DEPARTMENT OF THE ARMY TECHNICAL MANUAL

TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL

MAINTENANCE MANUAL

SUBSTATION, TRAILER MOUNTED, 500 KVA, AC,

4160-416Y/240V, 208Y/120V

3 PHASE 50/60 HERTZ

AVIONICS MODEL 950-2200A

FSN 6120-422-1047

HEADQUARTERS, DEPARTMENT OF THE ARMY

MAY 1972

WARNING

HIGH VOLTAGE

is used in the operation of this equipment.

DEATH ON CONTACT

may result if personnel fail to observe safety precautions. Learn the areas that open exposing high-voltage connection. Be careful not to contact high-voltage connections when installing or operating this substation. Before working inside the equipment, de-energize that section and check all grounds. Transformer vent valve. Open prior to air lift. Close immediately on landing. Energize switch gear heaters and lights at all times. When out of service, call direct support maintenance to add dry nitrogen to transformer until pressure reaches 3 PSI.

ELECTRICAL SHOCK

In case of accident or electrical shock, shut down substation at once. If substation can not be shut down, free victim from live conductor. Avoid direct contact with victim. Use a dry board, dry rope or any nonconducting implement to free victim. If victim is unconscious, apply artificial respiration and get medical help.

BODILY INJURY

Before energizing substation see that all loose bars, tools and parts are removed from the operating platform (trailer bed). Loose parts and tools could cause serious damage to equipment and bodily injury to personnel.

TECHNICAL MANUAL

NO. 5-6120-250-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *11 May1972*

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

SUBSTATION, TRAILER MOUNTED, 500 KVA,

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LIST OF ILLUSTRATIONS

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope
This manual is published for use by personnel who will operate this Avionics Model 950-2200A Mobile Substation in conjunction with a power source to service DCS stations. It provides information on operation, organizational maintenance, describes the main units and their functional relation to each other.

1-2. Forms and Records
Maintenance forms, records, and reports which are to the used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

1-3. Administrative Storage
(Refer to TM 740-90-1 (Administrative Storage of Equipment for information and instructions pertaining to organizational maintenance administrative storage.

1-4. Reporting of Errors
Reports of errors, omissions, and recent and recommendations for improving this publication by individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications), and forwarded direct to Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMSME-MP, 4300 Goodfellow Boulevard, St. Louis, Missouri, 63120.

1-5. Destruction of Army Material to Prevent

Refer to TM 750-244-3 (Procedure for Destruction of Equipment to Prevent Enemy Use) for information and instructions on destructions of equipment to prevent enemy use.

Section II. DESCRIPTION AND DATA

1-6. Description
a. General. The Avionics Model 950-2200A 500 (KVA Mobile Substation (fig. 1-1 sheets 1 and 2) is a self-contained unit. It may be used with generator sets or other power source for emergency or interim service at DCS stations or to support a DCS extension. It is mounted on a semitrailer for mobility and is provided with controls, instruments and accessories necessary to operate. All enclosures mounted on the trailer are weatherproof.

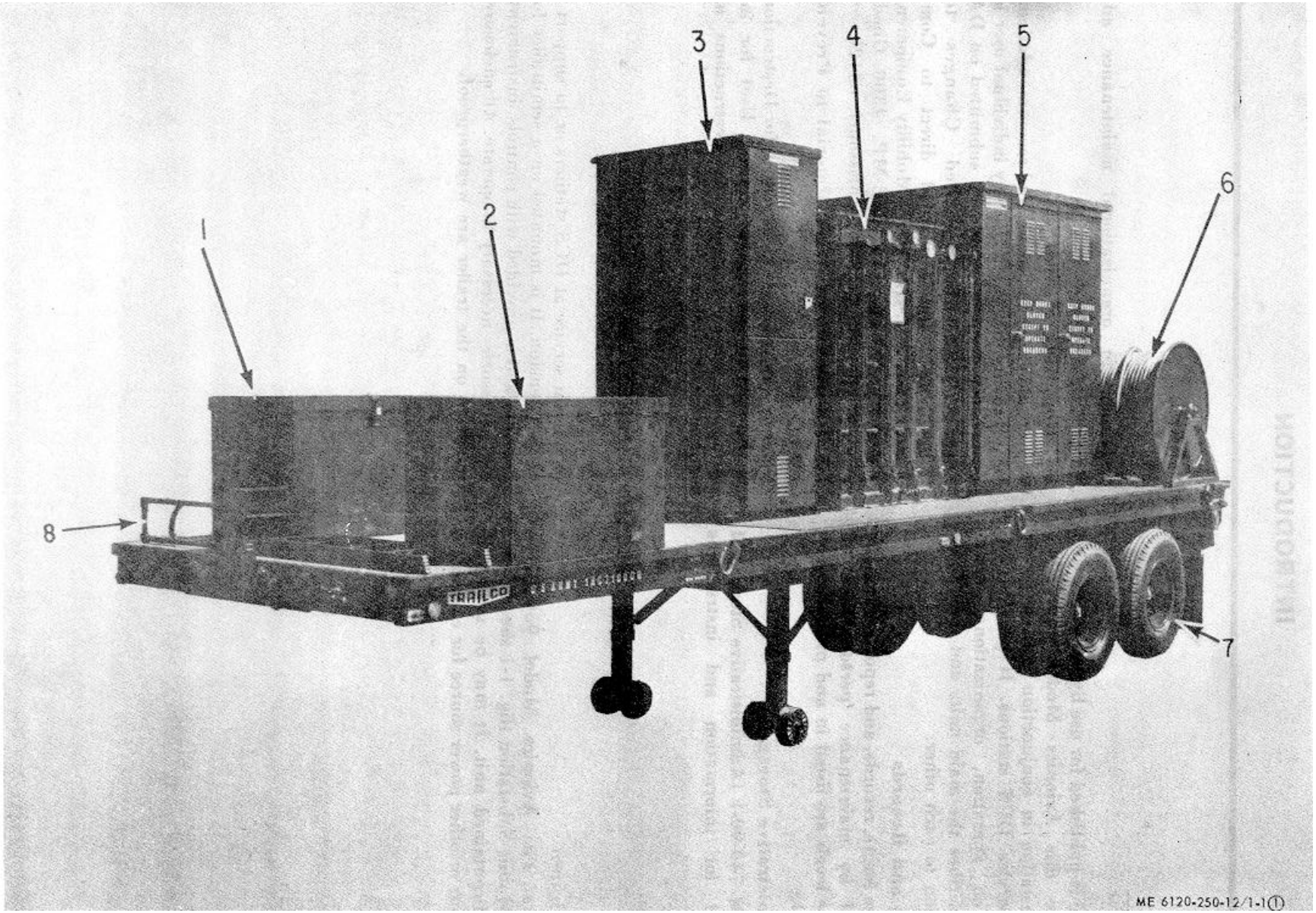


Figure 1-1. Front-right and rear-left side of mobile substation (sheet 1 of 2).

KEY to fig 1-1 (sheet 1 of 2)

1. Storage cabinet, splicing kits, handrails
2. Storage cabinet, lifting cables
3. High voltage cabinet, front view
4. Transformer, front view
5. Low voltage cabinet, front view
6. Cable reel, secondary cables
7. Rear suspension assembly
8. Access ladder

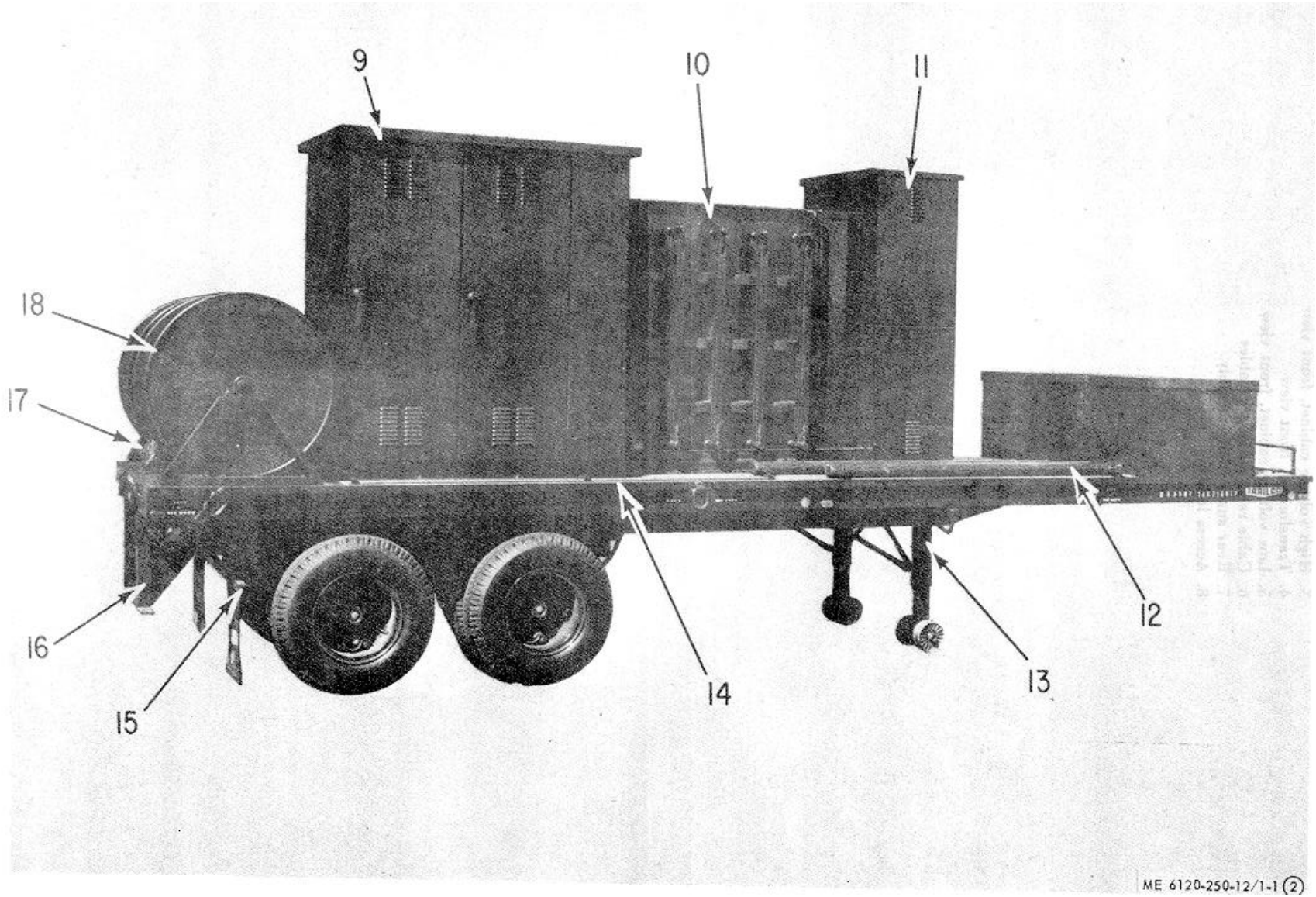


Figure 1-1. Front-right and rear-left-side of mobile substation (sheet 2 of 2).

KEY to fig. 1-1 Sheet 2 of 2):

9. Low voltage cabinet, rear view
10. Transformer, rear view
11. High voltage cabinet, rear view
12. Spreader bars
13. Landing gear, operating handle side
14. Ground rods
15. Mud flap assembly
16. Rear bumper assembly
17. Cable reels lock bar
18. Cable reel, primary cable

WARNING

Use only the first and third rings on each side of the trailer bed designated as a lifting eye whenever the trailer must be lifted.

b. Trailer. The trailer is a flat bed type. It has removable front landing gear, rear bumper, and rear .suspension assembly in order to meet aircraft loading per Air Force Requirement 463L. It has 10 tie down rings, 3 on each side and 2 on each end. The first and third rings located on each side are utilized as lifting eyes. On the forward end of 'he trailer are two storage cabinets. One (without trays) is for storage of bulk material. The other one with trays is for storage of spare parts and other small supplies. The removable access ladder (with handrail is stowed on the forward deck when not in use or enroute. Sockets are provided on the operator's side at 24 inch intervals for installing the railing. Hoisting sling and spreader bars are provided for use when lifting. The railing stanchion and the hoisting slings are stowed in the bulk storage cabinet. The spreader bars and ground rods are, stowed on the deck. The trailer is equipped with a 12 volt lighting system. The lighting cable connector is a standard 7 conductor S.A.E. trucktrailer type connector. A 24 volt adapter with resistors is also provided at the forward end for lighting systems requiring this voltage. Three trap doors 6 inches by 24 inches are provided for cable entry. One trap door is under the high voltage cabinet for the generator input. Two trap doors under the low voltage switch gear cabinet are for low voltage output connections. Mounted on the rear deck of the trailer are two cable reels; one for I/O four conductor 5 KV primary cable and the other for 500 MCM, 600V cables.

c. *High Voltage Cabinet.* The high voltage cabinet is a Breakmaster Switchgear (Single unit). It is designed for outdoor service with provisions for the incoming lines entering from the bottom to terminal connections on the load break switch located in the top compartment. (fig. 1-2.) The top front panel is hinged and bolted. Two windows allow the operator to view the switch using a flashlight without reflected glare. A mechanical position indicator is also provided showing switch position open or closed in the escutcheon over the switch operating shaft socket. A locked removable bar covers the operating shaft socket. (fig. 2-1.) The switch operating and maintenance handles are stowed in the storage cabinet on forward end of trailer. The lower compartment of the high voltage cabinet contain the three lighting arresters and heater. The cabinet is connected mechanically and electrically direct to the transformer and electrically to the low voltage cabinet for 115 VAC service. (fig. 1-3.)

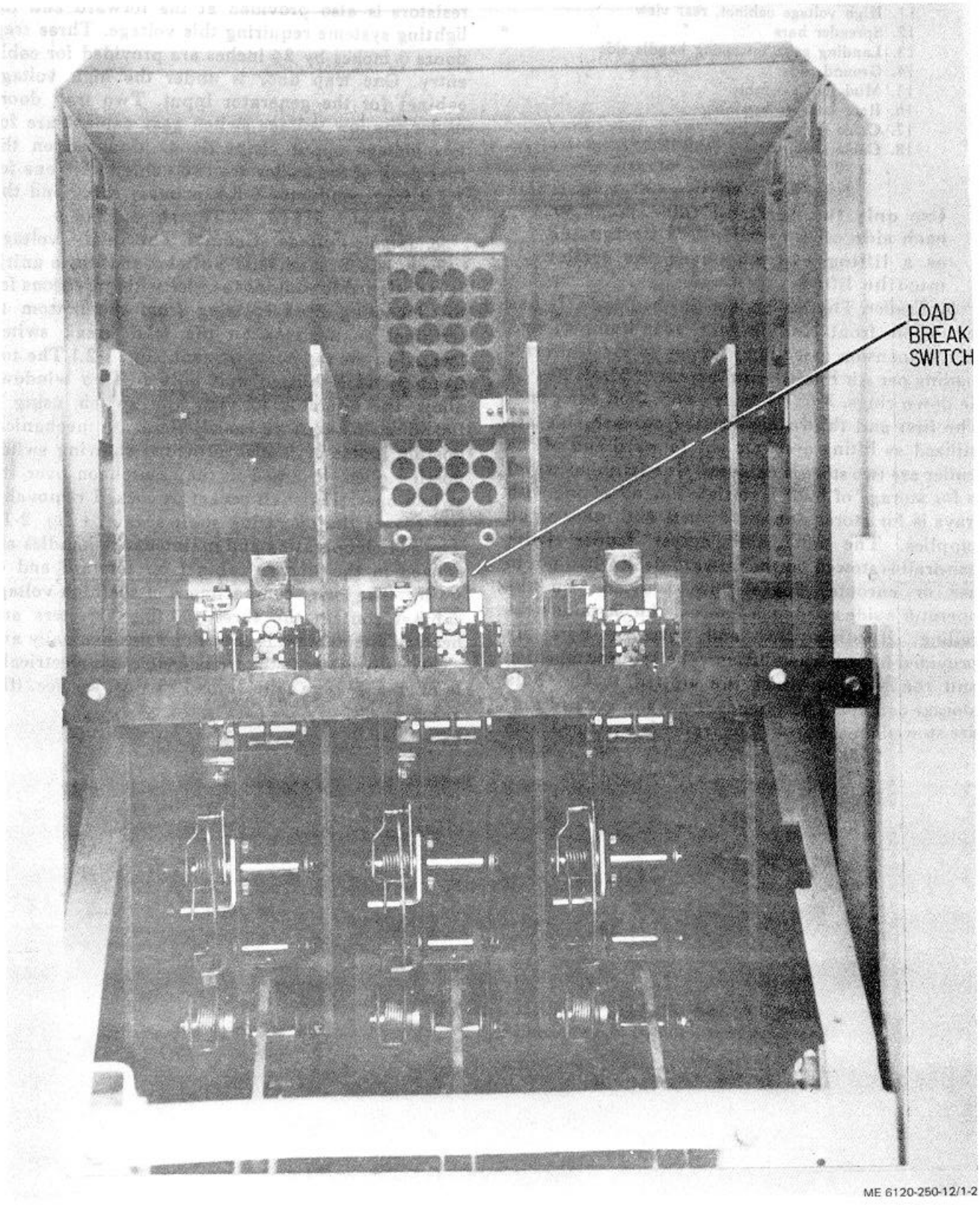


Figure 1-2. High voltage cabinet with upper front panel open.

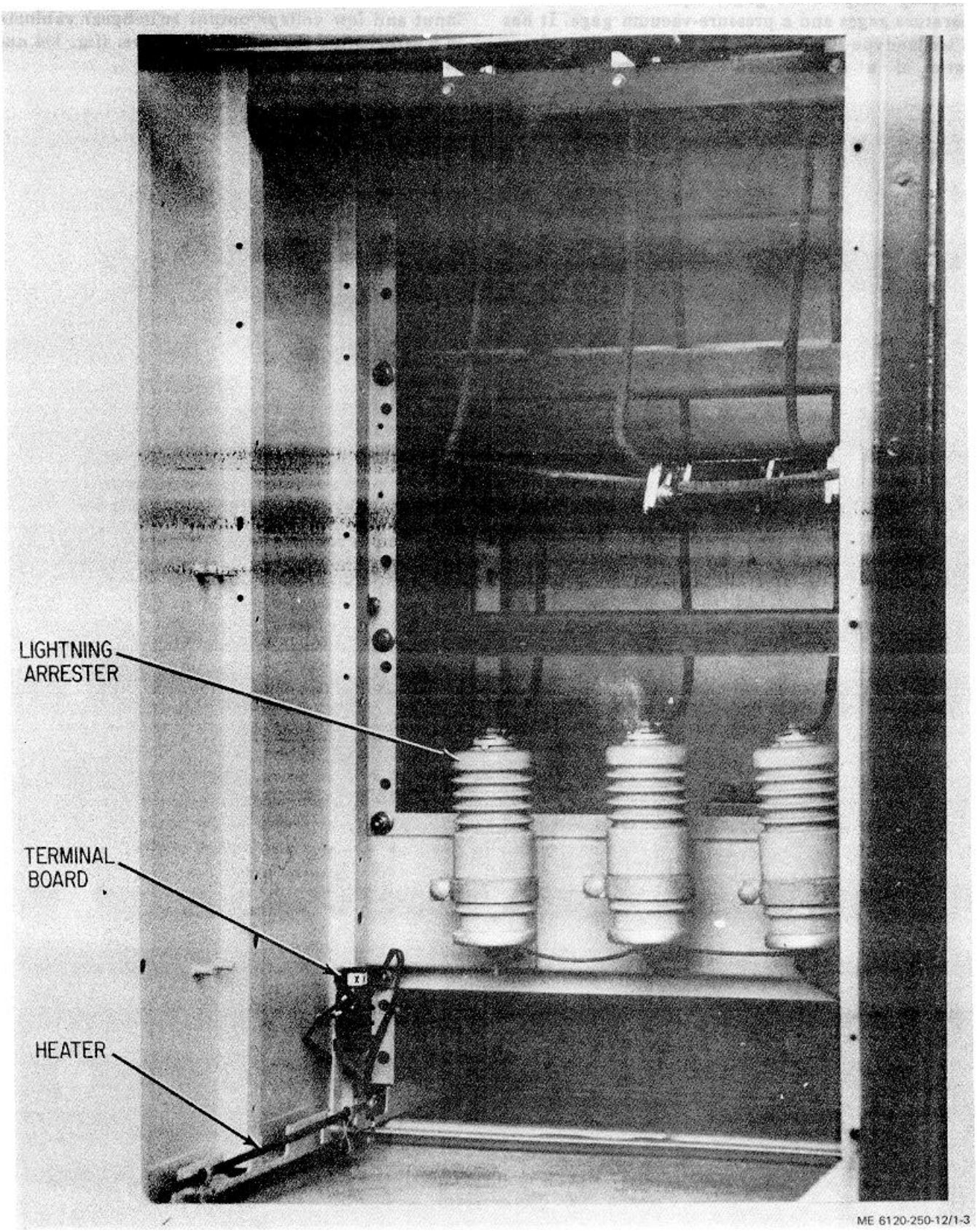
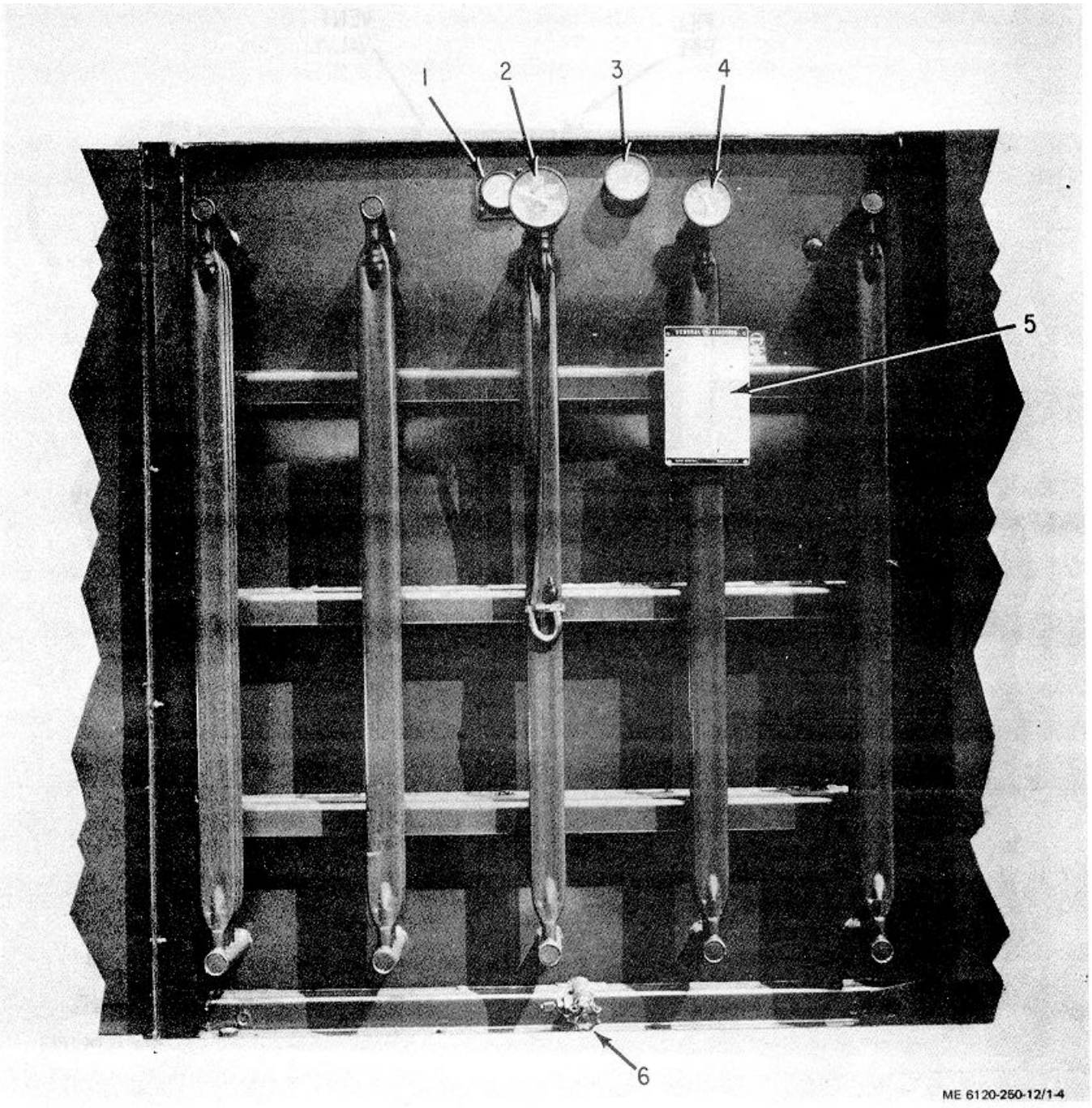


Figure 1-3. High voltage cabinet with lower front panel open

d. Transformer. The 500 KVA transformer is a Class 0A. It is liquid filled (oil), self-cooling with winding temperature gage, liquid level and temperature gages and a pressure-vacuum gage. It has a wedge type tap changer for changing the voltage ratio of a de-energized transformer, without breaking the transformer seal. The voltage ratings are 4160-416Y / 240. 208Y/120. The transformer is directly connected to the high voltage input and low voltage output switchgear cabinets. in weatherproof transition enclosures. (fig. 1-4 and 1.51.



1. Liquid level gage
2. Winding temperature gage
3. Pressure-vacuum gage
4. Liquid temperature gage
5. Name plate
6. Drain

Figure 1-4. Transformer front view.

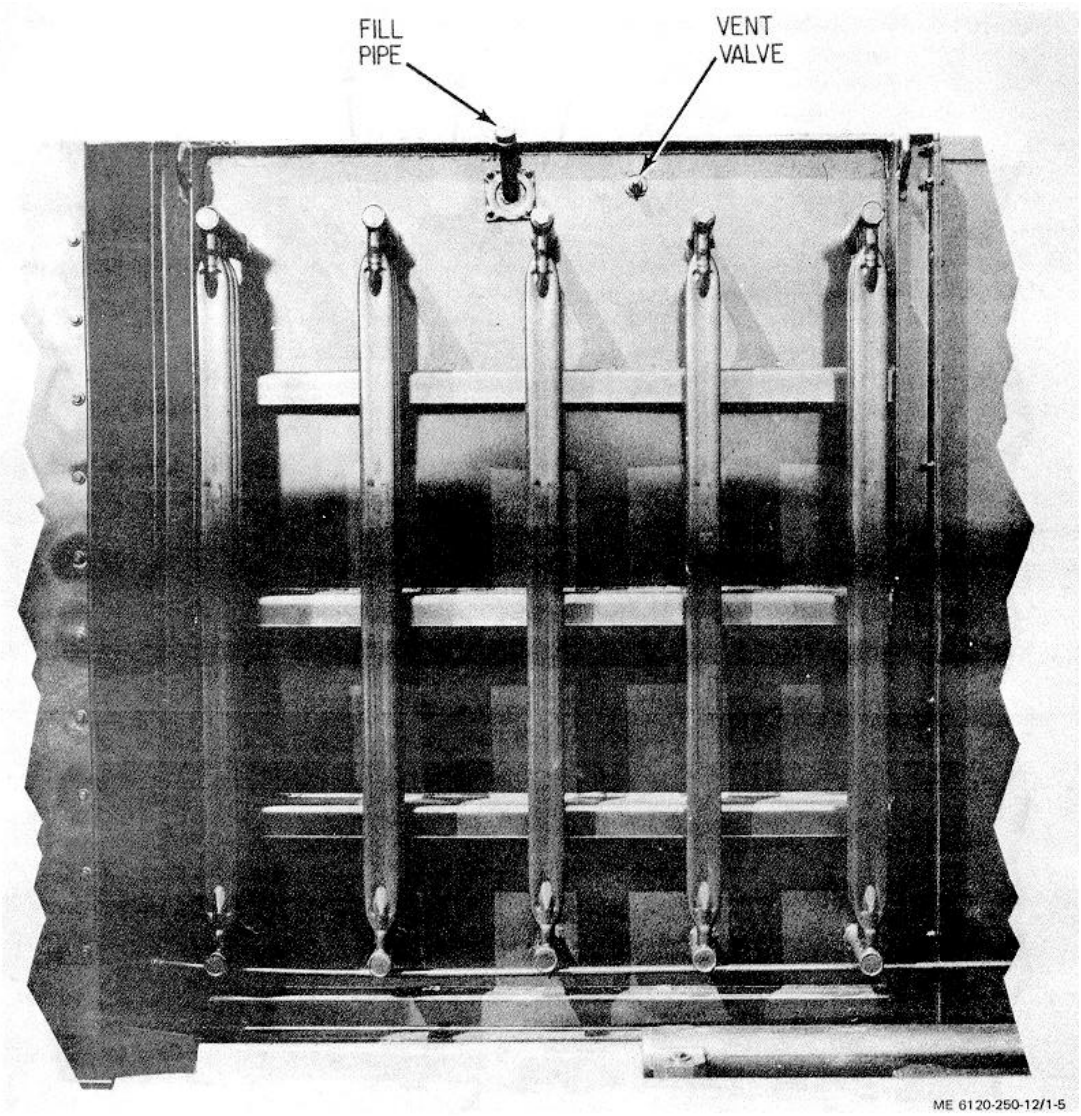


Figure 1-5. Transformer rear view.

c. Low Voltage Cabinet. The low voltage cabinet is an AKD-5 Powermaster. It is designed for outdoor service and provides distribution through a main breaker to three feeder breakers. (fig. 1-6).

(1) Looking at the cabinet from the front, there are two full length doors. When the left front door is open, it shows from top to bottom an instrument compartment with a voltmeter and a voltmeter switch. This compartment has a hinged panel secured with two knurled bolts. Inside this instrument compartment are three potential transformers.

(2) The middle compartment of this section has the main circuit breaker which is a AK-3-50 mounted on a draw out carriage. In the rear of the 1iain breaker compartment are bus stud connectors, and three current transformers.

(3) The bottom compartment is Feeder Breaker No. I which is a AK-2-50. It has similar features as the main breaker.

(4) Inside this section mounted on the left side wall of this section is a light switch for lights directly above each instrument compartment and

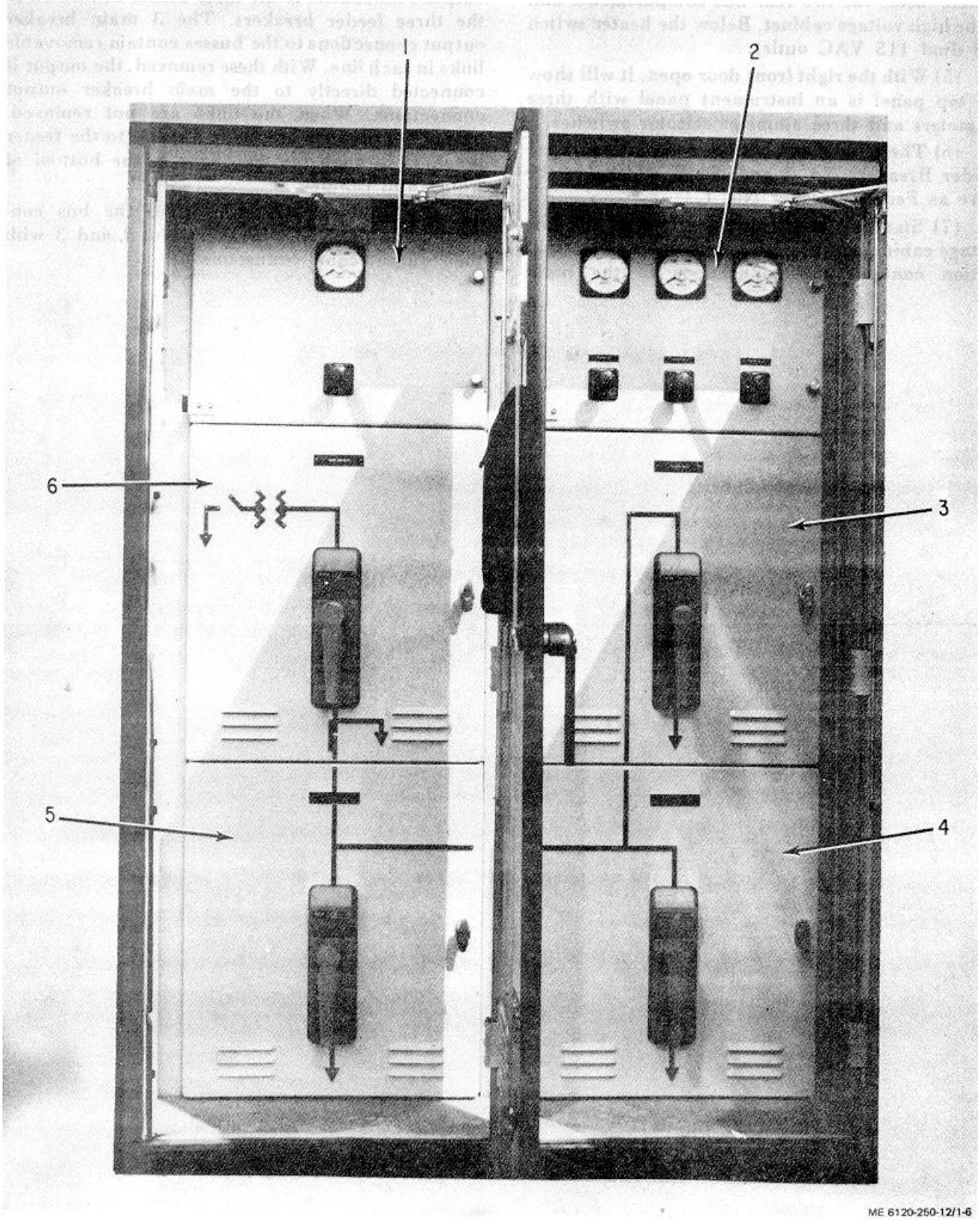
each rear section. Below this a heater switch for the heaters inside the two rear bus compartments and in the high voltage cabinet. Below the heater switch is a dual 115 VAC outlet.

(5) With the right front door open, it will show the top panel is an instrument panel with three ammeters and three ammeter selector switches.

(6) The middle and bottom compartments are Feeder Breakers No. 2 and No. 3 which are the same as Feeder Breaker No. 1.

(7) Standing and facing the rear of the low voltage cabinet are two full length doors. The right section contains the connections to the main breaker from the transformer plus main *breaker* output connections to the three busses connected to the three feeder breakers. The 3 main breaker output connections to the busses contain removable links in each line. With these removed, the output is connected directly to the main breaker output connections. When the links are not removed output connections are made directly to the feeder breakers through the trap door in the bottom of trailer and cabinet.

(8) The left section contains the bus connections to the feeder breakers No. 2 and 3 with their output cable connectors.



1. Voltmeter and selector switch
2. Ammeters and selector switches
3. Feeder breaker No. 2
4. Feeder breaker No. 3
5. Feeder breaker No. 1
6. Main breaker

Figure 1-6. Low voltage cabinet front doors open.

f. Cable and Reels. On the rear of the trailer are two mental cables reels. One is for the primary cable I / 0, four conductor 5 KV, the other is for the 500 M(:M, 6(1)() V single conductor secondary cables. 1h reel, and(l their mounting are the same but are independent from one another. Each steel drum is pinned shaft ends are supported by self -aligning. The hearing housings are mounted on stanching at each end. Each drum is locked to keep it from rotating when enroute.

1-7. Identification and Tabulated Data

a. Identification, The substation is basically three main units . A high voltage cabinet, a transformer and a low voltage distribution cabinet. The high voltage and low voltage distribution cabinets each have and identification plate located on the front upper left corner. These identification plates have manufacturers name, address, requisiton number and model . The transformer has a plate mounted on the operator's side at eye level and contain manufactures name, type, voltage rating, impedance volts, HV windings connections table, I, V winding connections table, HV and LV winding diagram liquid level changes changes by temperature and maximum operating pressures of liquid preservation system .

b. Tabulated Data

(1) High voltage cabinet.

(a) Breakmaster switchgear.

Manufacturer..... General Electric Co,
Requisition 722-82300
Summary 0224A9763

(b) Load break switch.

Manufacturer ..... General Electric Company
Type..... SE-100S
Number..... 0213X0300G1
Rating ..... 4800 V 600AMP 60 Cycle
Inter.Amps 600
Max. Des..... 5.5 DV

(c) Heater.

Manufacturer..... General Electric Company
Type..... Calrod
Rating ..... 140W 115VAC 50/60 Cycles
Cat. No. 4D846G020

(2) T*ransformer.*

(a) Transformer.

Manufacturer..... General Electric Co.
Number..... G852370M
Class..... OA Three Phase 60 Cycle
Voltage Rating ..... 4160t)-416Y/ 240 x 208Y/ 120
KVA Rating ..... 500 Continuous 65 C Rise
Impedance Volts .... (02 4160-416Y / 240 Volts at 500 KVA

H V Windings Connections

Volts	*Amp 500K VA*	*Dial Pos.*
4160	69.4	1
4055	71.02	2
3950	73.1	3
3845	75.1	4
3740	77.2	5

L V Winding

Volts	*Ampa*	*T B. Connection*
416Y/240	694	10-11, 14-15, 18-19
208Y/ 120	1388	10-12, 9-11, 14-16, 13-15, 18-20, 17-19

CT-A is for use with winding temperature equipment.

H V and L V Windings

H V and L V Windings Aluminum

H V Winding is Delta,. L V Windings are wye.

Liquid level below top surface of highest point of manhole flange at 25°C is 8.75 inches. Liquid level changes .50 inch per 10° C change in liquid temperature. Maximum operating pressures of liquid preservation system is 7.5 lbs. positive to 5 lbs. negative.

Tank suitable for 7.5 lbs. vacuum filling

Approximate Weight in Pounds

Total 6900
Untanking 1800
Tank and Fittings 1600
10 C Oil 475 Gal 3500

(b) Liquid level gage (QualiGage)

Manufacturer Made for General Electric Company by Quality control Corporation.

Type Magnet float operated. Pointer in. dicator, glass face.

Scale Bar with Min, -25° $^{\text{C-Max.}}$ readings

(c) Pressure-vacuum gage (QualiGage)

Manufacturer . Made for General ElectricCompany by Qualitrol Corporation.

Type .....Compound, pointer indicator, glass face.

Scale .....0 center, calibration in psi with-10, -5, 0. +5, +10 readings

(d) Liquid level gage (QualiTherm)

Manufacturer Made for General Electric Company by Qualitrol Corporation.

Type AL, pointer indicator (white) for present reading. Red pointer showing last highest level with magnet reset. Glass face

Scale Calibrated in degrees centigrade. Scale marked 0, 20, 40, 60, 80, 100, 120.

(e) Winding temperature gage (qualiTherm)

Manufacturer Made for General Electric Company by Qualitrol Corporation.

Type AWR, pointer indicator (white) for present reading. Red pointer shows last highest temperature with a magnet reset.

Scale Calibrated in degrees centigrade, Scale marked 0, 40, 80, 120, 160.

Assessory Two snap action switches with contacts for use to initiate remote alarms. Switches and gage are in a hermetically sealed case, with wires for connection to switch contacts.

(3) Low voltage cabinet.

(a) Low voltage switchgear.

Manufacturer..... General Electric Company
Requisition 722-82300
Summary 0224A9760

(b) Main breaker

Manufacturer.... General Electric Company
Type..... AK-3-50 Manually Operated
Cat. No. ..... 2249766-200 BG
Rating ..... 600/ 1600 Amps Continuous, 3 pole 600 volt, 60 cycle
Interrupting Rate (Symmetrical) 600 VAC 42,000 amps 480 VAC 50,000 amps 240 VAC 65,000 amps

Power Sensor Trip.

Type..... PS-1
Model No. 184L373G-5
Breaker Rating 800 amps continuous 60 Cycle 600 1600 amp range
Trip Device No. 184L369G1

(c) Feeder breaker.

Manufacturer.... General Electric Company
Type..... AK-2-50 Manually Operated
Cat. No. ..... 2249766-210A BG
Rating ..... 200 / 450 Amps

Series Overcurrent Trip.

Type..... EC-1
Model No. ..... 238D685G2 BG
Instantaneous Trip..... 3000 amps
Time Current Characteristics 1B-2B-3

(d) Volt meter AC.

