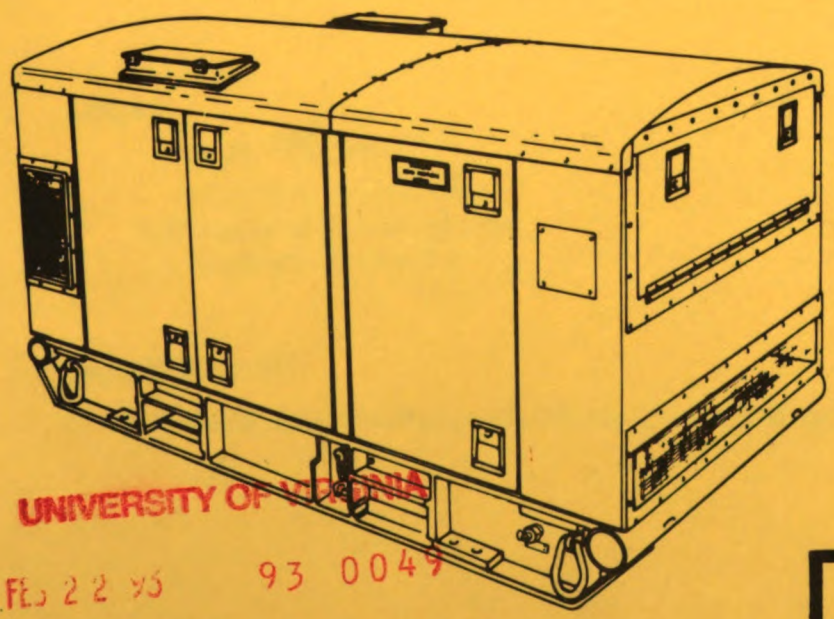
TECHNICAL MANUAL

INTERMEDIATE (DIRECT AND GENERAL SUPPORT) MAINTENANCE MANUAL

GENERATOR SET, GAS TURBINE ENGINE DRIVEN, SKID MOUNTED, 150 KW, ALTERNATING CURRENT, TACTICAL MODEL D424A (6115-01-113-1093)



This copy is a reprint which includes current pages from Changes 1 through 9.

HEADQUARTERS, DEPARTMENT OF THE ARMY
18 OCTOBER 1982

CHANGE

NO. 9

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 3 APRIL 1992

Intermediate (Direct and General Support) Maintenance Manual

GENERATOR SET, GAS TURBINE ENGINE DRIVEN, SKID MOUNTED, 150 kW, ALTERNATING CURRENT, TACTICAL MODEL D424A (NSN 6115-01-113-1093)

Approved for public release; Distribution is unlimited

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Remove pages	Insert pages
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By Order of the Secretary of the Army:

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CHANGE

NO. 8

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Intermediate (Direct and General Support) Maintenance Manual

GENERATOR SET, GAS TURBINE ENGINE DRIVEN, SKID MOUNTED, 150 kW, ALTERNATING CURRENT, TACTICAL MODEL D424A (NSN 6115-01-113-1093)

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Intermediate (Direct and General Support) Maintenance Manual

GENERATOR SET, GAS TURBINE ENGINE DRIVEN, SKID MOUNTED, 150 kW, ALTERNATING CURRENT, TACTICAL MODEL D424A (NSN 6115-01-113-1093)

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Index 1 and Index 2	Index 1 and Index 2
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Intermediate (Direct and General Support) Maintenance Manual

GENERATOR SET, GAS TURBINE ENGINE DRIVEN,
SKID MOUNTED, 150 KW, ALTERNATING CURRENT,
TACTICAL MODEL D424A (6115-01-113-1093)

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CHANGE
No. 5

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 17 June 1988

Intermediate (Direct and General Support) Maintenance Manual

GENERATOR SET, GAS TURBINE ENGINE DRIVEN,
SKID MOUNTED, 150 KW, ALTERNATING CURRENT,
TACTICAL MODEL D424A (6115-01-113-1093)

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DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 2 September 1986

Intermediate (Direct and General Support) Maintenance Manual

GENERATOR SET, GAS TURBINE ENDINE DRIVEN,
SKID MOUNTED, 150 KW, ALTERNATING CURRENT,
TACTICAL MODEL D424A
(6115-01-113-1093)

TM 5-6115-598-34, 18 October 1982, is changed as follows:

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Index 1 and Index 2	Index 1 and Index 2
Index 5 and Index 6	Index 5 and Index 6

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CHANGE
No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 28 February 1986

Intermediate (Direct and General Support)
Maintenance Manual

GENERATOR SET, GAS TURBINE ENGINE DRIVEN,
SKID MOUNTED, 150 KW, ALTERNATING CURRENT,
TACTICAL MODEL D424A (6115-01-113-1093)

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Remove pages	Insert pages
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General, United States Army
Chief of Staff

Official:

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Brigadier General, United States Army
The Adjutant General

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CHANGE NO. 2

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Intermediate (Direct and General Support)
Maintenance Manual

GENERATOR SET, GAS TURBINE ENGINE DRIVEN,
SKID MOUNTED, 150 KW, ALTERNATING CURRENT,
TACTICAL MODEL D424A (6115-01-113-1093)

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Index 1 and Index 2	Index 1 and Index 2
Index 5 and Index 6	Index 5 and Index 6

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CHANGE
No. 1

HEADQUARTERS
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WASHINGTON, D.C., 19 May 1983

**Intermediate (Direct and General Support)
Maintenance Manual Generator Set, Gas Turbine Engine Driven,
Skid Mounted, 150 KW, Alternating Current,
Tactical Model D424A (6115-01-113-1093)**

TM 5-6115-598-34, 18 October 1982, is changed as follows:

1. Remove and insert pages as indicated below:

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By Order of the Secretary of the Army:

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General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-25D, Organizational Maintenance requirements for Generator Sets, Engine Driven, 150 KW 400 HZ Precise Power.

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 containing high voltage in each piece of equipment. Be careful not to contact high-voltage connections when installing or operating this equipment. Before working inside the equipment, turn power off and ground points of high potential before touching them.

For Artificial Respiration refer to FM 21-11.

WARNING

Deadly fumes are discharged by this equipment in operation. Death by suffocation may result if generator set is operated indoors without exhaust gases being ducted outdoors. Make sure that air intake is free of debris and is large enough not to restrict flow.

WARNING

Fire may be caused by spilled fuel. Serious burns may result from accidental ignition of fuel spilled when servicing fuel system components. Emergency fuels are particularly hazardous. Use a fuel catch pan when draining fuel from any fuel line or fuel system component. Be sure that area around fuel nozzle assembly is not contaminated by fuel when testing igniter or ignition exciter. Do not weld fuel tank unless tank has been properly purged.

WARNING

Exhaust heat is created by operation of the generator set. Severe burns may result from attempting to service any exhaust system component before allowing time for cooling after operation.

WARNING

Battery electrolyte must be handled with care to avoid acid burns from spillage of battery electrolyte. Do not add electrolyte to a battery that has been previously filled. Use care not to spill electrolyte on skin when checking liquid level and specific gravity of a battery with a hydrometer.

WARNING

Ensure all personnel are clear of any lifting or lowering operation where lifting device is required. Personal injury or death may occur if object falls during operation.

WARNING

Battery voltage may result in shock and flash burns if battery cables are not disconnected while servicing dc electrical system components. Disconnect battery cables before removing starter relay or starter. Disconnect negative cable first; reconnect positive cable first.

WARNING

This equipment develops noise which can cause permanent hearing loss if suitable ear protection devices are not worn by personnel near the operating generator set.

WARNING

Toxic solvent is used for general cleaning of the generator set. Illness or skin damage may be caused by prolonged breathing of solvent fumes or excessive skin contact with the liquid. Ensure there is adequate ventilation and avoid open flame or sparks when using flammable solvent.

WARNING

Remove watches, rings, and all other jewelry while working on or near this equipment. These items could result in injury or death to personnel, or damage to equipment.

WARNING

Do not touch spark igniter or ignition lead while motoring the engine. High voltage could cause serious injury or death.

WARNING

Do not operate generator set unless ground terminal stud is connected to a suitable ground. Electrical fault in generator set, load lines, or load equipment can cause severe injury or electrocution from contact with ungrounded system.

WARNING

Use care when using soldering or welding equipment. Do not watch welding process without proper eye protection. Severe eye damage or blindness could result. Severe burns could result from improper use of equipment.

WARNING

Ensure that suitable eye protection is worn when grinding. Metal particles created by grinding can cause severe eye damage.

WARNING

Do not try to troubleshoot the current transformers with the generator set running. An unloaded secondary winding of the current transformers will develop very high voltage which could cause damage to test equipment or loss of life.

WARNING

Use care when handling burner assembly parts; debris can cause infection if it enters eyes or open cuts.

WARNING

Lube oils MIL-L-23699 and MIL-L-7808 are highly toxic. Wash at once with soap and water if oil comes in contact with skin. If irritation occurs, get medical attention.

WARNING

Personal injury may result if disc separates from housing when removing or installing the regenerator housing. Remove housing from block only far enough to strap disc in place to prevent disc from falling from housing.

TECHNICAL MANUAL

TM 5-6115-598-34

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C.,18 October 1982

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INTERMEDIATE (DIRECT AND GENERAL SUPPORT) MAINTENANCE MANUAL

GENERATOR SET, GAS TURBINE ENGINE DRIVEN, SKID MOUNTED, 150 kW, ALTERNATING CURRENT, TACTICAL

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HOW TO USE THIS MANUAL

This manual provides information for use in maintaining the generator set at the direct and general support level. Maintaining the generator set includes troubleshooting procedures and maintenance procedures to correct a malfunction.

You must familiarize yourself with the maintenance procedures before beginning the maintenance tasks. Any maintenance task that is not described within this manual is considered a task that must be performed by a higher level of maintenance.

To help you become familiar with this new kind of manual as quickly as possible, spend some time looking through the pages. The manual has a new look that is very different from the look of the manuals you've been using. You'll find that it's a lot easier to use and you'll be able to find what you're looking for a lot faster. We got rid of as many words as we could and put in pictures to show you how to repair, replace, test, or service those item(s) and component(s) that are the responsibility of the direct and general support level technician. The following instructions provide a general description of the entire manual, special features and characteristics, and detailed information on how to use this manual.

MANUAL CONTENT

1. This manual consists of the following:

   a. Cover page index
   b. Warning pages
   c. Table of contents
   d. How to use this manual
   e. Chapters 1 through 13
   f. Appendixes A through C
   g. Index

2. Further explanation of the manual contents follows.

   a. Chapter 1. Introduction. Contains general information regarding the complete generator set.

   b. Chapter 2. General Maintenance Instructions contains repair parts, special tools, test, measurement and diagnostic equipment and special support equipment. Troubleshooting covering those malfunctions not covered by the operator/organizational manual is included. Additional items in this chapter are general maintenance instructions and procedures for the removal and installation of major components.

   c. Chapters 3 through 12. Maintenance Instructions. Contains detailed maintenance procedures for direct and general support.

   d. Chapter 13. Lists test and inspection requirements after repair.

   e. Appendix A contains references to all forms and publications referred to in this manual.

f. Appendix B contains the Expendable Supplies and Materials List.

g. Appendix C contains the Additional Authorization List.

h. An Index lists all subjects in the manual in alphabetical order.

3. The intent of this new format is to provide you with a manual that will let you do your job quickly, easily and with a minimum of confusion. The maintenance tasks in chapters 3 through 12 are arranged in modules. Each module contains all the information you need to do a complete task. The illustrations associated with the task will be on the same page or a facing page where possible, making it easy for you to match the illustrations with the text.

The following is an example of a task and how the maintenance information is provided.

TM 5-6115-598-34

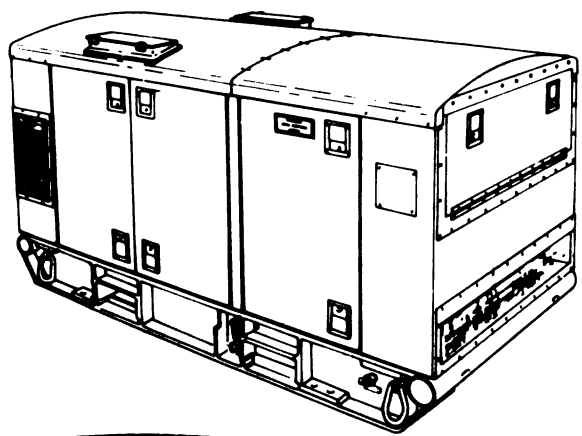
TECHNICAL MANUAL

INTERMEDIATE

(DIRECT AND GENERAL SUPPORT)

MAINTENANCE MANUAL

GENERATOR SET,
GAS TURBINE ENGINE DRIVEN,
SKID MOUNTED,
150 KW,
ALTERNATING CURRENT,
TACTICAL
MODEL D424A
(6115-01-113-1093)



a. On the right side of the cover you will see an index with black tabs as shown below.

b. You then go down the index and find the title "DC Electrical & Control System".

c. Then you open the manual by using the black tab on the side of the manual that is aligned with the black tab on the cover.

d. On the first page of the chapter you will see a chapter index (chapter 4 index is reproduced below). Notice that the maintenance tasks are listed in alphabetical order.

TM 5-6115-598-34

CHAPTER 4

MAINTENANCE OF DC ELECTRICAL AND CONTROL SYSTEM

e. Find the subject "T4 Single Element Thermocouple Assembly"; then look to the right and in line with the subject and you will see 4-5 in the Para column.

f. You then turn to paragraph 4-5.

TM 5-6115-598-34

4-5. T4 SINGLE ELEMENT THERMOCOUPLE ASSEMBLY

This task covers:

a. Inspection b. Test c. Removal d. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

Tool Kit, Master Mechanics (5180-00-699-5273)
5/16 open end wrench
3/8 combination wrench
5/8 combination wrench
11/32 open end wrench
7/16 socket
3/8-dr ratchet handle
5-in. extension
Putty knife

Materials/Parts

Tags (item 24, appx B)
Adapter block to engine block gasket

Personnel Required

Utilities Equipment Repairer MOS 52C

Troubleshooting References

Item	Step	Table
38	1	2-5
46	8	2-5

Equipment Condition

Para	Condition Description
4-13*	Front roof removed.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS

g. Notice that the title of paragraph 4-5 is "T4 Single Element Thermocouple Assembly"; then if you look just below the title you will see the block entitled "This task covers: a. Inspection, b. Test, c. Removal, d. Installation." You now know that this paragraph covers the inspection, test, removal, and installation of the thermocouple assembly.

h. If you continue down the page to "INITIAL SETUP", you would find any or all of the following headings, depending on which applies to the task being performed.

(1) Test Equipment
(2) Special Equipment
(3) Tools
(4) Materials/Parts
(5) Personnel Required
(6) References
(7) Troubleshooting References
(8) Equipment Condition
(9) Special Environmental Conditions
(10) General Safety Instructions

i. Notice that in the "INITIAL SETUP" headings, items (2), (6), (9), and (10) are missing. This means that you do not need any special equipment and no special enviromental conditions or general safety instructions are required. Special environmental conditions are provided when it is necessary to provide special conditions such as a dust-free, air conditioned area to perform the task. General safety instructions are provided when it is necessary for you to observe any general safety information that applies throughout the procedures. Warnings and cautions are provided in the procedure for special safety information that applies to a particular step.

j. Under "Test Equipment" you see that you will need a digital multimeter to test the thermocouples.

k. Under "Tools", you see that you will need a 3/8 in. and 5/8 in. combination wrench, a 5/16 in. and 11/32 in. open end wrench, a 3/8 drive ratchet handle, 7/16 in. socket, 5-in. extension and a putty knife.

l. Under "Materials/Parts", you see that you will need tags and gaskets to complete the work. The tags are used to identify electrical leads when they are disconnected and the new gaskets are used when installing parts on engine.

m. Under "Personnel Required," you see that the work is to be done by a Turbine Engine Driven Generator Repairer, MOS52F.

n. Under "Troubleshooting References", you see that there are procedures in the troubleshooting section that are related to this maintenance task. If you encounter problems, you will want to consult item 38, step 1, in troubleshooting table 2-5.

o. Under "Equipment Condition", you see that the front roof of the generator set must be removed before attempting this procedure, and that instructions for removal can be found in para 4-13 of TM 5-6115-598-12.

p. After you have the tools at hand, and have performed the procedures to set up the equipment condition, you are ready to go to the Inspection, Test, Removal, and Installation procedures located just below the INITIAL SETUP block.

q. The procedures are arranged in four columns with the following headings:

LOCATION, ITEM, ACTION AND REMARKS

r. In the LOCATION column, you will find the location for the parts listed in the ITEM column.

s. In the ITEM column, you will find the part or parts that you will take some action on.

t. In the ACTION column, you will find the action that you are to take on the item or items.

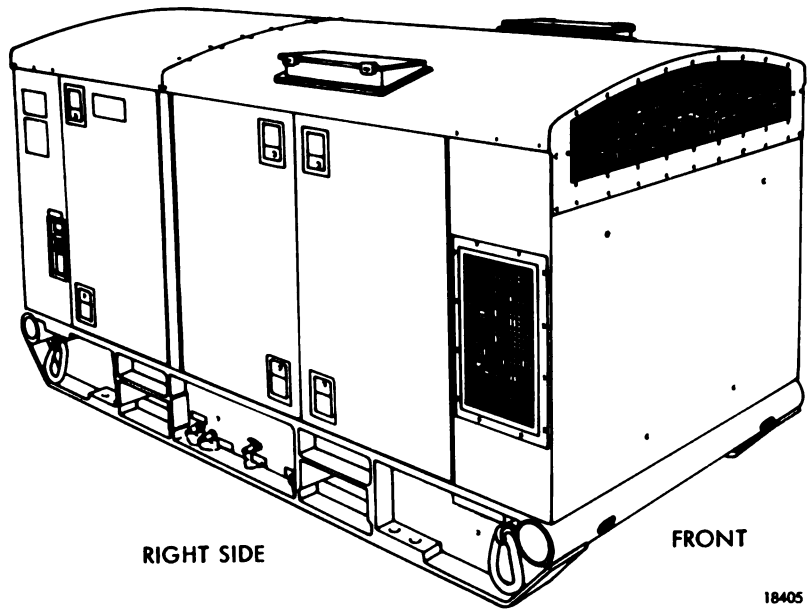
u. The REMARKS will provide you with additional information that will help you to perform the step or to understand better what is being done.

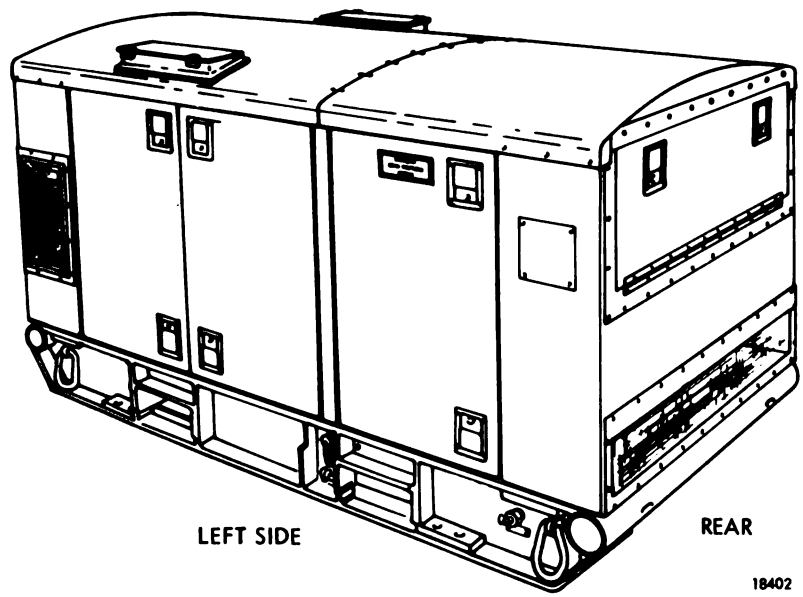
v. Begin by reading under each column heading from the left to right. To the far left you will find the number "1". This is step 1 of the Inspection procedure. All other steps follow in numerical order.

w. The LOCATION column tells you where to find the four T4 thermocouples found in the ITEM column. The ACTION column tells you what to look for in your inspection and the REMARKS column what to do if damage is found.

x. Notice that on the page opposite the procedure is an illustration that shows you where the items are that you are working on. This illustration is provided to help you see what you are doing in this task.

Now look at other maintenance tasks in this manual and see how the information you need is presented. You will find that all the maintenance tasks are presented in a similar manner.





CHAPTER I
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE

a. Type of Manual. Intermediate (Direct and General Support) Maintenance Manual.

b. Model No. and Equipment Name. Model D424A generator set, electric, transportable, gas turbine engine driven, skid mounted, 150 kW, 400 Hertz, alternating current, tactical, for ground power application.

c. Purpose of Equipment. Generates 400 Hertz, 208 volts ac line-to-line, 120 volts ac line-to-neutral, 3 phase electric power, 0.8 power factor (pf) (lagging).

d. Special Limitations on Equipment. Rated for 150 kW load, 520 ampere (current) load per phase.

NOTE

The contents of this manual will be followed if in conflict with the contents of any referenced document.

1-2. MAINTENANCE FORMS AND RECORDS

Maintenance forms and records used by Army personnel are prescribed by DA PAM 738-750, The Army Maintenance Management System.

1-3. REPORTING OF ERRORS

Reports of errors, omissions, and recommendations for improvement of this publication by the individual user is encouraged. Reports should be submitted as follows: Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to Commander, U.S. Army Troop Support Command, ATTN: AMSTR-MCTS, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798.

1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR's)

EIR's can and must be submitted by anyone who is aware of an unsatisfactory condition with the equipment design or use. It is not necessary to show a new design or list a better way to perform a procedure, just simply tell why the design is unfavorable or why a procedure is difficult. EIR's may be submitted on SF 368. Mail directly to Commander, U.S. Army Troop Support Command, ATTN: AMSTR-QX, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. A reply will be furnished to you.

1-5. LIST OF ABBREVIATIONS

AAL	Additional Authorization List	cont	continued
AL	alumel	CR	chromel
AN	Army (Air Force)-Navy	CT	current transformer
approx	approximately	cv	clutch valve
appx	appendix	cw	clockwise (right)
assy	assembly	DA	Department of the Army
ATE	automatic test equipment (simulator)	dr	drive
		DMWR	Depot Maintenance Work Requirement
attn	attention		
CB	circuit breaker	ea	each
ccw	counterclockwise (left)	ECA	electronic control assembly
COEIL	Components of End Item List	EIR's	Equipment Improvement Recommendations

1-5. LIST OF ABBREVIATIONS (cont)

ES&ML	Expendable Supplies and Material List
FO	foldout
FSCM	Federal Supply Code of Manufacturers
FSV	3-way solenoid
FV	fuel metering valve
gen	generator
GND	ground
hsg	housing
HOT	high oil temperature switch
Hz	Hertz
IGN	ignition
L1	Line 1
L2	Line 2
L3	Line 3
LH	left hand
LO	Lube Order
LOP	low oil pressure switch
MAC	Maintenance Allocation Chart
max	maximum
mfg	manufacture
MIL	military
min	minimum or minute
MS	Military Standard
N1	gasifier rotor speed
N2	power turbine rotor speed
NC	normally closed
NLO	no light off
NO	normally open
No.	number(s)
NSN	National Stock Number
P/N	part number
para	paragraph(s)
pf	power factor
ph	phase
PMCS	Preventive Maintenance Checks and Services
pot	potentiometer
pr	pair
pt	pint
reqd	required
RH	right hand
rl	roll
SN	starter solenoid
spec	Specification
sync	synchronize
STD	standard
TC	thermocouple
TB	terminal board
TM	Technical Manual
TMDE	test measurement and diagnostic equipment
T1	T1 sensor
U/M	Unit of measure
wt	weight

1-6. CATEGORIES OF MAINTENANCE ACCOMPLISHMENT

Refer to the Maintenance Allocation Chart (MAC) (appx B, TM 5-6115-598-12) for tasks and categories of maintenance to be performed.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-7. EQUIPMENT DESCRIPTION

a. The generator set is a transportable, electric power generating system. It can be easily moved to a selected site to provide 208/120 volts ac, 3-phase, 400 Hz electric power.

b. Refer to TM 5-6115-598-12 for equipment description.

1-8. EQUIPMENT DATA

The following tabular listing presents electric performance characteristic parameters for this generator set.

Table 1-1. Electric Performance Characteristics Parameters

Characteristics	Parameters	Test Method MIL-STD-705
a. Voltage characteristics		
1. Regulation	1%	608.1
2. Steady-state-stability (variation) (rated)		
(a) Short term (30 sec)	1%	608.1
(b) Long term (4 hr)	1%	608.2
b. Frequency characteristics		
1. Regulation	0.3%	608.1
2. Steady-state-stability (variation) (rated)		
(a) Short term (30 sec)	0.5%	608.1
(b) Long term (4 hr)	1%	608.2

CHAPTER 2

GENERAL MAINTENANCE INSTRUCTIONS

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

2-1. REPAIR PARTS

Repair parts and equipment are listed and illustrated in the Repair Parts and Special Tools List, TM 5-6115-598-24P.

2-2. TOOLS AND EQUIPMENT

a. Special tools, test, and support equipment are listed in Table 2-1.

Table 2-1. Special Tools, Test, and Support Equipment

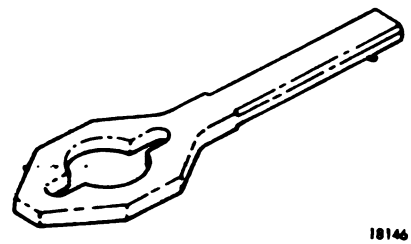
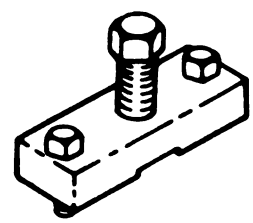
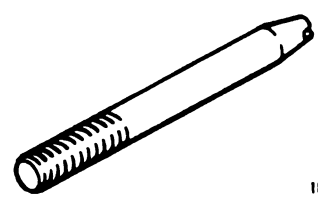
Item	NSN or Reference No.	Reference Para No.	Use
HOLDER, Alternator drive coupling	23005032 (63005)	2-14, 2-15, 4-7	Remove drive coupling from alternator and turn coupling
	 18146		
PULLER, Alternator drive coupling	23005033 (63005)	4-7	Remove drive coupling from alternator
	 18147		
PIN, Regenerator cover alignment	23005034 (63005)	9-3	Guide installation of regenerator cover
	 18148		

Table 2-1. Special Tools, Test, and Support Equipment (cont)

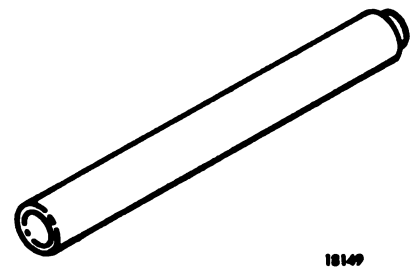
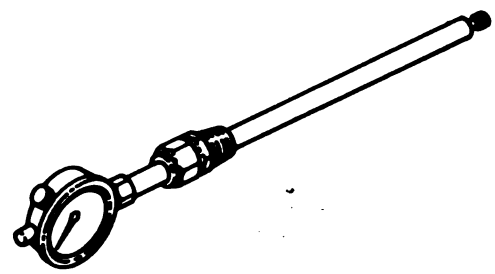
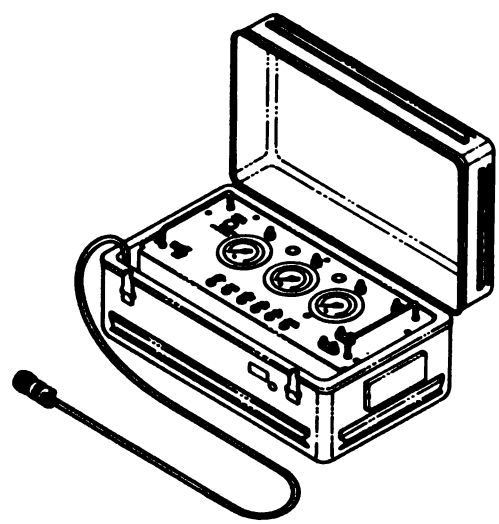
Item	NSN or Reference No.	Reference Para. No.	Use
INSTALLATION TOOL, Regenerator seal retaining ring	23005035 (63005)	9-3	Install regenerator seal retaining ring
	 18149		
INDICATOR, Generator shaft runout dial	23005042 (63005)	2-14, 2-15	Align generator to engine
	 18156		
TEST SET, AN/TJM-3 Monitor	23005047 (63005)	2-3	Troubleshoot engine
	 18758		

Table 2-1. Special Tools, Test, and Support Equipment (cont)

Item	NSN or Reference No.	Reference Para. No.	Use
Deleted			
LIFT, Regenerator cover and disc (roof on)	6899906 (63005)	9-3	Lift regenerator cover and disc

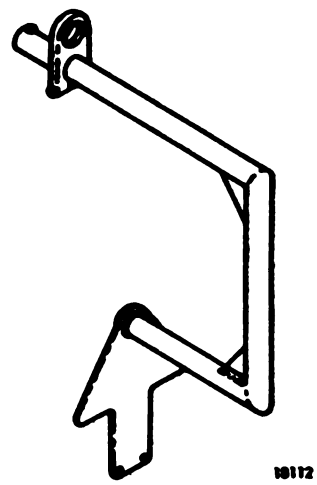
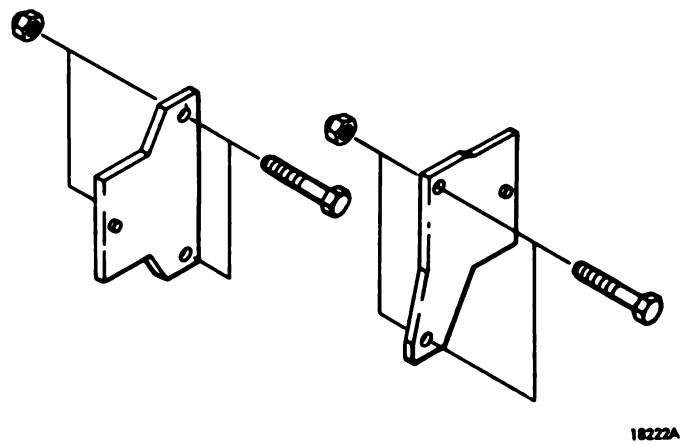


Table 2-1. Special Tools, Test, and Support Equipment (cont)

Item	NSN or Reference No.	Reference Para. No.	Use
PLATE ASSEMBLY, Regenerator cover mounting	23003187 (63005)	9-3	Adapts regenerator cover to stand



STAND, Regenerator cover	23003038 (63005)	9-3	Supports regenerator cover and disc

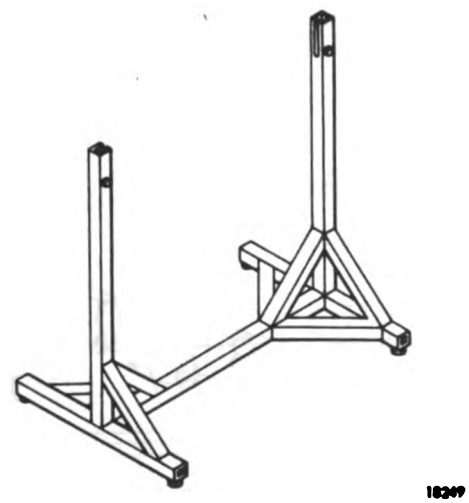
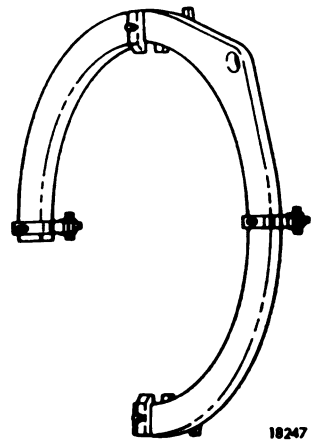
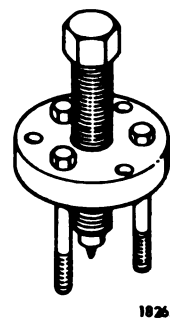


Table 2-1. Special Tools, Test, and Support Equipment (cont)

Item	NSN or Reference No.	Reference Para. No.	Use
LIFT Regenerator disc	23004192 (63005)	9-3	Lift regenerator disc
PULLER, Regenerator pinion drive shaft gear and worm gear	23003684 (63005)	9-6	Pull gears from housing or shaft
LIFT, Engine	23004174 (63005)	2-14, 2-15	Lift and remove engine





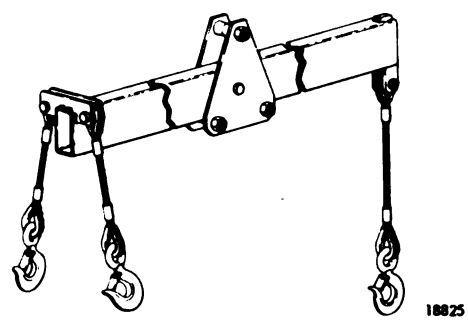
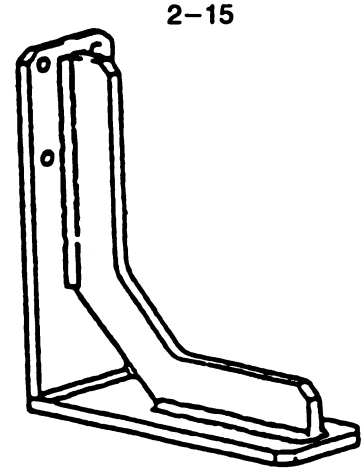
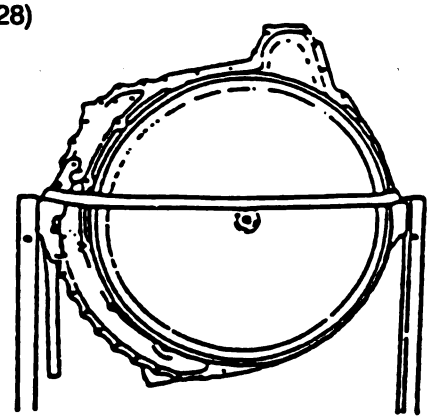


Table 2-1. Special Tools, Test and Support Equipment (Cont)

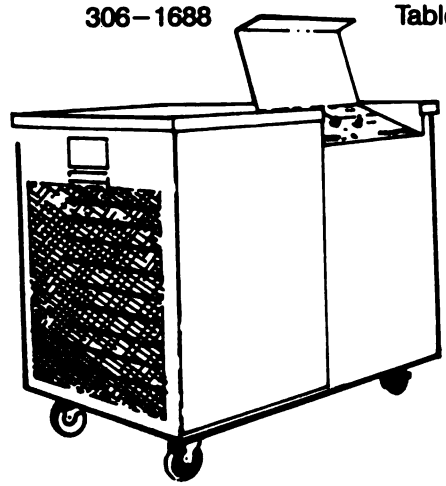
Item	NSN or Reference No.	Reference Para. No.	Use
SUPPORT, Generator Set engine-to-base	23006349 (63005)	2-15	Support engine enclosure with main alternator removed



STRAP Regenerator disc holder (2)	9592N13 (39428)	9-3	Hold disc to housing



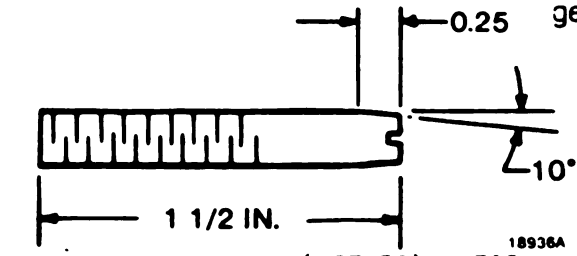
LOAD BANK, Electrical	6150-01-306-1688	2-11, Item 49 Table 2-5, Item 49	Verify kW output



b. Fabricated Tools and Equipment are listed in table 2-2.

Table 2-2. Fabricated Tools and Equipment

Item	Reference Para. No.	Use
GUIDE PIN, Engine to generator	2-14, 2-15	Guide installation of generator

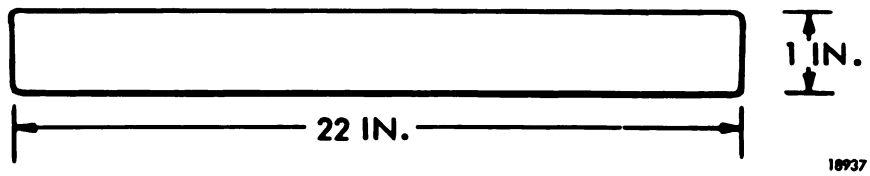


BOLT P/N 11500833 (METRIC) 1 EACH

1. Cut bolt head off 1 1/2 inches (38 mm) from threaded end of bolt.
2. Cut screwdriver slot in end of bolt approx 1/8-in. (3 mm) deep and 1/16-in. (1.5 mm) wide.
3. Cut taper at slotted end, 1/4-in. long X 10°.
4. Grind cut end of bolt to remove sharp corners.

Table 2-2. Fabricated Tools and Equipment (cont)

Item	Reference Para. No.	Use
PRYBAR	2-14, 2-15	Align generator coupling to engine



PRY BAR (ALUMINUM OR BRASS) 2 EACH

1. Cut one inch (25.4 mm) diameter stock to 22 inches (559 mm) long.
2. Grind ends to remove sharp corners.

JUMPER WIRE	4-9	Jumper pins in connectors

JUMPER WIRE (16 GAGE) 4 EACH

1. Cut 16 gage insulated electric wire to 10 inches (254 mm) long.
2. Strip wire ends 1/4 inch (6 mm).
3. Install shrink sleeving on each end of wire.
4. Install wire in socket type connector and solder.
5. Move sleeving over soldered connection and heat shrink.

