-312/PT sounds, lift handset from cradle, depress push-to-talk switch to acknowledge call and converse with distant operator. *f.* Terminate call by replacing handset in cradle.	
27		*		*		T-1054/GRC-144 indicators.	Check T-1054/GRC-144 indicators; all indicators should be green except as follows: *Indicator* — *Indication* 5 AMP SLO-BLO — Extinguished Fault indicator lamps — Extinguished RING — Amber with ring signal present.	
28		*		*		T-1054/GRC-144 meter selector switch.	Operate T-1054/GRC-144 meter selector switch through following positions and check for correct indications on meter. *Position* — *Indication* MODULATOR CONTROL. — 80 to 120 (black). MODULATOR OUTPUT. — 80 to 120 (black). FREQ CONTROL CTR FREQ. — -20 to +20 (blue). FREQ CONTROL OUTPUT. — 80 to 120 (black). TRAFFIC — 90 to 120 (orange). SYNTHESIZER — 30 to full scale (yellow). AMPL MULT — 30 to full scale (yellow). 2ND MULT — 30 to full scale (yellow). 3RD MULT (LOCAL OSC). — 30 to full scale (yellow). RF POWER — 30 to full scale (yellow).	Any of the following indications are abnormally high or low.

B—Before Operation D—During Operation A—After Operation W—Weekly M—Monthly

Item No.	Interval B	D	A	W	M	Item to be inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/ available if:
							REFL RF POWER 0 to 30	
29		*		*		T-1054/GRC-144 order wire checks.	Operate MODULE TEST selector switch through each position; CNTRL ALARM indicator lights green for each position except red for 12, MODULE TEST indicator extinguished except when MODULE TEST switch or RESET switch is depressed (1 and 12 respectively), 4 kHz tone heard on positions 2 through 9, 1.6 kHz on position 10, 1.1 kHz on position 11, and alternating 1.1 and 1.6 kHz tone heard on position 12.	
30		*		*		R-1467/GRC-144 indicators.	Check R-1467/GRC-144 indicators; all indicators should be green except as follows: *Indicator* — *Indication* SLO BLO 5AMP — Extinguished TDA 1 AMP — Extinguished Fault indicator lamps — Extinguished	
31		*		*		R-1467/GRC-144 meter selector switch.	Operate R-1467/GRC-144 meter selector switch through following positions and check for correct indication on meter: *Position* — *Indication* SYNTH — 30 to full scale (yellow). FREQ MIXER CURRENT 1. — 30 to full scale (yellow). FREQ MIXER CURRENT 2. — 30 to full scale (yellow). MULT OSC — 80 to 120 (black). AGC — 20 to 120. AMPL-MIXER CURRENT 1. — 30 to full scale (yellow). AMPL-MIXER CURRENT 2. — 30 to full scale (yellow). CARRIER (IF) — 110 to 140 TRAFFIC — 90 to 110 (orange). LOCAL OSC POWER. — 30 to full scale (yellow).	If any one of the following indications fall abnormally high or low.
32		*		*		Control indicators (serial numbers 1 through 25).	*a.* Operate alarm disable switch to up position; T-1054/GRC-144 alarm is disabled. *b.* Operate alarm disable switch to down position; T-1054/GRC-144 alarm is normal. *c.* Operate timer selector to a specific time. *d.* Press ALARM DISABLED indicator/switch; timer will start, ALARM DISABLED indicator/switch will light, and T-1054/GRC-144 alarm is disabled until timer times out. *e.* Check that TRAF IN and TRAF OUT indicator is lighted. *f.* Check that ANT-DUMMY LOAD indicator is lighted corresponding to	

B—Before Operation D—During Operation A—After Operation W—Weekly M—Monthly

Item No.	Interval B	D	A	W	M	Item to be inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/ available if:
							Waveguide Switch SA-1679/GRC position.	
33		*		*		Control indicator (serial numbers 25 and above).	*a.* Press ALARM DISABLED indicator/switch; ALARM DISABLED indicator/switch will light, and T-1054/GRC-144 alarm is disabled. *b.* Press ALARM DISABLED indicator/switch; ALARM DISABLED indicator/switch extinguished and T-1054/GRC-144 alarm is normal. *c.* Check that ANTENNA-DUMMY LOAD indicator is lighted corresponding to Waveguide Switch SA-1679/GRC position. *d.* Check that TRAF-IN and TRAF-OUT indicators are lighted.	
							NOTE If AN/TRC-138 is to remain in operation, do not perform sequence Nos. 34 through 39.	
34				*		T-1054/GRC-144.	Operate T-1054/GRC-144 POWER switch to OFF; all indicators extinguish.	
35			*			R-1467/GRC-144.	Operate R-1467/GRC-144 POWER switch to OFF; all indicators extinguished.	
36			*			CV-425/U.	Operate CV-425/U POWER switch to OFF.	
37			*			Miscellaneous switches.	Operate to OFF; shelter lights extinguish and exhaust blowers stop.	
38			*			POWER DISTRIBUTION BOX.	Operate circuit breakers to OFF; associated indicators extinguish.	
39			*			Power source.	Stop generator sets or turn off central power source.	

4-3. Organizational Preventive Maintenance Checks and Services

NOTE

The checks in the interval column are to be performed in the order listed.

M—Monthly Q—Quarterly

Item No.	Interval M	Q	Item to be inspected	Procedures Check for and have repaired or adjusted as necessary
				EXTERIOR
1	*		External condition.	Check for skin punctures, cracks, or open seams that could permit moisture to enter wall.
2	*		Grounding system.	*a.* Check grounding system to see that it is properly installed. *b.* Tighten loose ground lead connections.
3	*		Sling assembly (if installed in truck).	Tighten turnbuckles to remove slack in sling assembly.
4	*		Entrance boxes.	*a.* Clean area around receptacles. *b.* Put covers on unused receptacles.
5	*		Exhaust blower covers.	See that exhaust blower covers are open and not obstructed.
6	*		Air filter vent cover.	See that air filter vent cover on assemblage door is open and not clogged or obstructed.
7	*		Power and signal cable assemblies.	*a.* Clean cable insulation and connectors (if not connected). *b.* Tighten loose connections. *c.* Put covers on unused cable connectors.
8	*		Generator set (if used).	Perform daily preventive maintenance checks and services in applicable technical manual.
9		*	Entrance door.	*a.* Clean; paint bare metal spots. *b.* Tighten loose screws and bolts. *c.* Lubricate door locks and latches with Grease, Graphite Aircraft

M—Monthly Q—Quarterly

Item No.	Interval M	Interval Q	Item to be inspected	Procedures Check for and have repaired or adjusted as necessary
				(GGA); lubricate hinges with lubricating oil, general purpose, Preservative (PL Special) or lubricating oil, engine (OE-10).
				INTERIOR
10	*		Ceiling lights.	Inspect and replace if necessary.
11	*		Walls, ceiling, and floor.	Check for holes, open seams, or signs of seepage or leaks.
12	*		Signal and power cables, cords, wires, and harnesses.	*a.* Tighten loose connections of plugs and connectors. *b.* See that cable insulation is not cut or cracked; remove kinks and strain.
13	*		Storage compartments.	Remove unauthorized articles.
14	*		Unused components.	Inspect unused components for damage, dirt, grease, moisture, or fungi accumulation. Clean as required. Check to see that covers (if available) are on unused components.
				OPERATION NOTE Perform following procedures only during authorized downtime if they will interfere with normal system operation.
15	*		Knobs, dials, and switches.	While making operational checks (sequence numbers 15 through 40), make sure that knobs, dials, and switches are free from internal and external binding.
16	*		POWER INDICATOR neon light and VOLTS AC meter on POWER DISTRIBUTION BOX.	Apply power to assemblage by starting generator set or turning on central power source; POWER INDICATOR neon light lights and VOLTS AC meter indicates 115 volts ± 11.5.
17		*	Exhaust fans.	*a.* Lubricate all points with oil (PL Special or OE-10). *b.* Clean motor and fan housings.
18		*	Heaters.	Clean heaters and paint bare metal spots as required.
19	*		POWER DISTRIBUTION BOX circuit breakers.	*a.* Operate MAIN circuit breaker to ON; AMPERES AC meter indicates 0. *b.* Sequentially operate each circuit breaker to ON; associated indicator lights.
20	*		Ceiling lights.	*a.* Operate LIGHT 1 switch to ON; roadside bank of fluorescent ceiling lights on each strip light. *b.* Operate LIGHT 2 switch to ON; curbside bank of fluorescent ceiling lights on each strip light. *c.* Operate INCANDESCENT COLD START LIGHTS switch to ON; incandescent ceiling lights light. *d.* Check POWER DISTRIBUTION BOX; AMPERES AC meter will indicate slight drain (not exceeding 2 amperes).
21	*		Light tightness.	Close door, but leave vents open; inspect for light tightness.
22	*		Door microswitch (interlock).	Operate BYPASS-BLACKOUT switch to OFF and open door; assemblage lights extinguish.
23	*		BYPASS-BLACKOUT switch.	Operate BYPASS-BLACKOUT switch to ON with door open; assemblage lights light.
24	*		Exhaust blower No. 1.	Operate BLOWER-1 switch to ON; exhaust blower No. 2 will operate.
25	*		Exhaust blower No. 2.	Operate BLOWER-2 switch to ON; exhaust blower No. 2 will operate.
26	*		Electric heaters.	*a.* Operate HEAT-OFF-FAN switch to HEAT, operate TEMPERATURE control and note that warm air blows from front of heater. *b.* Operate HEAT-OFF-FAN switch to FAN; fan blows air and heating element ceases to glow. *c.* Operate HEAT-OFF-FAN switch to OFF.
27	*		CV-425/U POWER switch.	Operate to ON; associated POWER indicator will light.
28	*		AN/GRC-144 order wire.	*a.* Check that T-1054/GRC-144 and R-1467/GRC-144 PUSH-TO-TURN knobs and thumbwheels are at required frequencies. *b.* Operate T-1054/GRC-144 and R-1467/GRC-144 POWER switches to ON. *c.* Lift H-156/U from cradle and press T-1054/GRC-144 RING switch for 2 seconds or activate in accordance with called terminal or repeater identification code; RING indicator will light amber. *d.* When distant operator answers, converse by operating push-to-talk switch on H-156/U and check T-1054/GRC-144 SPEAKER VOLUME control by adjusting and listening for volume change. *e.* Request distant terminal or repeater to signal by order wire and replace H-156/U in cradle.

M—Monthly Q—Quarterly

Item No.	Interval M	Interval Q	Item to be inspected	Procedures Check for and have repaired or adjusted as necessary
				f. When T-1054/GRC-144 buzzer sounds and RING indicator lights, lift H-156/U from cradle and operate push-to-talk switch to converse with distant operator.
				g. Replace H-156/U in cradle when call is terminated.
29	*		TA-312/PT remote order wire.	*a.* Lift TA-312/PT handset from cradle.
				b. Turn handcrank on side of case to send ring signal to distant terminal or repeater.
				c. Operate push-to-talk switch on handset to converse with distant operator.
				d. Request distant terminal or repeater to signal by order wire, and replace handset in cradle.
				e. When TA-312/PT sounds, lift handset from cradle, press push-to-talk switch to acknowledge call and converse with distant operator.
				f. Terminate call by replacing handset in cradle.
30	*		T-1054/GRC-144 indicators.	Check T-1054/GRC-144 indicators; all indicators should be green except as follows:
				Indicator — *Indication* 5 AMP SLO-BLO — Extinguished Fault indicator lamps — Extinguished RING — Amber with ring signal present.
31	*		T-1054/GRC-144 meter selector switch.	Operate T-1054/GRC-144 meter selector switch through following positions and check for correct indications on meter.
				Position — *Indication* MODULATOR CONTROL. — 80 to 120 (black). MODULATOR OUTPUT. — 80 to 120 (black). FREQ CONTROL CTR FREQ. — -20 to +20 (blue). FREQ CONTROL OUTPUT. — 80 to 120 (black). TRAFFIC — 90 to 120 (orange). SYNTHESIZER — 30 to full scale (yellow). AMPL MULT — 30 to full scale (yellow). 2ND MULT — 30 to full scale (yellow). 3RD MULT (LOCAL OSC). — 30 to full scale (yellow). RF POWER — 30 to full scale (yellow). REFL RF POWER — 0 to 30
32	*		T-1054/GRC-144 order wire checks.	Operate MODULE TEST selector switch through each position; CNTRL ALARM indicator lights green for each position except red for 12, MODULE TEST indicator extinguished except when MODULE TEST switch or RESET switch is depressed (1 and 12 respectively), 4 kHz tone heard on positions 2 through 9, 1.6 kHz on position 10, 1.1 kHz on position 11, and alternating 1.1 and 1.6 kHz tone heard on position 12.
33		*	T-1054/GRC-144.	*a.* Remove test lead probe from T-1054/GRC-144 SPECIAL TOOLS AND SPARE FUSES compartment.
				b. Connect one end of test lead probe to T-1054/GRC-144 TEST LEAD jack on meter panel.
				c. Operate T-1054/GRC-144 meter selector switch to TEST LEAD (+) and sequentially connect free end of test lead probe to power supply module 1A1 test points TP1, TP2, TP6, TP7, TP8, TP9, TP10, TP11, and TP12; meter indicates 100 ± 20 (black) for each check.
				d. Operate T-1054/GRC-144 meter selector switch to TEST LEAD (-) and sequentially connect free end of test lead probe to power supply module 1A1 test points TP3, TP4, and TP9; meter indicates 100 ± 20 for each check.
				e. Operate T-1054/GRC-144 meter selector switch to TEST LEAD (+) and sequentially connect free end of test lead probe to test points indicated below; meter indicates 100 ± 20 (black) for each test.
				Module — *Test Point* 1A4 — TP1 1A5 — TP1 1A7 — TP5 1A8 — TP1 1A8 — TP2

M—Monthly Q—Quarterly

Item No.	Interval M	Interval Q	Item to be inspected	Procedures Check for and have repaired or adjusted as necessary
				1A11 TP1 1A12 TP1 1A12 TP2 1A12 TP3 *f.* Operate T-1054/GRC-144 meter selector switch to TEST LEAD (-) and sequentially connect free end of test lead probe to test point indicated below; meter indicates 100±20 (black) for each check. *Module* — *Test Point* 1A15 — TP2 1A12 — TP5 *g.* Disconnect test lead probe and store it in T-1054/GRC-144 SPECIAL TOOLS AND SPARE FUSES compartment. *h.* Lift H-156/U from cradle and press T-1054/GRC-144 RING switch for 2 seconds or activate in accordance with called terminal or repeater identification code; RING indicator will light amber. *i.* When distant operator answers, converse by operating push-to-talk switch on H-156/U and request that TD-204/U TEST TONE switch be operated to ON. *j.* Operate T-1054/GRC-144 meter selector switch to OW TEST; meter indicates 100±20. *k.* Request TD-204/U TEST TONE switch be operated to OFF and TD-204/U POWER switch be operated to OFF; T-1054/GRC-144 TRAF and associated control indicator TRAF IN indicators change from green to red. *l.* Request TD-204/U POWER switch be operated to ON; T-1054/GRC-144 TRAF and associated control indicator TRAF IN indicators change from red to green. *m.* Replace H-156/U in cradle when call is terminated. *n.* Disconnect T-1054/GRC-144 cable 1A-3W1 from J1 (IN) on module 1A4; T-1054/GRC-144 TRAF indicator changes from green to red. *o.* Reconnect T-1054/GRC-144 cable 1A3W1 to J1 (IN) on module 1A4; T-1054/GRC-144 TRAF indicator changes from red to green. *p.* Record T-1054/GRC-144 thumbwheel settings and change to 5090.0 MHz; SYNTH LOCK indicator changes from green to red. *q.* Reset T-1054/GRC-144 thumbwheels to original settings; SYNTH LOCK indicator changes from red to green. *r.* Disconnect T-1054/GRC-144 cable 1A15W16 from J1 on module 1A11; RF POWER indicator changes from green to red. *s.* Reconnect T-1054/GRC-144 cable 1A-15W16 to J1 on module 1A11; RF POWER indicator changes from red to green. *t.* Operate and hold Waveguide Switch SA-1679/GRC midway between positions; T-1054/GRC-144 REFL RF POWER indicator changes from green to red. *u.* Return Waveguide Switch SA-1679/GRC to original position; T-1054/GRC-144 REFL RF POWER indicator changes from red to green. *v.* Operate T-1054/GRC-144 module 1A2 switch to ON; RADIO TEST SET module 1A15A8 indicator changes from green to red. *w.* Operate T-1054/GRC-144 RADIO TEST SET meter switch to following positions and check meter indications: *Position* — *Indication* OSC LEVEL — SET OSC LEVEL ADJ CR1 — Yellow or slightly to right. CR2 — Yellow or slightly to right. *x.* Operate T-1054/GRC-114 module 1A2 switch to OFF; RADIO TEST SET module 1A15A8 indicator changes from red to green.
34		*	R-1467/GRC-144 indicators.	Check R-1467/GRC-144 indicators; all indicators should be green except as follows: *Indicator* — *Indication* SLO BLO 5AMP — Extinguished TDA 1 AMP — Extinguished Fault indicator lamps — Extinguished
35		*	R-1467/GRC-144 meter selector switch.	Operate R-1467/GRC-144 meter selector switch through following posi-

M—Monthly Q—Quarterly

Item No.	Interval M	Interval Q	Item to be inspected	Procedures Check for and have repaired or adjusted as necessary
				tions and check for correct indication on meter:
				Position — *Indication*
				SYNTH — 30 to full scale (yellow).
				FREQ MIXER CURRENT 1. — 30 to full scale (yellow).
				FREQ MIXER CURRENT 2. — 30 to full scale (yellow).
				MULT OSC — 80 to 120 (black).
				AGC — 20 to 120
				AMPL-MIXER CURRENT 1. — 30 to full scale (yellow).
				AMPL-MIXER CURRENT 2. — 30 to full scale (yellow).
				CARRIER (IF) — 110 to 140
				TRAFFIC — 90 to 110 (orange).
				LOCAL OSC POWER. — 30 to full scale (yellow).
36		*	R-1467/GRC-144	*a.* Remove test lead probe from R-1467/GRC-144 SPECIAL TOOLS AND SPARE FUSES compartment.
				b. Connect one end of test lead probe to R-1467/GRC-144 TEST LEAD jack on meter panel.
				c. Operate R-1467/GRC-144 meter selector switch to TEST LEAD (+) and sequentially connect free end of test lead probe to power supply module 2A1 test points TP1, TP2, and TP4; meter indicates 100 ±20 (black) for each check.
				d. Operate R-1467/GRC-144 meter selector switch to TEST LEAD (-) and connect free end of test lead probe to power supply module 2A1 test point TP3; meter indicates 100 ±20 (black).
				e. Operate R-1467/GRC-144 meter selector switch to TEST LEAD (+) and sequentially connect free end of test lead probe to test points indicated below; meter indicates 100 ±20 (black) for each check.
				Module — *Test Point*
				2A2 — BIAS (2)
				2A7 — TP2
				2A10 — TP1
				2A5 — TP3
				2A13 — TP1
				2A13 — TP2
				2A4 — TP7
				2A11 — TP1
				2A12 — TP1
				f. Operate R-1467/GRC-144 meter selector switch to TEST LEAD (-) and connect free end of test lead probe to module 2A12 test point TP2; meter indicates 100 ±20 (black).
				g. Disconnect test lead probe and store in R-1467/GRC-144 SPECIAL TOOLS AND SPARE FUSES compartment.
				h. Disconnect R-1467/GRC-144 cable 2A3W1 from J6 of module 2A4; R-1567/GRC-144 TRAF and associated control indicator TRAF OUT indicator change from green to red.
				i. Reconnect R-1467/GRC-144 cable 2A-3W1 to J6 of module 2A4; R-1467/GRC-144 TRAF and associated control indicator TRAF OUT indicators change from red to green.
				j. Record R-1467/GRC-144 thumbwheel settings and change to 5090.0 MHz; SYNTH LOCK indicator changes from green to red.
				k. Reset R-1467/GRC-144 thumbwheels to original settings; SYNTH LOCK indicator changes from red to green.
				l. Disconnect R-1467/GRC-144 cable 2A-5W1 from J2 of module 2A6; module 2A15A2 CARR (IF) alarm indicator changes from green to red.
				m. Reconnect R-1467/GRC-144 cable 2A5W1 to J2 of Module 2A6; module 2A15A2 CARR (IF) alarm indicator changes from red to green.
37		*	Control indicators (serial numbers 1 through 25).	*a.* Operate alarm disable switch to up position; T-1054/GRC-144 alarm is disabled.
				b. Operate alarm disable switch to down position; T-1054/GRC-144 alarm is normal.
				c. Operate time selector to a specific time.
				d. Press ALARM DISABLED indicator/switch; timer will start,

M—Monthly Q—Quarterly

Item No.	Interval M	Interval Q	Item to be inspected	Procedures Check for and have repaired or adjusted as necessary
				ALARM DISABLED indicator/switch will light, and T-1054/GRC-144 alarm is disabled until timer times out.
				e. Check that TRAF IN and TRAF OUT indicator is lighted.
				f. Check that ANT-DUMMY LOAD indicator is lighted corresponding to Waveguide Switch SA-1679/GRC position.
38		*	Control indicator (serial numbers 25 and above).	*a.* Press ALARM DISABLED indicator/switch; ALARM DISABLED indicator/switch will light, and T-1054/GRC-144 alarm is disabled.
				b. Press ALARM DISABLED indicator/switch; ALARM DISABLED indicator/switch extinguished and T-1054/GRC-144 alarm is normal.
				c. Check that ANTENNA-DUMMY LOAD indicator is lighted corresponding to Waveguide Switch SA-1679/GRC position.
				d. Check that TRAF IN and TRAF OUT indicators are lighted.
				NOTE If AN/TRC-138 is to remain in operation, do not perform sequence Nos. 39 through 44.
39		*	T-1054/GRC-144.	Operate T-1054/GRC-144 POWER switch to OFF; all indicators extinguish.
40		*	R-1467/GRC-144.	Operate R-1467/GRC-144 POWER switch to OFF; all indicators extinguished.
41		*	CV-425/U.	Operate CV-425/U POWER switch to OFF.
42		*	Miscellaneous switches.	Operate to OFF; shelter lights extinguish and exhaust blowers stop.
43		*	POWER DISTRIBUTION BOX.	Operate circuit breakers to OFF; associated indicators extinguish.
44		*	Power source.	Stop generator sets or turn off central power source.
45		*	Antenna.	Inspect antenna reflections, feedhorns, and waveguide assemblies for dents or deformation.
46		*	Baseplate anchor stakes and anchor assemblies.	Check to see that base plate anchor stakes and anchor assemblies are secure.
47	*		Guy assemblies.	Check for proper tensioning of guy cables.
48	*		Mast.	Check to see that the mast is properly plumbed.
49	*		Waveguide assemblies and supports.	Check to see that waveguides are not twisted, that there are no sharp bends, and that waveguide support cables are in good condition.
50		*	Components:	
			a. Inventory.	*a.* Inventory equipment; requisition missing or defective parts.
			b. Location of parts.	*b.* Check to see that all components are mounted or stowed in assigned places except those that are being used (power, signal, and interconnecting cables, etc).
			c. Publications.	*c.* Requisition all operator and organizational maintenance manuals covering AN/TRC-138 and its components that are not on hand or in usable condition (including all current changes of publications).
51		*	Modification work orders.	Check to see if any MWO's are required for AN/TRC-138 or its components. Check equipment to see if current MWO's have been applied and MWO number is stamped as required. Perform or request modification as applicable.
52		*	Fire extinguisher.	*a.* Refill if weight of contents is less than prescribed.
				b. Replace if valve assembly is damaged.
53		*	Chair and chair cushion.	*a.* Repair or replace cushion that is cut or torn, or has split seams or exposed padding.
				b. Repair or replace chair if parts are bent or broken, or if chair is unsafe for use.
54		*	Sledge hammer and axe.	Replace if handle is broken or split or not tight in head.
55		*	First aid kit.	Replace if case is broken or damaged. Replace parts that have been used.

4-4. Organizational Quarterly Preventive Maintenance Checks and Services (Deleted)

Section II. TROUBLESHOOTING

4–5. System Troubleshooting

a. General. System troubleshooting is based on symptoms that may occur at the AN/TRC–138 when it is connected as a radio repeater or a cable-to-radio conversion point. The trouble symptoms may be discovered through the build-in alarms in the equipment, incorrect indications in preventive maintenance checks and services (para 4–2 and 4–3), or from other terminals or repeaters in the system. When a trouble symptom occurs, refer to the appropriate troubleshooting chart (*b* or *c* below) to find the possible trouble and corrective measure. Refer to the chart in *b* below if the AN/TRC–138 is used as a radio repeater. Refer to the chart in *c* below if the AN/TRC–138 is operating as a cable-to-radio conversion point. The loopback checks (*d* below) may be used to verify isolation of troubles in the system.

b. Radio Repeater Troubleshooting Chart.

Item No.	*Symptom*	*Possible trouble*	*Corrective measure*
1	System 1 TRAF IN indicator on associated control indicator and T–1054/GRC–144 TRAF and CNTRL ALARM indicators change from green to red. System 2 indications are normal. Distant terminal or repeater (system 1 side) indicates loss of pcm signal.	*a.* Defective patch cord connected between SYSTEM 1 RADIO IN connector and SYSTEM 2 RADIO OUT connector on patch panel. *b.* Defective system 1 T–1054/GRC–144.	*a.* Check and replace if necessary. *b.* Troubleshoot T–1054/GRC/144 (para 4–7).
2	System 2 TRAF IN indicator on associated control indicator and T–1054/GRC–144 TRAF and CNTRL ALARM indicators change from green to red. System 1 indications are normal. Distant terminal (system 2 side) indicates loss of pcm signal.	*a.* Defective patch cord connected between SYSTEM 2 RADIO IN connector and SYSTEM 1 RADIO OUT connector on patch panel. *b.* Defective system 2 T–1054/GRC–144.	*a.* Check and replace if necessary. *b.* Troubleshoot T–1054/GRC–144 (para 4–7).
3	System 1 TRAF OUT indicator on associated control indicator, R–1467/GRC–144 TRAF indicator, and system 2 TRAF indicator and T–1054/GRC–144 TRAF and CNTRL ALARM indicators change from green to red. Distant terminal or repeater (system 2 side) indicates loss of pcm signal.	*a.* Defective system 1 R–1467/GRC–144. *b.* Defective component at distant terminal or repeater (system 1 side).	*a.* Troubleshoot R–1467/GRC–144 (para 4–7). *b.* Request distant terminal or repeater troubleshooting.
4	System 1 TRAF OUT indicator on associated control indicator, R–1467/GRC–144 TRAF and CARR (IF) indicators, and system 2 TRAF IN indicator on associated control indicator and T–1054/GRC–144 FRAF and CNTRL ALARM indicators change from green to red. Distant terminal or repeater (system 2 side) indicates loss of pcm signal.	*a.* Defective antenna assembly or receiving waveguide. *b.* Defective antenna assembly or transmission waveguide at distant terminal or repeater (system 1 side). *c.* Defective system 1 R–1467/GRC–144.	*a.* Check and make necessary repair or replacement. *b.* Request distant terminal or repeater troubleshooting. *c.* Troubleshooting R–1467/GRC–144 (para 4–7).

Item No.	Symptom	Possible trouble	Corrective measure
5	System 2 TRAF OUT indicator on associated control indicator, R–1467/GRC–144 TRAF and CARR (IF) indicators, and system 1 TRAF IN indicator on associated control indicator and T–1054/GRC–144 TRAF and CNTRL ALARM indicators change from green to red. Distant terminal or repeater (system 1 side) indicates loss of pcm signal.	*a.* Defective antenna assembly or receiving waveguide. *b.* Defective anntenna assembly or transmission waveguide at distant terminal or repeater (system 2 side). *c.* Defective system 2 R–1467/GRC–144.	*a.* Check and make necessary repair or replacement. *b.* Request distant terminal or repeater troubleshooting. *c.* Troubleshoot R–1467/GRC–144 (para 4–7).
6	System 2 TRAF OUT indicator on associated control indicator, R–1467/GRC–144 TRAF indicator, and system 1 TRAF IN indicator on associated control indicator and T–1054/GRC–144 TRAF and CNTRL ALARM indicators change from green to red. Distant terminal or repeater (system 1 side) indicates loss of pcm signal.	*a.* Defective system 2 R–1467/GRC–144. *b.* Defective ccmponent at distant Terminal or repeater (system 2 side).	*a.* Troubleshoot R–1467/GRC–144 (para 4–7). *b.* Request distant terminal or repeater troubleshooting.
7	No remote order wire (TA–312/PT) available through system 1 but system 2 is normal.	*a.* Defective system 1 CV–425/U. *b.* Defective system 1 T–1054/GRC–144. *c.* Defective associated TA–312/PT.	*a.* Troubleshoot CV–425/U (para 4–7). *b.* Troubleshoot T–1054/GRC–144 (para 4–7). *c.* Replace TA–312/PT.
8	No remote order wire (TA–312/PT) available through system 2 but system 1 is normal.	*a.* Defective system 2 CV–425/U. *b.* Defective system 2 T–1054/GRC–144. *c.* Defective asscciated TA–312/PT.	*a.* Troubleshoot CV–425/U (para 4–7). *b.* Troubleshoot T–1054/GRC–144 (para 4–7). *c.* Replace TA–312/PT.
9	Ring signal cannot be sent from remote order wire (TA–312/PT) through system 1. All other indications are normal.	Defective system 1 CV–425/U.	Troubleshoot CV–425/U (para 4–7).
10	Ring signal cannot be sent from remote order wire (TA–312/PT) through system 2. All other indicators are normal.	Defective system 2 CV–425/U.	Troubleshoot CV–425/U (para 4–7).
11	No through order wire available but order wire normal through each associated system side.	Defective patch cord connected between SYSTEM 1 ORDER WIRE connector and SYSTEM 2 ORDER WIRE connector on patch panel.	Check and replace if necessary.
12	No local order wire available through system 1 (H–156/U). All other indications normal.	*a.* Defective associated system 1 H–156/U. *b.* Defective system 1 T–1054/GRC–144.	*a.* Check and replace if necessary. *b.* Troubleshoot T–1054/GRC–144 (para 4–7).
13	No local order wire available through system 2 (H–156/U). All other indications are normal.	*a.* Defective associated system 2 H–156/U. *b.* Defective system 2 T–1054/GRC–144.	*a.* Check and replace if necessary. *b.* Troubleshoot T–1054/GRC–144 (para 4–7).

c. Cable-to-Radio Converter Troubleshooting Chart.

NOTE

The following troubleshooting procedures apply to any system in the AN/TRC-138.

Item No.	*Symptom*	*Possible trouble*	*Corrective measure*
1	TRAF IN indicator on control indicator and T-1054/GRC-144 TRAF and CNTRL ALARM indicators change from green to red. No order wire reception through cable link.	*a.* Defective patch cord connected between VIDEO CABLE IN connector and VIDEO EQUIPMENT IN connector on patch panel.	*a.* Check and replace if necessary.
		b. Defective T-1054/GRC-144.	*b.* Troubleshooting T-1054/GRC-144 (para 4-7).
		c. Defective TD-206/U or pcm cable (receive side).	*c.* Troubleshoot cable link (para 4-6).
		d. Defective TD-204/U at distant terminal or repeater (cable link).	*d.* Request distant terminal or repeater troubleshooting.
2	TRAF OUT indicator on control indicator No. 1 and R-1467/GRC-144 TRAF indicator changes from green to red. Distant terminal or repeater (cable link) indicates loss of pcm cable signal.	*a.* Defective R-1467/GRC-144.	*a.* Troubleshoot R-1467/GRC-144 (para 4-7).
		b. Defective component at distant terminal or repeater (radio link).	*b.* Request distant terminal or repeater troubleshooting.
3	TRAF OUT indicator on control indicator and R-1467/GRC-144 TRAF and CARR (IF) indicators change from green to red. Distant terminal or repeater (cable link) indicates loss of pcm cable signal.	*a.* Defective antenna assembly or receiving waveguide.	*a.* Check and make necessary repair or replacement.
		b. Defective component at distant terminal or repeater (radio link).	*b.* Request distant terminal or repeater troubleshooting.
4	Distant terminal or repeater (cable link) indicates loss of pcm cable signal. All local indications are normal except no order wire transmission through cable link.	*a.* Defective patch cord connected between VIDEO CABLE OUT connector and VIDEO EQUIPMENT OUT connector on patch panel.	*a.* Check and replace if necessary.
		b. Defective TD-206/G or pcm cable (send side).	*b.* Troubleshcot cable link (para 4-6).
5	Distant terminal or repeater (radio link) indicates loss of RF signal.	*a.* Defective T-1054/GRC-144.	*a.* Troubleshoot T-1054/GRC-144 (para 4-7).
		b. Defective antenna assembly or transmission waveguide.	*b.* Check and make necessary repair or replacement.
6	TRAF IN indicator on control indicator and T-1054/GRC-144 TRAF and CNTRL ALARM changes from green to red and distant terminal or repeater (cable link) indicates loss of pcm signal. No order wire available through cable link.	Open transmission cable (both directions) in cable link.	Troubleshoot cable link (para 4-6).
7	No remote order wire (TA-312/PT) available. All other indications are normal.	*a.* Defective TA-312/PT.	*a.* Check and replace if necessary.
		b. Defective CV-425/U.	*b.* Troubleshoot CV-425/U (para 4-7).
		c. Defective T-1054/GRC-144.	*c.* Troubleshoot T-1054/GRC-144 (para 4-7).
8	Ring signal cannot be sent from remote order wire (TA-312/PT). All other indications are normal.	*a.* Defective TA-312/PT.	*a.* Check and replace if necessary.
		b. Defective CV-425/U.	*b.* Troubleshoot CV-425/U (para 4-7).
9	No order wire (H-156/U) available.	*a.* Defective H-156/U.	*a.* Check and replace if necessary.
		b. Defective T-1054/GRC-144.	*b.* Troubleshoot T-961/GRC-144 (para 4-7).

d. Loopback Checks.