Manufacturer. General Electric Company
Type..... AB
Cat. No. 50103021RSSJ2
Rating ..... 600 / 250 Volt
Full Scale..... 250 Volt
) 'r ..... 2.4:1 50/60 Cycle
Resistance .... Internal
Code ..... J F

(e) Ammeter AC.

Manufacturer. General Electric company
Type..... AB-40
Cat. No. 50103131LSSJ2
Rating ..... 600 / 5 amps
Full Scale..... 5 amps
C T Ratio ..... 120.1 40-70 cycles
Code ..... J F

(f) Volt meter transfer switch.

Manufacturer. General Electric Company
Type..... SB-1
Cat. No. 16SB1CF16X2
Rating ..... 600 Volts, 20 amps, continuous, 250 amps for 3 sec.

(g) Ammeter transfer switch.

Manufacturer.... General Electric Company
Type..... SB-I
Cat. No. 16SBlCA19X2
Rating ..... 600 Volts, 20 amps continuous, 250 amps for 3 sec.

(h) Potential transformer.

Manufacturer.... General Electric Company
Type..... JE 27
Cat No. 760X90G7
No..... J889122
Primary ..... 288 Volts
Secondary..... 120 Volts
Ratio ..... 2 4:1 50-400 cycles

(i) Current transformers.

Manufacturer.... General Electric Company
Type..... JAHO
Cat. No. 837X62
Rating ..... 600 / 5 amp
Ratio 120.1

(j) Fuses and fuse holders (heater, lights & outlet Circuit).

Manufacturer..... General Electric Company
Five Holder Type . CLF
Rating ..... 30 amps, 600 V, 2 pole
Cat. No. 0673D0500SH210G-1
Fuse..... GF8B 30 Type CLF, 30 amps

(k) Fuse and fuse holder (Volt meter protection).

Manufacturer..... General Electric Company
Fuse Holder Type... CLF
Rating ..... 30 amp, 600 V, 3 pole
Cat. No. 0673D0500SH210G-2
Fuse..... GF8B6 type, CLF 6 amp

(1) Heaters.

Cat. No 2A817A701

(4) *Trailer.*

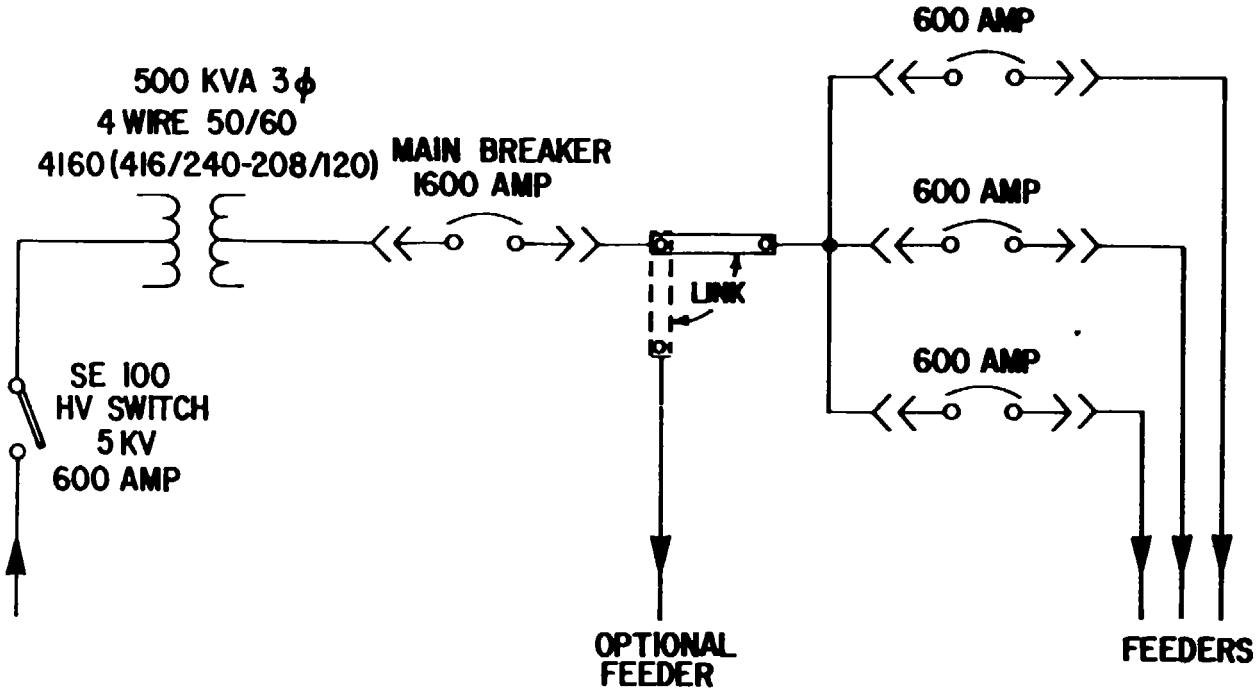
(a) General.

Manufacturer.... Trailco-Dorsey Trailers, Inc
No. ..... ACS1-9250-22001-001 (Mod.l
Type..... Flat Bed Pallet
Suspension ..... Side Mount Tandem, Hutch H-770 0,
..... H-7700, H-752 Springs
Wheels..... Webb
Drums ..... Webb
Rims ..... 7:00 x 20, Redco
Tires..... 9:00 x 20, 10 ply rating
Brakes..... Type 30 Bendix-Westinghouse #282780
Electrical System 24 VDC or 12 Volt I)C Berg Shur-Volt nose box capable of accepting ATH 7 prong plug
Clearance marker lights-l) (. #59 Tall Lights-l)ietz #141
Reflectors-Red(Arrow #218-00-020, Chess A 3 inch
Reflectors-Amber Arrow #218-001)-010, Chess A 3 In h

(b) Overall dimensions and weights.

Overall Length ..... 30 ft.
Overall width..... 8 ft
Overall height ..... 12 ft. I in
Net weight..... 28, 820 lb.

(5) Diagrams.
(a) System Block Diagram (fig. 1-7).
(b) System Connection Diagram (fig. 1-8).
(c) Power and Voltmeter Circuit (fig. 2-10).
(d) Distribution and Ammeter Circuit (fig. 2-12).
(e) Brake Air System (fig. 4-14).
(f) Trailer Lamp Location and Wiring (fig. 4-15).



ME 6120-250-12l1-7

Figure 1-7. System block diagram.

Figure 1-8. System connection diagram.

(Located in back of manual}

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Unloading of New Equipment

a. Unloading by Ramp.

(1) To unload from flatcar an end ramp suitable for semi-trailers and capable of supporting 30,000 lbs. must be used.

(2) A truck tractor for towing semi-trailers must be used to tow trailer from flatcar. Use standard hitching and towing procedures.

b. Unloading with Crane.

(1) If it is necessary or more advisable to unload the equipment by crane. The crane must have at least 30,000 lb. lifting capacity.

(2) Refer to paragraph 2-24 Preparation for Hoisting Trailer for sling arrangement.

2-2. Unpacking New Equipment

a. *General.* The substation is a self-contained mobile unit mounted on a semi-trailer. Its packing is only to prevent tampering by unauthorized persons while in transit. Park trailer in the normal manner and remove truck-tractor.

b. Unpacking. Remove protective material from the faces of the gages on transformer, and windows of high voltage cabinet. Cut and remove metal band around the top of low voltage cabinet. These bands were to secure doors only. Cut and remove metal bands, wood spacer block, and heavy paper covering cables on cable reels. Remove all filler material from storage cabinets being careful not to inadvertently dispose of spare parts. Cut wire securing removable bar on high voltage cabinet.

2-3. Inspection and Servicing

a. Trailer.

(1*) Body.* Inspect body for damage and loose mounting bolts of equipment.

(2) Electrical wiring. Examine all accessible wiring for chafing, cracking and loose connections.

(3) Wheeland lug nuts. Be sure all lug nuts are present and tight.

(4) Springs. Inspect the springs for sag, broken or shifted leaves and loose mounting bolts.

(5) Lights and reflectors. See if all lamps light when switch of towing vehicle is in ON position. Reflectors should be secure and clean .

(6) Air lines. Inspect all air lines for damage and insure all connections are made and tight.

(7) Landing gear. Inspect mounting for tightness, see that handle will operate in both high and low speed and that wheels will go up and down to their full extent without binding.

(8) *Tires.* Inspect tires for cuts or other damage and see that valves are installed securely and inflation is correct.

(9) Wheel bearings. Check hubs for proper oil level and add oil according to current Lubrication Order.

(10) *Brakes.* Be sure all slack adjusters are connected to cam shafts, brake chambers are intact, emergency relief valve is secure and connected to the brake chambers. Make sure air tank is not damaged and securely mounted.

(11) Accessories. Check that ladder, ground rods and spreader bars are not damaged and are properly secured to the desk. Inspect cable reels for damage, cable ties securing cable to drums and drums are held from rotating by their bar lock.

b. Substation Components.

(1) Inspect all hinged panels, doors and lids for alignment and see that they operate freely and close securely against their gaskets. Inspect all bolted panels for all mounting bolts, broken gaskets and see that all are tight.

(2) Inspect all switches and circuit breakers for secure mounting and proper operation. Inspect all gages for cracks, broken glass and secure mounting.

(3) Inspect transformer for signs of insulating oil leaks and bent or broken valves.

CAUTION

***Make* provision so landing gear does not sink into soft ground. Make sure all doors of cabinet will open and close.**

2-4. Installation or Setting Up Instructions

a. General. Place trailer in position relative to its source of primary power or as situation dictates. Trailer body should be as level as possible. Lower landing gear using crank on the right side of trailer bed. Disconnect and remove prime mover, block wheels on one side of trailer. Unfasten the access ladder from the forward deck. Place the ladder in position and the guardrail stanchions in the holes in the deck provided for them on the operator's (left)

side of trailer. Remove a 3 / 4 inch diameter by 10 foot long grounding rod from the deck. Drive grounding rod into the ground approximately 8 foot. Clamp the No. I ground wire to the grounding rod.

b. High Voltage Cabinet .Unlock and remove bar (4, fig. 2-1) covering load break switch operating handle switch socket (3). Remove switch handle from storage cabinet, insert it into socket and operate switch a few times: Observe through switch inspection window (I and by feel (with operating handle) that switch operates correctly. If switch operates hard or contacts are misaligned, see paragraph 3-10. When switch operates normally, switch it to the open position. Make sure switch position indicator (2) reads open, and observe by sight that switch is open. Remove operating handle and return it to storage cabinet. Open upper and lower front panels and make a visible check to see that all connections are tight.

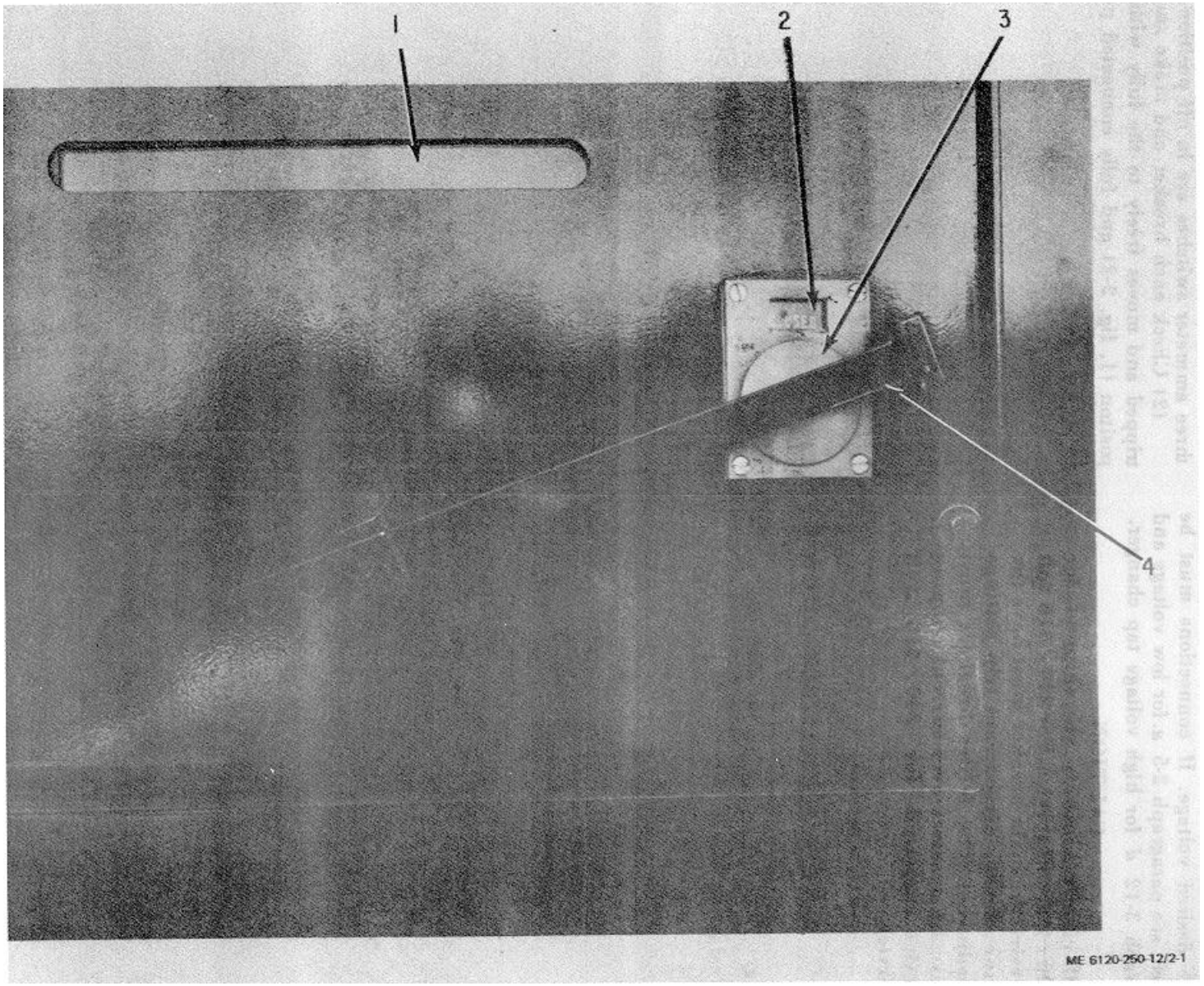


Figure 2-1. High voltage cabinet upper front panel

KEY to figure 2-1:
1. switch inspection window, lower
2. position indicator
3. Operating handle switch socket
4. Removable bar

c. Transformer. Inspect transformer for any visible damage or leaks and insure gages are operative. Check that the windings are connected for the desired voltage. If connections must be changed, see paragraph 2-5 a for low voltage and paragraph 3-12 *d* for high voltage tap changer.

CAUTION

All circuit breakers are shipped for 1210 / 208 volt service. For 240 / 416 volt service the main breaker must have the power sensor overcurrent trip settings readjusted. The feeder breakers must have ; E C-1 series over-current tripping tie vice replaced for 240/416 volt service.

d. Low Voltage Cabinet.

(1) Open front sections and make sure voltmeter switch, heater switch, light switch and the three ammeter switches are in off position.

(2) Check each breaker and make sure it is tripped and moves freely to the fully withdrawn positon (1, fig. 2-2) and fully connected position (3).

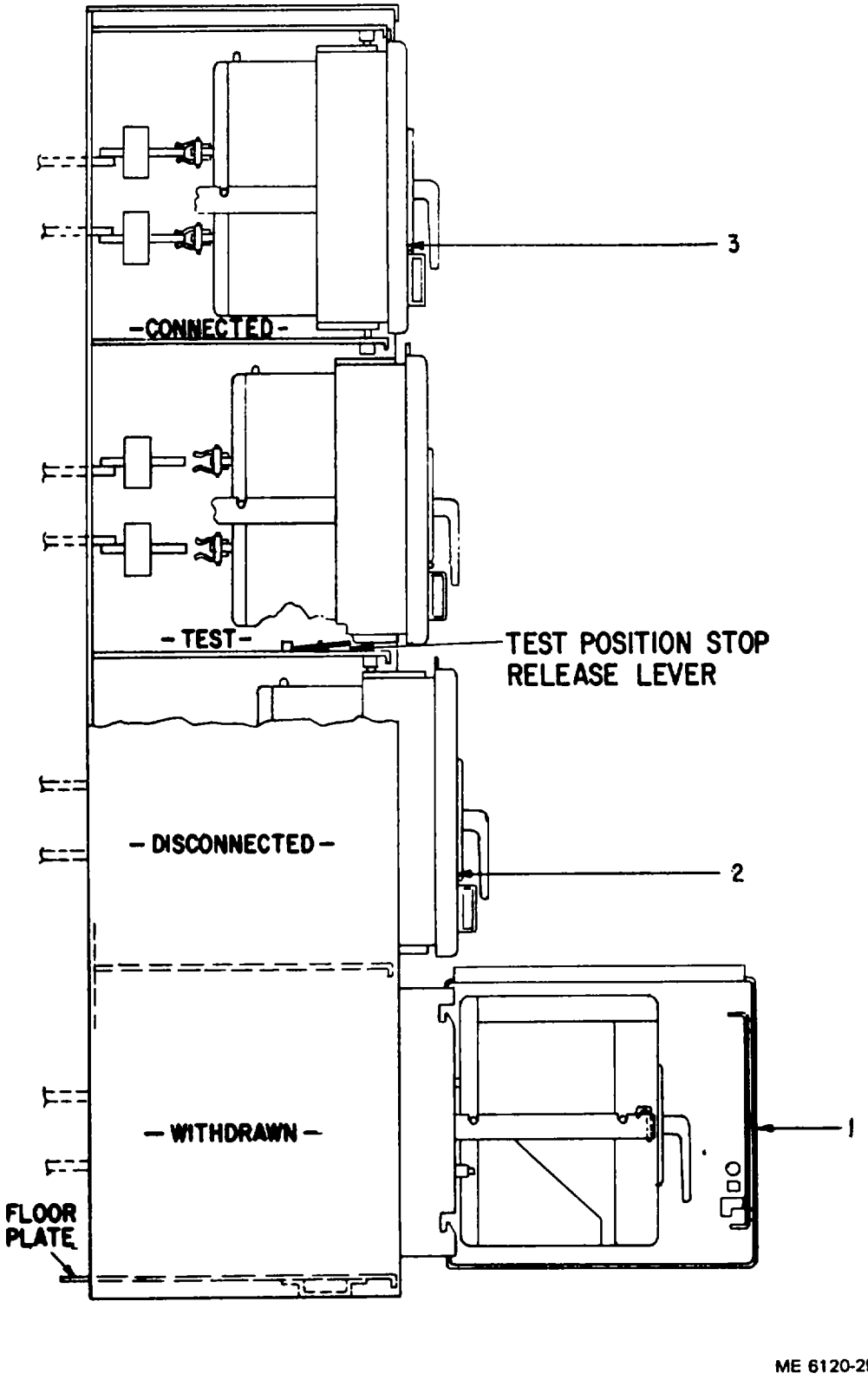


Figure 2-2. Positions of circuit breakers.

KEY to figure 2-2:

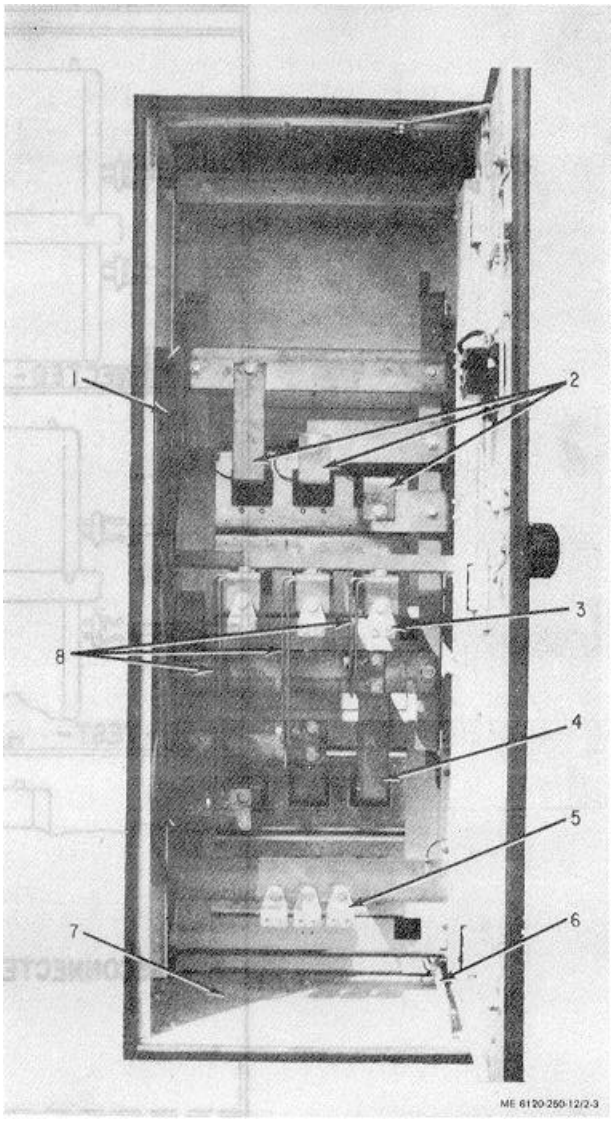
1. Fully withdrawn position
2. Disconnected
3. Fully connected position

(3) After determining that the breakers operate correctly, push them all the way in, fully connected, using racking handle (para. 3-15) and make sure they are tripped. Close the front doors.

(4)) Open rear doors, visibly and by hand check Ill connections for complete hardware and insure they are tight. See that the removable bus links (8, fig. 2-3) between main breaker and feeder breakers are' in place. If feeder breakers are not to be used, see, paragraph 2-21 for removal of the links so that only the main breaker is used.

(5) Directly below the low voltage cabinet underneath the trailer body are two trap doors. loosen the three captive bolts from each door and open them. Loosen and remove four bolts and remove bottom plate (7, fig. 2-3) in right and left .sections of the cabinet. These openings are the secondary cable (feeder line) entrances to the low voltage cabinet.

(6) Feed 2 / 0 ground wire from the grounding rod lip through the trap door and fasten to the ground lug (7, fig. 2-1 6) just inside at the bottom of the transition area from transformer.



1. 1, VAC cable (5(1 foot
2. Main breaker input
3. Main breaker output connectors
4. Feeder breaker No. I input connections
5. Feeder breaker No I output connectors
6 Heater
7 Removable bottom plate (1 each section
8 Removable bus links

Figure 2-3. Rear view of right section of low voltage cabinet

(7) Take the 50 foot cable (1, fig. 2-3) provided for 115 VAC 60 cycle service and feed the free end down through the trap door under the right cabinet. Connect it to a 115 VAC 60 cycle power supply. The other end of this cable is connected to OITB-1 and 2 which is located in the lower right side of the left section behind a plate that covers the wiring trough. (fig. 2-17). Close both rear doors.

(8) The trailer now has 115 volt service, and the heaters and lights should be turned on when substation is both in service or out of service. This eliminates moisture within all enclosures. The heater and light switch is located on the left side wall of the main breaker section. (fig. 2-13.)

e. Connecting Primary Cable.

(1) Remove the upper and lower rear panels of the high voltage cabinet.

(2) If the heater switch has been turned on check to see that the heater in the high voltage cabinet is working. If it is not, see Trouble Shooting Section, table 3-2.

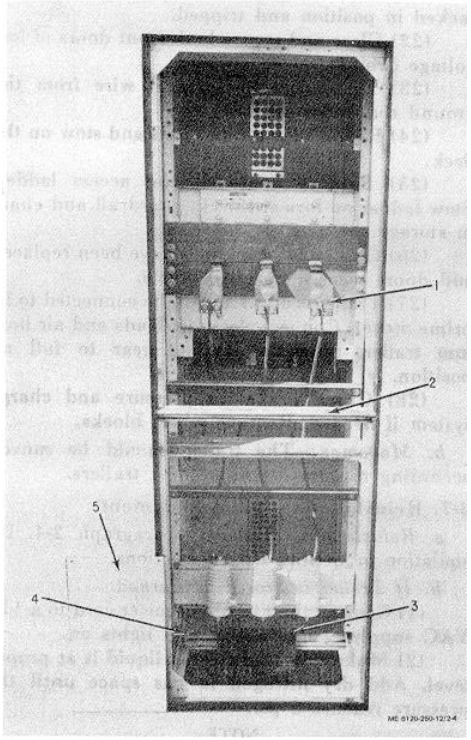


Figure 2-4. Rear view of high voltage cabinet, panel removed.

KEY to figure 2-4

1. Load break switch primary connectors
2. Cable separator and support
3. Trap door
4 Ground(lug
5. Bottom cover

(3) The bottom of the high voltage cabinet is a removable cover (5 fig. 2-4) over the trap door (3) for cable entrance from under the trailer. Loosen bolts and remove this cover. Loosen bolt and raise trap door (3) of trailer bed.

(4) Remove the primary cable from its reel mount on rear of trailer. Feed one end of this cable up through trap door (3) and into the cable entrance of the high voltage cabinet. (fig. 2-4) This cable goes all the way up to the top and is connected to the connections (1}) of the load break switch. Support cable, using separators (2) provided in cabinet.

CAUTION

Before primary cable connections are made, the conductors should be identified to indicate their phase relationship with the switch connections. Make sure all connections are tight.

(5) The fourth conductor is connected to the ground lug. (4, fig. 2-4.)

(6) Replace upper and lower rear panels.

(7) The other end of the primary may be connected at the source. Care must be taken to keep the phase relationship the same as in the high voltage cabinet.

(8) Feed the output cables up through the trap doors to the low voltage cabinet. Connect these cables as the situation dictates to the feed breakers. (fig. 2-3) Support cables so the stress is not on the connection.

CAUTION

Before feeder cable connections are made, the conductors should be identified to indicate their phase relationship to the breaker connections. When connections are made, make sure they are tight.

(9)) The output ends of the feeder cables are connected as the situation or installation dictates.

(10) If the removable links have been removed, the main breaker is the only one used. 'The feeder cable is connected directly to the main breaker output connectors (3, fig. 2-3).

(11) When all feeder cables have been connected and are tight, close rear doors. The trailer substation unit is ready for service.

WARNING

Never apply power to trailer unit before making sure unit is grounded and connections are tight.

2-5. Voltage Conversion.

WARNING

Never make voltage changes with transformer energized. Serious perpersonal injury and/ or damage to the *transformer may* result.

a. Low Voltage Change. This conversion of the low voltage output is made on the terminal board in top of transformer. Remove the terminal board cover and connect terminals as shown in L ¥ winding table on transformer nameplate for the desired voltage. See paragraph 3-12 e.

b. Voltage Ratio Change. The transformer is provided with a wedge-type tap changer to change voltage ratio without breaking the transformer seal to make this change, see paragraph 3-12 *d.*

Section II. MOVEMENT TO NEW WORK SITE

2-6. Dismantling for Movement

a. Preparation for Movement.

(1) Push trip button (5, fig. 2-11) on main breaker in low voltage cabinet.

(2) Push trip button feeder breakers. 15 fig. 215)

(3) Using switch operating handle, turn load break switch to off. Make a sight inspection through window (1 ,fig. 2-1) of high voltage cabinet to make sure switch is open. Return switch operating handle to storage cabinet.

(4) Place bar (4) in bracket to cover the operating handle socket (3) and lock with padlock.

(5) Check and make sure power source has been turned off to this substation.

(6) Remove primary cables at the power source, and feeder lines.

(7) Remove upper and lower rear panels of the high voltage cabinet.

(8) Disconnect the three primary conductors from the load break switch (1, fig. 2-4). Disconnect the fourth conductor from ground lug (4) at the left bottom .

(9) Until primary cable and ground wire down and out (of cabinet.

(10) Close the trap door (3) and secure with its bolt. Replace cabinet bottom cover (5).

(11) Replace upper and lower rear panels of high voltage cabinet.

(12) Replace primary cable on its cable reel on rear 4 of trailer and secure with tie to drum side.

(13) Open rear doors of low voltage cabinet and disconnect feeder cables from the three feed breakers .

(14) Replace feeder cables on their cable reels on rear of trailer, secure with tie to drum side, engage the drum lock bar.

(15) Turn light and heater switch to of! position.

(16) Disconnect 115 V service from its power source and pull cables on hangers inside left of right rear door of loss voltage cabinet.

(17) Disconnect ground wire in right bottom of low voltage cabinet.

(18) Close and secure rear doors of cabinet.

(19) Close and secure the two trap doors underneath the low voltage cabinet in trailer bed.

(20) Make sure the 3 ammeter, voltmeter, heater and light switches are in off positon.

(21) Move main and feeder breaker to the full racked in position and tripped.

(22) Close and secure both front doors of low voltage cabinet.

(23): Disconnect the ground wire from the ground rod and stow it.

(24) Remove the ground rods and stow on the deck.

(25) Remove guardrail and access ladder. Stow ladder on forward deck, guardrail and chain in storage cabinet.

(26) Check that all panels have been replaced and doors secured on all cabinets.

(27) Trailer is now ready to be connected to its prime mover. Connect electrical leads and air hose into trailer, raise the landing gear to full up position.

(28) Check brake air pressure and charge system if needed. Remove wheel blocks.

b. Movement. The trailer should be moved according to Army standards for trailers.

2-7. Reinstallation After Movement

a. Reinstallation. Refer to paragraph 2-4, Installation or Setting Up Instructions.

b. If Trailer is Stored or Parked.

(1) Connect the 115 VAC power cord to a 115 VAC supply. Turn heaters and lights on.

(2) Make sure transformer liquid is at proper level. Add dry nitrogen in gas space until the pressure reaches 3 psi.

NOTE

Transformer stored as spares should be maintained in the same condition as if in service. Make periodic inspections of liquid level. Check pressure gage to make sure seal is being maintained.

(3) The load break switch and the circuit breakers should be inspected periodically. Inspect all operating and machine parts for corrosion. Operate load break switch and circuit breakers a few times.

(4) For extended periods of storage all machined parts of operating mechanisms should be coated with suitable oil or grease.

(5) Precautions should be taken so landing gear does not sink into ground. The trailer should be completely lubricated and tire inflation checked for proper pressure.

Section III. CONTROL AND INSTRUMENTS

2-8. General

This section describes, locates, illustrates and furnishes the operator, crew or organizational maintenance personnel sufficient information the controls and instruments for proper operation of the substation.

2-9. Controls and Instruments

a. High Voltage Cabinet (fig. 2-1.)

(1) The load break switch is mounted behind the 11 tipper front panel. This switch is operated with a crank type removable operating handle that is stowed in the storage cabinet. A removable bar covers the operating handle socket and is locked in place by a padlock. The operating handle socket escutcheon also has a switch position indicator, indicating "open" or "Closed."

(2) The upper front panel also has two switch inspection windows. These windows allow visual inspection of the switch using a flashlight with no reflected glare. (fig. 2-5.)

Key :to figure 2-5:
1 Switch inspections windows
2. Switch position indicator
3. Switch operating socket
4. Removable bar

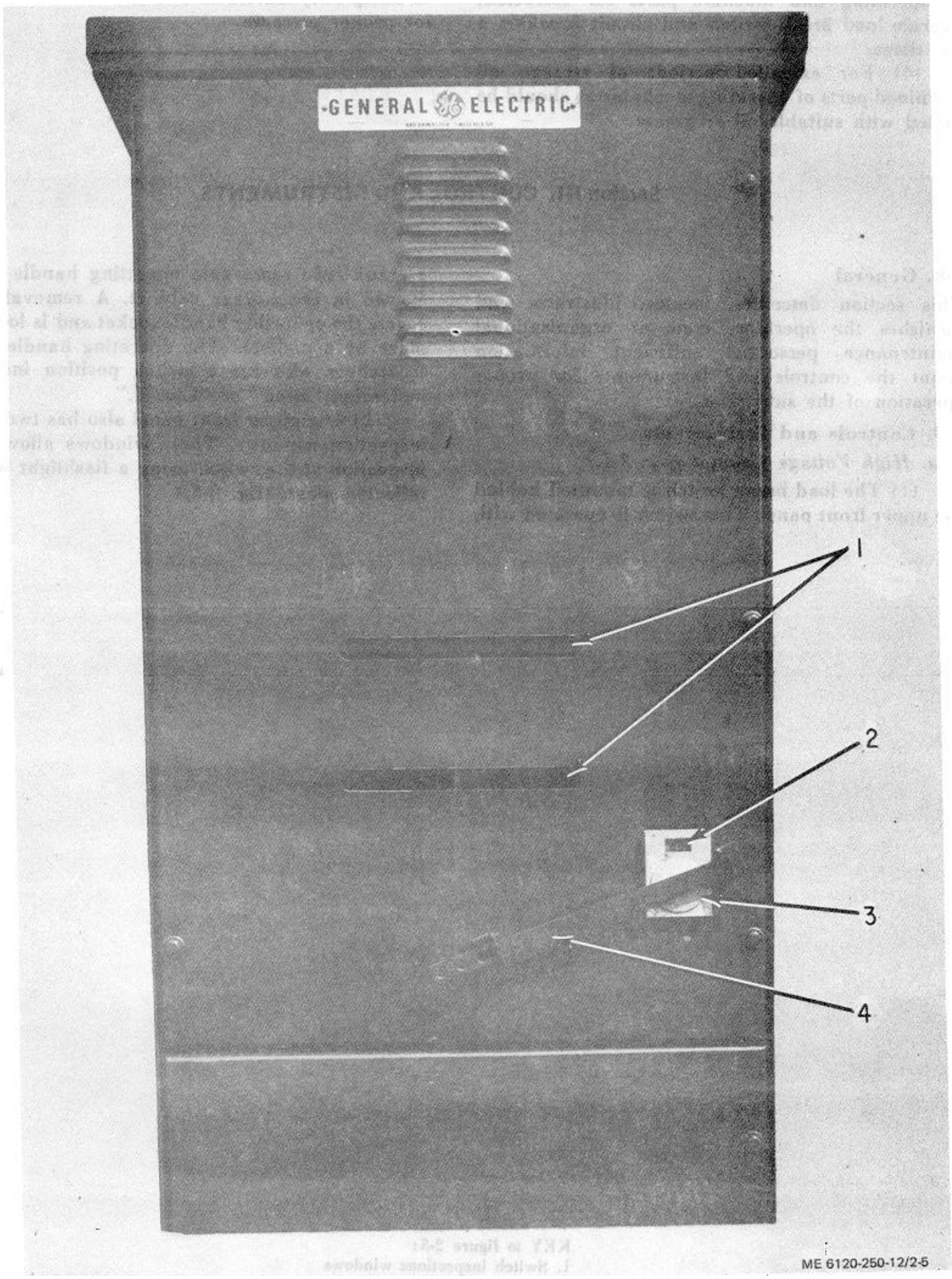


Figure 2-5. High voltage cabinet, upper front panel.

b. Transformer (fig. 2-7).

(1) The liquid-level gage (1) is a magnetic gage to indicate the level of the insulating oil in the main transformer tank. The level will rise .50 inches for (every 10°C rise in temperature. The gage may be removed whenever the liquid is at or below the *25* Level

(2) The pressure-vacuum gage (3) is of the compound type and is calibrated in psi. Gage reading should vary as the transformer temperature (changes and should normally indicate a positive pressure. (The gage is expected not to read accurately near the zero point). When the transformer is deenergized or is operating under light or no load conditions in low ambient temperatures the gage may indicate a vacuum within the tank. A lack of any change in reading with changes in temperature is an indication of a leak in the transformer seal and should be investigated. See nameplate *(61* for maximum plus and minimum minus readings.

(3) The liquid temperature gage (4, fig. 2-7) is used to indicate the top liquid temperature of the transformer. It is a standard type AL thermometer mounted with its temperature sensitive bulb in a well. The well extends into the transformer's top liquid and is secured with a union nut. the well is liquid-tight thus permitting removal of the thermometer without lowering the liquid level or breaking the transformer seal. The dial calibration is in degrees centigrade. A white pointer indicates the liquid temperature. A red pointer shows the maximum temperature attained since last reset. To reset the maximum reading (red) pointer, remove the magnet (5), that is attached to the gage by a chain, from its holder on side of case. Wipe magnet across face of dial counterclockwise, or toward zero. Replace magnet in holder.

(4) The winding temperature gage (2, fig. 2-7) provides a means of reading an equivalent of the transformer winding hot-spot temperature. The gage is a standard type AWR. It consists of a thermometer with two snap action switches mounted in a hermetically sealed case. The switches permit the instrument to be used to initiate an alarm in the event winding temperatures become excessive. The dial is calibrated in degrees centigrade. A white pointer indicates the winding hotspot temperature. A red pointer shows the maximum temperature obtained since last reset. To reset the maximum reading (red) pointer remove the magnet (5), that is attached to the gage by a chain, from its holder on side of case. Wipe magnet across face of dial counterclockwise, or toward zero. Replace magnet in holder. For switch lead color code and contacts see figure 2-6.

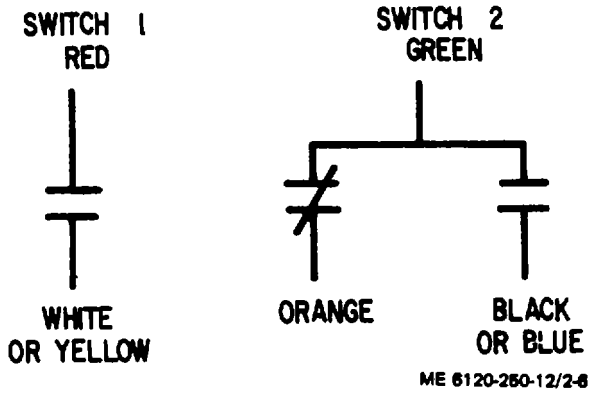


Figure 2-6. Temperature winding snap action auxiliary switch contacts and lead color code.