Section II. OPERATION OF MONITOR TEST SET

2-3. DESCRIPTION

a. The monitor test set monitors test voltages from the engine electronic control assembly (ECA). The unit provides valuable diagnostic information for trouble analysis of the GT404-4 turbine engine. The test set checks the following engine conditions:

(1) N1 speed (gasifier rotor)

(2) N2 speed (output shaft)

(3) T4 temperature

(4) Clutch valve current

(5) Fuel valve current

(6) Engine shutdown causes:

No light off (NLO)
Over crank
N1 under speed
N2 over speed
T4 over temperature
A failed sensor (T4/N2)

b. Three meters, located on control panel, display engine operating parameters.

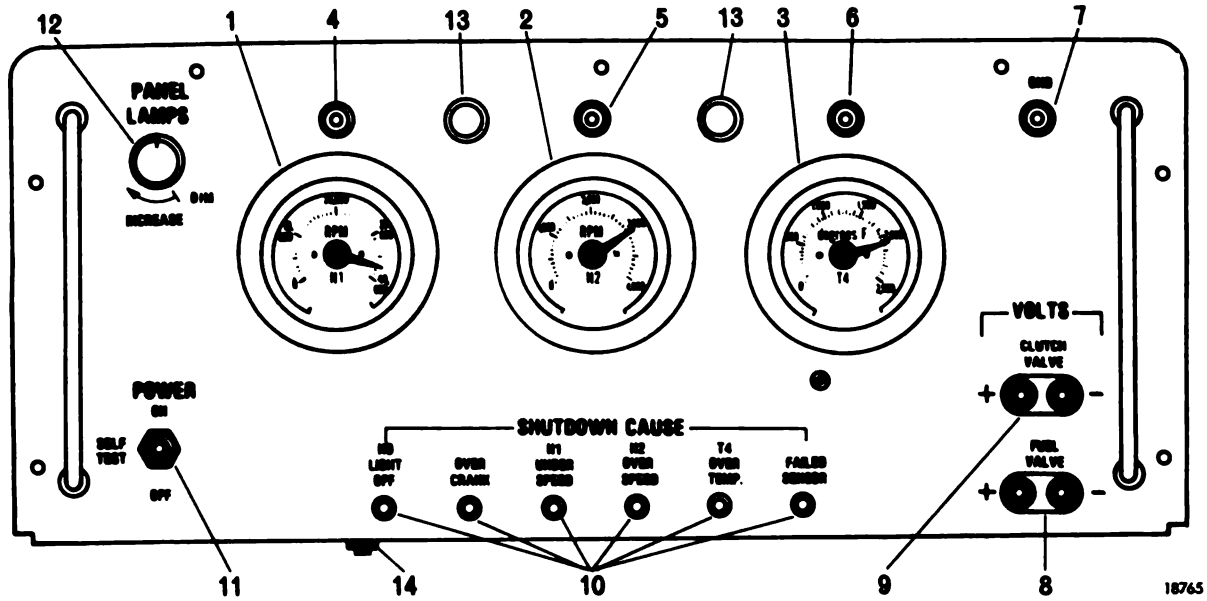
(1) N1 meter (1) indicates engine gasifier rotor speed in revolutions per minute (rpm).

(2) N2 meter (2) indicates engine output shaft speed in revolutions per minute (rpm).

(3) T4 meter (3) indicates engine temperature in degrees Fahrenheit.

c. Terminal binding posts are provided for checking clutch valve current, fuel valve current, calibration and recording of meters.

(1) N1 meter binding post (4) is used if calibration or recording of meter (N1) is required.



(2) N2 meter binding post (5) is used if calibration or recording of meter (N2) is required.

(3) T4 meter binding post (6) is used if calibration or recording of meter (T4) is required.

(4) Ground binding post (7) is used as a ground (-) when calibrating or recording individual meters N1, N2 or T4.

(5) Fuel valve binding posts (8) are used for measuring a signal (in millivolts) that represents fuel valve current.

(6) Clutch valve binding posts (9) are used for measuring a signal (in millivolts) that represents clutch valve current.

d. There are six shutdown lamps (10), indicating engine shutdown cause, located at lower center of panel. Lamps are normally OFF. Lamp ON indicates cause of shutdown.

e. A three-position POWER switch (11), located on lower left side of panel, places the set in the self test mode and turns the panel lights (13) on and off.

(1) POWER ON turns panel lights (13) on.

(2) SELF TEST position of switch is for checking of test set shutdown lights, meters, test jacks and panel lights.

(3) POWER OFF turns panel lights (13) off.

2-3. DESCRIPTION (cont)

f. A PANEL LAMPS rheostat (12), located in upper left of panel, controls the brightness of the two panel lights (13).

g. An integral cable with an MS connector connects the test set to the engine Electronic Control Assembly (ECA). Input power to test set is obtained from the connection to the ECA.

h. A circuit breaker (14) is a single pole, thermal type that features a reset button. It cannot be pulled out manually to disconnect the circuit. When an overload occurs, the reset button extends causing a red band to appear.

2-4. PRETEST PROCEDURE

a. Depress valve (15) to release pressure.

b. Loosen 4 latches (16) and remove cover.

c. Inspect cable connector (17) for broken pins, damaged or loose attachment to cable.

d. Inspect cable for damaged covering or broken wires at connector and control panel.

e. Inspect meters (1, 2, and 3) for broken glass, damaged faces or indicators. Check calibration sticker.

f. Inspect fuel valve (8) and clutch valve (9) binding posts for damage or loose mounting.

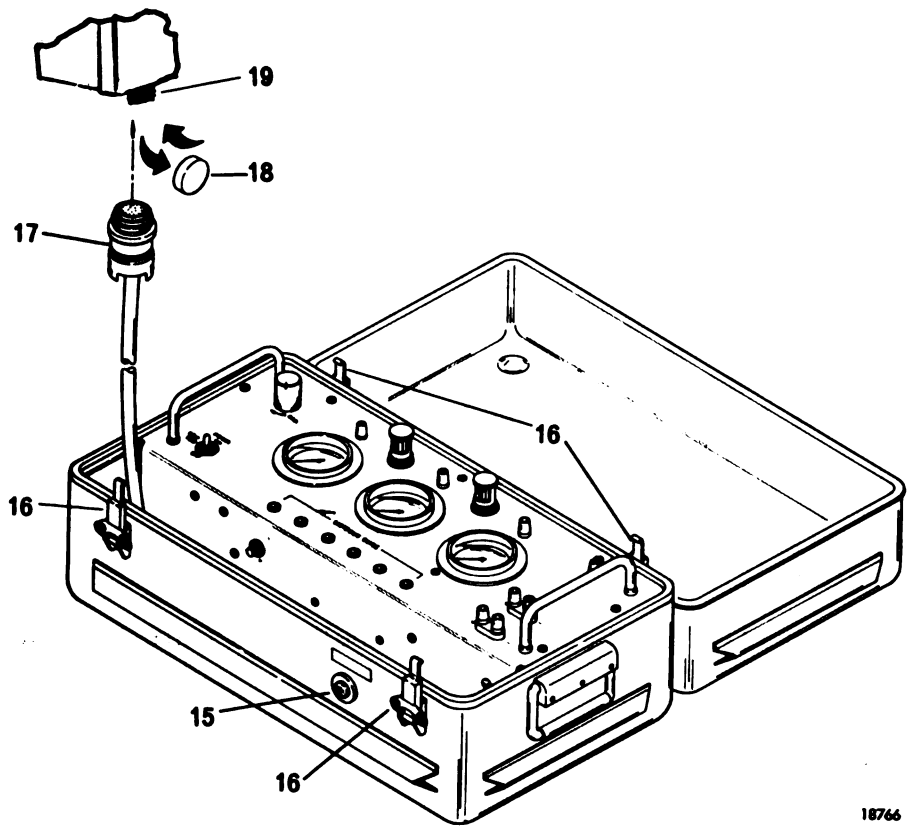
g. Place power switch (11) to OFF position.

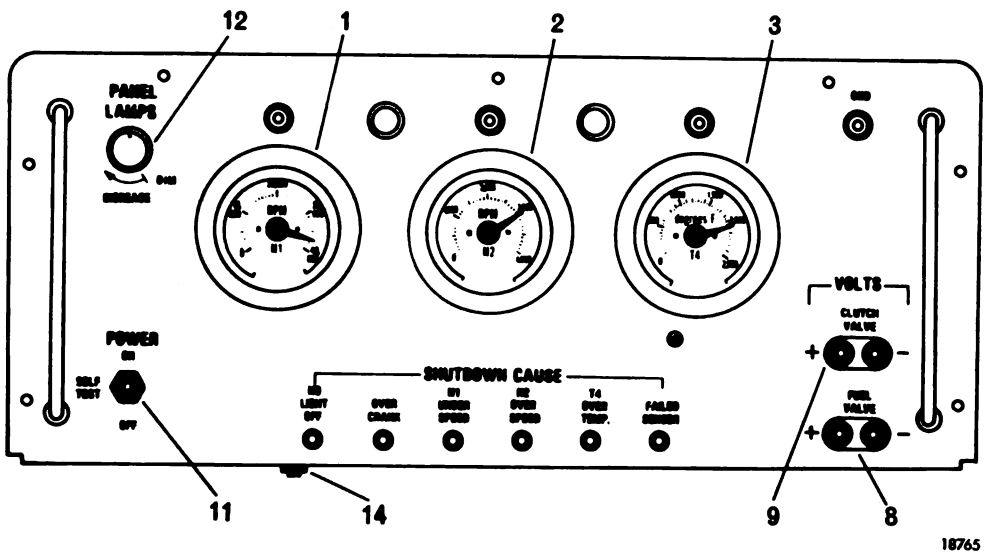
h. Remove cap (18) from ECA J4 connector(19)and connect cable connector (17).

2-5. SELF-TEST PROCEDURE

a. Open generator set control panel outer door and move MASTER switch to RUN position.

b. Place POWER switch (11) to SELF TEST position.





2-5. SELF-TEST PROCEDURE (cont)

c. Adjust PANEL LAMPS rheostat (12) for desired brightness.

d. The N1 meter (1), N2 meter (2), and T4 meter (3) should read as follows:

N1	37000 ± 2000 rpm
N2	3000 ± 150 rpm
T4	2000 ± 100°F

e. Set digital multimeter to 2.0 volt dc range and connect leads to FUEL VALVE and then to CLUTCH VALVE test points (8) and (9). Readings should be 300 ± 15 mv.

NOTE

If readings are not within limits, replace test set with serviceable unit.

f. Place POWER switch (11) to ON position if panel lights are needed.

2-6. ENGINE TEST PROCEDURE

a. Start engine per paragraph 2-2 and 2-3, TM 5-6115-598-12.

b. Check N1 and N2 speeds and T4 temperature on test set.

c. Check SHUTDOWN CAUSE lamps for cause of malfunction.

d. Set digital multimeter to 2.0 volt dc range and connect leads to FUEL VALVE and then to CLUTCH VALVE test points (8) and (9). Readings should be 300 ± 15 mv.

e. Move POWER switch (11) to OFF position to turn off panel lights.

f. Shut down generator set.

g. Disconnect test set cable connector (17) from J4 connector (19). Wipe cable with clean dry cloth and store in test set case.

h. Install cap (18) on J4 connector (19) and tighten cap.

CAUTION

Be sure test set and cover are dry before replacing cover. Moisture inside test set may damage the equipment.

i. Install cover on test set and secure with 4 latches (16).

Section III. OPERATION OF ELECTRICAL SIMULATOR TEST SET

2-7. DESCRIPTION

a. The electrical simulator test set is used to test the electronic control assembly (ECA) to fault isolate to any one of the eleven circuit boards in the ECA. The ECA must be removed from the generator set and should be located at a site where the test set and ECA can rest on a test bench. 115 volts ac, 50-400 Hz must be available to power the test set.

b. Two modes of operation are available for testing the ECA. The modes are AUTO-CONTINUOUS and AUTO-SINGLE STEP. The selection of operating mode by the operator is dependent upon the desired test sequence format. The following describes the operating modes.

(1) Auto-Continuous Mode. The simulator test set performs the checkout of the ECA starting at the first selected TEST # and continues until the end of the test program. If the test of the ECA was completed without failure, a PASS condition will be displayed. If the ECA failed one of the tests, the test program will stop at the failed TEST # and the suspect board will be displayed. The DATA DISPLAY will also indicate the failed TEST # and circuit board of the ECA.

(2) Auto-Single Step Mode. The simulator test set will run only the TEST # selected and then the test program will stop. The results of the test will be displayed on the DATA DISPLAY of the test set, in the same manner as in the Auto-Continuous mode. The Auto-Single Step mode is effectively utilized after a failed condition in Auto-Continuous mode is corrected and a repeat check of that particular failed test is desired.

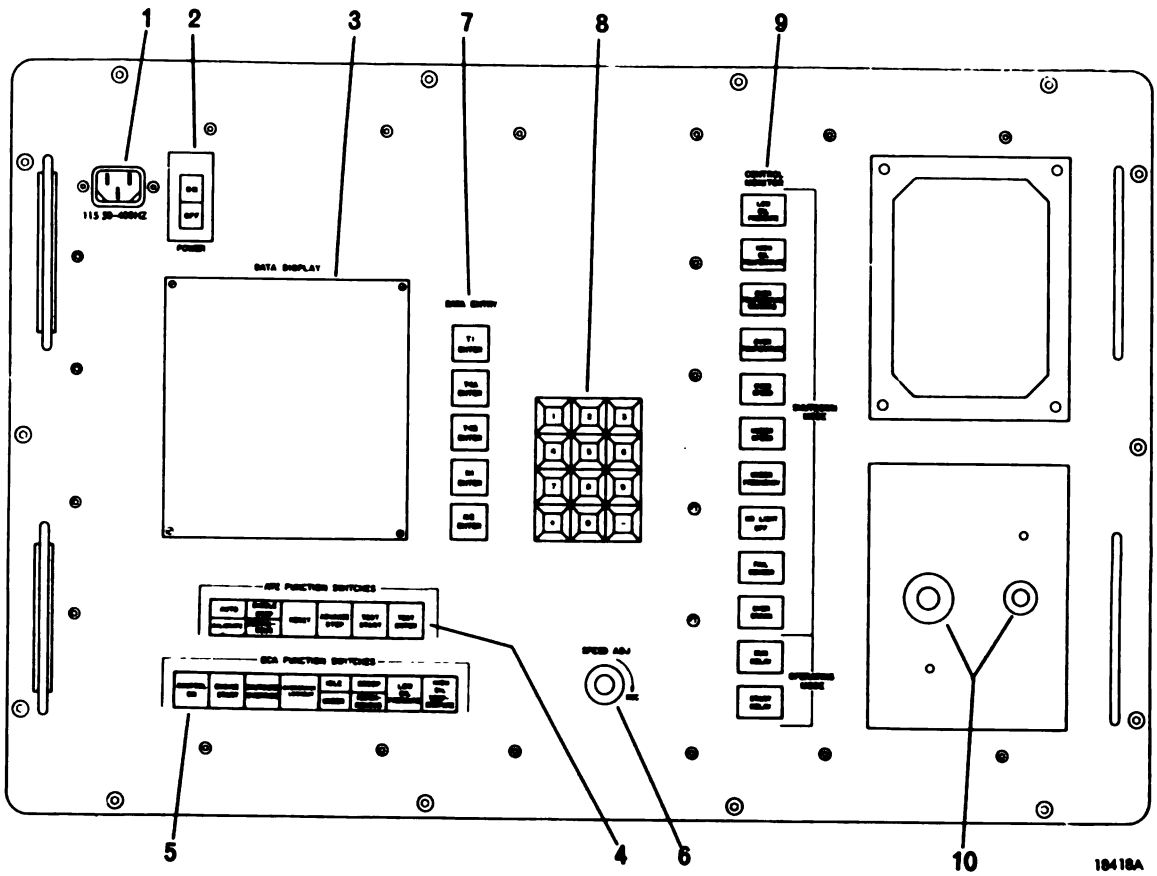
c. Table 2-3 describes the controls and indicators and the function of each.

d. The procedures that follow describe:

(1) Self test of the test set.

(2) Test set hookup.

(3) Auto-continuous and Auto-single step testing modes.



NOTE

The numbers on this illustration relate to key numbers in Table 2-3.

NOTE

A description and use of the controls and indicators of the simulator follows. The operating modes for testing and fault isolation of the circuit boards of the ECA are presented in a step-by-step procedure. The purpose of the modes of testing the ECA will be described briefly. Table 2-3 illustrates and describes the controls and indicators on the front panel of the simulator.

2-8. PRESTART PROCEDURE

Table 2-3. Simulator Controls and Indicators

Key	Control or Indicator	Function
1	115V, 50-400 Hz power cord adapter	Power cord supplied with test set connects between 115V, 50-400 Hz power cord adapter and an electrical outlet with 115 volts ac, 50-400 Hz.
2	POWER ON/OFF switch and circuit breaker	Placed in the ON position, the switch indicator will light. When an overload condition occurs the circuit breaker will interrupt power and move the POWER ON/OFF switch to the mid mechanical position (between ON/OFF). To reset the circuit breaker, place in the OFF position and then back to the ON position.
3	DATA DISPLAY	Contains six lines of alpha-numerical display information. The lines consist of the following: TEST #, PASS/FAIL, defective circuit boards, and operator instructions and test signal parameters which are displayed in all modes of operation. The test signal parameter information is also routed to the ECA.
4	ATE function switches	Select and control the operating modes. The double function switches are alternate action and illuminate the function selected.
	AUTO/CALIBRATE switch	AUTO mode, all test signal parameters and ECA status decisions are controlled and monitored by the simulator. CALIBRATE mode, all test signal parameters must be entered and ECA status decisions made by the operator. (Used only at Depot for test set check out.)

Table 2-3. Simulator Controls and Indicators (cont)

Key	Control or Indicator	Function
4 (cont)	SINGLE STEP/ CONTINUOUS switch	SINGLE STEP, performs only the test number selected. CONTINUOUS, performs from the first test number selected to the end of the program or until fail condition is encountered.
	RESET switch	Clears all test signal parameters and halts the test program.
	ADVANCE STEP switch	Used to advance the test number to a new starting location.
	TEST START switch	Informs the simulator to start the test program sequence.
	TEST ENTER switch	Informs the simulator to accept the test number that was entered on the keyboard.
5	ECA function switches	Illuminate when activated in either the AUTO or CALIBRATE position.
	CONTROL ON switch	Routes 24 volt dc, 5 amp power to the ECA.
	ENGINE START switch	Informs ECA to begin engine start sequence.
	SHUTDOWN OVERRIDE switch	Prevents ECA from shutting down engine when fault occurs.
	OVERCRANK LOCKOUT switch	Overrides certain functions for ECA testing.

Table 2-3. Simulator Controls and Indicators (cont)

Key	Control or Indicator	Function
5 (cont)	IDLE/RATED switch	Switches ECA between idle and rated speed modes.
	DROOP/ISOCHRONOUS switch	Switches ECA between DROOP controlling and ISOCHRONOUS controlling.
	LOW OIL PRESSURE switch	Simulates a low lube oil pressure condition of engine in ECA.
	HIGH OIL TEMPERATURE switch	Simulates high lube oil temperature condition of engine in ECA.
6	SPEED ADJ control	Enables operator to vary speed setting in CALIBRATE mode only. (Used at depot.)
7	CALIBRATE data entry switch	Transfers data that was entered into keyboard.
	T1 ENTER switch	To T1 (inlet temperature) simulator circuit.
	T4A ENTER switch	To T4A temperature simulation circuit.
	T4B ENTER switch	To T4B temperature simulation circuit.
	N1 ENTER switch	To N1 speed simulation circuit.
	N2 ENTER switch	To N2 speed simulation circuit.
8	Keyboard	Allows operator to enter numeric value into test set.

Table 2-3. Simulator Controls and Indicators (cont)

Key	Control or Indicator	Function
9	SHUTDOWN AND OPERATING MODE indicator	Indicates status of the incoming ECA signals.
	LOW OIL PRESSURE indicator	Indicates low lube oil pressure shutdown has occurred.
	HIGH OIL TEMPERATURE indicator	Indicates high lube oil temperature shutdown has occurred.
	OVER TEMPERATURE WARNING indicator	Indicates T4 temperature is higher than normal.
	OVER TEMPERATURE indicator	Indicates T4 temperature is high enough that shutdown has occurred.
	OVER SPEED indicator	Indicates that speed was high enough that shutdown has occurred.
	UNDER SPEED indicator	Indicates that speed was too low and shutdown occurred.
	UNDER FREQUENCY indicator	When illuminated, generator frequency is correct.
	NO LIGHT OFF indicator	Indicates engine did not light off.
	FAIL SENSOR indicator	Indicates one or more input sensors failed.
	OVER CRANK indicator	Indicates start relay didn't drop out in time.

Table 2-3. Simulator Controls and Indicators (cont)

Key	Control or Indicator	Function
9 (cont)	RUN RELAY indicator	Indicates run relay energized.
	START RELAY indicator	Indicates start relay energized.
10	Cables W1 & W2	Routes signal parameters and receives responses from the ECA.

NOTE

Test to fault isolate circuit boards will be performed while ECA is removed from generator set at a site where tester (simulator) and ECA can rest on test bench. 110 volts ac, 50-400 Hz must be available to power simulator.

a. Remove 3 connectors (1) and 4 nuts (2) and washers (3).

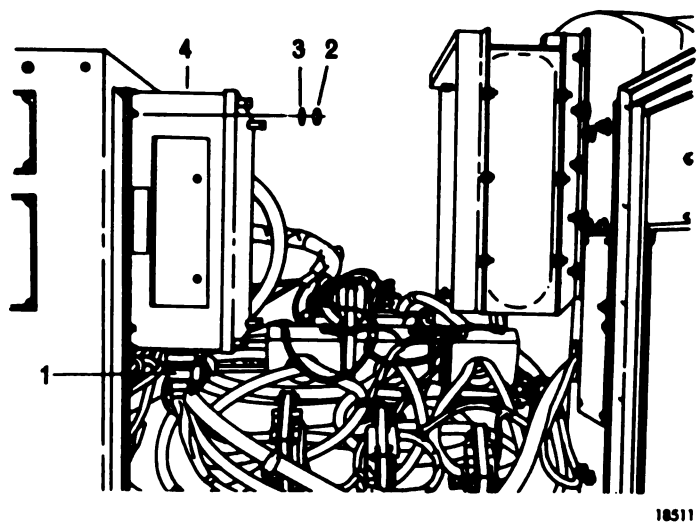
b. Remove ECA (4) and place on work bench.

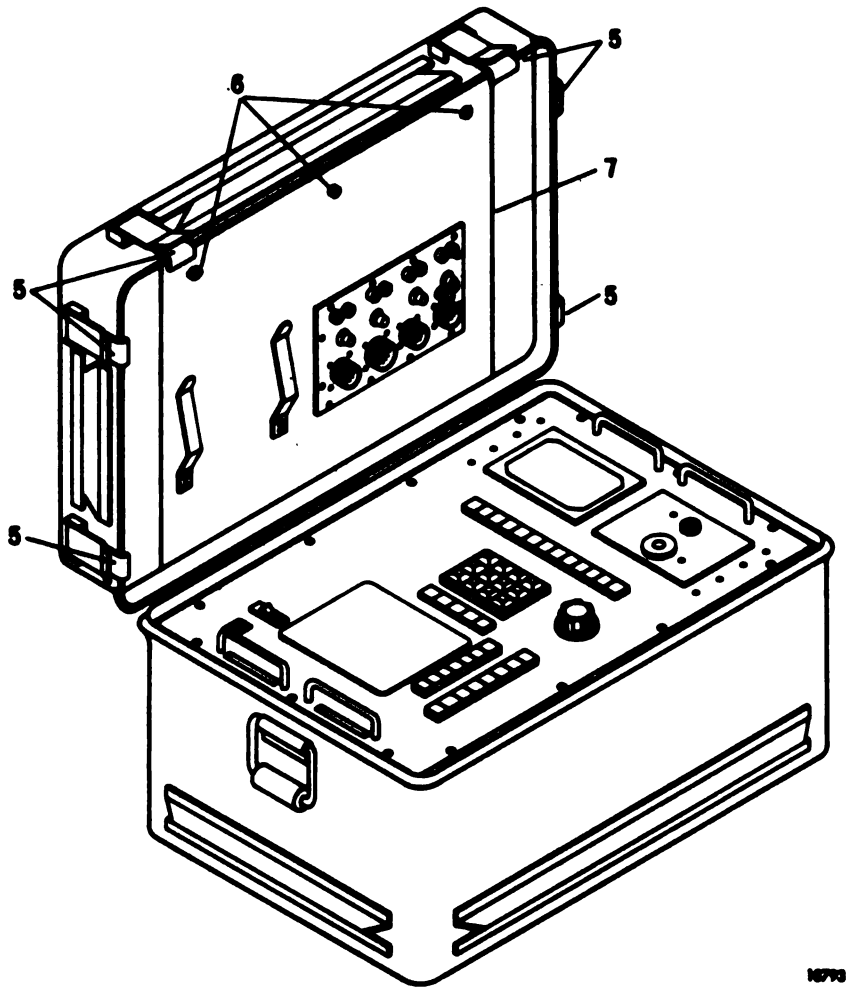
c. Position simulator test set on bench beside ECA.

d. Release 6 latches (5) and open lid.

e. Loosen 3 screws (6) and open panel (7).

f. Remove cable assemblies from panel. Close panel and tighten 3 screws (6).





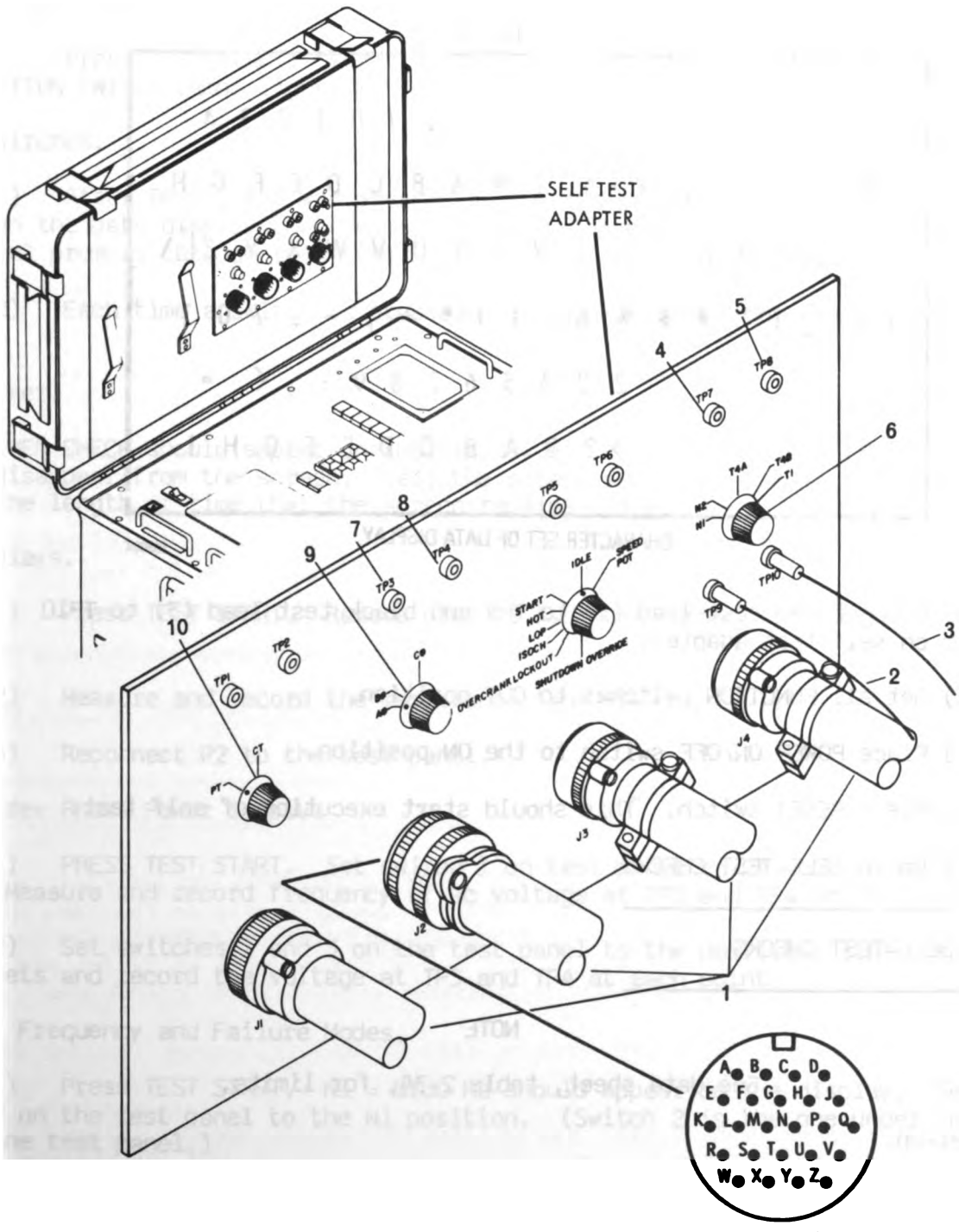
2-9. SELF-TEST PROCEDURE

a. Self-test of the simulator will be performed prior to initial checkout of the ECA. Subsequent self-tests of the simulator will be performed at the discretion of maintenance personnel.

b. Perform the following steps to self-test the simulator.

(1) Place the POWER ON/OFF switch on the simulator test set to the OFF position. Connect the power cord to the 115 ac power cord adapter on the test set and to a 115 Volts ac, 50-400 Hz electrical outlet.

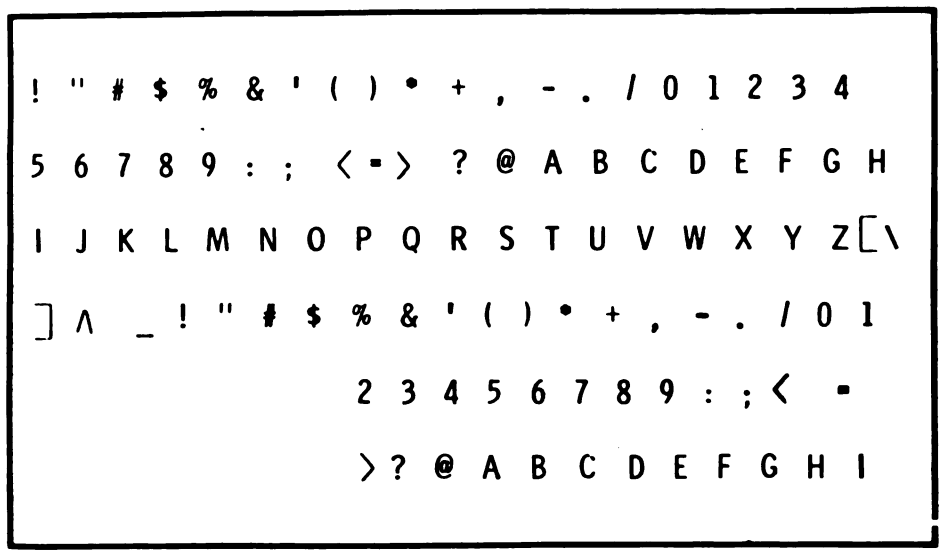
(2) Connect the simulator test set cable assemblies P1, P2, P3, and P4 (1) to the self-test adapter connectors located on the inner panel of the lid of the test set.



18791, 18793, 18910A

2-9. SELF-TEST PROCEDURE (cont)

DATA DISPLAY



CHARACTER SET OF DATA DISPLAY 18606X

(3) Connect red test lead (2) to TP9 and black test lead (3) to TP10 connector on self-test adapter.

(4) Set all FUNCTION switches to OUT position.

(5) Place POWER ON/OFF switch to the ON position.

(6) Press RESET switch. This should start execution of self test.

(7) Go to SELF-TEST CHECKS.

2-9A. SELF-TEST CHECKS

NOTE

See data sheet, table 2-3A, for limits.

a. Set-up.

(1) If at any point you inadvertently cause a test to fail by pressing a wrong key you must start the test over, from the beginning, by pressing RESET and repeating the key sequence above.

(2) After each test is successfully passed TEST OK should appear on the data display.

b. Display and Indicators.

(1) After the key sequence of step a.(1) was run the data display should be filled with ASCII characters. Verify that the display matches the legend shown on the attached sheets.

(2) Press TEST START. Verify that all the CONTROL MONITOR lamps and all the ECA FUNCTION SWITCH lamps light up. Press TEST START.

c. Switches.

(1) After TEST START was pressed at the end of step b.(2) a prompt should appear on the data display that reads PRESS "0". Press "0" and follow all subsequent prompts through this test.

(2) Each time a switch is pressed hold it down until the display prompt changes.

d. Timer.

TIMER CHECK should appear on the display. PRESS TEST START. TIMER CHECK should disappear from the screen, i.e.; the screen should go blank. Measure and record the length of time that the screen remains blank.

e. Relays.

(1) Press TEST START. Remove plug P2 from the connector J2 on the test panel.

(2) Measure and record the resistance from P2-P to P2-T.

(3) Reconnect P2 to the test panel.

f. Three Phase Power Supply.

(1) PRESS TEST START. Set switch 1 on test panel to CT and switch 3 to A phase. Measure and record frequency of ac voltage at TP3 and TP4 on the test panel.

(2) Set switches 1 and 3 on the test panel to the positions listed in the data sheets and record the voltage at TP3 and TP4 at each point.

g. N1 Frequency and Failure Modes.

(1) Press TEST START. N1 = 0100 Hz should appear on the display. Set switch 2 on the test panel to the N1 position. (Switch 2 is the one under TP7 and TP8 on the test panel.)

(2) Press TEST START. N1 = 2500 Hz should appear on the display. Measure and record the frequency at TP7 and TP8.

(3) Press TEST START. N1 = 5000 Hz should appear on the display. Measure and record the frequency at TP7 and TP8.

2-9A. SELF-TEST CHECKS (cont)

(4) Press TEST START and measure the resistance between TP7 and TP8.

(5) Repeat step g.(4).

(6) Press TEST START and measure the resistance between TP2 and TP7.

(7) Press TEST START and measure the resistance between TP2 and TP8.

h. N2 Frequency and Failure Modes.

(1) Press TEST START. N2 = 0100 Hz should appear on the display. Set switch 2 on the test panel to the N2 position.

(2) Press TEST START. N2 = 5000 Hz should appear on the data display. Measure and record the frequency at TP7 and TP8.

(3) Press TEST START. N2 = 9999 Hz should appear on the display. Measure and record the frequency at TP7 and TP8.

(4) Press TEST START and measure the resistance between TP7 and TP8.

(5) Repeat step h.(4)

(6) Press TEST START and measure the resistance between TP2 and TP7.

(7) Press TEST START and measure the resistance between TP2 and TP8.

i. T4A Simulation and Failure Modes.

(1) Measure and record the ambient room temperature accurately to ± 0.5 °F.

(2) Press TEST START. T4A = 0032 °F should appear on the data display. Set switch 2 on the test panel to the T4A position. (Switch 2 is the one under TP7 and TP8 on the test panel.) Measure and record the voltage at TP7(+) and TP8(-) of the test panel. This voltage must be measured accurately to ± 0.01 mV.

(3) Press TEST START. T4A = 1200 °F should appear on the display. Measure and record the voltage at TP7(+) and TP8(-).

(4) Press TEST START. T4A = 2000 °F should appear on the display. Measure and record the voltage at TP7(+) and TP8(-).

(5) Press TEST START and measure the resistance between TP7 and TP8.

(6) Repeat step i.(5).

(7) Press TEST START and measure the resistance between TP2 and TP7.

(8) Press TEST START and measure the resistance between TP2 and TP8.

j. T4B Simulation and Failure Modes.

(1) Press TEST START. T4B = 0032 °F should appear on the display. Set switch 2 on the test panel to the T4B position. Measure and record the voltage at TP7(+) and TP8(-).

(2) Press TEST START. T4B = 1200 °F should appear on the display. Measure and record the voltage at TP7(+) and TP8(-).

(3) Press TEST START. T4B = 2000 °F should appear on the display. Measure and record the voltage at TP7(+) and TP8(-).

(4) Press TEST START and measure and record resistance between TP7 and TP8.

(5) Repeat step j.(4).

(6) Press TEST START and measure the resistance between TP2 and TP7.

(7) Press TEST START and measure the resistance between TP2 and TP8.

k. T1 Simulation and Failure Modes.

(1) Press TEST START. T1 = -50 °F should appear on the display. Set switch 2 on the test panel to the T1 position. Measure and record the resistance between TP7 and TP8 on the test panel.

(2) Press TEST START seven more times. Each time after it is pressed, measure and record the resistance between TP7 and TP8.

2-9B. SWITCH TESTS

a. Set-Up.

(1) Set the AUTO/CALIBRATE switch to CALIBRATE. Press RESET.

(2) Connect leads of a VOM to TP5(+) and TP6(-) of the Test Fixture Panel.

2-9B. SWITCH TESTS (cont)

b. Relay Contacts.

Droop/Isoch:

Set the VOM to read ohms. Set switch 4 on the test panel to the ISOCH position. (Switch 4 is the one under TP5 and TP6). With the Droop/Isoch switch set to droop, measure the resistance between TP5 and TP6. Set the Droop/Isoch switch to Isoch and again measure the resistance.

c. Voltage Levels.