(1) *Cable loopback checks.*

WARNING

Voltages as high as 1,100 volts may be present on the pcm transmission cable during normal operation. *Do not* attempt to disconnect the cable until the distant cable terminal or repeater operator indicates that the TD–204/U CABLE POWER switch is at OFF.

(*a*) Contact the distant cable terminal or repeater operator by order wire (para 3–5) and coordinate the loopback checks.

(*b*) When requested, loop back the transmission cable by operating the T–1054/GRC–144 modem 1A12 CABLE LOOP TEST switch to TEST.

(*c*) If the trouble appears to be isolated to the transmission cable, further isolation can be performed by disconnecting the patch cords connected to the VIDEO CABLE IN and OUT connectors on the patch panel and then connecting a patch cord between the VIDEO CABLE IN and OUT connectors. Further isolation can be performed by disconnecting the transmission cable from the VIDEO ENTRANCE box and connecting the send and receive side together. The CX–11230/G cable can be looped back by use of the CX–10734/G cable adapter.

(*d*) When the distant operator completes the check, operate the T–1054/GRC–144 modem 1A12 CABLE LOOP TEST switch to NORMAL, and reconnect the transmission cable to the VIDEO ENTRANCE box.

(*e*) Remove the patch cord connected between the VIDEO CABLE IN and OUT connectors on the patch panel and reconnect the patch cords for their original configuration (para 2–7*b*).

(2) *AN/GRC–144 radio loopback checks.* The loopback test is performed to isolate troubles to the radio equipment or to the antenna system. Coordinate the checks with the distant radio terminal or repeater operator.

(*a*) Request the remote radio terminal or repeater operator to set the remote SA–1679/GRC to TO LOAD (TEST) and then set the local SA–1679/GRC to TO LOAD (TEST).

(*b*) Record the T–1054/GRC–144 and R–1467/GRC–144 operating frequencies.

(*c*) Operate the R–1467/GRC–144 PUSH TO TURN knobs and thumbwheel controls for 4700 Mhz.

(*d*) Operate the T–1054/GRC–144 PUSH TO TURN knob and thumbwheel controls for 4800 Mhz.

(*e*) Operate the T–1054/GRC–144 module 1A2 ON–OFF switch to ON.

(*f*) Operate the T–1054/GRC–144 RADIO TEST SET switch to OSC LEVEL and adjust modem 1A2 LEVEL ADJ control for a SET OSC LEVEL ADJ meter indication.

(*g*) Operate the T–1054/GRC–144 RADIO TEST SET OUTPUT LEVEL selector switch to high.

(*h*) Perform a complete operational check of the AN/GRC–144 (para 4–2) to determine whether the trouble is isolated to the antenna system or the AN/GRC–144.

(*i*) Operate the T–1054/GRC–144 module 1A2 ON–OFF switch to OFF and reset the T–1054/GRC–144 and R–1467/GRC–144 PUSH TO TURN knobs and thumbwheel controls to the original operating frequency.

(*j*) Operate the SA–1679/GRC switch to TO ANT (NORMAL) and request the remote radio terminal or repeater operator to set the remote SA–1679/GRC switch to TO ANT (NORMAL).

4–6. Cable Link Troubleshooting

All cable link troubleshooting is performed from the TD–204/U end of the cable link and coordinated with a lineman using the AN/PTM–7. If the lineman or distant operator request a loopback, of the cable, refer to paragraph 4–5*d* and comply with his request. If the lineman or distant operator request a fault check from your end of the transmission cable, follow the procedures below:

WARNING

Voltages as high as 1,100 volts may be present on the pcm transmission cable during normal operation. *Do not* attempt to perform the following checks until the distant cable terminal or repeater operator indicates that the TD–204/U CABLE POWER switch is at OFF.

a. Disconnect the transmission cable from the connector on the VIDEO ENTRANCE box.

b. Measure the capacitance of the cable with the TS–27B/TSM and translate the indication into the distance to the fault (fig. 4–1).

c. If the indicated distance exceeds 10 miles, send a lineman out to the 10-mile point to repeat the measurement.

d. Coordinate with the lineman to use the AN/

PTM–7 at the cable connection nearest the fault to locate the distance to the fault.

NOTE

If the fault is located in a section of the cable link where two sections join, use the AN/PTM–7 order wire facility to determine which cable section is at fault.

e. When the fault is located, replace the cable section.

4–7. Assemblage Troubleshooting

a. General. Replacement and repair of components and parts for the AN/TRC–138 are authorized for the various categories of maintenance as indicated in section II, appendix B. The tools and test equipment required are listed in section III, appendix B. The troubleshooting information in the troubleshooting chart (*b* below) is based on symptoms that would be obtained while performing the operator's daily preventive maintenance checks and services (para 4–2) and organizational monthly preventive maintenance checks and services (para 4–3). When an abnormal symptom is obtained, locate the symptom in the troubleshooting chart and perform the corrective measure indicated, as authorized in the maintenance allocation chart. If the corrective measure does not correct the trouble, replace the component and refer the defective component to higher category of maintenance. Refer to figure FO–2 for the ac power schematic-wiring diagram and to figure FO–3 for the signal schematic-wiring diagram.

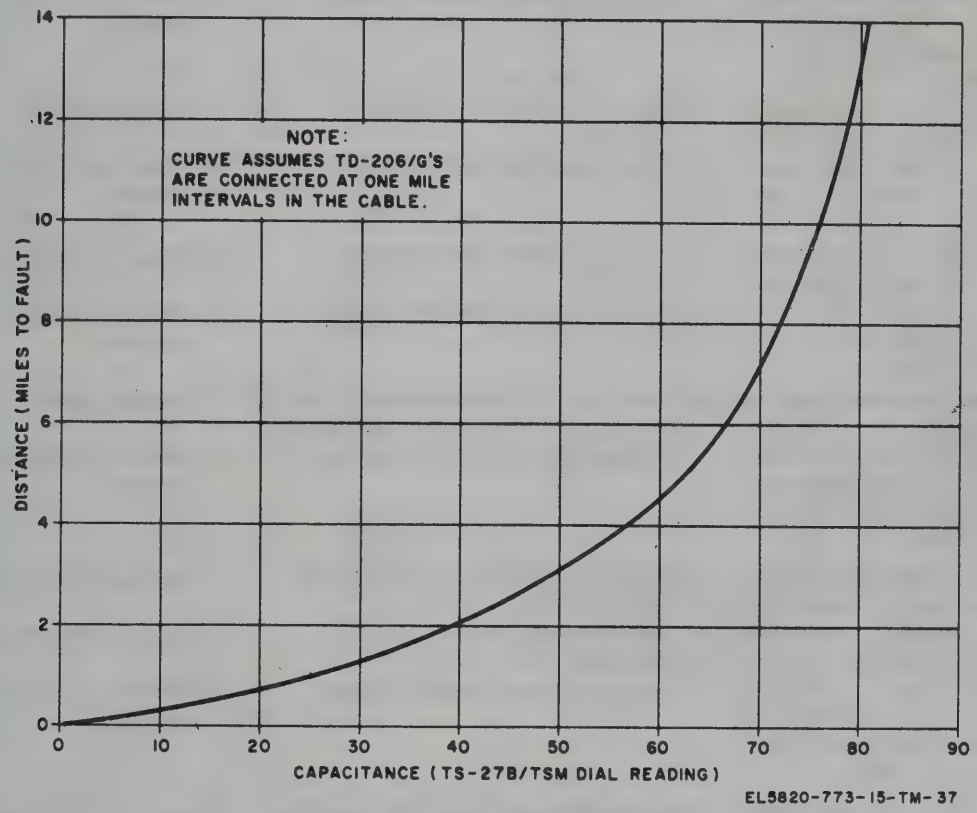


Figure 4–1. Test Set TS–27B/TSM, CX–4245/G transmission cable capacitance-distance curve.

b. Troubleshooting Chart.

Item No.	*Symptom*	*Possible trouble*	*Corrective measure*
1	POWER INDICATOR neon lamp fails to glow and no indication on VOLTS AC meter with ac power applied to assemblage.	*a.* Defective ac power cable.	*a.* Check and repair or replace as required.
		b. Defective POWER 115 VAC receptacle J1.	*b.* Replace receptacle.
		c. Defective shelter facility wiring.	*c.* Check and repair or replace as required.
2	POWER INDICATOR neon lamp fails to glow but	*a.* Defective lamp DS34.	*a.* Replace lamp.
		b. Defective socket XDS34.	*b.* Replace socket.

Item No.	Symptom	Possible trouble	Corrective measure
	VOLTS AC meter indicates normal with ac power applied to assemblage.	*c.* Defective shelter facility wiring.	*c.* Check and repair or replace as required.
3	VOLTS AC meter does not indicate when ac power is applied to assemblage but POWER INDICATOR neon lamp glows.	*a.* Defective VOLTS AC meter M2. *b.* Defective shelter facility wiring.	*a.* Replace meter. *b.* Check and repair or replace as required.
4	No ac power available inside assemblage but VOLTS AC meter indicates normal and POWER INDICATOR neon lamp glows.	*a.* Defective MAIN circuit breaker CB9. *b.* Defective shelter facility wiring.	*a.* Replace circuit breaker. *b.* Check and repair or replace as required.
5	Glowlamp on POWER DISTRIBUTION BOX fails to glow when associated circuit breaker is operated to ON.	*a.* Defective associated glowlamp (DS1 – DS8 (fig. 4–3). *b.* Defective associated circuit breaker (CB1 – CB8) (fig. 4–3).	*a.* Replace glowlamp. *b.* Replace circuit breaker.
6	No ac power available at 115 VAC receptacle in POWER ENTRANCE BOX. Ac power available inside assemblage.	*a.* Defective receptacle J3. *b.* Defective shelter facility wiring.	*a.* Replace receptacle. *b.* Check and repair or replace as required.
7	Roadside bank of fluorescent ceiling lights in each dual bank do not light when LIGHT–1 switch is operated to ON.	*a.* Defective LIGHT–1 switch S2 (fig. 5–1). *b.* Defective shelter facility wiring.	*a.* Replace switch. *b.* Check and repair or replace as required.
8	Curbside bank of fluorescent ceiling lights in each dual bank do not light when LIGHT–2 switch is operated to ON.	*a.* Defective LIGHT–2 switch S3 (fig. 5–1). *b.* Defective shelter facility wiring.	*a.* Replace switch. *b.* Check and repair or replace as required.
9	Incandescent ceiling lights do not light when INCANDESCENT COLD START LIGHTS switch is operated to ON. BYPASS-BLACKOUT switch is at OFF.	*a.* Defective INCANDESCENT COLD START LIGHTS switch S4 (fig. 5–1). *b.* Defective shelter facility wiring.	*a.* Replace switch. *b.* Check and repair or replace as required.
10	Neither fluorescent nor incandescent ceiling lights light when LIGHT 1, LIGHT 2, and INCANDESCENT COLD START LIGHTS switches are operated to ON. BYPASS-BLACKOUT switch is at OFF.	*a.* Defective LIGHTS circuit breaker CB1 (fig. 4–3). *b.* Defective interlock switch S1 (fig. 5–1). *c.* Defective shelter facility wiring.	*a.* Replace circuit breaker. *b.* Replace interlock switch. *b.* Check and repair or replace as required.
11	Ceiling lights do not extinguish when door is opened and BYPASS-BLACKOUT switch is at OFF.	Defective interlock switch S1 (fig. FO–1.	Replace interlock switch.
12	Exhaust blower fails to operate when associated BLOWER switch is operated to ON.	*a.* Defective exhaust blower. *b.* Defective associated BLOWER receptacle (J8 or J9). *c.* Defective shelter facility wiring.	*a.* Check and repair or replace as required. *b.* Replace receptacle. *c.* Check and repair or replace as required.
13	Both exhaust blowers fail to operate when BLOWER switches are operated to ON.	*a.* Defective BLOWERS circuit breaker CB2 (fig. 4–3). *b.* Defective shelter facility wiring.	*a.* Replace circuit breaker. *b.* Check and repair or replace as required.

Item No.	Symptom	Possible trouble	Corrective measure
14	Heater No. 1 fails to operate.	*a.* Defective HTR–1 circuit breaker CB2 (fig. 4–3).	*a.* Replace circuit breaker.
		b. Defective HEATER—1 receptacle J7 (fig. FO–1).	*b.* Replace receptacle.
		c. Defective heater.	*c.* Check and repair or replace as required.
		d. Defective shelter facility wiring.	*d.* Check and repair or replace as required.
15	Heater No. 2 fails to operate.	*a.* Defective HTR–2 circuit breaker CB3 (fig. 4–3).	*a.* Replace circuit breaker.
		b. Defective HEATER–2 receptacle J4 (fig. FO–1).	*b.* Replace receptacle.
		c. Defective heater.	*c.* Check and repair or replace as required.
		d. Defective shelter facility wiring.	*d.* Check and repair or replace as required.
16	No ac power available at any CONV receptacle and 115 VAC receptacle in POWER ENTRANCE BOX. No ac power available at INTERCOM receptacle.	*a.* Defective CONV circuit breaker CB8 (fig. 4–3).	*a.* Replace circuit breaker.
		b. Defective shelter facility wiring.	*b.* Check and repair or replace as required.
17	No ac power available at a specific CONV receptacle, or INTERCOM receptacle.	Defective CONV receptacle (J5, J6, or J15).	Replace receptacle.
18	No indication on AMPERES AC meter with all other indications normal.	*a.* Defective AMPERES AC meter M1 (fig. 4–3).	*a.* Replace meter.
		b. Defective transformer T1 (fig. 4–3).	*b.* Replace transformer.
19	No indication on control indicator(s) with all other indications normal.	*a.* Defective IND circuit breaker CB4 (fig. 4–3).	*a.* Replace circuit breaker.
		b. Defective connector P11.	*b.* Replace connector.
		c. Defective control indicator circuit.	*c.* Troubleshoot control indicator and repair.
20	No ac power to AN/GRC–144's. All other ac power indications are normal.	*a.* Defective EQUIP circuit breaker CB5 (fig. 4–3).	*a.* Replace circuit breaker.
		b. Defective shelter facility wiring.	*b.* Check and repair or replace as required.
21	No indication on ANT-DUMMY LOAD indicator of control indicator (fig. 3–2 or 3–3).	*a.* Defective associated Waveguide Switch SA–1679/GRC.	*a.* Check and replace as necessary.
		b. Defective ANT-DUMMY LOAD indicator I2 (fig. 4–6) or I3, I6, or I9 (fig. 4–8).	*b.* Replace indicator.
22	No indication on ALARM DISABLED indicator of control indicator (serial No.s 1 through 25 only) with alarm disable switch in up position or timer selector operating.	Defective indicator I3 (fig. 4–6).	Replace indicator.
23	Timer selector of control indicator (serial No.s 1 through 25 only) does not operate when ALARM DISABLED INDICATOR IS DEPRESSED.	*a.* Defective fuse F1 (fig. 4–6).	*a.* Replace fuse.
		b. Defective timer TD1 (fig. 4–6).	*b.* Replace timer.
		c. Defective transformer T1. (fig. 4–6).	*c.* Replace transformer.
24	ALARM DISABLED indicator on control indicator (serial No.s 1 through 25 only) does not flash when alarm is disabled.	Defective relay FL1 (fig. 4–6).	Replace relay.
25	No indication on ALARM DISABLED indicator of	Defective alarm disable switch S2 (fig. 4–6).	Replace switch.

Item No.	Symptom	Possible trouble	Corrective measure
	control indicator (serial No.s 1 through 25 only) with alarm disable switch in up position. Nor mal operation with timer selector.		
26	No indication on ALARM DISABLED indicator when depressed on control indicator (serial No.s 26 and above).	Defective ALARM DISABLE indicator/ switch (I3, I6, I9, fig. 4–8).	Replace indicator/switch.
27	ALARM DISABLED indicator on control indicator (serial No.s 26 and above) does not flash when depressed.	Defective associated relay FL1, FL2, or FL3 (fig. 4–8).	Replace relay.
28	TRAF IN TRAF OUT indicator on control indicator extinguished but all indications are normal including transmission and reception at distant terminals or repeaters.	Defective indicator (I1, fig. 4–6) (I1, I4, or I7, fig. 4–8).	Replace indicator.
29	No indication on T–1054/ GRC–144 when POWER switch is operated to ON.	*a.* Defective ac power cord. *b.* Defective XMTR receptacle (J10, J11, or J12) (fig. FO–1).	*a.* Check and repair or replace as required. *b.* Replace receptacle.
30	T–1054/GRC–144 5 AMP SLO-BLO fuse indicator lighted.	Defective 5 AMP SLO–BLO fuse.	Replace fuse, If fuse blows, higher category maintenance is required.
31	No indicator on T–1054/ GRC–144 module 1A15A8 lighted.	*a.* Defective fuse 1A1F11. *b.* Defective module 1A1A11.	*a.* Replace fuse. *b.* Replace module.
32	Specific indicator on T–1054/ GRC–144 module 1A1 not lighted.	*a.* Defective associated fuse above indicator. *b.* Defective indicator.	*a.* Replace fuse. *b.* Replace indicator.
33	T–1054/GRC–144 module 1A14 5V and 28V indicators not lighted.	*a.* Defective fuse 1A4F1. *b.* Defective module 1A14A8.	*a.* Replace fuse. *b.* Replace module.
34	T–1054/GRC–144 SYNTH OVEN indicator extinguished.	*a.* Defective indicator. *b.* Defective module 1A14A7.	*a.* Replace indicator. *b.* Replace module.
35	Both T–1054/GRC–144 CABLE TERMINAL OPERATION and RADIO REPEATER OPERATION indicators extinguished.	Defective operational mode indicator.	Replace associated indicator.
36	Specific indicatcr on T–1054/ GRC–144 module 1A1 extinguished.	Defective associated indicator.	Replace indicator.
37	T–1054/GRC–144 CNTRL ALARM indicator lighted red.	Following module defective: *a.* 1A5. *b.* 2A12. *c.* 1A12A5. *d* 1A13A2.	Replace modules in following sequence: *a.* 1A5. *b.* 2A12. *c.* 1A12A5. *d.* 1A13A2.
38	T–1054/GRC-144 RADIO TEST SET indicator lighted red.	Defective module 1A2.	Replace module 1A2.
39	T–1054/GRC–144 RADIO TO CABLE MODEM indicator lighted red.	Defective following module: *a.* 1A12A5.	Replace modules in following sequence: *a.* 1A12A5.

Item No.	Symptom	Possible trouble	Corrective measure
		b. 1A12A4.	*b.* 1A12A4.
		c. 1A12A8.	*c.* 1A12A8.
		d. 1A12A9.	*d.* 1A12A9.
		e. 1A12A11.	*e.* 1A12A11
		f. 1A12A10.	*f.* 1A12A10.
40	T–1054/GRC–144 CABLE TO RADIO MODEM indicator lighted red.	Defective following module:	Replace modules sequentially:
		a. 1A12A5.	*a.* 1A12A5.
		b. 1A12A2	*b.* 1A12A2.
		c. 1A12A3.	*c.* 1A12A3.
		d. 1A12A1.	*d.* 1A12A1.
		e. 1A12A4.	*e.* 1A12A4.
41	T–1054/GRC–144 TRAF indicator lighted red.	Defective following module:	Replace modules sequentially:
		a. 1A4.	*a.* 1A4.
		b. 1A8.	*b.* 1A8.
		c. 1A3.	*c.* 1A3.
42	T–1054/GRC–144 SYNTH LOCK indicator lighted red.	Defective following module:	Replace modules sequentially:
		a. 1A14A8.	*a.* 1A14A8.
		b. 1A14A7.	*b.* 1A14A7.
		c. 1A14A6.	*c.* 1A14A6.
		d. 1A14A1.	*d.* 1A14A1.
		e. 1A14A2.	*e.* 1A14A2.
43	T–1054/GRC–144 RF POWER indicator lighted red or incorrect indication on meter with selector switch at RF POWER.	Defective following module:	Replace modules in following sequence:
		a. 1A5.	*a.* 1A5.
		b. 1A9HY1CR1.	*b.* 1A9HY1CR1.
		c. 1A10HY1CR1.	*c.* 1A10HY1CR1.
		d. 1HY1CR1.	*d.* 1HY1CR1.
		e. 1A14A8.	*e.* 1A14A8.
		f. 1A14A7.	*f.* 1A14A7.
		g. 1A14A6.	*g.* 1A14A6.
		h. 1A14A1.	*h.* 1A14A1.
		i. 1A14A2.	*i.* 1A14A2.
		j. 1A10A1.	*j.* 1A10A1.
		k. 1W19.	*k.* 1W19.
		l. 1A8.	*l.* 1A8.
		m. 1A7.	*m.* 1A7.
		n. 1A9A1.	*n.* 1A9A1.
		o. 1A9W1.	*o.* 1A9W1.
44	T–1054/GRC–144 REFL RF POWER indicator lighted red or incorrect indication on meter with meter selector switch at REFL RF POWER.	Defective module 1A5.	Replace module.
45	Incorrect indication on T–1054/GRC–144 meter with meter selector switch at:	Defective following module:	Replace following modules sequentially.
	a. MODULATOR CONTROL or MODULATOR OUTPUT.	*a.* 1A8.	*a.* 1A8.
	b. FREQ CONTROL CTR FREQ or FREQ CONTROL OUTPUT.	*b.* 1A7 or 1A8.	*b.* 1A7 or 1A8.
	c. TRAFFIC.	*c.* 1A4, 1A8 or 1A3.	*c.* 1A4, 1A8, or 1A3.
	d. SYNTHESIZER.	*d.* 1A14A7, 1A14A6, 1A14A1, 1A14A2, or 1A14A8.	*d.* 1A14A7, 1A14A6, 1A14A1, 1A-14A2, or 1A14A8.
	e. AMPL MULT.	*e.* 1HY1CR1, 1A14A8, 1A14A7, 1A14A6, 1A14A1, or 1A14A2.	*e.* 1HY1CR1, 1A14A8, 1A14A7, 1A14A6, 1A14A1, or 1A14A2.
	f. 2ND MULT.	*f.* 1A10HY1CR1, 1HY1CR1, 1A14A8, 1A14A7, 1A14A6, 1A14A1, 1A14A2, 1A10A1, or 1W19.	*f.* 1A10HY1CR1, 1HY1CR1, 1A14-A8, 1A14A7, 1A14A6, 1A14A1, 1A14A2, 1A10A1, or 1W19.

Item No.	Symptom	Possible trouble	Corrective measure
	g. 3RD MULT	*g.* 1A9HY1CR1, 1HY1CR1, 1A14A8, 1A14A7, 1A14A6, 1A14A1, 1A14A2, 1W19, 1A10A2, or 1A9W1.	*g.* 1A9HY1CR1, 1HY1CR1, 1A14A8, 1A14A7, 1A14A6, 1A14A1, 1A14A2, 1W19, 1A10A2, or 1A9W1.
46	Incorrect indication on T–1054/GRC–144 meter for following module 1A1 test point:	Defective following module:	Replace following modules sequentially.
	a. TP1.	*a.* 1A1A1, 1A12A2, 1A12A3, or 1A12A5.	*a.* 1A1A1, 1A12A2, 1A12A3, or 1A12A5.
	b. TP2.	*b.* 1A1A2, 1A12A8, 1A12A9, or 1A12A10.	*b.* 1A1A2, 1A12A8, 1A12A9, or 1A12A10.
	c. TP3.	*c.* 1A1A3, 1A12A3, 1A12A5, 1A12A6, 1A12A7, 1A12A8, or 1A12A9.	*c.* 1A1A3, 1A12A3, 1A12A5, 1A12A6, 1A12A7, 1A12A5, or 1A12A9.
	d. TP4.	*d.* 1A1A4, 1A13A1, 1A13A2, 1A13A3, 1A13A4, or 1A13A5.	*d.* 1A1A4, 1A13A1, 1A13A2, 1A13A3, 1A13A4, or 1A13A.
	e. TP6.	*e.* 1A1A6, 1A13A1, 1A13A2, 1A13A3, 1A13A4, or 1A13A5.	*e.* 1A1A6, 1A13A1, 1A13A2, 1A13A3, 1A13–A4, or 1A13A5.
	f. TP7.	*f.* 1A1A7, 1A13A2.	*f.* 1A1A7, or 1A13A2.
	g. TP8.	*g.* 1A1A8, 1A12A1, 1A12A2, 1A12A3, 1A12A5, 1A12A6, 1A12A7, 1A12A8, 1A12A9, 1A12A10, or 1A12A11.	*g.* 1A1A8, 1A12A1, 1A12A2, 1A12A3, 1A12A5, 1A12A6, 1A12A7, 1A12A8, 1A12A9, 1A12A10, or 1A12A11.
	h. TP9.	*h.* 1A1A9, 1A5, 1A12A3, 1A12A8, 1A12A9, or 1A12A10.	*h.* 1A1A9, 1A5, 1A12A3, 1A12A8, 1A12A9, or 1A12A10.
	i. TP11.	*i.* 1A1A10, 1A2, 1A4, 1A7, or 1A8.	*i.* 1A1A10, 1A2, 1A4, 1A7, or 1A8.
	j. TP11.	*j.* 1A1A11, 1A5, or 1A8.	*j.* 1A1A11, 1A5, or 1A8.
	k. TP12.	*k.* 1A1A12, or 1A8.	*k.* 1A1A12, or 1A8.
47	Incorrect indication on T–1054/GRC–144 meter when checking module 1A4, 1A5, 1A7, 1A8, 1A11, and 1A12 test points.	Defective module 1A1A1 through 1A1A12 or 1A8.	Replace 1A1A1 through 1A1A12 and 1A8 sequentially.
48	5V indicator on T–1054/GRC–144 module 1A14 not lighted.	Defective 5V indicator or module 1A14A8.	Replace 5V indicator and 1A14A8 sequentially.
49	28V indicator on T–1054/GRC–144 module 1A14 not lighted.	Defective 28V indicator or module 1A14A8.	Replace 28V indicator and 1A14A8 sequentially.
50	Specific indicator on T–1054/GRC–144 module 1A14 lighted.	Defective associated 1A14 plug-in.	Replace associated 1A14 plug-in.
51	T–1054/GRC–144 1A14A2DS1 and 1A14A6DS1 indicator lighted.	Defective module 1A14A7.	Replace module.
52	T–1054/GRC–144 1A14A3DS1 and 1A14A6DS1 indicator lighted.	Defective module 1A14A6.	Replace module.
53	T–1054/GRC–144, 1A14A1DS1, 1A14A2DS1, 1A14A4DS1, and 1A14A5DS1 indicator lighted.	Defective module 1A14A1.	Replace module.
54	T–1054/GRC–144 1A14A2DS1, 1A14A4DS1, and 1A14A5DS1 indicators lighted.	Defective module 1A14A2.	Replace module.
55	T–1054/GRC–144 CABLE TO RADIO MODEM indicator lighted red with 1A12A2DS1 extinguished.	Defective module 1A12A2.	Replace module.

Item No.	Symptom	Possible trouble	Corrective measure
56	T–1054/GRC–144 CABLE TO RADIO MODEM indicator lighted red with 1A12A2DS1 extinguished.	Defective module 1A12A3 or 1A12A1.	Replace sequentially.
57	T–1054/GRC–144 CABLE TO RADIO MODEM or RADIO TO CABLE MODEM lighted red with 1A12A4DS1 extinguished.	Defective module 1A12A4, 1A12A9, 1A-12A11.	Replace sequentially.
58	T–1054/GRC 144 RADIO TO CABLE MODEM indicator lighted red with 1A12A8DS1 extinguished.	Defective module 1A12A8.	Replace module.
59	T–1054/GRC–144 RADIO TO CABLE MODEM indicator lighted red with 1A12A9DS1 extinguished.	Defective module 1A12A9 or 1A12A11.	Replace sequentially.
60	T–1054/GRC–144 RADIO TO CABLE MODEM indicator lighted red with 1A12A10DS1 extinguished.	Defective module 1A12A10.	Replace module.
61	T–1054/GRC–144 order wire test fails with MODULE TEST selector at:	Defective following module:	Replace following module:
	a. 1.	*a.* 1A13A1.	*a.* 1A13A1.
	b. 2, 6, 8, or 10.	*b.* 1A13A5.	*b.* 1A13A5.
	c. 3, or 4.	*c.* 1A13A3.	*c.* 1A13A3.
	d. 5, or 6.	*d.* 1A13A4.	*d.* 1A13A4.
	e. 11, or 12.	*e.* 1A13A2.	*e.* 1A13A2.
62	No indication on R–1467/GRC–144 when POWER switch is operated to ON.	*a.* Defective ac power cord.	*a.* Check and repair or replace as required.
		b. Defective RCVR receptacle (J10, J11, or J12) in ac power duct (fig. FO–1).	*b.* Replace receptacle.
63	R–1467/GRC–144 5 AMP SLO BLO fuse indicator lighted.	Defective 5 AMP SLO–BLO fuse.	Replace fuse. If fuse blows, higher category maintenance is required.
64	R–1467/GRC–144 TDA 1 AMP SLO BLO indicator lighted.	*a.* Defective TDA 1 AMP SLO–BLO fuse.	*a.* Replace fuse.
		b. Defective module 2A2.	*b.* Replace module.
65	No indicator on R–1467/GRC–144 module 1A15A2 lighted.	*a.* Defective fuse 1A1A5F4.	*a.* Replace fuse.
		b. Defective module 1A1A4.	*b.* Replace module.
66	R–1467/GRC–144 TDA OVEN indicator does not cycle on and off.	*a.* Defective TDA OVEN indicator.	*a.* Replace indicator.
		b. Defective module 2A2.	*b.* Replace module.
67	R–1467/GRC–144 SYNTH OVEN indicator not lighted.	*a.* Defective SYNTH OVEN indicator.	*a.* Replace indicator.
		b. Defective module 2A14A7.	*b.* Replace module.
68	Specific R–1467/GRC–144 module 2A1 indicator not lighted.	*a.* Defective specific indicator.	*a.* Replace indicator.
		b. Defective associated module 2A1A1 through 2A1A4.	*b.* Replace associated module.
69	R–1467/GRC–144 5V and 28V indicators not lighted.	*a.* Defective fuse 2A14F1.	*a.* Replace fuse.
		b. Defective module 2A14A8.	*b.* Replace module.
70	R–1467/GRC–144 SYNTH LOCK indicator lighted red.	Defective following module:	Replace following modules sequentially:
		a. 2A14A7.	*a.* 2A14A7.
		b. 2A14A6.	*b.* 2A14A6.
		c. 2A14A1.	*c.* 2A14A1.
		d. 2A14A2.	*d.* 2A14A1.
71	R–1467/GRC–144 CARR (IF) indicator lighted red and incorrect indication on me-	Defective following module:	Replace following modules sequentially:
		a. 2A13.	*a.* 2A13.

Item No.	Symptom	Possible trouble	Corrective measure
	ter with meter selector switch at CARRIER (IF).	*b.* 2A10. *c.* 2A8Z1CR1. *d.* 2W4. *e.* 2A14A7. *f.* 2A14A6. *g.* 2A14A1. *h.* 2A14A2. *i.* 2A14A8. *j.* 2A5. *k.* 2A7. *l.* 2A2.	*b.* 2A10. *c.* 2A8Z1CR1. *d.* 2W4. *e.* 2A14A7. *f.* 2A14A6. *g.* 2A14A1. *h.* 2A14A2. *i.* 2A14A8. *j.* 2A5. *k.* 2A7. *l.* 2A2.
72	R–1467/GRC–144 TRAF indicator lighted red and incorrect indication on meter with meter selector switch at TRAFFIC.	Defective following module: *a.* 2A12. *b.* 2A11. *c.* 2A4. *d.* 2A5.	Replace following modules sequentially: *a.* 2A12. *b.* 2A11. *c.* 2A4. *d.* 2A5.
73	Incorrect indication on R–1467/GRC–144 meter with meter selector switch at:	Defective following module:	Replace following modules sequentially:
	a. SYNTH.	*a.* 2A14A7, 2A14A6, 2A14A1, 2A14A2, or 2A14A8.	*a.* 2A14A7, 2A14A6, 2A14A1, 2A-14A2, and 2A14A8.
	b. FREQ MIXER CURRENT 1 or FREQ MIXER CURRENT 2.	*b.* 2A14A7, 2A14A6, 2A14A1, 2A14A2, 2A14A8, 2A10, 2A8Z1CR1, or 2W4.	*b.* 2A14A7, 2A14A6, 2A14A1, 1A-14A2, 2A14A8, 2A10, 2A8Z1CR1, and 2W4.
	c. MULT OSC.	*c.* 2A13.	*c.* 2A13.
	d. AGC.	*d.* 2A13, 2A10, 2A8Z1CR1, 2W4, 2A14A7, 2A14A6, 2A14A1, 2A14A2, 2A14A8, 2A5, 2A7, 2A2, or 2A5.	*d.* 2A13, 2A10, 2A8Z1CR1, 2W4, 2A14A7, 2A14A6, 2A14A1, 2A-14A2, 2A14A8, 2A5, 2A7, 2A2, and 2A5.
	e. AMPL MIXER CURRENT 1, AMPL MIXER CURRENT 2 or LOCAL OSC POWER.	*e.* 2A13, 2A14A7, 2A14A6, 2A14A1, 2A14A2, 2A14A8, 2A10, 2A8Z1CR1, or 2W4.	*e.* 2A13, 2A14A7, 2A14A6, 2A14A1, 2A14A2, 2A14A8, 2A10, 2A8Z-1CR1, and 2W4.
74	Incorrect indication on R–1467/GRC–144 meter for following 2A1 test points:	Defective following module:	Replace following modules sequentially:
	a. TP1.	*a.* 2A1A1, 2A10, or 2A13.	*a.* 2A1A1, 2A10, and 2A13.
	b. TP2.	*b.* 2A1A2, 2A2, 2A4, 2A5, 2A7, or 2A11.	*b.* 2A1A2, 2A2, 2A4, 2A5, 2A7, and 2A11.
	c. TP3.	*c.* 2A1A3, or 2A12.	*c.* 2A1A3, or 2A12.
	d. TP4.	*d.* 2A1A4, or 2A12.	*d.* 2A1A4, or 2A12.
75	Incorrect indication on R–1467/GRC–144 meter when checking module 2A2, 2A7, 2A10, 2A5, 2A13, 2A4, 2A11, and 2A12 test points.	Defective module 2A1A1 through 2A1A4 or 2A2 through 2A13.	Replace modules sequentially.
76	Specific R–1467/GRC–144 module 2A14 fault indicator lighted.	Defective associated module 2A14 plug-in.	Replace associated plug-in.
77	R–1467/GRC–144 2A14A2DS1 and 2A14A6DS1 indicators lighted.	Defective module 2A14A7.	Replace module.
78	R–1467/GRC–144 2A14A3DS1 and 2A14A6DS1 indicators lighted.	Defective module 2A14A6.	Replace module.
79	R–1467/GRC–144 2A14A1DS1, 2A14A2DS1, 2A14A4DS1, and 2A14A5DS1 indicators lighted.	Defective module 2A14A1.	Replace module.