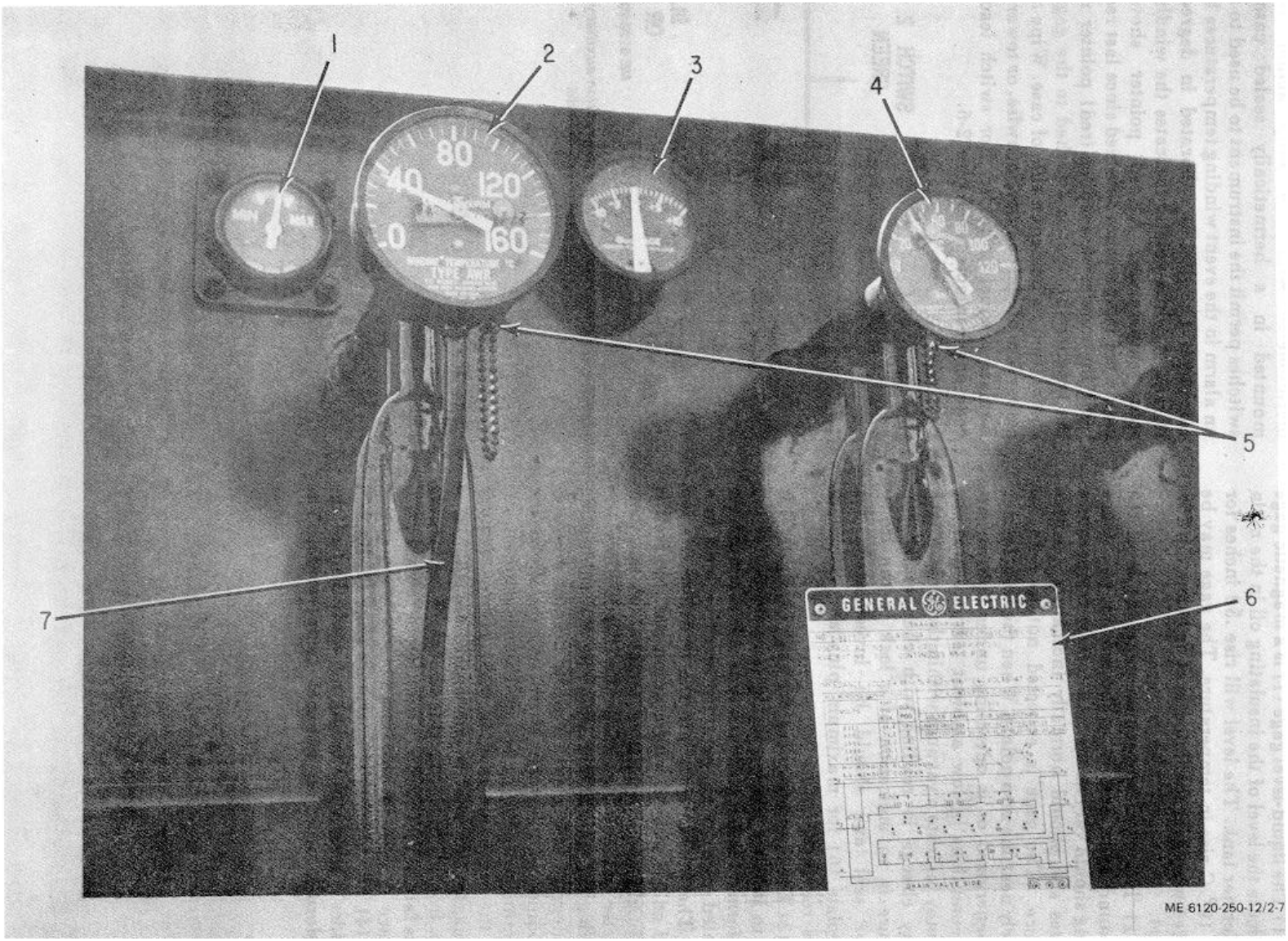


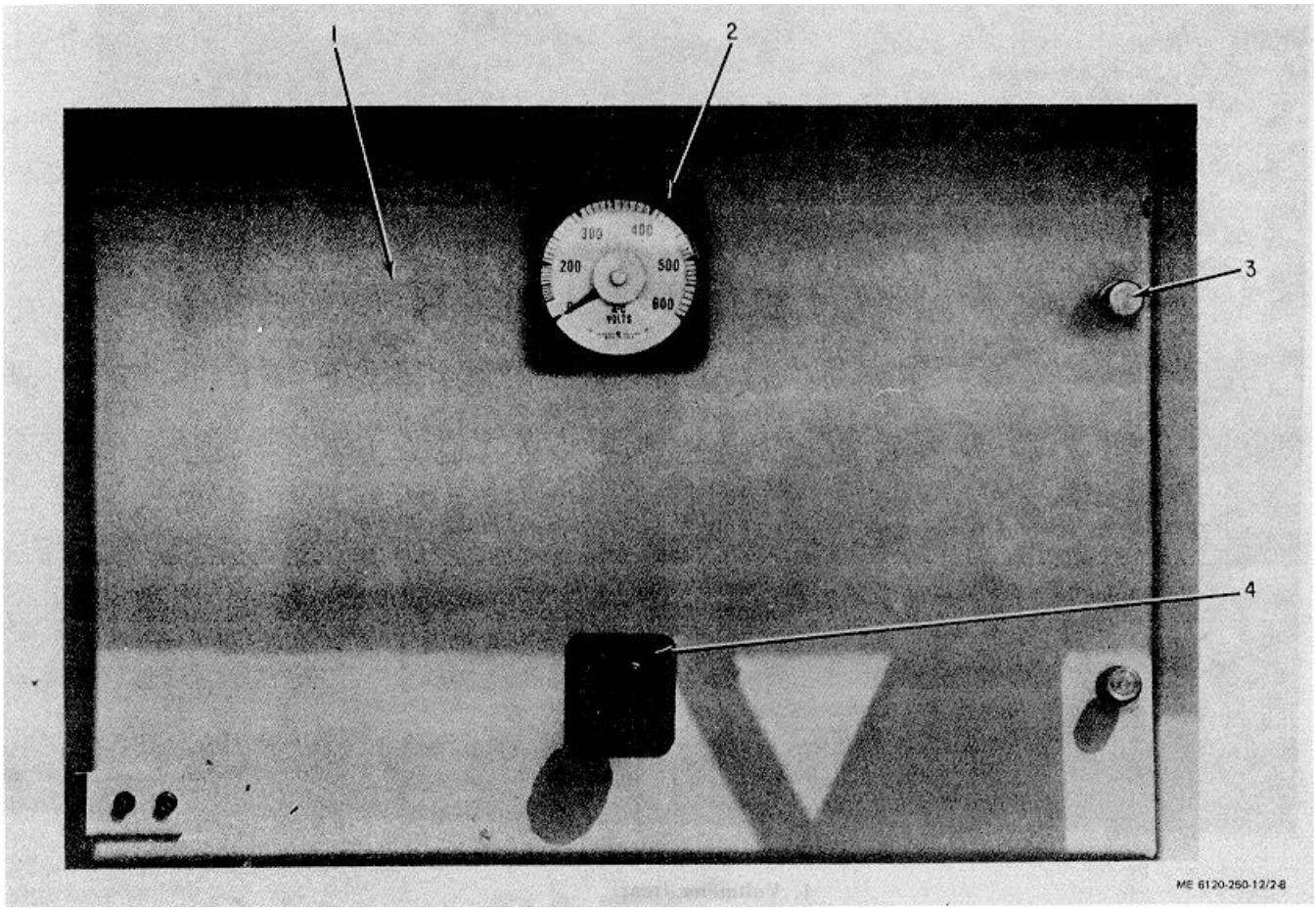
Figure 2-7. Transformer gages.

Key to figure 2-7

1 Liquid level gage
2 *Winding temperature* gage
3 *Pressure - vacuum* gage
4 Liquid Temperature gage
5 Reset magnets in holders
6 Name plate
7 Temperature winding auxiliary switch cable

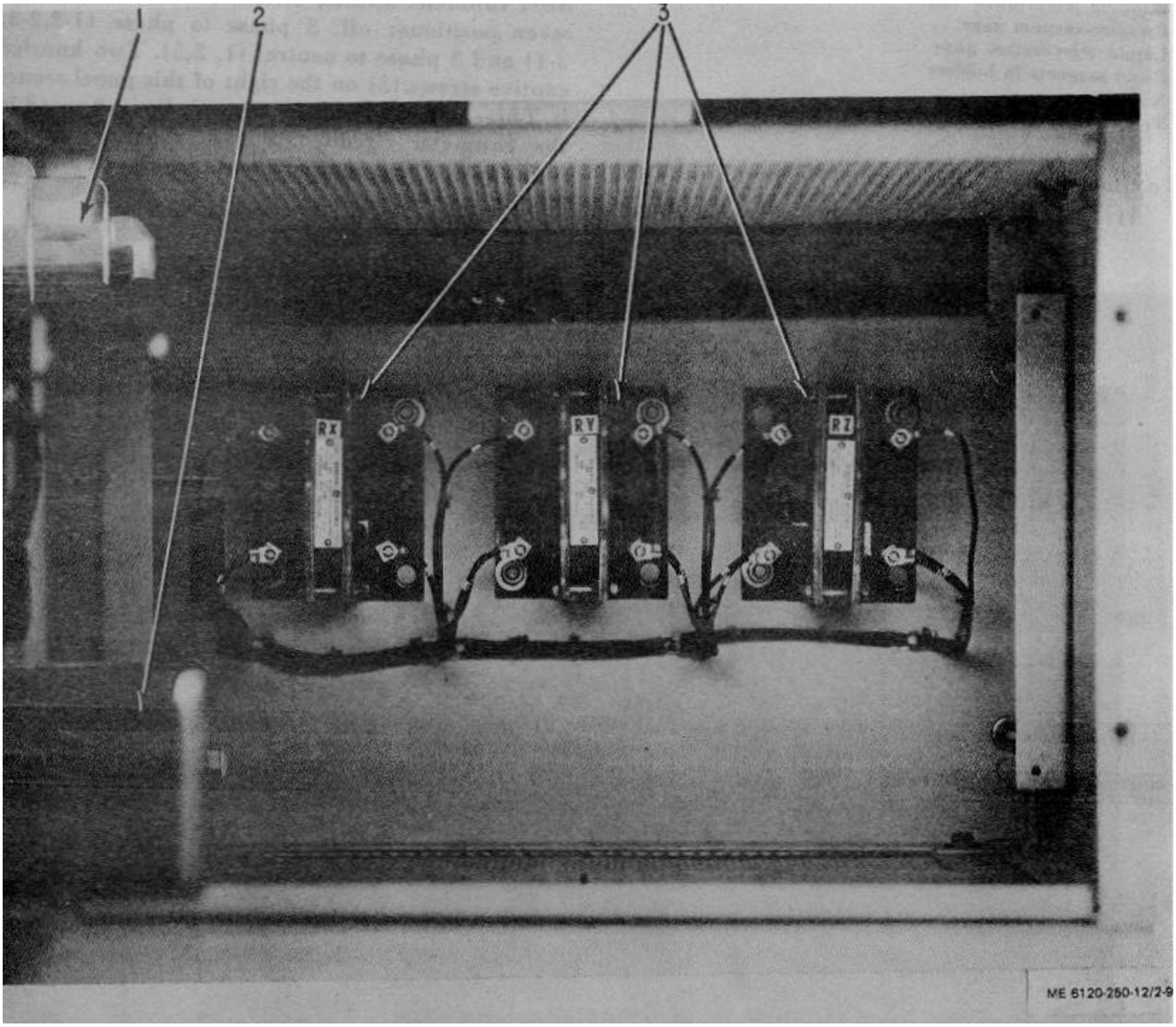
c. Low Voltage Distribution Cabinet (fig. 2-8).

(1) Behind the left front door, the top hinge panel is the instrument compartment. Mounted on the panel is a type AB-40 voltmeter (2) and a type SB-I voltmeter selector switch (4). The switch has seven positions: off, 3 phase to phase (1-2,2-3, 3-1) and 3 phase to neutral (1, 2,3). Two knurled captive screws (3) on the right of this panel secure it. Three potential transformers (3, fig. 2-9) used in the voltmeter circuits are seen mounted in the upper rear of this compartment. See figure 2-10 for circuit.



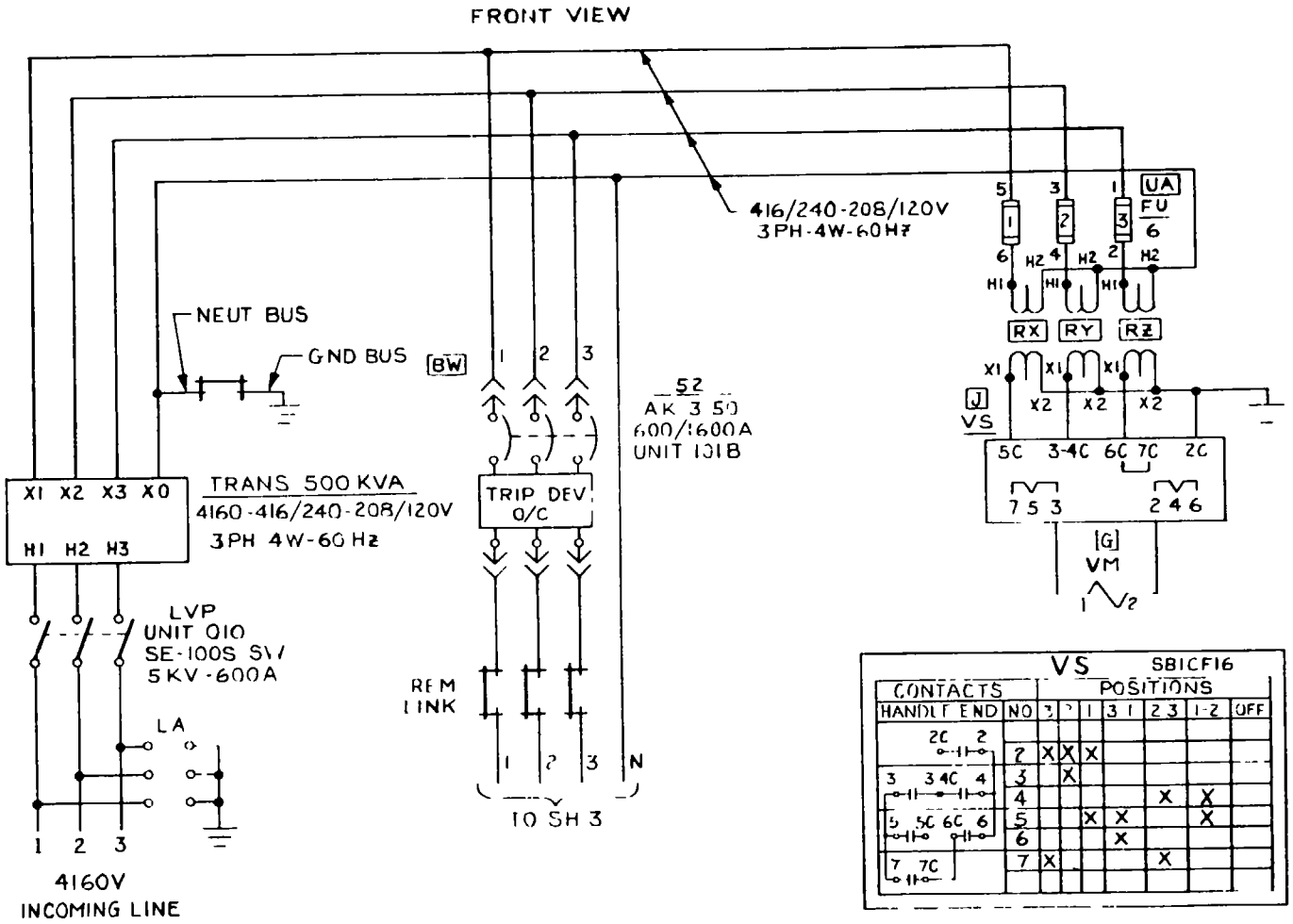
1. Panel
2. Voltmeter
3. Knurled screws
4. Voltmeter selector switch

Figure 2-8 Instrument panel, voltmeter and switch



1. Voltmeter dreary
2. Voltmeter selector switch (rear)
3. Potential transformers

Figure 2-9. Voltmeter compartment.



ME 6120-250-12/2-10

Figure 2-10. Power and voltmeter circuit.

(2) Directly below the instrument compartment is the main breaker compartment, see figure 2-11. The front hinged panel has an opening in the center allowing charging handle (4) of the breaker to protrude part way through. This part of the breaker has an indicator (1) showing if it is open or closed a mechanical trip push button 15) and a charge indicator number (2). The panel also has a red mimic bus (6) showing a one line diagram going from panel to panel. The main breaker is an AK-3-50 (600/ 1600 amp rating) having a drawout feature. It is manually operated with a selective power sensor overcurrent trip device.

WARNING

Never open a breaker compartment panel unless the breaker is in the open position. The breaker has a fully connect and disconnect position. A test position stop is in place and must be tripped to push the breaker in. See paragraph 3-15 for operation. In the rear of this compartment are the bus connections to the breaker.

KEY to figure 2-11:

I OPEN-CLOSED indicator
2. Charge indicator number
3. Compartment panel handle
4. Charging handle
5. Trip push button
6. Red mimic bus

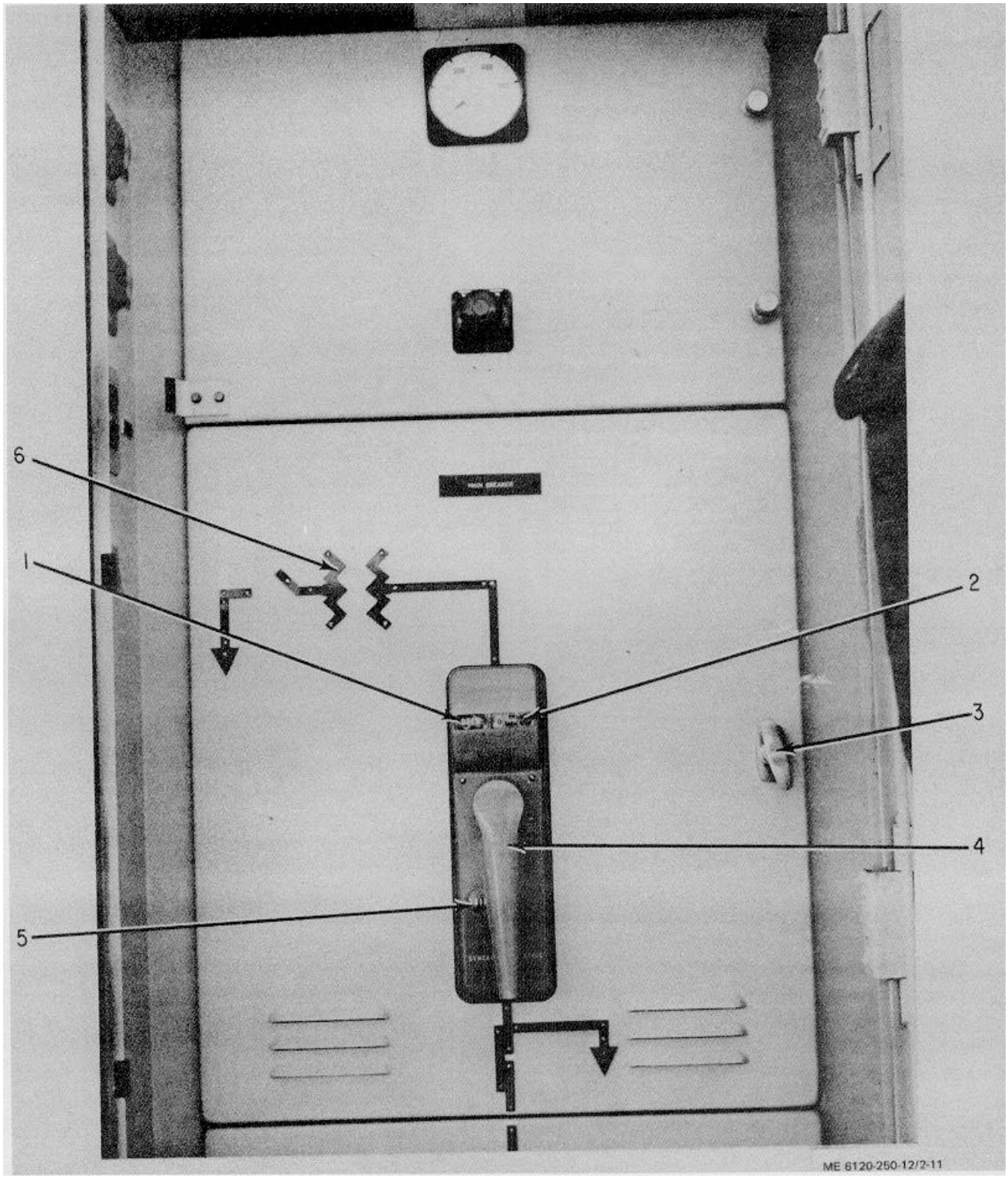
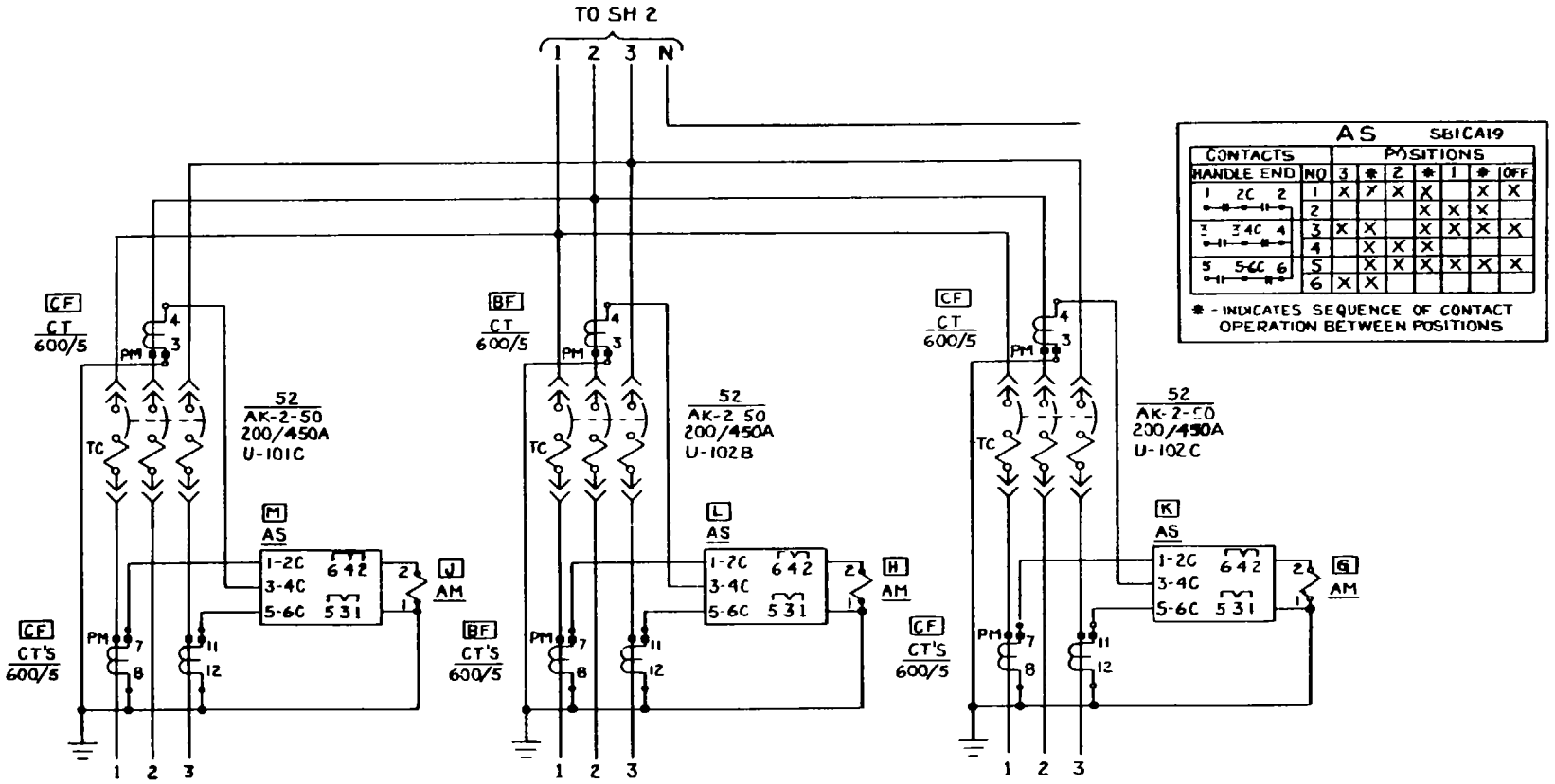


Figure 2-11. Main breaker front view.

(3) Below the main breaker compartment is feeder No. 1 breaker compartment. This compartment is the same as the main breaker except the breaker is an AK-2-50. There are three current transformers, one around each phase. These arc used in the ammeter circuits. See figure 2-12 for complete meter circuit diagram.



ME 612:25012/2-12

Figure 2-12. Distribution and ammeter circuits.

(41) On the left side wall just inside the door is a light switch I 1, fig. 2-13) which turns the light on or off. There are four lights at the top of each section, two front and two rear. Just below the light switch is a heater switch(2) which operates the heater; two in the low voltage cabinet and one in high voltage cabinet. These heaters should be turned on as soon as possible to keep the compartments just above the outside temperature. This keeps condensation from accumulating. Directly below the heater switch is a duplex outlet (3) for 115 VAC service as needed.

KEY to figure 2-1

1. Compartment light on-off switch
2. Heater on-off switch
3. Duplex 115 VAC outlet

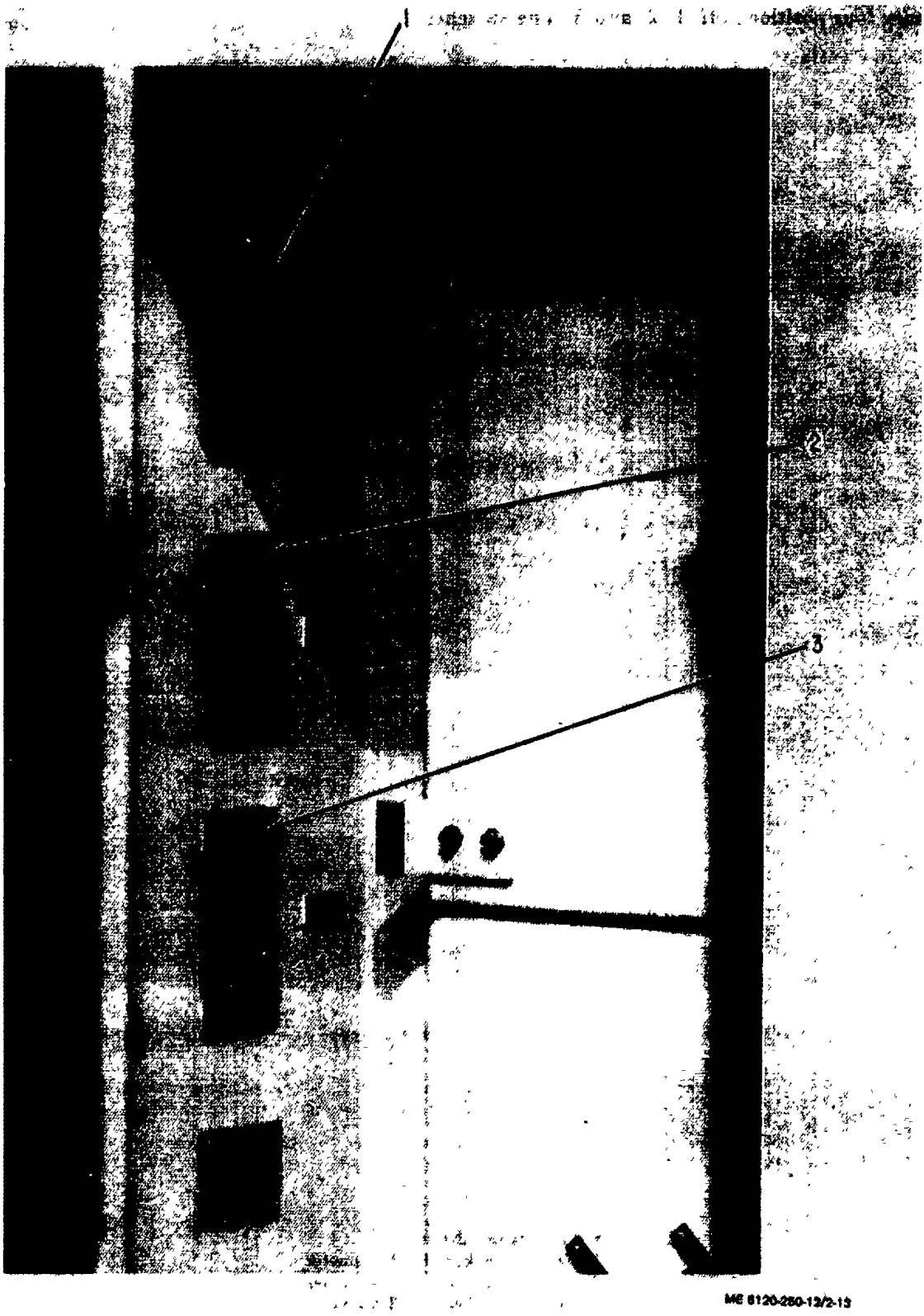


Figure 2-13. 115 V heater and light switch and outlet location.

(5)Behind the right front door section at the top is an instrument panel with 3 ammeters and 3 selector switches just below. (fig. 2-14). The ammeters are type AB-40, the switches are SB-1 rotary four position; off, 1, 2, and 3. The switches are labeled feeder No. 1, feeder No. 2, and feeder No. 3. These switches select the phase to be read on its ammeter. See figure 2-12 for complete ammeter circuit.

KEY to figure 2-14:

1. Feeder breaker No. I ammeter
2. Feeder breaker No 2 ammeter
3. Feeder breaker No. 3 ammeter
4. Knurled screws
5. Feeder breaker No :3 ammeter selector switch
6. Feeder breaker No 2 ammeter selector switch
7. Feeder breaker No. 1 ammeter selector switch

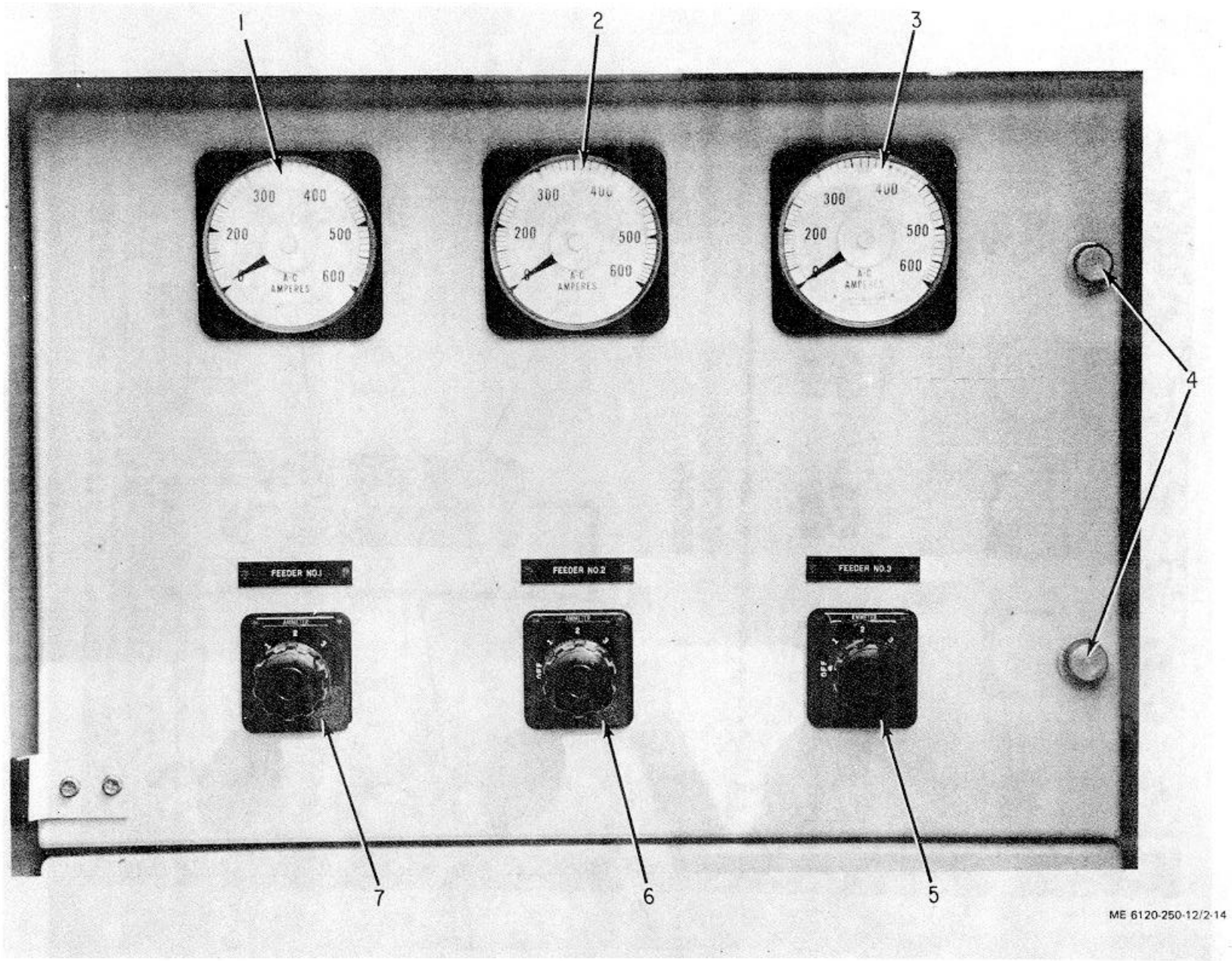


Figure 2-14. Instrument panel ammeter and switches.

(6) Right below the instrument panel is feeder No. 2 compartment, below that on the bottom is feeder no. 3 compartment. These two compartments and breakers are the same as feeder no.

1.

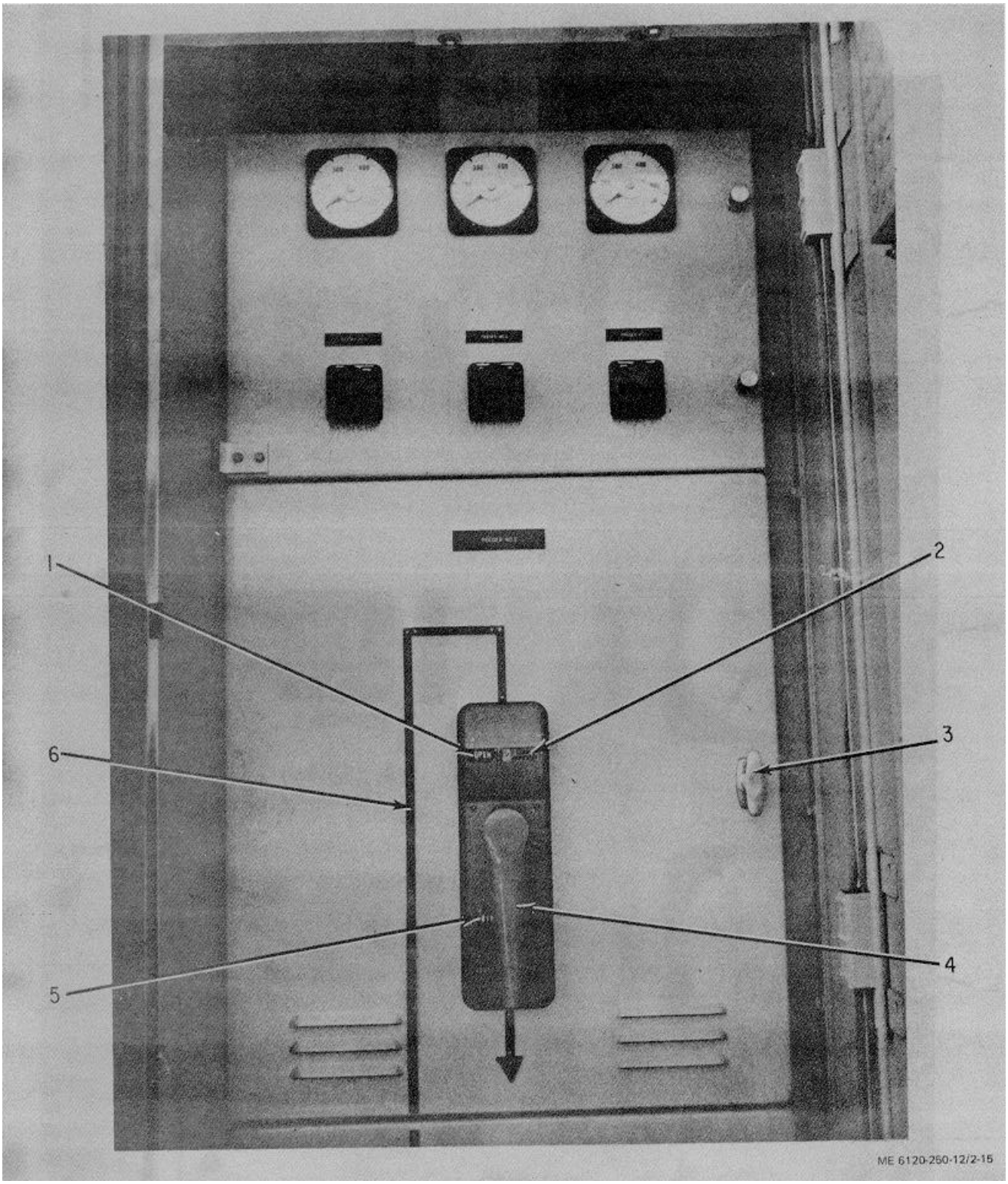


Figure 2-15. Feeder breaker.

KEY to figure 2-15

1. OPEN-CLOSEI) indicator
2. Charge indicator number
3. Compartment panel handle
4. Charging handle
5 Trip push button
6. Red mimic bus

(7) The door on the right facing the rear of the low voltage cabinet is the entrance to the bus compartment behind the main and feeder breaker No. The main breaker input is connected from the secondary side of the transformer. The output is connected by removable links, one set in each bus, that connect the feeder breakers inputs. The output of each feeder breaker is connected directly to the connectors of the feeder breaker. (fig. 2-3). To remove the removable links, see paragraph 2-21. Mounted on the inside of the righthand door is a fuse box for the potential transformers in the voltmeter circuit, there are three 6 amp fuses (2, fig. 2-16). Beside this is a two-fuse fuseblock (3, fig. 2-16); only one is used. It is a 20 amp fuse in the heater and light circuit. In the lower right of the left compartment in the wiring trough is 01 TB (1, fig. 217) for the 11 S VAC voltage input, and a heater (2, fig. 2-17).

KEY to figure 2-16:

1. Air filters
2. Potential transformer, voltmeter fuse block
3. Light, heater 115 V fuse block
4. Door latch mechanism
5. Door open retrainer
6. Air filter
7. 7/0 ground lug
8. Heater

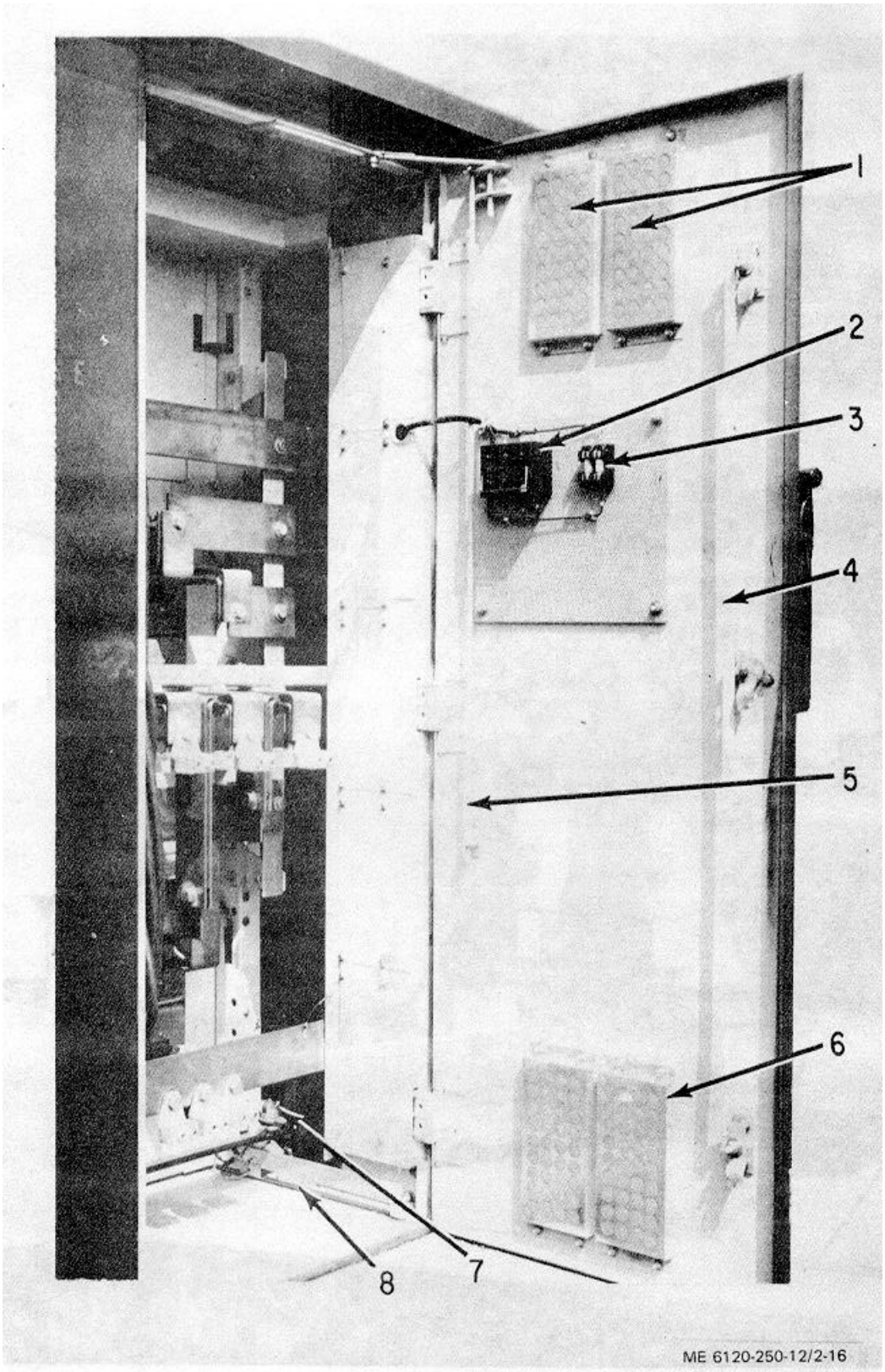


Figure 2-16 Low voltage cabinet rear view of right section.