(1) Set the VCM to read 0-15 Vdc.

(2) Shutdown Override:

Set switch 4 to the Shutdown Override position. Press the Shutdown Override switch on the test set until its lamp lights. Measure and record the voltage from TP5 to TP6 on the test panel, when the light is on. Read voltage. Press Shutdown override switch to turn it off. Read voltage.

(3) Repeat step c.(2) for Overcrank lockout, LOP, HOT, Start, and Idle/Rated.

Table 2-3A. Data Sheet (Sheet 1 of 4)

	MEASURED	SHOULD BE
2-9A.		
a. (1) Display matches the legend on the attached sheet.	_____	OK
(2) All CONTROL MONITOR and ECA FUNCTION SWITCHES lamps light	_____	OK
b. All button switches operate properly	_____	OK
c. Timer timeout length	_____	13 - 17 Sec
d. Relay contact resistance from P2-P and P2-T	_____	8 - 12 ohms
e. (1) Frequency of three phase power	_____	399 - 401 Hz

Table 2-3A. Data Sheet (Sheet 2 of 4)

		MEASURED	SHOULD BE
(2) Three phase PT and CT voltage			
SW1	SW3		
PT	A phase	_____	115 - 125 Vrms
PT	B phase	_____	115 - 125 Vrms
PT	C phase	_____	115 - 125 Vrms
CT	A phase	_____	1.95 - 2.05 Vrms
CT	B phase	_____	1.95 - 2.05 Vrms
CT	C phase	_____	1.95 - 2.05 Vrms
f. (1) N1 frequency at 100 Hz input		_____	99 - 101 Hz
(2) N1 frequency at 2500 Hz input		_____	2495 - 2505 Hz
(3) N1 frequency at 5000 Hz input		_____	4995 - 5005 Hz
(4) N1 open circuit resistance		_____	> 10 Mohms
(5) N1 short output resistance		_____	< 10 ohms
(6) N1 one side short to ground resistance		_____	< 10 ohms
(7) N1 other side short to ground resistance		_____	< 10 ohms
g. (1) N2 frequency at 100 Hz input		_____	99 - 101 Hz
(2) N2 frequency at 5000 Hz input		_____	4995 - 5005 Hz
(3) N2 frequency at 9999 Hz input		_____	9989 - 10009 Hz
(4) N2 open output resistance		_____	> 10 Mohms
(5) N2 short output resistance		_____	< 10 ohms
(6) N2 one side short to ground resistance		_____	< 10 ohms
(7) N2 other side short to ground resistance		_____	< 10 ohms
h. (1) Room temperature	_____	± 0.5°F	
(2) Ideal T4A output voltage at ambient temperature	_____	$-V_t$ mV	
Measured T4A output voltage at ambient temperature	_____	$-V_t \pm 0.10$ mV	

> Greater than < Less than

2-9A. and 2-9B. (cont)

Table 2-3A. Data Sheet (Sheet 3 of 4)

	MEASURED	SHOULD BE
(3) Ideal T4A output voltage at 1200°F input	_____	26.975 - V_t mV
Measured T4A output voltage at 1200°F input	_____	(26.975 - V_t) ± 0.10 mV
(4) Ideal T4A output voltage at 2000°F input	_____	44.856 - V_t mV
Measured T4A output voltage at 2000°F input	_____	(44.856 - V_t) ± 0.10 mV
(5) T4A open output resistance	_____	> 10 Mohms
(6) T4A short output resistance	_____	< 10 ohms
(7) T4A one side short to ground resistance	_____	< 10 ohms
(8) T4A other side short to ground resistance	_____	< 10 ohms

NOTE

V_t is the voltage corresponding to the ambient temperature of i.(1) below.

i. (1) Ideal T4B output voltage at ambient temperature	_____	-V_t mV
Measure T4B output voltage at ambient temperature	_____	-V_t ± 0.10 mV
(2) Ideal T4B output voltage at 1200°F input	_____	26.975 - V_t mV
Measured T4B output voltage at 1200°F input	_____	(26.975 - V_t) ± 0.10 mV
(3) Ideal T4B output voltage at 2000°F input	_____	44.856 - V_t mV
Measure T4B output voltage at 2000°F input	_____	(44.856 - V_t ± 0.10 mV
(4) T4B open output resistance	_____	> 10 Mohms

Table 2-3A. Data Sheet (Sheet 4 of 4)

	MEASURED	SHOULD BE
(5) T4B short output resistance	_____	<10 ohms
(6) T4B one side short to ground resistance	_____	<10 ohms
(7) T4B other side short to ground resistance	_____	<10 ohms
j. T1 output resistance		
T1, °F		
-50	_____	24948-25252 ohms
0	_____	5940 - 6060 ohms
+40	_____	2178 - 2222 ohms
60	_____	1415 - 1445 ohms
100	_____	634 - 648 ohms
140	_____	308 - 314 ohms
Short	_____	< 10 ohms
Open	_____	> 10 ohms

2-9B.

a. (1) Droop/Isoch relay contact resistance		
with droop indicator lit	_____	<10 ohms
with Isoch indicator lit	_____	>10 Mohms
(3) Switch voltage with		
shutdown override indicator lit	_____	>13 Vdc
shutdown override indicator unlit	_____	< 1 Vdc
overcrank lockout indicator lit	_____	>13 Vdc
overcrank lockout indicator unlit	_____	< 1 Vdc
LOP indicator lit	_____	< 1 Vdc
LOP indicator unlit	_____	> 13 Vdc
HOT indicator lit	_____	< 1 Vdc
HOT indicator unlit	_____	>13 Vdc
start indicator lit	_____	>13 Vdc
start indicator unlit	_____	< 1 Vdc
idle indicator lit	_____	>13 Vdc
rated indicator lit	_____	< 1 Vdc

SERIAL NO. _____ DATE _____

SALES ORDER NO. _____ TEST EQUIPMENT _____

CUSTOMER P.O. _____ TEST PERSONNEL _____

2-9A and 2-9B. (cont)

Table 2-3B. Temperature vs Millivolts

DEG.F	0	1	2	3	4	5	DEG.F.
50	0.397	0.419	0.441	0.464	0.486	0.508	50
60	0.619	0.642	0.664	0.686	0.709	0.731	60
70	0.843	0.865	0.888	0.910	0.933	0.955	70
80	1.068	1.090	1.113	1.135	1.158	1.818	80
90	1.294	1.316	1.339	1.362	1.384	1.407	90

DEG.F	6	7	8	9	10	DEG.F.
50	0.530	0.553	0.575	0.597	0.619	50
60	0.753	0.776	0.798	0.821	0.843	60
70	0.978	1.000	1.023	1.045	1.068	70
80	1.203	1.226	1.248	1.271	1.294	80
90	1.430	1.452	1.475	1.498	1.520	90

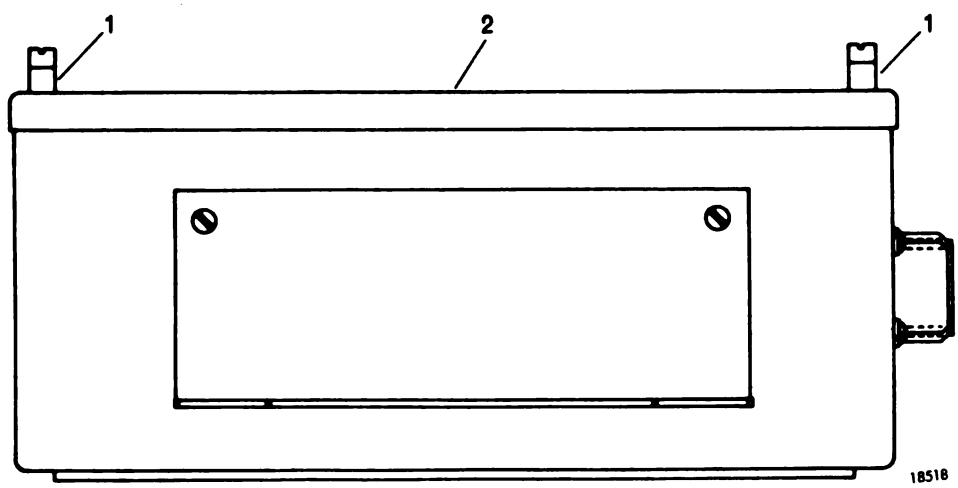
NOTE

- The entries in this table come from the data table for a type K chromel-alumel thermocouple. The entries are in millivolts.
- All voltage measurements of 100mV or less should be made using shielded test leads.

2-10 ECA TEST PROCEDURE

CAUTION

- If a control malfunction is suspected, replace the control. Do not attempt to troubleshoot or remove printed circuit boards while the control is mounted in a generator set.
- Electronic control repair should only be conducted by authorized personnel in a static free work area.
- Never attempt to remove an electronic control or printed circuit board while power is being applied to the control.
- Operate the Electrical Test Set only in the automatic mode.
- Before handling the printed circuit boards, discharge static electricity on your body to ground.
- Handle printed circuit boards by their edges only.
- Do not touch the printed circuits, the connectors or the components with conductive devices or your hands.
- When a board is not in a controlled area, place the board in a static shielding bag. Place a shielding strip over the board connector.
- Keep all plastic, vinyl, and styrofoam away from the control, the modules and the work area. These materials tend to generate and store static electric charges and should be kept away from the work area. These materials include: plastic or foam coffee cups, coffee cup holders, cigarette packages or cellophane candy wrappers, vinyl books or folders, plastic bottles, and plastic ash trays.



2-10. ECA TEST PROCEDURE (cont)

a. Setup Procedure

(1) Loosen 4 screws (1) and remove cover (2) from ECA.

(2) Connect the simulator test set cable assemblies P1, P2, P3, and P4 connectors (3) to the ECA.

(3) Place POWER ON/OFF switch to ON position.

(4) Press RESET switch twice to resume tests.

b. Operating Procedure.

The following paragraphs contain the operating instructions for the modes of operation. References will be made to table 2-4, Test Sequence. This table lists each TEST # used during the two Auto mode operations, and contains a brief description of the test sequence. It also lists the corrective action displayed on the data display.

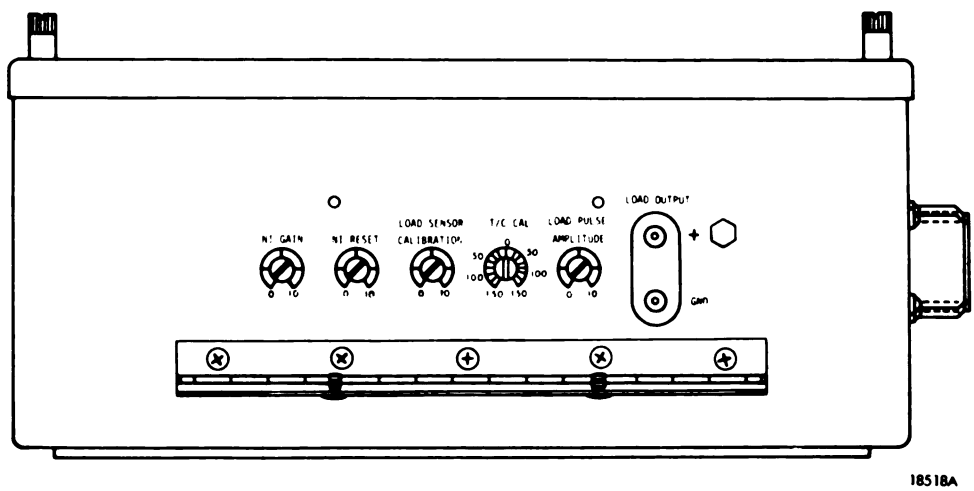
c. Auto-Continuous Checkout Procedure.

Perform the following steps to check the ECA.

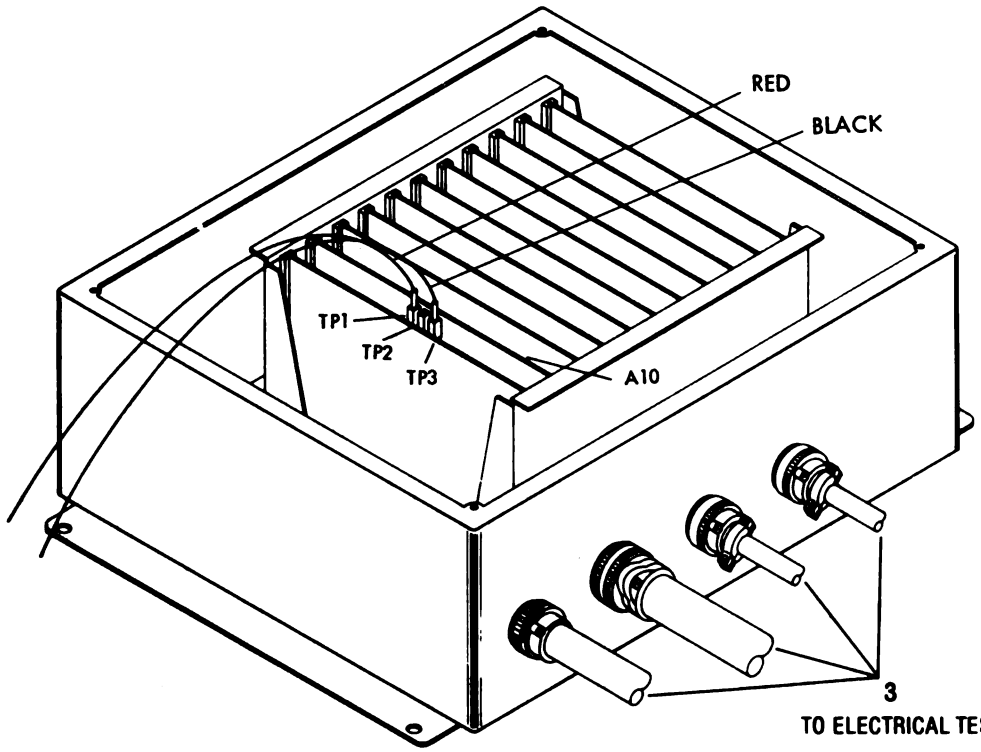
NOTE

Unless otherwise indicated, all controls and indicators are on the simulator test set.

(1) Set AUTO/MANUAL switch to AUTO position.



18518A



(2) Set SINGLE STEP/CONTINUOUS switch to CONTINUOUS position.

(3) Enter test 01 by pressing 01 on key pad and then TEST ENTER switch.

(4) Press TEST START switch. The test program will begin and proceed through the Test Sequence until all TEST #'s have been run or until a failure condition occurs. The TEST # is indicated on the Data display during each test.

(5) The program will stop at TEST #03. Display will read CHECK T/C CAL POT FOR CENTER POSITION THEN PRESS TEST START. Check that thermocouple calibration POT is on zero.

(6) The program will stop at TEST #16 and display will read CONNECT RED LEAD TO TP1 BOARD A10 AND BLACK LEAD TO TP3 BOARD A10 THEN PRESS "START". After test connections are completed, press TEST START switch to restart test program.

(7) The program will stop at TEST #18 and display will read CONNECT RED LEAD TO TP2 BOARD A10 AND BLACK LEAD TO TP3 BOARD A10 THEN PRESS START. After test connections are completed, press TEST START switch to restart test program.

(8) If a failed condition occurs, the test program will stop and indicate a fail condition on the DATA DISPLAY. Also, when the test program stops, the power to ECA will be turned off.

2-10. ECA TEST PROCEDURE (cont)

NOTE

If replacement of circuit board(s) does not correct fault, notify next higher level of maintenance.

(9) Replace the circuit board indicated on the DATA DISPLAY.

(10) Restart test by pressing TEST ENTER switch, test number, and pressing TEST START switch. Test program will start at beginning of test.

(11) At conclusion of test, a PASS condition on the DATA DISPLAY will be indicated, indicating that the ECA has passed the checkout test. Refer to step e for test disconnection procedure.

d. Auto-Single Step Checkout Procedure.

Perform the following steps to check out the ECA.

(1) Set AUTO/MANUAL switch to the AUTO position.

(2) Set SINGLE STEP CONTINUOUS switch to the SINGLE STEP position.

(3) Refer to table 2-4 for selection of desired TEST #. Enter desired TEST # in electrical test set using one of the two methods.

(a) Press the ADVANCE STEP switch until the desired TEST # is indicated on the DATA DISPLAY.

(b) Enter desired TEST # into the keyboard and press TEST ENTER switch.

(4) Press TEST START switch. The test program will run the desired TEST # selected and stop, displaying the status on the data display. The PASS or FAIL status displayed will be the same as for AUTO-CONTINUOUS checkout procedure.

(5) Replace circuit board indicated on DATA DISPLAY.

NOTE

If replacement of circuit board(s) does not correct fault, notify next higher level of maintenance.

(6) To rerun test, press TEST ENTER switch twice then TEST START switch.

(7) At conclusion of test, the PASS indication on the DATA DISPLAY will illuminate, indicating that the ECA has passed the checkout test. Refer to step e. for test disconnection procedure.

NOTE

The manual checkout procedure and the following switches are for Depot use only.

T1 ENTER, T4A ENTER, T4B ENTER, N1 ENTER, and N2 ENTER.

e. Electrical Test Set-to-ECA Test Cable Disconnection.

At conclusion of the checkout procedure of the ECA, perform the following steps.

(1) On the electrical test set, place the POWER ON/OFF switch to the OFF position.

(2) Disconnect the power cord from the 115V ac power cord adapter on the electrical test set and the 115 volt ac electrical outlet.

(3) Disconnect the electrical test set cable assemblies and test leads from the ECA.

(4) Loosen 3 screws (4), open panel (5), and install cable assemblies.

(5) Close panel (5) and tighten screws (4).

(6) Close lid and fasten 6 latches (6).

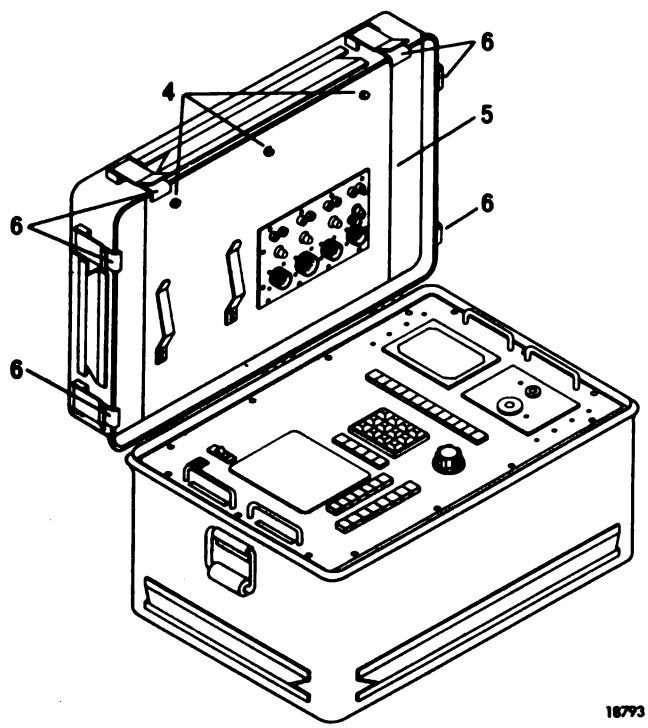


Table 2-4. Test Sequence

TEST NO.	FUNCTION	CORRECTIVE ACTION
00	SELF TEST	Indicated on display.
01	N1 Amplifier Calibration: Checks the N1 amplifier at 50% and 100% of maximum input speed.	Replace A2.
02	N2 Amplifier Calibration: Checks the N2 amplifier at 50% and 100% of maximum input speed.	Replace A4.
03	T4A Amplifier Calibration: Checks T4A amplifier at 50% and 100% of maximum input temperature.	Replace A5, A7, A6, A3, A1, A10.
04	N1 Reference and Fuel Control Check: Checks idle and run speed references. Checks for N1 control of fuel current	Replace A1, A2, A4, A3, A6, A8.
05	Clutch Lockup: Verifies correct control logic for clutch lockup. Checks for proper clutch current.	Replace A7, A4.
06	T4 Overtemperature: Checks T4 for overtemperature warning, T4 overtemperture shutdown, and T4 steady state overtemp shutdowns.	Replace A1, A6, A3, A8.
07	N1 Underspeed: Checks control logic for N1 high and low underspeed shutdowns.	Replace A1, A8.
08	N2 Overspeed: Checks control logic for N2 overspeed shutdown.	Replace A4, A8.

Table 2-4. Test Sequence (cont)

TEST NO.	FUNCTION	CORRECTIVE ACTION
09	Low Lube Oil Pressure: Checks for delayed low oil pressure failure condition.	Replace A4.
10	High Lube Oil Temperature: Checks for high oil temperature failure condition.	Replace A4.
11	Start Drop, No Lightoff, Overcrank Under-frequency: Checks the control logic for the above failure conditions.	Replace A3, A10, A2 A8.
12	Sensor Test: Checks for proper run and failure conditions for various shorts occuring on the T4 and N1.	Replace A2, A4, A5, A7, A8.
13	Manifold Fill Limit, Maximum Flow Schedule, Maximum Flow Clamp: Checks maximum allowable fuel current for various N1, N2, T1, and T4 conditions.	Replace A3, A2.
14	T4 Meter Calibration: Checks for meter current calibrated at 20% and 85% of maximum temperature.	This test is not run.
15	T4 Start Clamp, N1 and T1 Biases of T4 Acceleration Run Schedule: Checks for T4 closed loop fuel control at start clamp. Checks for T4 closed fuel control as a function of N1 and as a function of T1.	Replace A6, A1.
16	T4 Tracking: Checks for proper T4 tracking bias as a function of T4 temperature input.	Replace A10.

NOTE

The two test leads from the cable assembly must be connected for to the ECA this test. Connect the red lead to TP1 and the black lead to TP3 of PCB A10 on the ECA.

Table 2-4. Test Sequence (cont)

TEST NO.	FUNCTION	CORRECTIVE ACTION
17	N2 Governor Control: Checks for N2 control of fuel current.	Replace A4.
18	N1 Rate Bias of T4 Acceleration Limit: Checks T4 control bias as a function of the rate of change of N1.	Replace A10.
	NOTE The two test leads from the cable assembly must be connected to the A10 card of the ECA, red lead to TP2 and black lead to TP3.	
19	Load Test: Checks for the proper change in the N1 reference voltage when electrical load is applied, both in droop and isochronous modes.	Replace A9.

NOTE

- If four or five tests fail all the power supply is most likely faulty.
- The boards listed on the display of the tester for any given test failure will not necessarily correspond to the replacements shown in this list. Each test may consist of several parts. The replacement list that actually appears on the display will be the list corresponding to the PART of the test that failed. This list will be some portion of the list shown in the table. This table calls out the complete composite list of all the parts of each test.
- The replacement list called out on the tester display is in the order from most likely to least likely cause of failure.
- It is best to run the 19 tests in numerical sequence in order to maximize the fault isolation capabilities of the test set.

Section IV. TROUBLESHOOTING

2-11. GENERAL

a. This section consists of a troubleshooting table 2-5 and a troubleshooting index. The index lists malfunctions in alphabetical order and the number of each malfunction. Table 2-5 lists these malfunctions numerically by malfunction number. Troubles observed during operation of the generator set may be found by locating malfunction symptoms in the alphabetical index. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or cannot be corrected by listed corrective actions, notify your supervisor.

NOTE

- Before you use this table, be sure you have performed all applicable operating checks and verified that a malfunction exists. When a corrective action is performed, verify that the action has corrected the malfunction.
- All schematic diagrams (FO1, FO2, FO3 and FO4) referred to in this troubleshooting table are contained in TM 5-6115-598-12. The dash number indicates the sheet number of a certain foldout; for example, FO2-3 means sheet 3 of foldout FO2.

TROUBLESHOOTING INDEX

TROUBLESHOOTING INDEX (cont)

TROUBLESHOOTING INDEX (cont)

TROUBLESHOOTING INDEX (cont)

WARNING

Remove watches, rings and all other jewelry while working on or near this equipment. These items could result in injury or death to personnel, or damage to equipment.

Table 2-5. Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. PANEL LAMP(S) DO(ES) NOT COME ON WHEN PANEL LIGHTS SWITCH IS MOVED TO ON POSITION

Step 1. Check input voltage at PANEL LIGHTS switch (S5), terminal 2, wire number 7A (F02-1). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 2.

b. If voltage is not correct, do step 5.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. PANEL LAMP(S) DO(ES) NOT COME ON WHEN PANEL LIGHTS SWITCH IS MOVED TO ON POSITION (cont)

Step 2. Check output voltage at PANEL LIGHTS switch (S5) with switch in ON position, terminal 3, wire number 5A (FO2-1). Voltage should be 24 V dc minimum.

a. If voltage is correct, do step 3.

b. If voltage is not correct, replace PANEL LIGHTS switch (S5) (para 12-5).

Step 3. Check input voltage to panel light sockets (DS13), wire number 5A, (DS14), wire number 5B and (DS15), wire number 5C (FO2-1). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 4.

b. If voltage is not correct, repair wiring as necessary (para 12-9).

Step 4. Disconnect harness connector (P1) from control module receptacle (A7J1) and check ground wire for continuity as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO1-1, and FO1-2).

Wire No.	From	To	Remarks
2A	DS13	DS14	Meter on RX1 scale; resistance should be 0-1 ohm maximum
2B	DS14	DS15	
2AP	DS15	DS2 - pin 3	
2D	DS2 - pin 3	DS3 - pin 3	
2E	DS3 - pin 3	DS4 - pin 3	
2AR	DS4 - pin 3	DS12 - pin 1	
2AS	DS12 - pin 1	DS18 - pin 1	
2H	DS18 - pin 1	TB6-12 (TF6-12)	
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. PANEL LAMP(S) DO(ES) NOT COME ON WHEN PANEL LIGHTS SWITCH IS MOVED TO ON POSITION (cont)

Step 5. Check for input voltage at harness connector (P1), pin u (FO1-1). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 6.

b. If voltage is not correct, do step 7.

Step 6. Check input circuit to PANEL LIGHTS switch (S5) for continuity as outlined in the following chart (FO2-1, FO2-2, FO2-3 and FO2-4).

Wire No.	From	To	Remarks
7A	S5 - terminal 2	TB4-1 (TF4-1)	Meter on RX1 scale; resistance should be 0-1 ohm maximum
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 1	CB1 - terminal 2	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If wires are normal, replace circuit breaker (CB1) (para 12-6).

Step 7. Check wire number 1A for an open or short circuit between harness connector (P1), pin u and battery positive (FO1-1 and FO1-2).

If there is an open or short circuit, repair wire as necessary (para 12-9).

2. ENGINE CRANKS WHEN MASTER SWITCH IS MOVED TO RUN POSITION

Step 1. Disconnect starter switch lead (SW), wire number 8A, from starter (L5) (FO1-3). Remove wire number 9E from MASTER switch (S1), terminal 1 and wire number 12A from switch terminal 4 (FO2-1). Place MASTER switch in RUN position. Check for voltage at terminals 1 and 4. There should be no voltage.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
2. ENGINE CRANKS WHEN MASTER SWITCH IS MOVED TO RUN POSITION (cont)
a. If there is voltage, replace MASTER switch (S1) (para 12-5).
b. If there is no voltage, move MASTER switch to OFF position. Reconnect wire number 12A to terminal 4 and wire number 9E to terminal 1 of MASTER switch, and do step 2.
Step 2. Disconnect relay panel connector (P13) (FO1-3). Place MASTER switch (S1) in RUN position and check input voltage from electronic control assembly at connector (P13), pin C (positive) to pin D (negative). There should be no voltage.
a. If there is voltage, move MASTER switch to OFF position. Replace electronic control assembly (ECA) (para 11-3). Connect starter switch lead (SW), wire number 8A to starter terminal.
b. If there is voltage, move MASTER switch to OFF position. Replace/repair engine relay panel (A10) (para 4-9). Connect starter switch lead (SW), wire number 8A to starter terminal.
3. OVER TEMP LAMP COMES ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION
CAUTION Be sure MASTER switch is OFF before disconnecting connector (P23) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.
Step 1. Disconnect connector (P23) from electronic control assembly (ECA) (FO1-1). Move MASTER switch (S1) to RUN position and check if OVER TEMP lamp (DS2) is on.
a. If OVER TEMP lamp is on, do step 2.
b. If OVER TEMP lamp is off, replace ECA (para 11-3).
Step 2. Check wire number 52 for continuity as outlined in the following chart (FO1-1, FO2-3, FO2-2, and FO2-1).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

3. OVER TEMP LAMP COMES ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION (cont)

Wire No.	From	To	Remarks
52	P23 - pin L	P2 - pin N	Meter on RX1 scale;
52B	A7J2 - pin N	TB1-3 (TF1-3)	resistance should be
52A	TB1-3 (TF1-3)	DS2 - pin 2	0-1 ohm maximum

If there is an open or short circuit, repair wire as necessary (12-9).

4. LOW LUBE PRESSURE LAMP COMES ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION

CAUTION

Be sure MASTER switch is OFF before disconnecting connector (P23) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.

Step 1. Move MASTER switch (S1) to OFF position. Disconnect connector (P23) from electronic control assembly (ECA) (FO1-1). Move MASTER switch to RUN position and check if LOW LUBE PRESSURE lamp (DS3) is on.

a. If LOW LUBE PRESSURE lamp is on, do step 2.

b. If LOW LUBE PRESSURE lamp is off, replace ECA (para 11-3).

Step 2. Check wire number 55 for continuity as outlined in the following chart (FO1-1, FO2-3, FO2-2, and FO2-1).

Wire No.	From	To	Remarks
55	P23 - pin M	P2 - pin T	Meter on RX1 scale;
55B	A7J2 - pin T	TB1-4 (TF1-4)	Resistance should
55A	TB1-4 (TF1-4)	DS3 - pin 2	be 0-1 ohm maximum

If there is an open or short circuit, repair wire as necessary (12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
5. LOW FUEL LAMP IS ON WHEN MASTER SWITCH IS IN RUN POSITION
Step 1. If the fuel transfer pump is not running with the MASTER switch (S1) in the RUN position, disconnect fuel level switch connector (P9). Install a jumper wire between pin A and pin B of connector (P9). Move MASTER switch (S1) to RUN position. Wait 10 seconds for time delay relay (TD1) to time out and check if fuel transfer pump (B2) is running. a. If the fuel transfer pump is running, replace the fuel level switch (S11) (para 6-3). b. If the fuel transfer pump is not running, remove jumper wire from P9 connector, reconnect P9 to the fuel level switch (S11) and do step 7.
Step 2. If the day tank is full, disconnect harness connector (P3) from control module receptacle (A7J3) (F01-1). Check for 24 Vdc at REMOTE OPERATION receptacle (J7), pin B (F01-2). There should be no voltage. a. If there is voltage, do step 3. b. If there is no voltage, do step 4.
Step 3. Check wire number 37 for short circuit to battery positive between connector (P3), pin B and receptacle (J7), pin B (F01-1 and F01-2). If there is a short circuit, repair wire as necessary (12-9).
Step 4. Disconnect fuel level switch connector (P9) (F01-3). Move MASTER switch (S1) to OFF position, then to RUN position. Observe LOW FUEL lamp (DS12). a. If the LOW FUEL lamp is on, reconnect P9 connector and do step 5. b. If the LOW FUEL lamp is off, replace fuel level switch (S11) assembly (para 6-3).
Step 5. Remove low fuel relay (K6) (para 11-6) (F02-4). a. If the LOW FUEL lamp is on, do step 6.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
5. LOW FUEL LAMP IS ON WHEN MASTER SWITCH IS IN RUN POSITION (cont)
b. If the LOW FUEL lamp is off, replace low fuel relay (K6) (para 11-6).
Step 6. Check wire number 38B for a short circuit to battery positive between LOW FUEL lamp (DS12) socket, pin 2 and low fuel relay (K6), pin 4 (F02-1 and F02-4). If there is a short circuit, repair wire as necessary (12-9).
Step 7. Disconnect fuel transfer pump connector (P10) (F01-3). Check for voltage at connector (P10), pin A. Move MASTER switch (S1) to RUN position and wait 10 seconds. Voltage should be 24 Vdc. a. If voltage is correct, do step 8. b. If voltage is not correct, do step 10.
Step 8. Check fuel transfer pump ground strap. a. If ground strap is normal, replace fuel transfer pump (para 6-2). b. If ground strap is defective, repair or replace ground strap (para 6-2) and do step 9.
Step 9. Disconnect fuel transfer pump outlet line at the day tank end and route to a suitable container. Move MASTER switch (S1) to RUN position. Wait 10 seconds for time delay relay (TD1) to time out, and check for fuel flow. a. If there is no fuel flow, replace fuel transfer pump (para 6-2). b. If there is fuel flow, do step 10.
Step 10. Move MASTER switch (S1) to RUN position. Check fuel level switch voltage to K5 relay at terminal board TB2-9 (TF2-9) (F02-2). Voltage should be 24 Vdc minimum. a. If voltage is correct, do step 11. b. If voltage is not correct, do step 17.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. LOW FUEL LAMP IS ON WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Step 11. Remove fuel transfer pump relay (K5) (para 11-6) (FO2-4). Move MASTER switch (S1) to RUN position. Check voltage at K5 relay socket, pin 2, wire number 59B. Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 12.

b. If voltage is not correct, do step 14.

Step 12. Test fuel transfer pump relay (K5) (para 11-6).

a. If relay is normal, do step 13.

b. If relay is defective, replace K5 relay (para 11-6).

Step 13. Check K5 relay ground wiring for continuity as outlined in the following chart (FO2-4, FO2-2, FO2-3, FO1-1, and FO1-2).

Wire No.	From	To	Remarks
2AF	K5 - pin 7	K4 - pin 7	Meter on RX1 scale; resistance should be 0-1 ohm maximum
2AE	K4 - pin 7	K7 - pin 3	
2AD	K7 - pin 3	K8 - pin 7	
2AC	K8 - pin 7	K10 - pin 7	
2AB	K10 - pin 7	TD2 - pin 7	
2AA	TD2 - pin 7	TD1 - pin 7	
2Z	TD1 - pin 7	K12 - pin 7	
2Y	K12 - pin 7	K11 - pin 7	
2X	K11 - pin 7	TB6-11 (TF6-11)	
2AK	TB6-11 (TF6-11)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wiring as necessary (12-9).

Step 14. Remove time delay relay (TD1) (para 11-6) (FO2-4). Move MASTER switch (S1) to RUN position. Check voltage at TD1 relay socket, pin 2, wire number 35B. Voltage should be 24 Vdc minimum.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

5. LOW FUEL LAMP IS ON WHEN MASTER SWITCH IS IN RUN POSITION (cont)

a. If voltage is correct, do step 15.

b. If voltage is not correct, do step 17.

Step 15. Test time delay relay (TD1) (para 11-6).

a. If relay is normal, do step 16.

b. If relay is defective, replace relay (TD1) (para 11-6).

Step 16. Check TD1 relay ground wiring for continuity as outlined in the following chart (FO2-4, FO2-2, FO2-3, FO1-1, and FO1-2).

Wire No.	From	To	Remarks
2Z	TD1 - pin 7	K12 - pin 7	Meter on RX1 scale;
2Y	K12- pin 7	K11 - pin 7	resistance should be
2X	K11 - pin 7	TB6-11 (TF6-11)	0-1 ohm maximum
2AK	TB6-11 (TF6-11)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wiring as necessary (12-9).

Step 17. Check wire number 35 for continuity from time delay relay (TD1) pin 2 to fuel level switch (S11) connector (P9) as outlined in the following chart (FO2-4, FO2-2, FO2-3, FO1-1, and FO1-3).

Wire No.	From	To	Remarks
35B	TD1 - pin 2	TB2-9 (TF2-9)	Meter on RX1 scale;
35D	TB2-9 (TF2-9)	A7J1 - pin F	resistance should be
35	P1 - pin F	P9 - pin B	0-1 ohm maximum

If there is an open or short circuit, repair wire as necessary (12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

6. SHORT CIRCUIT LAMP COMES ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION

Step 1. Move LAMP RESET switch (S8) to RESET position. Observe UNDER FREQUENCY lamp (DS9) and SHORT CIRCUIT lamp (DS10).

a. If UNDER FREQUENCY lamp (DS9) is off and SHORT CIRCUIT lamp (DS10) is on, replace the electronic control assembly (ECA) (para 11-3).

b. If UNDER FREQUENCY lamp (DS9) is on and SHORT CIRCUIT lamp (DS10) is on, do step 2.

Step 2. Test diode (D6) (para 12-10) (FO2-2).

a. If diode (D6) is defective, replace diode (para 12-10).

b. If diode (D6) is normal, do step 3.

Step 3. Remove and test short circuit relay (K4) (para 12-7) (FO2-2).

a. If relay (K4) is defective, replace relay (para 12-7).

b. If relay (K4) is normal, do step 4.

Step 4. Disconnect three wires, number 97A, number 97B and number 97C, at terminal board TB7-12 (TF7-12) (FO2-2). Check each wire for short circuit to battery positive as outlined in the following chart (FO2-2, FO2-1, and FO2-4).

Wire No.	From	To	Remarks
97A	TB7-12 (TF7-12)	DS10 - pin 2	Meter on Vdc scale
97B	TB7-12 (TF7-12)	D6 - positive	
97C	TB7-12 (TF7-12)	K4 - pin 6	

If there is a short circuit, repair wire as necessary (para 12-9).