Item No.	Symptom	Possible trouble	Corrective measure
80	R-1467/GRC-144 2A14A2DS1, 2A14A4DS1, and 2A14A5DS1 indicators lighted.	Defective module 2A14A2.	Replace module.
81	No indication on LS-147C/FI when OFF-SEND control is operated.	*a.* Defective ac power cord.	*a.* Check and repair or replace as required.
		b. Defective LS-147C/FI.	*b.* Check and repair or replace as required.
		c. Defective receptacle J15 in ac power duct.	*c.* Replace receptacle.
82	No indication on CV-425/U when POWER switch is operated to ON.	*a.* Defective ac power cable.	*a.* Check and repair or replace as required.
		b. Defective CV-425/U.	*b.* Check and repair or replace as required.
		c. Defective receptacle (J13 or J14) in ac power duct.	*c.* Replace receptacle.

4-8. Maintenance Adjustments

NOTE

The procedures below may only be performed during an authorized downtime. Do not perform these procedures during normal system operation because they will interrupt system service.

a. R-1467/GRC-144 IF Gain.

(1) Request the remote radio terminal or repeater operator to set the remote SA-1679/GRC to TO LOAD (TEST) and then set the local SA-1679/GRC to TO LOAD (TEST).

(2) Record the T-1054/GRC-144 and R-1467/GRC-144 operating frequencies.

(3) Operate the R-1467/GRC-144 PUSH TO TURN knobs and thumbwheel controls for 4700 Mhz.

(4) Operate the T-1054/GRC-144 PUSH TO TURN knob and thumbwheel controls for ~~4700~~ 4800 Mhz.

(5) Operate the T-1054/GRC-144 module 1A2 ON-OFF switch to ON.

(6) Operate the T-1054/GRC-144 RADIO TEST SET switch to OSC LEVEL and adjust modem 1A2 LEVEL ADJ control for a SET OSC LEVEL ADJ meter indication.

(7) Operate the T-1054/GRC-144 RADIO TEST SET OUTPUT LEVEL selector switch to low.

(8) Operate the R-1467/GRC-144 module 2A5 AGC SEL switch to TEST.

(9) Operate the R-1467/GRC-144 module 2A15A2 meter selector switch to CARRIER (IF).

(10) Remove the green cap from the R-1467/GRC-144 module 2A5 IF GAIN control.

(11) Adjust the R-1467/GRC-144 module 2A5 IF GAIN control with the tuning tool until the meter indicates 150 ± 5.

(12) Replace the green cap on the R-1467/GRC-144 module 2A5 IF GAIN control.

(13) Remove the green cap from the R-1467/GRC-144 module 2A5 AGC GAIN control.

(14) Turn the R-1467/GRC-144 module 2A5 AGC GAIN control with the tuning tool completely clockwise.

(15) Operate the R-1467/GRC-144 module 2A5 AGC SEL switch to DIV OFF.

(16) Operate the T-1054/GRC-144 module 1A2 ON-OFF switch to OFF and reset the T-1054/GRC-144 and R-1467/GRC-144 PUSH TO TURN knobs and thumbwheel controls to the original operating frequency.

(17) Operate the SA-1679/GRC switch to TO ANT (NORMAL) and request the remote radio terminal or repeater operator to set the remote SA-1679/GRC switch to TO ANT (NORMAL).

b. R-1467/GRC-144 Carrier (IF) Alarm.

(1) Perform the procedures in *a* (1) through (15) above.

(2) Remove the green cap from the R-1467/GRC-144 module 2A5 AIM SET control.

(3) Adjust the R-1467/GRC-144 module 2A5 AIM SET control with the tuning tool until the module 2A15A2 CARRIER (IF) indicator turns from green to red.

(4) Adjust the R-1467/GRC-144 module 2A5 AIM SET control until the module 2A15A2 CARRIER (IF) indicator just turns green, then turn the module 2A5 AIM SET control two complete turns counterclockwise.

(5) Replace the green cap on the R-1467/GRC-144 module 2A5 AIM SET control.

(6) Perform the procedures in *a* (16) and (17) above.

Section III. ORGANIZATIONAL REPAIR PROCEDURES

4-9. Exhaust Blower Repairs

a. Removal.

(1) Operate the BLOWERS circuit breaker on the POWER DISTRIBUTION BOX to OFF (fig. 3-1).

(2) Operate the BLOWERS switch (fig. FO-1) to OFF.

(3) Disconnect the ac power cord from the BLOWER receptacle in the ac power duct.

(4) Remove the hex head cap screws that secure the cover assembly to the box assembly (fig. 2-2).

(5) Remove the clamp assemblies and the flexible joint between the blower assembly and the box assembly.

(6) Remove the cap screws that secure the channel support assembly to the outside front wall of the assemblage.

b. Repair (fig. 4-2).

(1) Remove the defective power cord, blower motor, or capacitor.

(2) Refer to figure 4-2 to determine the correct connections for the required motor rotation and the required positioning of the impeller. Be sure that the concave portion of the impeller faces the airflow hole as indicated.

c. Replacement.

(1) Position the channel support assembly (fig. 2-2) against the outside front wall of the assemblage and secure it with the cap screws.

(2) Install the flexible joint and clamp assemblies and secure them in the blower assembly and the box assembly.

(3) Position the cover assembly on the box assembly and secure it with the hex cap screws.

(4) Connect the ac power cord to the BLOWER receptacle in the ac power duct.

4-10. Power Distribution Box Repairs

(fig. 4-3)

WARNING

Before performing any POWER DISTRIBUTION BOX repairs, disconnect the power cable from the POWER 115 VAC IN receptacle in the POWER ENTRANCE BOX.

a. Preliminary Procedures. Loosen the screws on the hinged cover of the POWER DISTRIBUTION BOX and open the cover.

b. Remove and Replacement of Circuit Breaker.

(1) Grasp the defective circuit breaker and pull it straight out of the panel.

(2) Disconnect the wires connected to the circuit breaker.

(3) Connect the wires to the appropriate terminals of the replacement circuit breaker.

(4) Position the circuit breaker in the POWER DISTRIBUTION BOX and firmly press it in place.

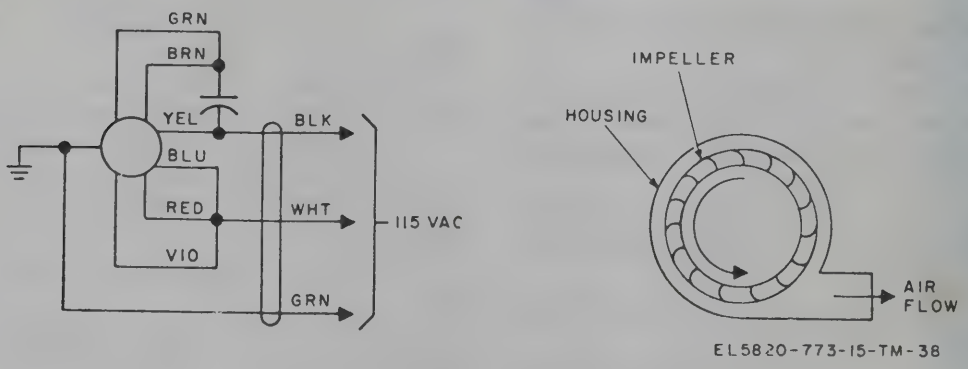


Figure 4-2. Blower Motor connection and impeller installation diagram.

c. Removal and Replacement of Current Transformer.

(1) Note and disconnect the black and white leads from the transformer terminals.

(2) Remove the nuts and washers that secure the current transformer inside the box and remove the current transformer.

NOTE

Count the number of turns of heavy black wire through the center hole of the current transformer before proceeding to the next step.

(3) Disconnect the black wire that is wound around the current transformer from the MAIN circuit breaker and carefully unwind the wire.

CAUTION

Be sure that the number of turns around the replacement current transformer is the same as that on the original transformer.

(4) Wind the black wire around the replacement current transformer.

(5) Reconnect the black wire to the MAIN circuit breaker.

(6) Position the current transformer inside the box and secure it with the original nuts and washer.

(7) Connect the black and white ammeter leads to the appropriate terminals of the transformer.

d. Removal and Replacement of Meters.

(1) Note the color and polarity of connections and remove the leads from the meter terminals.

(2) Remove the bolts that secure the meter to the hinged panel and pull the meter out of the panel.

(3) Position the replacement meter in the panel and secure it with the original bolts.

(4) Connect the leads to the appropriate terminals of the replacement meter.

4–11. Heater Repairs

a. Disconnect the ac power cord from the HEATER receptacle in the ac power duct.

b. Remove the heater from its mounting base.

c. Remove the cover plates to provide access to the interior.

d. Refer to the heater instruction plates for circuit details and identification of heater parts and replace defective parts as authorized.

4–12. Replacement of Power Connectors and Receptacles

a. Power Receptacle.

(1) Disconnect the ac power cable from the POWER 115 VAC IN receptacle in the POWER ENTRANCE BOX.

(2) Remove the rear cover from the POWER ENTRANCE BOX.

(3) Disconnect the wires from the defective receptacle and remove the receptacle.

(4) Install the replacement receptacle, connect the wires, and replace the rear cover on the POWER ENTRANCE BOX.

b. Power Connectors. Refer to figures 4–4 and 4–5 for details of removal and replacement.

4–13. Control Indicator Repairs

a. Serial No.'s 1 Through 25. Refer to the schematic diagram (fig. 4–6) to troubleshoot the control indicator, and the wiring diagram (fig. 4–7) for the location and replacement of parts.

b. Serial No.'s 26 and Above. Refer to the schematic diagram (fig. 4–8) to troubleshoot the control indicator, and the wiring diagram (fig. FO–4) for the location and replacement of parts.

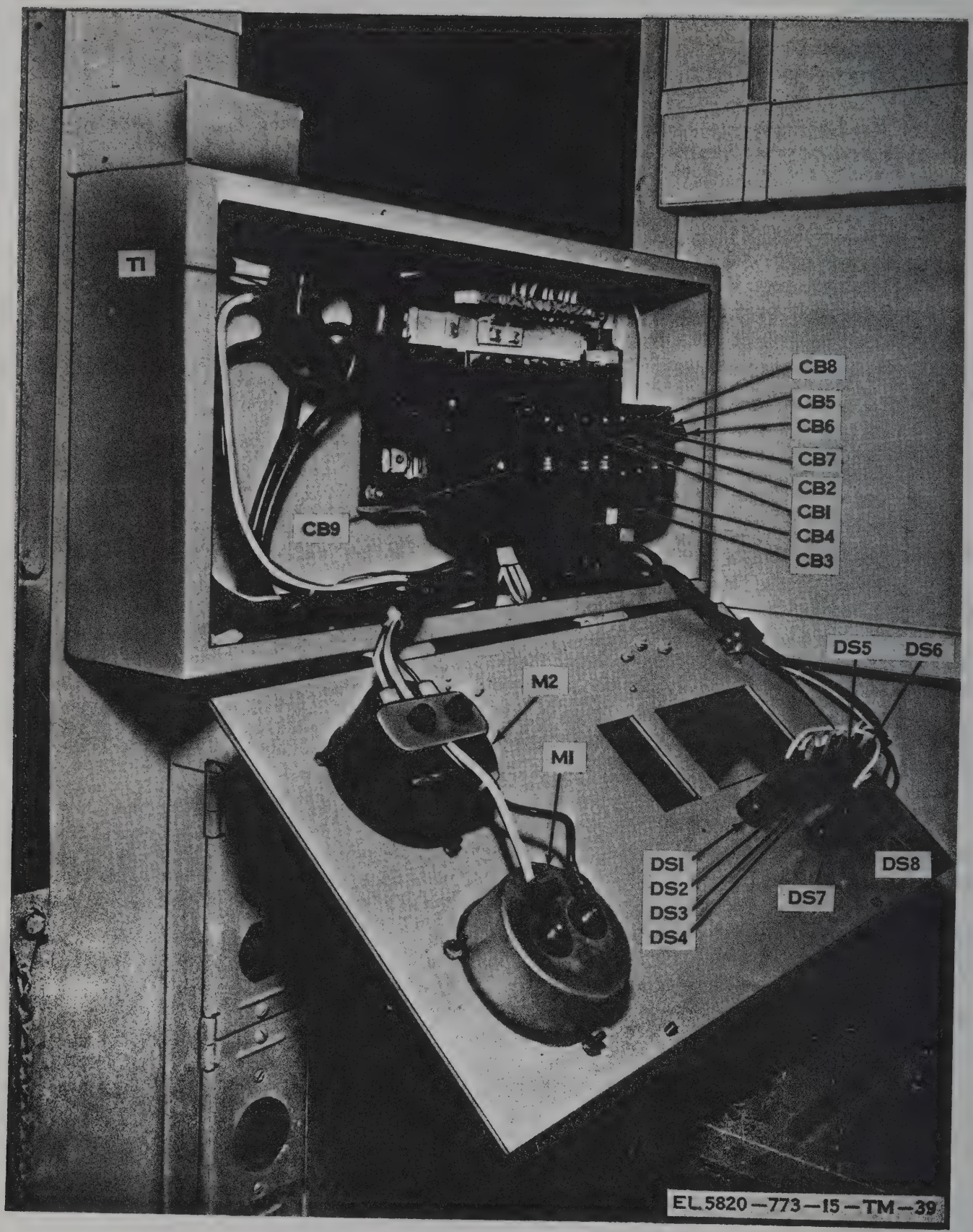
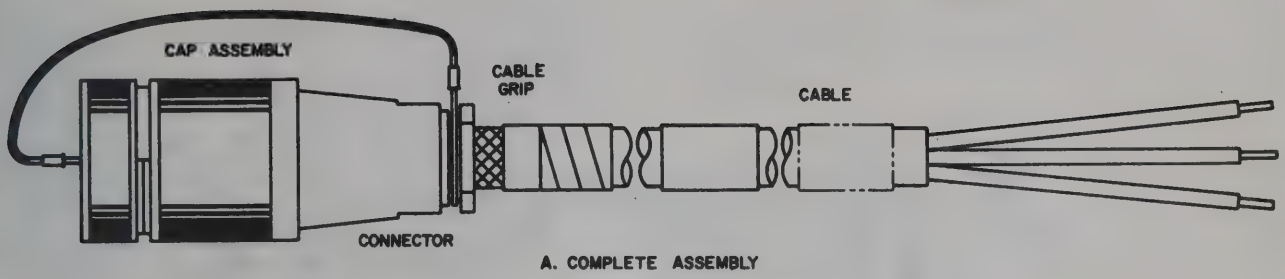
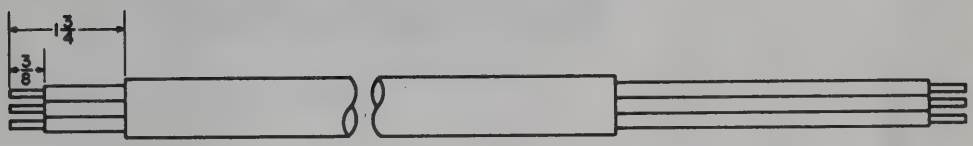


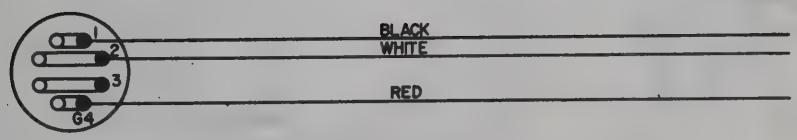
Figure 4-3. POWER DISTRIBUTION BOX, parts location diagram.



A. COMPLETE ASSEMBLY



B. CABLE PREPARATION DETAILS



C. WIRING DIAGRAM



D. PIN END VIEW OF CONNECTOR



E. REAR VIEW OF CONNECTOR

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Figure 4-4. Power cable repair details.

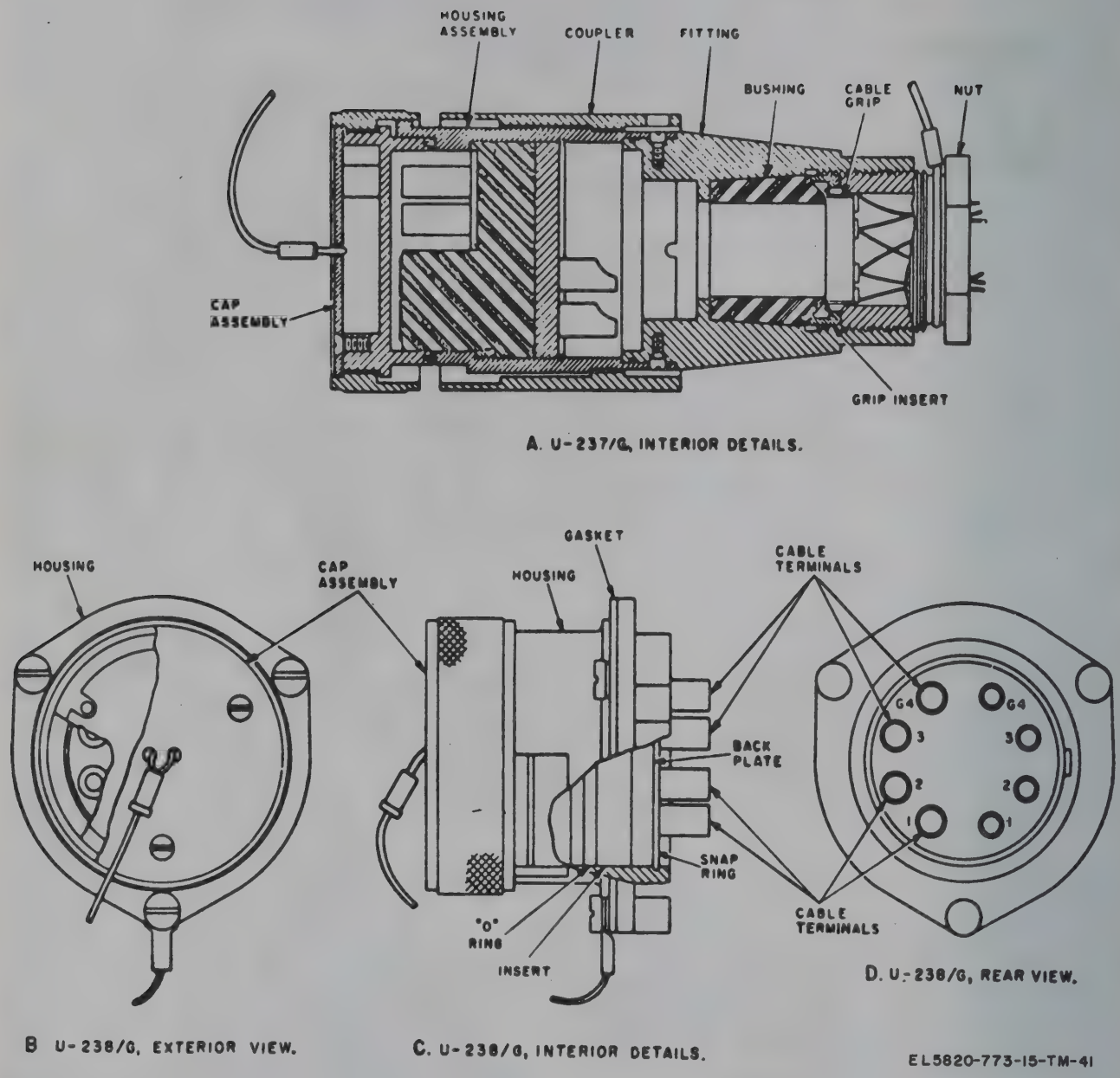
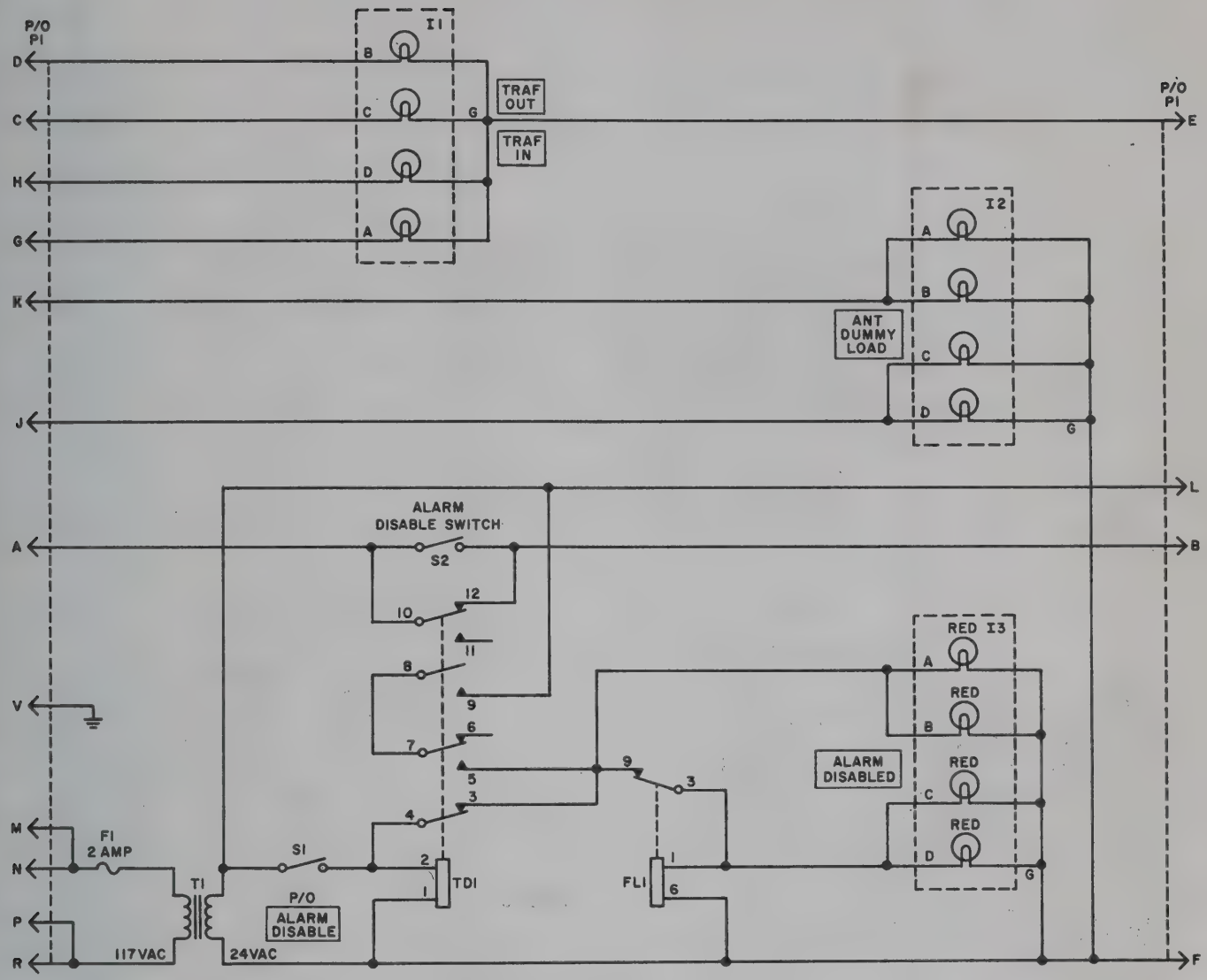
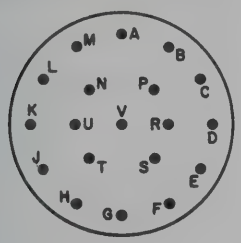


Figure 4–5. Power cable connector and power receptacle assembly details.



NOTES:
1. ▭ INDICATES EQUIPMENT MARKING.
2. CONNECTOR P1 AS FOLLOWS:



EL5820-773-15-TM-42

Figure 4-6. Control indicator, schematic diagram (serial No.'s 1 through 25).

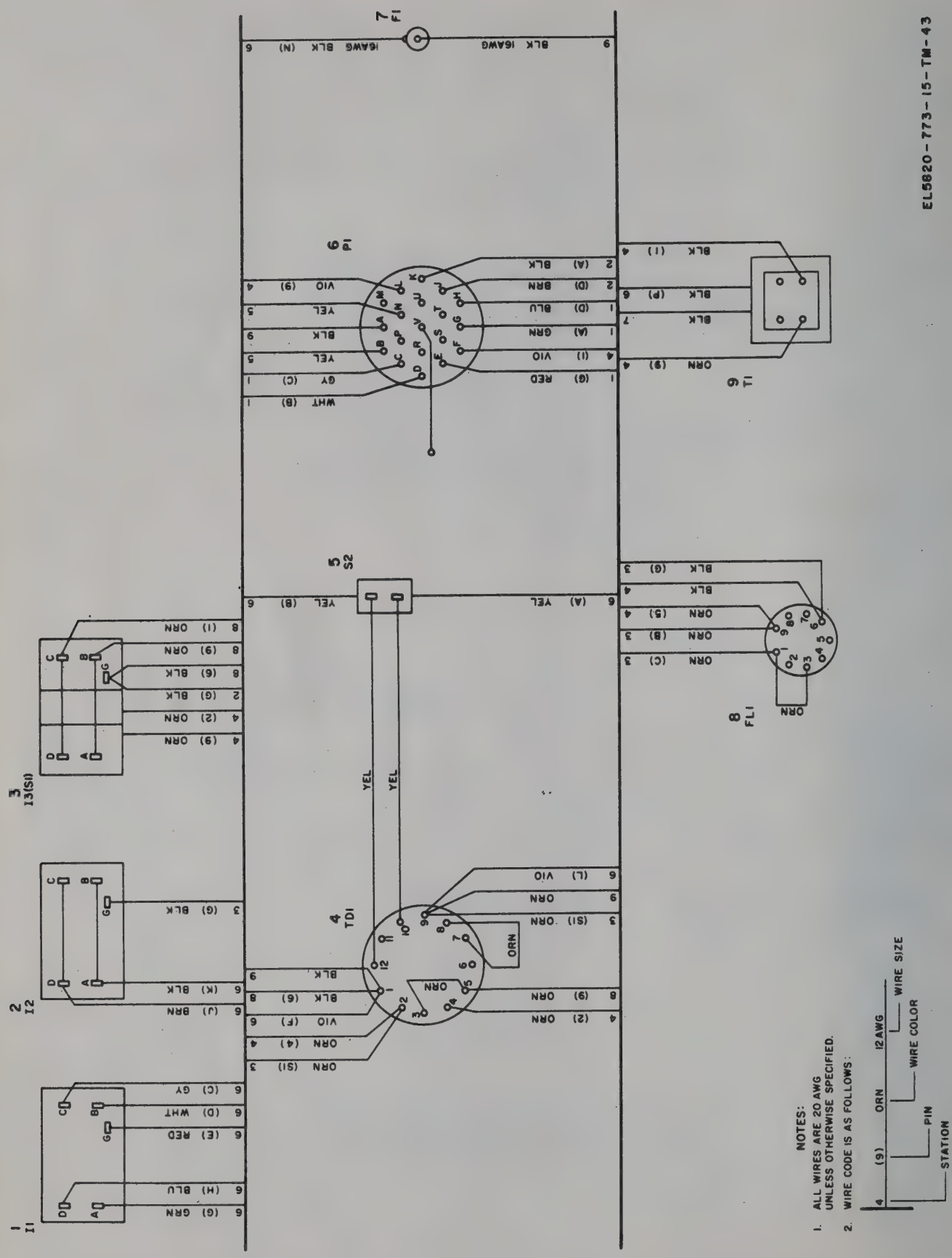
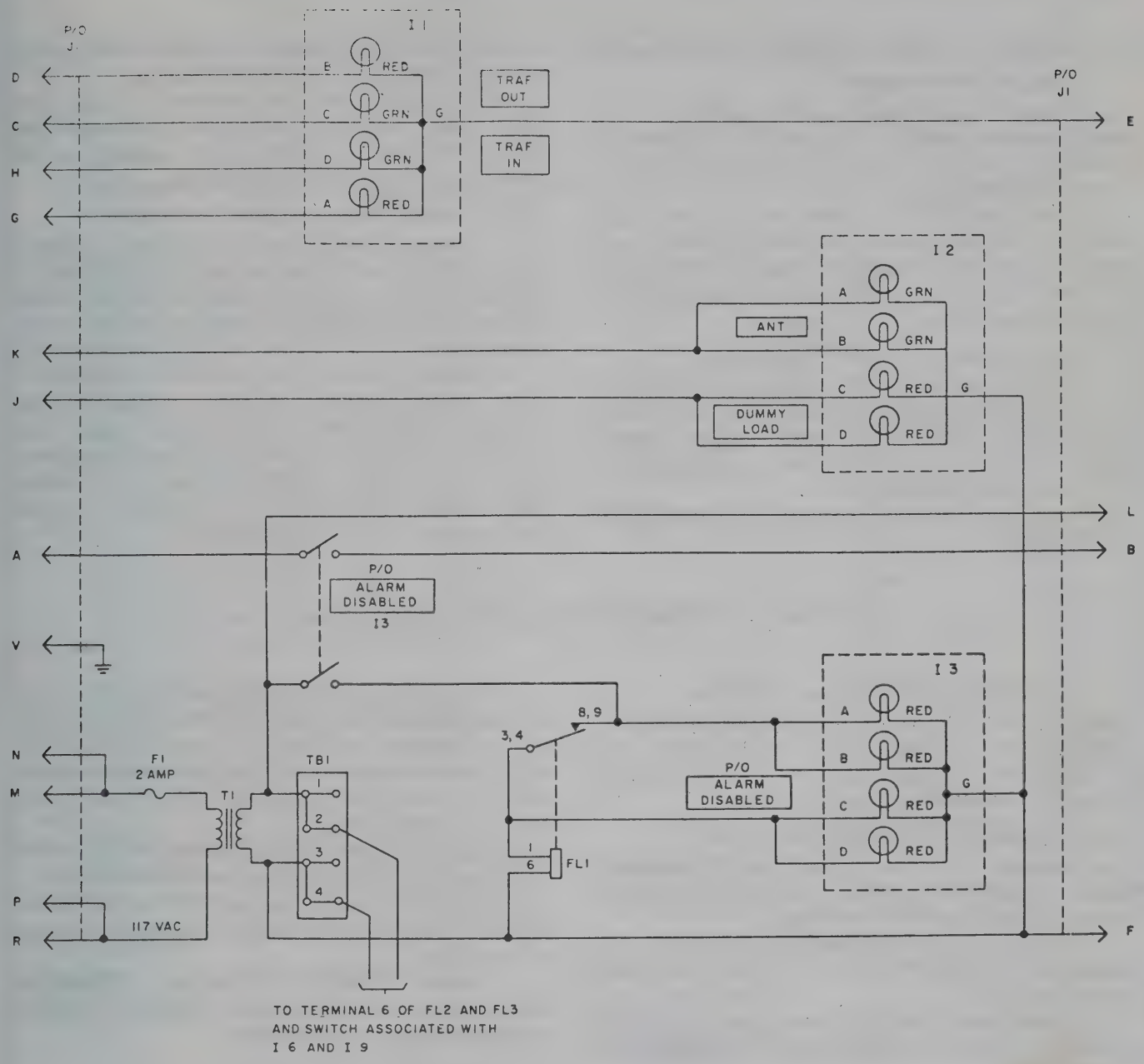


Figure 4-7. Control indicator, wiring diagram (serial No.'s 1 through 25).



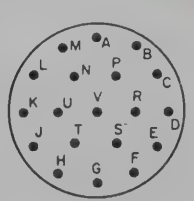
NOTES:

1. ▭ INDICATES EQUIPMENT MARKING

2. ONLY SYSTEM 1 CIRCUITS SHOWN. SYSTEM 2 AND 3 CIRCUITS ARE IDENTICAL EXCEPT FOR REFERENCE DESIGNATIONS LISTED BELOW:

SYSTEM		
1	2	3
I 1	I 4	I 7
I 2	I 5	I 8
I 3	I 6	I 9
S 1	S 2	S 3
FL1	FL2	FL3
J1	J2	J3

3. CONNECTOR P1 AS FOLLOWS:



EL5820-773-15-TM-44

Figure 4-8. Control indicator, schematic diagram (serial No's 26 and above.)

Section IV. DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

4-14. Scope of Direct Support and General Support Maintenance

a. General. Direct and general support maintenance consists entirely of corrective maintenance procedures as indicated in the maintenance allocation chart (app B).

b. Tools and Test Equipment Required. The tools and test equipment required for direct and general support maintenance of the AN/TRC-138 are listed in section III of the maintenance allocation chart (app B).

4-15. Direct Support Repair Procedures

a. Communications Equipment Repair. Refer to the applicable technical manual (app A) for instructions in performing direct support maintenance of the AN/GRC-144, LS-147C/FI, CV-425/U. and TA-312/PT.

b. Shelter, Electrical Equipment S-393/TRC-138 Repairs.

(1) Emergency repair of holes and minor structural damage to the shelter facility.

(2) Removal and replacement of the door handle and latchbolt assemblies, entrance door filter, and cover assemblies and gaskets for the blower vents and the entrance boxes.

4-16. General Support Repair Procedures

a. Communications Equipment Repair. Refer to the applicable technical manual (app A) for instructions on performing general support maintenance on the communications equipment in the assemblage.

b. Shelter, Electrical Equipment S-393/TRC-138 Repairs. Repair of the S-393/TRC-138 includes replacement of doors and skids, and permanent repair of holes and major structural damage to the shelter facility. Refer to TB 750-240 for further information on general support maintenance of the shelter facility.