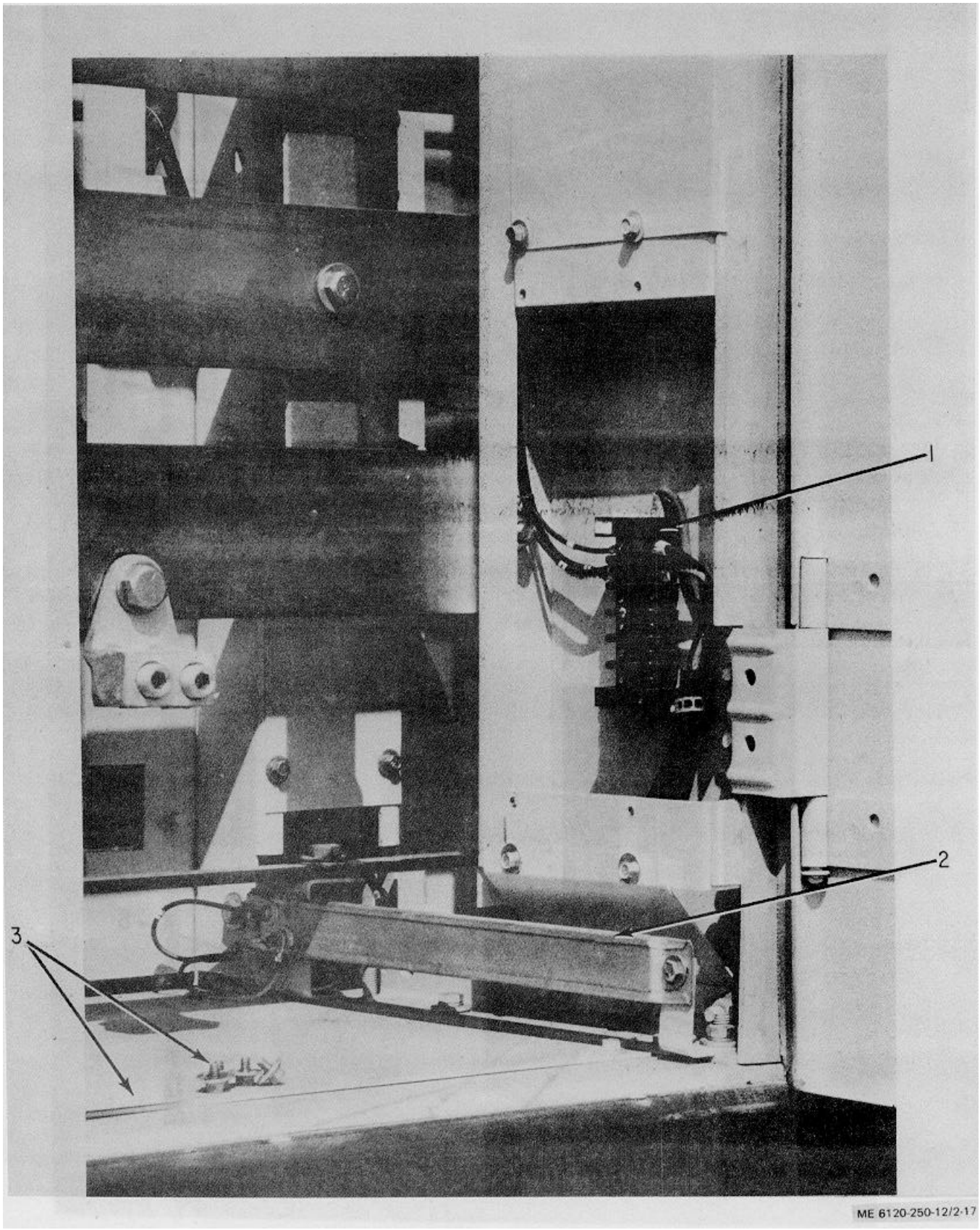


Figure 2-17 . Low voltage cabinet rear view of left section.

KEY to figure 2-17:

1. Terminal board OITB
2. Heater
3. TB. wire through cover and screws.

Section IV. OPERATING UNDER USUAL CONDITIONS

2-10. General

a. The instructions in this section are published for the information and guidance of personnel responsible for the operation of the substation.

b. The operator must know how to perform every operation of which the mobile substation is capable. This section gives instructions to put the transformer on the line from its primary source and (engage the low voltage distribution feeder lines. Since nearly every installation will have different problems and requirements, the operator may have to vary a given procedure to fit that individual situation.

2-11. Energizing Transformer and Distribution Line

a. Before Operation. Perform the before operation preventive maintenance services (Table : 3-1)1.

b. Safety Precaution. Perform the safety precautions as indicated by the applicable NOTES, CAUTIONS AND WARNINGS throughout the text.

(1) Make sure trailer is grounded and all ground connections are tight. A poor ground may be worse than none at all as it gives a sense of false security to those working around the equipment and may result in serious injury or damage to the equipment.

(2) Make sure all panels and covers are replaced so that no live connections are exposed.

(3) Check all circuit breakers to see that they are open, and have been racked to the connected position. See paragraph 3-15 j.

(4) Insure all compartment door panels are closed and secured.

(5) Make sure all tools and equipment used for installation have been stowed in their proper places and that nothing has been left on the deck of the trailer.

c Close Load Break Switch (fig. 2-1 and 2-5).

NOTE

The (closing operation is spring charged. The mechanism Is manually charged but is completely disengaged from the operating handle. In this way, actual operation of the switch is independent of the operator.

(1) With key, unlock padlock and remove bar covering operating handle socket of switch.

(2) From storage cabinet, take operating handle and insert into socket and engage operating mechanism.

(3) Rotate handle in a counterclockwise direction as far as possible (approximately 1800) using a positive motion throughout the entire stroke.

(4) The switch escutcheon should now read closed. The primary side of the transformer is now energized.

(5) Disengage handle, replace bar over operating handle socket and lock. Return operating handle to storage cabinet.

d. Close Main Breaker (fig. 2-11).

(1) Rotate the charging handle counterclockwise through approximately 120 degrees. Then clockwise back through 120 degrees to the normal handle position. Four such complete movements of the handle are required to close the breaker. During the four counterclockwise movements and the first three clockwise movements of the handle, the springs are charged. After approximately 70 degrees travel of the fourth clockwise handle movement the spring charged mechanism is driven over-center and the breaker closes.

(2) The charge-indicator numbered I to 4 moves with each complete handle movement. Indicating the number of complete handle movements that have been performed.

(3) The indicator should now read closed.

e. Close Feeder Breaker (fig. 2-15).

(1) Before closing a feeder breaker, it may be desirable to make sure there are no potential loads on the line to cause a surge and possible breaker tripping.

(2) The three feeder breakers are closed in the same manner as the main breaker.

2-12. operating Substation

a. Low Voltage Cabinet. The operator must make periodic readings of the voltage and current using the voltmeter, ammeter and their selector switches. Line voltage changes or excessive current loads require corrective action. The corrective action should be correlated with organizational maintenance. All readings should be recorded.

(1) Maximum allowable voltage drop on a primary line not employing a line regulator is 5 per cent.

(2) The load should not exceed 560 amps per feeder or a combined total of 1600 amps for the three feeders breakers in a 208 / 120 volt operational mode.

(3) The load should not exceed 280 amps per feeder or a combined total of 800 amps for the three feeder breakers in a 416/ 240 volt operational mode.

(4) The circuit breakers should be operated periodically. See paragraph 3-15 a

b. Transformer. Periodic readings of the meter and gages on the transformer must be made. Record and note any changes from the last and previous readings. Note the highest reading since the last one on the liquid temperature and winding temperature meters. Reset highest reading pointer. If a trend of deviations or a sharp change is noticed, notify organizational maintenance for corrective action.

(1) The liquid level gage has a center marking indicating the level at 25°C. Dial markings are minimum-25°C maximum. On a deenergized transformer the liquid level should indicate near enter at normal ambient temperature. It should indicate near maximum when fully loaded at operating temperature. When checking the level at temperatures other than 25°C, it should be noted the maximum end of the scale represents the level at approximately 90°C oil temperature. The gage indicator travel between 25°C and 90°C may considered to be proportional to the temperature. For example, for an oil temperature of 55°C the level would be $\frac{55-25}{90-25} = \frac{30}{65}$ slightly *less* than halfway between 25°C and maximum.

(2) The winding temperature with 65°C average rise in an average ambient temperature of 30°C (the permissible top oil temperature f normal life expectancy) would be 90°C. Assuming the hottest spot rise did not exceed 200C. NEMA Standard TR98-1964 provides a guide for loading

(3) The pressure-vacuum gage is calibrated P'SIG from-10 to + 10 pounds per square in(Gage readings vary with transformer temperature changes and would normally indicate a posit pressure. The gage may indicate a vacuum with the tank when the transformer is de-energized or operating under light or no load conditions in a l ambient temperature. Any change in temperate without a change in reading is an indication leak.

2-13. De-energizing Distribution and Main Lines

a. Feeder Lines (fig. 2-15).

(1) Trip feeder breakers No. 1, 2, *and* mechanically by pushing trip button located to left of breaker charging handle. To de-energize c one feeder line, the breaker of that feeder line tripped. When the trip button has been pushed, indicator should read open and the charging hat charge-indicator should read zero.

(2) A check to make sure a line is dead may performed by using the ammeter readings of feeder line.

(3) De-energize all feeder lines when shut complete substation down.

b. Main Line. Trip main breaker the same I feeder breaker in a. above.

c. *Open Load Bread Switch (fig. 2-1 and* . The opening operation is the same as the clothing (para. 2-1 11 c).

Section V. OPERATION UNDER UNUSUAL CONDITIONS

2-14. Operation in Extreme Cold

The mobile substation is designed to operate at temperatures down to -300 F. The cabinet interior must be continually checked to insure heaters are working.

2-15. Operation in Extreme Heat

a. G*eneral* The ambient temperature is an important factor in determining the load capacity of the transformer. The temperature rise for any load must be added to the ambient to determine operating temperature. Ambient temperature should be used in the determination of winding hottest-spot temperature and the load capacity of the transformer. Use table 2-1 to determine load capacity. This will give approximately the same life expectancy as if the transformer were operated at nameplate rating and standard ambient temperatures over the same period.

Table 2-1. Loading on Basis of Ambient Temperature.

	PERCENT OF RATED KVA	
TYPE OF COOLING	Decrease Decrease Load For Each Deg. C Higher Temperature	Decrease Load For Each Deg C Lower Temperature
Self-Cooled OA	1.5	1.0

b. Cleaning. Make sure the ventilation screens, grills and filters are clean and free from air intake obstruction.

2-16. Operation in Dusty or Sandy Areas Keep the unit as clean as possible paying special attention to the air filters and grills.

2-17. Operation Under Rainy or Himid Conditions Inspect the unit closely for corrosive action. Clean and paint chipped areas.

2-18. Operation in Saltwater Areas

a. Salt water causes corrosive action on metal. Care must be taken to avoid equipment contact with salt water. If contact is made, or if unit is exposed to salt spray, wash the exterior frequently with clean fresh water

b. Clean and repaint pre-painted surfaces that are chipped or corroded

2-19. Operation at High Altitudes The effect of the decreased air density due to high altitude is to increase the temperature rise of the transformer which is dependent upon air for the dissipation of its heat losses. The transformer can be operated at rated KVA at altitudes greater than 3,300 feet without exceeding temperature limits provided the average temperature of the cooling air does not exceed the temperature shown in table 2-2

Table 2-2 Maximum Allowable Average Temperature of Cooling Air for Carrying Rated K VA

Method of **Cooling Transformer**	3300 **Ft.**	6600 **Ft**	9900 Ft.	13,200 Ft
		Degrees C		
Oil-Immersed Self-Cooled	30	28	25	23

2-20. Operation at 50 Cycle The 50 cycle operation requires a primary voltage to the transformer of 3467 volts with a reduced KVA rating of 417. A complete rating is: OA-T-50 rycles-417 KVA (65 degrees C)-3467I 3Y / I 00 x 347Y / 200.

2-21. Operation Using Main Breaker Only
To use the main breaker only the feeder busses should be disconnected from the main breaker output studs. This is accomplished by removing the removable links in each of the three feeder bus connections to the main breaker output. Refer to Organizational Maintenance.

2-22. Preparation for air shipment

a. General. The trailer body must be supported in such a manner that it does not interfere with the removal of the landing gear, rear bumper or the wheels and suspension.

b. Removal of landing gear assembly (fig. 218).

(1) Loosen and remove the two 12-16 hex head bolts (I) and lock nuts 12) on either end of cross shaft (3).

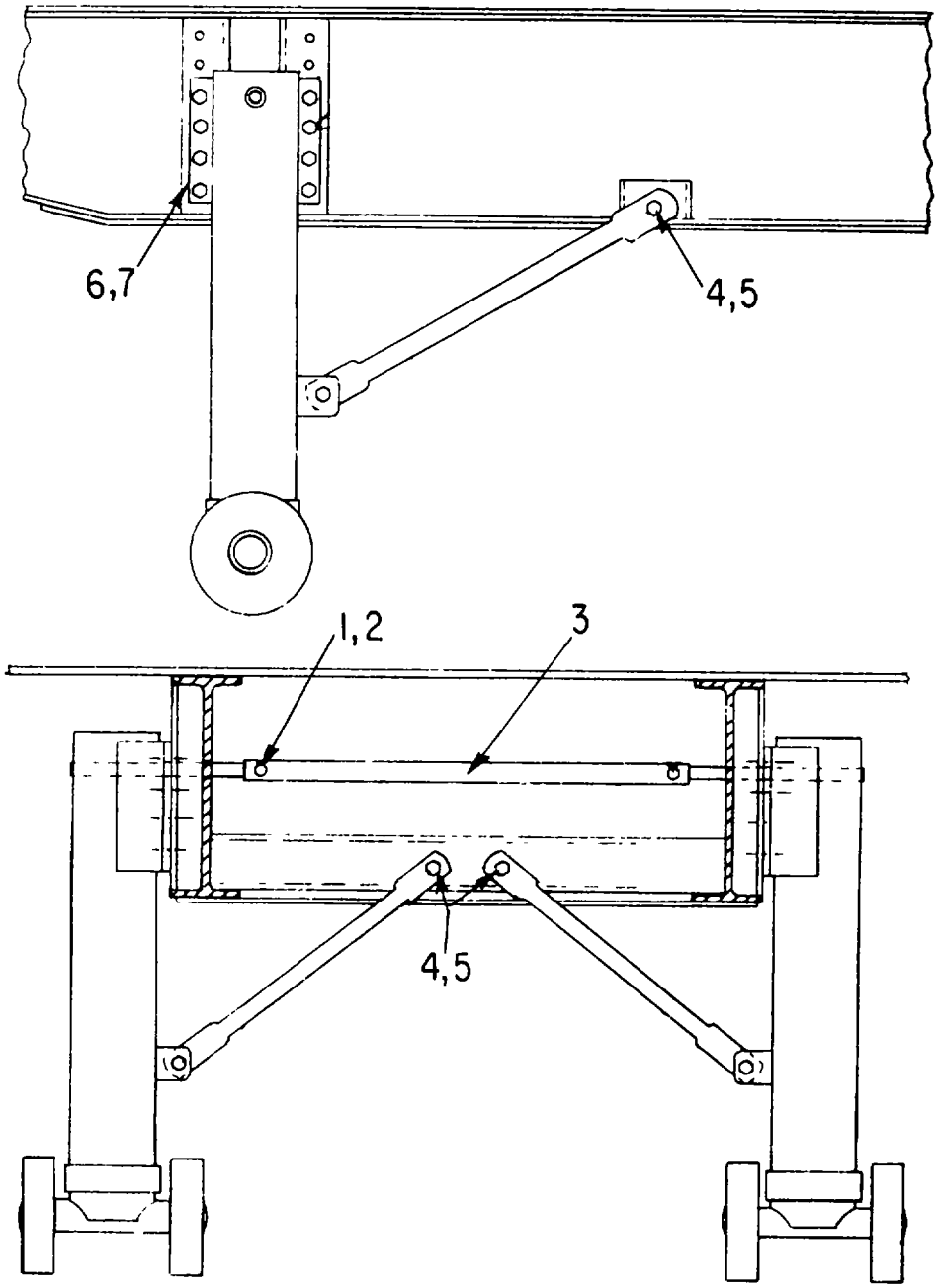
(2) Remove cross shaft (3).

(3) Loosen and remove the four 'St-11 hex head bolts (4) and locknuts (5) fastening the four landing gear braces to the trailer body.

(4) Loosen and remove the sixteen /-13 hex head bolts (6) and locknuts (7), 8 for each side, fastening the landing gear brackets to trailer body.

(5) Remove landing gear from trailer.

(6) All bolts and locknuts should be inserted into their respective holes in landing gear assembly for safekeeping.



ME 6120-250-12/2-18

Figure 2-18 Landing gear assembly removal.

KEY to figure 2-18:

1. Hex head bolt 1/2-16
2. Hex locknut 1/ 2-16
3. Cross shaft
4. Hex head bolt 5/8-11
5. Hex locknut 5/ 8-11
6. Hex head bolt 1/ 2-13
7. Hex locknut 1/ 2-13

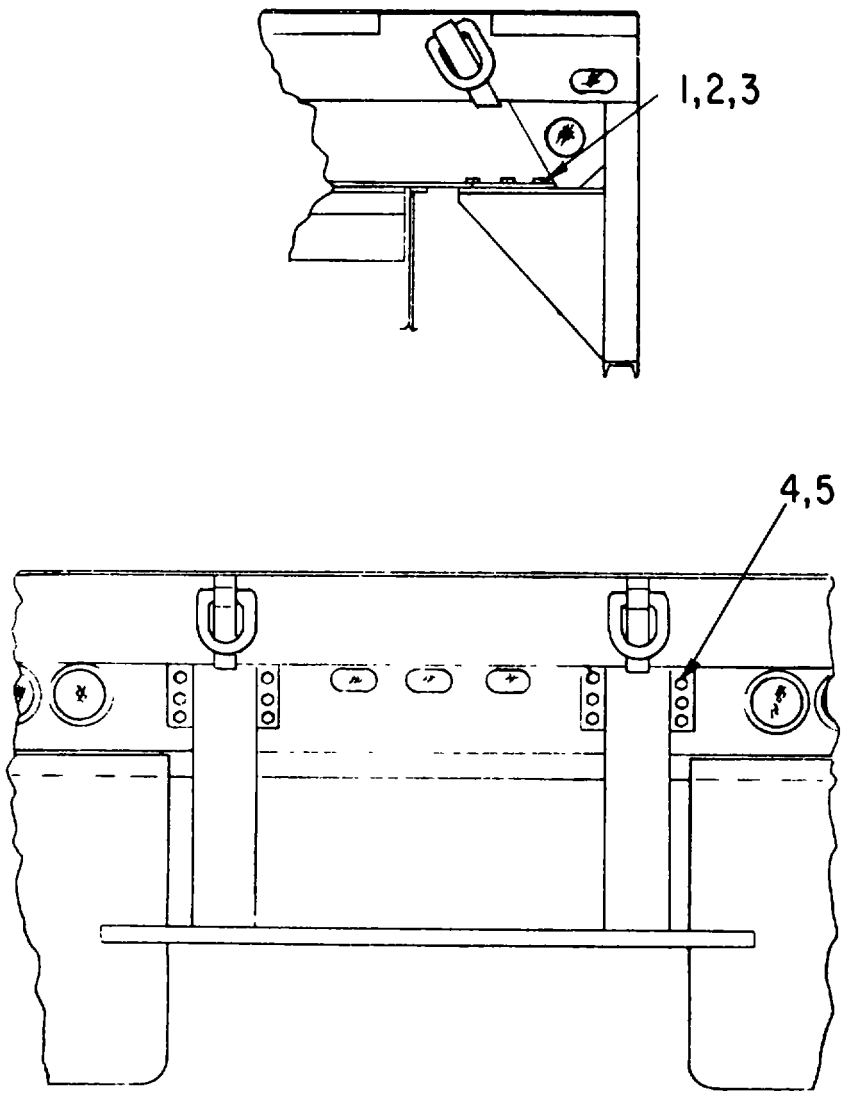
c Removal of Rear Bumper (fig. 2-19).

(1) Loosen and remove the six 12-13 NC x 13/4 hex head bolts (1),beveled washers (2) and locknut 31) from the bumper gussets, 3 bolts in each gusset.

(2) Loosen and remove the twelve 12-13 NC x 1⅛ hex head bolts (4) and locknuts (5) from the two bumper mounting plates on rear of trailer, 6 bolts in each mounting plate.

(3) Remove bumper.

(4) All bolts beveled washers and locknuts should be inserted into their respective holes of the bumper assembly for safekeeping.



ME 6120-250-12/2-19

Figure 2-19. Rear bumper assembly removal

KEY to figure 2.19:
1. Hex head bolt 1/2.13 x 1 3/4 LG
2. Beveled washer
3. Hex locknut 1/2-13
4. Hex head bolt 1/2-13 x 1 1/4 LG
5. Hex locknut 1/ 2-13

d. Removal of Rear Wheels and Suspension Assembly (fig. 2-20).

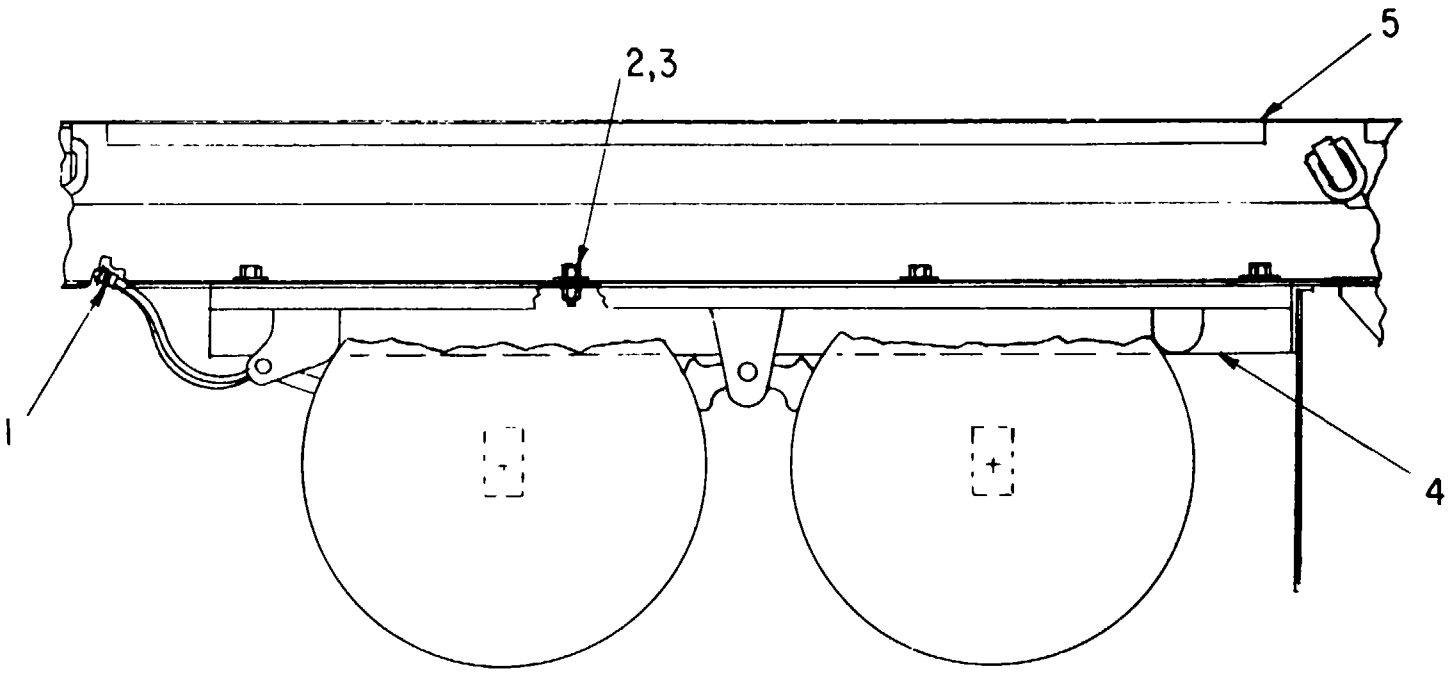
(1) Disconnect the air service and emergency hose hand disconnect (11 in middle of trailer.

(2) Make sure brakes have been released.

(3) Loosen and remove the eight 3/4-16 NF x 2V1 LG hex hd bolts (21 and locknuts (3) from the trailer frame and the wheel assembly frame, 4 bolts each side.

(4) Remove wheel and suspension assembly (41 from trailer bed (5).

(5) All bolts and locknuts should be inserted in the holes of the wheel and suspension assembly frame for safekeeping.



ME 6120-250-12/2-20

Figure 2-20. Rear wheels and suspension removal.

KEY to figure 2-20.
1. Air service and emergency hose hand disconnect
2. Hex head bolt 3 / 4-16 NF x 2 1/ 2 long
3. Locknut
4. Wheel and suspension assembly
5. Trailer bed

2-23. Reassembly After Air Shipment

a. The trailer body must be supported so that the landing gear assembly, rear wheel and suspension assembly and the rear bumper assembly can be mounted.

b. Install the rear wheel and suspension assembly in the reverse order of preceding paragraph 2-22 *d.* Torque frame mounting bolt 1/1-16 and nuts to 120- 15I foot-pounds.

c. Install rear bumper assembly in the reverse order of preceding paragraph 2-22 *c*.

d. Install landing gear assembly in the reverse order of preceding paragraph 2-22 b.

WARNING

Never attempt to lift or hoist trailer by cables without using the spreader bars provided and stowed on each trailer. Serious damage to equipment and injury to personnel may result.

2-24. Preparation for Hoisting Trailer

a. To hoist (lift) trailer for rail, shipboard, etc., loading use the slings and spreader bars provided. (fig. 2-2 1.)

b. To assemble lifting slings use the following procedure:

(1) Loosen and remove the two 5/8 x 4 in. long hex. hd. bolts and spacers securing each spreader bar to trailer deck. Put each bolt and spacer in storage cabinet for safekeeping.

(2) Take the four 10 foot long lifting cables (1, fig. 2-21) from storage cabinet. Each cable has a clevis 12) (with pin /3) and cotter pin (4)) on one end and a lifting hook 15) on the other end. Make sure, there are no kinks or sharp bends in cable.

(3) Attach two 10 foot cables by the clevis to each spreader bar (61 on opposite ends but on the same side of bar. See figure 2-21 rear view. Make sure clevis pin is locked or retained by the cotter pin.

(4) Take the bridle sling (7) from storage cabinet. The bridle sling has four cables (legs) fastened to one lifting ring. Each leg has a clevis assembly on the free end. Inspect and check each leg for kinks or sharp bends.

(5) Attach the clevis end of each leg of the bridle sling to the opposite side of the 10 foot cables on the spreader bars. Make sure clevis pin is locked or retained by cotter pin. The hoisting sling should now be assembled so that when the bridle lifting ring is raised the four legs will lift the two spreader bars from the same side with the four 10 foot cables suspended with their lifting hooks on free end.

(6) Attach the hooks to the trailer using the first and third rings on each side designated as lifting. The slings must be attached so that the spreader bars go across the width of the trailer and the hooks are in the rings so that the cable is on the inside with the hook point outside.

(7) The trailer may now be raised with the bridle lifting ring.

(8) The lifting crane must be able to lift 30,000 Ibs.

c. Disassembly hoisting slings and spreader bars in reverse order of preceding *b.* above. Before stowing lifting slings. clean all foreign matter and dirt front all cables, check clevis assemblies for pin and cotter pin, smooth out kinks and sharp bends. Then stow cables and bridle slings in storage cabinet. Secure spreader bars on each end to trailer deck with the 5/8 x 4 in. long hex. hd bolts and spacers.

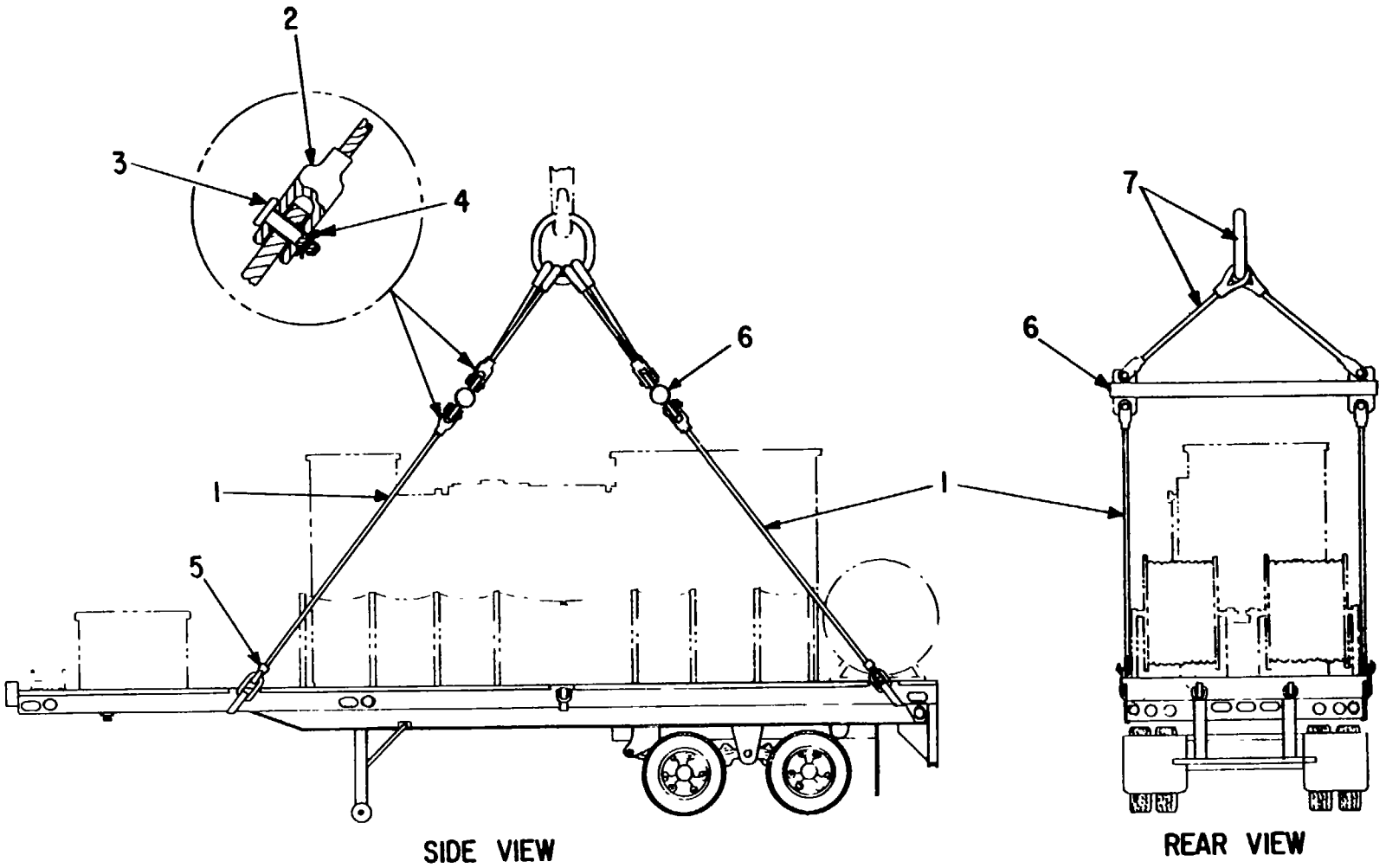


Figure 2-21. Lifting sling assembly.

KEY to figure 2-21:

1. 10 foot lifting cable
2. Clevis
3. Clevis pin
4. Cotter pin
5. Lifting hook
6. Spreader bar
7. Bridle sling

CHAPTER 3

OPERATOR/CREW MAINTENANCE INSTRUCTIONS

Section I. BASIC ISSUE ITEMS

3-1. Basic Issue Tools and Equipment
Tools, equipment, and repair parts issued with or authorized for the substation are listed in the basic issue items list, appendix C of this manual.

Section II. LUBRICATION INSTRUCTIONS

3-2. General Lubrication Information
This section contains lubrication instructions which are supplemental to and not specifically covered in the lubrication order LO 5-6120-250-12.

3-3. Detailed Lubrication Information

a. General. Keep all lubricants in closed containers and stored in storage cabinets of trailer. Allow no dust, dirt or other foreign material to mix with lubricants.

b. Cleaning. Keep all external parts not requiring lubrication clean of lubricants. Before lubricating the equipment, wipe all lubrication points free of dirt and grease. Clean all lubrication points after lubricating to prevent accumulation of foreign matter.

Section III. OPERATORS PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-4. General
To insure that the substation is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. Defects discovered during operation of the unit will be noted for future correction, to be made as soon as operation is ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operations were continued. All deficiencies and shortcomings will be recorded together with corrective action taken on 1)A Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

3-5. Operator's Preventive Maintenance Services
Table 3-1 contains a tabulated list of preventive maintenance checks and services which must be performed by the operator or crew. Item numbers indicate the sequence of minimum inspections requirements and the interval column designates the required service intervals.

Table 3-1 Preventive Maintenance Checks and Services.

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

Item number	Interval: Operator: Daily B	Daily D	Daily A	Org.: W	M	Q	Item to be inspected	Procedure	Reference
							Hi Voltage Cabinet	Check and inspect all devices to see that they function properly.	para 3-9
								Check all electrical connections for tightness and that indicating devices are operative.	
			X					Clean and inspect all painted surfaces and retouch where necessary.	
					X		Air Filters	Remove clean and replace.	para 3-9*k*.
2	X						Load Break Switch	Check all nuts, washers, bolts, cotter pins and terminal connections for tightness. See that all bearing surfaces of the mechanism have been lubricated. Operate switch by hand several times and note that there is no binding or excessive friction.	para 3-10
3	X						Transformer	Check exterior for leaks.	
		X					Transformer Gages	Check all gages and indicators for proper operations.	para 3-12
4	X						Low Voltage Cabinet	Check and inspect all devices to see that they function properly. Check all electrical connections for tightness and that indicating devices are operative.	para 3-14
5		X						Make voltage and ammeter checks.	para 2-12*a*.
		X					Bus Compartments	Check bus connections for overheating or discolorations for evidence of loose connections.	
		X					Heaters	Make sure all heaters are working in the high and low voltage cabinets.	para 3-20
6	X						Trailer	Check all air hoses of brake system, connected and tight.	para 3-34*b*.
	X							Check and inspect suspension	para 3-30
	X							Check tire inflation and inspect tires for breaks or stones etc imbedded in tread, valve stems, and valve caps.	para 3-31
	X							Check oil level in hub caps of each wheel.	para 3-32
	X							Check air and electrical connectors	
	X							Check all lens of lights and reflectors.	para 3-36
	X							When connected to prime mover check all lights are operating.	
	X							Charge air brake system and check brake operation.	
	X			X				Check king pin (fifth wheel) for gouges, cracks, foreign matter. Report damaged pin to DS maintenance.	para 3-35

Section IV. OPERATOR/ CREW TROUBLESHOOTING

3-6. General

This section provides information useful in the diagnosis an(d correcting unsatisfactory operation or failure of the substation and its components. Malfunctions which may occur are listed in Table 3-2. Each malfunction stated is followed by a list of probable causes of the trouble. The corrective action recommended is described opposite the probable cause.

3.7. Troubleshooting Table

Table 3-2 lists operator and crew troubleshooting malfunctions, probable causes and the recommended corrective action.

Table 3-2. Operator/Crew Troubleshooting.

Malfunction	Probable Cause	Corrective Action
1. Meters Failing to Register.	*a.* Blown potential fuse.	*a.* Renew blown fuse. Paragraph 3-19. (It may be necessary to ascertain reason for blowing of fuses and correct that trouble.)
	b Broken wires (or other fault in connections).	*b.* Repair.
	c. Wedge or block accidentally left at time of test or inspection.	*c.* Remove wedge or block, and see that meter is in good operating condition.
2. Damaged Control Instrument Transfer Switch	Burned or pitted contacts from long use without attention, or from unusual condition.	Dress or clean burned contact, or replace. para 3-17.
3. Noises due to Vibration of Parts.	*a* Loose bolts or nuts, permitting excessive vibration.	*a.* Tighten.
	b Loose laminations in cores of transformers	*b.* Tighten any loose nuts or core clamps.
4 Connections Overheating.	*a.* Increase of current due to additional load that is beyond normal current rating of bars or cables	*a.* Refer to DS maintenance to remove excess current from circuit.
	b. Bolts and nuts in the connection joints not tight	*b.* Tighten all bolts and nuts (too much pressure must be avoided).
5. Failure in function of all instruments and devices having potential windings.	*a.* Loose nuts, binding screw or broken wire at terminals.	*a.* Tighten all loose connections or repair broken wire circuits.
	b Blown fuse in potential circuit.	*b.* Renew fuses. Paragraph 3-19
	c Open circuit in potential transformer primary or secondary circuits.	*c.* Repair open circuit and check entire circuit for intactness and good condition
6. Voltmeter fails to register.	*a* Blown fuse.	*a.* Replace fuse. Paragraph 3-19.
	b. Loose or broken leads in voltmeter circuit.	*b* Tighten or replace leads.
7 Ammeter fails to register.	*a.* Meter switch in off position.	*a.* Turn switch to phase position.
	b Loose or broken leads in ammeter circuit.	*b* Tighten or replace leads
8 Compartment heaters not working	*a.* Blown fuse	*a* Replace fuse. Paragraph 3-19
	b Loose or broken leads.	*b.* Tighten or replace broken leads
	c Heater switch in off position.	*c.* Switch to on.
	d Loss of 115 V power	*d.* Restore 115V external power from source or at input terminals.
9. Trailer lights flicker or will not light	*a* Short circuit in trailer wiring or connection box	*a.* Check wiring for breaks or bare spots, tape bare spots.
	b. Intervehicular cable damaged.	*b* Replace cable
	c Burned out bulb.	*c* Replace bulb. Paragraph 3-36.
	d No current from towing vehicle.	*d* Provide current.
	e. Dirty or corroded contacts.	*e.* Clean contacts.
10 Trailer brakes will not apply or hold	Leaky intervehicular hose.	Tighten connections or replace.
11. Trailer brakes will not release.	Air hose connection wrong.	Check and make sure right hose connections are made.
12. Trailer will not track when towed.	Loose suspension assembly.	Tighten suspension assembly bolts Paragraph 3-30.

Section V. MAINTENANCE OF HIGH VOLTAGE SECTION

3-8. General

Instructions contained in this section are for operator's information and guidance in maintenance (of the high voltage section.

3-9. Enclosure

WARNING

Solid insulation surrounding an energized conductor and power apparatus must never he relied upon to provide protection to personnel.

a. Check and inspect all devices to see that they are functioning properly. Check heater feel for heat an(l mounting of it and other devices.

WARNING

Before any covers are removed or doors opened which permit access to the primary circuits, it is essential that the circuits be (de-energized. See paragraph 2-11 *c*.

b. Check indicating devices, mechanical and key interlocks and hinges of hinged panels.

c. Check that all bus mounting bolts and splice connection bolts are tight.

d. Wipe and vacuum clean the busses and supports.

e. Inspect all main cable connections for signs of overheating, and tighten all connections.

f. Check that all 120 volt wiring connections are tight and intact.

g. Check the ground bus connection and mounting bolt for tightness and clean ground bus.

h. Check to see that all anchor bolts and other structural bolts are tight.

i. Thoroughly clean interior of compartments. Use a vacuum cleaner and clean rags only. Do not use steel wool or oxide papers. Blowing with compressed air is not recommended.

j. Clean and inspect all painted surfaces and retouch where necessary.

k. Clean air filters by loosening and removing four nuts (fig. 3-1), holder, on inside of panels, covering the louvers. Remove filter and clean in warm soapy water. Squeeze dry and replace.