7. REVERSE POWER LAMP COMES ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION.

Step 1. Remove reverse power latching relay (K8) (para 12-7) (FO2-4). Move MASTER switch (S1) to RUN position. Check voltage at K8 relay socket, pin 4, wire number 63. There should be no voltage.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

7. REVERSE POWER LAMP COMES ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION (cont)

a. If there is voltage, repair wire as necessary (12-9).

b. If there is no voltage, do step 2.

Step 2. Remove wire number 29B from reverse power relay (A5) (FO2-3). Observe REVERSE POWER lamp (DS7).

If REVERSE POWER lamp is off, refer to step 11, malfunction 50.

8. UNDER VOLTAGE LAMP COMES ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION

Step 1. Remove wire number 117A from the voltage regulator and monitor assembly (A1), terminal UV (FO2-1). Observe UNDER VOLTAGE lamp (DS8).

a. If UNDER VOLTAGE lamp is off, replace the voltage regulator and monitor assembly (A1) (para 12-8).

b. If UNDER VOLTAGE lamp is on, do step 2.

Step 2. Remove and test under voltage relay (K7) (para 12-7) (FO2-4).

a. If K7 relay is defective, replace relay (para 12-7).

b. If K7 relay is normal, do step 3.

Step 3. Check wire number 117 for continuity as outlined in the following chart (FO2-1 and FO2-2).

Wire No.	From	To	Remarks
117A	A1 - terminal UV	TB7-2 (TF7-2)	Meter on RX1 scale; resistance should be 0-1 ohm maximum
117B	TB7-2 (TF7-2)	K7 - pin 7	
117C	TB7-2 (TF7-2)	TB6-3 (TF6-3)	
117D	TB6-3 (TF6-3)	D7 - positive	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

9. OVER VOLTAGE LAMP COMES ON WHEN MASTER SWITCH IS MOVED TO THE RUN POSITION

Step 1. Disconnect wire number 27A from the voltage regulator and monitor assembly (A1), terminal OV (FO2-1). Observe OVER VOLTAGE lamp (DS11).

a. If OVER VOLTAGE lamp (DS11) is on, do step 2.

b. If OVER VOLTAGE lamp is off, replace voltage regulator and monitor assembly (A1) (para 12-8). Reset circuit breaker (CB4) to OFF position, then to ON position.

Step 2. Check wire number 27A between voltage regulator and monitor assembly (A1), terminal OV and the OVER VOLTAGE lamp (DS11), pin 2, for a short circuit to battery positive (FO2-1).

If there is a short circuit, repair wire as necessary (12-9).

10. OVERLOAD LAMP COMES ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION

Step 1. Move MASTER switch (S1) to RUN position. Move LAMP RESET switch (S8) to RESET position. Observe OVERLOAD lamp (DS19).

a. If OVERLOAD lamp is off, there is no malfunction.

b. If OVERLOAD lamp is on, do step 2.

Step 2. Test overload relay (A4) (para 12-7).

a. If overload relay (A4) is defective, refer to step 11 malfunction 50.

b. If overload relay (A4) is normal, do step 3.

Step 3. Remove and test overload latching relay (K12) (para 12-7) (FO2-2).

a. If overload latching relay (K12) is defective, replace relay (para 12-7).

b. If overload latching relay is normal, do step 4.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

10. OVERLOAD LAMP COMES ON WHEN MASTER SWITCH IS MOVED TO THE RUN POSITION (cont)

Step 4. Disconnect three wires, number 130A, number 130B and number 130C, at terminal board TB5-2 (TF5-2) (FO2-2). Move MASTER switch (S1) to RUN position, and check each wire for short circuit to battery positive as outlined on the following chart (FO2-2, FO2-3, and FO2-4).

Wire No.	From	To	Remarks
130A	TB5-2 (TF5-2)	DS19- pin 2	Meter on Vdc scale
130B	TB5-2 (TF5-2)	K12 - pin 3	
130C	TB5-2 (TF5-2)	A4 - terminal NO	

If there is a short circuit, repair wire as necessary (12-9).

11. AC INTERRUPT LAMP COMES ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION.

Step 1. Check AC INTERRUPT switch (S2) for voltage at pin 3, wire number 20B (FO2-1). There should be no voltage.

a. If there is voltage, replace AC INTERRUPT switch (S2) (para 12-5).

b. If there is no voltage, do step 2.

Step 2. Disconnect harness connector (P6) from main ac contactor (CB5) receptacle (FO1-2). Observe AC INTERRUPT lamp (DS6).

a. If AC INTERRUPT lamp (DS6) is on, do step 3.

b. If AC INTERRUPT lamp (DS6) goes off, do step 4.

Step 3. Check wire number 99 for short circuit to battery positive as outlined in the following chart (FO1-1, FO1-2, FO2-3, FO2-2, and FO2-1.

Wire No.	From	To	Remarks
99	P6 - pin E	P1 - pin E	Meter on Vdc scale
99B	A7J1 - pin E	TB2-10 (TF2-10)	
99A	TB2-10 (TF2-10)	DS6 - pin 2	

If there is a short circuit, repair wires as necessary (12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
11. AC INTERRUPT LAMP COMES ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION (cont)
Step 4. Check for continuity between pin E and pin F on the main ac contactor (CB5) receptacle (J6) (FO1-2). Resistance should be greater than 50,000 ohms. a. If there is continuity, replace main ac contactor (CB5) (para 5-2). b. If there is no continuity, do step 5.
Step 5. Check for continuity between pin F and all other pins on the main ac contactor (CB5) receptacle (J6) (FO1-2). Resistance should be greater than 50,000 ohms. a. If there is continuity, replace main ac contactor (CB5) (para 5-2). b. If there is no continuity, do step 6.
Step 6. Check for continuity between pin C and pin D on the main ac contactor (CB5) receptacle (J6)(FO1-2). Resistance should be greater than 50,000 ohms. a. If there is continuity, replace main ac contactor (CB5) (para 5-2). b. If there is no continuity, do step 7.
Step 7. Check voltage at harness connector (P6), pin A (positive) to pin B (negative) (FO1-2). There should be no voltage. a. If there is no voltage, replace main ac contactor (CB5) (para 5-2). b. If there is voltage, do step 8.
Step 8. Move MASTER switch (S1) to OFF position. Disconnect harness connector (P1) from control module receptacle (A7J1) (FO1-1). Check wire number 36 for open or short circuit between connector (P6), pin A and connector (P1), pin W (FO1-1 and FO1-2). If there is an open or short circuit, repair wire as necessary (12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

12. BATTLE SHORT LAMP COMES ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION

Check wire number 39 for short circuit to battery positive as outlined in the following chart (FO1-1, FO1-2, FO2-1, FO2-2, and FO2-3).

Wire No.	From	To	Remarks
39A	S3 - terminal 3	DS5 - pin 2	Meter on Vdc scale
39B	S3 - terminal 3	A1 - terminal BS	
39C	S3 - terminal 3	TB6-9 (TF6-9)	
39D	TB6-9 (TF6-9)	A7J3 - pin E	
39	P3 - pin E	J7 - pin E	
39E	TB6-9 (TF6-9)	TB1-11 (TF1-11)	
39F	TB1-11 (TF1-11)	D8 - positive	
39G	TB1-11 (TF1-11)	A7J2 - pin e	
39H	P2 - pin e	P23 - pin C	

If there is a short circuit, repair wiring as necessary (12-9).

13. BATTERY LAMP DOES NOT COME ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION

Step 1. Remove battery lamp relay (K11) (para 11-6). Move MASTER switch (S1) to RUN position. Check voltage at K11 relay, pin 6 (FO2-4). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 2.

b. If voltage is not correct, do step 4.

Step 2. Test battery lamp relay (K11) (para 11-6).

a. If K11 relay is normal, do step 3.

b. If relay is defective, replace relay (K11) (para 11-6).

Step 3. Check wire number 25A for continuity between (K11) relay socket, pin 8 and BATTERY lamp (DS18) socket, pin 2 (FO2-4 and FO2-1).

a. If wire is normal, do step 5.

b. If there is an open or short circuit, repair wire as necessary (12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

13. BATTERY LAMP DOES NOT COME ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION (cont)

Step 4. Check wiring for continuity as outlined in the following chart (FO2-4, FO2-2, and FO2-1).

Wire No.	From	To	Remarks
7M	CB1	TB4-1 (TF4-1)	Meter on RX1 scale;
7A	TB4-1 (TF4-1)	S5 - terminal 2	resistance should be 0-1 ohm maximum
7B	S5 - terminal 2	S1 - terminal 2	S1 in RUN position
S1	S1 - terminal 2	S1 - terminal 1	
9E	S1 - terminal 1	TB7-11 (TF7-11)	
9F	TB7-11 (TF7-11)	K11 - pin 6	

a. If there is an open or short circuit, repair wire as necessary (12-9).

b. If MASTER switch (S1) is defective, replace switch (para 12-5).

Step 5. Check continuity to ground at BATTERY lamp (DS18) socket, pin 2 (FO2-1).

a. If there is continuity, replace lamp socket (DS18) (para 11-5).

b. If there is no continuity, do step 6.

Step 6. Check ground circuit for continuity from BATTERY lamp (DS18) socket, pin 2 to battery negative as outlined in the following chart (FO2-4, FO2-2, FO2-3, FO1-1, and FO1-2).

Wire No.	From	To	Remarks
2H	DS18 - pin 2	TB6-12 (TF6-12)	Meter on RX1 scale;
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	resistance should be
2AM	TB5-7 (TF5-7)	A7J1 - pin t	0-1 ohm maximum
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is a short or open circuit, repair wire as necessary (12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION

14. UNDER FREQUENCY LAMP DOES NOT COME ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION

CAUTION

Be sure MASTER switch is OFF before disconnecting connector (P23) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.

Step 1. Move MASTER switch (S1) to OFF position. Disconnect harness connector (P23) from electronic control assembly (ECA) receptacle (A2J1) (FO1-1). Move MASTER switch to RUN position, and observe UNDER FREQUENCY lamp (DS9).

a. If UNDER FREQUENCY lamp is on, replace the electronic control assembly (ECA) (para 11-3).

b. If UNDER FREQUENCY lamp is off, move MASTER switch (S1) to OFF position, reconnect connector (P23) to ECA and do step 2.

Step 2. Remove under frequency relay (K3) (para 12-7) (FO2-4). Move MASTER switch (S1) to RUN position. Check voltage at K3 relay socket, pin 2 and pin 3. Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 3.

b. If voltage is not correct, do step 7.

Step 3. Test under frequency relay (K3) (para 12-7) (FO2-4).

a. If relay (K3) is normal, do step 4.

b. If relay (K3) is defective, replace relay (para 12-7).

Step 4. Check wire number 120A for continuity from under frequency relay (K3), pin 1 to UNDER FREQUENCY lamp (DS9), socket, pin 2 (FO2-1 and FO2-4).

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If there is continuity, do step 5.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

14. UNDER FREQUENCY LAMP DOES NOT COME ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION (cont)

Step 5. Check continuity to ground at UNDER FREQUENCY lamp (DS9) socket, pin 2 (FO2-1).

a. If there is continuity, replace lamp socket (DS9) (para 11-5).

b. If there is no continuity, do step 6.

Step 6. Check ground wiring for continuity from UNDER FREQUENCY lamp (DS9) socket to battery negative as outlined in the following chart (FO2-4, FO2-2, FO2-3, FO1-1, and FO1-2).

Wire No.	From	To	Remarks
2S	DS9 - pin 1	DS11 - pin 1	Meter on RX1 scale; resistance should be 0-1 ohm maximum
2T	DS11 - pin 1	DS8 - pin 3	
2U	DS8 - pin 3	DS7 - pin 1	
2V	DS7 - pin 1	DS10 - pin 1	
2W	DS10 - pin 1	TB6-11 (TF6-11)	
2K	TB6-11 (TF6-11)	TB6-12 (TF6-12)	
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

14. UNDER FREQUENCY LAMP DOES NOT COME ON WHEN MASTER SWITCH IS MOVED TO RUN POSITION (cont)

Step 7. Check wires and components for continuity from under frequency relay (K3) to battery positive as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO2-4, FO1-1, and FO1-2).

Wire No. or Component	From	To	Remarks
10J	K3 - pin 3	TB7-1 (TF7-1)	Meter on RX1 scale; resistance should be 0-1 ohm maximum
10G	TB7-1 (TF7-1)	CB3 - terminal 1	
10C	CB3 - terminal 1	TB4-3 (TF4-3)	
10B	TB4-3 (TF4-3)	D3 - negative	
D3	D3 - positive	D3 - negative	Observe diode polarity
9C	D3 - positive	TB4-11 (TF4-11)	
9B	TB4-11 (TF 4-11)	TB7-11 (TF7-11)	
9E	TB7-11 (TF7-11)	S1 - terminal 1	
S1	S1 - terminal 1	S1 - terminal 2	S1 in RUN position
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 1	CB1 - terminal 2	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If reverse polarity diode (D3) is defective, replace diode (para 12-10).

c. If MASTER switch (S1) is defective, replace switch (para 12-5).

d. If circuit breaker (CB1) is defective, replace breaker (para 12-6).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

15. OVER TEMP LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION

Step. 1. Move MASTER switch (S1) to RUN position. Check for voltage at OVER TEMP lamp (DS2) socket, pin 1, wire numbers 11A and 11H (FO2-1). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 2.

b. If voltage is not correct, do step 4.

Step 2. Check for continuity to ground at pin 3 of OVER TEMP lamp (DS2) socket (FO2-1).

a. If there is continuity, replace lamp (DS2) socket (para 11-5).

b. If there is no continuity, do step 3.

Step 3. Check ground wiring for continuity from OVER TEMP lamp (DS2), pin 3 to battery negative terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO1-1, and FO2-2).

Wire No.	From	To	Remarks
2D	DS2 - pin 3	DS3- pin 3	Meter on RX1 scale; resistance should be 0-1 ohm maximum
2E	DS3 - pin 3	DS4 - pin 3	
2AR	DS4 - pin 3	DS12 - pin 1	
2AS	DS12 - pin 1	DS18 - pin 1	
2H	DS18 - pin 1	TB6-12 (TF6-12)	
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
15. OVER TEMP LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)	
Step 4. Remove low fuel relay (K6) (para 11-6) (FO2-4). Move MASTER switch (S1) to RUN position. Check voltage at K6 relay socket, pin 3. Voltage should be 24 Vdc minimum.	a. If there is voltage, do step 5. b. If there is no voltage, do step 7.
Step 5. Test low fuel relay (K6) (para 11-6).	a. If relay is defective, replace relay (K6) (para 11-6). b. If relay is normal, do step 6.
Step 6. Check continuity of wire number 11B from low fuel relay (K6) pin 1 to terminal board TB6-1 (TF6-1) and wire number 11A from terminal board TB6-1 (TF6-1) to OVER TEMP lamp (DS2), pin 1 (FO2-4, FO2-2, and FO2-1).	If there is any open or short circuit, repair wire as necessary (para 12-9).
Step 7. Check power supply wiring for continuity from low fuel relay (K6) to battery positive as outlined in the following chart (FO2-4, FO2-2, FO2-3, FO2-1, FO1-1, and FO2-1).	

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

15. OVER TEMP LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Wire No. or Component	From	To	Remarks
21B	K6 - pin3	TB3-3 (TF3-3)	Meter on RX1 scale;
21A	TB3-3 (TF3-3)	CB3 - terminal 1	resistance should be
10C	CB3 - terminal 1	TB4-3 (TF4-3)	0-1 ohm maximum
10B	TB4-3 (TF4-3)	D3 - negative	
D3	D3 - positive	D3 - negative	Observe diode polarity
9C	D3 - positive	TB4-11 (TF4-11)	
9B	TB4-11 (TF4-11)	TB7-11 (TF7-11)	
9E	TB7-11 (TF7-11)	S1 - terminal 2	
S1	S1 - terminal 1	S1 - terminal 2	S1 in RUN position
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 1	CB1 - terminal 2	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If defective, replace diode (D3) (para 12-10).

c. If defective, replace switch (S1) (para 12-5).

d. If defective, replace circuit breaker (CB1) (para 12-6).

16. LOW LUBE PRESSURE LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION

Step 1. Move MASTER switch (S1) to RUN postion. Check for voltage at LOW LUBE PRESS lamp (DS3) socket, pin 1, wire number 11H and 11J (F02-1). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 2.

b. If voltage is not correct, do step 4.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

16. LOW LUBE PRESSURE LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Step 2. Check for continuity to ground at pin 3 of LOW LUBE PRESS lamp (DS3) socket (FO2-1).

a. If there is continuity, replace lamp socket (DS3) (para 11-5).

b. If there is no continuity, do step 3.

Step 3. Check ground wiring for continuity from LOW LUBE PRESS lamp (DS3) socket, pin 3, to battery negative terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO1-1, and FO1-2).

Wire No.	From	To	Remarks
2E	DS3 - pin 3	DS4 - pin 3	Meter on RX1 scale; resistance should be 0-1 ohm maximum
2AR	DS4 - pin 3	DS12 - pin 1	
2AS	DS12 - pin 1	DS18 - pin 1	
2H	DS18 - pin 1	TB6-12 (TF6-12)	
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 4. Remove low fuel relay (K6) (para 11-6) (FO2-4). Move MASTER switch (S1) to RUN position. Check voltage at K6 relay socket, pin 3. Voltage should be 24 Vdc minimum.

a. If there is voltage, do step 5.

b. If there is no voltage, do step 7.

Step 5. Test low fuel relay (K6) (para 11-6).

a. If relay is defective, replace relay (K6) (para 11-6).

b. If relay is normal, do step 6.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

16. LOW LUBE PRESSURE LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Step 6. Check lamp circuit continuity from low fuel relay (K6) to LOW LUBE PRESSURE lamp (DS3) as outlined in the following chart (FO2-4, FO2-2, and FO2-1).

Wire No.	From	To	Remarks
11B	K6 - pin 1	TB6-1 (TF6-1)	Meter on RX1 scale;
11A	TB6-1 (TF6-1)	DS2 - pin 1	resistance should be
11H	DS2 - pin 1	DS3 - pin 1	0-1 ohm maximum

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 7. Check power supply wiring for continuity from low fuel relay (K6) to battery positive as outlined in the following chart (FO2-4, FO2-2, FO2-3, FO2-1, FO1-1, and FO1-2).

Wire No. or Component	From	To	Remarks
21B	K6 - pin 3	TB3-3 (TF3-3)	Meter on RX1 scale;
21A	TB3-3 (TF3-3)	CB3 - terminal 1	resistance should be
10C	CB3 - terminal 1	TB4-3 (TF4-3)	0-1 ohm maximum
10B	TB4-3 (TF4-3)	D3 - negative	
D3	D3 - positive	D3 - negative	Observe diode polarity
9C	D3 - positive	TB4-11 (TF4-11)	
9B	TB4-11 (TF4-11)	TB7-11 (TF7-11)	
9E	TB7-11 (TF7-11)	S1 - terminal 1	
S1	S1 - terminal 1	S1 - terminal 2	S1 in RUN position
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 1	CB1 - terminal 2	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
16. LOW LUBE PRESSURE LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont) a. If there is an open or short circuit, repair wire as necessary (para 12-9). b. If defective, replace diode (D3) (para 12-10). c. If defective, replace switch (S1) (para 12-5). d. If defective, replace circuit breaker (CB1) (para 12-6).
17. HIGH LUBE TEMPERATURE LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION Step 1. Move MASTER switch (S1) to RUN position. Check for voltage at HIGH LUBE TEMPERATURE lamp (DS4) socket, pin 1, wire number 11J (FO2-1). Voltage should be 24 Vdc minimum. a. If voltage is correct, do step 2. b. If voltage is not correct, do step 4. Step 2. Check for continuity to ground at HIGH LUBE TEMPERATURE lamp (DS4) socket, pin 3 (FO2-1). a. If there is continuity, replace lamp (DS4) socket (para 11-5). b. If there is no continuity, do step 3. Step 3. Check ground wiring for continuity from HIGH LUBE TEMPERATURE lamp socket, pin 3, to battery negative terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO1-1, and FO1-2).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

17. HIGH LUBE TEMPERATURE LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Wire No.	From	To	Remarks
2AR	DS4 - pin 3	DS12 - pin 1	Meter on RX1 scale;
2AS	DS12 - pin 1	DS18 - pin 1	resistance should be
2H	DS18 - pin 1	TB6-12 (TF6-12)	0-1 ohm maximum
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 4. Remove low fuel relay (K6) (para 11-6) (FO2-4). Move MASTER switch (S1) to RUN position. Check voltage at (K6) relay socket, pin 3. Voltage should be 24 Vdc minimum.

a. If there is voltage, do step 5.

b. If there is no voltage, do step 7.

Step. 5 Test low fuel relay (K6) (para 11-6).

a. If relay is defective, replace relay (K6) (para 11-6).

b. If relay is normal, do step 6.

Step 6. Check lamp circuit continuity from low fuel relay (K6) to HIGH LUBE TEMPERATURE lamp (DS4) as outlined in the following chart (FO2-4, FO2-2, and FO2-1).

Wire No.	From	To	Remarks
11B	K6 - pin 1	TB6-1 (TF6-1)	Meter on RX1 scale;
11A	TB6-1 (TF6-1)	DS2 - pin 1	resistance should be
11H	DS2 - pin 1	DS3 - pin 1	0-1 ohm maximum
11J	DS3 - pin 1	DS4 - pin 1	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

17. HIGH LUBE TEMPERATURE LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Step 7. Check power supply wiring for continuity from low fuel relay (K6) to battery positive as outlined in the following chart (FO2-4, FO2-2, FO2-3, FO2-1, FO1-1, and FO1-2).

Wire No. or Component	From	To	Remarks
21B	K6 - pin 3	TB3-3 (TF3-3)	Meter on RX1 scale; resistance should be 0-1 ohm maximum
21A	TB3-3 (TF3-3)	CB3 - terminal 1	
10C	CB3 - terminal 1	TB4-3 (TF4-3)	
10B	TB4-3 (TF4-3)	D3 - negative	
D3	D3 - positive	D3 - negative	Observe diode polarity
9C	D3 - positive	TB4-11 (TF4-11)	
9B	TB4-11 (TF4-11)	TB7-11 (TF7-11)	
9E	TB7-11 (TF7-11)	S1 - terminal 1	
S1	S1 - terminal 1	S1 - terminal 2	S1 in RUN position
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 1	CB1 - terminal 2	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1-pin u	
1A	P1 - pin u	BT4 - positive	

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If defective, replace diode (D3) (para 12-10).

c. If defective, replace switch (S1) (para 12-5).

d. If defective, replace circuit breaker (CB1) (para 12-6).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

18. LOW FUEL LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION

Step 1. Move MASTER switch (S1) to RUN position. Check for voltage at LOW FUEL lamp (DS12) socket, pin 3, wire number 7F (F02-1). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 2.

b. If voltage is not correct, do step 4.

Step 2. Check for continuity to ground at LOW FUEL lamp (DS12) socket, pin 1 (F02-1).

a. If there is continuity, replace lamp (DS12) socket (para 11-5).

b. If there is no continuity, do step 3.

Step 3. Check ground wiring for continuity from LOW FUEL lamp (DS12) socket, pin 1, to battery negative terminal as outlined in the following chart (F02-1, F02-2, F02-3, F01-1, and F01-2).

Wire No.	From	To	Remarks
2AS	DS12 - pin 1	DS18 - pin 1	Meter on RX1 scale;
2H	DS18 - pin 1	TB6-12 (TF6-12)	resistance should be
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	0-1 ohm maximum
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step. 4 Check power supply wiring for continuity from LOW FUEL lamp (DS12) socket, pin 3, to battery positive terminal as outlined in the following chart (F02-1, F02-2, F02-3, F02-4, F01-1, and F02-2).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

18. LOW FUEL LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Wire No. or Component	From	To	Remarks
7F	DS12 - pin 3	DS18 - pin 3	Meter on RX1 scale; resistance should be 0-1 ohm maximum
7E	DS18 - pin 3	DS5 - pin 3	
7D	DS5 - pin 3	DS6 - pin 3	
7C	DS6 - pin 3	S1 - terminal 2	
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 1	CB1 - terminal 2	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If defective, replace circuit breaker (CB1) (para 12-6).

19. BATTERY LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION--ENGINE RUNNING

Step 1. Move MASTER switch (S1) to RUN position. Check for voltage at BATTERY lamp (DS18) socket, pin 3, wire number 7E (F02-1). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 2.

b. If voltage is not correct, do step 4.

Step 2. Check for continuity to ground at BATTERY lamp (DS18) socket, pin 1 (F02-1).

a. If there is continuity, replace lamp (DS18) socket (para 11-5).

b. If there is no continuity, do step 3.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

19. BATTERY LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION--ENGINE RUNNING (cont)

Step 3. Check ground wiring for continuity from BATTERY lamp (DS18) socket, pin 1, to battery negative terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO1-1, and FO1-2).

Wire No.	From	To	Remarks
2H	DS18 - pin 1	TB6-12 (TF6-12)	Meter RX1 scale;
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	resistance should
2AM	TB5-7 (TF5-7)	A7J1 - pin t	be 0-1 ohm maximum
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 4. Check wiring for continuity from BATTERY lamp (DS18) socket, pin 3, to battery positive terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO2-4, FO1-1, and FO1-2).

Wire No. or Component	From	To	Remarks
7E	DS18 - pin 3	DS5 - pin 3	Meter on RX1 scale;
7D	DS5 - pin 3	DS6 - pin 3	resistance should
7C	DS6 - pin 3	S1 - terminal 2	be 0-1 ohm maximum
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 1	CB1 - terminal 2	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If defective, replace circuit breaker (CB1) (para 12-6).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

20. SHORT CIRCUIT LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITON

Step 1. Move MASTER switch (S1) to RUN position. Check for voltage at SHORT CIRCUIT lamp (DS10) socket, pin 3, wire number 7G (FO2-1). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 2.

b. If voltage is not correct, do step 4.

Step 2. Check for continuity to ground at SHORT CIRCUIT lamp (DS10) socket, pin 1 (FO2-1).

a. If there is continuity, replace DS10 lamp socket (para 11-5).

b. If there is no continuity, do step 3.

Step 3. Check ground wiring for continuity from SHORT CIRCUIT lamp (DS10) socket, pin 1, to battery negative terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO1-1, and FO1-2).

Wire No.	From	To	Remarks
2W	DS10 - pin 1	TB6-11 (TF6-11)	Meter on RX1 scale;
2K	TB6-11 (TF6-11)	TB6-12 (TF6-12)	resistance should be
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	0-1 ohm maximum
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para '2-9).

Step 4. Check power supply wiring for continuity from SHORT CIRCUIT lamp (DS10) socket, pin 3 to battery positive terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO2-4, FO1-1, and FO1-2).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

20. SHORT CIRCUIT LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Wire No. or Component	From	To	Remarks
7G	DS10 - pin 3	DS12 - pin 3	Meter on RX1 scale;
7F	DS12 - pin 3	DS18 - pin 3	resistance should be
7E	DS18 - pin 3	DS5 - pin 3	0-1 ohm maximum
7D	DS5 - pin 3	DS6 - pin 3	
7C	DS6 - pin 3	S1 - terminal 2	
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 2	
CB1	CB1 - terminal 2	CB1 - terminal 1	CB1 in closed position
1D	CB1 - terminal 1	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If defective, replace circuit breaker (CB1) (para 12-6).

21. REVERSE POWER LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION

Step 1. Move MASTER switch (S1) to RUN position. Check for voltage at REVERSE POWER lamp (DS7) socket, pin 3, wire number 7H (FO2-1). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 2.

b. If voltage is not correct, do step 4.

Step 2. Check for continuity to ground at REVERSE POWER lamp (DS7) socket, pin 1 (FO2-1).

a. If there is continuity, replace lamp (DS7) socket (para 11-5).

b. If there is no continuity, do step 3.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

21. REVERSE POWER LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Step 3. Check ground wiring for continuity from REVERSE POWER lamp (DS7) socket, pin 1, to battery negative terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO1-1, and FO1-2).

Wire No.	From	To	Remarks
2V	DS7 - pin 1	DS10 - pin 1	Meter on RX1 scale;
2W	DS10 - pin 1	TB6-11 (TF6-11)	resistance should be
2K	TB6-11 (TF6-11)	TB6-12 (TF6-12)	0-1 ohm maximum
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 4. Check power supply wiring for continuity from REVERSE POWER lamp (DS7) socket, pin 3, to battery positive terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO2-4, FO1-1, and FO1-2).

Wire No. or Component	From	To	Remarks
7H	DS7 - pin 3	DS10 - pin 3	Meter on RX1 scale;
7G	DS10 - pin 3	DS12 - pin 3	resistance should be
7F	DS12 - pin 3	DS18 - pin 3	0-1 ohm maximum
7E	DS18 - pin 3	DS5 - pin 3	
7D	DS5 - pin 3	DS6 - pin 3	
7C	DS6 - pin 3	S1 - terminal 2	
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 2	
CB1	CB1 - terminal 2	CB1 - terminal 1	CB1 in closed position
1D	CB1 - terminal 1	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
21. REVERSE POWER LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont) a. If there is an open or short circuit, repair wire as necessary (para 12-9). b. If defective, replace circuit breaker (CB1) (para 12-6).
22. UNDER VOLTAGE PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION NOTE When BATTLE SHORT switch (S3) is placed in ON position, 10 seconds are required for time delay relay (TD2) to time out before making the following tests.
Step 1. Move MASTER switch (S1) to RUN position. Move BATTLE SHORT switch (S3) to ON position. Check for voltage at UNDER VOLTAGE lamp (DS8) socket, pin 1, wire number 119B (FO2-1). Voltage should be 24 Vdc minimum. a. If voltage is correct, do step 2. b. If voltage is not correct, do step 4.
Step 2. Check for continuity to ground at UNDER VOLTAGE lamp (DS8) socket, pin 3 (FO2-1). a. If there is continuity, replace lamp (DS8) socket (para 11-5). b. If there is no continuity, do step 3.
Step 3. Check ground wiring for continuity from UNDER VOLTAGE lamp (DS8) socket, pin 3, to battery negative terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO1-1, and FO1-2).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

22. UNDER VOLTAGE PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Wire No.	From	To	Remarks
2U	DS8 - pin 3	DS7 - pin 1	Meter on RX1 scale; resistance should be 0-1 ohm maximum
2V	DS7 - pin 1	DS10 - pin 1	
2W	DS10 - pin 1	TB6-11 (TF6-11)	
2K	TB6-11 (TF6-11)	TB6-12 (TF6-12)	
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 4. Remove time delay relay (TD2) (para 12-7) (FO2-4). Check voltage at time delay relay (TD2) socket, pin 3. There should be 24 Vdc minimum.

a. If there is voltage, do step 5.

b. If there is no voltage, do step 7.

Step 5. Test time delay relay (TD2) (para 12-7).

a. If relay is defective, replace relay (TD2) (para 12-7).

b. If relay is normal, do step 6.

Step 6. Check wiring for continuity between UNDER VOLTAGE lamp (DS8) socket, pin 1, and time delay relay (TD2), pin 5, as outlined in the following chart (FO2-1 and FO2-4).

Wire No. or Component	From	To	Remarks
119B	DS8 -pin 1	S8 - terminal 3	Meter on RX1 scale; resistance should be 0-1 ohm maximum
S8	S8 - terminal 3	S8 - terminal 2	S8 in ON position
29A	S8 - terminal 2	TD2 - pin 5	

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

22. UNDER VOLTAGE PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If LAMP RESET switch (S8) is defective, replace switch (para 12-5).

Step 7. Check power supply wiring for continuity from the time delay relay (TD2), pin 3, to battery positive terminal as outlined in the following chart (FO2-4, FO2-2, FO2-3, FO2-1, FO1-1, and FO1-2).

Wire No. or Component	From	To	Remarks
40J	TD2 - pin 3	TD2 - pin 2	Meter on RX1 scale; resistance should be
40H	TD2 - pin 2	K3 - pin 5	
40G	K3 - pin 5	TB2-11 (TF2-11)	0-1 ohm maximum
40C	TB2-11 (TF2-11)	D8 - negative	
D8	D8 - positive	D8 - negative	Observe diode polarity
39F	D8 - positive	TB1-11 (TF1-11)	
39E	TB1-11 (TF1-11)	TB6-9 (TF6-9)	
39C	TB6-9 (TF6-9)	S3 - terminal 3	
S3	S3 - terminal 3	S3 - terminal 2	S3 in ON position
10A	S3 - terminal 2	TB7-1 (TF7-1)	
10G	TB7-1 (TF7-1)	CB3 - terminal	
10C	CB3 - terminal	TB4-3 (TF4-3)	
10B	TB4-3 (TF4-3)	D3 - negative	
D3	D3 - positive	D3 - negative	Observe diode polarity
9C	D3 - positive	TB4-11 (TF4-11)	
9B	TB4-11 (TF4-11)	TB7-11 (TF7-11)	
9E	TB7-11 (TF7-11)	S1 - terminal 1	
S1	S1 - terminal 1	S1 - terminal 2	S1 in RUN position
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 1	CB1 - terminal 2	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
22. UNDER VOLTAGE PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont) a. If there is an open or short circuit, repair wire as necessary (para 12-9). b. If reverse polarity diode (D3) or blocking diode (D8) are defective, replace diodes (para 12-10). c. If MASTER switch (S1) is defective, replace switch (para 12-5). d. If BATTLE SHORT switch (S3) is defective, replace switch (para 4-48, TM 5-6115-598-12). e. If circuit breaker (CB1) is defective, replace circuit breaker (para 12-6).
23. OVER VOLTAGE LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION Step 1. Move MASTER switch (S1) to RUN position. Check for voltage at OVER VOLTAGE lamp (DS11) socket, pin 3, wire number 7J (F02-1). Voltage should be 24 Vdc minimum. a. If voltage is correct, do step 2. b. If voltage is not correct, do step 4. Step. 2. Check for continuity to ground at OVER VOLTAGE lamp (DS11) socket, pin 1 (F02-1). a. If there is continuity, replace lamp (DS11) socket (para 11-5). b. If there is no continuity, do step 3. Step 3. Check ground wiring for continuity from OVER VOLTAGE lamp (DS11) socket, pin 1, to battery negative terminal as outlined in the following chart (F02-1, F02-2, F02-3, F01-1, and F01-2).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

23. OVER VOLTAGE LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Wire No.	From	To	Remarks
2T	DS11 - pin 1	DS8 - pin 3	Meter on RX1 scale;
2U	DS8 - pin 3	DS7 - pin 1	resistance should be
2V	DS7 - pin 1	DS10 - pin 1	0-1 ohm maximum
2W	DS10 - pin 1	TB6-11 (TF6-11)	
2K	TB6-11 (TF6-11)	TB6-12 (TF6-12)	
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 4. Check power supply wiring for continuity from OVER VOLTAGE lamp (DS11) socket, pin 3, to battery positive terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO2-4, FO1-1, and FO1-2).

Wire No. or Component	From	To	Remarks
7J	DS11 - pin 3	DS7 - pin 3	Meter on RX1 scale;
7H	DS7 - pin 3	DS10 - pin 3	resistance should be
7G	DS10 - pin 3	DS12 - pin 3	0-1 ohm maximum
7F	DS12 - pin 3	DS18 - pin 3	
7E	DS18 - pin 3	DS5 - pin 3	
7D	DS5 - pin 3	DS6 - pin 3	
7C	DS6 - pin 3	S1 - terminal 2	
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 1	CB1 - terminal 2	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
23. OVER VOLTAGE LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont) a. If there is an open circuit, repair wire as necessary (para 12-9). b. If defective, replace circuit breaker (CB1) (para 12-6).
24. UNDER FREQUENCY LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION Step 1. Move MASTER switch (S1) to RUN position. Check for voltage at UNDER FREQUENCY lamp (DS9) socket, pin 3, wire number 7K (FO2-1). Voltage should be 24 Vdc minimum. a. If voltage is correct, do step 2. b. If voltage is not correct, do step 4. Step 2. Check for continuity to ground at UNDER FREQUENCY lamp (DS9) socket, pin 1 (FO2-1). a. If there is continuity, replace lamp (DS9) socket (para 11-5). b. If there is no continuity, do step 3. Step 3. Check ground wiring for continuity from UNDER FREQUENCY lamp (DS9) socket, pin 1, to battery negative terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO1-1, and FO1-2).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

24. UNDER FREQUENCY LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Wire No.	From	To	Remarks
2S	DS9 - pin 1	DS11 - pin 1	Meter on RX1 scale;
2T	DS11 - pin 1	DS8 - pin 3	resistance should be
2U	DS8 - pin 3	DS7 - pin 1	0-1 ohm maximum
2V	DS7 - pin 1	DS10 - pin 1	
2W	DS10 - pin 1	TB6-11 (TF6-11)	
2K	TB6-11 (TF6-11)	TB6-12 (TF6-12)	
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 4. Check power supply wiring for continuity from UNDER FREQUENCY lamp (DS9) socket, pin 3, to battery positive terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO2-4, FO1-1, and FO1-2).