Section V. ADMINISTRATIVE STORAGE

4-17. Definition of Administrative Storage

Administrative storage is the short-term storage of equipment for a period of 1 to 45 days. The AN/TRC-138 is prepared for administrative storage as outlined in paragraph 4-18.

4-18. Administrative Storage Procedures

a. Perform complete preventive maintenance checks and services (para 4-2 through 4-4) before placing the equipment into storage.

b. Remove dry cell batteries from the clock, the telephones TA-312/PT (fig. 1-7). and the hand lantern (fig. 1-8).

c. Disassemble the equipment (para 3-8) and pack the equipment that fits into the shelter in the shelter.

d. Wrap the equipment that is normally stowed on the generator set (fig. 1-9) in moisture proof plastic wrappers and place in a wooden crate or a sturdy cardboard carton. (The generator and trailer although used with the AN/TRC-138 are not a part of this equipment).

e. Place shock absorbing material at all corners of the packing containers and seal the containers.

f. Close all the doors and all vents on the shelter and lock the back door. Seal all openings and vents on the shelter.

g. Perform complete preventive maintenance checks and services (para 4-2 through 4-4) before placing equipment into service.

CHAPTER 5

MATERIAL USED IN CONJUNCTION WITH AN/TRC-138

Section I. RADIO SET AN/VRC-46 WITH POWER SUPPLY PP-2953/U

5-1. Purpose and Use

a. Purpose. Radio Set AN/VRC-46 provides short range, two-way, radio-telephone communication in 30.00 to 75.95 MHz range, using frequency-modulated (fm) transmission and reception.

b. Use. The use of the AN/VRC-46 is determined by the commander, however the AN/VRC-46 can be used to provide backup order wire communications when the AN/TRC-138 is being relocated, or its antenna reoriented.

5-2. Technical Characteristics

a. Receiver-Transmitter, Radio RT-524(*)/VRC. (Official nomenclature followed by (*) indicates all models of the equipment.)

(1) *General.*

Type of modulation	Frequency modulation (fm).
Frequency range	From 30.00 to 75.95 MHz at 0.05-MHz intervals.
Frequency stability	± 3 kHz of selected frequency.
Number of frequency settings	920 settings.
Tuning facility	Manual tuning and 10 frequencies can be set up for automatic pushbutton tuning which can also be selected automatically by C-2742/VRC connected to RT-246(*)/VRC.
Antenna receptacle impedance	50 ohms; BNC receptacle
Control of matching networks in antenna	Tuning receiver-transmitter also automatically selects proper matching networks in antenna (*c* below).
Operating conditions	Push-to-talk and release to receive.
Modes of operation	Voice (radiotelephone), retransmission (radio relay), and X-mode.
X-mode operation	Provides facility for digital data and secure voice communication.
Audio response capability:	
Narrow band (usual mode of operation)	500 to 3,000 Hz.
Wide band	500 to 20,000 Hz.
Audio input and output control facilities	Five-pin panel receptacles; rear-mounted receptacle for remote control by radio-intercom system and C-2999/VRC; X-mode operation facility.
Operating power	22 to 30 volts dc.
Used in	Vehicles provided with 24-volt battery system.

(2) *Transmitting features.*

Output RF power (into ideal 50-ohm antenna)	
Low power	0.5 to 8 watts with 25 volts dc operating power; 0.5 to 10 watts with 30 volts dc operating power.
High power	35 watts minimum with 25 volts dc operating power.
Transmission distance (using whip antenna)	Approximately 5 miles (8 kilometer (km)) on low power; approximately 25 miles (41 km) on high power.
Carrier deviation	Audio input of 2.8 millivolts produces RF carrier deviation of 8 ±2kHz.
Squelch tone signal	150 Hz ±3; transmitted on all settings of SQUELCH switch except OLD ON position.
Audio input impedance	150-ohm microphone; 600 ohms for X-mode operation.
Duty cycle	Capable of operating continuously in high power in 120-degree ambient temperature with input power of 22 volts dc; and for one hour with input power of 30 volts dc.
Power drain:	
Using low power	3 amperes at 25 volts dc.
Using high power	10 amperes at 25 volts dc.

(3) *Receiving functions.*

RF signal sensitivity	0.1 microvolt, minimum
Audio output impedance (nominal)	
External loudspeaker	160 ohms.
Headphone	150 ohms.
To radio-intercom system	1,8000 ohms.
X-mode	600 ohms.
Squelch types:	
Carrier (operative in OLD SQUELCH)	Responsive to carrier noise (approximately 7,300 Hz).
Tone (operative in NEW SQUELCH)	Responsive to 150-Hz squelch tone signal.
Power drain	0.75 ampere at 25 volts dc.

b. Antenna AS-1729/VRC.

Frequency range	30.00 to 76.00 MHz
RF transmission power capability	70 watts maximum
Antenna type	Vertically polarized omnidirectional whip antenna.

Radio receptacle impedance ..... 50 ohms, BNC type receptacle.
Frequency matching networks ..... 10 sets that can be selected automatically by tuning controls of receiver-transmitter.

c. Power Supply PP-2953/U.

Power input requirements ..... 115 v ac, 50-60 cps at 4 amperes (max); 115 v ac, 400 cps, 4 amperes (max); 230 v ac, 50-60 cps, at 2 amperes (max).
Voltage output ..... 22.7 to 27.7 v dc.
Current output ..... 10 amperes (max).
Operating humidity .... Continuous operation in 97% humidity. Capable of operation in 100% humidity up to 4 hours.
Operating temperature . -40 degrees C to +66 degrees C (-40 degrees F to +150 degrees F).
Operating elevation .... Up to 10,000 feet above sea level.

5-3. Items That Make Up An Operable Radio Set AN/VRC-46.

NSN	*Item*	Quantity	Dimensions (in.) Height	Depth	Width	Weight (lb)	Figure
5995-00-823-2987	Cable Assembly CG-1773B/U	1	48 long			1	
5995-00-985-7900	Cable Assembly CX-4524/U	1	72 long			6	1-5
5995-00-823-2770	Cable Assembly CX-4721/VRC	1	36 long			1	
5995-00-491-7107	Cable Assembly, Special Purpose, Electrical CX-4722A/VRC	1	48 long			1	1-5
5985-00-985-9024	Antenna AS-1729/VRC	1	116 7/8 long			10	5-1
6130-00-985-7899	Power Supply PP-2953/U	1	6½	14½	14½	40	5-2
5820-00-892-0622	Receiver-Transmitter RT-524(*)/VRC	1	6¾	13 3/8	15 3/8	51	5-3
5820-00-893-1323	Mounting MT-1029/VRC Handset [a]	1 1	5	13 ½	15 7/8	17.5	5-4

[a] Item to be used will be authorized by Table of Organization and Equipment (TO&E).

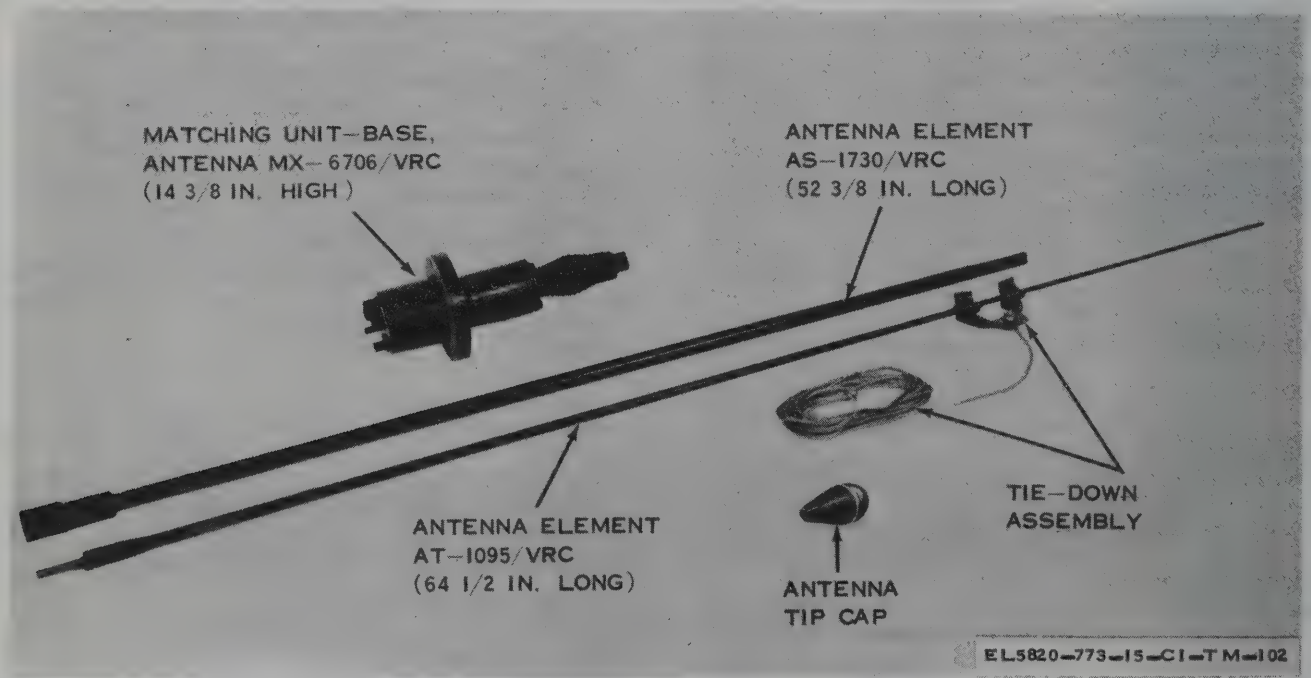


Figure 5-1. Antenna AS-1729/VRC parts identification.

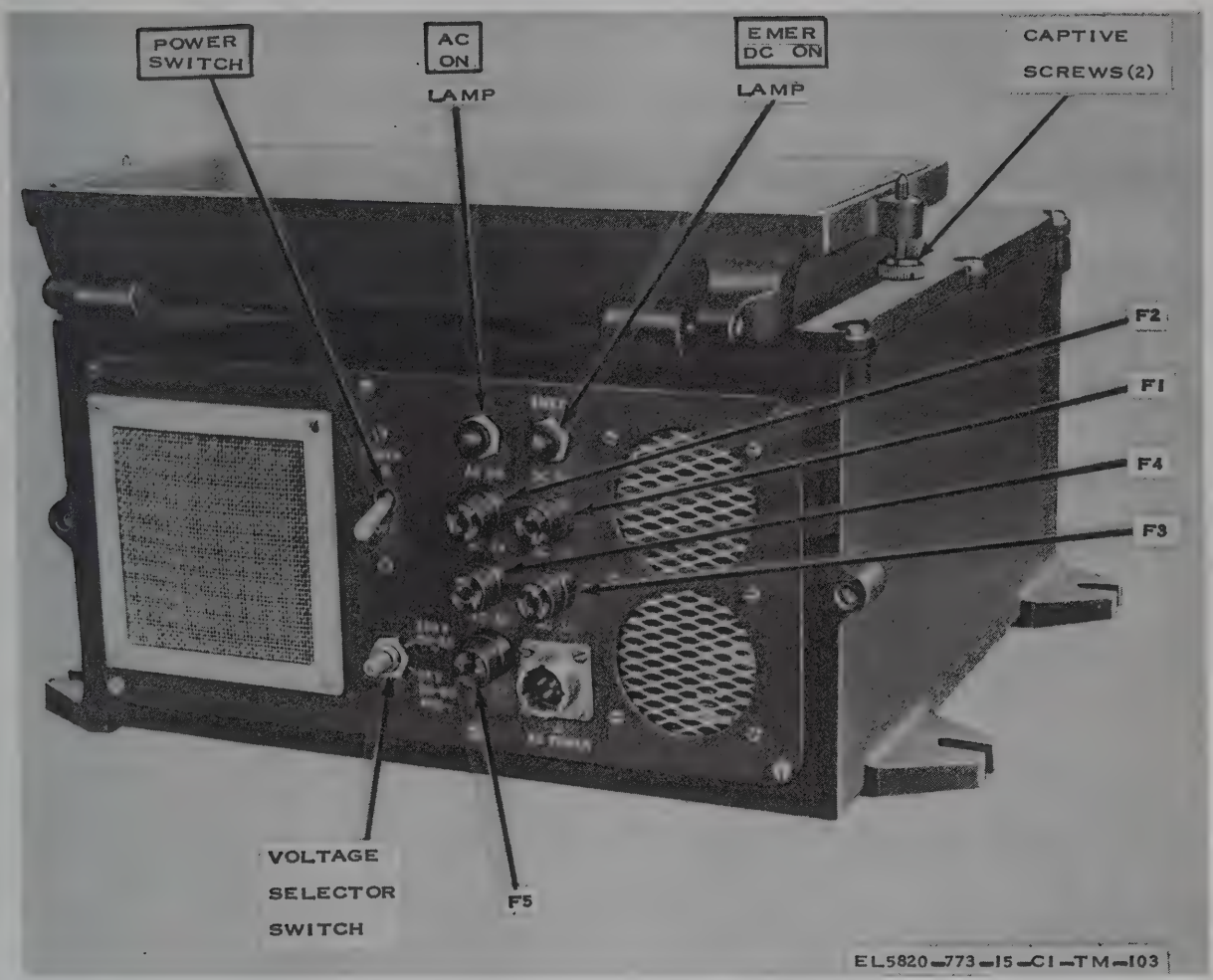
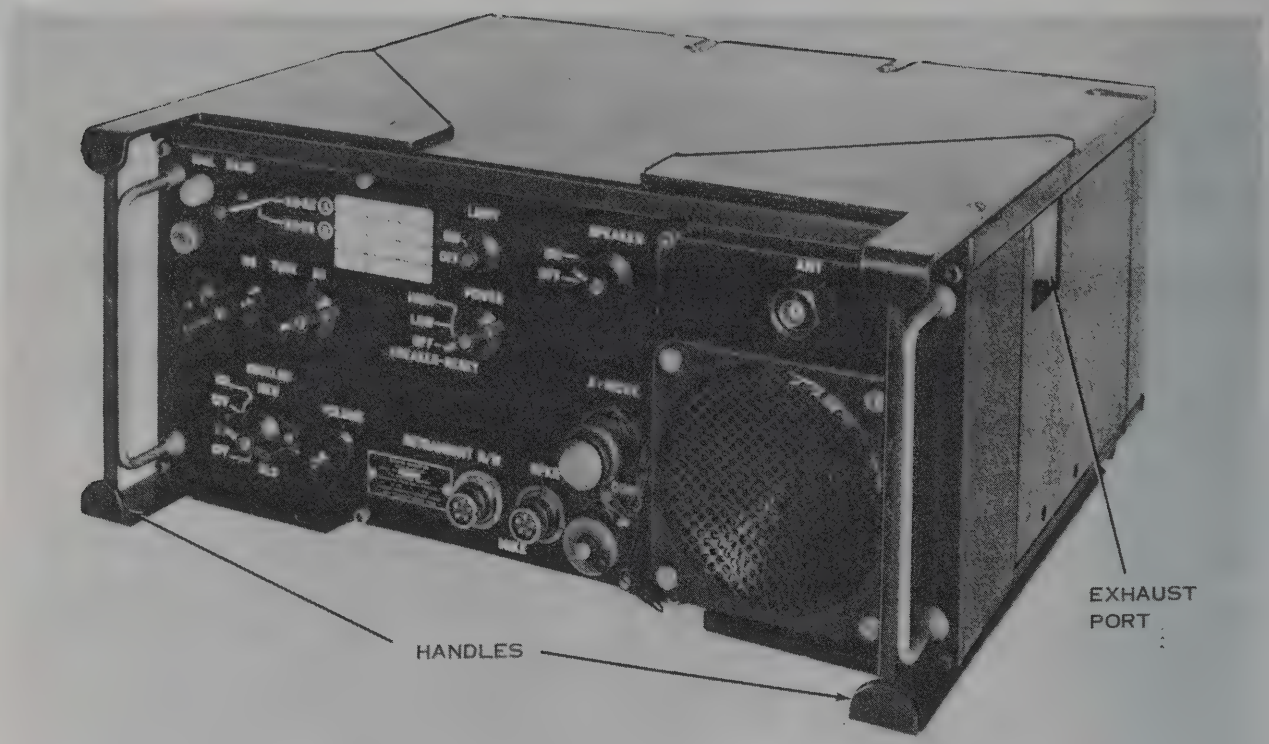
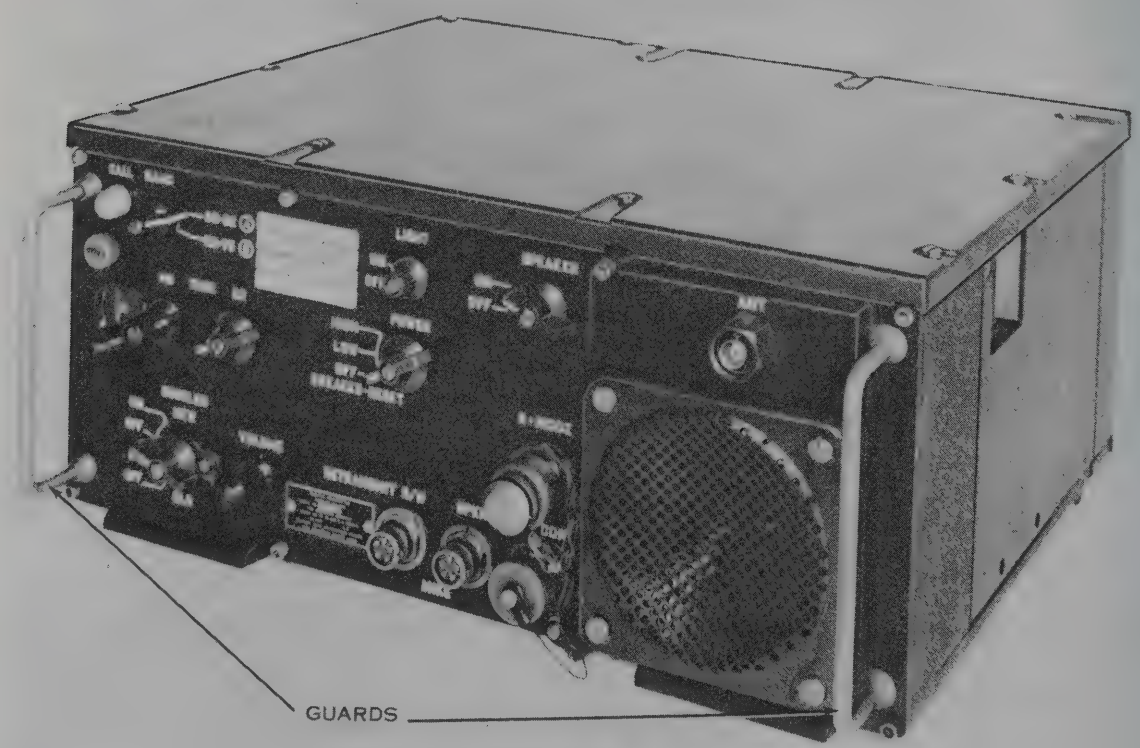


Figure 5–2. Power Supply PP–2953/U, front panel controls and indicators.



A. RECEIVER-TRANSMITTER, RADIO RT-524/VRC.



B. RECEIVER-TRANSMITTER, RADIO RT-524A/VRC.

EL5820-773-15-C1-TM-100

Figure 5-3. Receiver-Transmitters, Radio RT-524/VRC and RT-524A/VRC, front views.

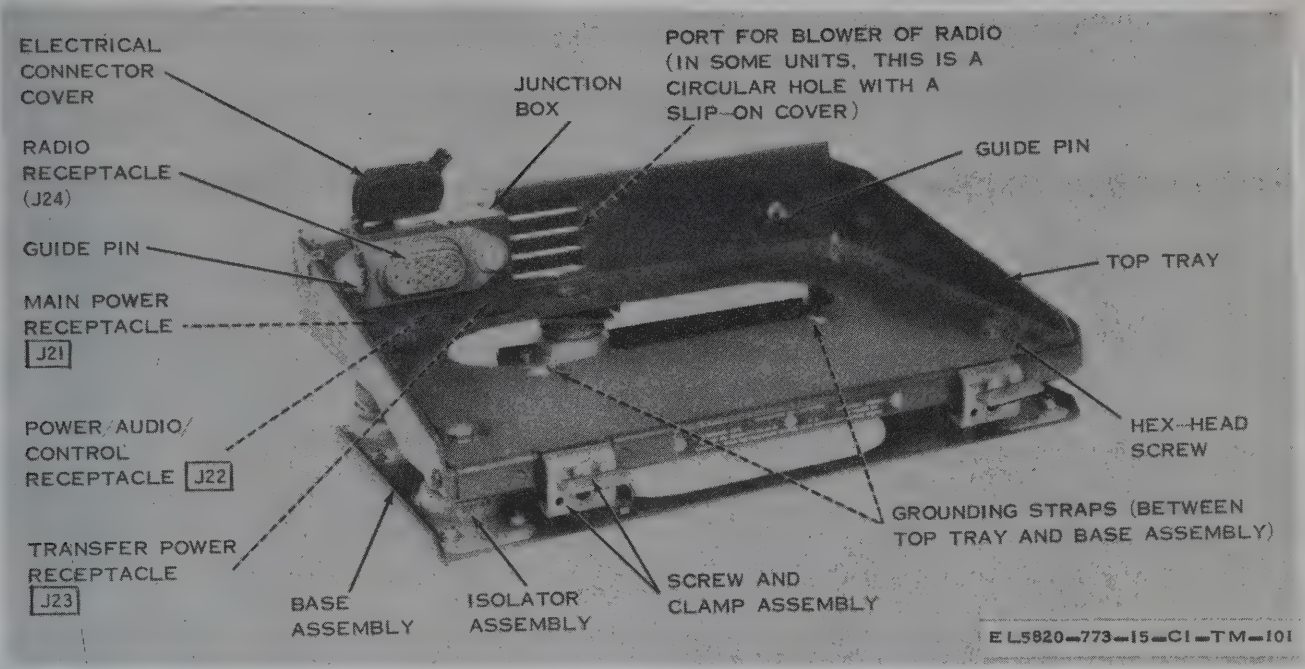


Figure 5-4. Mounting MT-1029/VRC parts identification.

NOTE

For a more detailed description of Radio Set AN/VRC-46, refer to TM 11-5820-401-12.

5-4. General Handling Procedures for AN/VRC-46.

WARNING

The receiver-transmitters are compact and heavy (over 50 pounds). Extreme care should be exercised in handling them in order to protect personnel from serious injury and the equipment from damage. Accordingly, observe the proper handling procedures (*a* through *f* below).

CAUTION

Before installing the radio in or removing it from the radio mount, turn off the radio power switches in AN/TRC-138. This also applies to the power switches of the receiver-transmitter in AN/VRC-46.

a. Make sure the MT-1029/VRC clamp assemblies are locked to hold the receiver-transmitter securely in the radio mount while the vehicle is in motion. To prevent the clamps from coming loose, a safety wire may be tied between the hole in the butterfly of the screw and the plate of one of the screw and clamp assemblies. Refer to figure 5-4.

b. When pulling the receiver-transmitter from the MT-1029/VRC, grasp both guards (or handles) to pull the unit from the radio mount, *and continue to use both hands to lift and carry the unit.* NEVER CARRY OR LIFT THE RECEIVER-TRANSMITTER BY ONLY ONE OF THE GUARDS (OR HANDLES).

c. When shipping the receiver-transmitter, tie or brace the unit in the transport unit in such a way that it will not change position due to the motion of the transport unit. This precaution is required in order to prevent damage to the guards (or handles) and the front panel or controls.

d. Do not set the receiver-transmitter up on its rear. The blower in the rear could be damaged by such objects as stones, pieces of metal or mud lying on the ground or floor.

e. When the receiver-transmitter is removed from the MT-1029/VRC, put the electrical connector cover on the radio receptacle of the MT-1029/VRC (fig. 5-4) to protect the receptacle pin jacks from the effects of the weather and dirt.

f. Before pushing the receiver-transmitter back on the MT-1029/VRC, clean the top surfaces of the MT-1029/VRC and remove the electrical connector cover from the radio receptacle of the MT-1029/VRC. If the receiver-transmitter is jammed against the radio receptacle while the

cover is installed on the radio receptacle, the pins in the receiver-transmitter receptacle can be damaged.

WARNING

During installation of this equipment conform to all safety requirements set forth in TB SIG 291. Injury or DEATH can result from failure to comply with safe practices.

5-5. Installlation and Removal Procedure for Radio Set AN/VRC-46 in Radio Repeater Set AN/TRC-138.

a. In order to install the Power Supply PP-2953/U, the upper shelf assembly that will support the RT-524A/VRC (fig. 1-5) must first be removed. Remove the upper shelf assembly as outlined in (1) and (2) below:

(1) Remove the four screws and eight nuts and washers that secure the support between the upper and lower shelf. The technical manual holder (fig. 1-5) is fastened to this support.

(2) Disconnect the shelf assembly for the RT-524/VRC from the forward wall of the shelter by removing the eight screws, flat washers and lockwashers from the rivnuts and remove shelf assembly.

b. Install Power Supply PP-2953/U (fig. 5-2) to shelf assembly as outlined in (1) and (2) below:

(1) Open the front cover of the power supply by loosening the two captive screws on the front cover.

(2) Use the four self locking nuts and flat round washers provided and secure the power supply to the lower shelf assembly.

c. Install Receiver-Transmitter RT-524/VRC (fig. 5-3) as outlined in (1), (2), and (3) below:

(1) Use the eight screws, flat washers and lockwashers removed in *a*(2) above and secure the upper shelf assembly back on the upper forward wall of the shelter.

CAUTION

If Cable CX-4720/VRC, that is used for obtaining power from a vehicle battery is connected to Mounting MT-1029/VRC (fig. 5-4), the cable must be removed in order to prevent shorting out the power supply by accidentally shorting out this cable. This cable is not used on this installation. Refer to TM 11-5820-401-12.

(2) Attach Cable Assembly CX-4721/VRC to J23 (fig. 5-4) of Mounting MT-1029/VRC.

(3) Use five hex head screws, flat round washers and self locking nuts and secure the mounting to the upper shelf assembly that will support the RT-524/VRC. This assembly was removed in *a* above.

(4) Connect Cable Assembly CX-4721/VRC to J3 POWER OUT jack (fig. 5-5) on rear of Power Supply PP-2953/U.

(5) Use the four screws, eight nuts and washers removed in *a*(1) above and secure the shelf support assembly between the upper and lower shelf assembly.

(6) Install Cable Assembly CX-4524/U into the three cradles fastened to the forward wall of the shelter over the operator's bench and secure in place with three clips.

(7) Lift the RT-524/VRC, set it on the MT-1029/VRC and push it to the back of the mounting. Tighten the mouting screw and clamp assemblies (fig. 5-2) and lock the receiver-transmitter on the mounting.

(8) Connect Cable Assembly CX-4524/U to AC POWER jack J1 (fig. 5-4) on the power supply and to the shelter receptacle marked PP-2953/U (fig. 1-7).

NOTE

Paragraph *d* blow applies only to shelters bearing serial numbers 1 through 25. Refer to paragraph *d* when installing AN/VRC-46 radios in these shelters, in order to provide access to Antenna Matching Unit-Base MX-6707/VRC cable connectors. While preparing shelters bearing serial numbers 26 and up, disregard paragraph *d* and proceed to paragraph *e* below.

d. Remove roadside control indicator box assembly by disconnecting power cable and by removing four each ½-inch wingnuts and washers.

e. Install antenna box (fig. 5-7) and Antenna AS-1729/VRC as outlined in (1), (2), and (3) below:

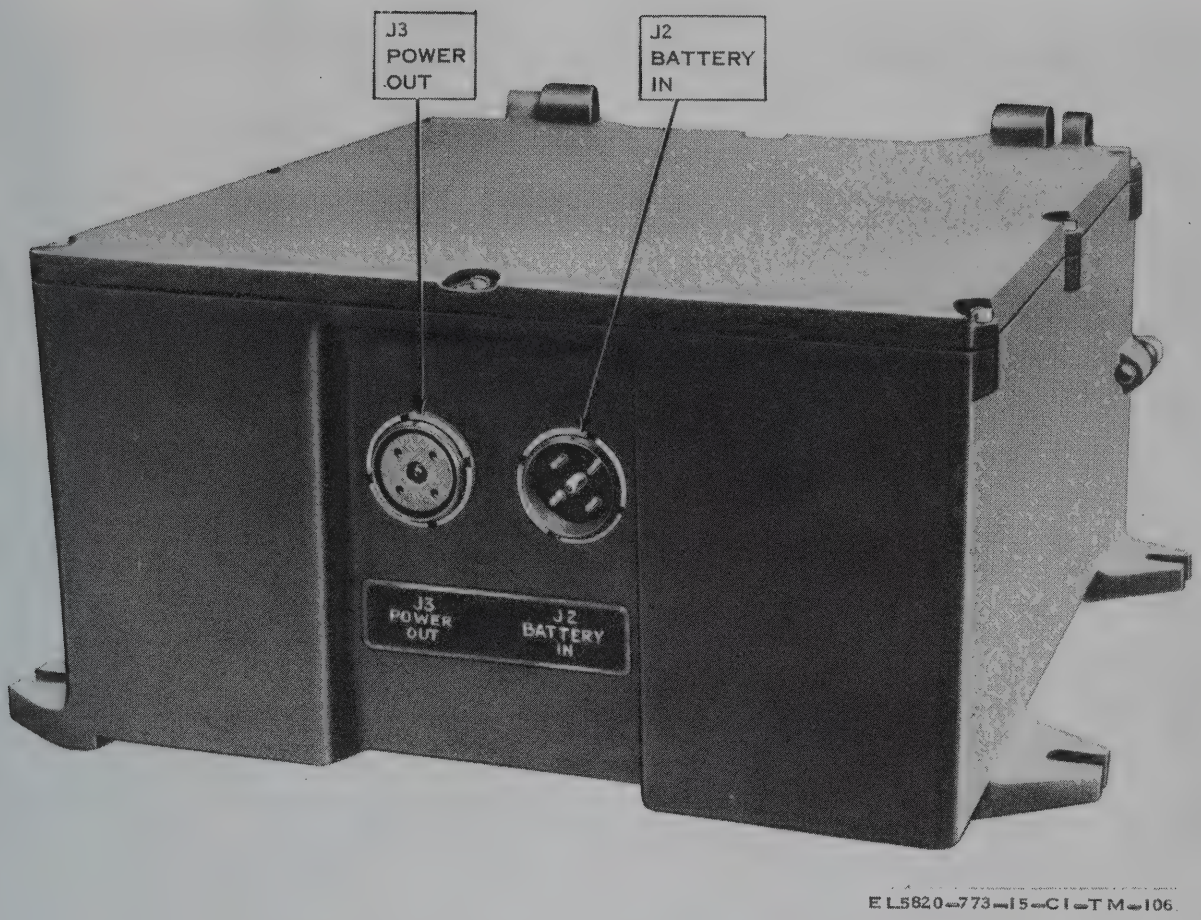


Figure 5–5. Power Supply PP–2953/U, dc output and emergency dc input connectors.

(1) Remove the antenna opening cover (fig. 5–6) from the shelter, by removing the 12 nuts and washers. Place the cover in one of the drawers of the shelter.

(2) Assemble Antenna Base MX–6707/VRC (fig. 5–7) to the antenna box as follows:

(*a*) Install antenna base gasket (fig. 5–8, NSN 5330–00–078–4184) between antenna base and antenna box.

(*b*) Use four screws (hex head 3/8–16 1–3.4 inch long), washers, (flat round 3/8 inch) and nuts (self-locking 3/8–16) and secure antenna base onto the antenna box.

(3) Mount the antenna box to the shelter as outlined in (*a*) and (*b*) below:

(*a*) Install antenna box gasket (fig. 5–9) between antenna box and the shelter plate assembly that surrounds the antenna opening.

(*b*) Use the 12 nuts and washers removed in (1) above and secure the antenna box to the plate assembly on shelter.

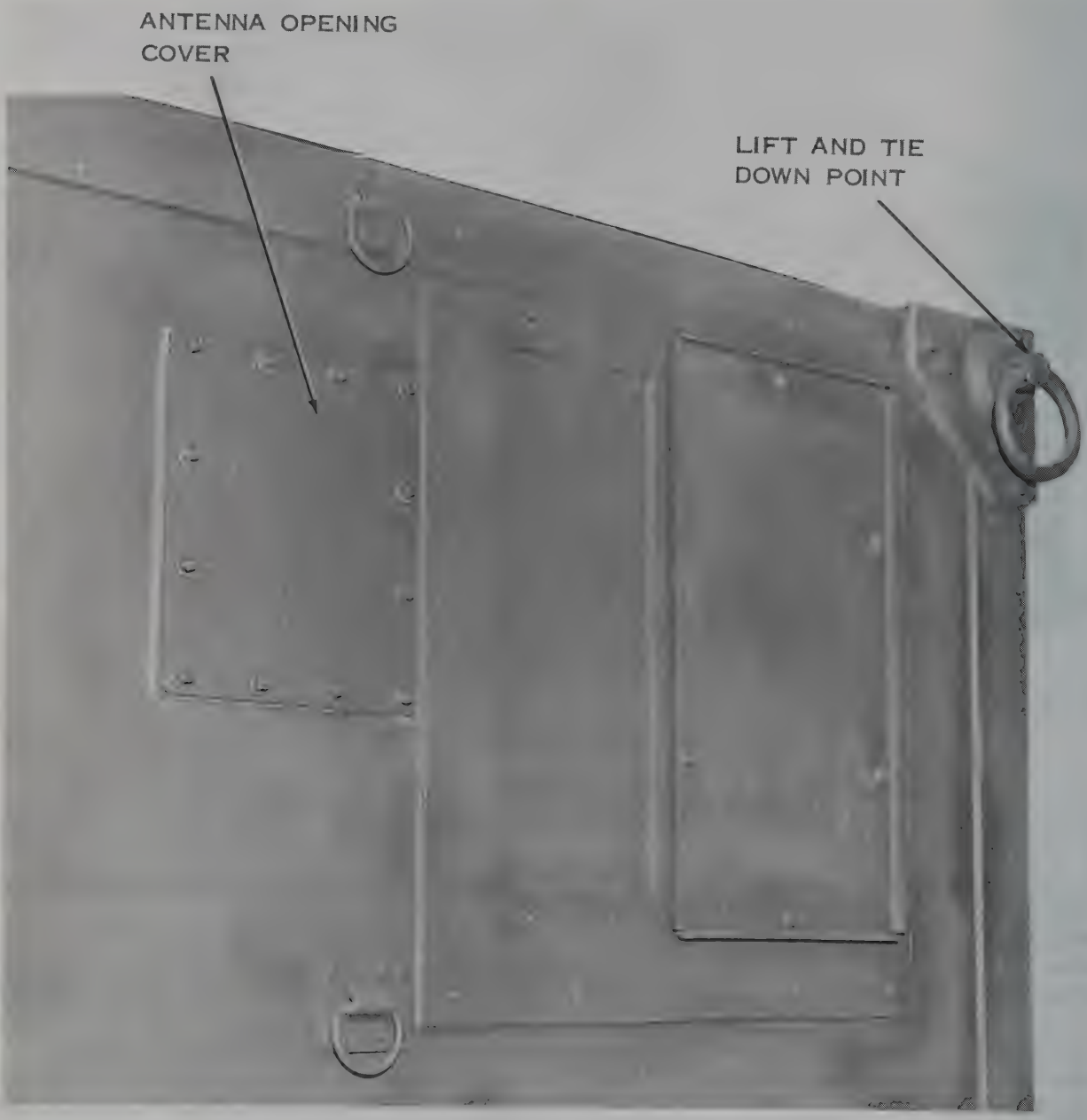


Figure 5–6. Antenna opening cover.