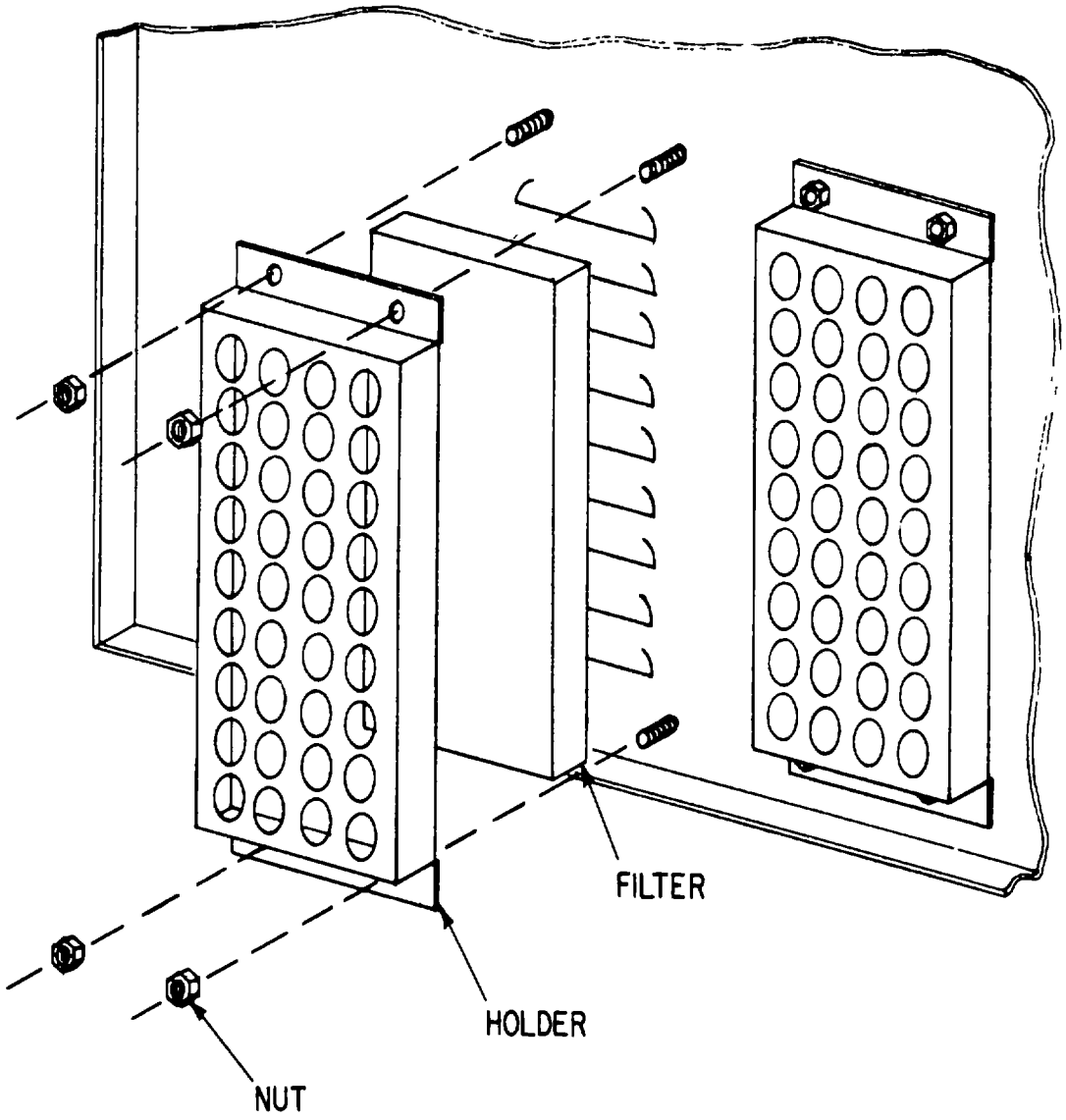


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Figure 3-1. Air filter removal.

3-10. Load Break Switch

a. Check all nuts, bolts, cotter pins and terminal connection for tightness.

b. See that all bearing surfaces of the mechanism have been lubricated. If lubrication is needed do as follows:

(1) Sleeve Bearings (Operating Rod Ends, Auxiliary Blade Hinge, Release Hook, etc.)-A light application of SAE 20-30 oil.

(2) Roller and Needle Bearings-A light application of SAE 20-30 oil.

(3) Worm and Wheel Miter Gears-Apply D50H15 grease.

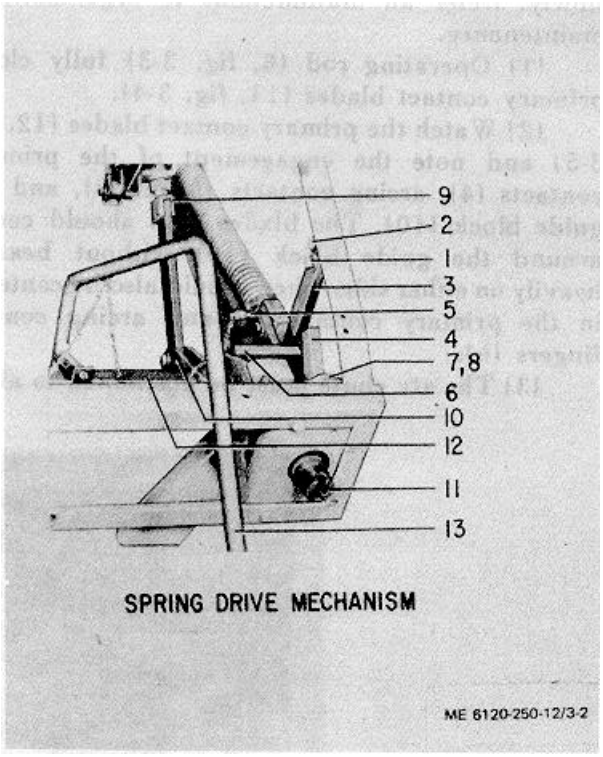
c. To check operation of switch it must be operated slowly, with the power springs blocked. Use the following procedure to block the power springs.

(1) Remove the rear bolt from lower position I(, fig. 3-2.) of the spring stop (3) located on the upper right angle frame.

(2) Rotate the stop until it is vertical. Insert the bolt removed from position I in location 2 and tighten.

(3) Using the operating handle rotate counterclockwise direction (direction of close) until the spring yoke on the right contacts the stop.

(4) Remove operating handle and insert maintenance handle (13) on main crank shaft (12). Screw the blocking pins attached by chains to maintenance handle 113) in the holes 15 spring blocking pin inserted) of left and right spring guides. The springs are now safely blocked. The maintenance handle will open and close the switch slowly for inspection purposes.



1. Spring stop bolt, lower position
2. Spring stop bolt, lower position
3. Spring stop
4. Driving crank
5. Spring blocking pin, inserted
6. Driving lug
7. Buffer rubber
8. Buffer stop
9. Operating rod
10. Operating rod crank
11. Operating hub
12. Main crank shaft
13. Maintenance handle

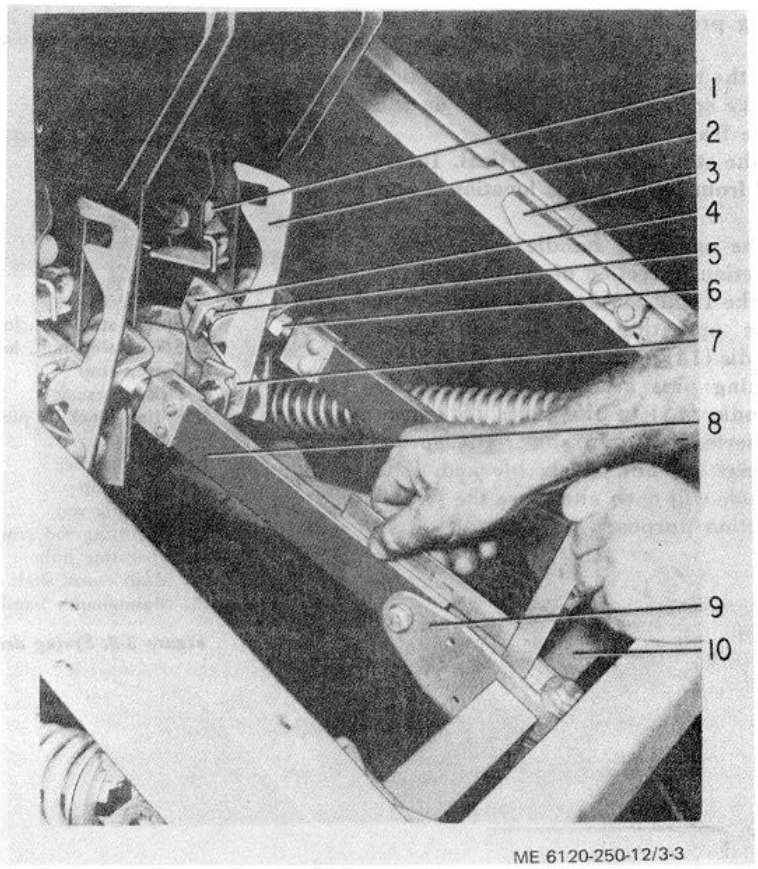
Figure 3-2. Spring drive mechanism.

d. Check the following while operating switch slowly. Refer all malfunctions to organizational maintenance.

(1) Operating rod (8, fig. 3-31 fully closes primary contact blades (I 1, fig. 3-4).

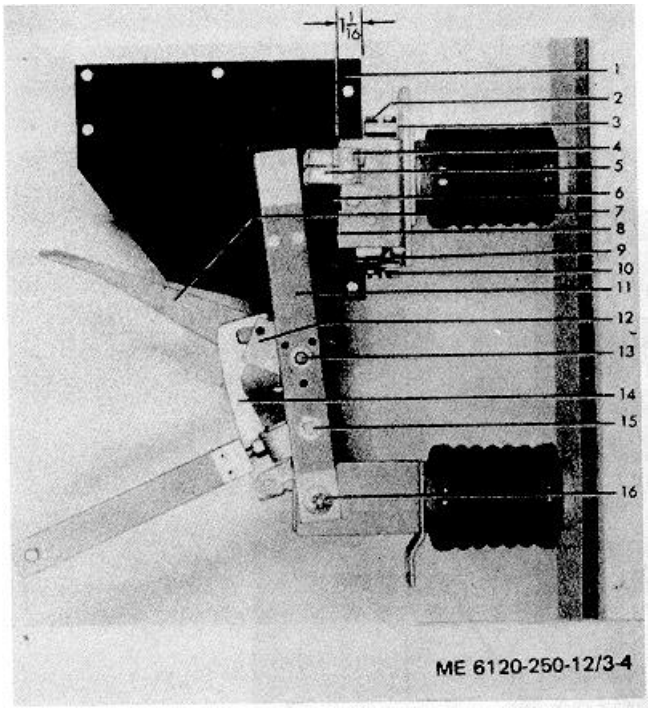
(2) Watch the primary contact blades (12, fig. 3-51 and note the engagement of the primary contacts (4), arcing contacts (6 and 8), and the guide block (10). The blades (12) should center around the guide block (10) without bearing heavily on either side. They should also be centered in the primary contact (4) and arcing contact fingers (6).

(3) The arc chute must be positioned to allow the auxiliary blade to enter, latch, and finally, to release the auxiliary blade at the proper time. While operating switch slowly rotating contact blade (12, fig. 3-4). Check the entry of the auxiliary blade (7) into arc chute (1). The blade should enter smoothly and be in center of the opening. It should travel the full length without binding or heavy scraping. Insure that the auxiliary blade (3, fig 3-6) contacts enter the chute properly positioned and latch the auxiliary blade. Note the position of the primary blades (11, fig. 3-4) is released by the auxiliary blade release hook (14). The release hook should hold the blade out of arc chute until with a 1/ 2 inch before arcing contacts touch.



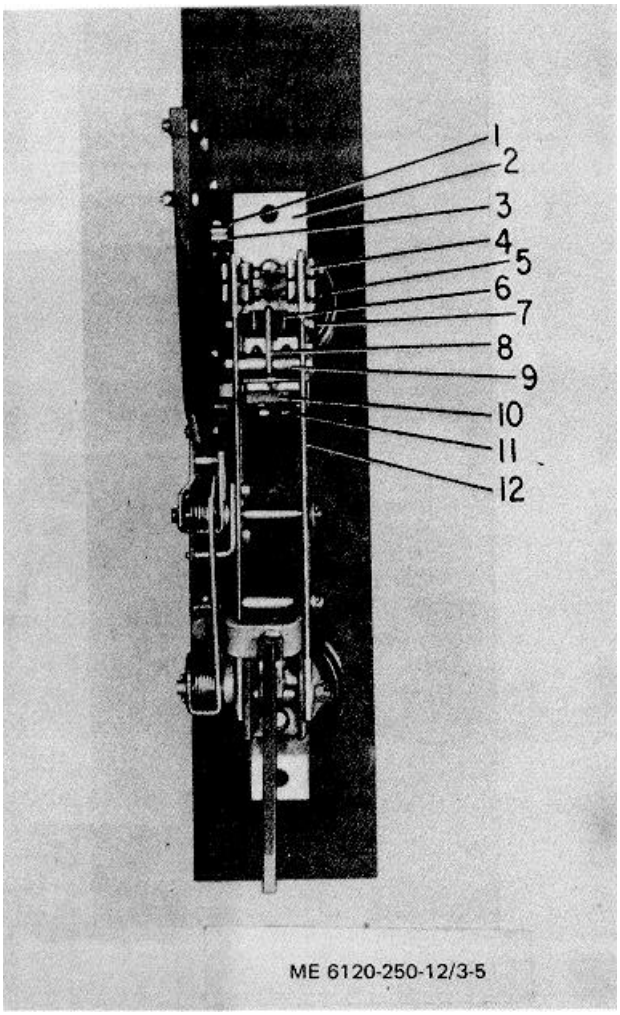
1. Auxiliary blade spring
2. Auxiliary blade release hook
3. Spring stop
4. Camming screw
5. Lock nut
6. Adjusting nut
7. Release hook spring
8. Operating rod
9. Operating rod crank
10. Main crank shaft

Figure 3-3. Switch blade



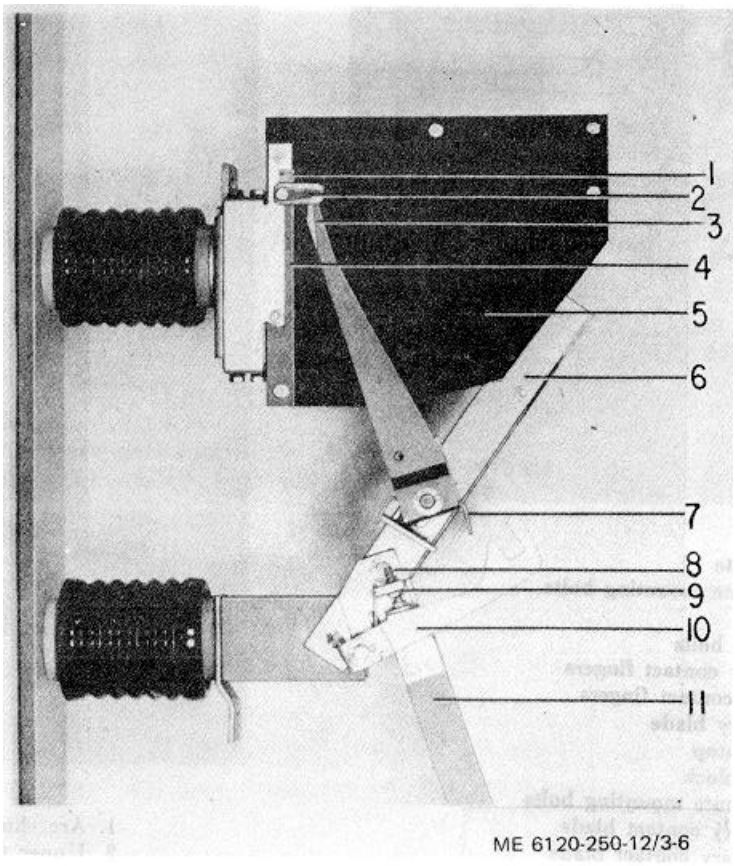
1. Arc chute
2. Arc chute mounting bolts
3. Shims
4. Contact bolts
5. Primary contact fingers
6. Arcing contact fingers
7. Auxiliary blade
8. Buffer stop
9. Guide block
10. Arc chute mounting bolts
11. Primary contact blade
12. Auxiliary contact blade
13. Pivot pin for auxiliary blade
14. Auxiliary blade release hook
15. Operating rod clevis pin
16. Hinge pin

Figure 3-4. Unit pole closing.



1. Arc chute mounting bolts
2. Upper terminal
3. Shims
4. Primary contacts
5. Contact bolts
6. Arcing contact fingers
7. Contact bolt
8. Movable arcing contact
9. Tube spacer
10. Guide block
11. Buffer block bolts
12. Primary contact blades

Figure 3-5. Contact arrangement.



1. Blade stop block
2. Arc chute contacts
3. Auxiliary blade
4. Spacer
5. Arc chute side
6. Primary contact blade

7 Auxiliary blade spring

8. Camming screw
9. Lock nut
10. Auxiliary blade release hook

11 Operating rod

Figure 3-6 Unit pole closing.

CAUTION

Lightning arrestors are live equipment. No contact should be made with them while line is energized. Current flows through an arrestor from line to ground. A potential gradient exists that is hazardous if handled while energized.

3-11. Lightning Arrestors

a. Inspect insulator for damage, if cracked or burned

b. Check anti make sure mounting is tight.

c. Check both top and bottom connections for tighteness and cleanliness.

Section VI. MAINTENANCE OF TRANSFORMER

3-12. General

Instructions contained in this section are for operator's information and guidance in maintenance of the transformer.

WARNING

Solid insulation surrounding an energized conductor and power apparatus must never be replied upon to provide protection to personnel.

a. The external surfaces should be inspected at regular intervals. If they show weathering is taking place the surfaces should be cleaned and repainted.

b. Check the pressure gage to make sure the transformer seal is being maintained. The gage reading should vary as the transformer temperature changes and should normally indicate a positive pressure. A lack of any change in readings with changes in temperature is an indication of a leak in the transformer seal and should be investigated. Check and make sure vent valve and sample valve are fully closed.

c. The meters and gages should be inspected to gee that all are in good condition, registering properly and have no broken or cracked glass, scarred, or damaged cases and are tightly mounted.

d. The wedge-type tap changer provides a means of c(hanging the voltage ratio of a de-energized transformer without breaking the transformer seal. It is shipped in place and is set on the position corresponding to the rated voltage shown on the transformer nameplate. A table on the transformer nameplate gives the voltages and current rating for each tap position.

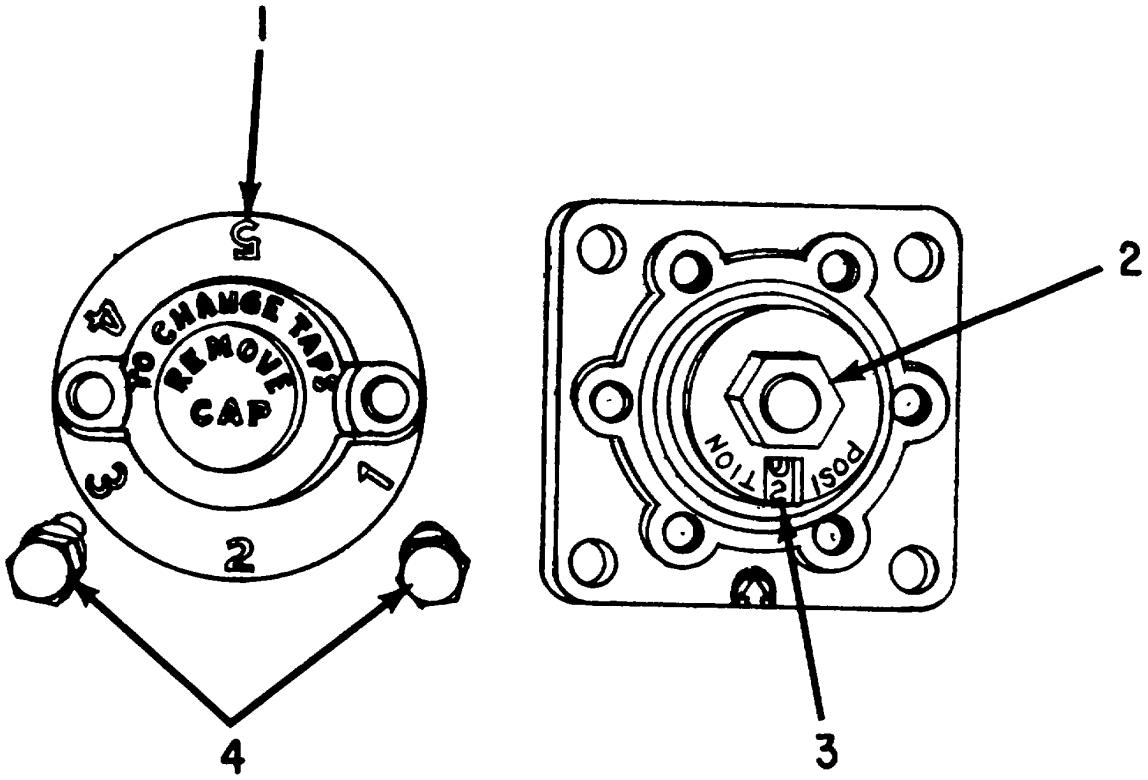
WARNING

The tap-changer must not be operated while the transformer is energized. Serious personal injury and / or damage to the transformer may result.

e. To change taps remove the tap changer cap (1, fig. 3-7) by removing the two hex head bolts (4). With the cap removed, the tap position can be observed through a slot in the indicator cams (3). Use a wrench to turn the hex head drive mechanism (2). The mechanism must be rotated through 5 / 6 of a turn to make a change of one tap. Although the drive mechanism can be turned continuously in either direction placing the wedge in any one of six different positions, only five positions are numbered for use as shown on the transformer nameplate. The unnumbered position should not be used. After the desired change has been made, make sure that the cap gasket is in good condition and replace the cap.

NOTE

The slots in the two indicator cams must coincide before the cap can be seated properly. This is to insure that the cap is not replaced until the tap changer is on position. It also serves to align an appropriate position number on the cap with the arrow on the mounting flange. Secure the cap with its two hex head bolts.



ME 6120-250-12/3-7

1. Cap
2. Drive mechanism
3. Slot in indicator cam
4. Bolts, hex head

Figure 3-7. Tap changer.

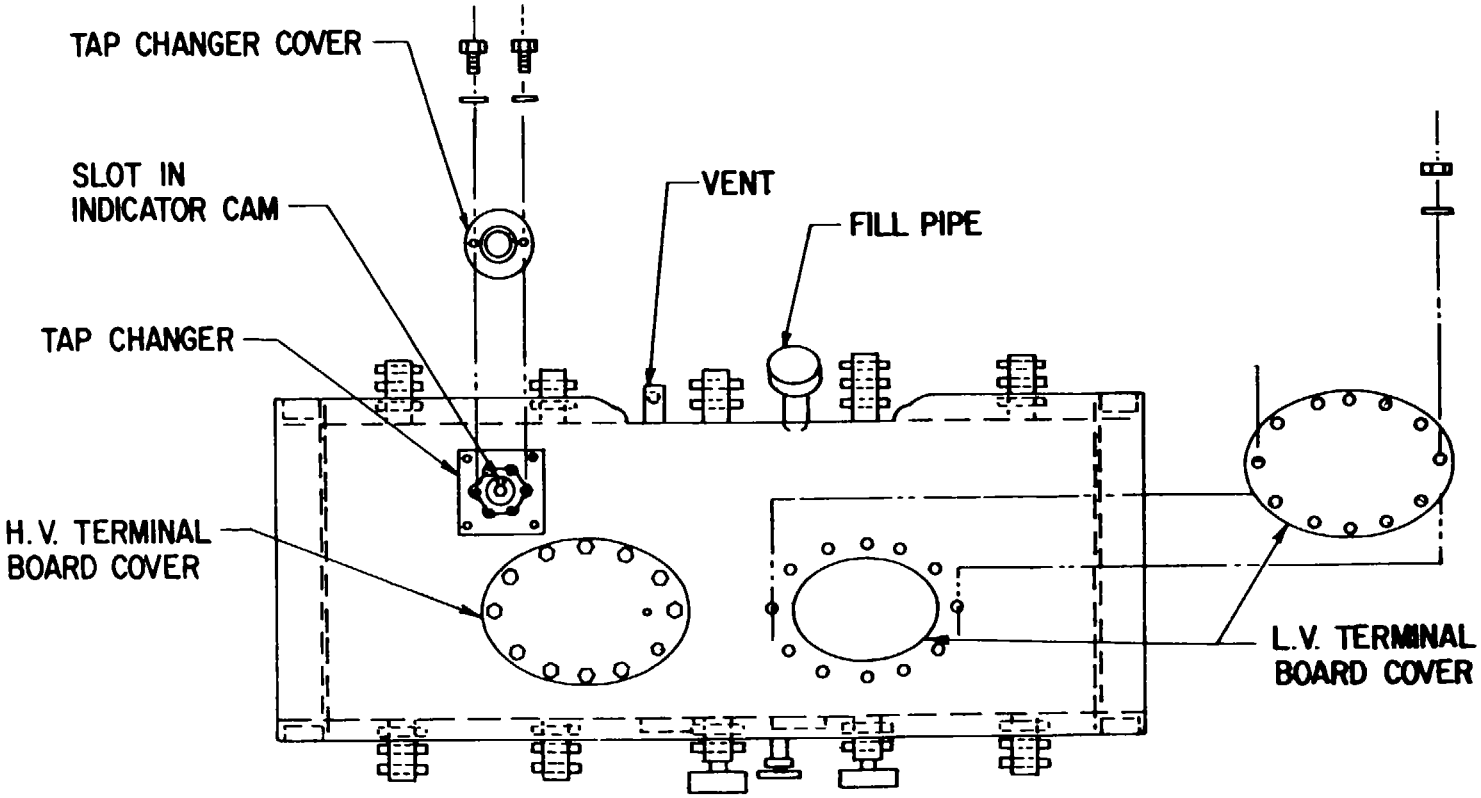
WARNING

Before removing a terminal board cover, vent the transformer to atmospheric pressure. See following subparagraph *h*.

f. Terminal boards for the high voltage and low voltage connections are located under the oval shaped covers on the top. (fig. 3-8). These covers must be removed to make connection changes on the terminal boards. To remove these covers loosen and remove the 12 nuts securing it to the top. Then remove the cover taking care not to damage gasket. With the cover removed check or change terminal connections according to the tables on the name plate for high and low voltage terminal connections and voltages.

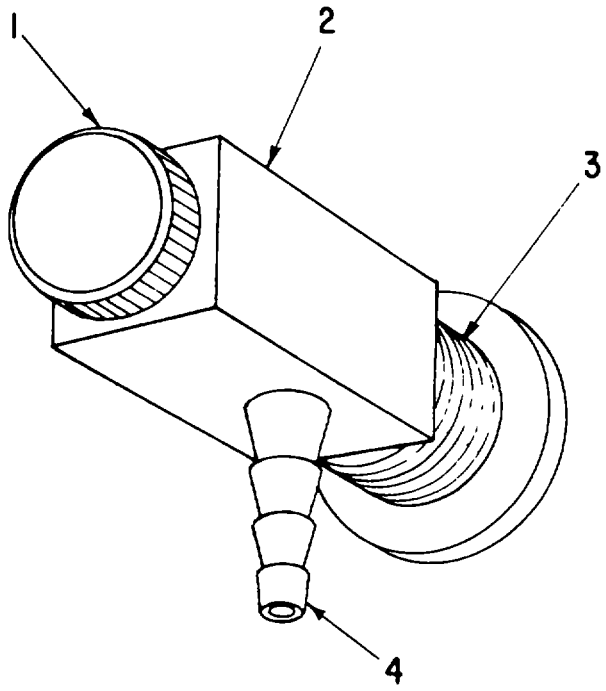
g. To replace the covers perform removal steps in reverse order. The gasket can be reused many times if not damaged. Thoroughly clean the gasket surfaces. Although no stickers are required, the compound furnished with or for the gaskets may be used to hold them in place during assembly. After replacing gasket, cover and nuts, tighten the nuts to coin press the gasket approximately one-third, or to

the stops when provided in either the mating parts or in the gasket itself. A leak test is recommended following the opening and closing of a gasketed joint affecting the transformer seal. Notify direct support maintenance to perform leak test.



ME 6120-250-12/3-8

Figure 3-8. Transformer top.



ME 6120-250-12/3-9

1. Control knob
2. Valve body
3. Valve
4. Vent outlet

Figure 3-9. Vent valve.

h. Venting. The transformer should be vented to the atmosphere before placed in service if it has been pressurized for leak tests or storage, or if the unit has been opened and resealed. Venting should take place with the liquid temperature at 25°C. If it is necessary to vent at other temperatures, re-vent as soon as the unit returns to 25°C. This operation is necessary to prevent excessive operating pressures or vacuums. To vent the transformer open vent valve (fig. 3-9) by turning control knob (1) counterclockwise to open. Close the vent valve when pressure gage shows no further drop, approximately zero. At higher altitudes, decreased air density reduces transformer cooling efficiency and lowers bushing arc-over voltages. Lower atmospheric pressures may require venting of the transformer before putting transformer in service in order to equalize internal and external pressures. If transformer is to be used at elevations above 3300 ft. (para. 2-19).

Section VII. MAINTENANCE OF LOW VOLTAGE SECTION

3-13. General

Instructions contained in this section are for operator's information and guidance in maintenance of the low voltage switchgear section.

WARNING

Before any covers are removed or doors opened which permit access to the primary or secondary circuits it is essential that the circuits be de-energized. See paragraph 2-13.

3-14. Enclosure

a. Check and inspect all devices, doors, latches and hinged panels to see that they are functioning properly. Check mounting of devices and see that all electrical connections are tight.

b. Check mechanical indicating devices and interlocks.

c. Check that all bus mounting bolts and splice connection bolts are tight.

d. Wipe and vacuum clean the busses and supports.

e. Inspect all main cable connections for signs of overheating. and tighten all connections.

f. Check that all 120 volt wiring connections are tight and intact.

g. Check the ground bus connections and mounting bolts for tightness and clean ground bus.

h. Check to see that all anchor bolts and other structural bolts are tight.

i. Thoroughly clean interior of compartments. Use a vacuum cleaner and clean rags only. Do not use steel wool or oxide papers. Blowing with compressed air is not recommended.

j. Clean and inspect all painted surfaces and retouch where necessary.

k. Clean air filters as described in preceding paragraph 3-9 *k*.

WARNING

Before inspection or any maintenance work is done be sure the breaker is in the open position. All electrical power both primary (load break switch) and control sources have been disconnected. See paragraph 2-13 *c*.

3-15. Circuit Breakers (Main and Feeder)

a. Inspection of the circuit breaker is recommended at least once a year. More frequent inspections are recommended if severe load conditions, dust, moisture or other unfavorable conditions exist. If the breaker remains open or closed for a period of six months it is recommended to open and close it several times in succession, preferably under load. A complete inspection of the breaker including contacts and are quenchers should always be made after the breaker has interrupted a short circuit. It should be operated slowly manually to observe the contact alignment and to make sure all mechanical parts move freely without binding or excessive friction.

b. The breakers are furnished with a drawout mechanism which facilitates the inserting and withdrawing of the breaker from its enclosure. It provides a suitable means of forcing the breaker through each part of the inserting and withdrawal operations. The drawout mechanism is equipped with a drawout trip interlock which prevents a racking operation from being performed when the breaker is closed. To withdraw a breaker perform the following steps.

(1) Trip the breaker (push trip button) to release the positive racking interlock.

(2) Lifting the racking handle (view E fig. 3- 10) as far as it will go. (This operation will re- engage the trip interlock to hold the breaker trip- free for the remainder of the withdrawal racking operation.

(3) Reset the handle to its lowered position and lift it again. This operation must be performed 5 times to completely disengage the racking cams (view A) from their racking pins in the compartment. After the fifth lifting stroke (view I) let the handle drop to its connected position, (View G).

(4) Pull the breaker out of its compartment until the test position stop (view C) engages to hold the breaker in "test position".

(5) Depress the test position stop handle (view D) and pull the breaker out of its compartment as far as the drawout tray will travel.

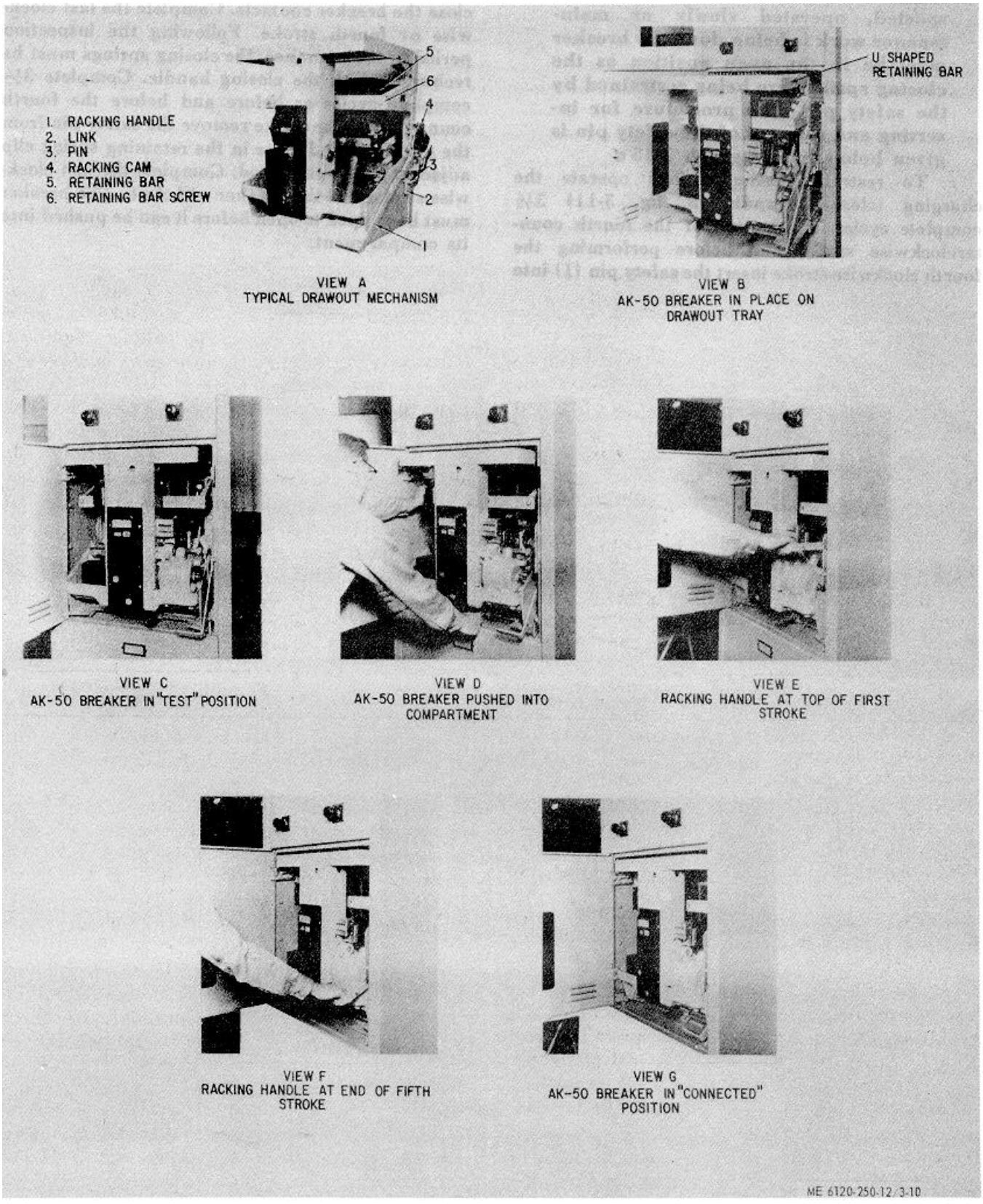
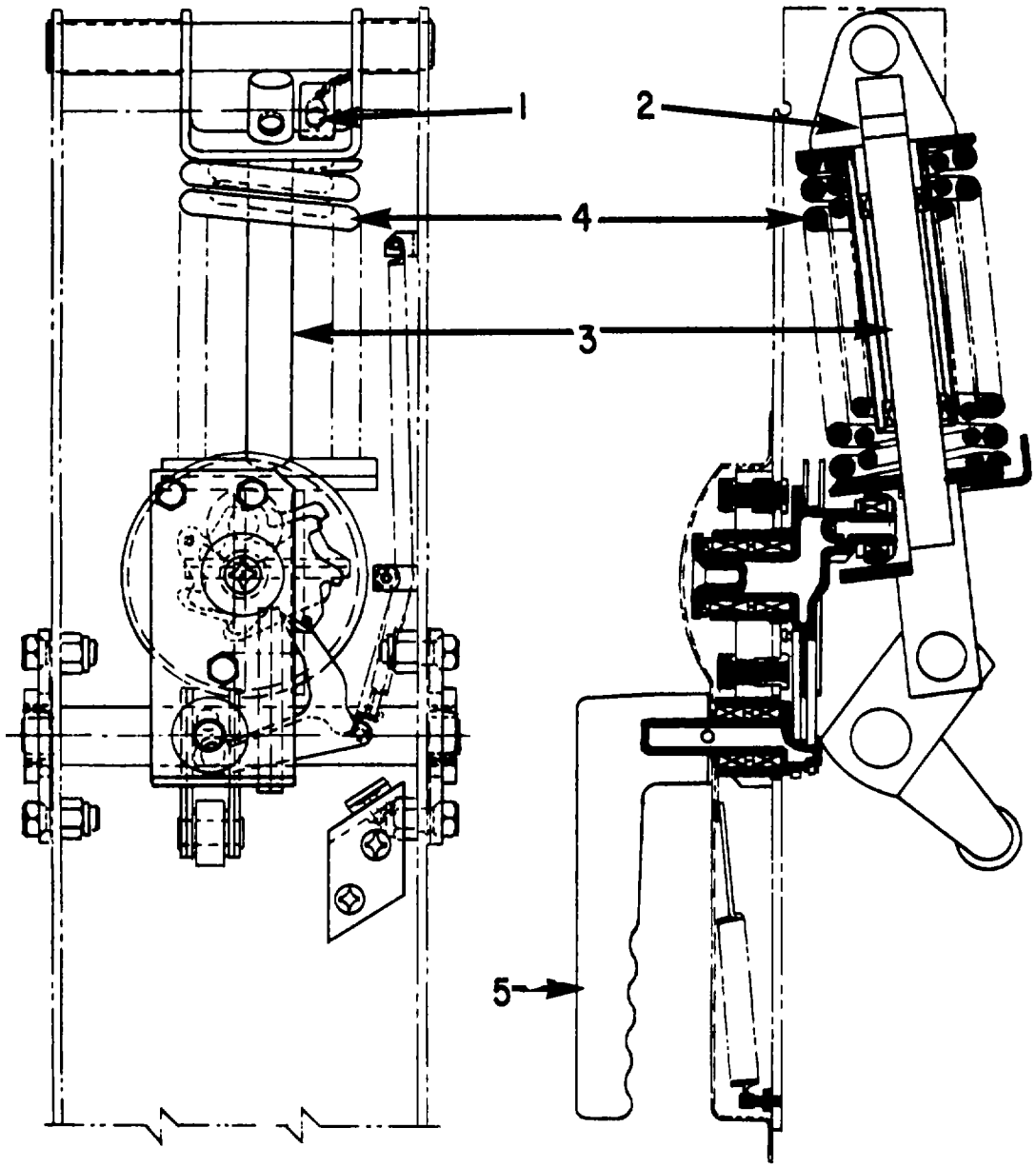


Figure 3.10. Racking of a circuit breaker

WARNING

When circuit breakers are being inspected, operated slowly or maintenance work is being done the breaker must be in the open position as the closing springs are being restrained by the safety pin. The procedure for inserting and removal of the safety pin is given below in paragraph 3-15*c*.

c. To restrain closing springs operate the charging (closing) handle (5, fig. 3-11) 31h complete cycles. At the end of the fourth counterclockwise stroke and before performing the fourth clockwise stroke insert the safety pin (1) into hole (21 in the guide rod (3). This prevents the closing springs (4) from releasing their energy to close the breaker contacts. Complete the last clock- wise or fourth stroke. Following the inspection period or maintenance, the closing springs must be recharged with the closing handle. Complete 31/2 complete cycles as before and before the fourth counterclockwise stroke remove the safety pin from the guide rod and place in the retaining spring clip adjacent to the guide rod. Complete the last clock- wise stroke and the breaker will close. The breaker must be tripped to open before it can be pushed into its compartment.