Wire No. or Component	From	To	Remarks
7K	DS9 - pin 3	DS11 - pin 3	Meter on RX1 scale;
7J	DS11 - pin 3	DS7 - pin 3	resistance should be
7H	DS7 - pin 3	DS10 - pin 3	0-1 ohm maximum
7G	DS10 - pin 3	DS12 - pin 3	
7F	DS12 - pin 3	DS18 - pin 3	
7E	DS18 - pin 3	DS5 - pin 3	
7D	DS5 - pin 3	DS6 - pin 3	
7C	DS6 - pin 3	S1 - terminal 2	
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 2	CB1 - terminal 1	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
24. UNDER FREQUENCY LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont) a. If there is an open circuit, repair wire as necessary (para 12-9). b. If defective, replace circuit breaker (CB1) (para 12-6).
25. OVERLOAD LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION Step 1. Move MASTER switch (S1) to RUN position. Check for voltage at OVERLOAD lamp (DS19) socket, pin 3, wire number 7L (FO2-1). Voltage should be 24 Vdc minimum. a. If voltage is correct, do step 2. b. If voltage is not correct, do step 4.
Step 2. Check for continuity to ground at OVERLOAD lamp (DS19) socket, pin 1 (FO2-1). a. If there is continuity, replace lamp (DS19) socket (para 11-5). b. If there is no continuity, do step 3.
Step 3. Check ground wiring for continuity from OVERLOAD lamp (DS19) socket, pin 1, to battery negative terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO1-1, and FO1-2).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

25. OVERLOAD LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Wire No.	From	To	Remarks
2R	DS19 - pin 1	DS9 - pin 1	Meter on RX1 scale; resistance should be 0-1 ohm maximum
2S	DS9 - pin 1	DS11 - pin 1	
2T	DS11 - pin 1	DS8 - pin 3	
2U	DS8 - pin 3	DS7 - pin 1	
2V	DS7 - pin 1	DS10 - pin 1	
2W	DS10 - pin 1	TB6-11 (TF6-11)	
2K	TB6-11 (TF6-11)	TB6-12 (TF6-12)	
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 4. Check power supply wiring for continuity from OVERLOAD lamp (DS19) socket, pin 3, to battery positive terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO2-4, FO1-1, and FO1-2).

Wire No. or Component	From	To	Remarks
7L	DS19 - pin 3	DS9 - pin 3	Meter on RX1 scale; resistance should be 0-1 ohm maximum
7K	DS9 - pin 3	DS11 - pin 3	
7J	DS11 - pin 3	DS7 - pin 3	
7H	DS7 - pin 3	DS10 - pin 3	
7G	DS10 - pin 3	DS12 - pin 3	
7F	DS12 - pin 3	DS18 - pin 3	
7E	DS18 - pin 3	DS5 - pin 3	
7D	DS5 - pin 3	DS6 - pin 3	
7C	DS6 - pin 3	S1 - terminal 2	
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 2	CB1 - terminal 1	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
25. OVERLOAD LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION a. If there is an open or short circuit, repair wire as necessary (para 12-9). b. If defective, replace circuit breaker (CB1) (para 12-6).
26. AC INTERRUPT LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION Step 1. Move MASTER switch (S1) to RUN position. Check for voltage at AC INTERRUPT lamp (DS6) socket, pin 3, wire number 7C (FO2-1). Voltage should be 24 Vdc minimum. a. If voltage is correct, do step 2. b. If voltage is not correct, do step 4. Step 2. Check for continuity to ground at AC INTERRUPT lamp (DS6) socket, pin 1 (FO2-1). a. If there is continuity, replace lamp (DS6) socket (para 11-5). b. If there is no continuity, do step 3. Step 3. Check ground wiring for continuity from AC INTERRUPT lamp socket (DS6), pin 1, to battery negative terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO1-1, and FO1-2).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

26. AC INTERRUPT LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Wire No.	From	To	Remarks
2N	DS6 - pin 1	DS5 - pin 1	Meter on RX1 scale; resistance should be 0-1 ohm maximum
2P	DS5 - pin 1	DS19 - pin 1	
2R	DS19 - pin 1	DS9 - pin 1	
2S	DS9 - pin 1	DS11 - pin 1	
2T	DS11 - pin 1	DS8 - pin 3	
2U	DS8 - pin 3	DS7 - pin 1	
2V	DS7 - pin 1	DS10 - pin 1	
2W	DS10 - pin 1	TB6-11 (TF6-11)	
2K	TB6-11 (TF6-11)	TB6-12 (TF6-12)	
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 4. Check power supply wiring for continuity from AC INTERRUPT lamp (DS6) socket, pin 3, to battery positive terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO2-4, FO1-1, and FO1-2).

Wire No. or Component	From	To	Remarks
7C	DS6 - pin 3	S1 - terminal 2	Meter on RX1 scale; resistance should be 0-1 ohm maximum
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 2	CB1 - terminal 1	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If defective, replace circuit breaker (CB1) (para 12-6).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

27. BATTLE SHORT LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION

Step 1. Move MASTER switch (S1) to RUN position. Check for voltage at BATTLE SHORT lamp (DS5) socket, pin 3, wire number 7E (FO2-1). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 2.

b. If voltage is not correct, do step 4.

Step 2. Check for continuity to ground at BATTLE SHORT lamp (DS5) socket, pin 1 (FO2-1).

a. If there is continuity, replace lamp (DS5) socket (para 11-5).

b. If there is no continuity, do step 3.

Step 3. Check ground wiring for continuity from BATTLE SHORT lamp (DS5) socket, pin 1, to battery negative terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO1-1, and FO1-2).

Wire No.	From	To	Remarks
2P	DS5 - pin 1	DS19 - pin 1	Meter on RX1 scale; resistance should be 0-1 ohm maximum
2R	DS19 - pin 1	DS9 - pin 1	
2S	DS9 - pin 1	DS11 - pin 1	
2T	DS11 - pin 1	DS8 - pin 3	
2U	DS8 - pin 3	DS7 - pin 1	
2V	DS7 - pin 1	DS10 - pin 1	
2W	DS10 - pin 1	TB6-11 (TF6-11)	
2K	TB6-11 (TF6-11)	TB6-12 (TF6-12)	
2AK	TB6-12 (TF6-12)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

27. BATTLE SHORT LAMP PRESS-TO-TEST DOES NOT OPERATE WHEN MASTER SWITCH IS IN RUN POSITION (cont)

Step 4. Check power supply wiring for continuity from BATTLE SHORT lamp (DS5) socket, pin 3, to battery positive terminal as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO2-4, FO1-1, and FO1-2).

Wire No. or Component	From	To	Remarks
7D	DS5 - pin 3	DS6 - pin 3	Meter on RX1 scale; resistance should be 0-1 ohm maximum
7C	DS6 - pin 3	S1 - terminal 2	
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 2	CB1 - terminal 1	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If defective, replace circuit breaker (CB1) (para 12-6).

28. ENGINE DOES NOT CRANK

Step 1. Move MASTER switch (S1) to RUN position. Check voltage at MASTER switch terminal 5, wire number 10F (FO2-1). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 2.

b. If voltage is not correct, do step 10.

Step 2. Hold MASTER switch (S1) in START position. Check voltage at MASTER switch terminal 4, wire number 12A (FO2-1). Voltage should be 24 Vdc minimum.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

28. ENGINE DOES NOT CRANK (cont)

a. If voltage is correct, do step 3.

b. If voltage is not correct, replace S1 MASTER switch (para 12-5).

CAUTION

Be sure MASTER switch is OFF before disconnecting connector (P23) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.

Step 3. Move MASTER switch (S1) to OFF position. Disconnect harness connector (P23) from ECA receptacle A2J1. With MASTER switch (S1) in START position, check input voltage to electronic control assembly (ECA) at P23 harness connector pin B (FO1-1). Voltage should be 24 Vdc minimum.

a. If voltage is correct, reconnect harness connector (P23) and do step 5.

b. If voltage is not correct, do step 4.

Step 4. Check wire number 12 for continuity from harness connector (P23), pin B, to MASTER switch (S1), terminal 4, as outlined in the following chart (FO1-1, FO2-3, FO2-2 and FO2-1).

Wire No.	From	To	Remarks
12	P23 - pin B	P2 - pin B	Meter on RX1 scale; resistance should be 0-1 ohm maximum
12C	A7J2 - pin b	TB1-9 (TF1-9)	
12A	TB1-9 (TF1-9)	S1 - terminal 4	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 5. Disconnect relay panel (A10) harness connector (P13) (FO1-3). Hold MASTER switch (S1) in START position. Check voltage from the ECA at pin C of engine harness connector (P13). Voltage should be 24 Vdc minimum.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

28. ENGINE DOES NOT CRANK (cont)

a. If voltage is correct, do step 6.

b. If voltage is not correct, do step 8.

Step 6. Reconnect engine harness connector (P13) to relay panel (A10). Hold MASTER switch (S1) in START position. Check voltage at starter (L5) solenoid switch post, wire SW, number 8A. Voltage should be 24 Vdc minimum (FO1-3).

a. If voltage is correct, do step 7.

b. If voltage is not correct, do step 9.

Step 7. Check continuity of ground wire number 2AX between starter solenoid negative terminal and starter negative terminal (FO1-3).

Repair or replace ground wire as necessary (para 12-9).

CAUTION

Be sure MASTER switch is OFF before disconnecting connector (P24) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.

Step 8. Move MASTER switch (S1) to OFF position. Disconnect connector (P24) from ECA receptacle A2J2 (FO1-1). Check wire number 41 for continuity from connector (P24), pin J to connector (P12), pin K and from receptacle (J12), pin K to connector (P13), pin C (FO1-1 and FO1-3).

a. If wire number 41 is normal, replace ECA (para 11-3).

b. If there is an open or short circuit, repair wire as necessary (para 12-9 and 11-2).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

28. ENGINE DOES NOT CRANK (cont)

Step 9. Disconnect engine harness connector (P13). Check continuity of wire number 8 from connector (P13), pin A, wire number 8B to splice E12 and from E12, wire 8A to starter solenoid switch (L5) (F01-3).

a. If there is an open or short circuit, repair wire as necessary (para 11-2).

b. If wire is normal, replace engine relay panel (A10) (para 4-9).

Step 10. Check power supply wiring for continuity from MASTER switch (S1) to battery positive terminal as outlined in the following chart (F02-1, F02-2, F02-3, F02-4, F01-1, and F01-2).

Wire No. or Component	From	To	Remarks
10F	S1 - terminal 5	TB4-3 (TF4-3)	Meter on RX1 scale;
10B	TB4-3 (TF4-3)	D3 - negative	resistance 0-1 ohm maximum
D3	D3 - positive	D3 - negative	Observe diode polarity
9C	D3 - positive	TB4-11 (TF4-11)	
9B	TB4-11 (TF4-11)	TB7-11 (TF7-11)	
9E	TB7-11 (TF7-11)	S1 - terminal 1	
S1	S1 - terminal 1	S1 - terminal 2	S1 in RUN position
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 2	CB1 - terminal 1	CB1 in CLOSED position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If circuit breaker (CB1) is defective, replace breaker (para 12-6).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

28. ENGINE DOES NOT CRANK (cont)

c. If diode (D3) is defective, replace diode (para 12-10).

d. If MASTER switch (S1) is defective, replace switch (para 12-5).

e. If wiring is normal, do step 11.

Step 11. Check voltage at starter (L5) positive (battery) post, wire number W19 (FO1-3). Voltage should be 24 Vdc minimum.

a. If voltage is correct, start engine and run for 30 minutes to charge batteries.

b. If voltage is not correct, do step 12.

Step 12. Check battery to starter circuit as outlined in the following chart (FO1-2 and FO1-3).

Wire No.	From	To	Remarks
W1	BT1 - negative	BT3 - negative	Meter on Vdc scale
W1	BT3 - negative	L5 - negative	
W2	BT2 - negative	BT1 - positive	
W3	BT2 - positive	BT4 - positive	
W3	BT4 - positive	L5 - positive	
W4	BT4 - negative	BT3 - positive	

Repair or replace cables as necessary (para 4-2 or para 4-21, TM 5-6115-598-12)).

29. ENGINE DOES NOT CRANK WHEN SLAVE CABLE IS PLUGGED IN

Step 1. Disarm battery power (para 4-21, TM 5-6115-598-12). Test blocking diode (D13) (surge rectifier) (para 4-8).

a. If diode (D13) is defective, replace diode (para 4-8).

b. If diode (D13) is normal, reconnect diode and do step 2.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

29. ENGINE DOES NOT CRANK WHEN SLAVE CABLE IS PLUGGED IN (cont)

Step 2. Check continuity of slave start cables as outlined in the following chart (FO1-3).

Wire No.	From	To	Remarks
W12	L5 - negative	Engine ground	Meter on Vdc scale
W15	J22 - negative	D13 - negative	
W16	CB8 - output	J22 - positive	
W19	J22 - positive	L5 - positive	
W20	J22 - negative	B1 - negative	
2AX	L5 - negative	B1 - negative	

a. If there is an open or short circuit, repair or replace cables as necessary (para 4-2 or 4-21, TM 5-6115-598-12).

b. If wires are normal, do step 3.

Step 3. Connect batteries (para 4-21, TM 5-6115-598-12). Connect external power supply and start engine.

a. If engine starts, disconnect external power supply and run engine for 30 minutes to charge batteries.

b. If engine will not crank, refer to malfunction 28.

30. ENGINE CRANKS WHEN SLAVE CABLE IS PLUGGED IN--MASTER SWITCH IN OFF OR RUN POSITION

Step 1. Check for voltage at starter switch post (L5), wire number 8A (lead marked SW) (FO1-3). There should be no voltage.

a. If there is voltage, do step 2.

b. If there is no voltage, do step 3.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

30. ENGINE CRANKS WHEN SLAVE CABLE IS PLUGGED IN--MASTER SWITCH IN OFF OR RUN POSITION (cont)

Step 2. Disconnect harness connector (P13) from engine relay panel (A10) (FO1-3). Check wire number 8 for a short circuit to battery positive as outlined in the following chart (FO1-3).

Wire No.	From	To	Remarks
8A	Starter switch (L5)	E12	Meter on Vdc scale
8B	E12	P13 - pin A	
8	E12	P16 - pin B	

If there is a short circuit, repair wire as necessary (para 11-2).

Step 3. Disconnect engine harness connector (P13) from the engine relay panel (A10). Check voltage at connector (P13), pin C, wire number 41 (FO1-3). Voltage should be 24 Vdc minimum.

a. If there is voltage, do step 4.

b. If there is no voltage, replace engine relay panel (A10) (para 4-9).

Step 4. Check voltage at terminal board TB1-9 (TF1-9) (FO2-2). Voltage should be 24 Vdc minimum.

a. If there is voltage, do step 5.

b. If there is no voltage, replace ECA (para 11-3).

Step 5. Disconnect wire number 12A from MASTER switch (S1), terminal 4 (FO2-1). Check voltage at terminal 4 of S1 switch. There should be no voltage.

a. If there is voltage, replace MASTER switch (S1) (para 12-5).

b. If there is no voltage, do step 6.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

30. ENGINE CRANKS WHEN SLAVE CABLE IS PLUGGED IN--MASTER SWITCH IN OFF OR RUN POSITION (cont)

CAUTION

Be sure MASTER switch is OFF before disconnecting connector (P23) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.

Step 6. Move MASTER switch (S1) to OFF position. Disconnect harness connectors (P2) and (P23) (FO1-1). Check wire number 12 for short circuit to battery positive as outlined in the following chart (FO1-1, FO2-1, FO2-2, and FO2-3).

Wire No.	From	To	Remarks
12A	S1 - terminal 4	TB1-9 (TF1-9)	Meter on Vdc scale
12B	A7J4 - pin D	TB1-9 (TF1-9)	
12C	TB1-9 (TF1-9)	A7J2 - pin b	
12	P2 - pin b	P23 - pin B	

If there is an open or short circuit, repair wire as necessary (para 12-9).

31. ENGINE CRANKS--THEN SHUTS DOWN (NO LIGHTOFF)

Step 1. Move MASTER switch (S1) to OFF position. Disconnect ignition exciter harness connector (P16) and engine relay panel connector (P13) (FO1-3). Check wire number 8 for continuity as outlined in the following chart.

Wire No.	From	To	Remarks
8A	Starter switch (L5)	E12	Meter on RX1 scale
8B	E12	P13 - pin A	
8	E12	P16 - pin B	

a. If there is an open or short circuit, repair wire as necessary (para 11-2).

b. If wire is normal, do step 2.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

31. ENGINE CRANKS--THEN SHUTS DOWN (NO LIGHTOFF) (cont)

NOTE

Voltage is present for approximately six seconds during the start sequence before the electronic control assembly (ECA) will time out on a no lightoff shutdown.

Step 2. Move MASTER switch (S1) to START position, and check voltage at relay panel connector (P13), pin C (FO1-3). Voltage should be 10 to 24 Vdc.

a. If voltage is correct, do step 3.

b. If voltage is not correct, do step 4.

CAUTION

Be sure MASTER switch is OFF before disconnecting connector (P24) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.

Step 3. Move MASTER switch (S1) to OFF position. Disconnect harness connector (P24) from electronic control assembly (ECA) (FO1-1). Check wire number 41 for continuity from connector (P24), pin J to connector (P12), pin K, and from receptacle (J12), pin K to connector (P13), pin C (FO1-1 and FO1-3).

a. If wire is normal, do step 4.

b. If wire is open or shorted, repair wire as necessary (para 11-2).

Step 4. Check engine harness wire number 15 for continuity from 3-way fuel solenoid valve (L2) to engine relay panel connector (P13), pin B (FO1-3).

a. If wire number 15 is normal, replace engine relay panel (A10) (para 4-9).

b. If there is an open or short circuit, repair wire as necessary (para 11-2).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

31. ENGINE CRANKS--THEN SHUTS DOWN (NO LIGHTOFF) (cont)

c. If malfunction still exists, do step 5.

Step 5. Check electronic control assembly (ECA) fuel demand signal during start attempt as follows: Connect an engine monitor test set to ECA A2J4 receptacle (para 2-4) (FO1-1). Connect a digital multimeter to the FUEL VALVE test jacks on the test set. FUEL VALVE reading should be 0.100 to 0.140 volt during first part of cranking cycle. Crank engine and measure the voltage at the test jacks.

a. If ECA output voltage is correct, do step 6.

b. If ECA output voltage is not correct, replace ECA (para 11-3).

Step 6. Disconnect engine harness connector (P10) from fuel metering valve (L3) (FO1-3). Check the resistance between the two spade connectors on the valve receptacle. Resistance should be 9 to 11 ohms.

a. If resistance is correct, do step 7.

b. If resistance is not correct, replace the fuel metering valve (L3) (para 6-5).

CAUTION

Be sure MASTER switch is OFF before disconnecting connector (P23) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.

Step 7. Move MASTER switch (S1) to OFF position. Disconnect harness connector (P23) from electronic control assembly (ECA) (FO1-1). Check the continuity of fuel metering valve wiring as outlined in the following chart (FO1-3 and FO1-1).

Wire No.	From	To	Remarks
79A	P18 - positive	J12 - pin P	Meter on RX1 scale;
79	P12 - pin P	P24 - pin P	resistance should be
2AZ	P18 - negative	E13	0-1 ohm maximum
2AW	E13	E4	

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

31. ENGINE CRANKS--THEN SHUTS DOWN (NO LIGHTOFF) (cont)

a. If wiring is normal, connect connectors (P18) and (P24) and do step 8.

b. If there is an open or short circuit, repair wire as necessary (para 11-2).

Step 8. Check for fuel flow at fuel metering valve outlet. Reference step 4, malfunction 31, table 4-2, TM 5-6115-598-12.

a. If fuel flow is correct, go to step 5, malfunction 31, table 4-2, TM 5-6115-598-12.

b. If fuel flow is low, replace fuel pump assembly (para 6-5); then do step 9.

c. If fuel flow is high, replace fuel metering valve (para 6-5.)

Step 9. Start engine.

If engine does not start, replace fuel metering valve (para 6-5).

32. ENGINE CRANKS--THEN SHUTS DOWN AFTER LIGHTOFF WITH NO INDICATOR LIGHTS ON

Connect external power supply to slave receptacle (J22) and start engine.

a. If engine start is normal, run engine for 30 minutes to recharge batteries.

b. If engine does not start, go to malfunction 35.

33. ENGINE CRANKS--BOOMS AT LIGHTOFF

Connect engine monitor test set to electronic control assembly (ECA) receptacle (A2J4) (para 2-4) (FO-1-1). Connect a digital multimeter to the monitor FUEL VALVE test jacks. Fuel valve voltage should be 0.100 to 0.140 Vdc during the first part of cranking cycle. Start engine and measure voltage at the test jacks.

a. If fuel valve voltage is normal, replace fuel metering valve (L3) (para 6-5).

b. If fuel valve voltage is high, replace ECA (para 11-3).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

34. ENGINE HAS EXCESSIVE NOISE AND/OR VIBRATION DURING START

Check oil cooler fan for damage and make sure it will turn freely by hand.

a. If damaged, replace fan and frame assembly as necessary (para 8-3).

b. If oil cooler fan will not turn freely by hand, replace the engine (para 2-14).

35. ENGINE FAILS TO ACCELERATE OR LAGS DURING START

Step 1. Check position of IDLE RUN switch (S4) on chassis support (FO-2-4).

a. If switch is in IDLE position, move switch to RUN position and start engine.

b. If switch is in RUN position, do step 2.

NOTE

With good batteries (or slave start) the starter should be able to crank the gasifier rotor (N1) to 5000 rpm in the time it takes to time out the NLO (no lightoff) shutdown.

Step 2. Close the manual fuel shutoff valve and connect the engine monitor test set to the electronic control assembly (ECA) receptacle (A2J4) (para 2-4) (FO-1-1). Crank engine and observe the maximum N1 crank speed on the N1 meter of the test set.

a. If 5000 rpm or over, open manual fuel shutoff valve and do step 3.

b. If under 5000 rpm, replace the starter (para 4-40, TM 5-6115-598-12).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

35. ENGINE FAILS TO ACCELERATE OR LAGS DURING START (cont)

Step 3. Check connection of engine harness connector (P26) to T1 sensor (A8) (F01-3).

a. If connected, do step 4.

b. If not connected, connect electrical harness to T1 sensor, open manual fuel shutoff, and start engine.

CAUTION

Be sure MASTER switch is OFF before disconnecting connector (P24) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.

Step 4. Check the T1 ambient temperature sensor (A8) circuit. Disconnect the electrical harness connector (P24) at the electronic control assembly (ECA) (F01-1). Check resistance between pins M and N at the harness connector (P24).

a. If resistance is 980 to 2750 ohms, do step 5.

b. If resistance is less that 980 ohms or greater than 2750 ohms, do step 6.

Step 5. Check for short to ground from pin M to pin T and pin N to pin T at harness connector (P24). Resistance should be greater than 50,000 ohms.

a. If resistance is greater than 50,000 ohms, T1 sensor system is normal. Reconnect electrical harness connector (P24) to electronic control assembly (ECA), and do step 7.

b. If resistance is less than 50,000 ohms, do step 6.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

35. ENGINE FAILS TO ACCELERATE OR LAGS DURING START (cont)

Step 6. Disconnect engine harness connector (P26) from T1 sensor (A8) and engine disconnect connector (P12) from engine harness connector (J12) (F01-3). Check wiring and T1 sensor as outlined in the following chart.

Wire No. or Component	From	To	Remarks
T1 Sensor (A8)	Spade	Spade	980 - 2750 ohms
T1 Sensor (A8)	Spade	Ground	More than 50,000 ohms
73	P26 - positive	J12 - pin A	0-1 ohms
73	P26 - positive	Ground	More than 50,000 ohms
73	P12 - pin A	P24 - pin M	0-1 ohms
73	P12 - pin A	Ground	More than 50,000 ohms
74	P26 - negative	J12 - pin B	0-1 ohms
74	P26 - negative	Ground	More than 50,000 ohms
74	P12 - pin B	P24 - pin N	0-1 ohms
74	P12 - pin B	Ground	More than 50,000 ohms

a. If there is an open or short circuit, repair wires as necessary (para 11-2 and 12-9).

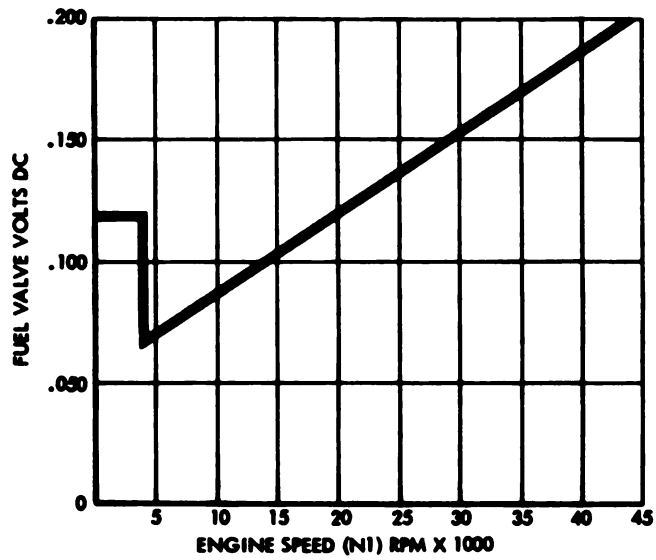
b. If defective, replace T1 sensor (A8) (para 4-6).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

35. ENGINE FAILS TO ACCELERATE OR LAGS DURING START (cont)

Step 7. Connect engine monitor test set to electronic control assembly (ECA) receptacle (A2J4) (para 2-4) (FO1-1). Connect a digital multimeter to FUEL VALVE test jacks. Start engine and observe T4 temperature and fuel valve volts.



a. If T4 temperature is greater than 1700°F (927°C) and fuel valve voltage is greater than the value shown in the curve, a regenerator problem is indicated; do step 8.

b. If T4 temperature is less than 1700°F (927°C) and fuel valve voltage is less than the value shown in the curve, a controls problem is indicated; do step 10.

c. If T4 temperature is less than 1700°F (927°C) and fuel valve voltage is greater than the value shown in the curve, a fuel starvation problem is indicated; do step 11.

Step 8. Check for air leaks at the regenerator cover to engine block splitline on both sides of the engine.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
35. ENGINE FAILS TO ACCELERATE OR LAGS DURING START (cont)
a. If there are air leaks, repair as necessary (para 9-3).
b. If there are no air leaks, do step 9.
Step 9. Inspect regenerators for damage (para 9-3).
If damaged, replace regenerator components as necessary (para 9-3).
Step 10. Test frequency adjust rheostat (R3) (para 11-4) (FO2-1).
a. If rheostat is defective, replace rheostat (R3) (para 11-4).
b. If rheostat is good, replace (ECA) (para 11-3).
Step 11. Check connection of engine harness connector (P18) to fuel metering valve (L3) (FO1-3).
a. If not connected, connect P18 to the fuel metering valve and start engine.
b. If connected, do step 12.
CAUTION Be sure MASTER switch is OFF before disconnecting connector (P24) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.
Step 12. Move MASTER switch (S1) to OFF position. Disconnect the electrical harness connector (P24) at the electronic control assembly (ECA) (FO1-1). Check the resistance between connector (P24), pin P and ground. Resistance should be 9 to 11 ohms.
a. If resistance is normal, reconnect connector (P24) and do step 15.
b. If resistance is less than 8 ohms or greater than 12 ohms, do step 13.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

35. ENGINE FAILS TO ACCELERATE OR LAGS DURING START (cont)

Step 13. Disconnect the engine harness connector (P18) from the fuel metering valve (L3) (FO-1-3). Check the resistance between the two terminals on the fuel metering valve (L3). Resistance should be 9 to 11 ohms.

a. If resistance is correct, do step 14.

b. If resistance is less than 9 ohms or greater than 11 ohms, replace the fuel metering valve (para 6-5).

Step 14. Check fuel metering valve wiring for open or short circuit as outlined in the following chart (FO-1-1 and FO-1-3).

Wire Number	From	To	Remarks
79	P18 - positive	J12 - pin R	Meter on RX1 scale;
79	P12 - pin R	P24 - pin P	resistance should be
2AZ	P18 - negative	E13	0-1 ohm maximum
2AW	E13	E4	

If there is an open or short circuit, repair wire as necessary (para 11-2 and 12-9).

Step 15. Check the fuel pump flow (para 6-5).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
35. ENGINE FAILS TO ACCELERATE OR LAGS DURING START (cont)
a. If the fuel flow is not correct, replace the fuel pump (para 6-5).
b. If the fuel flow is correct, do step 16.
Step 16. Start engine.
If engine does not accelerate, change the fuel metering valve (para 6-5).
36. ENGINE ACCELERATES TO 100% SPEED WHEN IDLE RUN SWITCH IS IN IDLE POSITION
Step 1. Check S4 switch output voltage at terminal board TB1-10 (TF1-10), wire number 48 (FO-2-2). There should be 24 Vdc minimum.
a. If voltage is correct, do step 2.
b. If there is no voltage, do step 4.
CAUTION Be sure MASTER switch is OFF before disconnecting connector (P23) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.
Step 2. Move MASTER switch (S1) to OFF position. Disconnect harness connector (P23) from the electronic control assembly (ECA) (FO-1-1). Place MASTER switch (S1) in RUN position. Check voltage at harness connector (P23), pin D. There should be no voltage.
a. If there is voltage, replace electronic control assembly (ECA) (para 11-3).
b. If there is no voltage, do step 3.
Step 3. Check wire number 48 for continuity from connector (P23), pin D to connector (P2), pin c and wire number 48B from receptacle (A7J2), pin c to terminal board TB1-10 (TF1-10) (FO-1-1, FO-2-3, and FO-2-2).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

36. ENGINE ACCELERATES TO 100% SPEED WHEN IDLE RUN SWITCH IS IN IDLE POSITION (cont)

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 4. Check the power supply wiring for open circuit from terminal board TB1-10 (TF1-10) to battery positive terminal, as outlined in the following chart (FO2-2, FO2-4, FO2-3, FO2-1, FO1-1, and FO1-2).

Wire No. or Component	From	To	Remarks
48A	TB1-10 (TF1-10)	S4 - terminal 3	Meter RX1 scale; resistance should be be 0-1 ohm maximum
S4	S4 - terminal 3	S4 - terminal 2	S4 in IDLE
11G	S4 - terminal 2	S6 - terminal 2	position
11F	S6 - terminal 2	TB1-8 (TF1-8)	
11C	TB1-8 (TF1-8)	TB6-1 (TF6-1)	
11B	TB6-1 (TF6-1)	K6 - pin 1	
K6	K6 - pin 1	K6 - pin 3	
21B	K6 - pin 3	TB3-3 (TF3-3)	
21A	TB3-3 (TF3-3)	CB3 - terminal 2	
CB3	CB3 - terminal 2	CB3 - terminal 1	CB3 in closed
10C	CB3 - terminal 1	TB4-3 (TF4-3)	position
10B	TB4-3 (TF4-3)	D3 - negative	
D3	D3 - positive	D3 - negative	Observe diode polarity
9C	D3 - positive	TB4-11 (TF4-11)	
9B	TB4-11 (TF4-11)	TB7-11 (TF7-11)	
9E	TB7-11 (TF7-11)	S1 - terminal 1	
S1	S1 - terminal 1	S1 - terminal 2	S1 in RUN position
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 1	CB1 - terminal 2	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
36. ENGINE ACCELERATES TO 100% SPEED WHEN IDLE RUN SWITCH IS IN IDLE POSITION (cont) a. If there is an open or short circuit, repair wire as necessary (para 12-9). b. If reverse polarity diode (D3) is defective, replace diode (para 12-10). c. If MASTER switch (S1) or IDLE RUN switch (S4) is defective, replace switch (para 12-5). d. If low fuel relay (K6) is defective, replace relay (para 11-6). e. If circuit breaker (CB3 or CB1) is defective, replace breaker (para 12-6).
37. ENGINE FAILS TO ACCELERATE PAST IDLE--IDLE RUN SWITCH IN RUN POSITION CAUTION Be sure MASTER switch is OFF before disconnecting connector (P23) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA. Step 1. With MASTER switch (S1) in OFF position, disconnect the harness connector (P23) from the receptacle (A2J1) of the electronic control assembly (ECA) (FO1-1). Move MASTER switch (S1) to RUN position. Check for voltage at connector (P23), pin D. There should be no voltage. a. If there is voltage, do step 2. b. If there is no voltage, reconnect connector (P3) and do step 5.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

37. ENGINE FAILS TO ACCELERATE PAST IDLE--IDLE RUN SWITCH IN RUN POSITION (cont)

Step 2. Move MASTER switch (S1) to OFF position. Disconnect wire number 48A from IDLE RUN switch (S4), terminal 3 (FO2-4). With IDLE RUN switch (S4) in RUN position, move MASTER switch (S1) to RUN position and check voltage at terminal 3 of switch (S4). There should be no voltage.

a. If there is voltage at switch terminal 3, replace IDLE RUN switch (S4) (para 12-5).

b. If there is no voltage, do step 3.

Step 3. With MASTER switch (S1) in RUN position, check voltage at wire number 48A (FO2-4). There should be no voltage.

a. If there is no voltage, move MASTER switch (S1) to OFF position. Connect wire number 48A to terminal 3 of IDLE RUN switch (S4). Connect connector (P23) and do step 5.

b. If there is voltage, do step 4.

Step 4. Check wire number 48 for short circuit to battery positive as outlined in the following chart (FO2-4, FO2-2, FO2-3, and FO1-1).

Wire Number	From	To	Remarks
48A	S4 - terminal 3	TB1-10 (TF1-10)	Meter on Vdc scale
48B	TB1-10 (TF1-10)	A7J2 - pin c	
48	P2 - pin c	P23 - pin D	

If there is a short circuit, repair wire as necessary (para 12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
37. ENGINE FAILS TO ACCELERATE PAST IDLE--IDLE RUN SWITCH IN RUN POSITION (cont)
Step 5. Connect engine monitor test set to the electronic control assembly (ECA) receptacle (A2J4) (para 2-4) (FU1-1). Start engine and observe N1 and N2 meters when speeds stabilize. If N2 meter is at 3000 rpm (100% speed) and N1 meter is less than 36,826 rpm (100% speed), the engine clutch did not lock up; do step 6.
Step 6. Connect a digital multimeter to the CLUTCH VALVE VOLTS test jacks on the engine monitor test set. Start engine and observe clutch valve actuation voltage. Voltage should be 0.300 ± 0.015 Vdc. a. If voltage is not correct, replace the electronic control assembly (ECA) (para 11-3). b. If voltage is correct, do step 7.

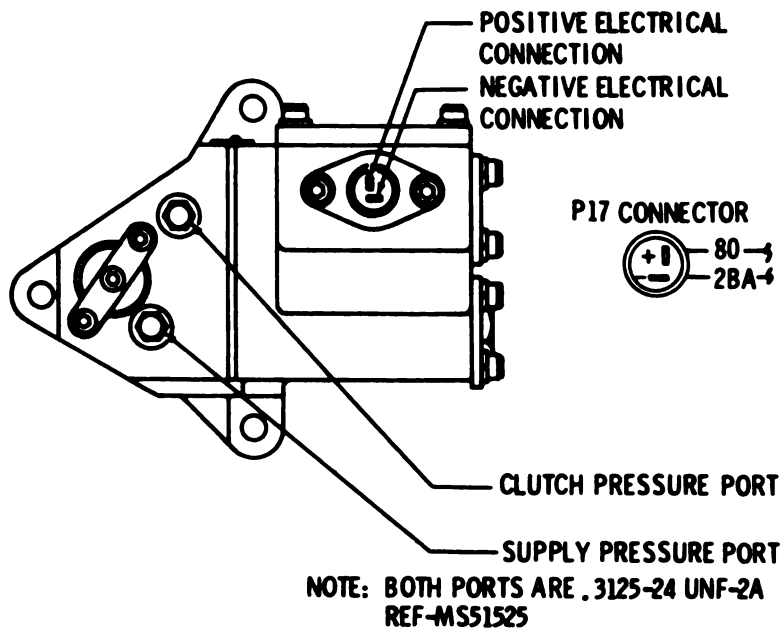


Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

37. ENGINE FAILS TO ACCELERATE PAST IDLE--IDLE RUN SWITCH IN RUN POSITION (cont)

Step 7. Move MASTER switch (S1) to OFF position. Remove clutch valve connector (P17) from clutch valve (L4) (FO1-3). Check resistance across the clutch valve terminals. Resistance should be 9 to 11 ohms.

a. If resistance is normal, do step 8.

b. If resistance is less than 9 ohms or greater than 11 ohms, replace the clutch valve assembly (L4) (para 11-7).

CAUTION

Be sure MASTER switch is OFF before disconnecting connector (P24) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.

Step 8. Move MASTER switch (S1) to OFF position. Disconnect harness connector (P24) from electronic control assembly (ECA) (FO1-1). Check clutch valve wiring for open or short circuit as outlined in the following chart (FO1-3 and FO1-1).

Wire Number	From	To	Remarks
80	P17 - positive	J12 - pin L	Meter on Vdc scale
80	P12 - pin L	P24 - pin A	
2BA	P17 - negative	E4	

a. If there is an open or short circuit, repair wire as necessary (para 11-2 and 12-9).

b. If wires are normal, do step 9.