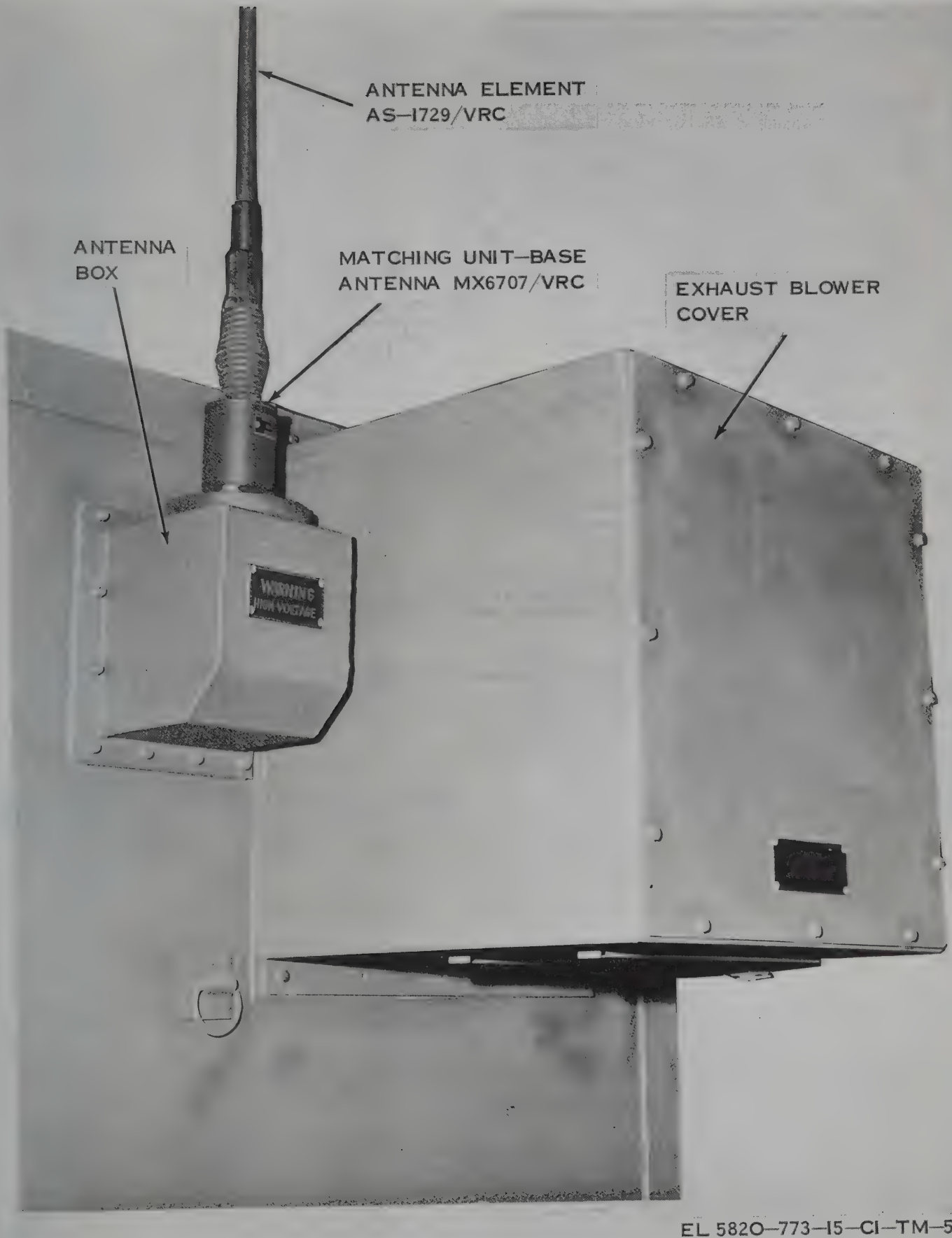
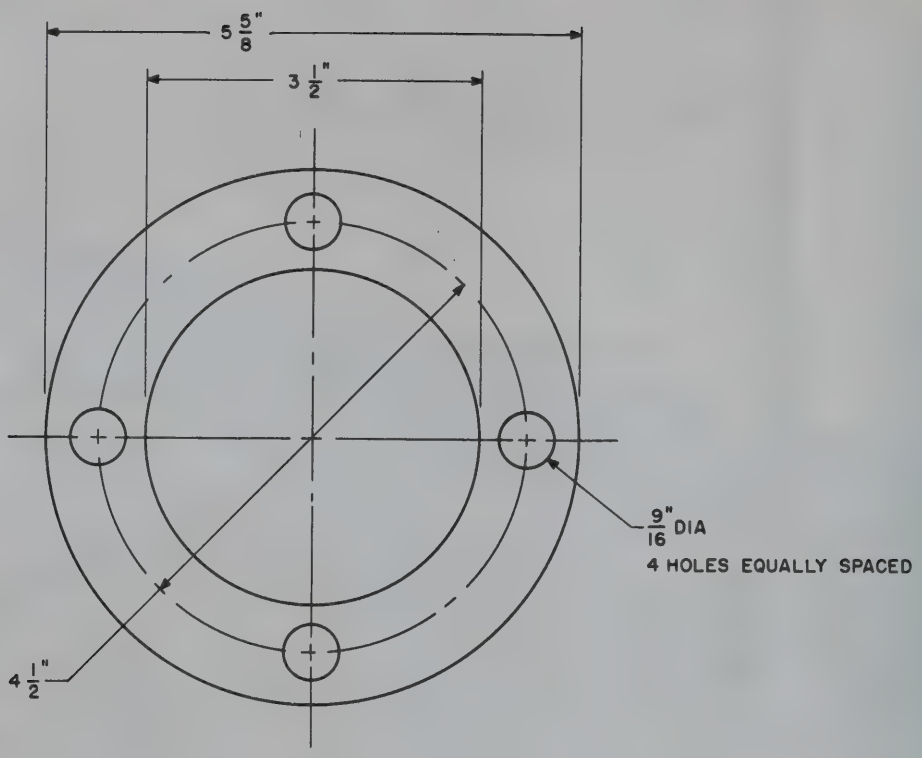


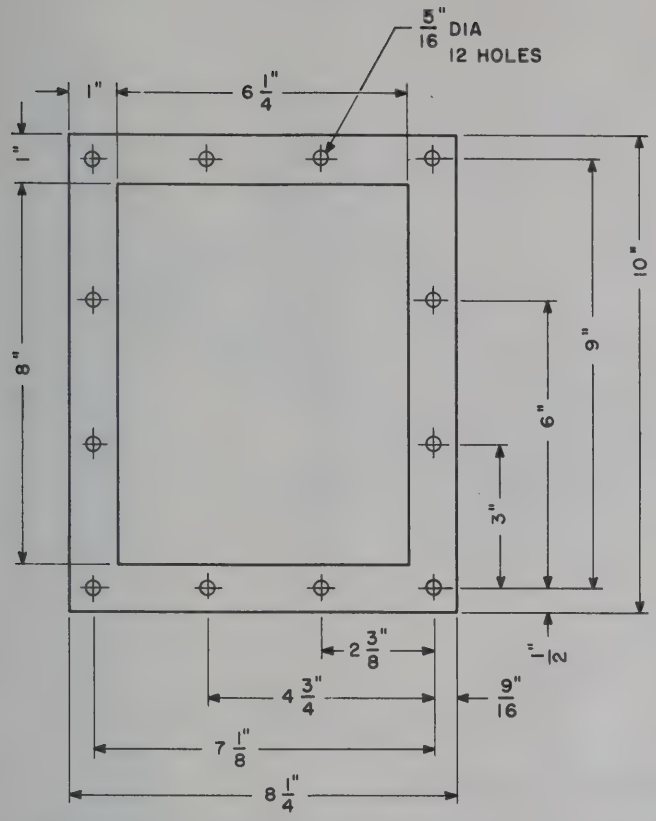
Figure 5-7. Antenna AS-1729/VRC installed.



NOTE:
MATERIAL: .125 THK RUBBER, CELLULAR, CHEMICALLY BLOWN TYPE II, CLOSED CELL GRADE A, CONDITION MEDIUM, COLOR BLACK PER SPEC MIL-R-6130.

EL5820-773-15-CI-TM-61

Figure 5-8. Antenna base gasket.



NOTE:
MATERIAL: .125 THK RUBBER, CELLULAR, CHEMICALLY BLOWN TYPE II CLOSED CELL GRADE A, CONDITION MEDIUM, COLOR BLACK PER SPEC MIL-R-6130.
EL5820-773-15-CI-TM-60

Figure 5–9. Antenna box gasket.

(4) Inspect the antenna sections for damaged and split fiberglass. Check the tip of the top section to see that the embedded wiring is not exposed. Replace antenna sections that exhibit these defects.

NOTE

It is advisable to apply graphite grease to the threads of the antenna sections to facilitate removal and also to help prevent the sections from seizing if they are infrequently separated from each other.

CAUTION

Check to be sure the antenna tip cap (fig. 5–1) is in place on the tip of the top antenna section. It is required in order to protect personnel from the sharp point. It also helps to prevent the top of the antenna section from being worn down to the embedded wiring due to scraping on overhead obstructions.

(5) To secure the tip cap to the mast section follow the procedures in (*a*) through (*e*) below.

(*a*) Apply 6–7 layers of ½-inch wide filament reinforced pressure sensative tap approximately 2 inches from the end of the tip of the top antenna section (fig. 5–9A, step 1).

(*b*) Position the tip cap so that top half of the wound tape is inside of and contacting the tip cap. Apply more layers of tape if necessary (fig. 5–9A, step 2).

(*c*) Apply the ½ inch wide, filament reinforced pressure sensitive tape starting just below the first layered application at a slot. Wrap as shown across the tip cap slot to conform with the shape of the tip cap over the top of the cap and return to the start. Cut the tape and make a new start at the next slot repeating the procedure in a crossing pattern until all slots have been reinforced and the tip cap assembly is completely covered (fig. 5–9B, step 3).

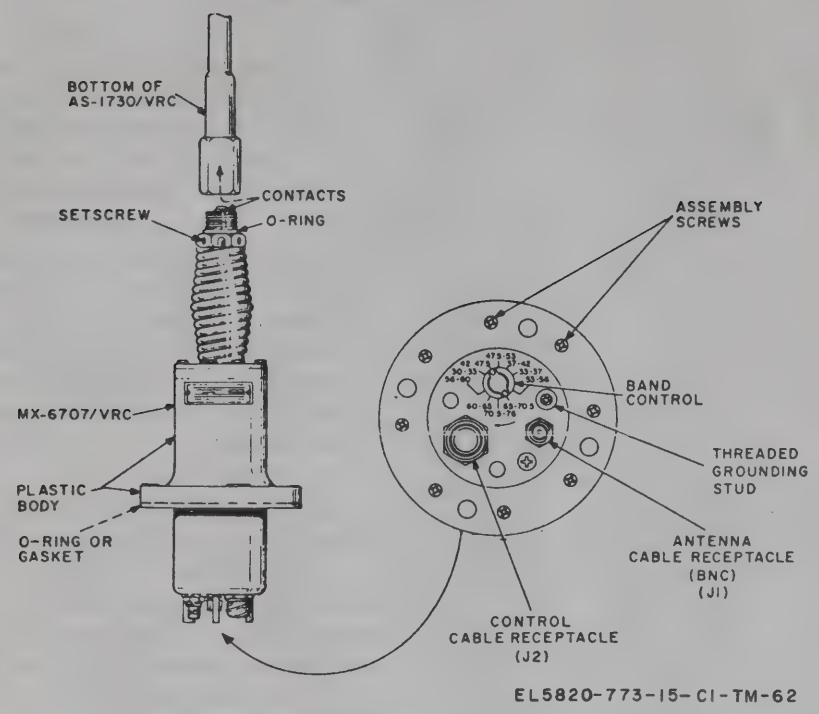


Figure 5-10. Antenna AS-1729/VRC matching unit details.

(*d*) Apply 3/4 inch wide electrical insulating low temperature tape on the antenna section just below the starting point of the filament reinforcing tape applied in step 3 and follow the tip contour. Lightly stretch the electrical tape and wrap over the top and back to the starting point. Repeat until the entire tip assembly is completely covered and the joint below the cap is neatly tapered to antenna section (fig. 5-11C, step 4). The finished product uses the filament tape to secure the two shells of the tip assembly together, to reinforce the plastic slotted skirt, to cushion against impact, and to secure the tip cap to the antenna section. The electrical tape seals and protects the filament tape from the effects of sunlight and moisture. Replace the tape when excessively scuffed or weathered (fig. 5-11D, step e).

(6) Check to see that the contact on the top of the MX-6707/VRC (fig. 5-12) protrudes fully from the top of the spring section. Use an Allen wrench to tighten the three setscrews to keep the contact in place.

NOTE

When the bottom section, AS-1730/VRC is not installed on the MX-67-7/VRC, it is recommended that a sturdy type of masking tape to put over the top contact of the MX-6707/VRC to protect it.

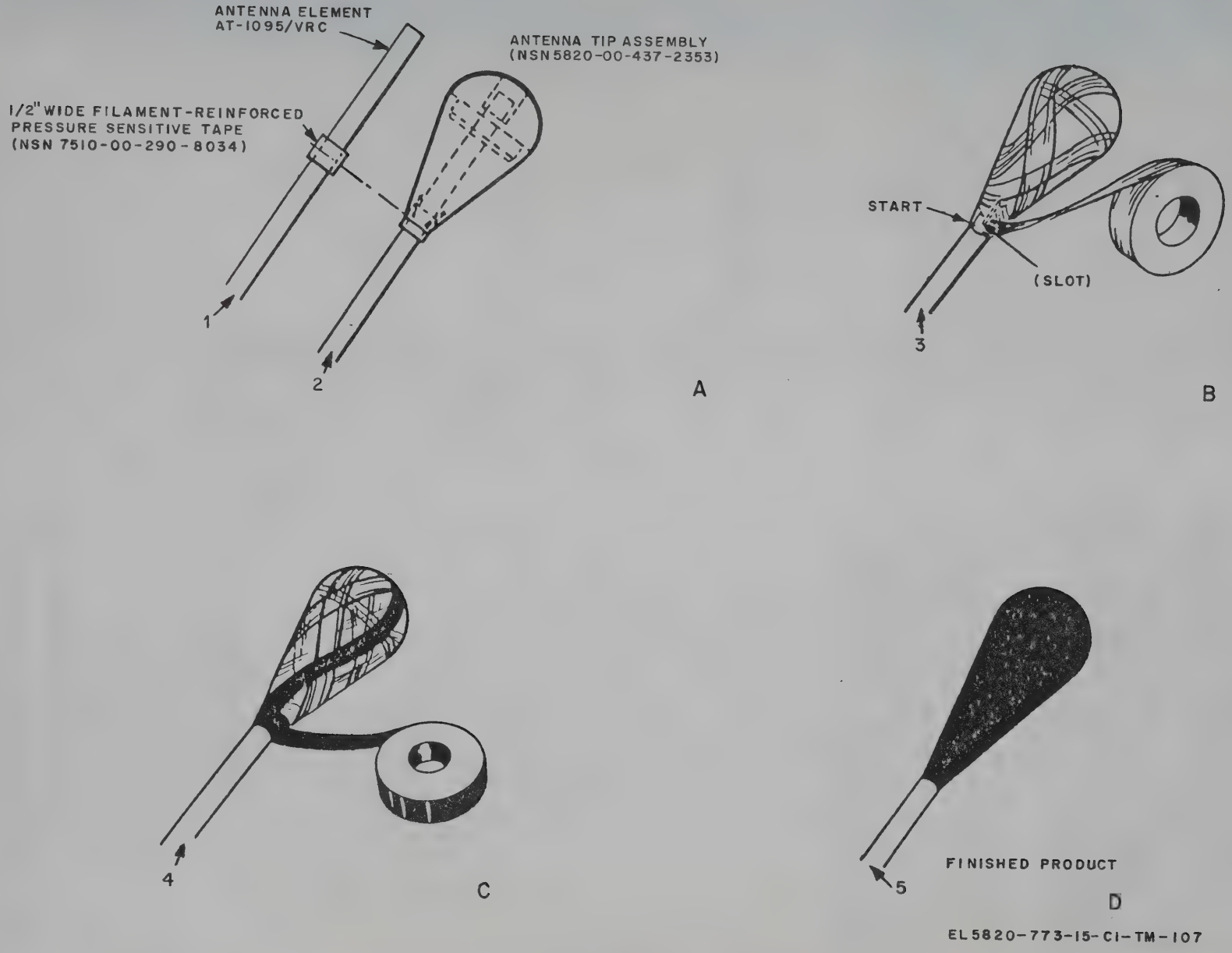


Figure 5–11. Technique for attaching antenna tip assembly to Antenna Element AT–1095/VRC

(7) Screw the top section of the antenna into the bottom section. If experience shows that the two sections come loose, wrap a few turns of electrical insulation tape around the joint.

(8) Screw the bottom section into the top of the spring mount section of the MX–6707/VRC (fig. 5–12).

(9) Connect the safety wire between the holes in the bottom antenna section and the MX–6707/VRC. Tie the ends of the safety wire into a small pigtail and flatten the pigtail back against the top of the MX–6707/VRC.

NOTE

The tiedown assembly is used to pull down the whip antenna sections (fig. 5–1). This is usually done when the radio is not being used for communications or when the vehicle is in transit. When tied down, the whip antenna can safely jump out of the clip in the tiedown assembly when the whip sections hit obstructions.

(9) Install the whip antenna tiedown assembly as outlined in (*a*) through (*d*) below:

(*a*) Slide the V-shaped locking jaws of the tiedown assembly (fig. 5–1) to approximately the middle of the top antenna section. Do not put the antenna beneath the clamp; it cannot spring out in this position.

(*b*) Pull down the antenna sections to approximately 60 degrees above the top section of the shelter. The angle should be such that personnel are not endangered by the point of the antenna.

(*c*) The antenna may be tied down when the radio is being used, provided communication can be established under this condition.

(*d*) If the tiedown cord unravels, cut off the raveled part and put the end over a flame a moment to seal the threads. Tie a knot in the end of the cord.

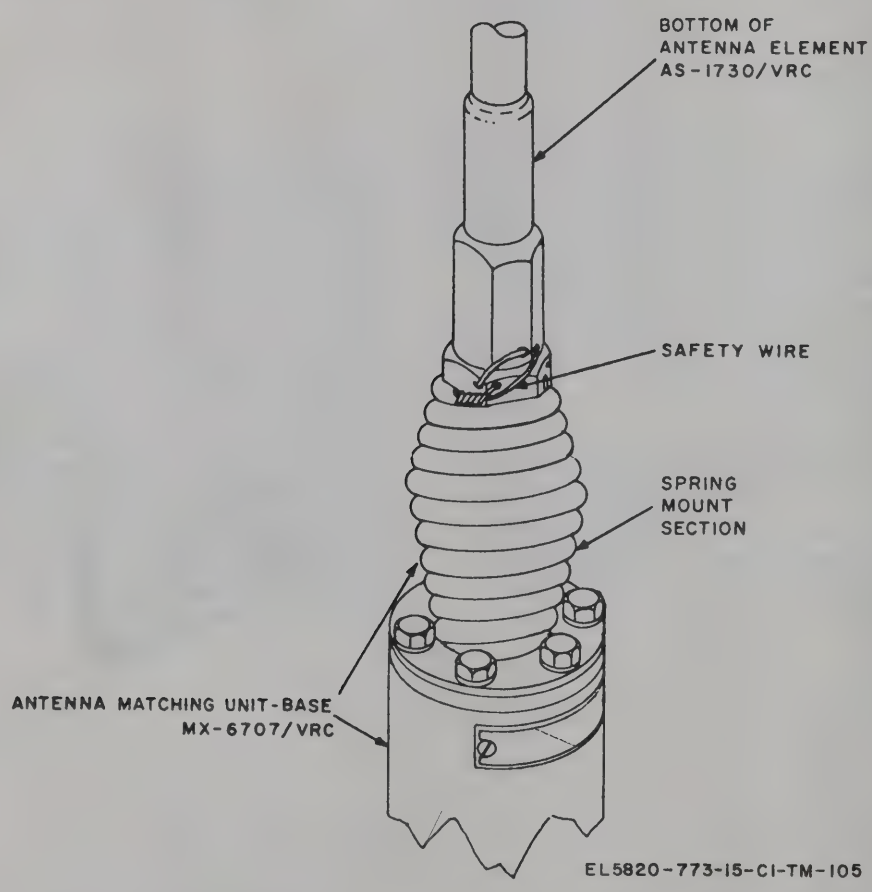


Figure 5–12. Tying safety wire between AS–1730/VRC and MX–6707/VRC.

f. Connect Cable Assembly CG 1773/U between the AS–1729/VRC J1 and the receiver-transmitter ANT bnc receptacle (fig. 5–10 and 5–13).

g. Connect Cable Assembly CX–4722/VRC between the AS–1729/VRC J2 and the ANT CONT jack on the receiver-transmitter.

h. Reinstall the control indicator box assembly if removed in *d* above.

i. Remove the AN/VRC-46 from the shelter as outlined in (1) through (17) below:

(1) On the receiver-transmitter set the POWER switch (fig. 5-11) to OFF.

(2) On the Power Supply PP-2953/U, set the POWER switch (fig. 5-4) to OFF.

(3) Disconnect Power Cable Assembly CX-4524/U from the shelter receptacle marked PP-2953/U (fig. 1-7).

(4) Disconnect Rf Cable Assembly CG-1773/U from J1 on the antenna base and the receiver-transmitter ANT bnc receptacle (fig. 5-10, 5-13).

(5) Disconnect Cable Assembly CX-4722/VRC from J2 of the antenna base and the receiver-transmitter ANT CONT jack.

(6) Loosen the MT-1029/VRC screw and clamp assembly (fig. 5-4) and withdraw the receiver-transmitter from the mounting.

(7) Remove the five hex head screws, flat round washers and self locking nuts that secure the mounting to the upper shelf assembly.

(8) Remove the four screws, eight nuts and washers that secure the shelf support assembly between the upper and lower shelf assembly.

(9) Remove the eight screws, flat washers and lockwashers that secure the upper shelf assembly to the upper forward wall of the shelter, and remove the upper shelf assembly.

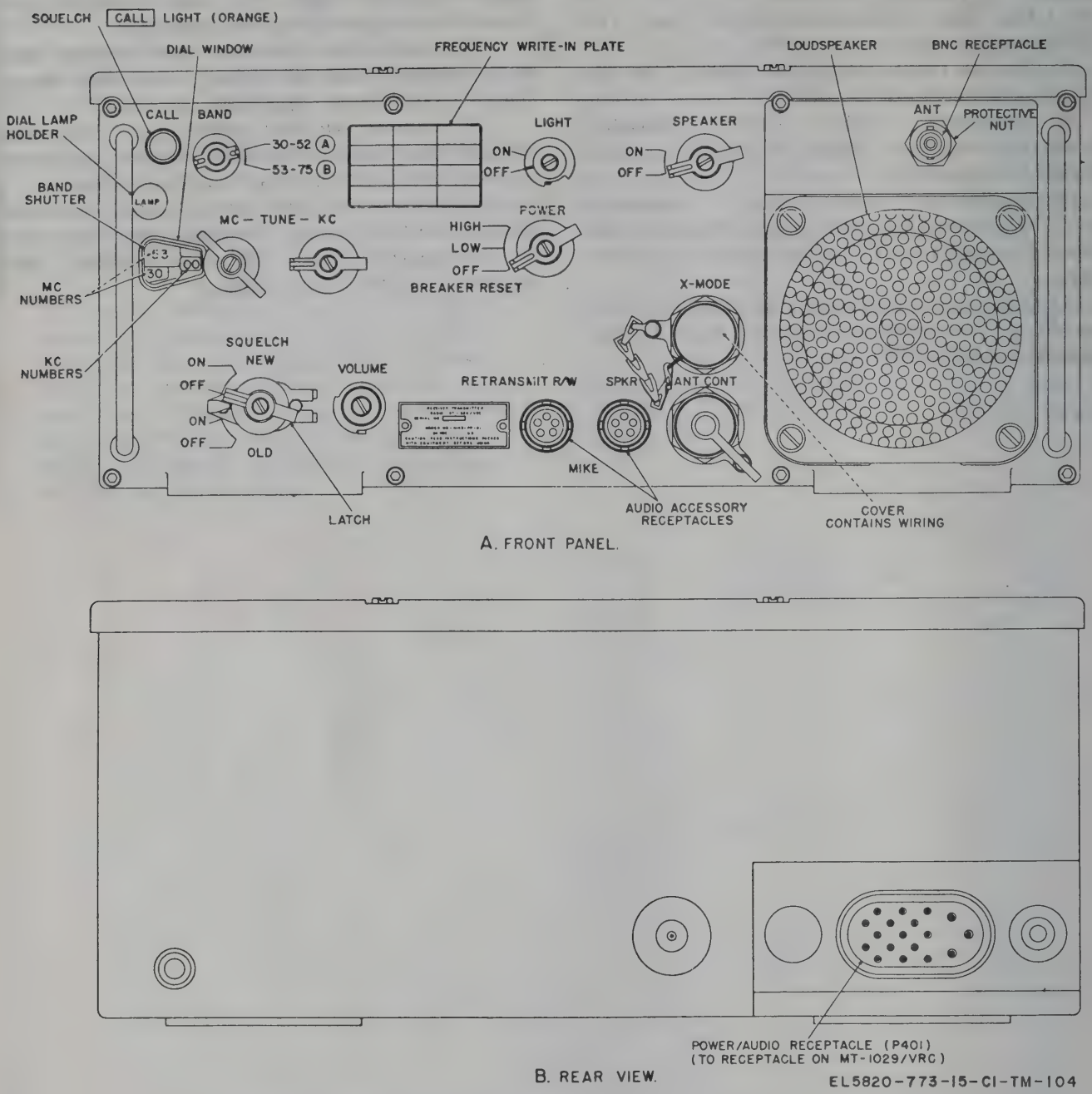


Figure 5–13. RT–524(*)/VRC, controls indicators, and receptacles.

(10) Remove the four self-locking nuts and flat round washers that secure the power supply to the lower shelf assembly and remove the power supply from the shelf assembly.

(11) Use the eight screws, flat washers and lockwashers removed in (9) above and replace the upper shelf assembly back on the upper forward wall of the shelter.

(12) Use the four screws, eight nuts and washers removed in (8) above and secure the shelf support assembly between the upper and lower shelf assembly.

(13) Remove antenna tiedown assembly from the antenna.

(14) Remove antenna elements AT–1730/VRC from antenna base by unscrewing AT–1730/VRC (fig. 1–11) and separating the two elements.

(15) Remove the antenna box (fig. 5–7) from the shelter, by removing the twelve nuts and washers.

(16) Replace the antenna opening cover (fig. 5–6). Apply sealant prescribed in TB 750–240 around the perimeter of the antenna opening cover.

(17) Remove the four screws, washers and nuts that secure the Antenna Base MX–6707/VRC to the antenna box (fig. 5–7).

5–6. Controls, Indicators and Receptacles

a. Receiver-Transmitter, Radio RT–524(*)/VRC, Controls, Indicators, and Receptacles (fig. 5–13).

Control, indicator, and receptacle	Function
Squelch CALL indicator	During squelch operation, lights to indicate signal is received, when LIGHT switch is ON and SQUELCH switch is in NEW ON or OLD ON.
LAMP holder	Holds dial window lamp.
LIGHT switch	Controls dc power to dial window lamp and squelch CALL indicator.
BAND switch	Selects tuning of frequency band A (30.00 to 52.95 MHz) or B (53.00 to 75.95 MHz).
SPEAKER switch	Controls received audio signal to loudspeaker (ON and OFF).
MC tuning control	Provides manual tuning of radio in 1–MHz steps (30, 31, 53, 54, etc).
KC tuning control	Provides manual tuning of radio in 0.05–MHz steps (00, 05, 10, 15, etc).
POWER switch	Controls dc power to radio: *Position* — *Function* OFF BREAKER-RESET — Turns off dc power to radio; and resets circuit breakers when they are tripped. LOW — Turns on dc power to radio; when radio is keyed for transmission, it transmits on low rf power (0.5 to 8 watts). HIGH — Turns on dc power to radio; when radio is keyed for transmission, it transmits on high rf power (35 watts, min).
SQUELCH switch	For reception, selects type of squelch function to be used; during transmission, 150–Hz squelch tone is transmitted in all positions of the switch except OLD ON. *Position* — *Function* NEW ON and OLD ON — Turns off (squelches receiver to prevent rushing noise from being heard until squelch signal is received. *a.* In NEW ON, 150–Hz squelch tone, unsquelches the receiver. *b.* In OLD ON, noise that is part of the distant transmitter carrier frequency unsquelches the receiver. NEW OFF and OLD OFF — Receiver is in unsquelched condition (on standby, rushing noise is heard).
SQUELCH switch latch	When to right, it confines the SQUELCH switch to two upper positions (NEW) or two lower positions (OLD).
VOLUME control	Controls audio output.
RETRANSMIT R/W receptacle	Connections for following functions: *a.* Audio accessory (such as microphone and headset) for radio transmission and reception. *b.* Retransmission cable when radio is set up for radio relay operation. *c.* Radio/wire (R/W) integration cable for radio transmission and reception to be controlled by remote control equipment situated at a site remote from the radio (such as AN/GSA–7).
SPKR receptacle	Connection for following functions: *a.* Audio accessory (such as microphone or headset) for radio transmission and reception). *b.* Loudspeaker for radio reception.
ANT CONT receptacle	Connection for control cable, CX–4722/VRC, to antenna matching unit. Control of antenna matching unit networks is automatic and occurs when MC control and BAND switch are positioned.
X-MODE receptacle	Connection for cable to X-mode equipment (such as telephone multiplex, secure voice, and digital data equipment) for control of radio transmission and reception by X-mode equipment. The X-MODE-NORMAL switch inside the radio must also be set to X-MODE position when X-mode operation is used.

a. Receiver-Transmitter, Radio RT-524(*)/VRC, Contro., Indicators, and Receptacles (fig. 5-13).(cont.)

Control, indicator, and receptacle	Function
	The X-MODE receptacle cover contains wiring to enable to operate when X-mode equipment is not connected to the receptacle. The X-MODE-NORMAL switch in the radio must also be set to NORMAL position.
ANT receptacle	BNC, 50-ohm impedance receptacle for antenna cable.
Power/audio receptacle (P401)	Connected to radio receptacle of MT-1029/VRC for application of dc power to the radio and for the passage of dc power and control and audio signals between the radio and equipment connected to the MT-1029/VRC.

b. Antenna AS-1729/VRC, Control and Receptacles.

Control, indicator and receptacle	Function
Band control	Provides manual selection of a matching network for each of the 10 frequency bands indicated on the control: 30-33; 42-47.5; 47.4-53; 37-42; 33-37; 53-56; 65-70.5; 70.5-76; 60-65; and 56-60.
Control cable receptacle (J2)	Receptacle for connection of control cable, CX-4772/VRC, from receiver-transmitter for automatic selection of the 10 matching networks by the tuning circuits of the receiver-transmitter.
Antenna cable receptacle (J1)	BNC, 50-ohm impedance receptacle for connection of antenna cable from receiver-transmitter for transmission of rf signals.
MX-6707/VRC contact	Contact for transfer of RF power between MX-6707/VRC and spring loaded contact in base of AS-1730/VRC.
Grounding stud	Threaded stud that may be used to attach a ground wire.

c. Mounting MT-1029/VRC, Receptacles and Power Control Link.

Receptacle and link	Function
Radio receptacle (J24)	Connection for receiver-transmitter power/audio receptacle (P401) for: *a.* Application of dc power from receptacle J21 to receiver-transmitter. *b.* Passage of dc power and audio and keying control signals between receiver-transmitter and receptacle J22.
Main power receptacle J21	Connection for cable from dc power source (for another MT-1029/VRC) for application of dc power to receptacles J22, J23 and J24.
Audio/control/power receptacle J22	Connection for cable from radio-intercom equipment or C-2299/VRC for passage of audio and control signals between connected equipment and receptacles J21 and J24.
Power transfer receptacle J23	Connection for power cable to another MT-1029/VRC (or MT-1898/VRC) for passage of dc power from receptacles J21 and J22.
Power control link (fig. 5-14)	Controls application of dc power from receptacle J21 to receptacles J22, J23, and J24. *a.* For control of dc power by receiver-transmitter, the link is positioned between center post and E24, Dc power is applied from receptacle J21 to J24. *b.* For control of dc power by AM-1780/VRC in radio-intercom system, the link is positioned between center post and E22. Dc power is applied from receptacle J21 to J22, J23, and J24.

d. Power Supply PP-2953/U, Controls, Indicators, and Receptacles.