PARTIAL FRONT VIEW, WITH
HANDLE & ESCUTCHEON REMOVED

ME 6120-250-12/3-11

1. Safety pin
2. Safety pin hole
3. Guide rod

4 Closing springs
5 Charging handle

Figure 3-11. Stored-energy manual closing mechanism.

d. With breaker withdrawn and closing springs restrained see that all nuts and bolts are in place and tight. See that no pins or cotter pins have worked out of place and that all cotter pins have sufficient spread to hold them in place. All mechanism rods and moving parts should be free from binds and the mechanisms should be in good working order.

e. Operate the breaker several times to check the proper functioning of all parts. In general circuit-breaker mechanisms require little lubrication. It is recommended to use a few drops of good grade light machine oil at bearing points, and to wipe off any excess oil with a clean rag. This should be done at regular inspection intervals.

f. Inspect the arc quenchers, if the barriers are cracked or eroded to one-half their original thickness of 3/16 inch, they should be replaced. Removal or replacement of arc-quenchers procedure is:

CAUTION

Be sure the breaker is open and closing springs are restrained. See preceding paragraph 3-5 *c*.

(1) Remove the channel-shaped retaining bar (view B fig. 3-10) by removing two screws and two nuts, one on each end.

(2) Lift the quenchers clear of the movable arcing contacts.

(3) Replacement is the reverse of (1), (2) above. During replacement be careful not to overtighten the screws which secure the channel-shaped retaining bar. Overtightening the screws will bow the bar and leave the center arc-quencher loose.

g. Examine the contacts (it is necessary to remove the arc quenchers to properly inspect contacts) they should be clean and bright, free from dust and dirt accumulation. Check the condition of the arcing contacts which open after and close before the main current-carrying contacts. If they are badly pitted or burned, it may be necessary to dress or to replace them. Laminated contacts so badly dam aged or burned and pitted that satisfactory operation can not be obtained should be replaced.

h. On feeder breakers (AK-2-50) the series overcurrent tripping device EC-I is enclosed in a molded case. It is mounted by three screws and a bracket to the lower part of the pole unit base.

(1) Check trip latch engagement. The gap between trip latch (5, fig. 3-12) and roller (6) of the reset latch should be 1/64 to 1/32 inch. This adjustment is made with adjusting screw (7).

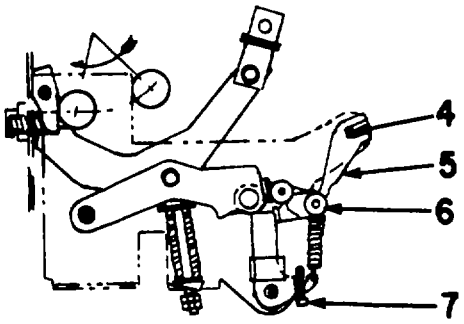
(2) Turn the adjusting screw (1, fig 3-12) on the trip arm (21. The screw should not touch the trip paddle (3) when breaker is open and the latch is reset but should have a clearance not exceeding 1 / 32 inch.

NOTE

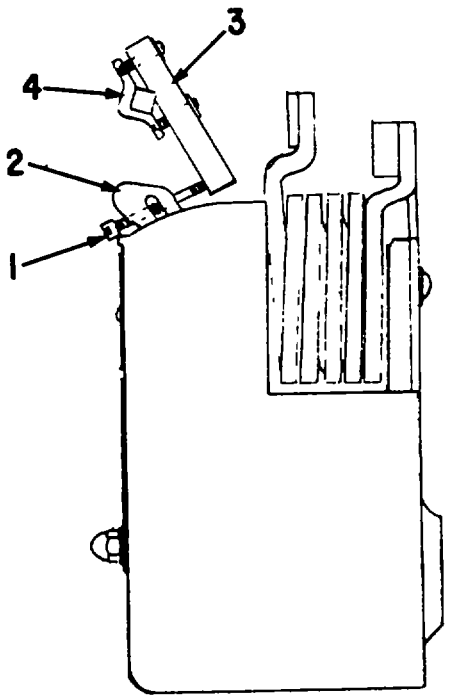
Component parts of the overcurrent tripping devices are not replaceable. Install a new device when parts are worn or damaged. To replace an EC-I overcurrent device the front and rear frames should be separated 'he breaker must be removed from the drawout mechanism and put on a work bench

KEY to figure 3-12:
1. Trip paddle adjusting screw
2. Trip arm
3. Trip paddle
4. Trip shaft
5. Trip latch
6. Roller of reset latch

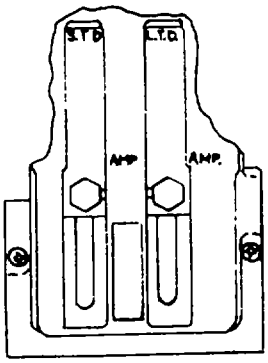
7 Adjusting screw



OPERATING MECHANISM
IN CLOSED POSITION



RIGHT SIDE VIEW



FRONT VIEW SHOWING
MOUNTING BRACKET

ME 6120-250-12/3-12

Figure 3-12. Overcurrent tripping device EC-1.

i. The main breaker (AK-3-50) has a power sensor overcurrent trip device. When malfunctioning of the power sensor trip is indicated notify direct support maintenance.

j. Racking in a Circuit Breaker.

(1) Push the breaker into the compartment until the "test" position stop engages to prevent further travel. (view C fig. 3-10)

(2) Depress the test stop (view D) lever and push circuit breaker back into compartment until the racking pins on the housing butt against the outer surface of the racking cam.

(3) Raise the racking handle (view E) this stroke tip causes racking pin (view A) on housing to engage the trip interlock link and pin assembly, rotating the link (view A) and causing the pin (view A) to remove upward against the adjusting screw on the interlock trip paddle. This trips the breaker and holds it tripfree during the entire racking operation.

(4) Push racking handle down and repeat this four more times (5 complete). The fifth and final stroke releases the trip interlock and allows breaker to be closed.

3-16. Meters (Voltmeter and Ammeters)

If the meters have broken cover glasses, damaged cases or pointers or are not operating, they must be replaced . Report to organizational maintenance.

3- 17. Voltmeter and ammeter Selector Switches fig. 2-9)

a. Remove the cover of the switch by loosening the captive screw on the back.

b. Inspect for burning of the contacts, broken shunts on the moving contacts and for contact wipe.

c.. If the shunts are broken or the contacts badly pitted, the switch should be replaced.

d. Contacts have sufficient wipe as long as there is an appreciable opening, with the contact, between the moving contact and the moving contact support. If there is no opening, it indicates that the parts of the contact support that bears on the cam or the cam itself has become worn. Sometimes it is possible to secure a temporary repair by bending the moving contact so it has a smaller separation from the fixed contact when in the open position.

3-18. Potential and Current Transformers

Transformers need no care other than keeping them clean and dry and connections tight.

3-19. Fuses

a. General. There are two circuits fused; the potential transformer circuit with three 6 amp, 600 volt cartridge fuses and the 115 volt circuit serving the heaters, lights and an outlet. This circuit has one 20 amp fuse. Both fuse blocks are mounted on the inside of the right rear door near the top. Always replace blown fuses with the recommended fuse ratings.

b. Replacement of potential transformer fuses (2. fig. 2-16).

(1) Fuse block is a molded black totally enclosed case.

(2) Using handle pull the fuse block from the case.

(3) Replace the blown fuses (6 amp 600 volt).

(4) Push fuse block back into case.

c. Replacement of 115 volt circuit fuse (3, fig. 2-16).

(1) Fuse block is an expose cartridge clip for two fuses.

(2) Replace blown fuse (only one in circuit).

3-20. Heaters (fig. 1-3) (8, fig. 2-16) and (2, fig. 2-17)

Check that heaters are secured tight and the connections are tight.

Section VIII. MAINTENANCE OF ACCESSORIES

3-2 1. General

Instructions contained in this section are for operators information and guidance in maintenance of the accessories.

3-22. Storage Cabinets

a. The external and internal surfaces should be inspected regularly. If they show signs of weathering, scratches, digs or are dirty, the surfaces should be cleaned and repainted where needed.

b. The hinged top should work smoothly and close properly. If it or the hinges are bent and cannot be corrected by the operator, he should report this for future repair.

3-23. Handrails

a. Inspect the post for straightness, scratches and digs. Clean and repaint where needed.

b. Inspect the chain for breaks and that the snap hooks are working.

3-24. Lifting Slings

a. Inspect each sling for bad kinks or bends, broken strands, hook and eye splices are intact.

b. If there are defects in the slings they should be replaced.

3-25. Cable Spreader Heads

a. Inspect the spreader bar for straightness, the end plates are not loose, the surface for scratches or digs.

b. If bar is bent have it straightened.

c. If end plate loose have rewelded.

d. Clean and repaint scarred areas.

3-26. Access Ladder

Inspect the ladder for loose steps, bent sides, bent hand rail, and that pivot of the top landing is working.

3-27. Ground Rods and Cables

a. Inspect ground rods for straightness, I nicks or bends, clean and free from dirt and fun growth.

b. Inspect cables for broken strands, bad kin dirt and fungus growth.

3-28. Cable Splice Kits

a. Check high voltage splice kit to see that i complete.

b. Check low voltage splice kit to see that is complete.

Section IX. MAINTENANCE OF SEMI-TRAILER

3-29. General

Instructions contained in this section are for operators information and guidance in maintenance of the semi-trailer.

1/2 inch	adjustable torque arm clamp bolt	45-55 foot pounds
5/8 inch	equilizer step bolt	75-90 foot pounds
7/8 inch	"U" bolt	225-250 foot pounds
1 inch	torque arm bolts	350-375 foot pounds

Torque specification call for clean dry threads, use of lubricants or sealants reduce requirements.

b. Lubricate in accordance with current Lubrication Order.

3-30. Under ,Carriage Assembly

a. Inspect the suspension for loose bolts and worn or damaged parts. If bolts are found to be loose they should be retorqued to:

b. Inspect brake hose assembly to see that the lines are not pinched or cracked, hose is not " torn or frayed, all connections and air hose fittings are tight.

3-31. Tires

a. Inspect the tires for cuts, bruises, breaks, blisters, uneven wear, embedded foreign matter and damaged valve stems.

b. Check for correct tire pressure and missing valve caps. Correct tire pressure is 85 lbs.

3-32. Axle Hub

a. After unit has set sufficient time to allow oil to drain to static condition, oil level can be seen and should be maintained at oil level as shown on transparent hub cap.

b. Use lubricant in accordance with current Lubrication Order.

3-33. Landing Gear

a. Inspect for loose or missing bolts, worn or dam aged parts, and that each leg has an operative grease fitting.

b. Tighten or replace all missing or loose bolts, replace missing grease fitting.

c. Report damaged or worn parts.

d. See paragraph 2-22 for removal and replacement.

3-34. Valves

a. Inspect chamber for dents and leaks, chamber linkages for binds. all mounting bolts tight.

3-35. King Pin Fifth Wheel

Visually inspect king pin for cracks, gouges or burrs. Report cracks and deep gouges to Direct Support Maintenance. Remove burrs and clean. Lubricate pin with G A A grease (automotive and artillery).

3-36. Lamp Bulbs

a. General. Inspect all lamps to see that they are intact and functioning properly Replace bulbs that are burned out. Use only the proper bulb replacement. This system has been designed for a specific load and any variance from this load could burn out the resistors in the nose box.

b. Replacement of Clearance Marker Lamps.

(1) Place blade of screw driver in slot on one end of holder and twist, lens snaps off from holder

(2) Remove burned out or broken bulbs. (Two bulbs per holder).

(3) Insert and secure new bulb or bulbs.

Socket and bulb base are the bayonet type. Always replace with recommended bulb. Do not substitute.

(4) Replace lens by engaging one end in the recess around holder, then snapping other end in place.

c. Replacement of Tail Light Lamps.

(1) Engage detent in retaining ring with a screw driver and pry the retaining ring out.

(2) Remove lens.

(3) Remove burned out or broken bulb.

(4) Insert and secure new bulb. This is a double filament bulb and the base in indexed for proper installation. Always use recommended bulb. Do not substitute.

(5) Replace lens.

(6) Replace retaining ring.

Section X. MAINTENANCE OF CABLE REELS

3-37. General

Instructions contained in this section are for operators information and guidance in maintenance of cable and reels.

3-38. Cables

a. Inspect all primary and secondary cables for worn insulation, breaks or cracks and that splices are still insulated.

b Inspect end terminals to see if they are intact, clean and bright.

c. Replace badly worn or unserviceable cables. Clean dirty end terminals.

3-39. Cable Reels

a. Inspect the drums for cracks, chips, dents, and rust.

b. If drums are found to be unserviceable report your findings to organizational maintenance.

3-40. Shaft Bearings

a. Check that bearings rotate freely.

b. Lubricate according to current Lubrication Order.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

4-1. Tools and Equipment

Tools, equipment and repair parts issued with or authorized for this substation are listed in the basic issue items list, Appendix C of this manual.

4-2. Special Tools and Equipment

No special tools and equipment is required.

4-3. Maintenance Repair Parts

Repair parts and equipment are listed and illustrated in the repair parts and special tools list required for organizational maintenance TM 5(6120-250-20P. (When printed).

Section II. ORGANIZATIONAL PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-4. General

For a general description and purpose of preventive maintenance checks and services, refer to paragraph 3-4.

4-5. Organizational Preventive Maintenance

Table 4-1 contains a tabulated list of preventive maintenance checks and services which must be performed by organizational maintenance personnel. Item numbers indicate the sequence of minimum inspection requirements and the interval column designates the required service intervals.

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

Item number	Interval: Operator: Daily B	Daily D	Daily A	W	Org.: M	Q	Item to be Inspected	Procedure	Reference
						X	High Voltage Cabinet	Check that all panels have fastening bolts, front panel hinges work properly, all anchor bolts and other structural bolts are tight. Clean and inspect all surfaces and repaint where necessary.	para 4-9
								Check weather proof joints between high voltage and transformer, trap door in bottom of cable entrance.	
2						X	Transformer	Inspect external surfaces for weathering.	
								Clean and repaint when external surfaces need it	
						X	Transformer Gages	Check all gages for connections, damaged cases, glass face, if operating	
								Replace damaged or inoperative gages.	Para 4-13 thru 4-16
3						X	Low Voltage Cabinet	Check all door and panel hinges, latches. Check all weather tight joints, anchor bolts and structural bolts. Inspect all surfaces inside and out for dirt, scratches, etc.	para 4-17
								Repair inoperative hinges and latches. If not repairable, replace panel assembly.	para 4-17
								Tighten loose anchor, structural bolts, handles and devices	
								Clean and repaint all surfaces that are dirty, scratched or gouged.	
						X	Bus Compartments	Check all bus mounting bolts and splice connections for tightness	para 4-23, 4-24
								Check all wiring connections for tightness.	para 4-23, 4-24
								Check all bolts that secure terminals for tightness	para 4-23, 4-24
								Check ground bus connections and clean ground bus.	para 4-23, 4-24
						X	Trailer	Check that all grease fittings are in place and clean.	
								Check oil level in each hub	para 4-39
						X		Check brake air chamber for dents, leaks, hose or pipe connections for leaks, chamber linkages for binds.	para 4-41
								Check tires for wear, break, cuts Check tread wear to see if wheel is out of alignment.	para 4-38
								Replace worn or damaged tires Report uneven wear to have wheel alignment checked.	
								Check for all lights working, lens & reflectors.	
								Replace broken lens & reflectors.	para 4-44
								Check all body wiring for wear and breaks. Repair if worn or replace if broken.	
								Check all air lines, hoses & connectors	para 4-43
								Replace dented or pinched air lines, worn hose and bad connectors	
								Check wheel bearings for looseness, if loose, adjust.	para 4-39
						X	Accessories	Check storage cabinets handrails, access ladder for servicability.	para 4-29
								Check lifting slings for bad kinks, broken strands, bad splice at hook & eyes.	para 4-32
								Check hold down lugs for items stored on deck of trailer.	para 4-30
								Check items in storage cabinets to see if all equipment is there and useable. Check all kits for completeness	para 4-29

Section III. ORGANIZATIONAL MAINTENANCE TROUBLESHOOTING

4-6. General

For a general description and purpose of the troubleshooting table, refer to paragraph 3-6.

4-7. Organizational Maintenance Troubleshooting

Table 4-2 lists the organizational maintenance troubleshooting malfunctions, probable causes and recommended corrective actions. Probable causes and corrective actions beyond the scope of organizational maintenance shall be referred to direct support maintenance.

Table 4-2. Organizational Maintenance Troubleshooting.

Malfunction	*Probable Cause*	*Corrective Action*
1. Overheating (Breakers)	*a.* Contacts not aligned.	*a.* Refer to DS Maintenance
	b. Contacts badly burned or pitted.	*b.* Refer to DS Maintenance
	c. Contacts dirty, greasy or coated with dark film.	*c.* Refer to DS Maintenance
	d. Inductive heating.	*d.* Refer to DS Maintenance
	e. Current-carrying surfaces dirty.	*e.* Refer to DS Maintenance
	f. Current in excess of breaker rating.	*f.* Refer to DS Maintenance
	g. Corrosive atmosphere	*g.* Refer to DS Maintenance
	h. Insufficient bus or cable capacity.	*h.* Refer to DS Maintenance
	i. Bolts and nuts at terminal connections not tight.	*i.* Refer to DS Maintenance
	j. Excessive ambient temperature.	*j.* Refer to DS Maintenance
2. Failure to trip AK-2 Breakers	*a.* Travel of tripping device does not provide positive release of tripping latch.	*a.* Refer to DS Maintenance
	b. Worn or damaged trip unit parts.	*b.* Refer to DS Maintenance
	c. Binds in overcurrent trip device.	*c.* Refer to DS Maintenance
	d. Calibration setting high.	*d.* Refer to DS Maintenance
3. False Tripping AK-2 Breakers.	*a.* Overcurrent pick up too low.	*a.* Refer to DS Maintenance
	b. Overcurrent time setting too short.	*b.* Refer to DS Maintenance
4. Failure to Close and Latch (Breakers).	*a.* Binding in attachments preventing resetting of latch.	*a.* Refer to DS Maintenance
	b. Latch out of adjustment.	*b.* Refer to DS Maintenance
	c. Latch return spring too weak or broken.	*c.* Refer to DS Maintenance
	d. Hardened or gummy lubricant.	*d.* Refer to DS Maintenance
	e. Safety pin left in push rod.	*e.* Refer to DS Maintenance
5. Burned Main Contacts	*a.* Improper contact sequence (main contacts not sufficiently parted when arcing contacts part.)	*a.* Refer to DS Maintenance
	b. Short-circuit current level above interrupting rating of breaker.	*b.* Refer to DS Maintenance
	c. Loss of contact wipe or pressure.	*c.* Refer to DS Maintenance
6. Unnecessary tripping (Tripping when tripping should not occur.)	*a.* Calibration setting too low.	*a.* Set device for proper value according to ampere load of circuit.
	b. Worm latch (breaker easily jarred open).	*b.* Refer to DS Maintenance
7. Failure to close or latch.	Out of adjustment.	Refer to DS Maintenance
8. Meters faulty.	Damaged meter.	Replace para 4-21
9. Transformer gages faulty.	Damaged gages.	Replace. para 4-13, 4-14, 4-15
10. Meter selector switch faulty.	Damaged contacts or Springs.	Replace. para 4-22
11. Compartment heater not working.	Faulty heater.	Replace para 4-10, 4-20
12.Trailer lights flicker or will not light	*a.* Short circuit in trailer wiring or connection box	*a.* Check wiring for breaks or bare spots, tape bare spots. para 4-47.
	b. Intervehicular cable damaged.	*b.* Replace cable.
	c. Dirty or corroded contacts.	*c.* Clean contacts.
	d. Other cause	*d.* Report other cause to DS Maintenance.
13.Trailer brakes will not apply or hold	*a.* Adjustment too loose	*a.* Adjust brakes. para 4-41.
	b. Clogged air filter	*b.* Clean air filter in service port of emergency relay valve. para 4-42

Table 4-2. Organizational Maintenance Troubleshooting Continued.

Malfunction	*Probable Cause*	*Corrective Action*
13. Trailer brakes will not apply or Hold - Cont'd	*c.* Leaky intervehicular hose. *d.* Defective emergency relay valve. *e.* Other causes.	*c.* Tighten connections or replace. *d.* Test valve and replace if necessary. para 4-42 *e.* Report other cause to DS Maintenance.
14. Trailer brakes will not release.	*a.* Air hose connection wrong. connections are made. *b.* Emergency relay valve will not release. *c.* Weak or broken brakeshoe retracting spring. *d.* Other causes.	*a.* Check and make sure right hose para 4-43. *b.* Replay relay valve para 4-42 *c.* Refer to DS Maintenance. *d.* Refer to DS Maintenance.
15. Trailer brakes drag or grab.	*a.* Brakes adjusted too. *b.* Weak or broken brakeshoe retracting spring. *c.* Grease on brake lining. *d.* Other causes.	*a.* Re-adjust brakes. para 4-41. *b.* Refer to DS Maintenance. *c.* Refer to DS Maintenance. *d.* Refer to DS Maintenance.
16. Trailer wheels wobble and tire wear uneven.	*a.* Loose wheel bearing. *b.* Broken wheel bearing. *c.* Bent wheel. *d.* Other cause.	*a.* Adjust wheel bearings. para 4- 39. *b.* Replace wheel bearings. *c.* Replace wheel. *d.* Refer to DS Maintenance.
17. Trailer will not track when towed.	Bent, misaligned axle, broken spring.	Refer to DS Maintenance

Section IV. RADIO INTERFERENCE SUPPRESSION

4-8. General

The substation is a static or passive device which will not generate any EMI. Its transmission is only as good as its source of power. The unit is grounded and the enclosures are shielded.

Section V. MAINTENANCE OF HIGH VOLTAGE INCOMING SECTION

4-9. Enclosure

Keep hinges for front panels tight, free from bends that (a use binding and pivot pins straight. The pins are not the removable type and the panel side of hinge is welded to the panel. If the hinge is beyond repair the panel assembly must be replaced. The assembly is bolted to cabinet with two lock nuts on each hinge. By removing these four lock nuts the panel assembly may be removed and a new one installed.

4-10. Heater (fig. 2-3).

Replacement of high voltage cabinet heater.

a. Loosen screw on heater end and remove two wires.

b. Loosen bolts of retaining clips.

c. Remove heater.

d. Install new heater in reverse order.

Section VI. MAINTENANCE OF TRANSFORMER

4-11. General

The insulating liquid must be maintained at the proper level 4see name plate) and the dielectric strength of the liquid should be maintained at a high value. The liquid should be sampled and tested after the first few days of operation, again after six months, and yearly thereafter. Keep accurate records of the test and filter or replace the liquid as indicated. The sampling and test procedures are in TM 5-6120-250-34.

4-12. Vent Valve Replacement (fig. 3-9)

The vent valve has a square body with knurled control knob at one end. The other end has a NPT valve. With transformer de-energized an vented to the atmosphere, unscrew the vent valve from the transformer. Apply teflon tape or pip compound to the threads of new vent valve. If replacing a used valve make sure threads have bee thoroughly cleaned. Insert valve replacement an screw in until tight.

4-13. Liquid-level Gage

a. The liquid level gage consists of a float arm and magnet on one side of a liquid-tight partition and a second magnet and indicating pointer on the other side. The gage can be removed whenever the liquid is at or below the 250C level.

b. To remove the liquid level gage, remove the two screws in the round face cover.

c. Remove cover and gage.

d. Replace in reverse order.

4-14. Pressure Vacuum Gage

a. The pressure vacuum gage can be removed when the transformer has been vented and the internal and external pressures are equal.

b. Loosen the nut behind the gage.

c. Remove gage.

d. Replace in reverse order.

4-15. Liquid Temperature Gage

a. 'The thermometer is mounted with its temperature sensitive bulb in a well which extends into the transformer's top liquid and is secured with a union nut. The well is liquid-tight thus permitting removal of the thermometer without lowering the liquid level or breaking the transformer seal.

b. Loosen union nut directly behind the gage.

c. Remove gage.

d. Replace in reverse order.

4-16. Winding Temperature

a. This gage is mounted in the same manner as the liquid temperature gage. It is removed and replaced in the same way. Care must be taken when inserting the bulb into the well to prevent damage to the insulation on the bulb.

NOTE

If a remote alarm has been wired to the switch of this device the wires must be disconnected before removal and connected to the same terminals when replaced. See wiring diagram figure 2-6

Section VII. MAINTENANCE OF LOW VOLTAGE CABINET

4-17. Enclosure

a. Keep all mechanisms for door and panel latching tight, free from bends causing hard operation.

b. Door hinges are not of the removable pin type, the hinge is welded to the door assembly. The door assembly is bolted to the cabinet by two locknuts for each hinge. To remove a door the locknuts are removed and then the door assembly. A new assembly is put in place and secured by the locknuts. Adjust the latching mechanism for good weather seal.

c. The door handles may be replaced by removing taper pin on inside pinning handle to keyed latch and latch bar actuator. Remove handle by pulling out towards front of door. Install new handle in reverse order.

4-18. Fuses

With an ohmmeter test the fuses by placing a meter tip on each end and read meter for continuity. No reading indicates a blown fuse.

4-19. Lamp Holder Replacement (60 Watt 115 V)

a. De-energize circuit by removing the 20 amp fuse in light and heater circuit. Fuse block is on inside of the right section rear door, fig. 2-16).

b. Unscrew 60 watt bulb and remove from sock et.

c. Unscrew and remove the two self-tapping screws, one each side of lamp socket (fig. 4-1 I.

d. Remove the two wires connected to the back of socket by screws.

e. Replace the old socket with a new one and install in reverse order of step *b*, *c*, and *d*.

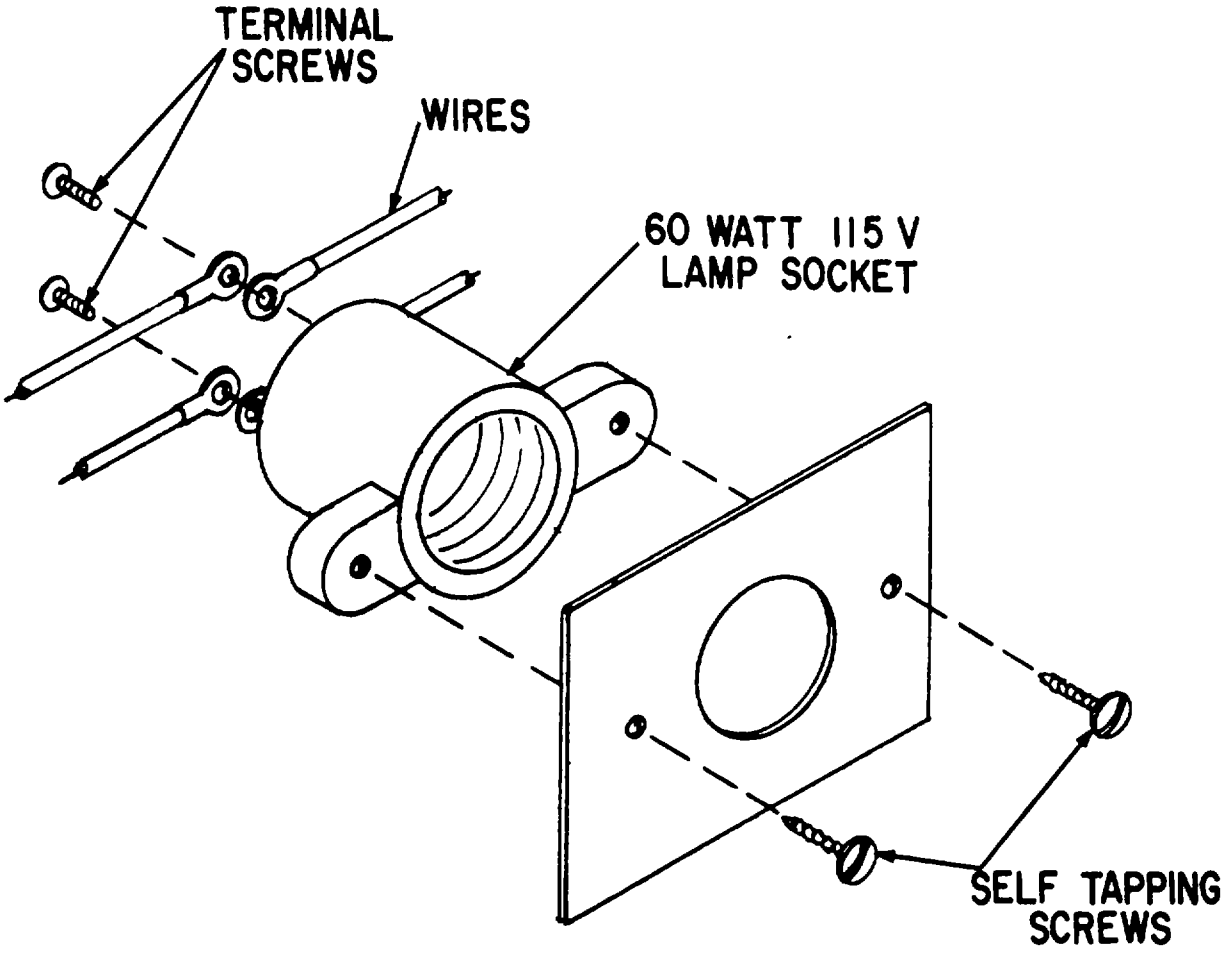
4-20. Heater Replacement (fig. 2-16 and 2-17)

a. Loosen the two bolts on the inner end.

b. Remove the bolts and two wire., c. Loosen and remove the bolt on the outer end.

d. Remove heater strip.

e. Install new heater strip in reverse order.



ME 6120-250-12/4-1

Figure 4-1. Lamp holder (60 watt 115V).

WARNING

Do not remove cover while the instruments are energized. Scale plate, pointer and element assembly may be at hazardous voltage levels.

4-21. Meter Replacement (Voltmeter and Ammeter)

a. To replace meter remove the connecting wires from the back (2 wires on the voltmeters, 3 on the ammeter, one connection has two wires on it). Tag each wire when disconnected to insure correct installation.

b. Remove the four screws and nuts mounting the meter to the panel.

c. Replace new meter in reverse order.

4-22. Switch Replacement {Voltmeter and Ammeter Selector Switches)

Remove the voltmeter selector or ammeter selector 's4 itches.

a. Remove the wires from the contacts of the switch. Tag each wire when disconnected to insure correct installation.

b. Remove the three screws on the front, remove switch from panel.

c. Replace in reverse order, and connect wires, put cover on

WARNING

The low voltage distribution cabinet must be de-energized before attempting to disconnect the bus removable links. Serious personal injury and/or damage to equipment may result.

4-23. Bus Link Removal

a. Perform the Safety Precautions

(1) Visually check that load break switch is open.

(2) Check that all ground connections are made and connections tight.

(3) A check may be made using the voltmeter and selector switch to make sure the low voltage section is de-energized.

b. To Disconnect Removable Bus Links (fig. 42).

(1) Open right rear door of low voltage cabinet.

(2) Approximately in the middle is the rear of the main breaker. Each of the three output studs is connected by double bars (space apart) to two cable clamps and by two "L" shaped bars (spaced apart) to a feeder bus. These "L" shaped bars are the removable links. (8, fig 2-3).

(3) Loosen and remove the 5/8-11 x 13/4 long bolt (1, fig. 4-2), nut (2) and two washers (3) on the bottom (the long leg) of the removable link. This is the connection to the bus (4).

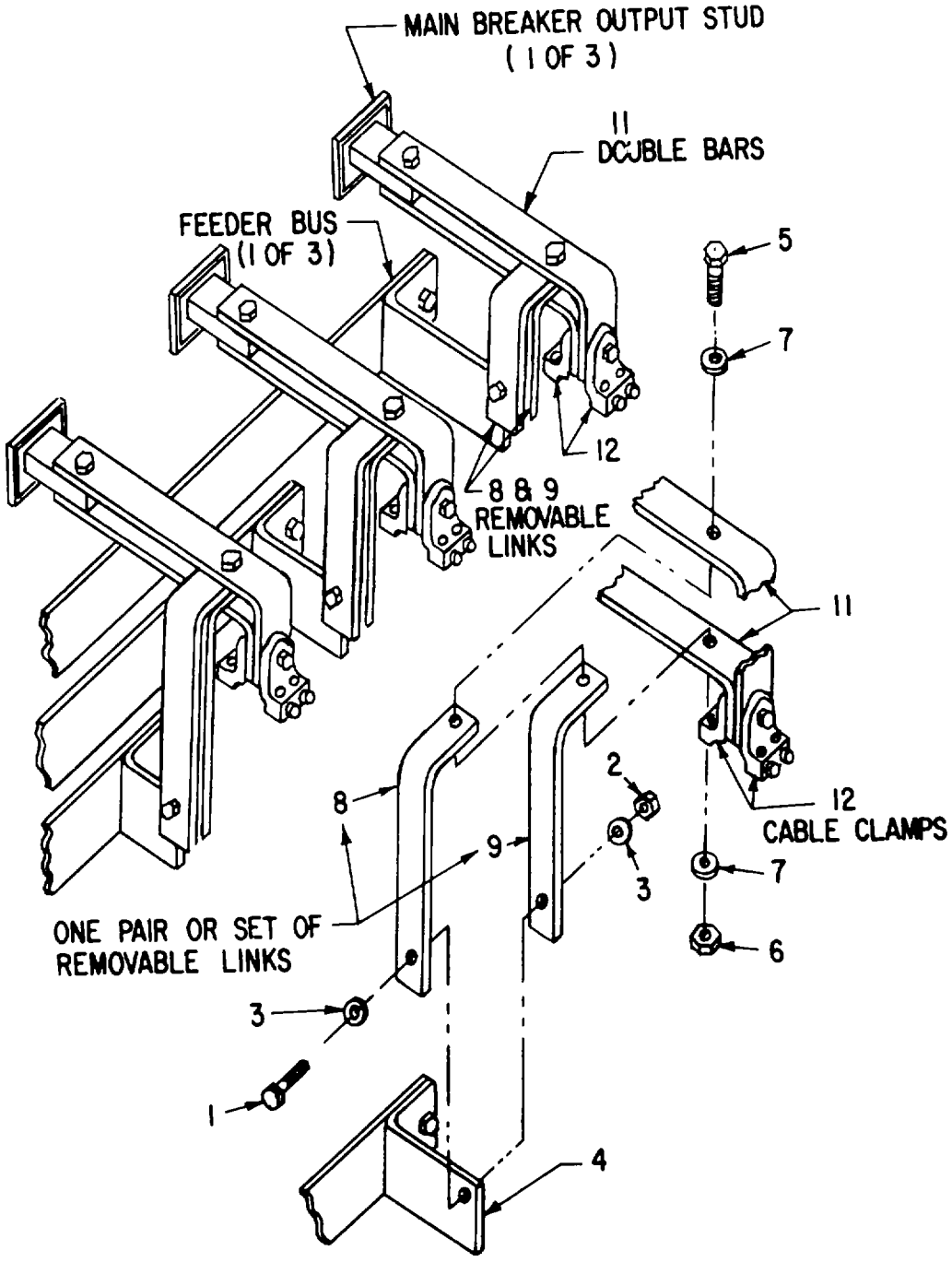
(4) Loosen and remove the 5/8-11 x 2 long bolt (5), nut 1((1 and two washers (7) at the top (the short leg) of the removable link (8 and 9). This is the connection to the main breaker output stud.

(5) Remove the two "L" shaped links (8 and 9() from between the output stud connecting bars. Note that one "L" shaped link (9) has shorter legs (approximately the thickness of a bar).

(6) The bolts, nuts, washers and legs should be reassembled to keep links paired and for safe keeping of the hardward.

(7) Repeat paragraphs 3, 4, 5 and 6 for each of the two remaining sets of links. It should be noted that each pair or set of links are different in length because the feeder bases are at different heights.

(8) The removable bus links should be assembled as pairs or sets as in paragraph (6) and stowed in one of the storage cabinets when not connected.



ME 6120-250-12/4-2

Figure 4-2. Removal of removable links.

KEY to figure 4-2:

1. Bolt 5/8-11 x 1 3/4 LG
2. Hex nut 5/8-11
3. Washer for 5/8 bolt
4. Feeder bus connection
5. Bolt 5/8-11 x 2 LG
6. Hex nut 5/ 8-11
7. Washer for 5/8 bolt
8. Link
9. Link
10. Removable link 8 and 9 connected
11. Connection bars from output stud
12. Main breaker output cable clamps

WARNING

The low voltage distribution cabinet must be de-energized before starting to install removable bus links. Serious personnel injury and/or damage to (equipment may result.

4-24. Installation of Feeder Bus Removable Link Connections

a. Perform the safety precautions in paragraph 4-23: a.

b. The three pairs or sets of links are different lengths because the three output stud connections of the main breaker are at the same level. While the three feeder bus connections are on three different levels (fig. 2-3). It also should be noticed that the legs of each pair or set of links (8 and 9, fig. 4-2) are of different lengths. The shorter (9, fig. 4-2) of the t_ is installed tinder the longer (8 fig. 4-2) so that the holes of the short legs line up when placed one o4n top of the other. The holes of the longer legs ,should also line up but a space is between bars, approximately the thickness of one bar. (fig. 4-2).

c. When bus bar connections are to be made

(1) Clean all silvered contacts with silver polish. Do not use sandpaper or any other type of abrasive material.

(2) Be sure all polish is removed after cleaning.

(3) Coat contacts with a lubricant D50H47

(4) The above steps must be performed on all contacts of the three pairs or sets.

d. To install the removable links after cleaning(fig. 4-2).

(1) Check for proper length links. (Holes line tip in top stud connection and lower bus connections.)

(2) With the tops (short legs) together insert between the two bars of the breaker output stud connection. The lower or longer legs straddle the bus connection bar. All holes at top and bottom should line up.

(3) With a plain washer (7, fig. 4-2) on the 2 inch long 5/ bolts, insert bolt (5) from the top through the holes in the top bar, the two link bars and the lower stud connecting bar.

(4) Place second plain washer (, I on bolt 1l) and install nut (6) on bolt.

(5) Tighten nut hand tight.

(6) Place a washer (3) on the 1 3/4 inch long 5/8 bolt (1). Insert bolt through outside link bar feeder bus connection (4) and other link bar.

(7) Place second washer (3) on bolt 41) and install nut (2) on bolt hand tight.

(8) Make sure all bars line up right.

(9) Tighten each bolt and nut to 35-45 lb-ft.

(10) Install the next two pairs or sets of removable links the same as in paragraphs lone through nine.

Section VII. MAINTENANCE OF CABLE REELS

4-25. Drum

a. Straighten the sides if they are bent, or badly dented. Make sure the shaft is straight and the weld securing it to the sides is intact.

b. Check barrel for dents and the weld securing it to the sides are intact, check cable tie down on barrel, check drum locking bar and eye bolts.