Step 9. Connect a pressure gage, 0 to 300 psig (0-2069 kPa) capacity, to clutch valve pressure port. Start engine and check clutch valve lock-up pressure. Pressure should be 140 psi (965 kPa) minimum.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
37. ENGINE FAILS TO ACCELERATE PAST IDLE--IDLE RUN SWITCH IN RUN POSITION (cont)
a. If lock-up pressure is more than 140 psi (965 kPa), power transfer clutch failure is indicated. Replace engine (para 2-14).
b. If lock-up pressure is less than 140 psi (965 kPa), do step 10.
Step 10. Connect a pressure gage, 0 to 300 psig (0-2068 kPa) capacity, to clutch valve supply port. Start engine and check clutch valve supply pressure. Clutch valve supply pressure should be 170 to 230 psi (1172 to 1585 kPa).
a. If supply pressure is 170 to 230 psi (1172 to 1585 kPa), replace clutch valve (para 11-7).
b. If supply pressure is less than 170 psi (1172 kPa), an oil pump failure is indicated. Replace engine (para 2-14).
38. ENGINE SHUTS DOWN--OVER TEMP LAMP COMES ON
CAUTION Be sure MASTER switch is OFF before disconnecting connector (P24) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.
Step 1. Move MASTER switch (S1) to OFF position. Disconnect connector (P24) from electronic control assembly (ECA) (FO1-1). Disconnect T4 thermocouple harness and thermocouple leads from the engine terminal block (FO1-3). Check the continuity of the thermocouple system as outlined in the following chart (FO1-1 and FO1-3).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

38. ENGINE SHUTS DOWN--OVER TEMP LAMP COMES ON (cont)

Wire No.	From	To	Remarks
P24	pin W	pin X	More than 50,000 ohms
P24	pin W	pin T	More than 50,000 ohms
P24	pin X	pin T	More than 50,000 ohms
P24	pin Y	pin Z	More than 50,000 ohms
P24	pin Y	pin T	More than 50,000 ohms
P24	pin Z	pin T	More than 50,000 ohms
91	P24 - pin W	TC1	0-1 ohm
92	P24 - pin X	TC1	0-1 ohm
93	P24 - pin Y	TC2	0-1 ohm
94	P24 - pin Z	TC2	0-1 ohm
2AT	P24 - pin T	Ground	0-1 ohm
TC1	Lead 1	Lead 2	0.5-5 ohms
TC2	Lead 1	Lead 2	0.5-5 ohms
TC3	Lead 1	Lead 2	0.5-5 ohms
TC4	Lead 1	Lead 2	0.5-5 ohms
T/C junction block	4 studs	Ground	More than 50,000 ohms

a. If there is an open or short circuit, replace engine harness assembly (para 11-2).

b. If there are open or short circuits, replace T4 thermocouples (para 4-5).

c. If there is a short circuit, replace T4 terminal block (para 4-5).

d. If thermocouple system is normal, do step 2.

Step 2. Close the manual fuel shutoff valve (para 4-35, TM-6115-598-12) and install the engine monitor test set to the electronic control assembly ECA (para 2-4) (FO1-1). Crank engine and observe the maximum N1 crank speed on the N1 meter of the test set.

a. If 5000 rpm or over, do step 3.

b. If under 5000 rpm, replace the starter (para 4-40, TM 5-6115-598-12).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

38. ENGINE SHUTS DOWN--OVER TEMP LAMP COMES ON (cont)

Step 3. Check engine performance per step 7 of malfunction 35.

39. ENGINE SHUTS DOWN--LOW LUBE PRESSURE LAMP COMES ON

NOTE

The electronic control should block out the low lube pressure signal until 8 seconds after the engine has reached 50% N1 speed (18,413 rpm) during the start sequence.

Step 1. Connect engine monitor test set to the electronic control assembly (ECA) receptacle (A2J4) (para 2-4). Start engine and observe the N1 meter and LOW LUBE PRESSURE lamp (DS3). Time the interval between N1 = 50% speed (18,413 rpm) and the low lube pressure shutdown.

a. If low lube pressure shutdown occurs prior to the 8 second delay after engine reaches 18,413 rpm (N1), replace the electronic control assembly (ECA) (para 11-3).

b. If low lube pressure shutdown occurs after the engine reaches 18,413 rpm (N1) plus 8 seconds, do step 2.

CAUTION

Be sure MASTER switch is OFF before disconnecting connector (P24) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.

Step 2. Disconnect connector (P14) at the low lube pressure switch (S10) (para 4-25, TM 5-6115-598-12) (FO1-3). Disconnect harness connector (P24) from the electronic control assembly (ECA) receptacle (A2J2) (FO1-1). Check wire number 62 at connector (P14), pin B, for a short circuit to ground from connector (P14) to connector (P24), pin A.

a. If wire number 62 is shorted, repair harness as required (para 11-2).

b. If wire number 62 is normal, reconnect connector (P24) to the ECA and do step 3.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

39. ENGINE SHUTS DOWN--LOW LUBE PRESSURE LAMP COMES ON (cont)

Step 3. Remove low lube pressure switch (S10) (para 4-25, TM 5-6115-598-12). Connect a pressure gage, 0 to 100 psig (0-689 kPa) capacity, to the oil pressure manifold. Start engine and observe oil pressure at the time the LOW LUBE PRESSURE lamp comes on. Oil pressure should be greater than 35 psig (241 kPa).

a. If the oil pressure is 35 psig (241 kPa) or less, replace the engine (para 2-14).

b. If the oil pressure is greater than 35 psi (241 kPa), replace the oil low lube pressure switch (S10) (para 4-25, TM 5-6115-598-12); do step 4.

Step 4. Start engine.

If low lube pressure shutdown occurs, replace the electronic control control assembly (ECA) (para 11-3).

40. ENGINE SHUTS DOWN--HIGH LUBE TEMPERATURE LAMP COMES ON

NOTE

The electronic control assembly (ECA) is programmed to block out the high lube temperature shutdown function during starting until 50% N1 speed (18,413 rpm) is reached.

Step 1. Connect engine monitor test set to the electronic control assembly (ECA) receptacle (A2J4) (para 2-4). Start engine and observe N1 meter and HIGH LUBE TEMPERATURE lamp (DS4).

a. If a high lube temperature shutdown occurs before engine has reached 50% N1 speed (18,413 rpm), replace the electronic control assembly (ECA) (para 11-3).

b. If a high lube temperature shutdown occurs after the engine reaches 50% N1 speed (18,413 rpm), do step 2.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

40. ENGINE SHUTS DOWN--HIGH LUBE TEMPERATURE LAMP COMES ON (cont)

CAUTION

Be sure MASTER switch is OFF before disconnecting connector (P24) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.

Step 2. Disconnect wire number 61 at high oil temperature (thermo) switch (S9) (FO1-3). Disconnect electronic control assembly (ECA) harness connector (P24) (FO1-1). Check wire number 61 at switch end for short circuit to ground from switch connector to harness connector (P24), pin S.

a. If wire number 61 is shorted, repair harness as required (para 11-2).

b. If wire number 61 is normal, reconnect to thermo switch (S9) and reconnect connector (P24) to electronic control assembly (ECA) and do step 3.

Step 3. Check that oil cooler fan turns when the engine is cranked.

a. If fan does not turn, replace engine (para 2-14).

b. If fan turns, replace oil filter cooler bypass thermostat (para 8-2); do step 4.

Step 4. Start engine.

If high lube temperature shutdown occurs, replace electronic control assembly (ECA) (para 11-3).

41. VOLTMETER SHOWS IMPROPER VOLTAGE--DIGITAL VOLTMETER AND VOLTAGE REGULATOR AND MONITOR ASSEMBLY READINGS DIFFER MORE THAN 6 VOLTS

With a calibrated multimeter, measure the voltage at the AC terminals of the digital voltmeter (M1) (FO2-1). Measure voltage Va to Vb, Vb to Vc and Vc to Va. Compare voltage readings to the voltage indicated on the voltage regulator and monitor assembly (A1).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
41. VOLTMETER SHOWS IMPROPER VOLTAGE--DIGITAL VOLTMETER AND VOLTAGE REGULATOR AND MONITOR ASSEMBLY READINGS DIFFER MORE THAN 6 VOLTS (cont) a. If voltages are the same as the voltage regulator and monitor assembly (A1), replace digital voltmeter (M1) (para 12-3). b. If the digital voltmeter is normal and the voltage regulator and monitor assembly (A1) has incorrect voltage, replace the regulator and monitor assembly (A1) (para 12-8).
42. VOLTAGE REGULATOR AND MONITOR ASSEMBLY WILL NOT SCAN WHEN SCAN IS SELECTED Replace voltage regulator and monitor assembly (A1) (FO2-1) (para 12-8).
43. VOLTAGE REGULATOR AND MONITOR ASSEMBLY SCANS WHEN HOLD IS SELECTED Replace voltage regulator and monitor assembly (A1) (FO2-1) (para 12-8).
44. VOLTAGE REGULATOR AND MONITOR ASSEMBLY SHOWS IMPROPER FREQUENCY (HZ)--FREQUENCY LESS THAT 380 HZ--UNDER FREQUENCY LAMP COMES ON NOTE Digital voltmeter and voltage regulator and monitor are not field adjustable. Step 1. Connect engine monitor test set to the electronic control assembly (ECA) receptacle (A2J4) (para 2-4) (FO1-1). Start engine and observe engine speed on N2 meter. a. If engine speed is less than 100% (3000 $\pm$ 150 rpm), do step 2. b. If engine speed is 100% (3000 $\pm$ 150 rpm), replace the voltage regulator and monitor assembly (A1) (para 12-8).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
44. VOLTAGE REGULATOR AND MONITOR ASSEMBLY SHOWS IMPROPER FREQUENCY (HZ)--FREQUENCY LESS THAT 380 HZ--UNDER FREQUENCY LAMP COMES ON (cont)
Step 2. With engine monitor test set connected to the ECA, connect a digital multimeter to the monitor FUEL VALVE test jacks. Start engine and measure fuel demand voltage. The voltage should read 0.200 Vdc or greater. a. If the fuel demand signal is below 0.200 Vdc, do step 3. b. If the fuel demand signal is 0.200 Vdc or greater, replace the fuel pump (para 6-5) and do step 4.
Step 3. Check the T1 temperature sensor probe and wiring per steps 4 through 6, malfunction 35. If T1 temperature sensor system is normal, replace the electronic control assembly (ECA) (para 11-3).
Step 4. Start engine and measure fuel demand voltage. If the fuel demand voltage is 0.200 Vdc or greater, replace the fuel metering valve (para 6-5).
45. VOLTAGE REGULATOR AND MONITOR ASSEMBLY SHOWS IMPROPER FREQUENCY (HZ)--FREQUENCY 380-410 HZ
Step 1. Connect engine monitor test set to the electronic control assembly (ECA) (para 2-4). Start engine and observe engine speed on N2 meter. a. If engine speed is less than 100% (3000 ± 150 rpm), do step 2. b. If engine speed is 100% (3000 ± 150 rpm), replace the voltage regulator and monitor assembly (A1) (para 12-8).
Step 2. Check frequency rheostat (R3) (para 11-4) (FO2-1). Disconnect wire number 70A at TB2-1 (TF2-1) and wire number 72A at TB2-2 (TF2-2) and check the rheostat (R3) resistance through the range of operation (3 turns = 0 to 1000 ± 30 ohms) (FO2-2). The rheostat should operate smoothly with no momentary opens or shorts.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

45. VOLTAGE REGULATOR AND MONITOR ASSEMBLY SHOWS IMPROPER FREQUENCY (HZ)--FREQUENCY 380-410 HZ (cont)

a. If rheostat is normal, reconnect wire number 70A and 72A, do step 3.

b. If rheostat has improper reading, replace rheostat (R3) (para 11-4).

CAUTION

Be sure MASTER switch is OFF before disconnecting connector (P23) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.

Step 3. Move MASTER switch (S1) to OFF position. Disconnect connector (P23) from electronic control assembly (ECA). Check wiring between frequency rheostat (R3) and the ECA for open or short circuit as outlined in the following chart (FO1-1, FO2-1, FO2-2 and FO2-3).

Wire No.	From	To	Remarks
72A	R3	TB2-2 (TF2-2)	0-1 ohm
72C	TB2-2 (TF2-2)	A7J2 - pin h	0-1 ohm
72	P2 - pin h	P23 - pin V	0-1 ohm
70A	R3	TB2-1 (TF2-1)	0-1 ohm
70B	TB2-1 (TF2-1)	A7J2 - pin g	0-1 ohm
70	P2 - pin g	P23 - pin J	0-1 ohm
65D	TB3-3 (TF3-3)	A7J2 - pin j	0-1 ohm
65D	TB3-3 (TF3-3)	TB2-2 (TF2-2)	More than 50,000 ohms
65D	TB3-3 (TF3-3)	TB2-1 (TF2-1)	More than 50,000 ohms
65	P2 - pin h	P2 - pin j	More than 50,000 ohms
65	P2 - pin g	P2 - pin j	More than 50,000 ohms

a. If wiring is normal, reconnect connector (P23) and do step 4.

b. If wiring has open or short circuits, repair wire as necessary (para 12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
45. VOLTAGE REGULATOR AND MONITOR ASSEMBLY SHOWS IMPROPER FREQUENCY (HZ)--FREQUENCY 380-410 HZ (cont)
Step 4. Connect a digital multimeter to the FUEL VALVE test jacks of the engine monitor test set. Start engine and observe the fuel demand voltage. Voltage should be 0.200 Vdc or greater. a. If fuel voltage is less than 0.200 Vdc, do step 5. b. If fuel voltage is 0.200 Vdc or greater, replace the fuel pump assembly (para 6-5); do step 6.
Step 5. Check T1 temperature sensor probe and wiring per steps 4 through 6, malfunction 35. If T1 temperature sensor system is normal, replace the electronic control control assembly (ECA) (para 11-3).
Step 6. Start engine and measure fuel demand voltage. If the fuel demand voltage is 0.200 Vdc or greater, replace the fuel metering valve (para 6-5).
46. VOLTAGE REGULATOR AND MONITOR ASSEMBLY READOUT HUNTS OR FLUCTUATES MORE THAN ONE (1) HZ
Step 1. Connect engine monitor test set to the electronic control assembly (ECA) (para 2-4). Start engine and observe engine speed on N2 meter. a. If speed is fluctuating, do step 2. b. If speed is steady, replace voltage regulator and monitor assembly (A1) (FO2-2) (para 12-8).
Step 2. Check that ECA is adjusted in accordance with para 11-3. a. If necessary, adjust per para 11-3. b. If properly adjusted and speed is still fluctuating, do step 3.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
46. VOLTAGE REGULATOR AND MONITOR ASSEMBLY READOUT HUNTS OR FLUCTUATES MORE THAN ONE (1) HZ (cont)
Step 3. Observe N2 meter for fluctuations with changes in load. Observe kW readout for 1 minute. a. If load is fluctuating, do step 4. b. If load is not fluctuating, do step 5.
Step 4. Attempt to eliminate fluctuations by reducing the electronic control assembly (ECA) setting of the load anticipator circuit (para 11-3). Ensure that load pulse amplitude potentiometer is set near midrange; then, turn counterclockwise (left) in very small increments (a total of no more than 1/8th turn) to try to eliminate fluctuation. If this adjustment does not correct fluctuation, replace the electronic control assembly (ECA) (para 11-3).
Step 5. Shut down the generator set and check if oil cooler fan turns freely. a. If oil cooler fan turns freely, do step 6. b. If oiler cooler fan does not turn freely, replace the engine (para 2-14).
Step 6. Check if alternator turns freely. a. If alternator turns freely, replace fuel pump (para 6-5); do step 7. b. If the alternator does not turn freely, replace the alternator (para 2-15).
Step 7. Start engine and observe frequency on the regulator and monitor assembly (A1). If frequency readout still fluctuates, shutdown engine and replace fuel metering valve (para 6-5); do step 8.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

46. VOLTAGE REGULATOR AND MONITOR ASSEMBLY READOUT HUNTS OR FLUCTUATES MORE THAN ONE (1) HZ (cont)

Step 8. Start engine and observe frequency on the regulator and monitor assembly (A1).

If frequency readout still fluctuates, shutdown engine and replace the T4 thermocouples (para 4-5); do step 9.

Step 9. Start engine and observe frequency on the regulator and monitor assembly (A1).

If frequency readout still fluctuates, replace engine (para 2-14).

47. VOLTAGE REGULATOR AND MONITOR ASSEMBLY AND DIGITAL VOLTMETER SHOW NO OR LOW VOLTAGE (LESS THAT 25-30 VOLTS)

WARNING

High voltage is used in operation of the main ac contactor. Death on contact may result if personnel fail to observe safety precautions.

NOTE

The alternator will produce 20 to 30 volts on its residual magnetism, so readings in this range indicate lack of excitation.

Step 1. With engine running, verify a low voltage condition by measuring ac voltage at main ac contactor (CB5) (FO1-2). Read voltage at ac output terminals, A2 to B2, B2 to C2 and C2 to A2. Voltage should be 208 $\pm$ 2 Vac.

a. If voltage is correct, shut down engine; do step 2.

b. If voltage is not correct, do step 3.

Step 2. Check voltage signal wires from main ac contactor (CB5) to the voltage regulator and monitor assembly (A1) for continuity, as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO2-4, FO1-1, and FO1-2).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

47. VOLTAGE REGULATOR AND MONITOR ASSEMBLY AND DIGITAL VOLTMETER SHOW NO OR LOW VOLTAGE (LESS THAT 25-30 VOLTS) (cont)

Wire No.	From	To	Remarks
83A	CB5-C1	P1 - pin z	Meter on RX1 scale; resistance should be 0-1 ohm
83G	A7J1 - pin z	TB3-6 (TF3-6)	
83D	TB3-6 (TF3-6)	TB7-7 (TF7-7)	
83J	TB7-7 (TF7-7)	R10	
83K	R10	A1 - terminal Vc	
82A	CB5-B1	P1 - pin b	
82F	A7J1 - pin b	TB3-5 (TF3-5)	
82E	TB3-5 (TF3-5)	TB7-6 (TF7-6)	
82H	TB7-6 (TF7-6)	A1 - terminal Vb	
81A	CB5-A1	P1 - pin W	
81L	A7J1 - pin W	TB3-4 (TF3-4)	
81D	TB3-4 (TF3-4)	TB7-5 (TF7-5)	
81M	TB7-5 (TF7-5)	R9	
81P	R9	A1 - terminal Va	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 3. Check field excitation output voltage at the voltage regulator and monitor assembly (A1) with the generator set running at 400 Hz and 208 V. Check voltage between terminal F(+) and terminal F(-) (FO-2-1). Voltage should be 19 to 24 Vdc.

a. If voltage is correct, do step 9.

b. If there is no voltage, do step 4.

Step 4. Check voltage at terminal B_{HZ} of the voltage regulator and monitor assembly (A1) (FO-2-1). There should be 24 Vdc minimum.

a. If there is voltage, replace the voltage regulator and monitor assembly (para 12-8).

b. If there is no voltage, shut down engine; do step 5.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

47. VOLTAGE REGULATOR AND MONITOR ASSEMBLY AND DIGITAL VOLTMETER SHOW NO OR LOW VOLTAGE (LESS THAT 25-30 VOLTS) (cont)

Step 5. Remove under frequency relay (K3) (para 12-7) (FO-2-4). Move MASTER switch (S1) to RUN position. Check voltage at relay socket (K3), pin 2 and pin 3. Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 6.

b. If voltage is not correct, do step 8.

Step 6. Test under frequency relay (K3) (para 12-7) (FO-2-4).

a. If relay (K3) is normal, do step 7.

b. If relay (K3) is defective, replace relay (para 12-7).

Step 7. Check wires for continuity between under frequency relay (K3) and the voltage regulator and monitor assembly (A1) as outlined in the following chart (FO-2-4, FO-2-2, FO-2-3, and FO-2-1).

Wire No. or Component	From	To	Remarks
40G	K3 - pin 5	TB2-11 (TF2-11)	Meter on RX1 scale; resistance should be 0-1 ohm
40C	TB2-11 (TF2-11)	D8 - negative	
40B	D8 - negative	CB4 - terminal 1	
CB4	CB4 - terminal 1	CB4 - terminal 2	CB4 in closed position
42A	CB4 - terminal 2	A1 - terminal B_{HZ}	

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If circuit breaker (CB4) is defective, replace circuit breaker (para 12-6).

Step 8. Check wires and components from under frequency relay (K3) to battery positive as outlined in the following chart (FO-2-1, FO-2-2, FO-2-3, FO-2-4, and FO-1-2).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

47. VOLTAGE REGULATOR AND MONITOR ASSEMBLY AND DIGITAL VOLTMETER SHOW NO OR LOW VOLTAGE (LESS THAT 25-30 VOLTS) (cont)

Wire No. or Component	From	To	Remarks
10J	K3 - pin 3	TB7-1 (TF7-1)	Meter on RX1 scale;
10G	TB7-1 (TF7-1)	CB3 - terminal 1	resistance should
10C	CB3 - terminal 1	TB4-3 (TF4-3)	be 0-1 ohm
10B	TB4-3 (TF4-3)	D3 - negative	
D3	D3 - positive	D3 - negative	Observe diode polarity
9C	D3 - positive	TB4-11 (TF4-11)	
9B	TB4-11 (TF4-11)	TB7-11 (TF7-11)	
9E	TB7-11 (TF7-11)	S1 - terminal 1	
S1	S1 - terminal 1	S1 - terminal 2	S1 in RUN position
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB 1 - terminal 1	
CB1	CB1 - terminal 1	CB1 - terminal 2	CB1 in closed position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If reverse polarity diode (D3) is defective, replace diode (para 12-10).

c. If MASTER switch (S1) is defective, replace switch (para 12-5).

d. If circuit breaker (CB1) is defective, replace breaker (para 12-6).

Step 9. Shut down generator set. Disconnect wire number 103A from the voltage regulator and monitor assembly (A1) (FO-2-1). Check exciter field coil resistance by measuring resistance between wire number 103A and regulator and monitor terminal F (-). Resistance should be 2.75 to 3.05 ohms.

a. If resistance is not correct, do step 10.

b. If resistance is correct, the exciter field coil circuit is normal.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

47. VOLTAGE REGULATOR AND MONITOR ASSEMBLY AND DIGITAL VOLTMETER SHOW NO OR LOW VOLTAGE (LESS THAT 25-30 VOLTS) (cont)

Step 10. Disconnect exciter harness connector (P11) from the end of the alternator (G1) (FO-1-2). Measure the resistance between pins A and B. Resistance should be 2.5 to 3.5 ohms.

a. If resistance is correct, do step 11.

b. If resistance is not correct, replace alternator (para 2-15).

Step 11. Check field exciter wiring for continuity from voltage regulator and monitor assembly (A1) to the alternator (G1) as outlined in the following chart (FO-1-2, FO-1-1, FO-2-3, FO-2-2, and FO-2-1).

Wire No.	From	To	Remarks
103	P11 - pin A	P1 - pin C	Meter on RX1 scale;
103C	A7J1 - pin C	TB3-1 (TF3-1)	resistance should be
103A	TB3-1 (TF3-1)	A1 - terminal F(+)	0-1 ohm
104	P11 - pin B	P1 - pin T	
104C	A7J1 - pin T	TB3-2 (TF3-2)	
104A	TB3-2 (TF3-2)	A1 - terminal F(-)	

If there is an open or short circuit, repair wire as necessary (para 12-9).

48. VOLTAGE REGULATOR AND MONITOR ASSEMBLY AND DIGITAL VOLTMETER SHOW SAME BUT IMPROPER VOLTAGE

Step 1. Attempt to adjust voltage with VOLTAGE ADJUSTMENT rheostat (R4).

If voltage will not adjust, or adjustment is not smooth (spikes or momentary 0 volts), do step 2.

Step 2. Check voltage rheostat (R4) operation. Disconnect wire number 101 and wire number 103 from two terminals RH on the voltage regulator and monitor (A1). Connect a digital multimeter to the wires and measure the resistance of R4 as it is turned through its range (one turn of potentiometer is 0 to 3500 $\pm$ 350 ohms).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECT ION CORRECTIVE ACTION

48. VOLTAGE REGULATOR AND MONITOR ASSEMBLY AND DIGITAL VOLTMETER SHOW SAME BUT IMPROPER VOLTAGE (cont)

a. If voltage rheostat (R4) operation is erratic, replace rheostat (para 12-4)

b. If R4 operation is normal, replace voltage regulator and monitor assembly (A1) (para 12-8).

49. VOLTAGE REGULATOR AND MONITOR ASSEMBLY SHOWS IMPROPER KW LOAD

Connect generator set to the load bank (Page 2-7, Para. 2-11, Item 49, Table 2-5, Item 49). Start engine and apply load. Observe kW reading on the voltage regulator and monitor assembly (A1).

If kW reading does not agree with the load bank, replace the voltage regulator and monitor assembly (para 12-8).

50. AC INTERRUPT LAMP DOES NOT COME ON (OR WILL NOT LATCH ON) WHEN AC INTERRUPT SWITCH IS MOVED TO CLOSE--SINGLE UNIT OPERATION

NOTE

If any voltage is present on the AC bus bar, the AC INTERRUPT switch (S2) will not close.

Step 1. Check ac output voltage at main ac contactor (CB5) (FO1-2). Read voltage at terminals A2 to B2, B2 to C2 and C2 to A2. Voltage should be 208 ± 2 Vac.

a. If ac output voltage is correct, shut down engine; do step 2.

b. If ac output voltage is not correct, shut down engine; do step 3.

Step 2. Check AC INTERRUPT lamp (D56) circuits per malfunction 26.

NOTE

AC INTERRUPT switch (S2) actuates CB5 by pulling in relay (K10) through relay (K9) and SINGLE UNIT PARALLEL switch (S7). CB5 is latched on by CB5 A contacts.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECT ION CORRECTIVE ACTION
50. AC INTERRUPT LAMP DOES NOT COME ON (OR WILL NOT LATCH ON) WHEN AC INTERRUPT SWITCH IS MOVED TO CLOSE--(SINGLE UNIT OPERATION) (cont)
Step 3. Disconnect the main ac contactor (CB5) harness connector (P6) (FO1-2). Move MASTER switch (S1) to RUN position. Hold AC INTERRUPT switch (S2) in CLOSED position. Check voltage at connector (P6), pin A - positive to ground. Voltage should be 24 Vdc minimum. a. If voltage is correct, do step 4. b. If voltage is not correct, do step 6.
Step 4. Check for continuity at main ac contactor (CB5) receptacle (J6), pin A to pin B (FO1-2). Resistance should be 20 $\pm$ 5 ohms. a. If resistance is correct, do step 5. b. If resistance is not correct, replace the main ac contactor (CB5) (para 5-2).
Step 5. Move MASTER switch (S1) to OFF position. Check for continuity to ground at connector (P6), pin B, wire number 2F to splice (E9) and wire number 2C from splice (E9) to battery negative (BT3) (FO1-2 and FO1-1). If there is an open or short circuit, repair wire as necessary (para 12-9).
Step 6. Remove AC interrupt relay (K10) (Para. 12-7). Connect Harness connector (P6) to main AC contactor (CB5). Start engine and let run to 100% rated speed. Hold AC interrupt switch (S2) in closed position and check voltage at relay (K10) socket, pin 2 (FO2-4). Voltage should be 24 Vdc minimum. a. If voltage is correct, do step 7. b. If voltage is not correct, do step 9.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

50. AC INTERRUPT LAMP DOES NOT COME ON (OR WILL NOT LATCH ON) WHEN AC INTERRUPT SWITCH IS MOVED TO CLOSE--(SINGLE UNIT OPERATION) (cont)

Step 7. Test ac interrupt relay (K10) (para 12-7) (FO2-4).

a. If relay (K10) is defective, replace relay (para 12-7).

b. If relay (K10) is normal, do step 8.

Step 8. Move MASTER switch (S1) to OFF position. Check ground wires for continuity from ac interrupt relay (K10), to battery negative terminal, as outlined in the following chart (FO2-4, FO2-2, FO2-3, FO1-1, and FO1-2).

Wire No.	From	To	Remarks
2AB	K10 - pin 7	TD2 - pin 7	Meter on RX1 scale; resistance should be 0-1 ohm
2AA	TD2 - pin 7	TD1 - pin 7	
2Z	TD1 - pin 7	K12 - pin 7	
2Y	K12 - pin 7	K11 - pin 7	
2X	K11 - pin 7	TB6-11 (TF6-11)	
2AK	TB6-11 (TF6-11)	TB5-7 (TF5-7)	
2AM	TB5-7 (TF5-7)	A7J1 - pin t	
2C	P1 - pin t	E9	
2C	E9	BT3 - negative	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 9. Check ac interrupt actuate circuit for voltage from relay (K10) to battery positive terminal as outlined in the following chart (FO1-1, FO1-2, FO2-1, FO2-2, FO2-3, and FO2-4). Voltage should be 24 Vdc minimum.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

50. AC INTERRUPT LAMP DOES NOT COME ON (OR WILL NOT LATCH ON) WHEN AC INTERRUPT SWITCH IS MOVED TO CLOSE--(SINGLE UNIT OPERATION) (cont)

Wire No. or Component	From	To	Remarks
36	P6 - pin A	P1 - pin w	Meter on Vdc scale
36C	A7J1 - pin w	TB5-8 (TF5-8)	
36B	TB5-8 (TF5-8)	K10 - pin 4	
22E	K10 - pin 6	TB5-11 (TF5-11)	
22B	TB5-11 (TF5-11)	S2 - terminal 6	
S2	S2 - terminal 6	S2 - terminal 5	S2 in center position
20B	S2 - terminal 5	S2 - terminal 3	
S2	S2 - terminal 3	S2 - terminal 2	S2 in closed
17A	S2 - terminal 2	TB7-10 (TF7-10)	position
17B	TB7-10 (TF7-10)	K9 - A3	
18B	K9 - A2	TB6-7 (TF6-7)	
18A	TB6-7 (TF6-7)	S7 - terminal 7	
S7	S7 - terminal 7	S7 - terminal 8	S7 in UNIT position
46A	S7 - terminal 8	TB4-10 (TF4-10)	
46C	TB4-10 (TF4-10)	CB2 - terminal 2	
CB2	CB2 - terminal 2	CB2 - terminal 1	CB2 in closed position
1B	CB2 - terminal 1	CB1 - terminal 1	
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT4 - positive	

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
50. AC INTERRUPT LAMP DOES NOT COME ON (OR WILL NOT LATCH ON) WHEN AC INTERRUPT SWITCH IS MOVED TO CLOSE--(SINGLE UNIT OPERATION) (cont)
a. If there is an open or short circuit, repair wire as necessary (para 12-9).
b. If AC INTERRUPT switch (S2) is defective, replace switch (para 12-5).
c. If UNIT PARALLEL switch (S7) is defective, replace switch (para 12-5).
d. If circuit breaker (CB2) is defective, replace circuit breaker (para 12-6).
e. If dead bus relay (K9) is defective, replace relay (para 12-7).
f. If all wires and components are normal, do step 10.
Step 10. Check ac interrupt latching circuit for voltage from relay (K10) to battery positive terminal as outlined in the following chart (F01-1, F01-2, F02-1, F02-2, F02-3, and F02-4). Voltage should be 24 Vdc minimum.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

50. AC INTERRUPT LAMP DOES NOT COME ON (OR WILL NOT LATCH ON) WHEN AC INTERRUPT SWITCH IS MOVED TO CLOSE--(SINGLE UNIT OPERATION) (cont)

Wire No. or Component	From	To	Remarks
34D	K10 - pin 2	TB4-5 (TF4-5)	Meter on Vdc scale
34B	TB4-5 (TF4-5)	A6 - terminal 6	
A6	A6 - terminal 6	A6 - terminal 5	
30B	A6 - terminal 5	TB6-8 (TF6-8)	
30A	TB6-8 (TF6-8)	K7 - pin 8	
K7	K7 - pin 8	K7 - pin 6	
28A	K7 - pin 6	A5 - terminal NC	
A5	A5 - terminal NC	A5 - terminal NC	
26A	A5 - terminal NC	A4 - terminal NC	
A4	A4 - terminal NC	A4 - terminal NC	
24A	A4 - terminal NC	K3 - pin 4	
K3	K3 - pin 4	K3 - pin 6	
22D	K3 - pin 6	TB5-11 (TF5-11)	
22B	TB5-11 (TF5-11)	S2 - terminal 6	
S2	S2 - terminal 6	S2 - terminal 5	S2 in center position
20A	S2 - terminal 5	TB4-12 (TF4-12)	
20C	TB4-12 (TF4-12)	A7J1 - pin g	
20	P1 - pin g	P6 - pin D	
9	P6 - pin c	P1 - pin f	
9G	A7J1 - pin f	TB4-11 (TF4-11)	
9B	TB4-11 (TF4-11)	TB7-11 (TF7-11)	
9E	TB7-11 (TF7-11)	S1 - terminal 1	
S1	S1 - terminal 1	S1 - terminal 2	S1 in RUN position
7B	S1 - terminal 2	S5 - terminal 2	
7A	S5 - terminal 2	TB4-1 (TF4-1)	
7M	TB4-1 (TF4-1)	CB1 - terminal 1	
CB1	CB1 - terminal 1	CB1 - terminal 2	CB1 in CLOSED position
1D	CB1 - terminal 2	TB5-9 (TF5-9)	
1C	TB5-9 (TF5-9)	A7J1 - pin u	
1A	P1 - pin u	BT-4 - positive	

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
50. AC INTERRUPT LAMP DOES NOT COME ON (OR WILL NOT LATCH ON) WHEN AC INTERRUPT SWITCH IS MOVED TO CLOSE--(SINGLE UNIT OPERATION) (cont)
a. If there is an open or short circuit, repair wire as necessary (para 12-9).
b. If short circuit relay (A6) is defective, replace relay (para 12-7).
c. If under voltage latching relay (K7) is defective, replace relay (para 12-7).
d. If reverse power relay (A5) is defective, do step 11.
e. If overload relay (A4) is defective, do step 11.
f. If under frequency relay (K3) is defective, replace relay (para 12-7).
g. If there is no voltage on circuit through main ac contactor (CB5), pin D and pin C, replace contactor (para 5-2).
h. If circuit breaker (CB1) is defective, replace breaker (para 12-6).
WARNING Do not try to troubleshoot the current transformers with the generator set running. An unloaded secondary winding of the current transformers will develop very high voltage which could cause damage to test equipment or loss of life.
Step 11. Shut down generator set and check the ac signal circuits for continuity for the input to the reverse power relay (A5) and overload relay (A4) as outlined in the following chart (FO1-1, FO1-2, FO2-2, and FO2-3).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

50. AC INTERRUPT LAMP DOES NOT COME ON (OR WILL NOT LATCH ON) WHEN AC INTERRUPT SWITCH IS MOVED TO CLOSE--(SINGLE UNIT OPERATION) (cont)

Wire No. or Component	From	To	Remarks Meter on RX1 scale;
111A	A5 - terminal 6	TB3-11 (TF3-11)	0-1 ohm
111B	TB3-11 (TF3-11)	A7J1 - pin o	0-1 ohm
111	P1 - pin O	CT4 - terminal X1	0-1 ohm
CT4			0.4 ohm
114C	CT4	E11	0-1 ohm
114	E11	P1 - pin s	0-1 ohm
114A	A7J1 - pin s	TB5-5 (TF5-5)	0-1 ohm
114B	TB5-5 (TF5-5)	A4 - terminal 4	0-1 ohm
203A	A5 - terminal 6	A4 - terminal 1	0-1 ohm
112B	A4 - terminal 2	TB5-3 (TF5-3)	0-1 ohm
112A	TB5-3 (TF5-3)	A7J1 - pin n	0-1 ohm
112	P1 - pin n	CT5 - terminal X1	0-1 ohm
CT5			0.4 ohm
114D	CT5	E11	0-1 ohm
113B	A4 - terminal 3	TB5-4 (TF5-4)	0-1 ohm
113A	TB5-4 (TF5-4)	A7J1 - pin r	0-1 ohm
113	P1 - pin r	CT6 - terminal X1	0-1 ohm
CT6			0.4 ohm
114E	CT6	E11	0-1 ohm

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If current transformers (CT4, CT5, or CT6) are defective, replace transformers as required (para 5-3).

c. If wires and current transformers are normal, replace reverse power relay (A5) and overload relay (A4)as required (para 12-7).

51. AC INTERRUPT LAMP COMES ON BUT GOES OUT WHEN AC INTERRUPT SWITCH IS RELEASED FROM CLOSE TO CENTER POSITION.

NOTE

This condition indicates that the main contactor relay (K10) is not latching.

Check main ac contactor (CB5) latch circuit per step 10 of malfunction 50.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

52. MAIN AC CONTACTOR CLOSES--BUT EXCESSIVE NOISE, VIBRATION, OR SMOKE IS NOTICED

Remove the alternator (para 2-15). Check engine output rotation.

a. If engine output turns freely, replace the alternator (para 2-15).

b. If engine output does not turn freely, replace the engine (para 2-14).

53. ENGINE SPEED DROOPS WHEN MAIN AC CONTACTOR IS CLOSED

Refer to malfunction 45.

54. MAIN AC CONTACTOR CLOSES--BUT AN UNBALANCED AMP LOAD IS INDICATED

NOTE

Before troubleshooting the unbalanced amp load condition, be sure external connections are correctly distributed.

Step 1. Check output voltage at the main ac contactor (CB5) with the contactor closed. Measure the voltage between terminals A2 to B2, B2 to C2, and C2 to A2. Voltage should be 208 ± 2 Vac.

a. If output voltage is correct, do step 3.

b. If output voltage is not correct, do step 2.