Control, indicator and receptacle	Function
POWER switch	In the ON position, turns on the power supply. In the OFF position, turns off the power supply.
Voltage selector switch	Connects circuits for input voltage of: 230 volts 50-60 cycle or 115 volts 50-60, 400 cycle AC power inputs.
AC ON pilot lamp	Lights when ac input is above 80 volts.
EMER DC ON pilot lamp	Lights when there is no ac input or when ac input falls below 80 volts.

d. Power Supply PP-2953/U. Controls, Indicators, and Receptacles.

Control, indicator, and receptacle	Function
AC 3A fuses	Powerline fuses. Protect the power supply from damage caused by line surges, application of wrong voltages, or internal short circuit due to part malfunction.
AC POWER connector	Connects the selected ac input to power supply.
DC 10A fuse	Output fuse; protects the power supply when excessive load current is drawn.
BATTERY IN connector (fig. 5–5)	Connection to external dc power source.
POWER OUT connector	Dc output connection.

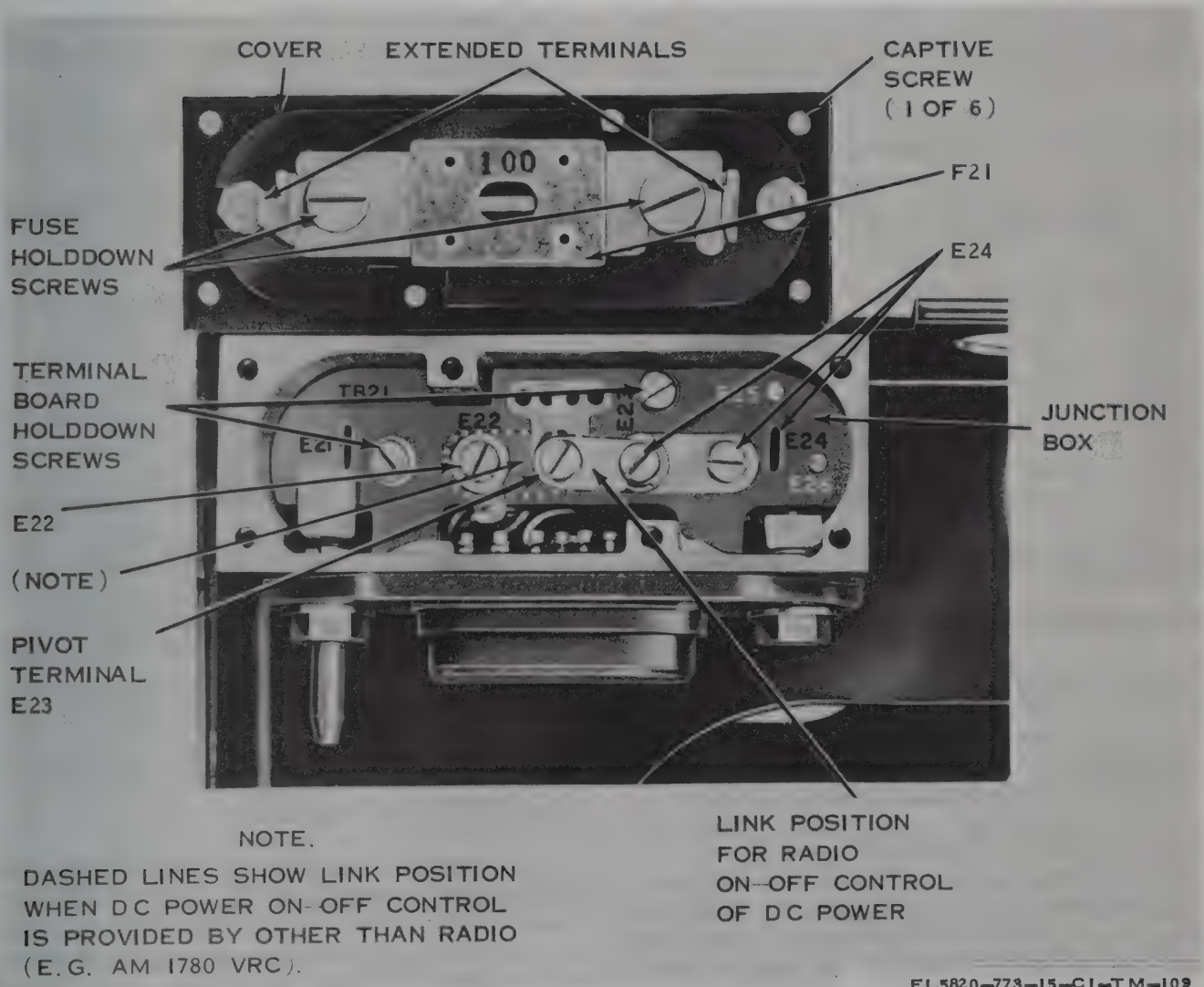


Figure 5–14. Junction Box of MT–1029/VRC, positioning of power control link.

WARNING

Check to be sure that all equipment is properly grounded before performing the procedures in this section. Be sure also that you are familiar with the safety requirements of TB SIG 291.

Dangerous RF voltages exist on the AS–1729/VRC antenna components while transmitting. Avoid radiofrequency burns. Remain in or stay clear of shelter when transmitting with the AS–1729/VRC.

5-7. General Operating Instructions

a. Determine the assigned operating and alternate frequencies.

b. Transmit only on the assigned frequencies.

c. There is an internal leak between the transmit and receive branches of the receiver-transmitters that is identified by quieting of the receiver circuit. This occurs when the SQUELCH switch is set to either OFF position and also when the switch is set to OLD ON at which operation the CALL lamp will light. The frequencies which produce these indications and which should not be used are as follows:

(1) 33.90 MHz
(2) 45.20 MHz
(3) 56.50 MHz
(4) 67.80 MHz

CAUTION

Damage to the communications equipment in shelter can be experienced if all circuit breakers are not turned off after a power interuption. Allow sufficient time for the power source to stabilize, if not commercial, and then turn on the main circuit breaker. Make sure that the ac volt and ammeter on the power distribution box show a normal steady indication prior to applying power to each item listed below. If there is a fluctuation in meter readings, check the power to the equipment in the following sequence: the heater and/or air conditioner; blowers; lights; convenience outlets and finally the communications equipment.

5-8. Starting Procedure

CAUTION

Before placing the POWER switch to ON (fig. 5-2) on Power Supply PP-2953/U, check to make sure that the voltage selector switch is in the proper position for the source of ac voltage available. If this switch is set in the wrong position, serious damage to the power supply can result.

a. To turn the power supply on, set the power switch to ON (fig. 5-2) and allow a 10-minute warmup period. The AC ON indicator lamp will light. The EMER DC ON indicator lamp will light when the ac input voltage falls below 80 volts.

NOTE

Use low transmitting power (with POWER switch on LOW) (fig. 5-13) unless experience shows that the distant radio station cannot be contacted until high transmitting power is used. The setting of the POWER switch has no effect on receiver circuit of the receiver-transmitter.

b. To turn on receiver-transmitter, set the POWER switch to LOW or HIGH. The dial should light indicating power is applied.

5-9. Tuning the Radio

a. Before attempting to tune the radio check the conditions for using squelch mode of operation (para 5-11).

CAUTION

In some original units of the RT-524/VRC, the KC control cannot be turned beyond the limits of 00 and 95 positions. To prevent damage to the control mechanisms of these units, be careful not to turn the KC control beyond the 00 and 95 positions.

b. On the receiver-transmitter, set the power switch to LOW.

c. Set the LIGHT switch to ON to illuminate the dial window and enable the CALL indicator to light during squelch operation.

d. Set the SQUELCH switch to ON for squelch mode operation or to OFF when squelch operation is not required (para 5-11).

NOTE

When the control cable, CX-4722/VRC, is not connected between the receiver-transmitter and the MX-6707/VRC, the band control requires manually positioning (fig. 5-10) to the position that includes the operating frequency of the receiver-transmitter.

e. Set the BAND switch to the position that includes the assigned operating frequency.

f. Turn the MC control until the desired MHz number appears in the dial window; it should be set with a slight detent action.

g. Turn the KC control until the desired KHz section of the assigned frequency appears in the dial window; it should be set with a slight detent action.

5-10. Conditions for Using Squelch Mode Operation
(fig. 5-13)

The following explanation of squelch mode operation is applicable to all radio operations. Squelch mode operation is used in order to turn off the continuous rushing noise an fm receiver produces when a distant transmitter is not keyed for transmission.

a. Squelch Switch Functions.

(1) When the SQUELCH switch of the receiver-transmitters is in NEW ON, NEW OFF, and OLD OFF positions, and the transmitter is keyed for transmission, a squelch tone is transmitted for the purpose of unsquelching radios that are prepared for this feature. In OLD ON position, the 150-Hz squelch tone is not transmitted.

(2) When the SQUELCH switch is set to OFF (NEW OFF or OLD OFF), rushing noise is heard, then stops when the receiver-transmitter is keyed for transmission, or the distant transmitter is keyed.

(3) When the SQUELCH switch is set to ON (NEW ON or OLD ON), the radio is squelched and no sound is heard. When the distant transmitter is keyed, the CALL lamp lights, indicating an incoming call, and the transmitted signal can be heard. When the local transmitter is keyed, the CALL lamp also lights and permits sidetone to be heard.

b. Conditions for Using Squelch Mode Operation.

(1) When the SQUELCH switch is set to NEW ON position, reception cannot be accomplished unless the distant transmitter transmits the 150-Hz squelch tone while keyed for transmission.

(2) When the SQUELCH switch is set to OLD ON position, reception cannot be accomplished until the distant transmitter is keyed for transmission. The receive circuit is unsquelched by the reception of the carrier signal from the distant radio. Such would be the case when the distant transmitter is operating on OLD ON squelch (*a* (3) above), or is a radio that does not have the 150-Hz squelch tone.

c. Determining Squelch Mode Operation. To determine whether squelch mode operation is possible, use the following procedure.

(1) Arrange for the distant radio station to send a short transmission. Set the SQUELCH switch to NEW OFF (or OLD OFF, as applicable). The rushing noise should stop and the message should be heard when the distant radio station transmits.

(2) Arrange with the distant radio station to turn its squelch tone on the send another test message. Then, set the SQUELCH switch to NEW ON (or OLD ON, as applicable). The CALL light should light and the message should be heard when the distant radio transmits.

(3) If the CALL light does not light indicating the receiver is still squelched, reset the SQUELCH switch to NEW OFF (or OLD OFF) and advise the distant radio station of the situation.

(4) The same procedures ((1), (2), and (3) above) should be performed at the distant radio station.

(5) Push the SQUELCH switch latch to the left to confine the switch to NEW or OLD positions.

NOTE

The failure of either radio to receive the other while in squelch mode may indicate that the distance between the two stations is too great or that the squelch circuit of either station is defective.

(6) If either radio station is moving about, leave the SQUELCH switch to OFF until it has been determined ((1) through (4) above) that reception can be accomplished with the SQUELCH in ON position.

5-11. Using the Radio for Communication (fig. 5-13)

a. Turn on the radio (para 5-9) and tune (para 5-10) to the assigned frequency. To use the loudspeaker, set SPKR switch on ON.

b. Press the push-to-talk switch on the handset and speak into the handset. As long as the push-to-talk switch is depressed, the blower motor should be heard running. Sidetone of the transmission should be heard.

c. Release the push-to-talk switch to hear the reply. Adjust the VOLUME control for comfortable listening level.

d. If squelch operation is desired (para 5-11), set the SQUELCH switch to NEW ON (or OLD ON, as appropriate).

e. When it has been determined that communication cannot be conducted with low power transmission, set the POWER switch to HIGH. (The position of the switch has no effect on received radio signals.)

f. To turn on the radio after it stops operating during use, set the POWER switch to OFF-RESET position, then back to LOW or HIGH position. If this operation is ineffective, refer to the operator troubleshooting procedures in TM 11-5820-401-12.

5-12. Stopping Procedures

a. To turn off the receiver-transmitter, set the POWER switch (fig. 5-13) to OFF.

b. To turn off the POWER Supply PP-2953/U, set the POWER switch (fig. 5-2) to OFF.

5-13. Recognition of Jamming and Antijamming Procedures

a. Recognition and Identification of Jamming. Under real or simulated tactical conditions, it is possible to be jammed by the enemy. Jamming is easily done by transmitting a strong signal on the same frequency, making it difficult or impossible to hear the desired signal. Unusual noises or strong interference heard on the receiver may be enemy jamming, signals from a friendly station, noise from a local source, or a defective receiver. To determine whether the interference is originating in the receiver, disconnect the antenna and short the center conductor of the ANT receptacle to the chassis. If the interference continues, the receiver is defective.

b. Antijamming. When it is first noticed that a channel is being jammed, notify your immediate superior officer and continue to operate the equipment. To provide maximum intelligibility of jamming signals follow the operational procedure below.

(1) The effects of enemy jamming may be reduced by locating the vehicle so that nearby obstructions act as a screen in the direction of probable sites of enemy jamming transmitters. This screen action may also reduce the transmitted signal strength toward the enemy, thereby making it more difficult for the enemy to intercept signals. If possible, try several different locations within the prescribed area and stay at one where jamming is minimum.

(2) Vary the VOLUME control. The level of the desired signal may be raised enough to be distinguished from the jamming signal.

(3) If the distant transmitter is operating on low power and the operating frequency is being jammed, request the distant transmitter to turn the POWER switch to HIGH. The additional power output may override the received jamming signal and thus permit the signal to be heard.

(4) If the above procedures do not provide sufficient signal separation for operation, change to the alternate frequency, with permission from radio net control station.

5-14. Operation at Low Temperature and in Desert and Dusty Areas

a. Operation at Low Temperatures.

(1) Keep the antenna free of ice. Communication will be impaired if ice is allowed to collect on the antenna.

(2) Interconnecting cables and cords lose some of their flexibility at low temperatures. Be careful not to strain them.

(3) If possible, keep the radios and radio intercom equipment turned on when it is not being used for communication.

(4) Turn on and allow the equipment to warm up before changing the MC and KC controls.

(5) Before turning on the radio in extreme cold temperatures, turn on the shelter heater to warm up the radio.

b. Operation in Desert and Dusty Climates. When operated in desert and dusty climates, large amounts of sand and dust may collect on the equipment. Keep the equipment as clean as possible. Keep the blower air intake and exhaust ports of the receiver-transmitters free of sand and dust.

5-15. Maintenance of Radio Set AN/VRC-46

For maintenance procedures, refer to TM 11-5820-401-12 for operational and organizational maintenance and TM 11-5820-401-35 for direct and general support and depot maintenance.

Section II. DEICING KIT, ANTENNA OPENING COVER AND ANTENNA BOX

5-16. Deicing Kit
(fig. 2-5.1, 5-15 and 5-16)

The deicing kit is used with Antenna AS-1425/VRC in temperatures 32 degrees Fahrenheit and below. The kit consists primarily of one power cable and three extension cords, one for each of the three AS-1425/VRC antennas.

5-17. Removal and Replacement of Deicer Equipment
(fig. 5-17)

a. Removal.

(1) Remove the tapes securing the heater and ground wire to the feedhorn, and loosen the self-locking nut that secures the ground wire.

(2) Disconnect the deicer plug.

(3) Gently pry the tube out from under the four clips securing it to the feedhorn, and remove the deicer equipment.

b. Replacement.

(1) Connect the deicer plug.

(2) Gently press the tube into position under the four clips along the length of the feedhorn.

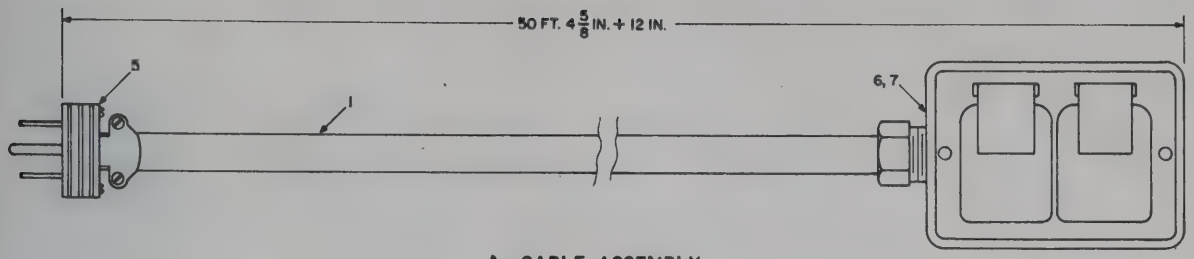
(3) Wrap the heater around the neck of the feedhorn, and secure the ground wire under the self-locking nut on the feedhorn as shown in figure 5-17.

(4) Secure the heater and ground wire to the feedhorn with red electrical tape and overwrap with black electrical tape.

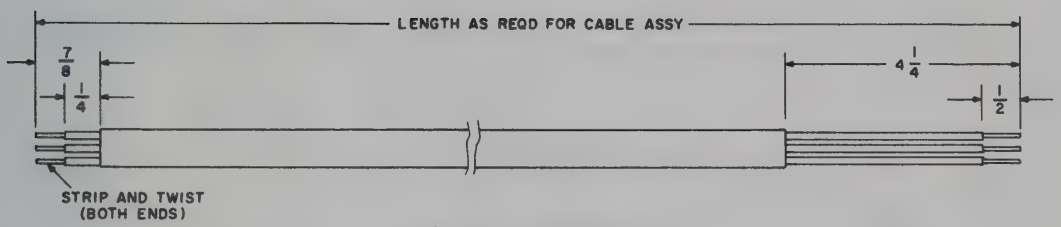
(5) Seal the ends of the tube and of the tape overwrap with General Electric RTV-103 silicone rubber.

5-18. Antenna Opening Cover and Antenna Box
(fig. 5-6 and 5-7)

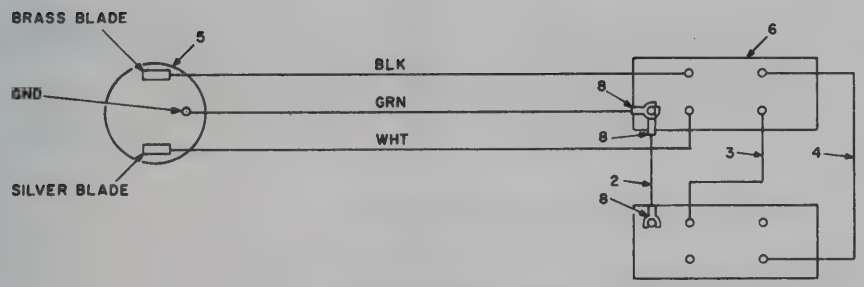
The antenna opening cover is used to protect shelter interior and personnel from the weather when Antenna AS-1729/VRC is not installed. When the antenna is installed, the antenna opening cover is stored in a storage drawer in the shelter. The antenna box covers the band control (fig. 5-9) of the installed MX-6707/VRC antenna base.



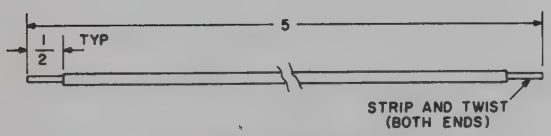
A. CABLE ASSEMBLY.



B. CABLE PREPARATION.



C. POWER WIRING DIAGRAM.

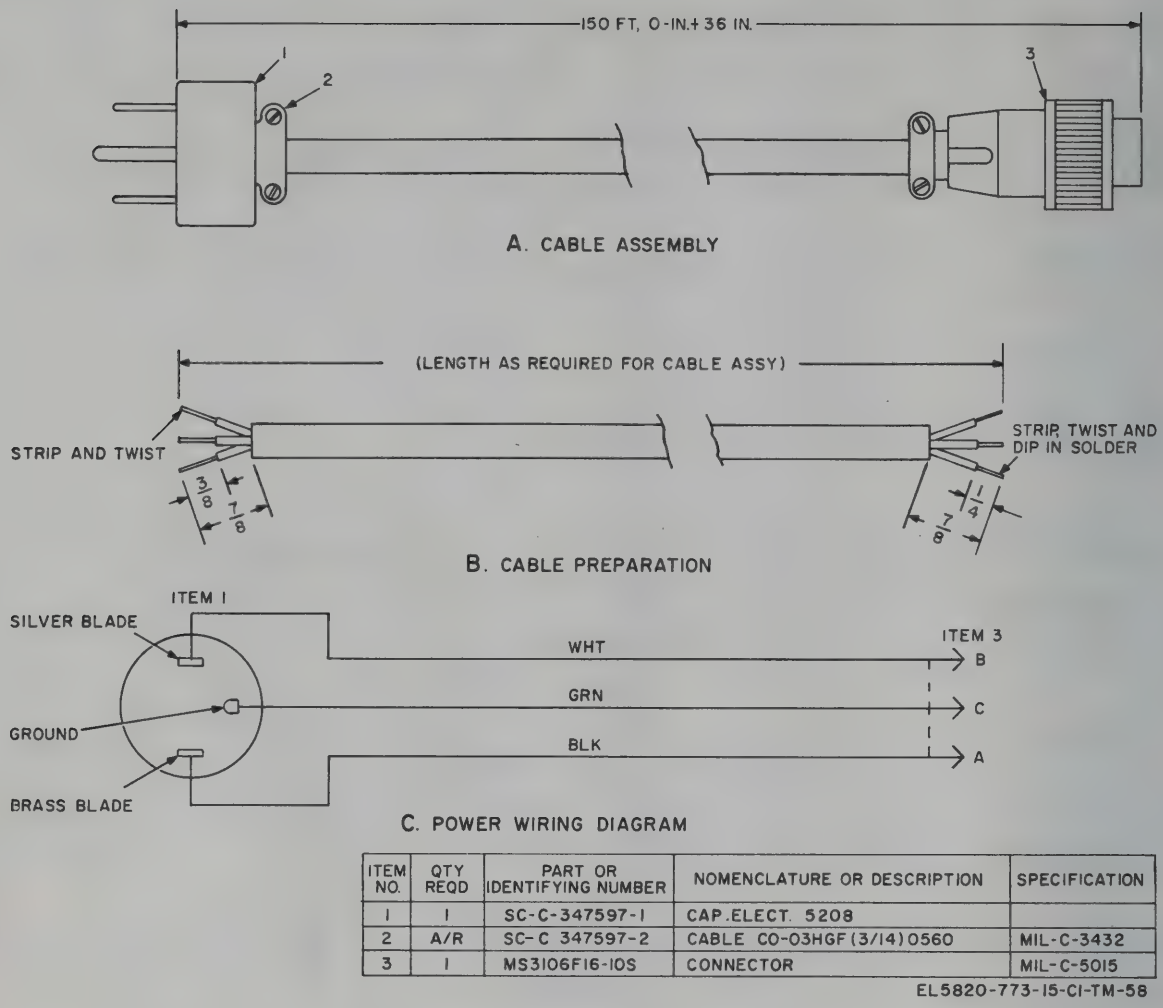


D. WIRE PREPARATION.
(TYP FOR ITEMS 2, 3, AND 4)

ITEM NO.	QTY REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	SPECIFICATION
1	1	SC-D-347598-1	CABLE CO-03HGF (3/14) 0560	MIL-C-3432
2	1	-2	WIRE, GRN MW-C-14(41) U5	MIL-W-76
3	1	-3	WHT U9	↓
4	1	-4	BLK U0	↓
5	1	-5	CAP, CORD GRIP #5208	
6	2	-6	OUTLET, DUPLEX #5262	
7	1	-7	BOX #3005	
8	3	-8	SPADE, SLOTTED TONGUE #32060	

EL5820-773-15-CI-TM-57

Figure 5–15. Deicer kit power cable.



ITEM NO.	QTY REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	SPECIFICATION
1	1	SC-C-347597-1	CAP.ELECT. 5208	
2	A/R	SC-C 347597-2	CABLE CO-03HGF(3/14)0560	MIL-C-3432
3	1	MS3106F16-10S	CONNECTOR	MIL-C-5015

EL5820-773-15-CI-TM-58

Figure 5-16. Deicer kit power extension cord.

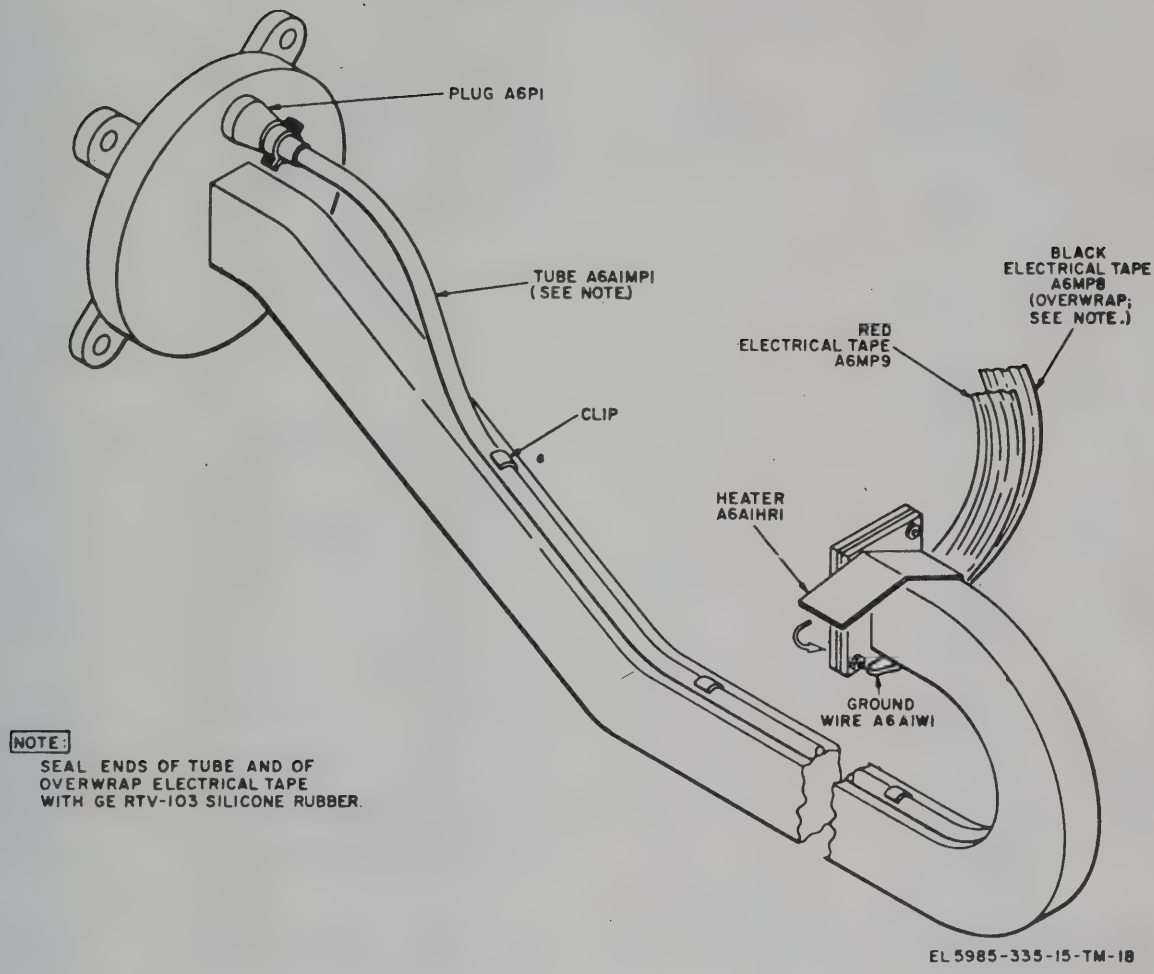


Figure 5–17. Removal and replacement of deicer equipment.

Figure FO–1. Radio Repeater Set AN/TRC–138, floor plan and elevation diagram.
Located in back of manual

Figure FO–2. Radio Repeater Set AN/TRC–138, ac power schematic diagram.
Located in back of Manual

Figure FO–3. Radio Repeater Set AN/TRC–138, signal schematic-wiring diagram.
Located in back of Manual

APPENDIX A

REFERENCES

DA Pam 310-4	Index of Technical Publications, Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins and Lubrication Orders.
DA Pam 310-7	US Army Index of Modification Work Orders.
SB 11-6	FSC Class 6135: Dry Battery Supply Data.
SB 11-30	FSC Class 6135: Dry Battery Management Data.
SB 38-100	Preservation, Packaging, Packing and Marking Materials. Supplies and Equipment Used By the Army.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TB 43-0124	Maintenance and Repair Procedures for Shelters, Electrical Equipment S-141/G, S-144G, S-250/G, S-280/G, and S-318/G.
TB SIG 291	Safety Measures to be Observed When Installing and Using Whip Antennas, Field Type Masts, Towers and Antennas and Metal Poles That Are Used With Communications, Radar, and Direction Finder Equipment.
TM 5-6115-332-14	Operator, Organizational, Intermediate (Field), Direct Support and Depot Level Maintenance Manual: Generator Set, Tactical Gasoline Engine: Air Cooled, 5 KW, AC, 120/240 V Single Phase, 120/208 V 3 Phase, Skid Mounted, Tubular Frame (Less Engine) (Military Design, DOD Model MEP-017A) Utility 60 Hertz (NSN 6115-00-017-8240) and (DOD Model MEP-022A), Utility, 400 Hertz (6115-00-017-8241).
TM 9-2330-213-14	Operator, Organizational, Direct Support and General Support Maintenance Manual (Including Repair Parts and Special Tools Lists): Chassis Trailer; 1-½ Ton, 2-Wheel. M103A1 (2330-835-8629): M103A4 (2330-141-8051), M103A4C (2330-542-2182); Trailer, Cargo: 1-½ Ton, 2-Wheel, M104 (2330-754-0509); M104A1 (2330-835-8630), M105A1 (2330-835-8631); M105A2 (2330-141-8050) M105A2G (2330-542-5689); Trailer, Tank, Water: 1-½ Ton, 2-Wheel, 400 Gallon, M107A1 (2330-835-8633), M107A2 (2330-141-8049), M107A2C (2330-542-5688); Trailer, Van, Shop: Folding Sides, 1-½ Ton, 2-Wheel, M448 (2330-631-5692).
TM 11-2057A	Test Set TS-27B/TSM.
TM 11-5805-201-12	Operator's and Organizational Maintenance Manual: Including Repair Parts and Special Tool Lists, Telephone Set TA-312/PT (NSN 5805-00-543-0012).
TM 11-5805-201-35	Direct Support, General Support, and Depot Maintenance Manual (Including Repair Parts and Special Tools Lists): Telephone Set TA-312/PT (NSN 5805-00-543-0012).
TM 11-5805-356-12	Operator and Organizational Maintenance Manual (Including Repair Parts and Special Tools List): Terminal, Telegraph-Telephone AN/TCC-29 (Incuding Terminal, Telegraph TH-22/TG) (5805-00-907-8300) and Converter, Telegraph-

	Telephone Signal CV-425 /U) (5805-00-985-9088).
TM 11-5805-356-34-1	Direct Support and General Support Maintenance Manual Including Repair Parts and Special Tools Lists: Terminal, Telegraph TH-22/ TG and Filter Assembly, Electrical F-316/U.
TM 11-5805-356-34-2	Direct Support and General Support Maintenance Manual (Including Repair Parts and Special Tools List): Converter, Telegraph-Telephone Signal CV-425/U.
TM 11-5820-695-12	Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tools Lists); Radio Set AN/GRC-144 (NSN 5820 -00-926-7356).
TM 11-5820-695-35	Direct Support, General Support, and Depot Maintenance Manual: Radio Set AN/GRC-144 (NSN 5820-00-926-7356).
TM 11-5820-773-24P	Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools Lists for Radio Repeater Set AN/ TRC-138 (NSN 5820-00-133-8841).
TM 11-5830-221-12	Operators' and Organizational Maintenance Manual: Intercommunication Stations LS-147A/FI, FL-147B/FI, LS-147C/FI, and LS-147D/ FI.
TM 11-5830-221-24P	Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools Lists For Telecommunication Station LS-147C/FI (NSN 5830-00-752-5357).
TM 11-5830-221-35	Field and Depot Maintenance Manual: Intercommunications Stations LS-147A/FI, LS-147B/FI, LS-147C/FI, and LS-147D/FI.
TM 11-5935-205-14P	Operators', Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools): Connectors, Receptacles, Electrical U-187/G and U-187A/G (FSN 5935-692-0381).
TM 11-5985-334-15	Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Including Repair Parts and Special Tool Lists, Mast AB-621/G (NSN 5985-00-782-5278).
TM 11-5985-335-15	Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual (Including Repair Parts and Special Tools Lists): Antenna AS-1425 /GRC.
TM 11-5995-208-10	Operators' Manual for Cable Assembly, Special Purpose CX-11230/G (5995-00-133-9126) and Cable Assembly, Adapter CX-10734/G (5995-00-133-9125).
TM 11-5995-208-24&P	Organizational, Direct Support, and General Support Maintenance Manual for Cable Assembly, Special Purpose CX-11230/G (5995-00-133-9126) and Cable Assembly, Adapter CX-10734 /G (5995-00-133-9125) Including Repair Parts and Special Tools List.
TM 11-6625-648-12	Operators' and Organizational Maintenance Manual: Test set, Telephone AN/PTM-7.
TM 38-750	The Army Maintenance Management System (TAMMS).

APPENDIX B

COMPONENTS OF END ITEM LIST

Section I. INTRODUCTION

B-1. Scope

This appendix lists integral components of and basic issue items for the AN/TRC-138 to help you inventory items required for safe and efficient operation.