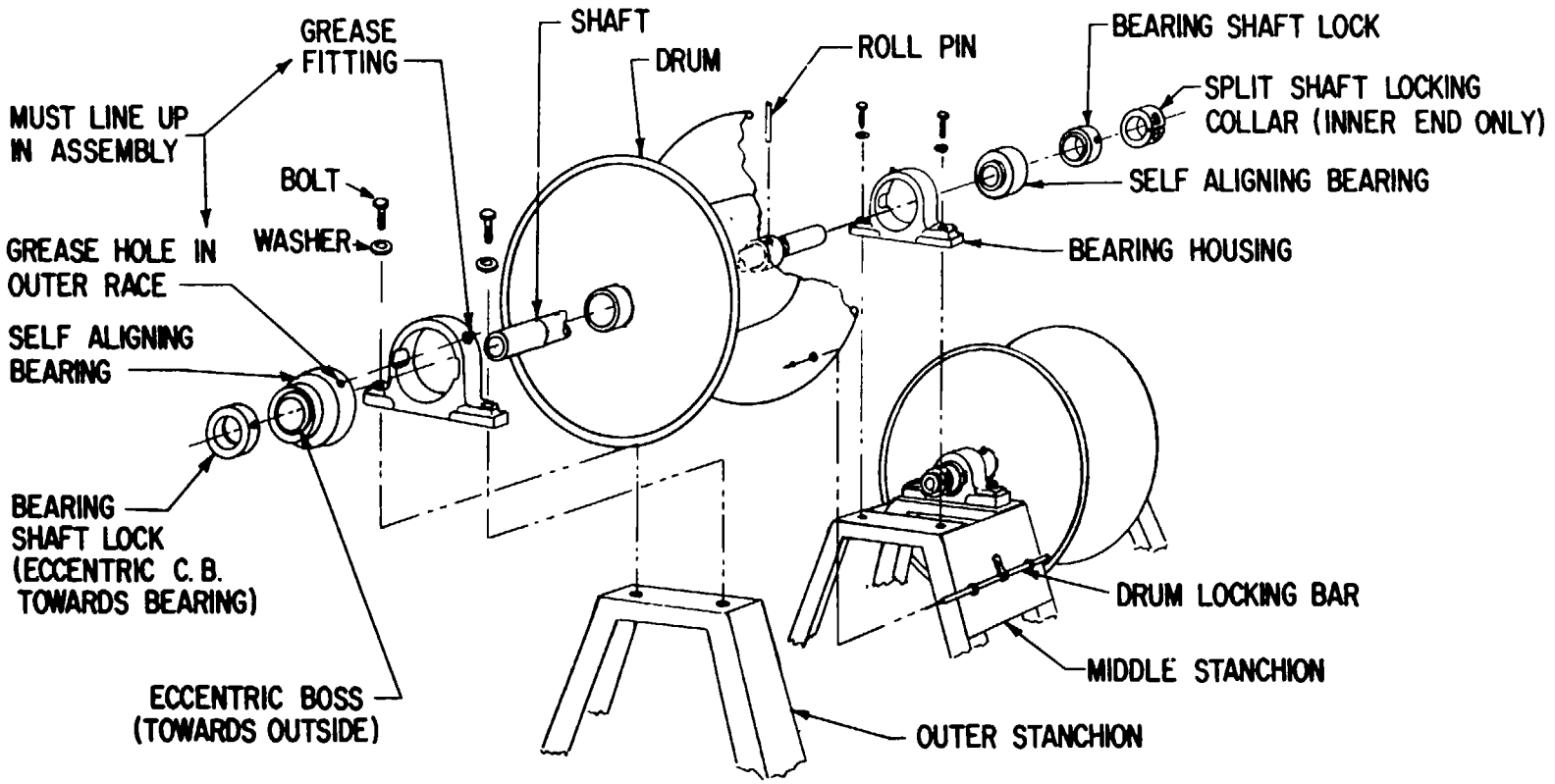
c. Straighten all dents or bends and repair welded joints as needed. Clean and repaint where bare metal is showing. If drum must be removed, see paragraph 4-28.

4-26. Shaft

a. Straighten or replace shaft 'f bent

b. Check that roll pin pinning it to drum shaft is in place and tight.

c. Check to insure shaft locking collars .are tight. There are two locking collars just outside of each bearing block, and a split locking collar on the inside end just beyond the bearing locking collar. (fig. 4-3).



ME 6120-250-12/4-3

Figure 4-3. Cable reel assemblies.

4-27. Bearing Block

a. If shaft is straight but bearing is rough when rotating, grease bearing through grease fitting with general purpose bearing grease.

b. After applying grease to the bearing and it still is rough or hard to turn, replace bearing in hearing block. See following paragraph 4-28 cable reel dismantling.

4-28. Cable Reel Dismantling and Bearing Replacement (fig. 4-3)

NOTE
It is easier to dismantle reel with the cable removed from the drum.

a. Remove the two nuts and bolts fastening each bearing block on both ends of shaft to the stanchion.

b. Remove reel and shaft assembly from the stanchion.

c. Loosen the hex head screw in the split locking ring and remove ring from shaft.

d. Loosen the hex head set screw in the locking ring of the bearing block, remove ring from shaft.

e. The bearing block now slides off the end of the shaft. Make sure that there are no burrs on shaft to damage inner race of bearing.

f. To remove self-aligning bearing from housing, rotate bearing until it is 90° to hole in housing and slide it out the notches of the housing. The grease hole in outer race must line up with grease fitting in housing. otherwise it can not be lubricated.

g. Replacing or installing a self-aligning bearing and bearing housing.

(1) Note where the grease hole is in outer race of bearing.

(2) With the bearing flat 90° to the hole in the housing. Slide bearing into the housing hole using the notches.

(3) With grease hole placed so that when bearing is rotated it will line tip with and under grease fitting. Rotate bearing into bearing housing.

(4) Check ends of reel shaft and remove all burrs and lightly lubricate shaft.

(5) Slide bearing and housing onto shaft.

NOTE
The smaller eccentric diameter of bearing inner rach is always on the outside when mounted in place.

(6) Locate bearings housing on the reel stanchions. This step is done with the drum mounted and its roll pin in place on the reel shaft.)

(7) When bearing housing is located on stanchion and drum turns true, secure each bearing housing with its two bolts and nuts.

(8) Slide the bearing locking collar onto shaft with the eccentric counterbore towards the bearings.

(9) Rotate the locking collar on the eccentric diameter of bearing until the collar engages bearing and shaft positively.

(10) Retighten hex socket head set screw of locking collar onto shaft.

(11) On the inside end of shaft (middle of trailer bed) slide the split locking collar on shaft until it touches bearing locking ring.

(12) Tighten hex socket head screw of split locking ring until ring is tight on shaft.

h. To remove drum from reel shaft the bearing housing must be removed from shaft end. With bearing housing removed, knock out the roll pin fastening the drum shaft to the reel shaft and slide drum off of reel shaft.

i. Re-assemble cable reel in reverse order.

Section IX. MAINTENANCE OF ACCESSORIES

4-29. Storage Cabinets

a. Keep all sides, top and trays free from bends or dents.

b. Keep hinges aligned and working free.

c. Plug all holes in sides and top.

d. Clean and keep surfaces free from oil and dirt.

e. Repaint surfaces that have been repaired, dented, chipped or badly weathered.

f. To remove a storage cabinet, empty it of all its contents. Loosen the four 5/8 inch bolts and nuts in the bottom and remove them. Lift storage cabinet from trailer bed.

g. Install a storage cabinet in reverse order of f. above.

4-30. Platform

a. Keep platform of trailer free of dirt. grease and other foreign matter.

b. Keep all hold down clamps, bars, lugs and bolts in working order. Repair or replace as needed.

c. Keep rubber mat free from oil and grease and secured to the platform.

d. Repair all dents, digs, chips or badly weathered spots by cleaning, straightening and painting.

4-31. Handrails

a. Straighten or replace all bent posts.

b. Replace all posts that are badly cracked or split at end.

c. Clean and repaint where needed.

d. Replace broken hook eyes in post and chain snaps on chain.

e. Keep chain intact, replace when needed.

4-32. Lifting Slings

a. Inspect wire rope of slings for doglegs and kinks. crushed or bruised, popped core, high strands, broken cut or sheared wires, excessive abrasion and rust.

b. Inspect the swaged sleeves on thimble splices and insure that the swaged open socket joints are tight and intact.

c. Inspect hooks, sling links, for defects and rust. Inspect open socket, its pin and cotter pin retainer for defects or rust.

d. Clean all rust and corrosion and accumulated foreign matter from wire rope fittings.

e. lubricate slings, (in the field an external application is better than none), the lubricant must penetrate to the inside of rope to get coverage the strands and core. Apply preheated lubricant to cable and wipe off excess lubricant with rag.

f. Store slings that are not in use. Do not let them lie around; they may be damaged between uses.

g. Replace slings or rings when they are damaged. Never use a kinked sling. Smooth it out.

NOTE
A new wire rope should have a short breaking-in period before it is put into full operation Run the rope with a light load, the component parts adjust themselves to the conditions they will encounter with heavier loads, also the rope lay, core, wires and strands into a more efficient cross section. A proper breaking-in period will pay off in longer, safer rope life

4-33. (Cable Spreader Heads

a. Inspect spreader bar for cracks and bends, insure the weld joints are intact.

b. Repair welds if possible, clean and repaint where badly dug or scratched.

c. If spreader is bent a closer inspection may be needed to determine why and if it should be replaced.

4-34. Access Ladder

a. Inspect ladder for broken, missing or loose steps. Also twisted and/or bent side rails and hand rail, platform and pivot.

b. Straighten bent members when possible. Tighten steps and hand rail if loose.

c. If impossible to tighten or straighten steps, etc., replace ladder.

4-35. Ground Rods and Cable

a. Clean all oil, grease and foreign matter from rods and cable.

b. Straighten rods if bent.

4-36. Low and High Voltage Splice Kits
Make sure that there are the correct number of each kit and each kit is complete.

Section X. MAINTENANCE OF SEMI-TRAILER

WARNING
Do not completely remove lug nuts off of wheel studs until wheel spacer is free of wheels. It is normally under compression between wheels.

4-37. Wheel
To remove wheel (fig. 4-4).

a. Loosen both lug nuts on each of the three Wheel lugs until the outer edge of the nut is flush with end of the wheel stud. (The nut threads are fully engaged on stud).

b. Block the wheels on opposite side.

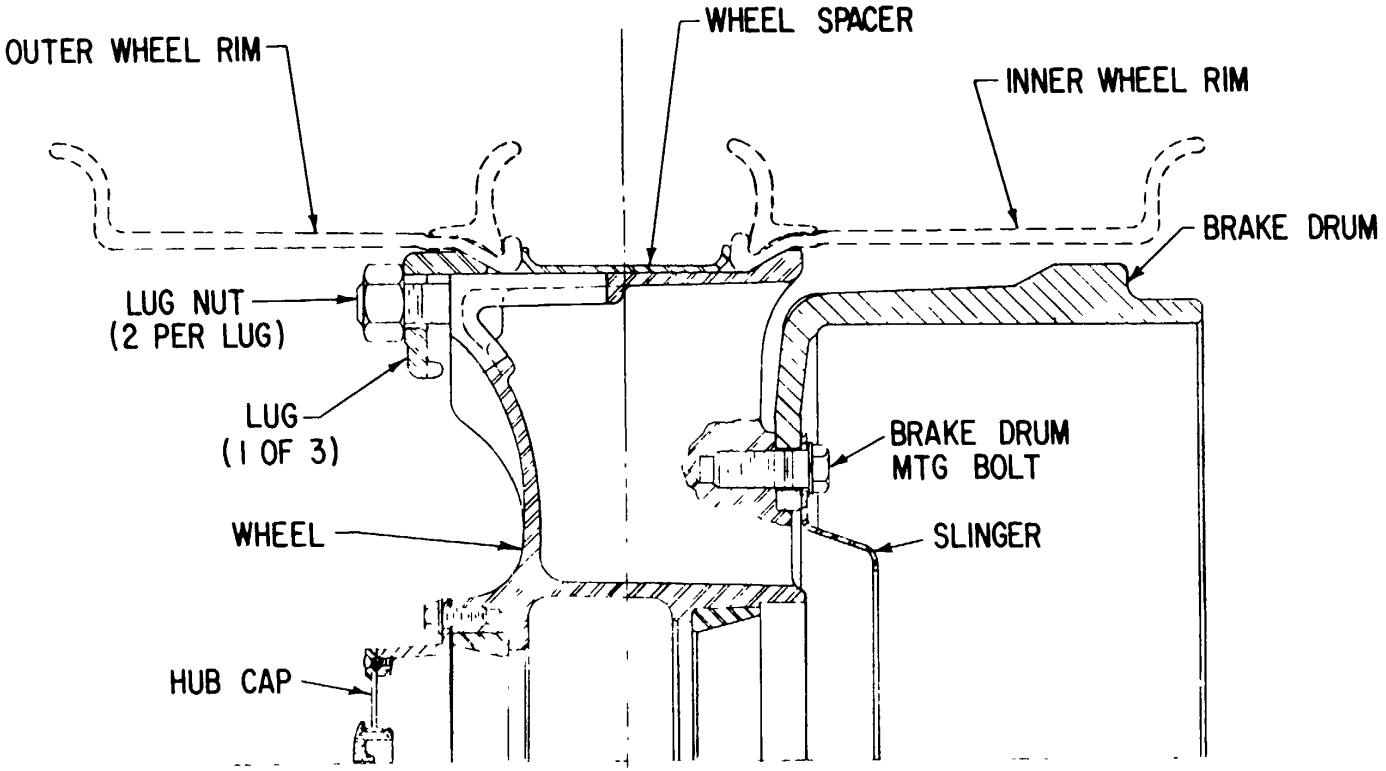
c. Jack tip trailer until tire clears the ground.

d. Standing to one side of wheel being removed never directly in front of hit wheel rim with mallet until the wheel spacer springs free of wheels and the compression of the wheel spacer is relieved.

e. Remove all lug nuts and lugs.

f. Remove wheel, wheel spacer if inner wheel is to be removed.

g. Reinstall wheels in reverse order.



ME 6120-250-12/4-4

Figure 4-4. Wheel and brake drum removal.

4-38. Tire

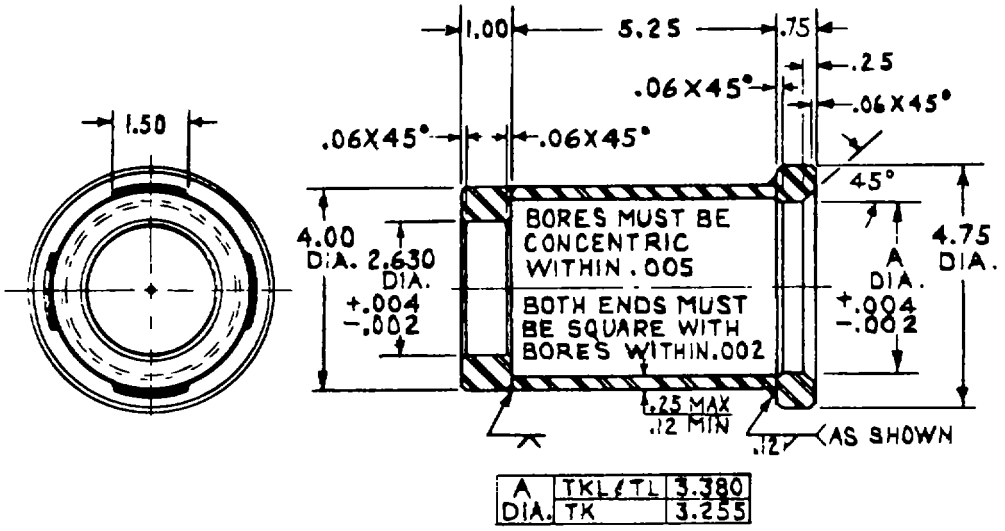
For care and maintenance of the trailer tires see TM 9-1870-1.

4-39. Wheel Bearings

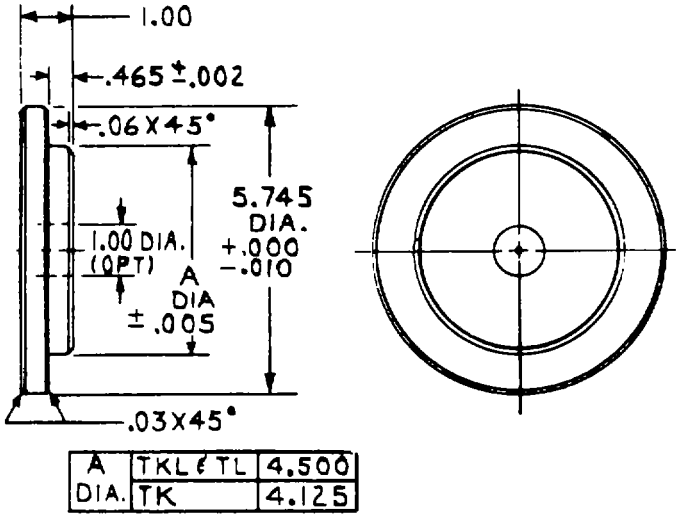
a. Each axle hub is equipped with an oil seal which requires regular attention. Refer to current LO for lubricating instructions. Each hub should be checked after unit has set sufficient time to allow oil to drain to static condition. Oil should be maintained at oil level as shown on transparent hub cap. Use SAE-140 gear type oil if temperature is above freezing, or SAE-90 if temperature is below freezing. It is recommended that seals be replaced at 100,000 miles or at brake lining replacement.

NOTE

The oil seal must be installed with tool similar to one in figure 4-5.



WIPER DRIVER



OIL SEAL DRIVER

ME 6120-250-12/4-5

Figure 4-5. Oil seal and wiper drivers.

b. The trailer axle uses a positive bearing adjustment feature. When the wheel and parts are assembled into position, the proper bearing adjustment is obtained automatically by tightening the retaining nuts against the shoulder on the axle spindle. The bearing adjustment will range from .005 inches .007 inches loose. Both the inner (adjusting) and outer (jam) nuts are tightened to 250-300 ft.-lb. The adjustment can in time become looser, especially when the bearing wear is accelerated by contaminated lubricant.

c. The after-service adjustment condition can be checked by means of a dial indicator.

(1) Loosen and remove the six capscrews and lockwashers fastening hub cap. Drain oil first.

(2) Remove hub cap and gasket.

(3) Attach indicator base to end of the axle spindle and the stem should bear against the outer machined face of the wheel hub. (A magnetic base indicator is easier and faster to mount).

(4) Watch the indicator while pushing inward on the wheel assembly and roll it back and forth until the indicator stops changing. Make note of this reading.

(5) Pull outward and roll the wheel assembly until the indicator again stops changing. Make note of this reading.

(6) The difference between the two readings taken in (4) and (5) above is the adjustment condition.

(7) If the difference is .040 inches loose or greater, the bearings should be replaced even though they may appear satisfactory.

(8) If the difference is greater than .012 inches loose but less than .040 inches loose see h. of this paragraph.

d. Wheel Bearings Replacement (fig. 4-6). Drain as much oil from the unit as possible by removing plug in side of hub cap and rotate the hole to the bottom. Replace plug when all oil is out.

(1) Loosen and remove the six cap screws and lockwashers securing the hub cap.

(2) Remove hub cap and its gasket.

(3) Remove bearing jam nut, pierced lockwasher, and wheel bearing adjusting nut.

(4) Remove hub and outer and inner bearings with brake drum from axle spindle.

CAUTION

When removing hub the brake drum will come with it. Do not let brake drum drag across brake shoes or drop down on axle spindle.

(5) Remove bearings from hub.

(6) Remove seal from hub.

(7) Remove wiper from spindle journal.

(8) Clean hub cavity and spindle journal removing all nicks and burrs.

(9) Install new wiper. See *e* of this paragraph.

(10) Install new oil seal in hub. (See f of this paragraph.)

(11) Install hub with the new oil seal and bearings on axle spindle.

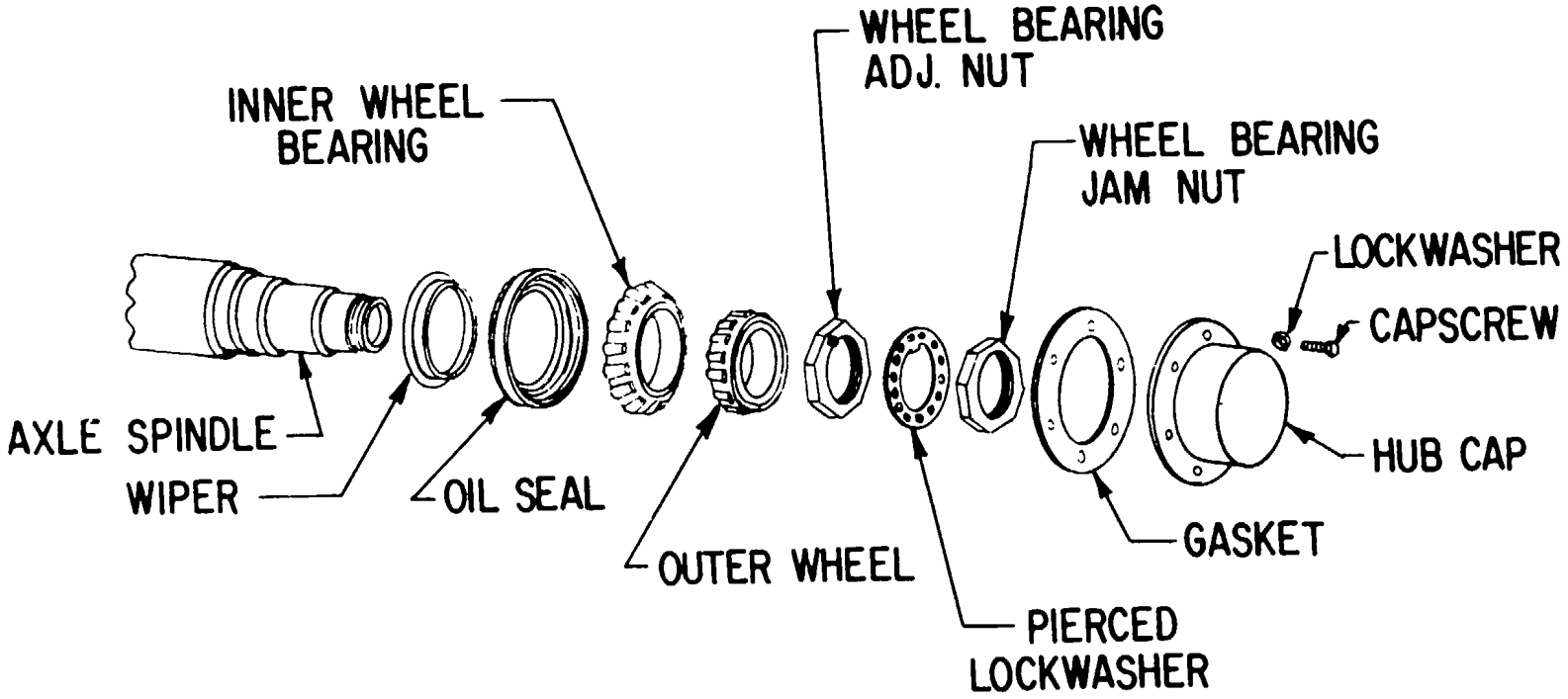
(12) Install wheel bearing adjustment nut and tighten with a torque wrench to 250-300 ft.-lb., while rotating hub back and forth.

(13) Install pierced locking washer.

(14) Install outer jam nut and tighten with a torque wrench to 250-300 ft.-lb.

(15) Install hub cap. (See *g* of this paragraph).

(16) Fill hub with recommended oil to level indicated on hub cap. Rotate wheel and re-check oil level.



ME 6120-250-12/4-6

Figure 4-6. Wheel bearing installation.

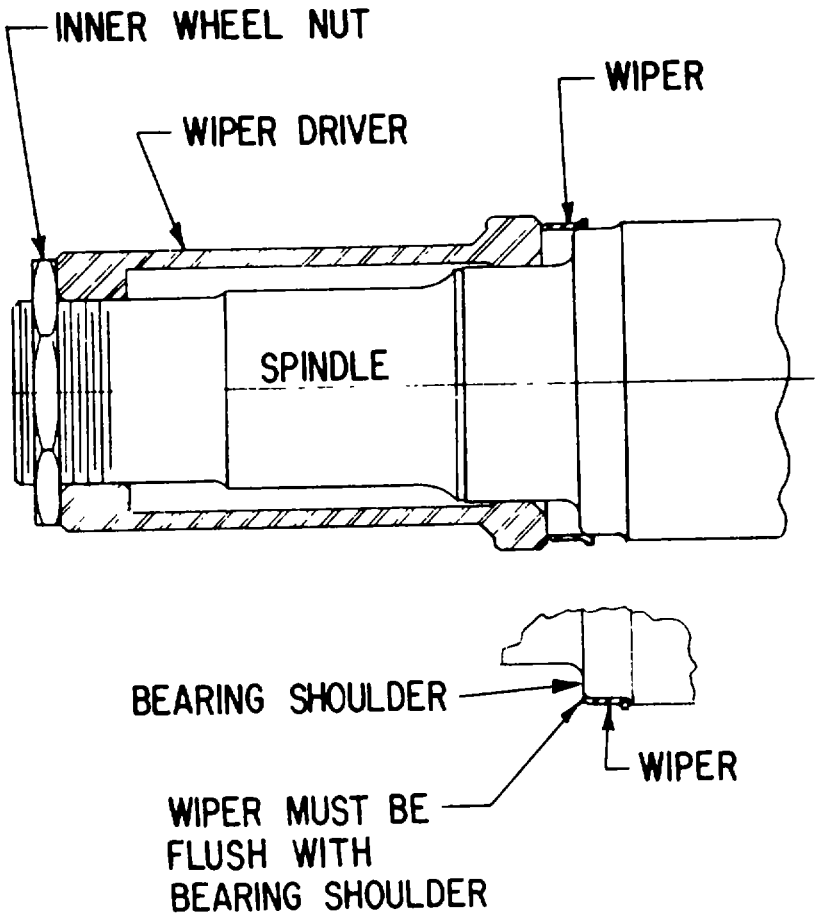
e. Installation of new wiper.

(1) Clean entire axle spindle, removing all nicks and burrs.

(2) Apply a thin coat of non-hardening gasket sealer around the journal of the spindle.

(3) Position new wiper and driver as shown in figure 4-7. See figure 4-5 for typical driver dimensions.

(4) Force the wiper onto the journal by tightening the wheel bearing adjustment nut. The wiper must be installed squarely to allow proper installation of inner wheel bearing. the end of the wiper must be flush with the bearing shoulder.(fig. 4-7).



ME 6120-250-12/4-7

Figure 4-7. Installation of wiper.

f. Installation of Oil Seal in Hub (fig. 4-8).

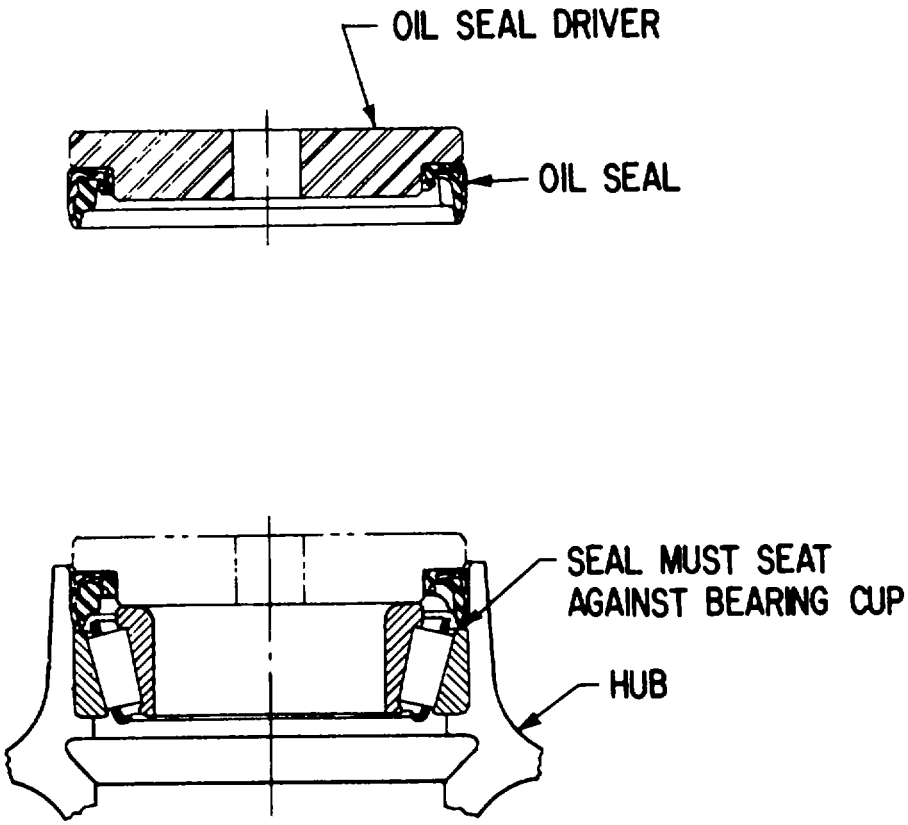
(1) With hub in upright position, install the new inner bearing.

(2) Position the new oil seal on the oil seal driver as shown in figure 4-8.

(3) Hold the driver upright and tap until the oil seal bottoms against bearing cap located in hub.

CAUTION

Do not tap on driver after seal has bottomed.



ME 6120-250-12/4-8

Figure 4-8. Installation of oil seal.

g. Install Hub Cap.

(1) Clean the face of the hub cap and apply a light coat oaf non-hardening gasket sealer for the hub cap gasket.

(2) Position the gasket and apply another light coat of non-hardening gasket sealer to outside surface.

(3) Install the transparent hub cap and reinforcing ring with cap screws and lockwashers. Tighten cap screws.

h. To Change from Positive Wheel Bearing Adjustment to Manual Adjustment. (fig. 4-9). If wheel bearings adjustment measured as in paragraph 4-31*c* is greater than .012 inches loose, but less than .040 inches loose, a manually adjusted set may be used. The inner adjusting nut is replaced by a special Service Nut A-1227-S-877. This nut has a recess on its inner face to clear the shoulder on the spindle. This will permit removing the excess looseness, if the bearings are satisfactory for further ,service. Perform the following steps:

(1) See *d* above for removal and replacement of hub and drum.

CAUTION

When installing hub and brake drum on axle do not let drum drag across lining on brake shoes.

(2) Install special service nut with recessed face towards the bearing. This nut replaces original adjustment nut (save the original adjustment nut for future use. The reuse of this nut with new bearings will again achieve the original positive bearing adjustment).

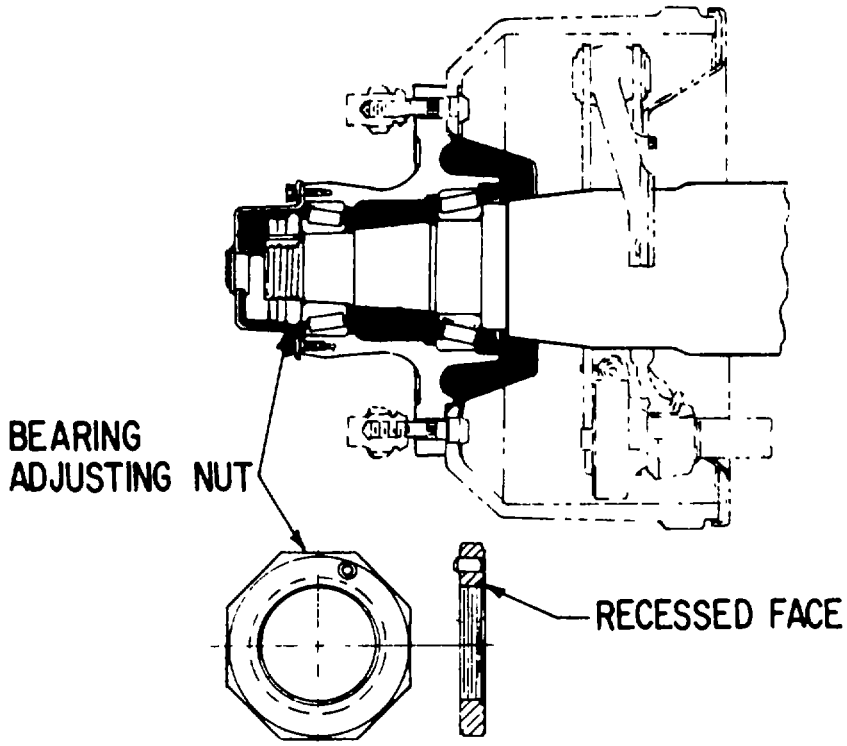
(3) Tighten special service adjusting nut to 50 ft.-lb. with a torque wrench while rotating hub back and forth (in both directions).

(4) Back off adjusting nut (special service nut) 1/4 turn.

(5) Install pierced lockwasher. Reverse lockwasher if necessary to engage dowel on adjusting nut.

(6) Install jam nut and tighten to 256-300 ft. lb. with a torque wrench.

(7) Install gasket and hub cap per preceding subparagraph *g*.



ME 6120-250-12/4-9

Figure 4-9. Installation of manual adjusting nut.

4-40. Brake Drum Replacement

a. Remove hub and brake drum as per paragraph 4-38 d. (1) (2) (3) and (4).

b. On inside of brake drum loosen and remove 6 bolts securing brake drum to wheel and hub. (fig. 4-4).

c. Replace brake drum and assemble in reverse order.

4-41. Brake Shoe and Assembly Inspection, Brake Adjustment

a. Inspection. Periodic adjustment, cleaning and lubrication of brake equipment should be established by the organizational maintenance on the basis of past experience and severity of operation. Linings and drums are parts particularly subject to wear. To compensate for this wear brakes should be adjusted as frequently as required to maintain satisfactory operation and maximum safety. Brakes should be cleaned, inspected, lubricated and adjusted each time the hubs are removed.

(1) Inspect brake linings for grease saturation, wear and loose bolts. Lining should not be allowed to wear to the point where bolts may contact brake drums.

(2) Inspect brake drum for cracks, scoring or other damage.

b. Adjustment. The trailer is equipped with a straight-air system of the cam type brake. Each cam brake is actuated by a brake chamber which forces a slack adjust er lever to rotate the cam shaft. The cam at the outer end of the cam shaft acting on a cam follower pushes the brake lining out against the brake drum. Wheel bearings should be properly adjusted before making brake adjustment.

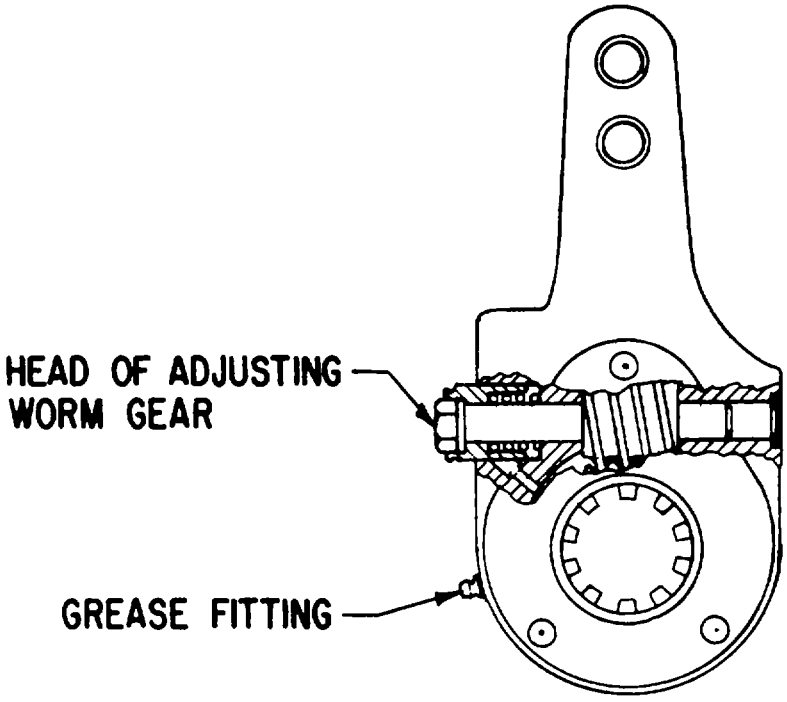
(1) Have the wheel raised off the ground.

(2) With the wheel turning slightly (by hand) rotate the adjusting screw (worm shaft) on the slack adjuster (note worm shaft lock must be depressed) until the wheel is locked by the brakes. (fig. 4-10).

(3) Back off the adjusting screw until the wheel turns freely with no evidence of brake drag. Usually two clicks of the slack adjuster screw is sufficient to provide the proper clearance.

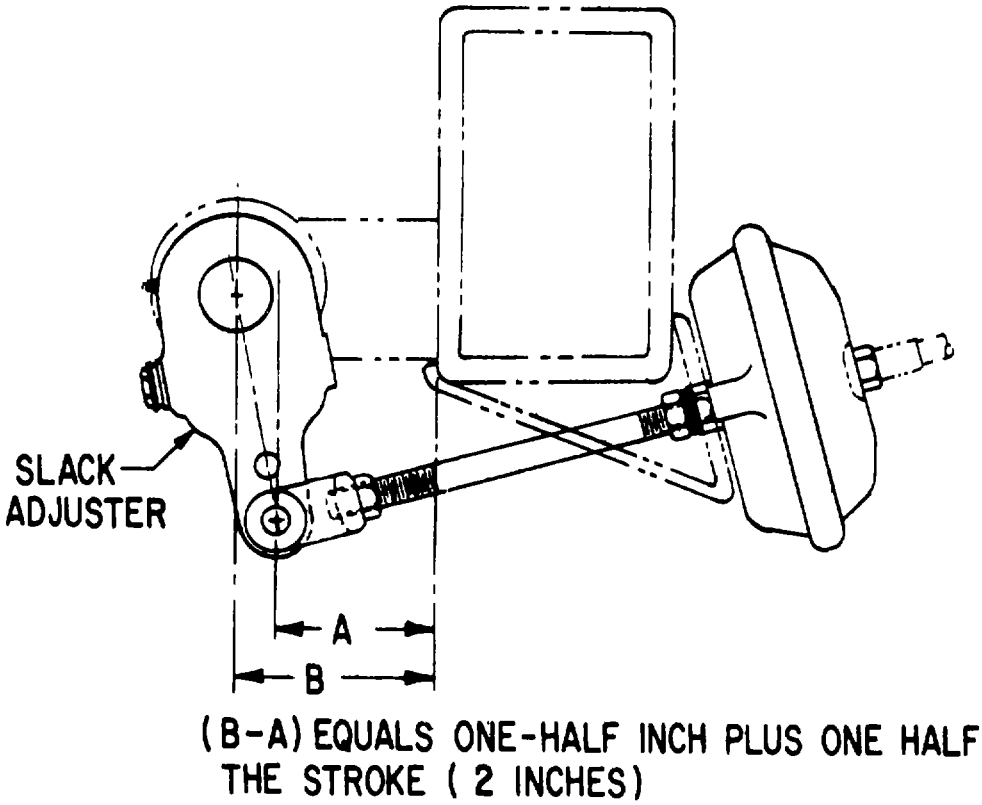
(4) After adjusting brakes, if the brake will not release (cam returns to closed position) the linings should be replaced.

c. Chamber Stroke. When travel increases from liner wear to 2 inches, readjust. (fig. 4-11).



ME 6120-250-12/4-10

Figure 4-10. Slack adjuster.



ME 6120-250-12/4-11

Figure 4-11. Correct position of chamber push-rod and slack adjuster in "OFF" position.

4-42. Valve (RE-6 Relay Emergency Valve)

a. Every 3600 operating hours or 100,000 miles, or yearly, depending upon operating conditions and experience, the relay valve should be disassembled, cleaned and lubricated. Rubber parts and parts subject to wear should be replaced if worn or damaged. The emergency line filter should be cleaned or replaced.

b. RE-6 (Relay Emergency Valve Removal (fig. 4-12).

(1) Block trailer wheels.

(2) Open drain cocks on reservoir and drain air from trailer air system.

(3) Disconnect from RE-6 relay emergency valve the four air lines to the brake chamber, the service line and the emergency line. See figure 4-14.

(4) Remove the RE-6 relay emergency valve from tank connection.

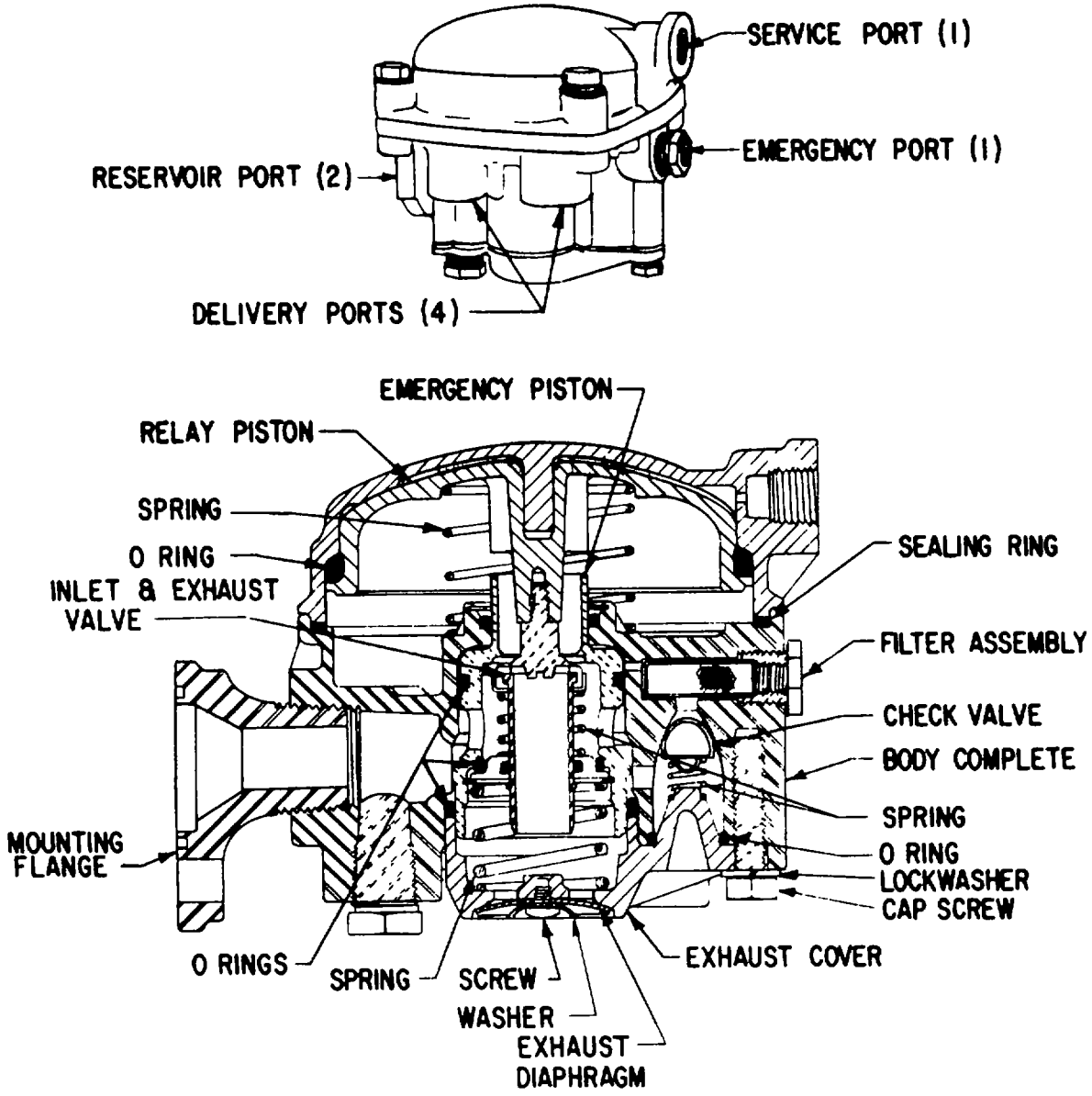
c. Installing RE-6 Relay Emergency Valve.