Step 2. Check input voltage to main ac contactor (CB5) with the contactor closed (FO-1-2). Measure the voltage between the terminals A1 to B1, B1 to C1 and C1 to A1. Voltage should be 208 ± 2 Vac.

a. If input voltage is correct, shut down the generator set and replace the main ac contactor (CB5) (para 5-2).

b. If input voltage is not correct, shut down the generator set and replace the alternator (para 2-15).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

54. MAIN AC CONTACTOR CLOSES--BUT AN UNBALANCED AMP LOAD IS INDICATED (cont)

Step 3. With the generator set operating under load, use a clamp on ammeter to measure the line current (split core digital multimeter, NSN 6625-00-892-1498), at the 3 output lines L1, L2 and L3 (FO-3). The amperage level is a direct function of the load being supported at the time of operation. Compare the amp readings obtained to the readings on the voltage regulator and monitor assembly (A1) for the phase being measured. Compare the three amp readings to each other.

a. If the amps measured for a phase do not agree within 10 percent of the amp reading for that phase on the voltage regulator and monitor assembly (A1), replace the regulator and monitor assembly (para 12-8).

b. If the measured and observed amps agree, but the phase unbalance is confirmed, do step 4.

Step 4. Measure the voltage across the ballast resistors, R5, R6, and R7 (FO-2-2). Compare the resistor voltage to the phase amp reading for each of the three phases as shown in the following curve, R5 for L1, R6 for L2, and R7 for L3. The voltage should be within 10 percent of the nominal value of the curve.

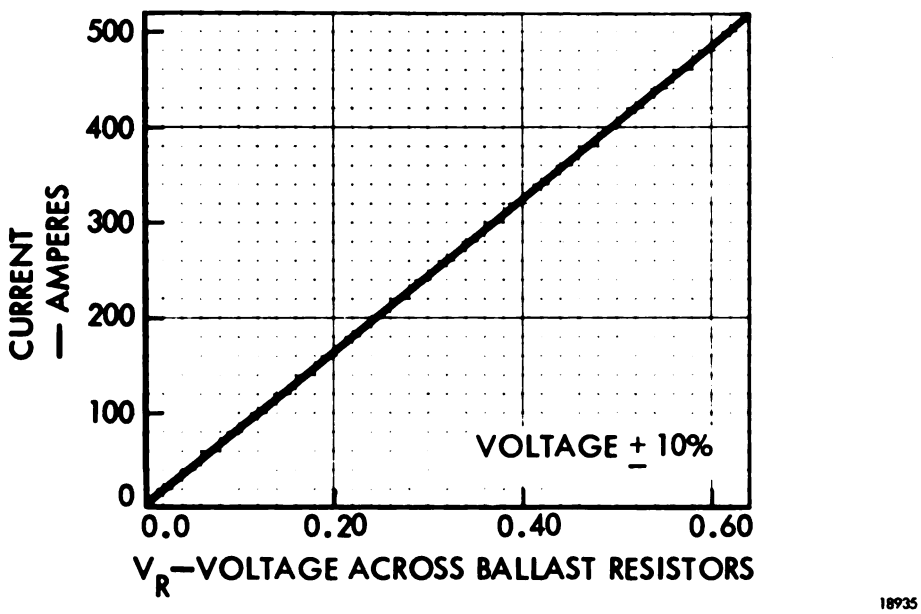


Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

54. MAIN AC CONTACTOR CLOSES--BUT AN UNBALANCED AMP LOAD IS INDICATED (cont)

a. If the ballast resistor voltage is correct for the load applied, the unbalance condition is external of the generator set. Notify supervisor of the problem.

b. If the voltage is not correct, do step 5.

WARNING

Do not try to troubleshoot the current transformers with the generator set running. An unloaded secondary winding of the current transformers will develop very high voltage which could cause damage to test equipment or loss of life.

Step 5. Shut down the generator set. Remove wire number 105A from terminal C on the voltage regulator and monitor assembly (A1). Measure the resistance between wire 105A and terminal for the problem phase. Resistance should be 242 ± 15 ohms. Following verification of the problem circuit, check continuity of the particular phase as outlined in the following chart (FO1-1, FO1-2, FO2-2, FO2-1, and FO2-3).

Phase L1 105A to A1 - terminal Ia

Wire No. or Component	From	To	Remarks
85A	A1 - terminal Ia	TB3-12 (TF3-12)	0-1 ohm
85B	TB3-12 (TF3-12)	A7J1 - pin P	0-1 ohm
85	P1 - pin P	CT1 - terminal 2	0-1 ohm
CT1	CT1 - terminal 2	CT1 - terminal 1	230 ± 12 ohms
86	CT1 - terminal 1	P1 - pin V	0-1 ohm
86D	A7J1 - pin V	TB3-9 (TF3-9)	0-1 ohm
86A	TB3-9 (TF3-9)	R5	0-1 ohm
R5			12.4 ohms
105F	R5	R6	0-1 ohm
105D	R6	R7	0-1 ohm
105B	R7	TB3-8 (TF3-8)	0-1 ohm
105A	TB3-8 (TF3-8)	A1 - terminal C	0-1 ohm

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

54. MAIN AC CONTACTOR CLOSES--BUT AN UNBALANCED AMP LOAD IS INDICATED (cont)

Phase L2 105A to A1 - terminal Ic

Wire No. or Component	From	To	Remarks
87A	A1 - terminal Ib	TB3-10 (TF3-10)	0-1 ohm
87B	TB3-10 (TF3-10)	A7J1 - pin R	0-1 ohm
87	P1 - pin R	CT2 - terminal 2	0-1 ohm
CT-2	CT2 - terminal 2	CT2 - terminal 1	230 ± 12 ohms
88	CT2 - terminal 1	P1 - pin h	0-1 ohm
88D	A7J1 - pin h	TB4-2 (TF4-2)	0-1 ohm
88A	TB4-2 (TF4-2)	R6	0-1 ohm
R6			12.4 ohms
105D	R6	R7	0-1 ohm
105B	R7	TB3-8 (TF3-8)	0-1 ohm
105A	TB3-8 (TF3-8)	A1 - terminal C	0-1 ohm

Phase L3 105A to A1 - terminal Ic

Wire No. or Component	From	To	Remarks
89A	A1 - terminal Ic	TB4-4 (TF4-4)	0-1 ohm
89B	TB4-4 (TF4-4)	A7J1 - pin U	0-1 ohm
89	P1 - pin U	CT3 - terminal 2	0-1 ohm
CT3	CT3 - terminal 2	CT3 - terminal 1	230 ± 12 ohms
90	CT3 - terminal 1	P1 - pin p	0-1 ohm
90A	A7J1 - pin p	TB4-8 (TF4-8)	0-1 ohm
90D	TB4-8 (TF4-8)	R7	0-1 ohm
R7			12.4 ohms
105B	R7	TB3-8 (TF3-8)	0-1 ohm
105A	TB3-8 (TF3-8)	A1 - terminal C	0-1 ohm

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If current transformer is defective, replace transformer (para 5-3).

c. If ballast resistor is defective, replace resistor (para 5-3).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

55. AC INTERRUPT LAMP GOES OUT WHILE GENERATOR SET IS ON THE LINE - - NO OTHER FAULTS ARE INDICATED

Refer to malfunction 50.

56. AC INTERRUPT LAMP GOES OUT WHILE GENERATOR SET IS ON THE LINE - - SHORT CIRCUIT LAMP COMES ON

NOTE

The short circuit trips when the average line-to-neutral voltage falls below 96 volts (line-to-line 160 volts).

Step 1. Check external load to determine cause of the short circuit.

a. Disconnect external shorted equipment.

b. If there is no external short circuit, do step 2.

Step 2. Check the input to the short circuit relay assembly (A6) (FO2-2). Read ac voltage at the relay, neutral to line as follows: terminal 4 to terminal 3, terminal 4 to terminal 2, terminal 4 to terminal 1. Voltage should be 120 + 5 Vac.

a. If voltage is correct, shut down the generator set and do step 3.

b. If voltage is not correct, refer to malfunction 54.

Step 3. Disconnect harness connector (P6) from the main ac contactor (CB5) (FO1-2). Run generator set and hold AC INTERRUPT switch (S2) in CLOSE position. Measure 24 Vdc voltage at the short circuit relay (A6) as follows:

A6 - terminal 5 to ground - 24 Vdc minimum
A6 - terminal 5 to terminal 7 - 24 Vdc minimum
A6 - terminal 5 to terminal 6 - no voltage should be present

Observe if SHORT CIRCUIT lamp (DS10) is on.

a. If voltage is not correct, replace the short circuit relay assembly (A6) (para 12-7).

b. If SHORT CIRCUIT lamp (DS10) is on, refer to malfunction 6.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

57. MAIN AC CONTACTOR OPENS DURING SINGLE UNIT OPERATION--REVERSE POWER LAMP COMES ON

NOTE

This fault can occur only when two sets are operating in parallel. If reverse power lamp comes on at any other time, it is a false indication.

Step 1. Actuate the LAMP RESET switch (S8), and observe the REVERSE POWER lamp (DS7).

a. If the REVERSE POWER lamp is on, refer to malfunction 6.

b. If the REVERSE POWER lamp is off, do step 2.

Step 2. Move AC INTERRUPT switch (S2) to CLOSE position.

If main ac contactor (CB5) does not close and the REVERSE POWER lamp (DS7)is on, replace the reverse power relay (A5) (para 12-7).

58. MAIN AC CONTACTOR OPENS DURING PARALLEL OPERATION--REVERSE POWER LAMP COMES ON

Step 1. Check external load connections for proper connections.

a. If external connection is not correct, make proper connection.

b. If external connection is correct, do step 2.

Step 2. Check the individual operation of each generator set.

a. If each generator set operates normally, do step 3.

b. If main ac contactor (CB5) will not close and REVERSE POWER lamp (DS7) is on, refer to malfunction 57.

Step 3. Check external paralleling cable between each of the generator sets.

a. If paralleling cable is normal, do step 4.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
58. MAIN AC CONTACTOR OPENS DURING PARALLEL OPERATION--REVERSE POWER LAMP COMES ON (cont)
b. If paralleling cable is defective, replace cable assembly (external equipment).
Step 4. Attempt parallel unit operation.
If units will not operate in parallel, check the load share settings on each electronic control assembly (ECA) (para 11-3).
59. MAIN AC CONTACTOR OPENS DURING OPERATION--UNDER VOLTAGE LAMP COMES ON
Step 1. Observe voltages on the voltage regulator and monitor assembly (A1). Normal voltage should be 208 ± 2 Vac.
a. If voltage is greater than 180 volts on all three phases, do step 2.
b. If voltage is less than 180 volts, do step 3.
Step 2. Actuate the LAMP RESET switch (S8) and observe the UNDER VOLTAGE lamp (DS8).
a. If UNDER VOLTAGE lamp is on, refer to malfunction 8.
b. If UNDER VOLTAGE lamp is off, do step 4.
Step 3. Check voltage adjust rheostat (R4) per malfunction 48.
If voltage rheostat is normal, do step 4.
Step 4. Check voltage regulator and monitor assembly (A1) per malfunction 47.
60. MAIN AC CONTACTOR OPENS DURING OPERATION--OVER VOLTAGE LAMP COMES ON
Step 1. Observe voltages on the voltage regulator and monitor assembly (A1). Normal voltage should be 208 ± 2 Vac.
a. If voltage is less than 240 Vac, do step 2.
b. If voltage is greater than 240 Vac, do step 5.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

60. MAIN AC CONTACTOR OPENS DURING OPERATION--OVER VOLTAGE LAMP COMES ON (cont)

Step 2. Actuate the LAMP RESET switch (S8) and observe the OVER VOLTAGE lamp (DS11).

a. If OVER VOLTAGE lamp is on, refer to malfunction 9.

b. If OVER VOLTAGE lamp is off, do step 3.

Step 3. Check regulator monitor circuit breaker (CB4) (para 12-6).

a. If circuit breaker (CB4) is defective, replace breaker (para 12-6).

b. If circuit breaker (CB4) is normal, do step 4.

Step 4. Check over voltage circuit wires for continuity as outlined in the following chart (FO2-1, FO2-4, and FO2-3).

Wire No.	From	To	Remarks
27B	A1 - terminal OV	CB4 - terminal 3	Meter on RX1 scale;
2AH	CB4 - terminal 4	K6 - pin 7	resistance should be
40B	CB4 - terminal 1	D8 - negative	0-1 ohm maximum
42B	CB4 - terminal 2	A1 - terminal B_{HZ}	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 5. Check voltage adjust rheostat (R4) per malfunction 48.

If voltage rheostat is normal, do step 6.

Step 6. Check voltage regulator and monitor assembly (A1) per malfunction 47.

61. MAIN AC CONTACTOR OPENS DURING OPERATION--UNDER FREQUENCY LAMP COMES ON

Step 1. Observe frequency readout (Hertz) on the voltage regulator and monitor assembly (A1).

a. If frequency is 380 hertz or greater, do step 2.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
61. MAIN AC CONTACTOR OPENS DURING OPERATION--UNDER FREQUENCY LAMP COMES ON (cont)
b. If frequency is less than 380 hertz, do step 4.
Step 2. Check under frequency relay (K3) circuits per malfunction 14.
If under frequency relay circuits are normal, do step 3.
Step 3. Check voltage regulator and monitor assembly (A1), frequency adjust rheostat (R3) and control system per malfunction 45.
Step 4. Check voltage regulator and monitor assembly (A1) and engine control system per malfunction 44.
62. MAIN AC CONTACTOR OPENS DURING OPERATION--OVERLOAD LAMP COMES ON
Step 1. Observe amps on the voltage regulator and monitor assembly (A1).
a. If amp is reading 520 or greater, do step 2.
b. If amp is reading less than 520, do step 3.
Step 2. Check external system load.
Reduce system load or bring additional generator on line to share the load.
Step 3. Actuate the LAMP RESET switch (S8) and observe the OVERLOAD lamp (DS19).
If OVERLOAD lamp is on, refer to malfunction 10.
63. VOLTAGE READOUT ON VOLTAGE REGULATOR AND MONITOR ASSEMBLY IS UNSTABLE UNDER LOAD
Step 1. Check the load current per steps 1, 2, and 3 of malfunction 54.
a. If load (line current) balance is correct, do step 2.
b. If load is unbalanced, correct per steps 4 and 5 of malfunction 54.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
63. VOLTAGE READOUT ON VOLTAGE REGULATOR AND MONITOR ASSEMBLY IS UNSTABLE UNDER LOAD (cont)
Step 2. Check voltage signal circuit per step 2, malfunction 47. a. If signal circuit is normal, do step 3. b. If signal circuit is defective, repair per malfunction 47.
Step 3. Check field excitation circuit per steps 9, 10, and 11 of malfunction 47. a. If field excitation circuit is normal, do step 4. b. If field excitation circuit is defective, repair per malfunction 47.
Step 4. Check frequency circuit per steps 3, 4, 5, 6, 7, and 8 of malfunction 47. a. If frequency circuit is normal, do step 5. b. If frequency circuit is defective, repair per malfunction 47.
Step 5. Check the paralleling circuit with the generator set shut down. Move the UNIT PARALLEL switch (S7) to SINGLE UNIT position. Check continuity between terminals P1 and P2 on the voltage regulator and monitor assembly (A1) (FO2-1). Resistance should be 0-1 ohm. a. If the resistance is greater than 1 ohm, do step 6. b. If the resistance is less than 1 ohm, replace the voltage regulator and monitor assembly (A1) (para 12-8).
Step 6. Check droop rheostat (R8) (para 12-4) (FO2-4). a. If rheostat is normal, do step 7. b. If defective, replace droop rheostat (para 12-4).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

63. VOLTAGE READOUT ON VOLTAGE REGULATOR AND MONITOR ASSEMBLY IS UNSTABLE UNDER LOAD (cont)

WARNING

Do not try to troubleshoot the current transformers with the generator set running. An unloaded secondary winding of the current transformers will develop very high voltage which could cause damage to test equipment or loss of life.

Step 7. Check droop transformer (CT7) (para 5-4) (FO1-2).

a. If droop transformer is normal, do step 8.

b. If defective, replace droop transformer (para 5-4).

Step 8. Check SINGLE UNIT--PARALLEL switch (S7) (para 12-5).

a. If switch (S7) is normal, do step 9.

b. If defective, replace switch (S7) (para 12-5).

Step 9. Check the droop transformer and rheostat circuit wiring for continuity as outlined in the following chart (FO1-1, FO1-2, FO2-1, FO2-2, FO2-3 and FO2-4).

Wire No.	From	To	Remarks
96B	A1 - terminal P1	S7 - terminal 11	Meter on RX1 scale; resistance should be 0-1 ohm maximum
96A	S7 - terminal 11	TB4-6 (TF4-6)	
96C	TB4-6 (TF4-6)	R8 - CW	
96E	TB4-6 (TF4-6)	A7J1 - pin Y	
96	P1 - pin Y	CT7 - terminal P1	
96D	R8 - center	R8 - CW	
98C	A1 - terminal P2	S7 - terminal 10	
98B	S7 - terminal 10	TB4-7 (TF4-7)	
98A	TB4-7 (TF4-7)	R8 - CCW	
98D	TB4-7 (TF4-7)	A7J1 - pin Z	
98	P1 - pin Z	CT7 - terminal P2	

If there is an open or short circuit, repair wire as necessary (para 12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

64. GENERATOR SET SHUTS DOWN--NO FAULT LAMP COMES ON

Step 1. Close fuel shutoff valve (pull lever out) and attempt to crank engine. Listen for unusual noises during cranking and coastdown.

a. If no unusual noises are heard, open fuel shutoff valve and do step 2.

b. If there is any unusual noise, refer to malfunction 34.

Step 2. Connect the engine monitor test set to the electronic control assembly (ECA) (para 2-4) (FO1-1). Start the engine and observe the malfunction indicator lights for the cause of shutdown as follows:

a. NO LIGHTOFF lamp on indicates shutdown caused by failure of the engine to light off; refer to malfunction 31, TM 5-6115-598-12.

b. OVERCRANK lamp on indicates that the engine achieved lightoff but shut down when the engine would not accelerate to self sustaining speed; refer to malfunction 32, TM 5-6115-598-12.

c. N1 UNDERSPEED lamp on indicates that the engine reached sustained idle or run condition and then shut down when the gasifier rotor speed decreased; refer to step 7 of malfunction 35.

d. N2 OVERSPEED lamp on indicates a shutdown after overspeed of the engine output shaft; refer to step 6 of malfunction 37.

e. T4 OVER TEMPERATURE lamp on indicates a shutdown caused by excessive engine temperature; refer to malfunction 38.

f. FAILED SENSOR lamp on indicates a shutdown caused by loss of continuity in either the N1, N2, or T4 sensor circuits; do step 8.

g. If the engine shuts down with no indicator lamp on, do step 3.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
64. GENERATOR SET SHUTS DOWN--NO FAULT LAMP COMES ON (cont)
Step 3. Check the power supply circuit to the electronic control assembly (ECA). Remove the cover plate and check for voltage at test connector (A7J4), pin E, with the MASTER switch (S1) in the RUN position (FO1-1). There should be 24 Vdc minimum. a. If voltage is correct, remove the ECA (para 11-3). b. If voltage is not correct, do step 4.
Step 4. Check voltage at test connector (A7J4), pin C (FO1-1). Voltage should be 24 Vdc minimum. a. If voltage is correct, do step 6. b. If voltage is not correct, do step 5.
Step 5. Move PANEL LIGHT switch (S5) to ON position and observe panel lamps. a. If panel lamps are on, test and replace (as required) the MASTER switch (S1) (para 12-5). b. If panel lamps are off, test and replace (as required) the main dc circuit breaker (CB1) (para 12-6).
Step 6. Remove and test low fuel (K6) relay (para 11-6) (FO2-4). a. If relay is defective, replace relay (K6) (para 11-6). b. If K6 relay is normal, do step 7.
Step 7. Check continuity of power supply circuit between MASTER switch (S1) and the electronic control assembly (ECA) as outlined in the following chart (FO2-1, FO2-2, FO2-3, and FO2-4).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

64. GENERATOR SET SHUTS DOWN--NO FAULT LAMP COMES ON (cont)

Wire No. or Component	From	To	Remarks
9E	S1 - terminal 1	TB7-11 (TF7-11)	Meter RX1 scale; resistance should be 0-1 ohm
9B	TB7-11 (TF7-11)	TB4-11 (TF4-11)	
9C	TB4-11 (TF4-11)	D3 - positive	
D3	D3 - positive	D3 - negative	Observe diode polarity
10B	D3 - negative	TB4-3 (TF4-3)	
10C	TB4-3 (TF4-3)	CB3 - terminal 1	
CB3	CB3 - terminal 1	CB3 - terminal 2	CB3 in closed position
21A	CB3 - terminal 2	TB3-3 (TF3-3)	
21B	TB3-3 (TF3-3)	K6 - pin 3	
11B	K6 - pin 1	TB6-1 (TF6-1)	
11C	TB6-1 (TF6-1)	TB1-8 (TF1-8)	
11D	TB1-8 (TF1-8)	A7J2 - pin a	
11	P2 - pin a	P23 - pin A	

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If diode (D3) is defective, replace diode (para 12-10).

c. If circuit breaker (CB3) is defective, replace breaker (para 12-6).

CAUTION

Be sure MASTER switch is OFF before disconnecting connector (P24) from electronic control assembly (ECA). Disconnecting ECA connectors with MASTER switch in RUN (power on) position could damage ECA.

Step 8. Disconnect harness connector (P24) from the electronic control assembly (ECA) (FO1-1). Check the continuity of the N1, N2, and T4 circuits per the following chart at the connector (P24).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

64. GENERATOR SET SHUTS DOWN--NO FAULT LAMP COMES ON (cont)

Circuit	Pin	Pin	Remarks
P24 - N1	E (wire number 75)	F (wire number 76)	150 ± 50 ohms
	E	ground	More than 50,000 ohms
	F	ground	More than 50,000 ohms
P24 - N2	K (wire number 77)	L (wire number 78)	150 ± 50 ohms
	K	ground	More than 50,000 ohms
	L	ground	More than 50,000 ohms
P24 - T4	W (wire number 91)	X (wire number 92)	2 to 5 ohms
	W	ground	More than 50,000 ohms
	X	ground	More than 50,000 ohms
	Y (wire number 93)	Z (wire number 94)	2 to 5 ohms
	Y	ground	More than 50,000 ohms
	Z	ground	More than 50,000 ohms

a. If N1 circuit is not correct, do step 9.

b. If N2 circuit is not correct, do step 10.

c. If T4 circuit is not correct, do step 1, malfunction 38.

Step 9. Disconnect engine harness connector (P20) from the N1 magnetic pickup (PU1) (F01-3). Check the resistance between pins A and B on the pickup. Resistance should be 150 ± 50 ohms.

a. If resistance is correct, repair harness wire numbers 75 and 76 between connectors (P20 and P24) as necessary (para 11-2).

b. If resistance is not correct, replace pickup (PU1) (para 4-4).

Step 10. Disconnect engine harness connector (P19) from the N2 magnetic pickup (PU2) (F01-3). Check the resistance between pins A and B on the pickup. Resistance should be 150 ± 50 ohms.

a. If resistance is correct, repair harness wire numbers 77 and 78 between connectors (P19 and P24) as necessary (para 11-2).

b. If resistance is not correct, replace pickup (PU2) (para 4-4).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

65. MAIN AC CONTACTOR WILL NOT OPEN WHEN AC INTERRRUPT SWITCH IS MOVED TO OPEN POSITION

Step 1. Disconnect harness connector (P6) at the main ac contactor (CB5) (FO1-2). Check voltage at connector (P6), pin A with the MASTER switch (S1) in RUN position and the AC INTERRUPT switch (S2) held in the OPEN position. There should be no voltage.

a. If there is no voltage, replace the main ac contactor (CB5) (para 5-2).

b. If there is voltage, do step 2.

Step 2. Disconnect wire numbers 22A and 22B from terminal 6 on the AC INTERRUPT switch (S2) (FO2-1). Hold switch (S2) in OPEN position with MASTER switch (S1) in RUN position and check voltage at terminal 6. There should be no voltage.

a. If there is voltage, replace the AC INTERRUPT switch (S2) (para 12-5).

b. If there is no voltage, do step 3.

Step 3. Remove and test ac interrupt relay (K10) (para 12-7) (FO2-4).

a. If ac interrupt relay (K10) is defective, replace relay (para 12-7).

b. If ac interrupt relay is normal, do step 4.

Step 4. Check ac interrupt circuit for short circuit to battery positive as outlined in the following chart (FO2-1, FO2-2, FO2-4, FO2-3, FO1-1, and FO1-2).

Wire No.	From	To	Remarks
22B	S2 - terminal 6	TB5-11 (TF5-11)	Meter on Vdc scale
22E	TB5-11 (TF5-11)	K10 - pin 6	
36B	K10 - pin 4	TB5-8 (TF5-8)	
36C	TB5-8 (TF5-8)	A7J - pin u	
36	P1 - pin u	P6 - pin A	

If there is a short circuit, repair wire as necessary (para 12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

66. GENERATOR SET WILL NOT SHUT DOWN WHEN MASTER SWITCH IS MOVED TO OFF POSITION

Step 1. Check for voltage at control module test receptacle (A7J4), pin C, with MASTER switch (S1) in OFF position (FO1-1). There should be no voltage.

a. If there is voltage, replace electronic control assembly (ECA) (para 11-3).

b. If there is voltage, do step 2.

Step 2. Disconnect wire number 9E from the MASTER switch (S1), terminal 1 (FO2-1). Check voltage at terminal 1 of switch (S1) with switch in OFF position. There should be no voltage.

a. If there is voltage, replace MASTER switch (S1) (para 12-5).

b. If there is no voltage, do step 3.

Step 3. Check wire number 9 circuit for a short to battery positive as outlined in the following chart (FO2-1, FO2-2, FO2-3, FO2-4, FO1-1, and FO1-2).

Wire No.	From	To	Remarks
9E	S1 - terminal 1	TB7-11 (TF7-11)	Meter on Vdc scale
9B	TB7-11 (TF7-11)	TB4-11 (TF4-11)	
9G	TB4-11 (TF4-11)	A7J1 - pin f	
9	P1 - pin f	P6 - pin C	
9H	P6 - pin C	P6 - pin R	
9C	TB4-11 (TF4-11)	D3 - positive	
9D	TB4-11 (TF4-11)	A7J4 - pin C	
9F	TB7-11 (TF7-11)	K11 - pin 6	
9P	D3 - positive	D4 - positive	

If there is a short circuit, repair wire as necessary (para 12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

67. BATTLE SHORT LAMP FAILS TO COME ON WHEN BATTLE SHORT SWITCH IS MOVED TO ON POSITION AND MAIN AC CONTACTOR IS CLOSED

Step 1. Check wire number 22 for open or short circuit from BATTLE SHORT switch (S3), terminal 11 to AC INTERRUPT switch (S2), terminal 6 (FO2-1).

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If wire is normal, do step 2.

Step 2. Check voltage at BATTLE SHORT switch (S3), terminal 2, wire number 10A (FO2-1). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 3.

b. If voltage is not correct, do step 5.

Step 3. Check voltage at BATTLE SHORT switch (S3), terminal 3, wire number 39 (FO2-1). Voltage should be 24 Vdc minimum.

a. If the voltage is correct, do step 4.

b. If voltage is not correct, replace BATTLE SHORT switch (S3) (para 4-48, TM 5-6115-598-12).

Step 4. Check wire number 39A for open circuit from BATTLE SHORT switch (S3), terminal 3, to BATTLE SHORT lamp (DS5) socket, pin 2 (FO2-1).

a. If wire is normal, refer to step 2 of malfunction 27.

b. If there is an open circuit, repair wire as necessary (para 12-9).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

67. BATTLE SHORT LAMP FAILS TO COME ON WHEN BATTLE SHORT SWITCH IS MOVED TO ON POSITION AND MAIN AC CONTACTOR IS CLOSED (cont)

Step 5. Check power supply circuit for continuity from BATTLE SHORT switch (S3) to MASTER switch (S1) as outlined in the following chart (FO-2-1, FO-2-2, and FO-2-3).

Wire No.	From	To	Remarks
10A	S3 - terminal 2	TB7-1 (TF7-1)	Meter on RX1 scale; resistance should be 0-1 ohm maximum
10G	TB7-1 (TF7-1)	CB3 - terminal 1	
10C	CB3 - terminal 1	TB4-3 (TF4-3)	
10F	TB4-3 (TF4-3)	S1 - terminal 5	

If there is an open or short circuit, repair wire as necessary (para 12-9).

68. SYNC LAMPS DO NOT COME ON WHEN PARALLELING SWITCH IS MOVED FROM UNIT TO PARALLEL OPERATION POSITION--PARALLEL OPERATION

Step 1. Disconnect the REMOTE OPERATION harness connector from the generator set J7 receptacle and check for 120 Vac at pins G and H of the external connector (FO-1-2). Voltage should be 120 ± 5 Vac.

a. If ac voltage is not correct, do step 2.

b. If voltage is correct the problem is external of the generator set.

Step 2. Shut down generator set. Check the continuity of the SYNC LAMP circuits as outlined in the following chart (FO-1-1, FO-1-2, FO-2-1, FO-2-2, FO-2-3, and FO-2-4).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

68. SYNC LAMPS DO NOT COME ON WHEN PARALLELING SWITCH IS MOVED FROM UNIT TO PARALLEL OPERATION POSITION--PARALLEL OPERATION (cont)

Wire No. or Component	From	To	Remarks
108A	J7 - pin G	P1 - Pin V	0-1 ohm
108B	A7J1 - pin V	TB5-6 (TF5-6)	0-1 ohm
108E	TB5-6 (TF5-6)	S7 - terminal 5	0-1 ohm
S7	S7 - terminal 5	S7 - terminal 6	S7 in PARALLEL position
124A	S7 - terminal 6	DS16	0-1 ohm
230A	DS16	R9	0-1 ohm
R9			2250 to 2750 ohms
81P	R9	A1 - terminal Va	0-1 ohm
110A	J7 - pin H	P1 - pin j	0-1 ohm
110B	A7J1 - pin j	TB5-1 (TF5-1)	0-1 ohm
110C	TB5-1 (TF5-1)	S7 - terminal 2	0-1 ohm
S7	S7 - terminal 2	S7 - terminal 3	S7 in PARALLEL position
125A	S7 - terminal 3	DS17	0-1 ohm
131A	DS17	R10	0-1 ohm
R10			2250 to 2750 ohms
83K	R10	A1 - terminal Vc	0-1 ohm

a. If UNIT PARALLEL switch (S7) is defective, replace switch (para 12-5).

b. If ballast resistors (R9 and R10) are defective, replace resistor (para 12-10).

c. If there is an open or short circuit, repair wire as necessary (para 12-9).

69. SYNC LAMPS DO NOT FLASH TOGETHER WHEN UNIT-PARALLEL SWITCH IS IN PARALLEL OPERATION POSITION--PARALLEL OPERATION

Check to determine if main ac contactor (CB5) is connected properly (FO-1-2).

If not properly connected, connect in accordance with instructions in para 4-3, TM 5-6115-598-12.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

70. MAIN AC CONTACTOR WILL NOT CLOSE--PARALLEL OPERATION

NOTE

Output voltage from the phase paralleling switch (A3) is only a momentary signal emitted as the phase relationship between the two generators becomes synchronous.

Step 1. Check for dc output voltage of phase paralleling switch (A3) at terminal board TB7-10 (TF7-10), wire number 17 as SYNC lamps (DS16 and DS17) go from dim to out (FO-3 and FO-2-2). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 2.

b. If voltage is not correct, do step 5.

Step 2. Check dc voltage at AC INTERRUPT switch (S2), terminal 2, wire number 17 (FO-2-1). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 4.

b. If voltage is not correct, do step 3.

Step 3. Shut down generator set and check continuity of wire number 17A from terminal board TB7-10 (TF7-10) to AC INTERRUPT switch (S2), termminal 2 (FO-2-2 and FO-2-1).

a. If there is an open or short circuit, repair wire as necessary (para 12-9).

b. If wire number 17A is normal, refer to malfunction 50.

Step 4. MOVE UNIT PARALLEL switch (S7) to UNIT position and attempt to close main ac contactor (CB5).

a. If CB5 closes during single unit operation, try parallel operation again (para 2-5, TM 5-6115-598-12).

b. If CB5 does not close during single unit operation, refer to step 3, malfunction 50.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

70. MAIN AC CONTACTOR WILL NOT CLOSE--PARALLEL OPERATION (cont)

Step 5. Disconnect harness connector (P5) at phase paralleling switch (A3). Check dc input voltage to switch (A3) at harness connector (P5), pin F, wire number 46B (FO-2-2). Voltage should be 24 Vdc minimum.

a. If voltage is correct, do step 7.

b. If voltage is not correct, do step 6.

Step 6. Shut down generator set and check continuity of wire number 46C from circuit breaker (CB2), terminal 2 to terminal board TB4-10 (TF4-10) and wire number 46B from TB4-10 (TF4-10) to connector (P5), pin F (FO-2-4 and FO-2-2).

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 7. Start generator set and check ac actuation input voltage at connector (P5), pin C to pin D and pin A to pin D (FO-2-2). Voltage should be 120 ± 5 Vac.

a. If ac voltage is correct, replace the phase paralleling switch assembly (A3) (para 12-11).

b. If ac voltage is not correct between pins A and D, do step 8.

c. If ac voltage is not correct between pins C and D, do step 9.

Step 8. Shut down generator set and check ac wiring continuity for the external set as outlined in the following chart (FO-2-2, FO-2-3, FO-1-1, and FO-1-2).

Wire No.	From	To	Remarks
108D	P5 - pin C	TB5-6 (TF5-6)	Meter RX1 scale; resistance should be be 0-1 ohm maximum
108B	TB5-6 (TF5-6)	A7J1 - pin v	
108A	P1 - pin v	J7 - pin G	
84S	P5 - pin D	P5 - pin B	
84D	P5 - pin B	TB7-8 (TF7-8)	
84G	TB7-8 (TF7-8	TB3-7 (TF3-7)	
84M	TB3-7 (TF3-7)	A7J1 - pin m	
84A	P1 - pin m	E3	

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

70. MAIN AC CONTACTOR WILL NOT CLOSE--PARALLEL OPERATION (cont)

If there is an open or short circuit, repair wire as necessary (para 12-9).

Step 9. Shut down generator set and check ac wiring continuity as outlined in the following chart (FO2-2, FO1-1, FO1-2, FO2-3, and FO2-4).

Wire No.	From	To	Remarks
81F	P5 - pin A	TB7-5 (TF7-5)	Meter RX1 scale;
81D	TB7-5 (TF7-5)	TB3-4 (TF3-4)	resistance should be
81L	TB3-4 (TF3-4)	A7J1 - pin W	0-1 ohm maximum
81A	P1 - pin W	CB5 - terminal A1	
81M	TB7-5 (TF7-5)	R9	
81P	R9	A1 - terminal Va	
84S	P5 - pin D	P5 - pin B	
84D	P5 - pin B	TB7-8 (TF7-8)	
84G	TB7-8 (TF7-8)	TB3-7 (TF3-7)	
84M	TB3-7 (TF3-7)	A7J1 - pin m	
84A	P1 - pin m	E3	

If there is an open or short circuit, repair wire as necessary (para 12-9).

71. GENERATOR SETS WILL NOT LOAD-SHARE IN PARALLEL OPERATION

Step 1. Check the voltage at the LOAD-SHARE test points at the inner panel of the electronic control assy (A2) of each generator set under the same load (para 11-3).

a. If the voltages are equal, replace and test the electronic control assembly (ECA) of unit 1 (para 11-3).

b. If the voltages are not equal, do step 2.

Step 2. Adjust LOAD-SHARE voltage (para 11-3).

If the LOAD-SHARE voltage cannot be adjusted, replace and test the electronic control assembly (ECA) of unit 2 (para 11-3). Adjust LOAD-SHARE voltage of replacement ECA (para 11-3).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

72. BATTERY OR BATTERIES REQUIRE EXCESSIVE AMOUNT OF WATER CONTINUALLY

Adjust the alternator (G2) regulator setting (para 4-7) (FO1-3).

If regulator cannot be properly adjusted, replace alternator (G2) (para 4-7).

73. GENERATOR SET REQUIRES EXCESSIVE SLAVE STARTS

Check alternator output voltage (para 4-7).

a. If output voltage is not correct, adjust the voltage regulator (para 4-7).

b. If output voltage is correct, replace batteries as required (para 4-22, TM 5-6115-598-12).

74. NO VOLTAGE IS AVAILABLE AT 110 V CONVENIENCE RECEPTACLE

Shut down generator set and check the continuity of wires to the 110 V convenience receptacle (J15) as outlined in the following chart (FO1-2).

Wire No.	From	To	Remarks
83B	CB5 - terminal C1	CB7 - input	Meter on RX1 scale;
84B	J15	E3	resistance to be
W17	CB7 - output	J15	0-1 ohm maximum
Jumper wire	J15	Receptacle ground	

If there is an open or short circuit, repair wire as necessary (para 12-9).

75. ENGINE OIL CONSUMPTION IS EXCESSIVE

NOTE

Average oil consumption is 1 quart/50 ± 20 hours. Excessive oil consumption is 1 quart/10 hours, averaged over a 30 hour period.

Verify engine oil consumption rate from the oil added as recorded in the log book.

If excessive oil consumption continues for a period of 50 hours, replace the engine (para 2-14).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

76. ENGINE EXHAUST COVER MALFUNCTION--COVER IS STUCK OPEN OR CLOSED

Remove duct assembly (para 4-47, TM 5-6115-598-12). Disconnect cylinder linkage (para 10-2). Attempt to move the cover.

a. If cover is still stuck, repair duct assembly (para 10-3) or replace as necessary (para 4-47, TM 5-6115-598-12).

b. If cover is not stuck, replace the cylinder assembly (para 10-2).

77. HOURMETER DOES NOT RECORD CORRECT HOURS OF OPERATION

Step 1. Check continuity of wire number W9 from the 3-way fuel solenoid (L2) to hourmeter (M2) positive terminal (F01-3).

a. If there is an open or short circuit, repair wire as necessary (para 4-10).

b. If wire is normal, do step 2.