B-2 General

This Components of End Item List is divided into the following sections:

a. Section II. Integral Components of the End Item. Not applicable. These items, when assembled, comprise the AN/TRC-138 and must accompany it whenever it is transferred or turned in. The illustrations will help you identify these items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the AN/TRC-138 in operation, to operate it, and to perform emergency repairs. Although shipped separately packed they must accompany the AN/TRC-138 during operation, and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII, based on TOE/MTOE authorization of the end item.

B-3. Explanation of Columns

a. Illustration. This column is divided as follows:

(1) *Figure number.* Indicates the figure number of the illustration on which the item is shown.

(2) *Item number.* The number used to identify item called out in the illustration.

b. National Stock Number. Indicates the National stock number assigned to the item and which will be used for requisitioning.

c. Description. Indicates the Federal item name and, if required, a minimun description to identify the item. The part number indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items. Following the part number, the Federal Supply Code for Manufacturers (FSCM) is shown in parentheses.

d. Location. The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

e. Usable on Code. Not applicable.

f. Quantity Required (Qty Reqd). This column lists the quantity of each item required for a complete major item.

g. Quantity. This column is left blank for use during an inventory. Under the Rcvd column, list the quantity you actually receive on your major item. The Date columns are for your use when you inventory the major item.

(Next printed page is B-3).

SECTION II INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER	(FSCM)	(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY RCVD	(7) QUANTITY DATE
1-2	1	5410-00-999-6022	RADIO, REPEATER SET AN/TRC-138	80063			1		
			CONSISTING OF:						
			SHELTER, ELECTRONICS EQUIP S-393/TRC-138						
1-4	1	2540-00-892-6243	LADDER, BOARDING, MX-3391()/G	80063			1		
1-7	2	7520-00-162-6178	SHARPENER, PENCIL	81349			1		
1-9	1	2330-00-141-8052	CHASSIS, TRAILER 1.5 TONS M103AC	12986			1		
1-9	2	5985-00-782-5278	MAST, AB-621()/GRC				3		
1-9	3	5995-00-889-1500	CABLE ASSEMBLY, POWER	80063	WOUND ON RC-435		1		
			CX-7453()/U (100 FT)						
1-9	3	8130-00-656-1090	REEL, CABLE RC-435()/U	80063	PU-631/G		1		
1-10	1	5940-00-283-5386	BINDING POST U-106	80063			10		
			P/O POWER ENTRANCE BOX						
1-14)) 1015)	ALL	5985-00-926-2593	ANTENNA ASSEMBLY	80063			3		
			AS-1425()/GRC						
FO-1(A)	1		DRAWER NO. 1 (RECEIVER SPARE MODULES)	28528			1		
			CONSISTING OF:						
		5820-00-407-0756	AMPLIFIER-FREQUENCY MULTIPLIER RECEIVER	28528			1		
		5820-00-136-1244	AMPLIFIER, 70 MHz IF 2AS	28528			1		
		5820-00-136-1259	AMPLIFIER, MIXER 2A7	28528			1		
		5820-00-136-1240	AMPLIFIER TUNNEL DIODE 2A2	28528			1		
		5820-00-136-4960	DEMODULATOR 2A4	28528			1		
		5820-00-407-0754	FREQUENCY MULTIPLIER OSCILLATOR 220MHz 2A13	28528			1		
FO-1(A)	2		DRAWER NO. 2 (TRANSMITTER SPARE MODULES)	28528			1		
			CONSISTING OF:						
		5820-00-407-0705	AMPLIFIER-FREQUENCY, MULTIPLIER TRANSMITTER 1A11	28528			1		
		5820-00-136-1250	CONTROL ELECTRONIC FREQUENCY 1A7	28528			1		
		5820-00-136-1237	FREQUENCY MULTIPLIER, 2ND STAGE TRANSMITTER 1A10A1	28528			1		
		5820-00-136-1236	FREQUENCY MULTIPLIER, 3RD STAGE TRANSMITTER 1A10A2	28528			1		
			MIXER CRYSTAL 1A9A1	28528			1		
		5820-00-136-1242	MODULATOR, RADIO TRANSMITTER 1A8	28528			1		
		5820-00-136-1233	OSCILLATOR, 100 MHz RF 1A1	28528			1		
		6110-00-136-2331	REGULATOR, VOLTAGE 5/6 VOLT 1A1A1 THROUGH 1A1A4	28528			1		
FO-1(A)	3		DRAWER NO. 3 (DIGITAL DATA MODEM AND ORDER-WIRE SPARE MODULES)	28528			1		
			CONSISTING OF:						

SECTION II INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER	(FSCM)	(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY RCVD	(7) QUANTITY DATE
		5820-00-135-4589	ALARM MONITOR 1A12A5	28528			1		
		5820-00-140-7393	AMPLIFIER, AF 1A12A6	28528			1		
			AMPLIFIER-DETECTOR, RADIO 1A12A7	28528			1		
			CONTROL-COMPARATOR, CABLE 1A12A3	28528			1		
		5820-00-140-7391	CONTROL-COMPARATOR, RADIO 1A1249	28528			1		
		5820-00-256-5726	DAUGHTER BOARD NO. 1 ASSEMBLY 1A13A1	28528			1		
		5820-00-256-5729	DAUGHTER BOARD NO. 2 ASSEMBLY 1A13A2	28528			1		
		5820-00-256-5730	DAUGHTER BOARD NO. 3 ASSEMBLY 1A13A3	28528			1		
		5820-00-405-4563	DAUGHTER BOARD NO. 4 ASSEMBLY 1A13A4	28528			1		
		5820-00-451-8277	DAUGHTER BOARD NO. 5 ASSEMBLY 1A13A5	28528			1		
			MODEM TEST CABLE, DIGITAL DATA				1		
		5820-00-136-1234	OSCILLATOR VOLTAGE CONTROL 1A12A1 OR 1A12A11	28528			1		
		5820-00-146-1249	PROCESSOR, DIGITAL, CABLE 1A12A4	28528			1		
			PROCESSOR, DIGITAL, RADIO 1A12A10	28528			1		
		5820-00-135-4585	REGENERATOR, DIGITAL, ~~RADIO~~ CABLE 1A12A2	28528			1		
			REGENERATOR, DIGITAL RADIO 1A12A8	28528			1		
FO-1(A)	4		DRAWER NO. 4 (RECEIVER/TRANSMITTER SPARE MODULES, SPARE INCANDESCENT LAMPS AND SPARE SEMICONDUCTOR DEVICES) CONSISTING OF:	28528			1		
		5820-00-136-1246	ALARM MONITOR 1AS OR 2A12	28528			1		
		5820-00-136-1241	AMPLIFIER, AF-RF 1A4 OR 2A11	28528			1		
		5820-00-136-1258	CONVERTER FREQUENCY, ELECTRONIC 1A14A2 OR 2A14A2	28528			1		
		5820-00-136-1257	DETECTOR, AF PHASE ERROR 1A14A3 OR 2A14A3	28528			1		
		5820-00-136-1235	FREQUENCY DIVIDER, FIXED 1A14A6 OR 2A14A4	28528			1		
		5820-00-136-1255	FREQUENCY DIVIDER, VARIABLE 1: 1A14A4 OR 2A14A4	28528			1		
		5820-00-136-1256	FREQUENCY DIVIDER VARIABLE 2: 1A14A5 OR 2A14A5	28528			1		
		6240-00-407-0703	LAMP, INCANDESCENT TYPE CM-8-1062				1		

SECTION II INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER	(3) (FSCM)	(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY RCVD	(7) QUANTITY DATE
		6240-00-060-2941	LAMP, INCANDESCENT TYPE 683				1		
		6240-00-406-7335	LAMP, INCANDESCENT TYPE 683				1		
		6240-00-407-0704	LAMP, INCANDESCENT TYPE 62				1		
		6240-00-965-1381	LAMP, INCANDESCENT TYPE 382				1		
		6240-00-763-7744	LAMP, INCANDESCENT TYPE 387				1		
		5820-00-136-1232	OSCILLATOR, RF 1A14A1 OR 2A14A1	28528			1		
		5820-00-136-4959	OSCILLATOR, RF 1A14A7 OR 2A14A7	28528			1		
		6110-00-191-9224	REGULATOR VOLTAGE, 12 VOLT 1A16A6-A9 OR 2A1A3	28528			1		
		6110-00-191-9225	REGULATOR VOLTAGE, 15/28 VOLT 1A1A10 THROUGH A-12 OR 2A1A1 AND 2A1A2, 2A1A4	28528			1		
		5961-00-615-4309	SEMICONDUCTOR-DEVICE, DIODE TYPE 1N23WE				4		
		5961-00-985-9091	SEMICONDUCTOR DEVICE, DIODE TYPE 1623 WG				2		
		5961-00-557-5273	SEMICONDUCTOR DEVICE DIODE TYPE 1N76				1		
		6130-00-135-4552	SUPPLY, POWER 1A14A8 OR 2A14A8	28528			1		
FO-1(A)	5	7105-00-943-3868	CHAIR FOLDING	80063			1		
FO-1(A)	6	5985-00-450-9720	INDICATOR, ANTENNA ALIGNMENT ID-1708()/GRC	80063	STORAGE CABINET		1		
FO-1(A)	6	4940-00-752-2528	STRAP GROUND (10 FT)	20309	STORAGE CABINET		2		
FO-1(A)	6	5210-00-211-1882	TAPE, MEASURING (100 FT)	80063	STORAGE CABINET		1		
FO-1(A)	6	9920-00-682-6757	TRAY, ASH	81348	STORAGE CABINET		1		
FO-1(A)	6	7910-00-733-5256	CLEANER, VACUUM HAND HOOVER M2800 OR EQUIVALENT	29335	STORAGE CABINET		1		
FO-1(A)	7	5805-00-985-9088	CONVERTER, TELEGRAPH-TELEPHONE CV-425()/U	80063			3		
FO-1(A)	8	5120-00-946-5148	GRIP, CABLE (POWER)	95344	STORAGE DRAWER		1		
FO-1(A)	8	6240-00-143-3070	LAMP, INCANDESCENT 50 WATTS (FOR EXTENSION LIGHT)	80063	STORAGE DRAWER		3		
FO-1(A)	8	6605-00-264-3994	COMPASS, MAGNETIC KEUFFEL AND ESSER NO. 800090 OR EQUIVALENT	33363	STORAGE DRAWER		1		
FO-1(B)	1	7520-00-926-4726	BASKET, WASTEPAPER	80063			2		
FO-1(B)	2	7110-00-273-8791	CHAIR, ROTARY	81348			1		
FO-1(B)	4	5830-00-752-5357	STATION, INTERCOMMUNICATION LS-147	80063			1		
FO-1(B)	5	5805-00-543-0012	SET, TELEPHONE TA-312()/PT	80063			3		

SECTION II INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER	(3) DESCRIPTION (FSCM)	(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY RCVD	(7) QUANTITY DATE
FO-1(B)	6	6645-00-410-2395	CLOCK, ELECTRIC, BATTERY OPERATED (WALL MOUNTED 3 INCH)	19200			1		
FO-1(C)	7	4140-00-409-8298	EXHAUST, BLOWER, WITH HOUSING	80063			2		
FO-1(C)	1	5975-00-224-5260	ROD GROUND, MX-148/G	80063			2		
FO-1(D)	2	6240-00-152-2996	LAMP, FLUORESCENT, 20 WATT	80063	17 IN CEILING, 3 SPARES		20		
F(-1(D)	3	6240-00-143-3034	LAMP, INCANDESCENT, 25 WATTS	80063	8 IN CEILING, 2 SPARES		10		
FO-1(F)	1	5820-00-926-7356	RADIO SET AN/GRC-144() INCLUDES BUT NOT LIMITED TO THE FOLLOWING:	80063			3		
		5820-00-782-5093	RECEIVER, RADIO T-1461()/GRC-144				1		
		5820-00-926-7365	TRANSMITTER, RADIO T-1054()/GRC-144				1		
		5965-00-892-3850	HANDSET H-156()/PT				1		
			RUNNING SPARES FOR TRANSMITTER, RADIO T-1054/GRC-144 CONSITING OF:		SPECIAL TOOLS AND SPARE FUSES COMPARTMENT				
		5920-00-777-6473	FUSE, 3A (FM01-3A)				5		
		5920-00-281-0210	FUSE, 4A (FO2A250V4AS)				5		
		5920-00-877-9934	FUSE, 3A (FO2A250V3AS)				5		
		5920-00-775-2273	FUSE, 5A SLO-BLO (FO2B32V5AS)				5		
			RUNNING SPARES FOR RECEIVER, RADIO R-1467/GRC-144 CONSISTING OF:		SPECIAL TOOLS AND SPARE FUSES COMPARTMENT				
		5920-00-777-6473	FUSE, 3A (FM01-3A)				5		
		5920-00-850-6091	FUSE, 1A (FO2B250V1AS)				5		
		5920-00-877-9934	FUSE, 3A (FO2A250V3AS)				5		
		5920-00-775-2273	FUSE, 5A SLO-BLO (FO2B32V5AS)				5		
FO-1(E)	6	7920-00-178-8315	BRUSH, DUSTING				1		

SECTION III. BASIC ISSUE ITEMS

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION PART NUMBER	(3) DESCRIPTION (FSCM)	(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY RCVD	(7) QUANTITY DATE
1-1	1	5340-00-682-1508	PADLOCK W/2 KEYS (2 LOCKS - NOT KEYED ALIKE)	80063			2		
FO-1(A)	6	7210-00-205-3545	CUSHION, CHAIR	80063	STORAGE CABINET		1		
FO-1(A)	6	6230-00-239-3518	LIGHT, EXTENSION (25 FT)	80063	STORAGE CABINET		1		
FO-1(A)	8	6240-00-082-3411	LAMP, GLOW NE-51	80063	STORAGE DRAWERS		10		
FO-1(8)	3		TM 11-5820-773-15		MANUAL HOLDER		1		
FO-1(B)	6	6135-00-850-3177	BATTERY, 9V, DRY SNAP ON TYPE TERMINALS (FOR CLOCK)	17397	CLOCK		1		
FO-1(D)	1	6240-00-635-9753	LAMP, GLOW, NE-34		(POWER INDICATOR)		2		
FO-1(D)	4	7520-00-162-6178	STARTER, FLUORESCENT LAMP FS-2	80063			21		
FO-1(E)	1	5120-00-234-8910	SCREWDRIVER, FLAT BLADE (6 IN) (GENERAL USE)	81348			1		
FO-1(E)	1	5120-00-240-8716	SCREWDRIVER, CROSSTIP, PHILLIPS TYPE TIP 8 IN BLADE	81348			1		
FO-1(E)	2	5120-00-900- 6096	HAMMER, SLEDGE (8 LB)	80063			1		
FO-1(E)	3	6545-00-922-1200	KIT, FIRST AID	80063			1		
FO-1(E)	4	5110-00-293-2339	AXE, SINGLE BLADE	80063			1		
FO-1(E)	5	6230-00-729-9614	FLASHLIGHT, HAND LANTERN	80063			1		
FO-1(E)	5	6135-00-120-1020	BATTERY, LANTERN BA-30	14838			4		
FO-1(E)	7	4210-00-270-4512	EXTINGUISHER, FIRE (516)	81349			1		
FO-1(E)	7	4210-00-595-4085	BRACKET, FIRE EXTINGUISHER						
FO-1(F)	2	7220-00-753-2982	MAT, FLOOR (10 YD ROLL)	80063			1		

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

C-1. Scope

This appendix lists additional items you are authorized for the support of the AN/TRC-138.

C-2. General

This list identifies items that do not have to accompany the AN/TRC-138 and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

C-3. Explanation of Listing

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment.

If the item you require differs between serial numbers of the same model, effective serial numbers are shown in the last line of the description. If item required differs for different models of this equipment, the model is shown under the "Usable on" heading in the description column.

(Next printed page is C-3)

SECTION II ADDITIONAL AUTHORIZATION LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION PART NUMBER AND FSCM	USABLE ON CODE	(3) UNIT OF MEAS	(4) QTY AUTH
6115-00-059-5173	83298 GENERATOR SET, GASOLINE ENGINE 5 KW TRAILER MOUNTED PU-631/G		EA	2
5820-00-223-7433	80063 RADIO SET AN/VRC-46		EA	1
6130-00-985-7899	80003 POWER, PORTABLE, PP-2953		EA	1

APPENDIX D

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

D-1. General

This appendix provides a summary of the maintenance operations for AN/TRC-138. It authorizes categories 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.

D-2. Maintenance Function

Maintenance functions will be limited 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.

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, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the 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 equipment 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. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

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 materiel 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 equipments/components.

D-3. Column Entries

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed wihout maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "worktime" 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 category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "worktime" figures will be shown for each category. The number of task-hours specified by the

"worktime" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns or column 4 are as follows:

C - Operator/Crew
O - Organizational
F - Direct Support
H - General Support
D - Depot

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

D-4. Tool and Test Equipment Requirements (Sect. III)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

D-5. Remarks (Sect. IV)

a. Reference Code. This code refers to the appropriate item in section II, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in section II.

(Next printed page is D-3.)

SECTION II MAINTENANCE ALLOCATION CHART FOR

RADIO REPEATER SET AN/TRC-138

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
00	RADIO REPEATER SET AN/TRC-138	Inspect		0.3					
		Test		0.5				1,3,5	B, F
		Test			1.0			1,2,3,4,5	G
		Service		0.5				1,3,5	A
		Install		2.5				1,2,5	
		Repair		1.0				1,3,5	C
		Repair			1.0			1,3,5	C
		Repair				1.7		1,2,4,5	C
		Overhaul					12.0	1,2,4,5	D
01	SHELTER ELECTRICAL EQUIPMENT S-393/TRC-138 (DLSCB 632352 & SCD 632353)	Repair		1.0				1,3,5	H
		Repair			2.0			1,3,5	D
		Repair				3.0		1,2,4,5	E
0101	CABLE ASSY, CX-7705/U, 15 FT SMD 352157	Replace		0.2					
		Repair			0.5			1,3	
0102	POWER CABLE, 6½ FT SCC 632527	Replace		0.2					
		Repair			0.5			1,3	
0103	PATCH PANEL ASSY SCD 632629	Repair			0.7			1,3	
0104	ORDER WIRE PATCH CABLE, 1½ FT SCD 632631	Replace		0.2					
		Repair			0.4			1,3	
0105	PATCH CABLE, CABLE/REPEATER, 1½ FT SCC 632636	Replace		0.2					
		Repair			0.4			1,3	
0106	CONTROL INDICATOR ASSY SCD 632644	Repair		0.5				1,3	H
		Repair			0.7			1,3	
0107	BRACKET INSTALLATION SCD 632354	Repair				2.0		5	
010701	UTILITIES INSTALLATION ELECTRICAL SCD 632355	Repair		0.5				1,3	H
		Repair			1.0			1,3	
01070101	AUDIO CABLE ASSY GRI THRU GRV SCC 602248	Repair			0.4			1,3	
01070102	WIRE ASSY SCB 547222	Repair			1.0			1,3	
01070103	REPEATER INTERCONNECT GRI THRU GRIV SCD 632529	Repair			0.4			1,3	
01070104	VIDEO CABLE GRI THRU GRVI SCD 632531	Repair			0.4			1,3	
01070105	CABLE, RF TEST OUT SCD 632532	Repair			0.4			1,3	
01070106	SIGHTING CABLE GRI, GRII, GRIII SCD 632533	Repair			0.4			1,3	
01070107	TRAFFIC CABLE SCD 632534	Repair			0.4			1,3	
01070108	EQUIPMENT INTERCONNECT HARNESS GRI, GRII, GRIII SCD 632535	Repair			1.0			1,3	
01070109	CABLE ASSY VIDEO (XMTR TO PATCH) GRI, GRII, GRIII SCD 632609	Repair			0.4			1,3	
01070110	CABLE ASSY VIDEO (XMTR TO PATCH) GRI, GRII, GRIII SCD 632610	Repair			0.4			1,3	
01070111	THRU ORDER WIRE CABLE GRI, GRII, GRIII SCD 632630	Repair			0.4			1,3	
01070112	UTILITIES INSTALLATION RACEWAY SCD 632356	Repair		0.5				1,3	H
		Repair			1.0			1,3	
0107011201	BLOWER ASSY SCD 539982	Repair			0.8			1,3,5	
0107011202	POWER DISTRIBUTION ASSY SCD 632400	Repair		0.5				1,3	H
		Repair			1.0			1,5	
0107011203	POWER ENTRANCE ASSY SCD 632418	Repair			0.6			1,5	
0107011204	VIDEO ENTRANCE ASSY SCD 632432	Repair			0.6			1,3,5	
0107011205	ANTENNA ENTRANCE ASSY (ROADSIDE) SCD 632458	Repair			0.6			1,3,5	
0107011206	ANTENNA ENTRANCE ASSY (CURBSIDE) SCD 632459	Repair			0.6			1,3,5	

SECTION II MAINTENANCE ALLOCATION CHART FOR

RADIO REPEATER SET AN/TRC-138

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
0107011207	SHELTER, MODIFIED SCD 632357	Repair				2.0		4	
02	ANTENNA AS-1425/GRC	Replace		1.0				3,5	I
03	MAST AB-621/G	Replace		1.0				3,5	J
04	RADIO SET AN/GRC-144	Replace		0.3				3	K
05	INTERCOMMUNICATION STATION LS-147C/FI	Replace		0.3				3	L
06	CONVERTER, TELEGRAPH-TELEPHONE SIGNAL CV-425/U	Replace		0.4				3	M
07	TELEPHONE SET TA-312/PT	Replace		0.2				3	N

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS FOR RADIO REPEATER SET AN/TRC-138

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O, F, H, D	MULTIMETER TS-352()/U	6625-00-553-0142	
		OR		
		AN/USM-223	6625-00-999-7465	
2	H, D, F	OHMMETER, ZM-21A/U	6625-00-643-1030	
3	O, F	TOOL KIT, ELECTRONIC EQUIPMENT TK-105/G	5180-00-610-8177	
4	H, D, F	TOOL KIT, ELECTRONIC EQUIPMENT, SHELTER TK-144/G	5180-00-973-4369	
5	O, F, H, D	TOOL KIT, GENERAL MECHANIC	5180-00-177-7033	

SECTION IV. REMARKS
RADIO REPEATER SET AN/TRC-138

REFERENCE CODE	REMARKS
A	PREVENTIVE MAINTENANCE
B	SYSTEM OPERATION USING BUILT-IN FACILITIES
C	IN ACCORDANCE WITH COMPONENT MAINTENANCE ALLOCATION CHART (MAC)
D	BY COMPONENT
E	SHELTER FACILITY ONLY, TB 750-240
F	CONTINUITY OF POWER, LIGHTING AND SIGNAL CIRCUITS
G	ALL TESTS
H	LAMPS, FUSES, SWITCHES, STARTERS, RECEPTACLES, OUTLETS, CIRCUIT BREAKERS
I	TM 11-5985-335-15 (SEE TM FOR PARTS)
J	TM 11-5985-334-15 (SEE TM FOR PARTS)
K	TM 11-5820-695-34P (SEE TM FOR PARTS)
L	TM 11-5830-221-24P (SEE TM FOR PARTS)
M	TM 11-5805-356-34P-2 (SEE TM FOR PARTS)
N	TM 11-5805-201-12 (SEE TM FOR PARTS)

APPENDIX F

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

F-1. Scope

This appendix lists expendable supplies and materials you will need to operate and maintain the AN/TRC-138. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

F-2. Explanation of Columns

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 5, App. D").

b. Column 2—Level. This column identifies the lowest level of maintenance that requires the listed item.

C—Operator/Crew

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 the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

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.

(Next printed page is F-3.)

SECTION II EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION PART NO. AND FSCM	(5) UNIT OF MEAS
1	C	7530-00-285-1738	PAPER, WRITING	PADS
2	C	6810-00-292-9625	TRICHLOROETHANE	QT.
3	C	7510-00-281-5234	PENCISL, WRITING #2	DOZ.
4	C	8305-00-170-5063	CHEESECLOTH, UNBLEACHED	BOLT

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

VERNE L. BOWERS,
Major General, United States Army,
The Adjutant General.

Distribution:

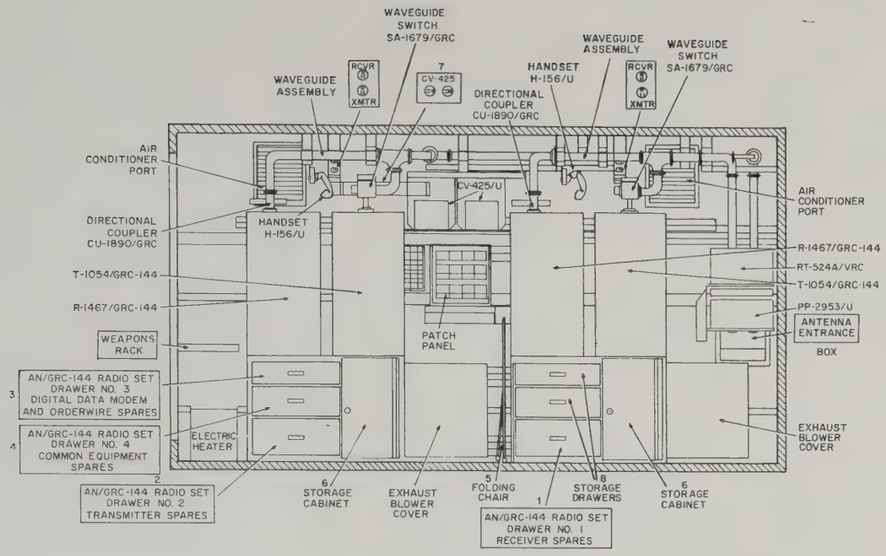
Active Army:

USASA (2)
CNGB (1)
ACSC–E (2)
Dir of Trans (1)
CofEngrs (1)
TSG (1)
CofSptS (1)
USAARENBD (2)
USAMB (10)
USACDC (2)
USACDC Agcy (1)
USAMC (1)
CONARC (5)
ARADCOM (2)
ARADCOM Rgn (2)
OS Maj Comd (4) except
  USAREUR (10)
LOGCOMDS (5)
USAMICOM (4)
USATECOM (2)
USASTRATCOM (4)
USAESC (70)
MDW (1)
Armies (5)
Corps (2)
1st Cav Div (3)
Svc Colleges (2)
USASCS (200)
USASESS (5)
USAADS (2)
USAFAS (2)
USAARMS (2)
USAIS (2)
USAES (2)
USAINTS (3)
WRAMC (1)
USACDCEC (10)
Instl (2) except
  Fort Gordon (10)
  Fort Huachuca (10)
  Fort Carson (21)
  Ft Richardson (USAECOM Ofc) (2)
  WSMR (3)
Army Dep (2) except
  LBAD (14)
  SAAD (30)
  TOAD (14)
  LEAD (7)
  NAAD (5)
  SVAD (5)
  ATAD (10)
Gen Dep (2)
Sig Sec Gen Dep (5)
Sig Dep (10)
Sig FLDMS (2)
ATS (1)
USAERDAA (2)
USAERDAW (5)
USACRREL (2)
MAAG (1)
USARMIS (1)
Units org under fol TOE:
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  11–85
  11–86
  11–87
  11–97
  11–98
  11–117
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  11–500 (AA–AC)
  29–134
  29–136

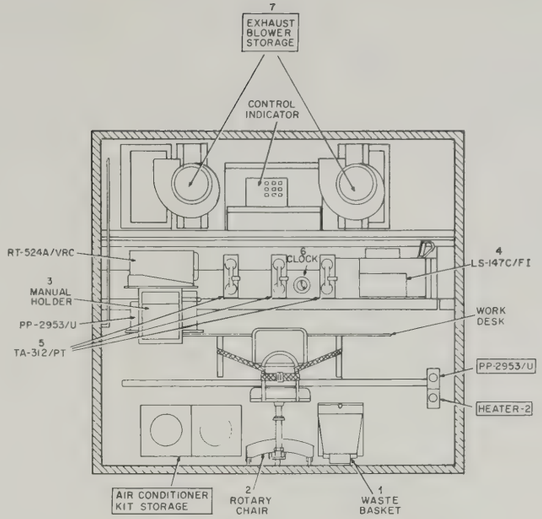
NG: State AG (3)

USAR: None.

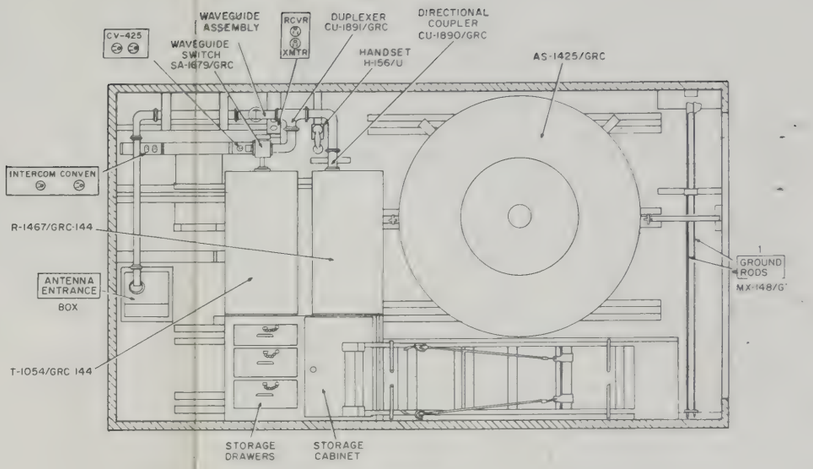
For explanation of abbreviations used, see AR 310–50.



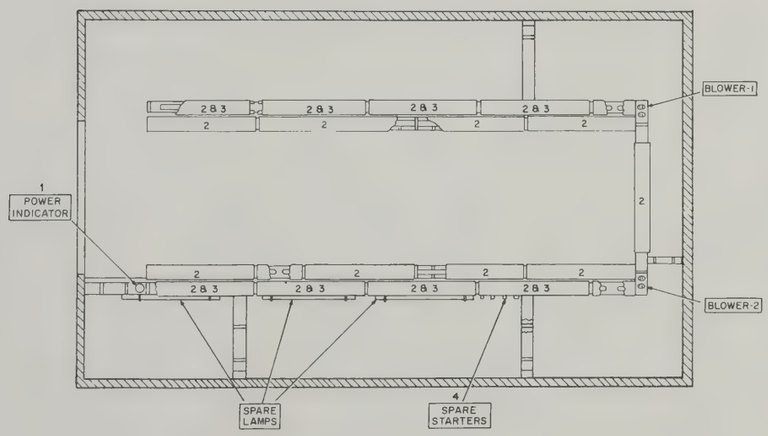
A. ROADSIDE WALL



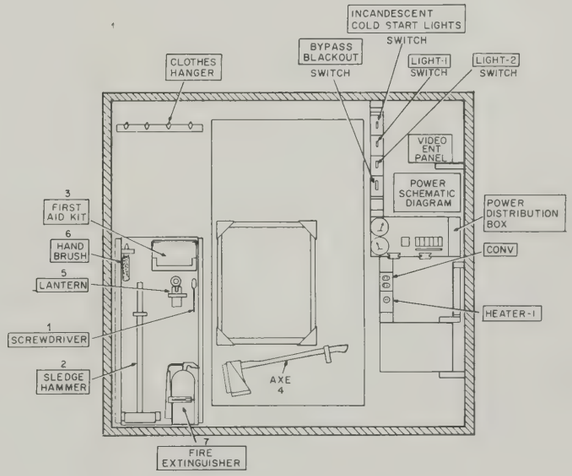
B. FRONT WALL



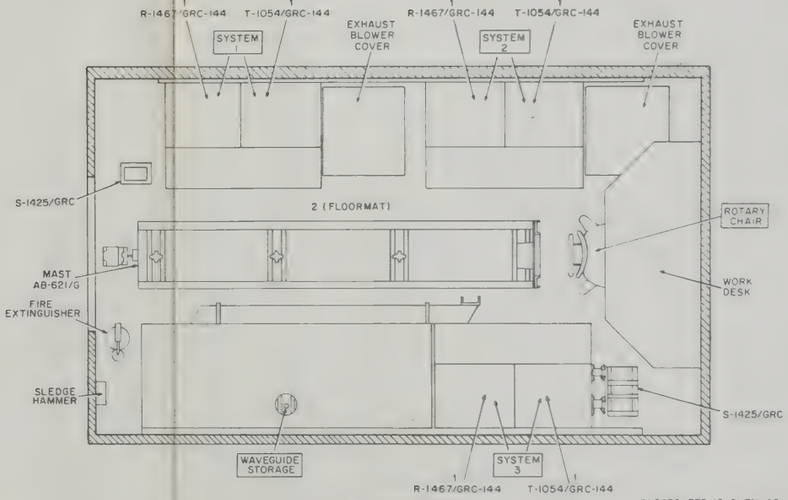
C. CURBSIDE WALL



D. CEILING PLAN



E. ENTRANCE WALL



F. FLOOR PLAN

EL5820-773-15-CI-TM-46

Figure FO-1. Radio Repeater Set AN/TRC-138, floor plan and elevation diagram.