(1) Clean or replace line to valve.

(2) Mount relay valve on tank nipple, be sure it is mounted vertically (delivery parts facing down) and securely.

(3) Connect the four brake chamber air hoses to the delivery ports on RE-6 Valve.

(4) Connect service line in service port (upper port) and emergency line in emergency port (lower port). (fig. 4-12).



ME 6120-250-12/4-12

Figure 4-12. RE-6 Relay emergency valve.

d. Disassembly of RE-6 Relay Emergency Valve (fig. 4-13).

(1) Mark cover and body so that upon assembly cover will he in proper position in relation to body.

(2) Remove three cap screw, lockwashers, and exhaust cover.

(3) Remove check valve, check valve spring, exhaust cover, O-rings, and emergency piston spring.

(4) Remove exhaust diaphragm screw,

diaphragm and diaphragm washer.

(5) Remove four cap screws, lockwasher from ('over.

(6) Remove cover, relay piston assembly, and relay piston return spring.

(7) Remove relay piston O-ring.

(8) Remove exhaust valve seat from piston.

(9) Remove sealing ring.

(10) With thumb, apply pressure downward on (emergency piston and remove emergency piston and inlet-exhaust valve assembly.

(11) Remove filter assembly from emergency port.

(12) Using tru-arc pliers, remove large retaining ring from bottom of emergency piston assembly.

(13) Remove inlet and exhaust valve assembly from emergency piston. (Valve assembly can be easily dislodged by pushing through small end of emergency piston with finger).

(14) Remove emergency piston O-ring.

(15) Remove O-ring from inlet-exhaust valve assembly.

(16) Remove retaining ring from inlet-exhaust valve assembly.

(17) Remove valve guide, valve spring, and inlet and exhaust valve retainer.

(18) Remove O-ring from inside of valve guide.

(19) Remove inlet and exhaust valve from body. (This is a boot type valve and will slip off body).

e. Cleaning and Inspection of RE-6 Relay Emergency Valve.

(1) Wash all metal parts in cleaning solvent and dry thoroughly.

(2) Inspect parts for wear or damage.

(3) Check all bores for out of round condition.

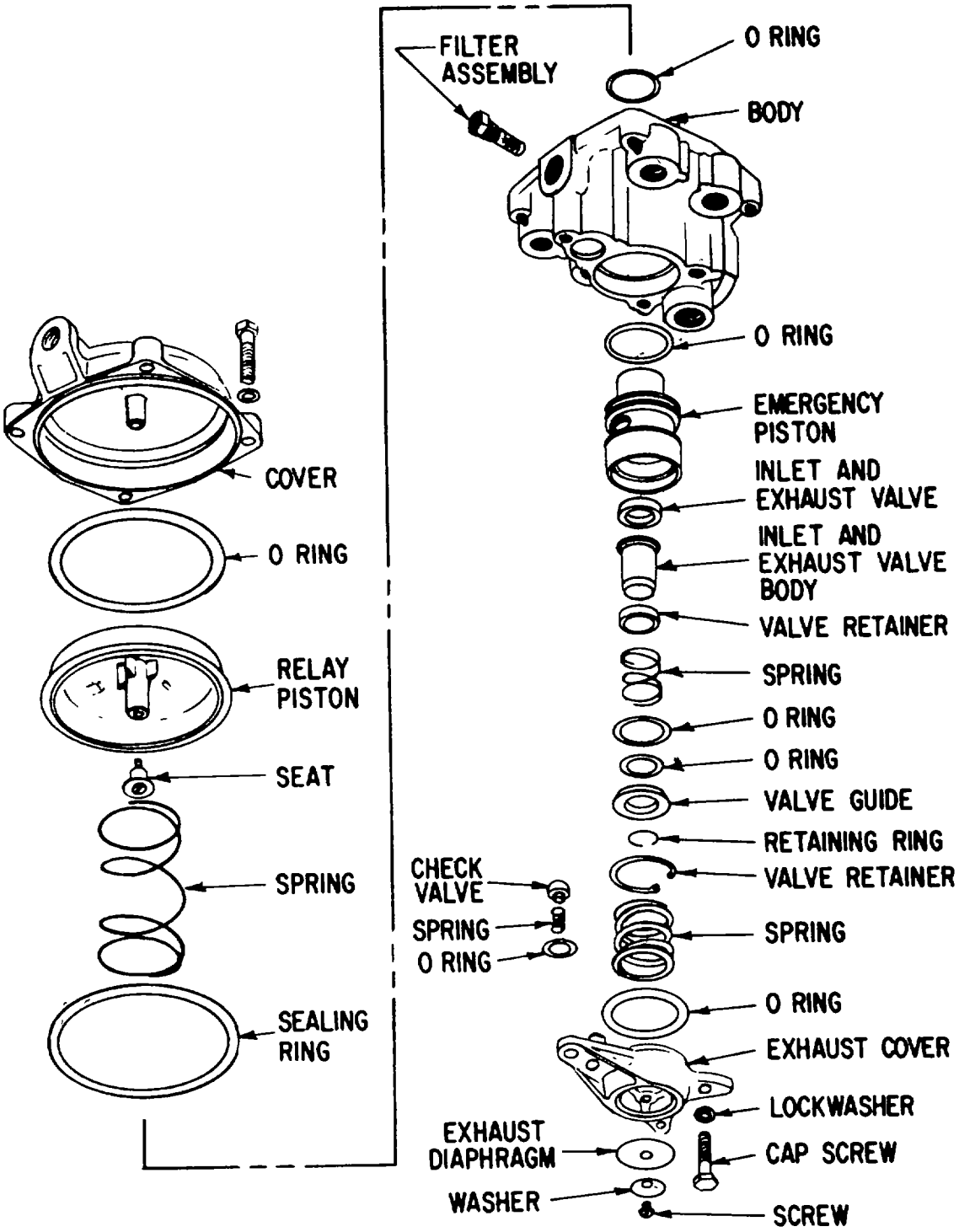
(4) Inspect all rubber parts for wear or deterioration.

(5) Inspect springs for breaks or deterioration.

(6) Inspect valve seats for nicks or burrs.

(7) Inspect filter and either clean or replace.

(8) Replace any parts which are found to be no longer serviceable by these inspections.



ME 6120-250-12/4-13

Figure 4-13 RE-6 Relay emergency valve assembly.

f. Assembly of RE-6 Relay Emergency Valve (fig. 4-13).

(1) Prior to assembly lubricate lightly all rubber parts and mating surfaces and bores with a barium base grease. All surfaces must be free from foreign material when assembling.

(2) Slip inlet and exhaust valve over inlet and exhaust valve body.

(3) Install O-ring in valve guide.

(4) Install valve retainer, spring and valve guide.

(5) Compress spring by holding valve guide and install retaining ring making certain ring is properly installed in groove.

(6) Install O-ring on inlet and exhaust valve assembly.

(7) Install inlet and exhaust valve assembly inside of emergency piston and, using tru-arc pliers, install retaining ring making certain ring is properly seated into groove.

(8) Install emergency piston O-ring.

(9} Replace filter assembly (using new filter assembly if necessary) in emergency port of valve.

(10) Install valve seat on piston.

(11) Install relay piston O-ring on relay piston.

(12) Install O-ring in upper bore of body (between body and retainer),.

(13) Install sealing ring in groove of body.

(14) Install relay piston in cover (Boss on cover will go into bore in piston)

(15) Install relay piston return spring on body, and install cover on body and secure with cap screws and lockwashers making certain that cover is in proper position in relation to body.

(16) Install emergency piston and inlet and exhaust valve assembly in body.

(17) Install O-ring in body (between emergency piston and bore of body).

(18) Install emergency piston spring in body.

(19) Install exhaust diaphragm, diaphragm washer and screw.

(20) Install small O-ring on exhaust cover.

(21) Install check valve and check valve spring. (Spring will fit in groove provided in cover).

(22) Install exhaust cover using cap screws and lockwashers.

4-43. Brake Hose Assembly Replacement (fig. 4-14)

a. Service or Emergency Hose.

(1) Disconnect hand coupling in middle of trailer (underneath).

(2) Remove screw on hose separator and separate hose.

(3) Disconnect hose from RE-6 Relay Emergency Valve mount on reservoir. (The top connection is the service port and lower one is the emergency port). See figure 4-12.

(4) Replace with a 3/8 x 60" hose with fittings. Install hose assembly in reverse order.

b. Brake Chamber Hose (fig. 4-14).

(1) The two front wheels use 24" long hose assemblies, the rear wheel hoses are 48" long.

(2) Disconnect the hose from the RE-6 relay emergency valve.

(3) Remove screw on hose separator and separator hose.

(4) Disconnect hose from brake chamber.

(5) Replace the front wheel air hose with a 3/8 x 24" long air hose with fittings. Install hose assembly in reverse order.

4-44. Lamp Holder Replacement ({fig. 4-15)

Replacement of Clearance Marker Lamp Holder.

a. Remove lens and bulbs as in paragraph 3-36.

b. With circuit de-energized, remove the two screws on ends of lamp holder, remove holder from trailer body.

c. Disconnect wire from lamp holder to trailer wiring. You may have to cut the wire so that outer covering 3/16 loom may be used after splicing in new wire.

d. Connect wire from new holder into trailer wiring in same manner as the other holder. If wire had to be cut, splice new wire to trailer wire, tape and cover with 3/16 loom to keep it water-tight. Do not substitute. Use recommended lamp holder.

e. Place new lamp holder into position and mount it with the three screws.

f. Replace bulb and lens as in paragraph 3-36.

4-45. Replacement of Cable Connectors (fig 4-16)

a. Replacement of 12 pin 24 volt connector.

(1) Remove the four screws, nuts and lock-washers. (Connector is the top one on the box).

(2) Remove connector from box.

(3) Unsolder the five wires to the pins of connector.

(4) Solder wires to new connector (12 pin # 7731428E) according to diagram figure 4-16.

(5) Mount connector and spring cover on box with the four screws, nut and lockwasher.

b. Replacement of 7 pin 12 Volt Connector.

(1) Remove the two screws, nuts and lockwashers. (Connector is bottom one on front of the box 1).

(2) Remove connectors from box.

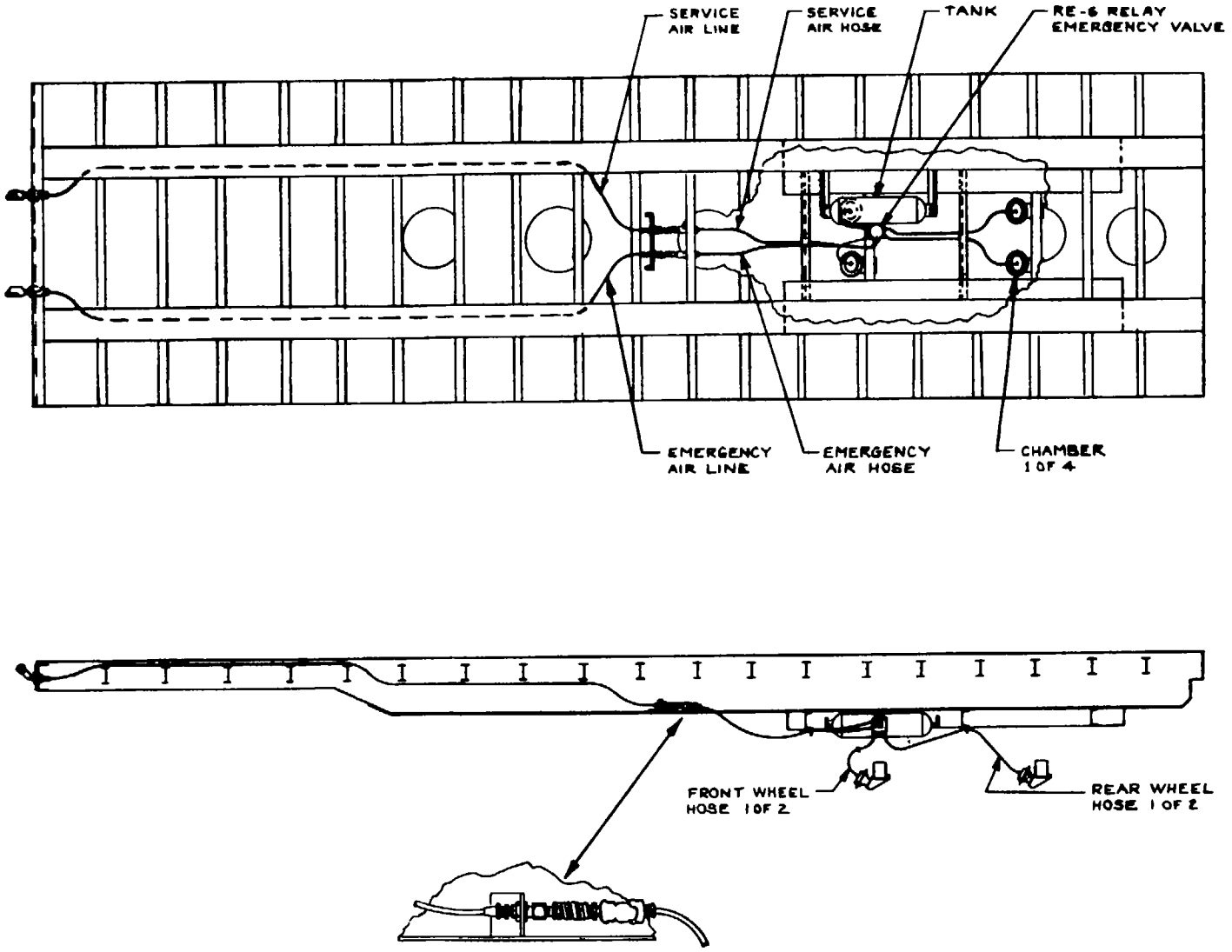
(3) Solder wire to new connector (7 pin Berg # 782-ATA) according to diagram figure 4-16.

4-46. Replacement of Voltage Reducer

The voltage reducer consists of 7,55 watt resistors of various values. Replace them according to diagram figure 4-16.

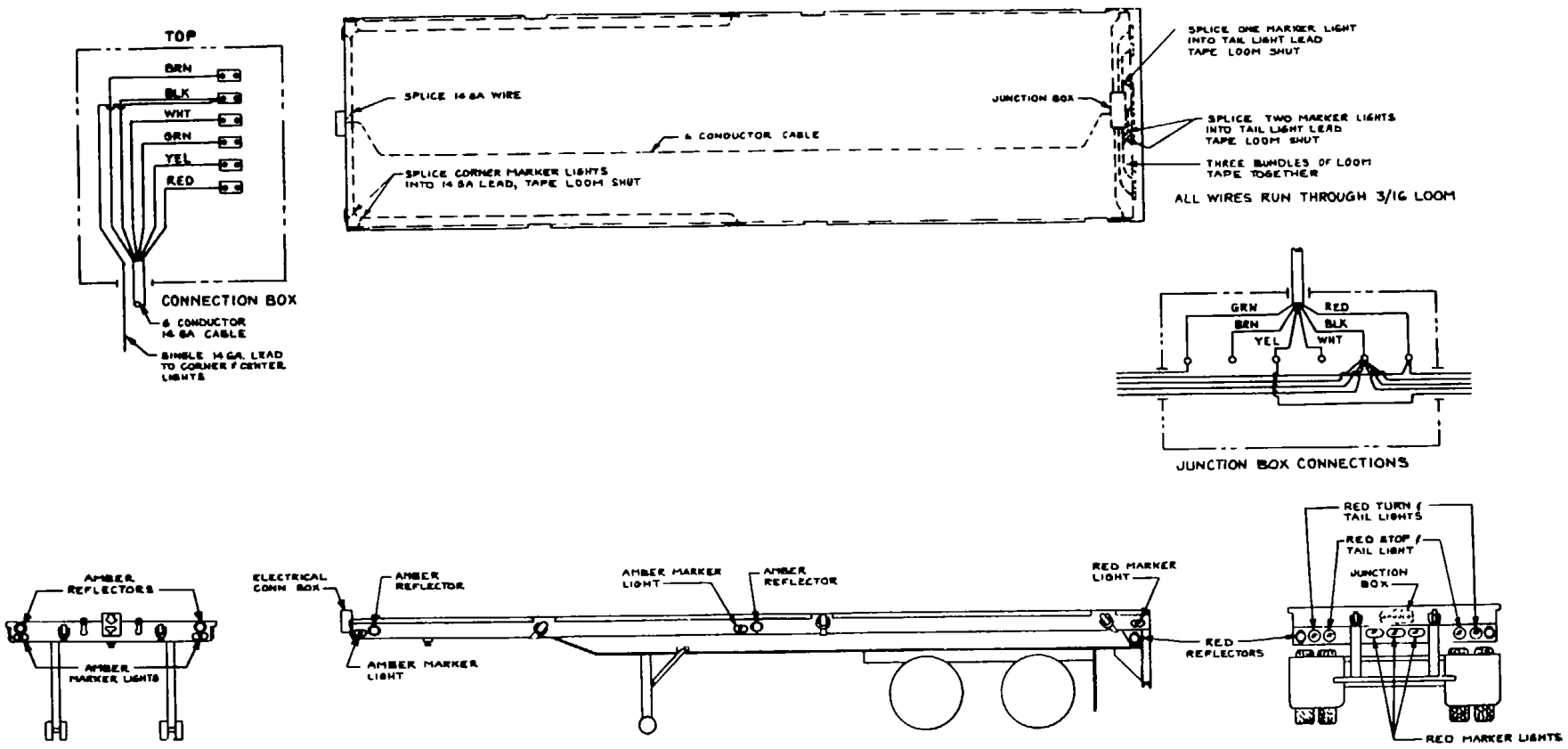
4-47. Trailer Wiring

Replace or repair according to figure 4-15.



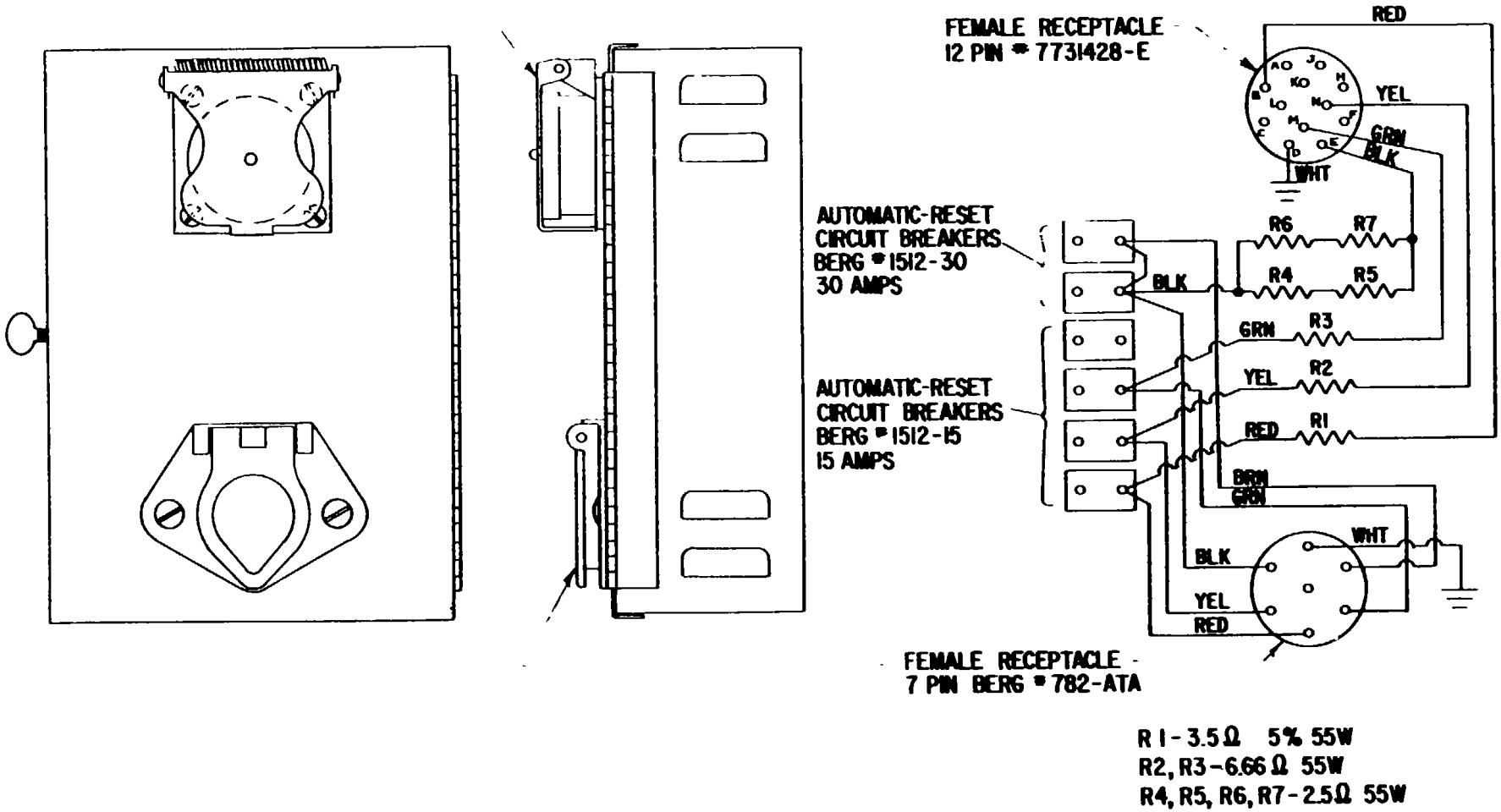
ME 6120-250-12/4-14

Figure 4-14. Brake air system.



ME 6120-250-12/4-15

Figure 4-15. Lamp location and wiring, trailer.



ME 6120-250-12/4-16

Figure 4-16. Electrical connection box.

APPENDIX A

REFERENCES

A-1	**Fire Protection**	
	TB5-4200-200-10	Hand Portable Fire Extinguishers Approved for Army Users.
A-2	**Lubrication**	
	C9100-IL	Identification List for Fuels, Lubricants, Oils and Waxes
	LO 5-6120-250-12	Lubrication Order
A-3	**Maintenance**	
	TM 9-1870-1	Care and Maintenance of Pneumatic Tires
	TM 38-750	The Army Maintenance Management System
A-4	**Shipment And Storage**	
	TM 740-97-2	Preservation of USAMEC Mechanical Equipment for Shipment and Storage
	TM 740-90-1	Administrative Storage of Equipment
A-5	**Destruction to Prevent Enemy Use**	
	TM 750-244-3	Procedures for Destruction of Equipment to Prevent Enemy Use

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. General

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

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

c. Section III-Not applicable.

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

B-2. Explanation of Columns in Section II

a. Group Number, Column (1). The assembly group is a numerical group assigned to each assembly in a top down breakdown sequence. The applicable assembly groups are listed on the MAC (Maintenance Allocation Chart) is disassembly sequence beginning with the first assembly removed in a top down disassembly sequence.

b. Functional Group, Column (2). This column contains a brief description of the component of each assembly group.

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

C-Operator or crew
O-Organizational maintenance
F-Direct support maintenance
H-General support maintenance
D-Depot maintenance

The maintenance functions are defined as follows:

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

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

C-Service. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air.

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

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

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

G-Install: To set up for use in an operational environment such as an emplacement, site or vehicle.

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

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

.J-O*verhaul: Normally,* the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

K-Rebuild: The highest degree of material maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero hours or miles the equipment, or component thereof, has been in use

L-Symbols: The uppercase letter placed in the appropriate column indicates the lowest level at which that particular maintenance function is to be performed.

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

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

B-3 Explanations of Columns in Section III- Not Applicable.

B-4. Explanations of Columns in Section IV

a. Reference Code. This column consists of two letters separated by a dash, both of which are references to section II. The first letter references column 5 and the second letter references a maintenance function, column 3, A through K.

b. Remarks. This column lists information pertinent to the maintenance function being performed, as indicated on the MAC, section II.

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) Functional group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
01	Accessories													
	Storage Cabinets	C	..	C	..	..	..	..	O	O				
	Platform	C	..	C	..	..	..	..	C	O				
	Handrails	C	..	C	..	..	..	..	C	O				
	Lifting Slings	C	..	C	..	..	..	..	C	O				
	Cable Splice Kit	C	..	C	..	..	..	..	C	O				
	Cable Spreader Heads	C	..	C	..	..	..	..	C	O				
	Ladder Access	C	..	C	..	..	..	..	C	O				
	Ground Rod and Cable	C	..	C	..	..	..	..	C	O				
02	High Voltage Section													
	Air Filters	C	..	C	..	..	..	..	C					
	Housing	C	..	C	..	..	..	..		O				
	Door Assy	C	..	C	..	..	..	..	O	O				
	Heater	C	..		..	..	..	..	O					
	Switch Load Break Assy	C	..		..	..	..	..	F	F				
	Contacts, Switch		..		..	..	..	..	F					
	Lightening Arresters	C	..		..	..	..		F					
03	Transfer Section													
	Transformer Assy	C	F		..	..	..	..	F	F	H	H	.....	A-K
	Insulators	C	F		..	..	..	..	F					
	Oil		H		..	..	..	..	F	..	..	..	.....	B-B
	Tap Changer	C	..		C	..	..	..	F	F				
	Gauges	C	..		..	..	..	..	O					
	Vent Relief Valve	C	..		..	..	..	..	O					
04	Low Voltage Section													
	Air Filters	C	..	C	..	..	..	..	C					
	Housing	C	..	C	..	..	..	..	F	F				
	Door Handle	C	..	C	..	..	..	..	O	O				
	Door Assy	C	..	C	..	..	..	..	O	O				
	Circuit Breakers	C	..		..	..	..	..	F	F				
	Power Sensor	C	..		..	..	..	..	F	F				
	Overcurrent Trips	C	..		..	..	..	..	F					
	Contacts C. B.	..			..	..	..		F					
	Fuses	C	O		..	..	..	..	C					
	Meters	C	..		..	..	..	..	O					
	Switches	C	O		..	..	..	..	O					
	Transformer Potential	C	F		..	..	..	..	F					
	Lamps (Bulbs)l		..		..	..	..		C					
	Lamp Holder		..		..	..	..		O					
	Wiring		..		..	..	..		F	F				
	Heater	C	..		..	..	..	..	O					
	Busses	..	..		..	..	..		F	F				
	Bus Links	C	..		..	..	..		O					
05	Cable Reels													
	Cables Electrical)	C	F		..	..	..	..	C					
	Drum	C	..	C	..	..	..	..	O	O				
	Shaft	..	..		..	..	..	..	O	O				
	Bearing	C	..	C	..	..	..	..	O					
	Bearing Block		..		..	..	..	..	O	O				
06	Semi-Trailer													
	Under Carriage Assy	C	..	C	..	..	..	..	C	F				
	Wheel	C	..		..	..	..	..	O					
	Tire, Pneumatic	C	..	C	..	..	..	..	O					
	Tube, Inner	C	..	C	..	..	..	..	O	O				
	Bearings, Wheel	O	..	O	O	..	..	..	O					
	Seal, Hub	O		..	..	..	..	..	O					
	Drum Brake	..	..		..	..	..		O	F	..	..	.....	V-I
	Brakeshoe	O	..		O	..	..	..	F					

(1) GROUP NUMBER	(2) Functional group	(3) Maintenance functions											(4) Tools and equipment	(5) Remarks
		A	B	C	D	E	F	G	H	I	J	K		
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
06	Semi Trailer-Cont.													
	Brake Assy.	O	..	..	..	..	..	..	F	F				
	Chamber Brake	..	..	..	..	..	..	F	..	F				
	Axle	..	..	..	..	..	..	F	..	F				
	Springs	..	..	..	..	..	..	F						
	Bogey Assy	..	..	..	..	..	..	H	..	H				
	Landing Gear	C	..	..	C	..	..	..	C	F				
	Valves	C	..	..	..	..	..	..	O	O				
	Hose Assy. Brake	C	..	..	..	..	..	..	O					
	King Pin Fifth Wheel	C	..	..	..	..	..	..	F					
	Lamp Bulbs	C	..	..	..	..	..	..	C					
	Lamp Holder	..	..	..	..	..	..	O	O					
	Cable Connectors	..	..	..	..	..	..	O	O					
	Voltage Reducer	..	..	..	..	..	..	O	O					
	Frame and Bed	..	..	..	..	..	..	..	F		H			
	Wiring	..	..	..	..	..	..	O	O					

Section IV. REMARKS

Reference Code	Remarks
A-K	Rebuild includes rewind
B-B	Test oil for moisture content
C-I	Repair includes undercutting
D-J	Overhaul includes parts fabrication, replacement and straightening metal parts

APPENDIX C

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

C-1. Scope

This appendix lists items which accompany the mobile (substation or are required for installation, operation, or operator's maintenance.

C-2. General

This Basic Issue Items List is divided into the following sections:

a. Basic Issue Items-Section II. A list of items which accompany the substation and are required by the (operator/crew for installation, operation, or maintenance.

b. Maintenance and Operating Supplies-Section II. A listing of maintenance and operating supplies required for initial operation.

C-3. Explanation of Columns

The following provides an explanation of columns in the tabular list of basic issue items, section II.

a. Source, Maintenance, and Recoverability Codes (SMR).

(1) Source code, indicates the source for the listed item. Source codes are:

Code	*Explanation*
P	Repair parts which are stocked in or supplied from the GSA/DSA, or Army supply system and authorized for use at indicated maintenance categories
P2	Repair parts which are procured and stocked for insurance purposes because the combat or military essentiality of the end item dictates that a minimum quantity be available in the supply s) stem
M	Repair parts which are not procured or stocked, but are to be manufactured in indicated maintenance levels.
A	Assemblies which are not procured or stocked as such, but are made up of two or more units. Such component units carry individual stock numbers and descriptions, are procured and stocked separately and can be assembled to form the required assembly at indicated maintenance categories.
X	Parts and assemblies which are not procured or stocked and the mortality of which normally is below that of the applicable end item or component The failure of such a part or assembly should result In retirement of the end item from the supply system.
X1	Repair parts which are not procured or stocked. The requirement for such items will be filled by use of the next higher assembly or component
X2	Repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization. Where such repair parts are not obtainable through cannibalization, requirements will be requisitioned, with accompanying justification, through normal supply channels.
O	Major assemblies that are procured with PEMA funds for initial issue only as exchange assemblies at DSU and GSU level. These assemblies will not be stocked above GS and DS level or returned to depot supply level.

(2) Maintenance code, indicates the lowest category of maintenance authorized to install the listed item. The maintenance level code is:

Code	*Explanation*
C	Operator/crew

(3) Recoverability code, indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are expendable. Recoverability codes are:

Code	*Explanation*
R	Repair parts (assemblies and components) which are considered economically repairable at direct and general support maintenance levels. When the maintenance capability to repair these items does not exist, they are normally disposed of at the GS level When supply considerations dictate, some of these repair parts may be listed for automatic return to supply for depot level repair as set forth in AR 710-50. When so listed, they will be replaced by supply on an exchange basis.
S	Repair parts and assemblies which are economically repairable at DSU and GSU activities and which normally are furnished by supply on an exchange basis. When items are determined by a GSU to be uneconomically repairable, they will be evacuated to a depot for evaluation and analysis before final disposition.
T	High dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts normally are repaired or overhauled at depot maintenance activities.
U	Repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, or high dollar value of reusable casings or castings.

b. Federal Stock Number. This column indicates the Federal Stock Number assigned to the item and ,ill be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A two-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based. e.g., ft., ea., pr., etc.

e. Quantity Incorporated in Unit. This column indicates the quantity of the item used in the assembly group. A"V" appearing in this column in lieu of a quantity indicates that a definite quantity can not be indicated (e.g., shims, spacers, etc.).

f. Quantity Furnished With Equipment. This column indicates the quantity of an item furnished with the equipment.

g. Illustration. This column is divided as follows:

(1) *Figure number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item number.* Indicates the callout number used to reference the item in the illustrations.

C-4. Explanation of Columns in the Tabular List of Maintenance and Operating Supplies-Section III

a. Component Application. This column identifies the component application of each maintenance or operating supply item.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the item name and brief description.

d. Quantity Required for Initial Operation. This column indicates the quantity of each maintenance or operating supply item required for initial operation of the equipment.

e. Quantity Required for 8 Hours Operation. This column indicates the estimated quantities required for an average 8 hours of operation.

f. Notes. This column indicates informative notes keyed to data appearing in a preceding column.

C-5. Abbreviations

ft. .....feet
gal.....gallon
GE .....general expenses
lb.....pound
lg .....long
qt .....quart

Section II. BASIC ISSUE ITEMS

(1) SMR code	(2) Federal stock number	(3) Description Ref No. & Mfr Code — Usable on code	(4) Unit of meas	(5) Qty inc in unit	(6) Qty furn with equip	(7) Illustration (A) Fig No.	(7) Illustration (B) Item No.
PC	7510-889-3494	Binder, Log Book	ea		1		
PC	7520-559-9618	Case: Maintenance and operational manual, cotton duck, water repellent, mildew resistant	ea		1		
		Department of the Army Operator and Organizational Maintenance Manual TM 5-6120-250-12	ea		1		
		Department of the Army Lubrication Order LO 5-6120-250-12.	ea		1		

Section III. MAINTENANCE AND OPERATING SUPPLIES

(1) Component application	(2) Federal stock number	(3) Description	(4) Quantity required F initial operation	(5) Quantity required F/8 hrs operation	(6) Note
Load Break Switch	9150-068-9474	Oil Lubricating: OE/HDO 1 qt can Grease: (1) D50H15 grease			(1) Worm a Wheel Motor gears bearings
Circuit Breakers		Lubricating: GE D50H15 (2) GE D50H47 (3)			(2) Mechanical bearing points, sliding surfaces. (3) Sliding Silverplated contact surfaces, and contact surface of disconnect studs.
Trailer Wheel Bearings	9150-935-4119 9150-754-2635	Oil Lubricating: GA-140 gear type (4) 1 qt can G090 gear type (5) 1 qt can			(4) Use in temperature above freezing (5) Use in temperature below freezing
Trailer Axle	9150-190-0905	GAA-5 lb can			
Landing Gear	9150-190-0905	GAA-5 lb can			

By Order of the Secretary of the Army:

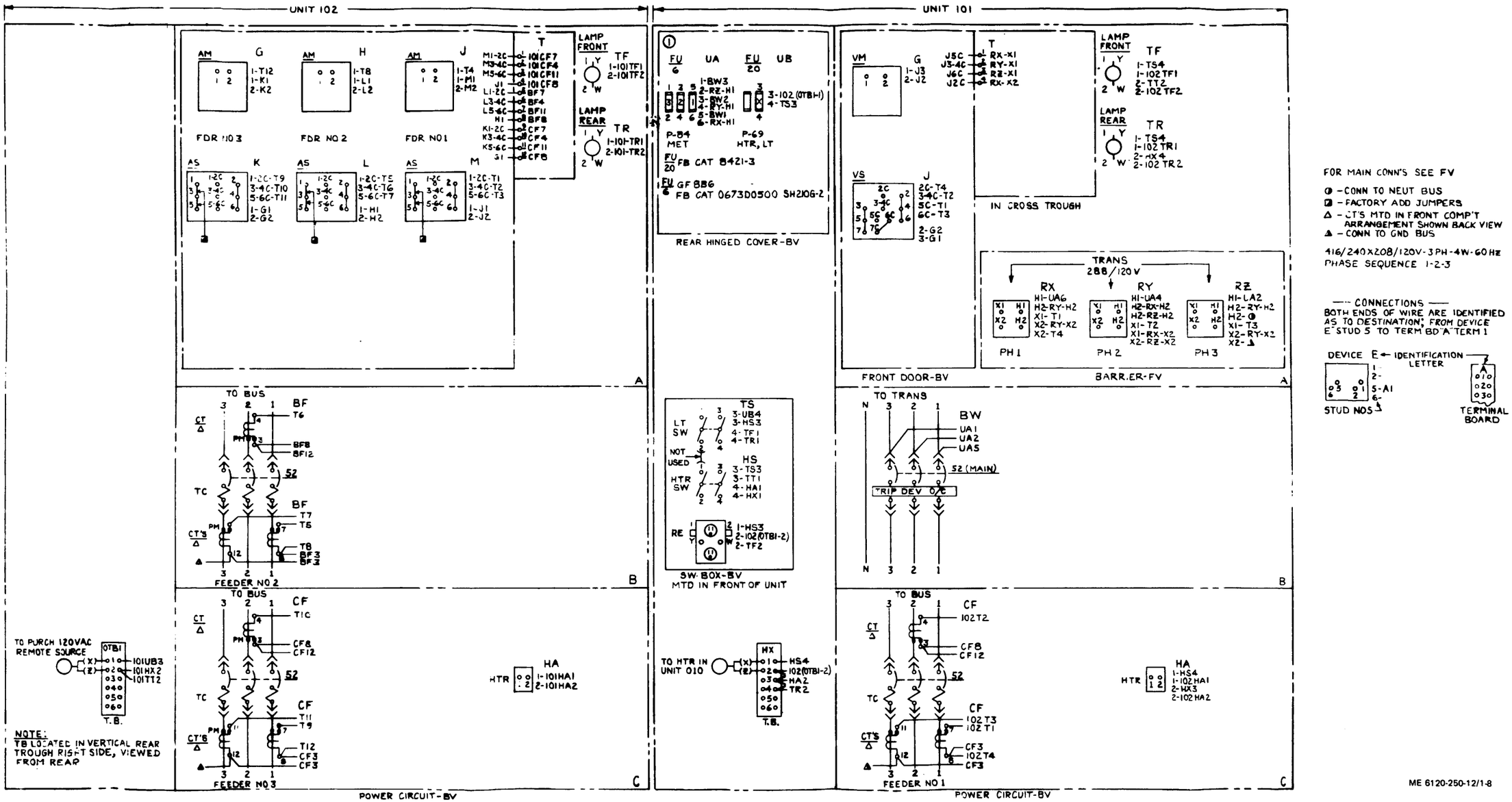
W. C. WESTMORELAND,
General. United States Army,
Chief of Staff.

Official:

VEIRNE L. BOWERS,
Major General, United States Army,
The Adjutant General.

Distribution:
To be distributed in accordance with DA Form 12-25D (qty rqr block no. 782), Organizational maintenance requirements for Trailer Mounted Generators, (PU's).

***U.S GOVERMENT PRININNG OFFICE: 1996-406-421/52106**



ME 6120-250-12/1-8

Figure 1-8. System connections diagram.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

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BE EXACT PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

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

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DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

TM 5-6120-250-12 SUBSTATION, TRAILER MOUNTED, 500 KVA, AC-1972

PIN: 022380-000