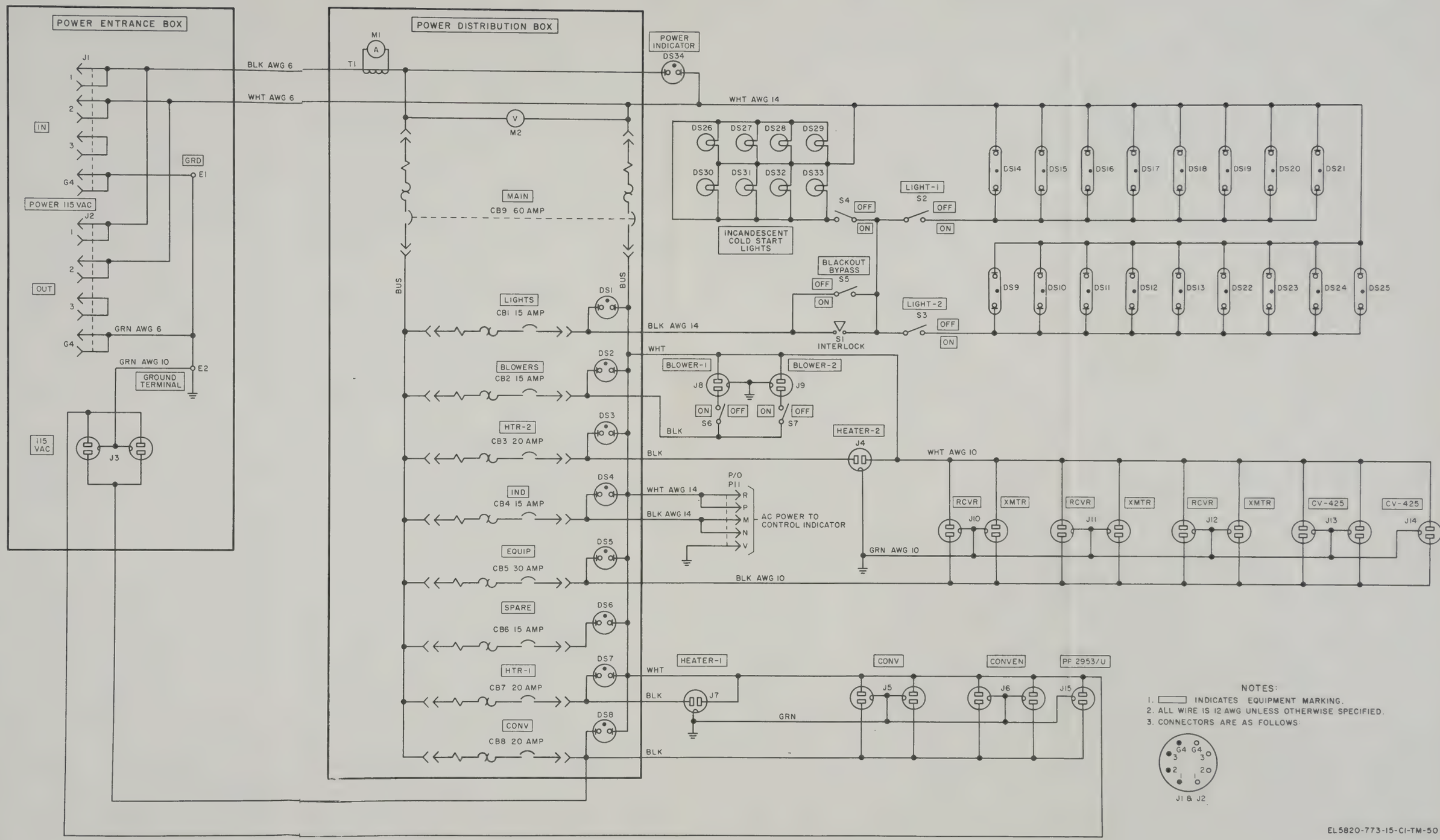


Figure FO–2. Radio Repeater Set AN/TRC–138, ac power schematic diagram.

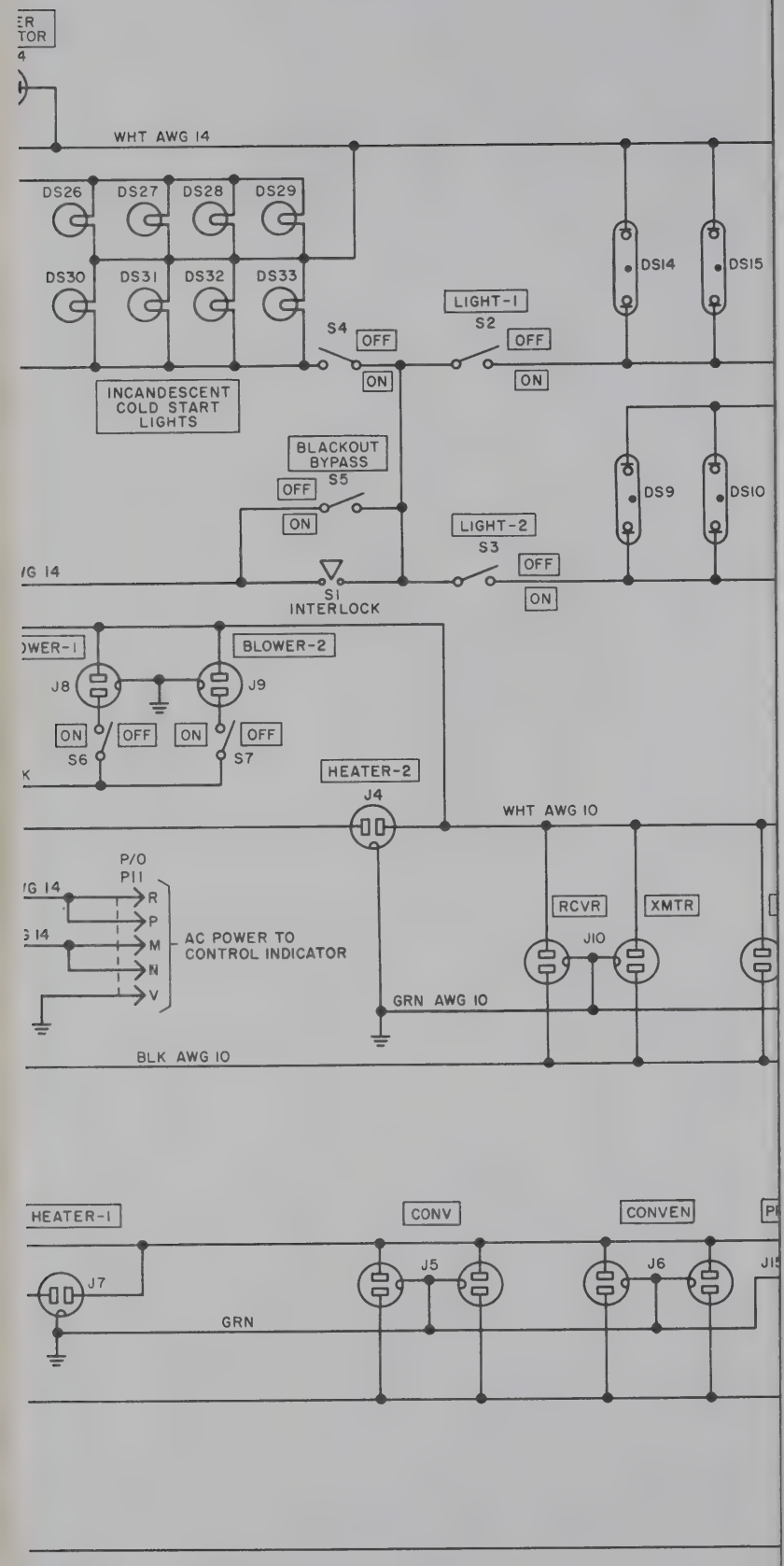
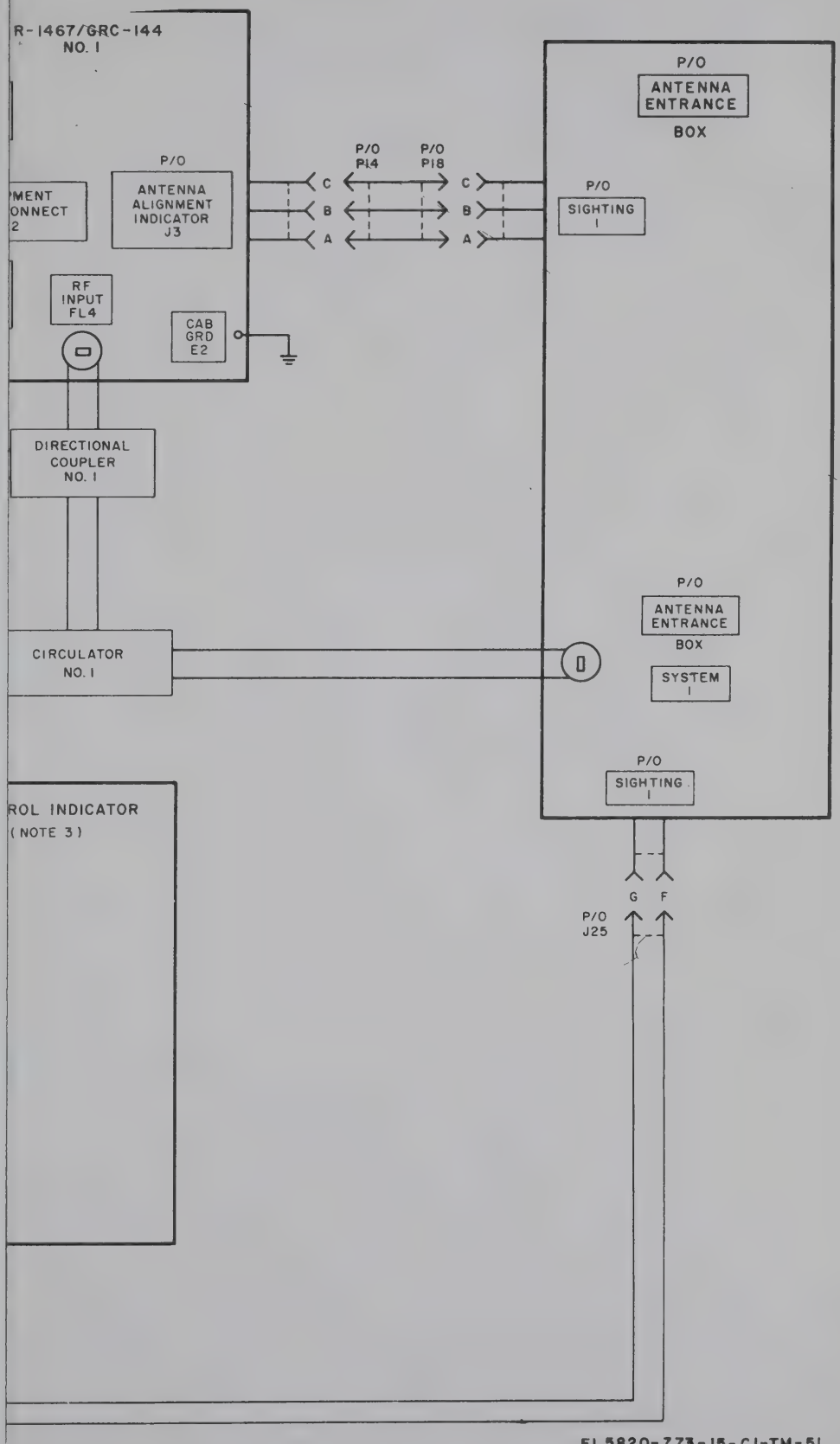


Figure FO–2. Radio Repeater



Radio Repeater Set AN/TRC-138, signal schematic-wiring diagram.

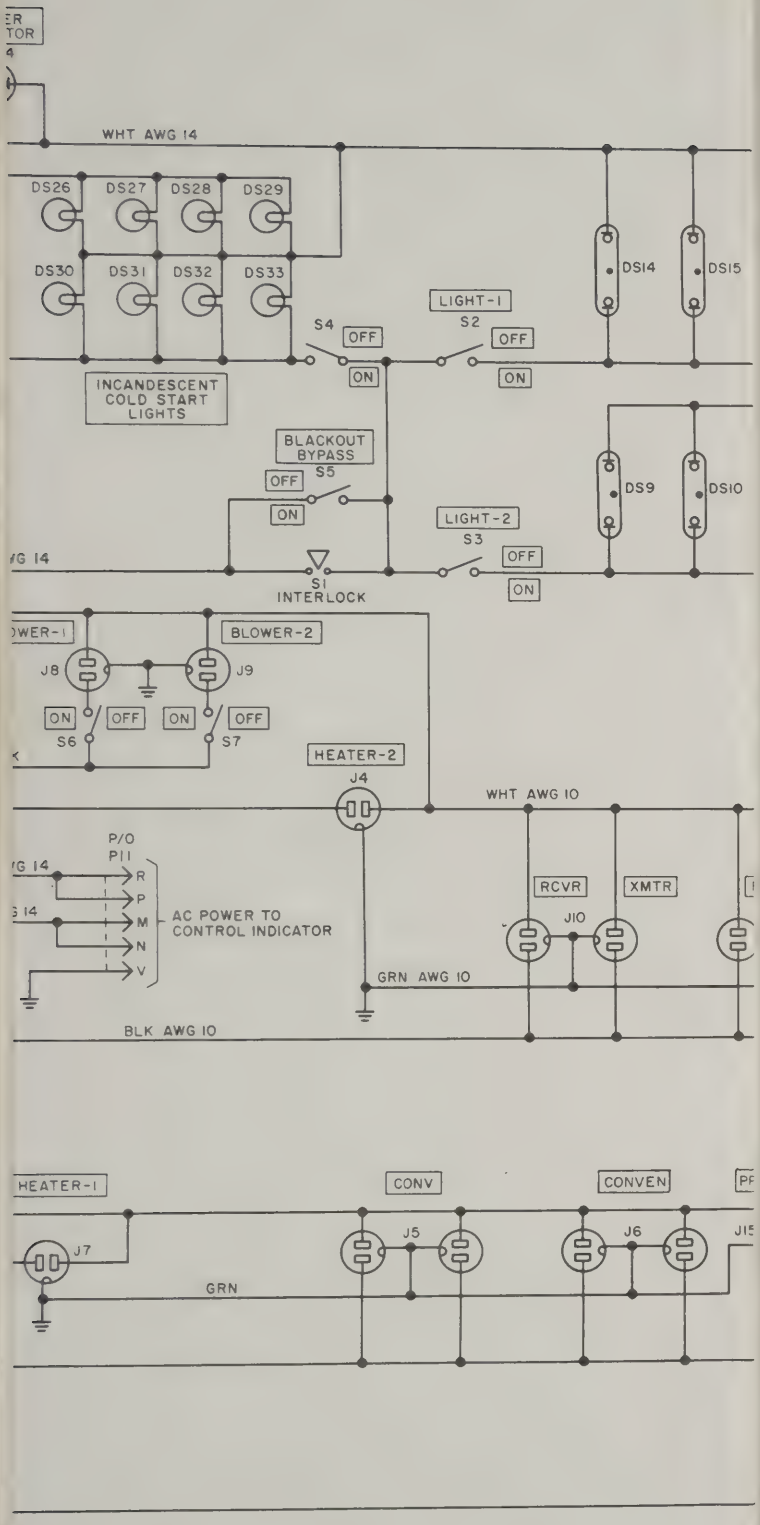
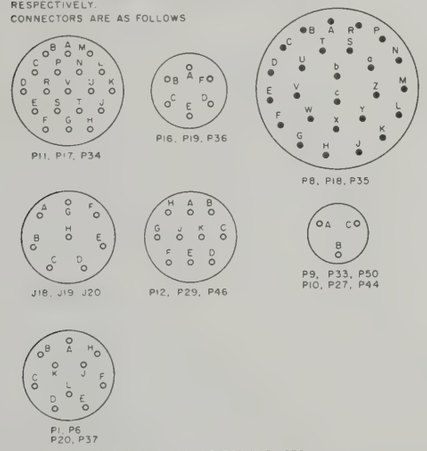


Figure FO–2. Radio Repeater S

NOTES:
1. ▭ INDICATES EQUIPMENT MARKING
2. ONLY SYSTEM 1 IS SHOWN. SYSTEM 2 AND 3 ARE IDENTICAL EXCEPT FOR REFERENCE DESIGNATIONS INDICATED BELOW

SYSTEM 1	SYSTEM 2	SYSTEM 3
BP1	BP3	BP5
BP2	BP4	BP6
P1	P24	P41
P2	P23	P40
P3	P22	P39
P4	P21	P38
P5	P30	P47
P6	P20	P37
P7	P26	P43
P8	P18	P35
P9	P33	P50
P10	P27	P44
P11	P17	P34
P12	P29	P46
P13	P25	P42
P14	P32	P49
P15	P31	P48
P16	P19	P36
J1	J3	J5
J2	J4	J6
J7	J9	J11
J8	J10	J12
J13	J15	J17
J14	J16	J18
J19	J20	J21
J22	J23	J24
J25	J26	J27

3. ASSEMBLAGES BEARING SERIAL NO'S 1 THRU 25 CONTAIN THREE SEPARATE CONTROL INDICATORS. ASSEMBLAGES BEARING SERIAL NOS. 26 AND ABOVE CONTAIN ONE CONTROL INDICATOR WITH CIRCUITS FOR ALL THREE SYSTEMS. REFERENCE DESIGNATIONS J2 AND J3 ARE USED FOR SYSTEMS 2 AND 3 RESPECTIVELY.
4. CONNECTORS ARE AS FOLLOWS



5. CONNECTOR DESIGNATIONS P28 AND P45 NOT USED

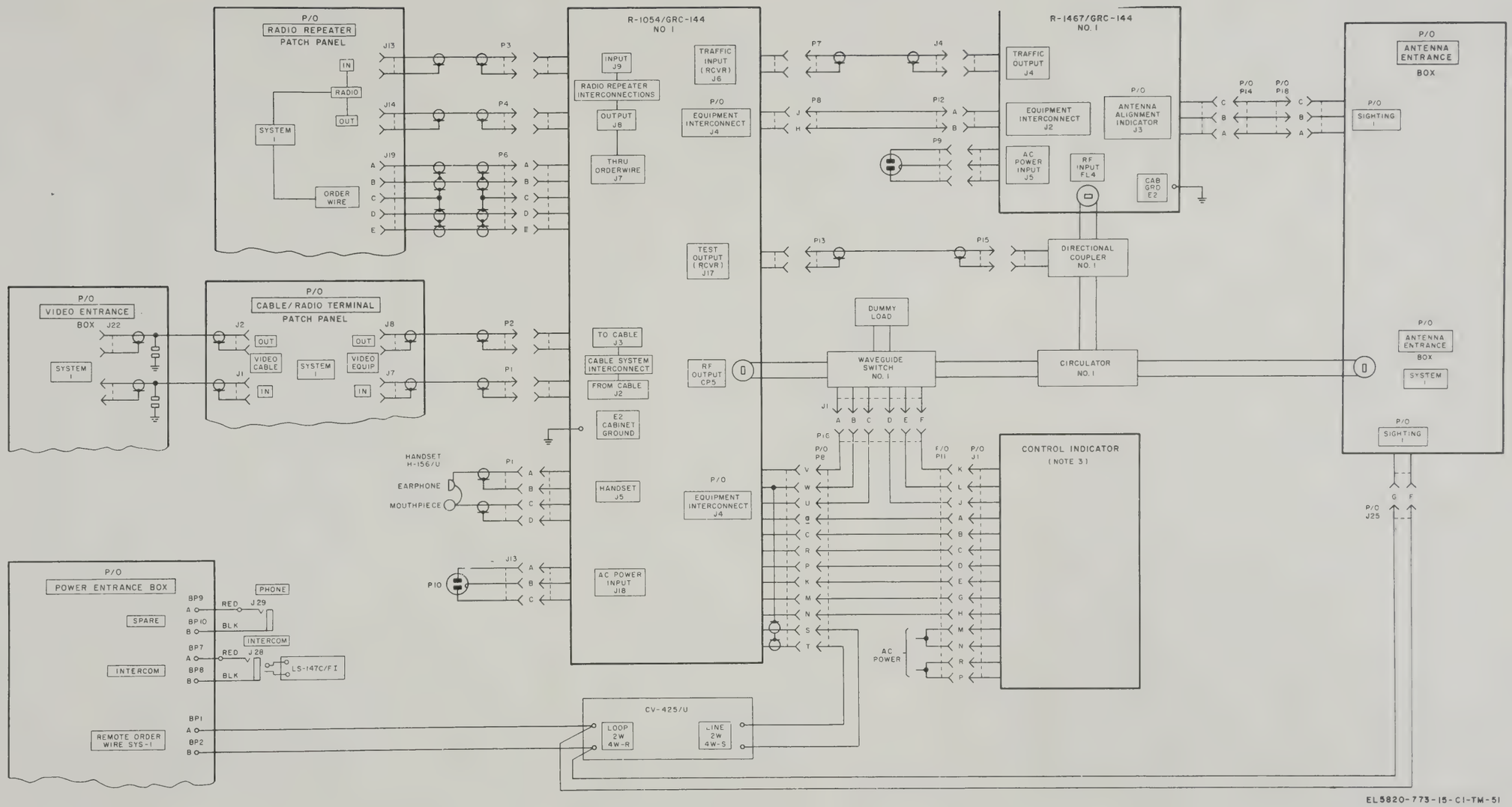
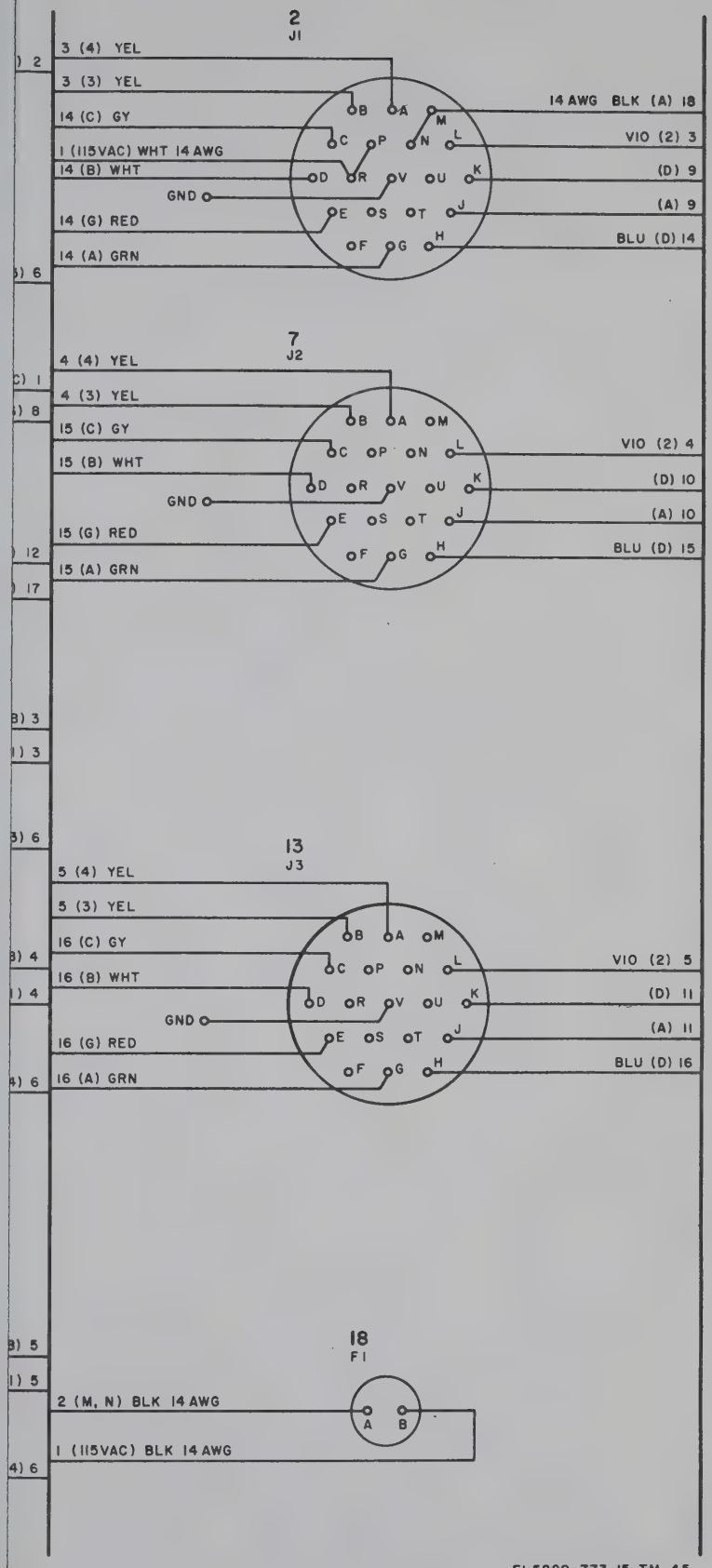


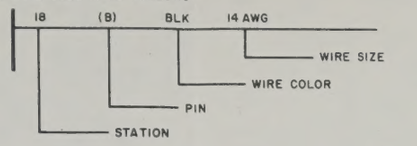
Figure FO-3. Radio Repeater Set AN/TRC-138, signal schematic-wiring diagram.

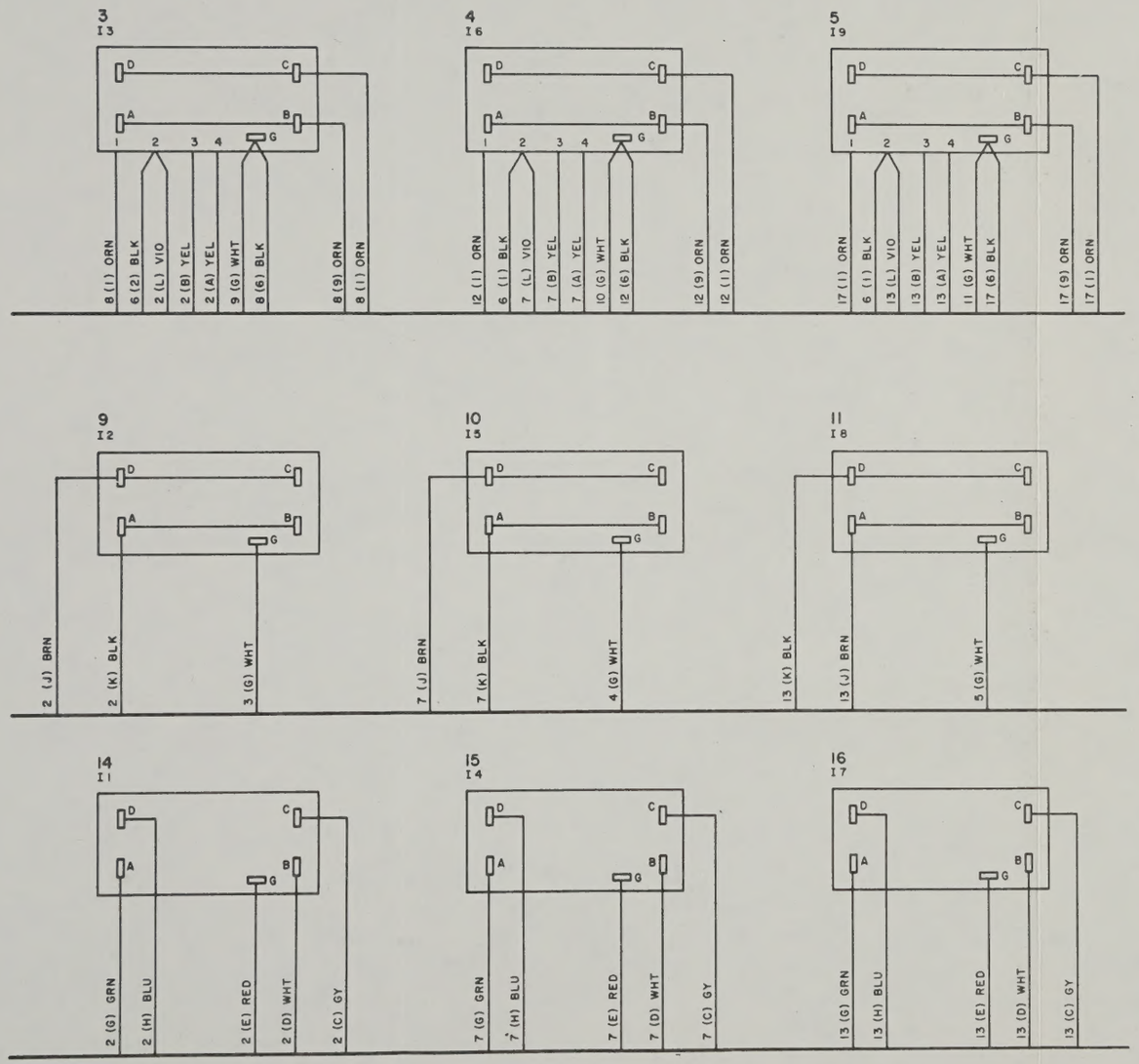


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NOTES:
1. ALL WIRES ARE 20 AWG UNLESS OTHERWISE SPECIFIED.
2. WIRE CODE IS AS FOLLOWS:





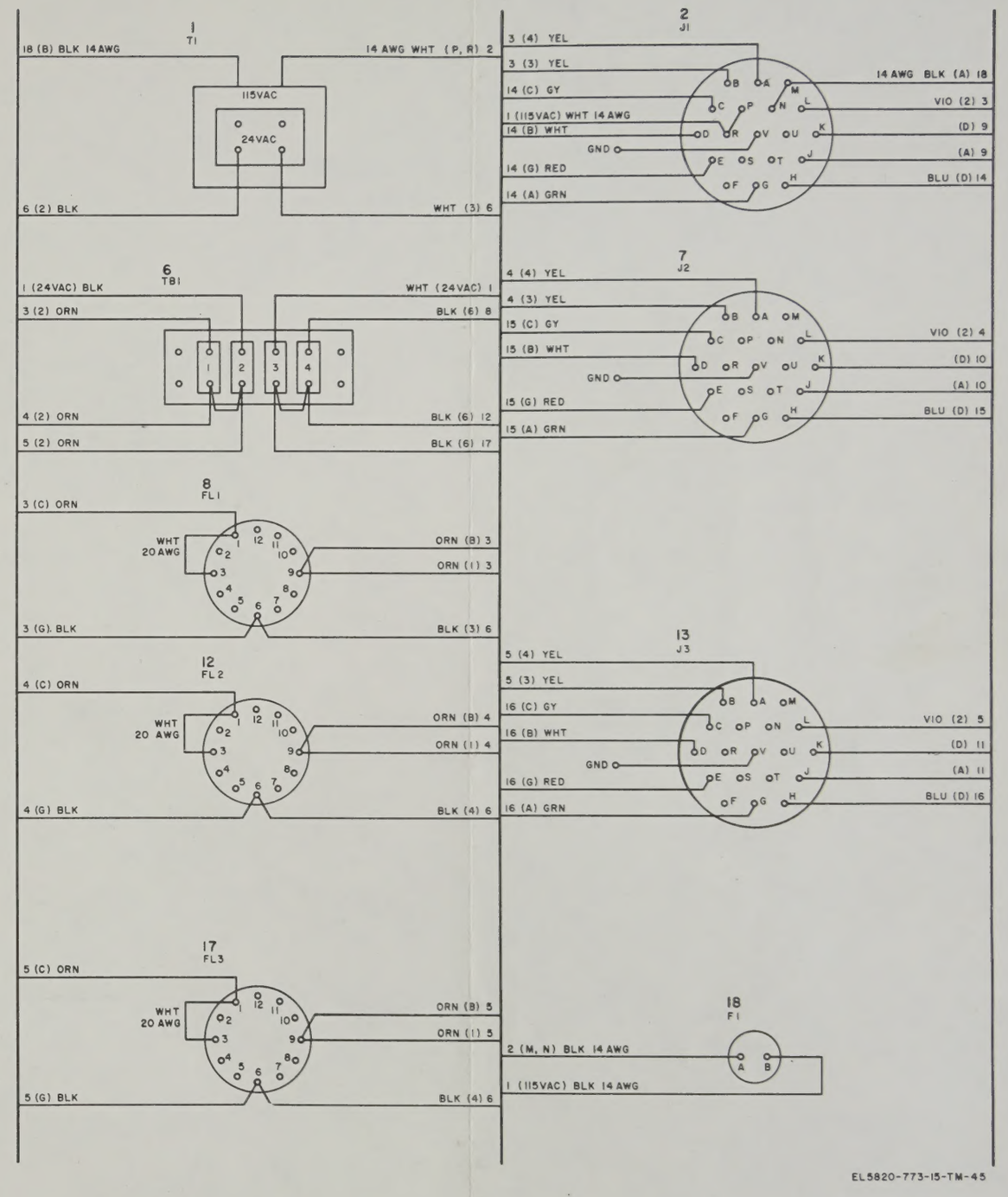
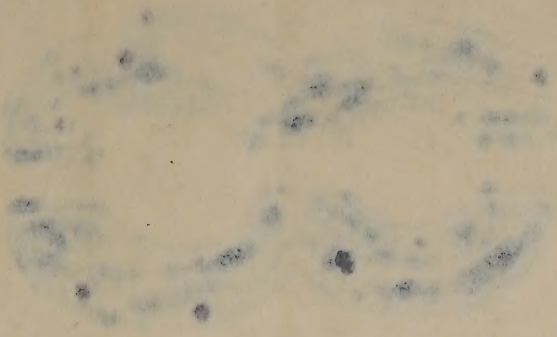
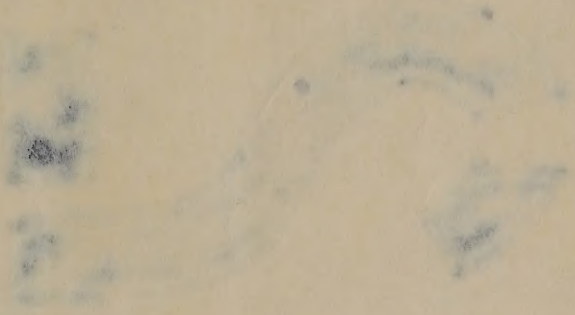


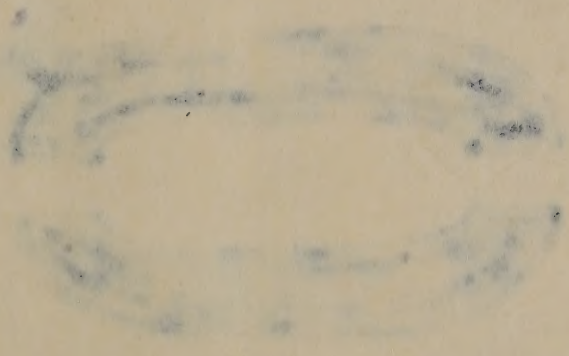
Figure FO–4. Control indicator, wiring diagram (serial No.'s 26 and above).

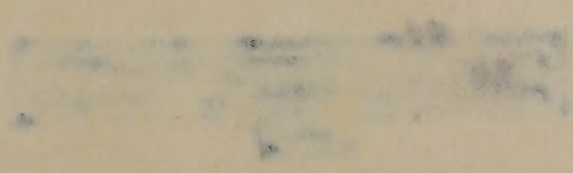
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