Step 2. Check continuity of wire number W21 from the hourmeter negative terminal to ground on the hourmeter mounting bracket (F01-3).

If there is an open circuit, repair wire as necessary (para 4-10).

78. FUEL TRANSFER PUMP RUNS AFTER SHUTDOWN

Step 1. Determine if the fuel day tank is full (step 6, malfunction 5, TM 5-6115-598-12). Disconnect fuel level switch (S11) connector (P9) (F01-3). Close circuit breaker (CB2).

a. If the tank is full and the fuel pump continues to run, do step 2.

b. If the tank is full and the fuel pump stops running, replace the fuel level switch (S11) (para 6-3).

Step 2. Remove time delay relay (TD1) (para 11-6) (F02-4).

a. If the fuel pump stops running, replace TD1 relay (para 11-6).

b. If the pump continues to run, do step 3.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

78. FUEL TRANSFER PUMP RUNS AFTER SHUTDOWN (cont)

Step 3. Remove fuel transfer pump relay (K5) (para 11-6) (FO2-4).

a. If the fuel pump stops running, replace relay (K5) (para 11-6).

b. If the fuel pump continues to run, do step 4.

Step 4. Check fuel transfer pump wiring for a short circuit to battery positive as outlined in the following chart (FO1-3, FO1-1, FO2-3, FO2-2, and FO2-4).

Wire No.	From	To	Remarks
19	P10 - pin A	P1 - pin x	Meter on Vdc scale
19K	A7J1 - pin x	TB5-10 (TF5-10)	
19H	TB5-10 (TF5-10)	K5 - pin 4	

If there is a short circuit, repair wiring as necessary (para 12-9).

79. FUEL DRIPPING OR FLOWING FROM FUEL CATCH AND DRAIN CANISTER VENT WHILE OPERATING

Refer to malfunction 79, TM 5-6115-598-12.

80. BATTERY LAMP COMES ON WHILE GENERATOR SET IS OPERATING

Step 1. Check the alternator (G2) output voltage (para 4-7). Voltage should be 27.5 to 29.5 Vdc.

a. If voltage is correct, do step 2.

b. If voltage is not correct, replace the alternator (para 4-7).

Step 2. Remove and test battery lamp relay (K11) (para 11-6) (FO2-4).

a. If relay (K11) is normal, do step 3.

b. If relay (K11) is defective, replace relay (para 11-6).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

80. BATTERY LAMP COMES ON WHILE GENERATOR SET IS OPERATING (cont)

Step 3. Check continuity of battery lamp circuit from the alternator (G2) regulator terminal to battery lamp relay (K11) for an open or short circuit as outlined in the following chart (FO1-3, FO1-1, FO2-3, FO2-2, and FO2-4).

Wire No.	From	To	Remarks
23	G2	P1 - pin A	Meter on RX1 scale;
23A	A7J1 - pin A	TB2-6 (TF2-6)	resistance should be
23B	TB2-6 (TF2-6)	K11 - pin 2	0-1 ohm maximum

If there is an open or short circuit, repair wire as necessary (para 12-9).

81. DC CIRCUIT BREAKER (CB1) WILL NOT RESET

Step 1. Disconnect wire number 7M from terminal board TB4-1 (TF4-1) (FO2-2). Reset circuit breaker (CB1).

a. If circuit breaker (CB1) resets, do step 4.

b. If circuit breaker (CB1) will not reset, do step 2.

Step 2. Test circuit breaker (CB1) (para 12-6) (FO2-4).

a. If CB1 is defective, replace circuit breaker (para 12-6).

b. If CB1 is normal, do step 3.

Step 3. Check wire number 7M for short circuit to ground from CB1 to terminal board TB4-1 (TF4-1) (FO2-4 and FO2-2).

If there is a short circuit, repair wire as necessary (para 12-9).

Step 4. Check wire number 7A for short circuit to ground at terminal board TB4-1 (TF4-1) with MASTER switch (S1) in OFF position and PANEL LIGHTS switch (S5) in ON position.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

81. DC CIRCUIT BREAKER (CB1) WILL NOT RESET (cont)

a. If there is a short to ground, do step 5.

b. If wire is normal, do step 6.

Step 5. Check lamp circuits for short to ground as outlined in the following chart (FO2-2 and FO2-1).

Wire No. or Component	From	To	Remarks
7A	TB4-1 (TF4-1)	S5 - terminal 2	Meter on Vdc scale
7B	S5 - terminal 2	S1 - terminal 2	
7C	S1 - terminal 2	DS6-3	
7D	DS6-3	DS5-3	
7E	DS5-3	DS18-3	
7F	DS18-3	DS12-3	
7G	DS12-3	DS10-3	
7H	DS10-3	DS7-3	
7J	DS7-3	DS11-3	
7K	DS11-3	DS9-3	
7L	DS9-3	DS19-3	
S5	S5 - terminal 2	S5 - terminal 3	S5 in ON position
5A	S5 - terminal 3	DS13	
5B	DS13	DS14	
5C	DS14	DS15	

a. If there is a short circuit, repair wire as necessary (para 12-9).

b. If PANEL LIGHT switch (S5) is defective, replace switch (para 12-5).

c. If lamp socket(s) (DS13, DS14, or DS15) are defective, replace lamp sockets (para 11-5).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

81. DC CIRCUIT BREAKER (CB1) WILL NOT RESET (cont)

Step 6. Disconnect wire numbers 9B, 9C, 9D, and 9G at terminal board TB4-11 (TF4-11) (FO2-2). Check each wire for short circuit to ground.

a. If wire number 9B is shorted, do step 7.

b. If wire number 9C is shorted, do step 8.

c. If wire number 9D is shorted, do step 9.

d. If wire number 9G is shorted, do step 10.

Step 7. Check power supply circuit from short to ground as outlined in the following chart (FO2-2, FO2-4).

Wire No.	From	To	Remarks
9B	TB4-11 (TF4-11)	TB7-11 (TF7-11)	Meter on Vdc scale
9E	TB7-11 (TF7-11)	S1 - terminal 1	
9F	TB7-11 (TF7-11)	K11 - pin 6	
S1	S1 - terminal 1	ground	

a. If there is a short circuit, repair wire as necessary (para 12-9).

b. If MASTER switch (S1) is defective, replace switch (12-5).

Step 8. Check control system power supply circuit for short circuit to ground as outlined in the following chart (FO2-2, FO2-3, FO2-4, FO2-1, FO1-1, and FO1-3).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

81. DC CIRCUIT BREAKER (CB1) WILL NOT RESET (cont)

Wire No. or Component	From	To	Remarks
9C	TB7-11 (TF7-11)	D3 - positive	Meter on Vdc scale
D3	D3 - positive	D3 - negative	
9P	D3 - positive	D4 - positive	
D4	D4 - positive	D4 - negative	
32D	D4 - negative	TB2-7 (TF2-7)	
32E	TB2-7 (TF2-7)	A1 - terminal B+	
32F	A1 - terminal B+	M1 - terminal B+	
32C	TB2-7 (TF2-7)	A7J1 - pin B	
32A	P1 - pin B	E5	
32A	E5	P9 - pin A	
32B	E5	P9 - pin D	
10B	D3 - negative	TB4-3 (TF4-3)	
10C	TB4-3 (TF4-3)	CB3 - terminal 1	
10D	TB4-3 (TF4-3)	D11 - negative	
10F	TB4-3 (TF4-3)	S1 - terminal 5	
S1	S1 - terminal 5	S1 - terminal 4	S1 in START position
12A	S1 - terminal 4	TB1-9 (TF1-9)	
12B	TB1-9 (TF1-9)	A7J4 - pin D	
12C	TB1-9 (TF1-9)	A7J2 - pin b	
12	P2 - pin b	P23 - pin B	

a. If there is a short circuit, repair wire as necessary (para 12-9).

b. If diodes (D3) or (D4) are defective, replace diodes (para 12-10).

c. If MASTER switch (S1) is defective, replace switch (para 12-5).

d. If voltage regulator and monitor assembly (A1) is defective, replace monitor assembly (para 12-8).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

81. DC CIRCUIT BREAKER (CB1) WILL NOT RESET (cont)

e. If digital voltmeter (M1) is defective, replace voltmeter (para 12-3).

f. If electronic control assembly (ECA) is defective, replace ECA (para 11-3).

Step 9. Check wire number 9D for short circuit to ground from terminal board TB4-11 (TF4-11) to connector A7J4, pin C (FO2-2 and FO2-3).

If there is a short circuit, repair wire as necessary (para 12-9).

Step 10. Check main ac contactor (CB5) relay power circuits as outlined in the following chart (FO2-2, FO2-3, FO1-1, and FO1-2).

Wire No.	From	To	Remarks
9G	TB4-11 (TF4-11)	A7J1 - pin f	Meter on Vdc scale
9	P1 - pin f	P6 - pin C	
9H	P6 - pin C	P6 - pin R	

a. If there is a short circuit, repair wire as necessary (para 12-9).

b. If wires are normal, replace main ac contactor (CB5) (para 5-2).

82. DC CIRCUIT BREAKER (CB2) WILL NOT RESET

Step 1. Disconnect wire numbers 46A, 46B, 46C, and 46D from terminal board TB4-10 (TF4-10) (FO2-2). Check each wire for short circuit to ground.

a. If wire number 46A is shorted, do step 2.

b. If wire number 46B is shorted, do step 3.

c. If wire number 46C is shorted, do step 4.

d. If wire number 46D is shorted, do step 5.

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

82. DC CIRCUIT BREAKER (CB2) WILL NOT RESET (cont)

Step 2. Check circuit to dead bus relay (K9) as outlined in the following chart for short circuit to ground (FO2-2, FO2-1 and FO2-4).

Wire No.	From	To	Remarks
46A	TB4-10 (TF4-10)	S7 - terminal 8	Meter on Vdc scale
S7	S7 - terminal 8	S7 - terminal 7	Switch in UNIT OPERATION position
18A	S7 - terminal 7	TB6-7 (TF6-7)	
18B	TB6-7 (TF6-7)	K9 - pin A2	
18C	K9 - pin A2	K9 - pin B2	

a. If there is a short circuit, repair wire as necessary (para 12-9).

b. If UNIT PARALLEL switch (S7) is defective, replace switch (para 12-5).

c. If dead bus relay (K9) is defective, replace relay (para 12-7).

Step 3. Check wire number 46B for short circuit to ground from terminal board TB4-10 (TF4-10) to connector (P5), pin F (FO2-2).

a. If there is a short circuit, repair wire as necessary (para 12-9).

b. If wire is normal, replace phase paralleling switch assembly (A3) (para 12-11).

Step 4. Check wire number 46C for short circuit to ground from terminal board TB4-10 (TF4-10) to circuit breaker (CB2) (FO2-2 and FO2-4).

a. If there is a short circuit, repair wire as necessary (para 12-9).

b. If wire is normal, replace circuit breaker (CB2) (para 12-6).

Step 5. Remove and test fuel transfer relay (K5) (para 11-6) (FO2-4).

a. If relay (K5) is defective, replace relay (para 11-6).

Table 2-5. Troubleshooting (cont)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

82. DC CIRCUIT BREAKER (CB2) WILL NOT RESET (cont)

b. If relay (K5) is normal, do step 6.

Step 6. Check relay (K5) socket for short to ground at pins 5, 6, 3, and 4 (FO-2-4).

a. If pins 5 and 6 are shorted, repair wire numbers 46E and 46D as necessary (para 12-9).

b. If pins 3 and 4 are shorted, do step 7.

Step 7. Check the fuel transfer pump power circuit for short to ground as outlined in the following chart (FO-1-1, FO-1-3, FO-2-2, FO-2-3 and FO-2-4).

Wire No.	From	To	Remarks
19J	K5 - pin 3	K5 - pin 4	Meter on Vdc scale
19H	K5 - pin 4	TB5-10 (TF5-10)	
19G	TB5-10 (TF5-10)	A7J4 - pin K	
19K	TB5-10 (TF5-10)	A7J1 - pin x	
19	P1 - pin x	P10 - pin A	

a. If there is a short circuit, repair wire as necessary (para 12-9).

b. If wires are normal, replace the fuel transfer pump (6-2).

83. DC CIRCUIT BREAKER (CB3) WILL NOT RESET

Step 1. Disconnect wire numbers 21A and 21B at terminal board TB3-3 (TF3-3) (FO-2-2). Move circuit breaker CB3 to ON (push in) position.

a. If circuit breaker CB3) resets, do step 4.

b. If circuit breaker (CB3) will not reset, do step 2.

Step 2. Test circuit breaker (CB3) (para 12-6) (FO-2-4).

a. If CB3 is defective, replace circuit breaker (para 12-6).

b. If CB3 is normal, do step 3.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION	

83. DC CIRCUIT BREAKER (CB3) WILL NOT RESET (cont)

Step 3. Check wire number 21A for short circuit to ground from CB3 to TB3-3 (TF3-3) (FO-2-4 and FO-2-2).

If there is a short circuit, repair wire as necessary (para 12-9).

Step 4. Check the electronic control assembly (ECA) power circuit for short to ground as outlined in the following chart (FO-1-1, FO-2-1, FO-2-2, FO-2-3, and FO-2-4).

Wire No.	From	Tc	Remarks
21B	TB3-3 (TF3-3)	K6 - pin 3	Meter on Vdc scale
11B	K6 - pin 1	TB6-1 (TF6-1)	
11A	TB6-1 (TF6-1)	DS2 - pin 1	
11H	DS2 - pin 1	DS3 - pin 1	
11J	DS3 - pin 1	DS4 - pin 1	
11C	TB6-1 (TF6-1)	TB1-8 (TF1-8)	
11E	TB1-8 (TF1-8)	A7J4 - pin E	
11D	TB1-8 (TF1-8)	A7J2 - pin a	
11	P2 - pin a	P23 - pin A	
11F	TB1-8 (TF1-8)	S6 - terminal 2	
11G	S6 - terminal 2	S4 - terminal 2	

a. If there is a short circuit, repair wires as necessary (para 12-9).

b. If the wires are normal, do step 5.

Step 5. Test relay (K6) (para 11-6) (FO-2-4).

a. If K6 relay is defective, replace relay (para 11-6).

b. If K6 relay is normal, do step 6.

Step 6. Check the electronic control assembly for short to ground at receptacle A2J1, pin A (FO-1-1).

a. If there is a short circuit, replace (ECA) (para 11-3).

b. If ECA is normal, do step 7.

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
83. DC CIRCUIT BREAKER (CB3) WILL NOT RESET (cont)
Step 7. Check ISOCH DROOP switch (S6) for short to ground at terminal 6, with switch in ISOCH position (FO2-4). a. If there is a short circuit, replace switch (S6) (para 12-5). b. If switch (S6) is normal, do step 8.
Step 8. Check IDLE RUN switch (S4) for short to ground at terminal 2, with switch in the RUN position (FO2-4). If there is a short circuit, replace switch (S4) (para 12-5).
84. DC CIRCUIT BREAKER (CB4) WILL NOT RESET
Step 1. Disconnect wire numbers 27A and 27B from terminal OV on the voltage regulator and monitor assembly (A1) (FO2-1). Check each wire for short circuit to ground. a. If both wires are normal, do step 2. b. If wire number 27A is shorted, do step 3. c. If wire number 27B is shorted, do step 4.
Step 2. Check terminal OV on voltage regulator and monitor for short to ground (FO2-1). If there is a short circuit, replace the voltage regulator and monitor assembly (A1) (para 12-8).
Step 3. Check wire number 27A for short circuit to ground from terminal OV (A1) to OVER VOLTAGE lamp (DS11), pin 2 (FO2-1). a. If there is a short circuit, repair wire as necessary (para 12-9). b. If wire is normal, replace OVER VOLTAGE lamp (DS11) assembly (para 11-6).

Table 2-5. Troubleshooting (cont)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
84. DC CIRCUIT BREAKER (CB4) WILL NOT RESET (cont)
Step 4. Test circuit breaker (CB4) (para 12-6) (FO2-4). a. If CB4 is defective, replace circuit breaker (para 12-6). b. If CB4 is normal, do step 5.
Step 5. Check wire number 27B for short circuit to ground from terminal OV on the voltage regulator and monitor assembly (A1) to circuit breaker (CB4), terminal 3 (FO2-1 and FO2-4). If there is a short circuit, repair wire as necessary (para 12-9).

Section V. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS

2-12. GENERAL

This section contains procedures for the removal and installation of all major components i.e., control cabinet, engine, and alternator. All special adjustments or maintenance procedures required during installation are included. Paragraphs are arranged in the order in which the components should logically be removed. A separate paragraph is devoted to each major component.

2-13. CONTROL CABINET ASSEMBLY REMOVAL AND INSTALLATION

This task covers:

a. Removal b. Installation

INITIAL SETUP

Tools

Tool Kit, Master Mechanics
(5180-00-699-5273
7/16 socket
3/8-dr speed handle

Personnel Required

Turbine Engine Driven Generator
Repairer MOS 52F

Material/Parts

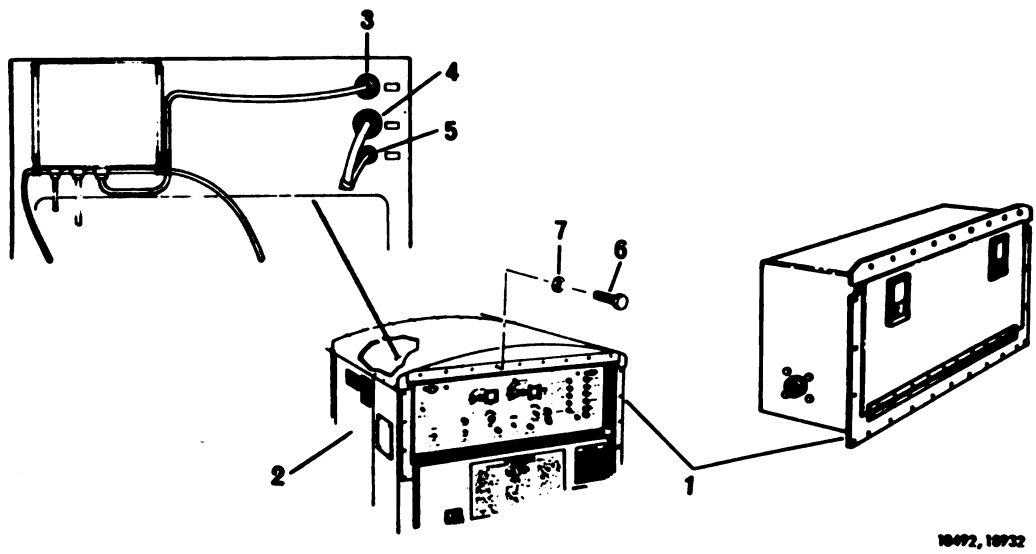
Tags (item 24, appx B)

Equipment Condition

Para	Condition Description
11-3	Electronic control assy removed.

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Control cabinet assembly (1)	a. Left rear door (2)	Open.	
	b. Connectors (3,4,5)	Disconnect, tag, and identify.	
	c. 26 bolts (6) and washers (7)	Remove.	
	d. Cabinet assembly (1)	Remove.	2 technicians reqd.
INSTALLATION			
2. Control cabinet assembly (1)	a. Cabinet assembly (1)	Install in rear cabinet.	2 technicians reqd.
	b. 26 bolts (6) and washers (7)	Install. Tighten bolts.	

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
2. Control cabinet assembly (1) (cont)	c. Connectors (3),(4), and (5)	Remove tags and connect.	
	d. Left rear door (2)	Close.	



2-14. ENGINE ASSEMBLY REMOVAL AND INSTALLATION

This task covers:

a. Removal b. Installation

INITIAL SETUP

Tools

Suitable lifting device (4850 lb, 2200 kg capacity)
17 mm combination wrench (appx C)
17 mm socket, 1/2 dr (appx C)
Rect inspection mirror (appx C)
Engine lift (Table 2-1)
Dial indicator (Table 2-1)
Pry bars (2) (Manufacture per table 2-2.)
Guide pin (Manufacture per table 2-2)
Alternator drive coupling holder (Table 2-1)
Tool Kit, Master Mechanics (5180-00-699-5273)
3/8 socket, 3/8 dr
5-in. extension, 3/8 dr
5-in. extension, 1/2 dr
Plastic face hammer
Mechanical fingers
3/8-dr ratchet handle
1/2-dr ratchet handle
Inserted hammer face holder
7/16 socket, 3/8 dr
1/2 socket, 3/8 dr
9/16 socket, 3/8 dr
3/4 socket, 1/2 dr
7/16 combination wrench
9/16 combination wrench
11/16 combination wrench
3/4 combination wrench
12-in flat tip screwdriver

Tools (cont)

Putty knife
7/8 combination wrench
10-in brass drift, 3/4 dia
Shop Equipment, Contact Maintenance, Truck Mounted (4940-00-293- 9518)
12-in. adjustable wrench
Shop Equipment, Electrical Repair, Semitrailer Mounted (4940-00-294- 9517)
1 1/4 combination wrench
1 1/2 combination wrench
Flashlight
4 lb hand hammer (appx C)
17mm socket, 0.375 in. Square drive (appx C)
5-75 lb-ft torque wrench (appx C)

Materials/Parts

Paint brush (item 5, appx B)
Lubricant, petrolatum (item 13, appx B)
Paint (item 16, appx B)
Rags (item 17, appx B)
Sandpaper (item 19, appx B)
Tags (item 24, appx B)
Suitable container
Wooden blocks, 4x4x12 (3 reqd)
Flywheel housing gasket
Lock washer (8) (item 56)
Lock washer (12) (item 58)
Bolts (8) (item 55)

Personnel Required

Turbine Engine Driven Generator Repairer MOS52F

INITIAL SETUP (cont)

Troubleshooting References			Equipment Condition	
Item	Step	Table	Para	Condition Description
34	1	2-5	4-13*	Front and rear roof removed.
37	9,10	2-5	4-14*	Front cabinet panel assembly removed.
39	3	2-5	4-15*	4 Front doors removed.
40	3	2-5	4-22*	Battery power disarmed.
46	5,9	2-5	4-45*	Oil system drained.
52	2	2-5	4-51*	Engine assembly shipping container installation and removal
75	1	2-5	6-4	Fuel tank removed.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS

NOTE

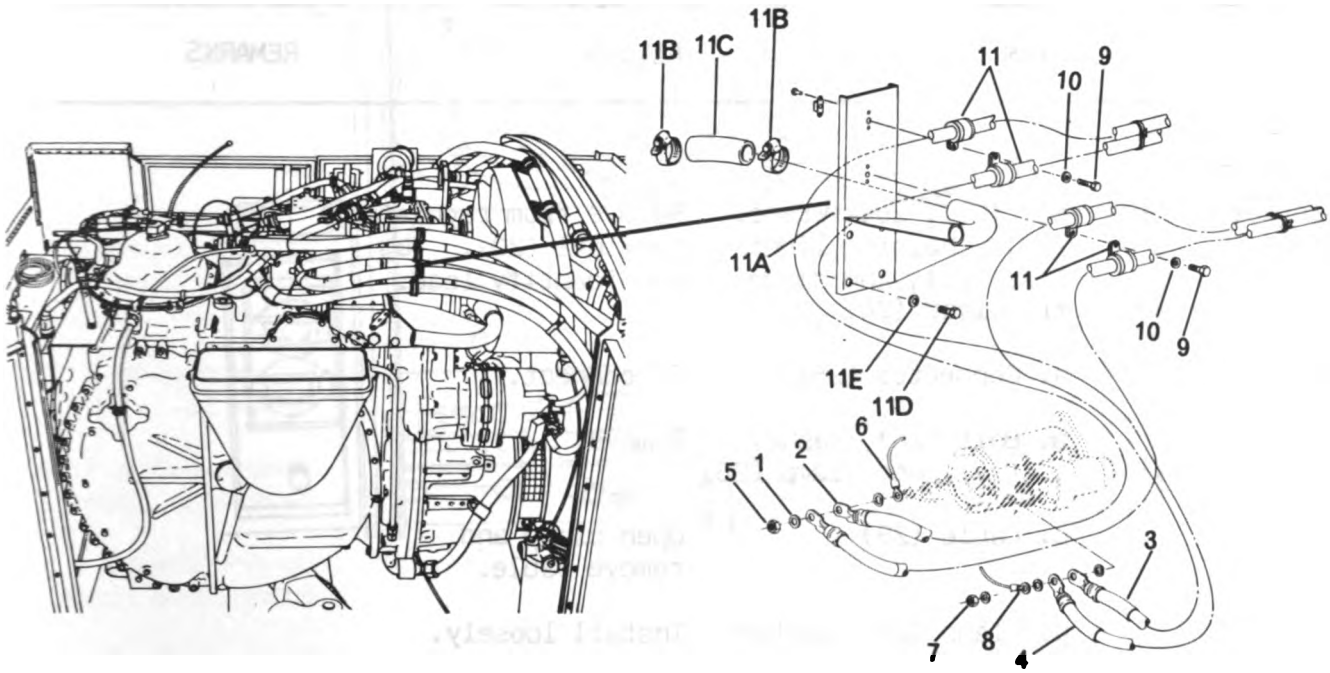
If engine is being removed because of suspected internal failure, and metal particles appear in lubrication system, remove oil cooler per paragraph 8-3 and return to depot for proper metal decontamination. Hour meter and bracket must remain with engine when engine is sent to depot for overhaul or repair.

REMOVAL

1.	Starter cables (1,2,3,and 4)	a.	Nut (5) and 2 cables (1) and (2)	Remove, tag, and identify cables.	Reinstall small lead (6) and hardware on starter.
		b.	Nut (7) and 2 cables (3) and (4)	Remove, tag, and identify cables.	Reinstall small lead (8) and hardware on starter.
		c.	2 bolts (9), washers (10), and 4 clamps (11)	Remove from bracket.	Do not remove clamps from cables. Lay cables over top of center bulkhead.

2-14. ENGINE ASSEMBLY REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
1A. Gearbox vent and battery support bracket (11A)	a. 2 clamps (11B) and hose (11c)	Remove	
	b. 4 bolts (11D), lock washers (11E), and bracket (11A)	Remove	
2. Alternator positive terminal (12)	Nut (13), lock washer (14), and positive battery lead (15)	Remove from positive terminal (12). Tag and identify lead.	
3. Alternator negative terminal (16)	Nut (17), lock washer (18), and negative battery lead (19)	Remove from negative terminal (16). Tag and identify lead.	



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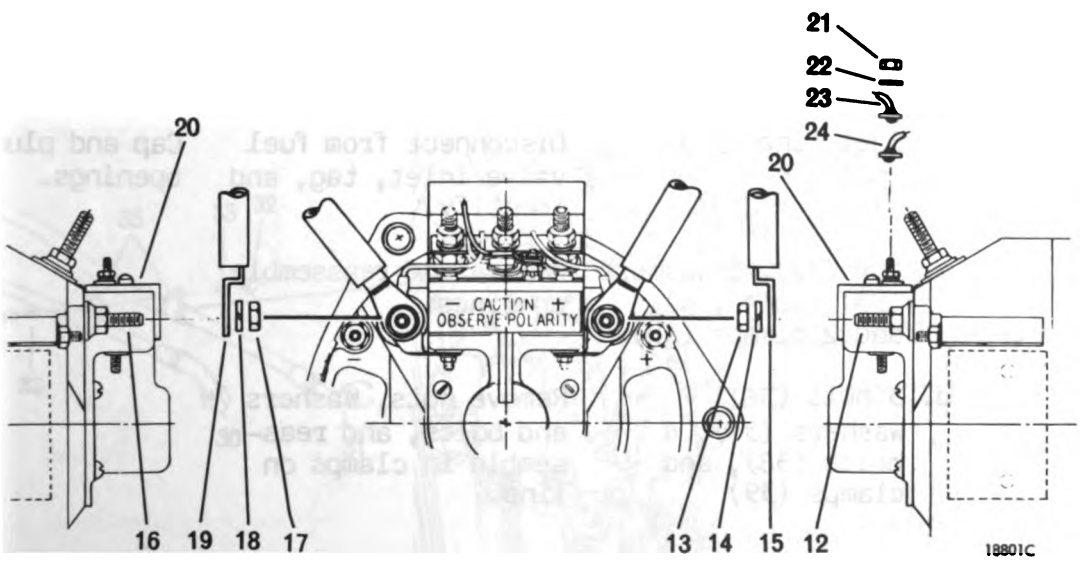

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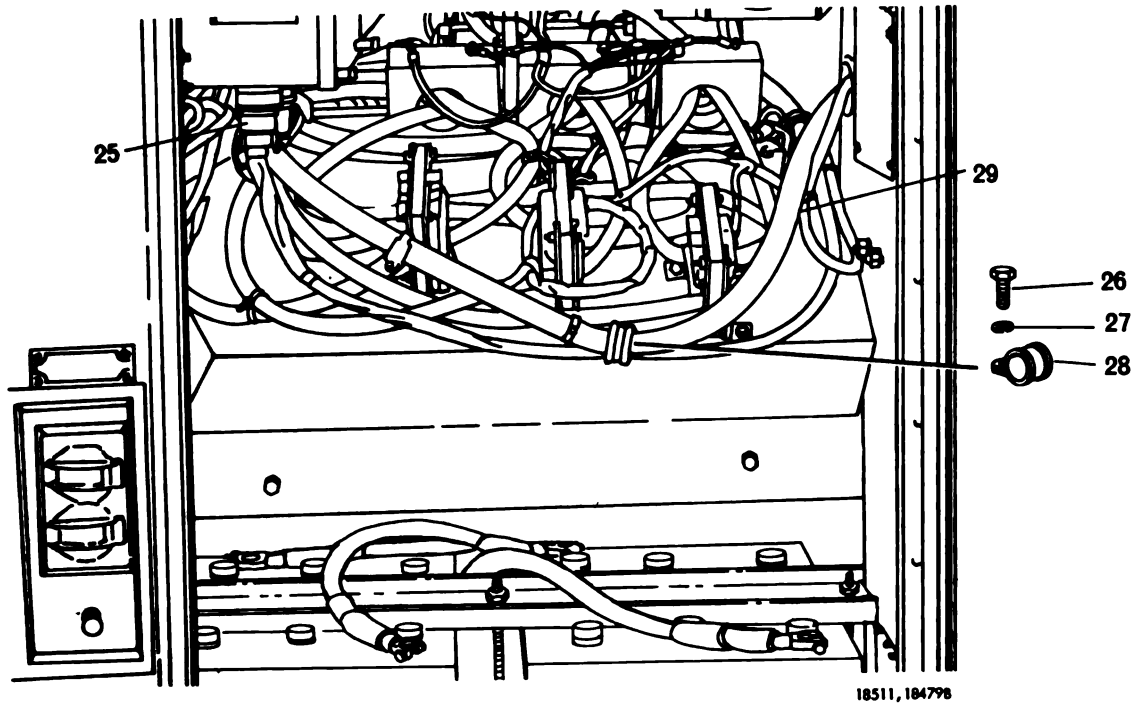
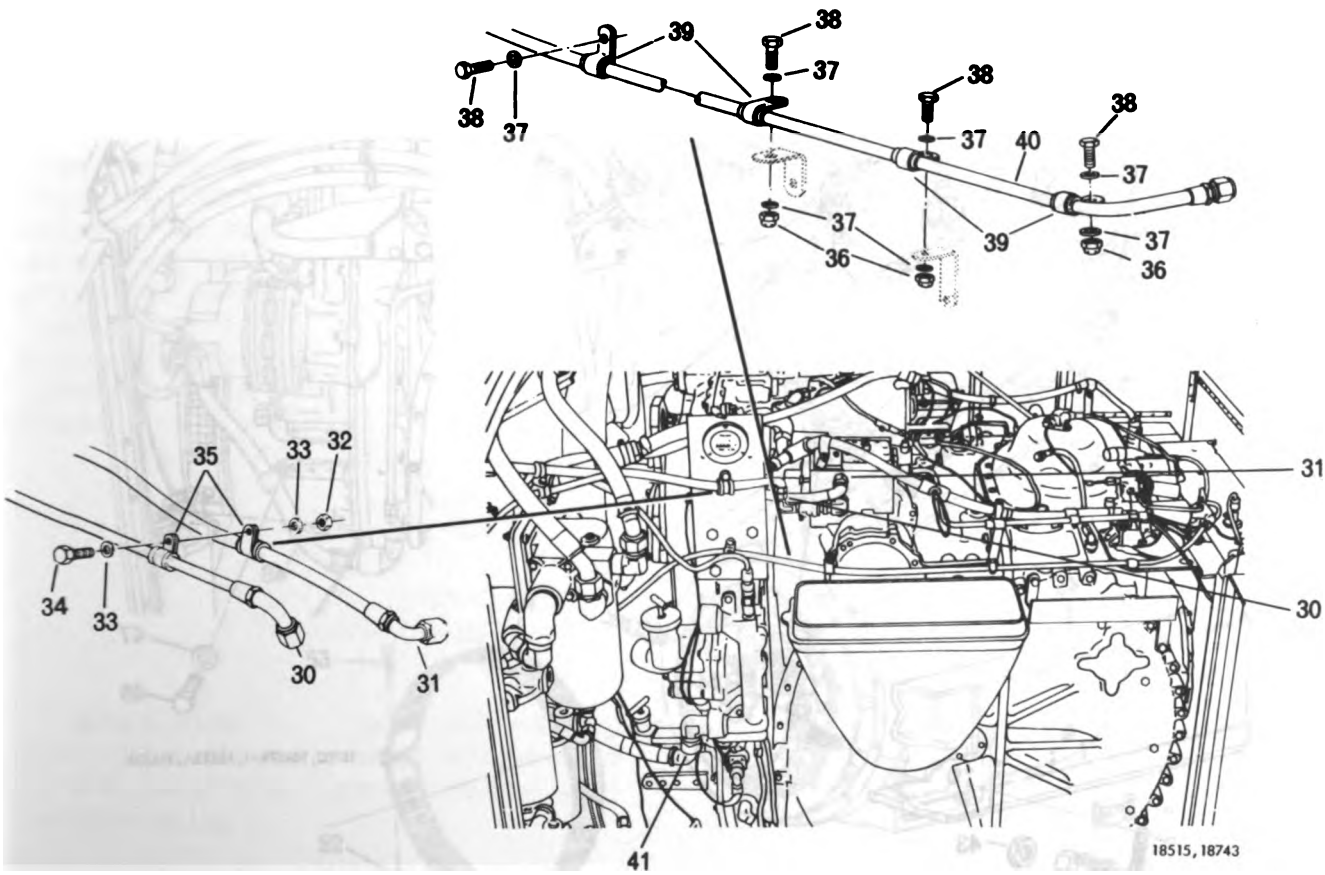
2-14. ENGINE ASSEMBLY REMOVAL AND INSTALLATION (cont)

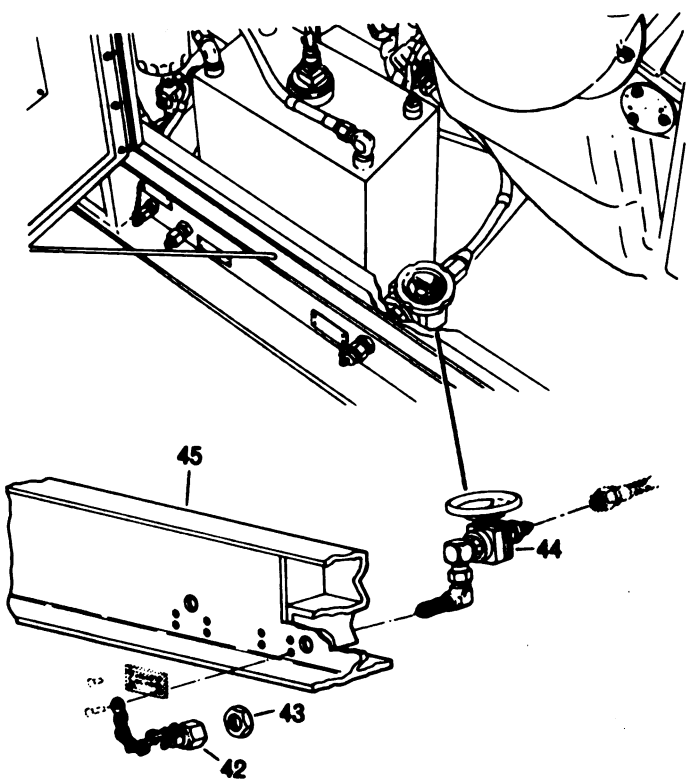
LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
4. Regulator assy (20)	Nut (21), lock washer (22), charging light lead (23), and diode trio lead (24)	Remove from regulator terminal (20). Tag and identify lead.	
5. ECA	a. Connector (25)	Disconnect.	
	b. Bolt (26), washer (27), and clamp (28)	Remove.	
	c. Cable (29)	Open clamp and remove cable.	
	d. Clamp (28), washer (27), and bolt (26)	Install loosely.	
	e. Cable (29)	Push through hole in center bulkhead and lay across top of engine.	
6. Fuel and oil lines	a. Fuel line (30)	Disconnect from fuel bypass, tag, and identify.	Cap and plug openings.
	b. Fuel line (31)	Disconnect from fuel valve inlet, tag, and identify.	Cap and plug openings.
	c. Nut (32), 2 washers (33), bolt (34), and 2 clamps (35)	Remove and reassemble on lines.	
	d. 3 nuts (36), 7 washers (37), 4 bolts (38), and clamps (39)	Remove nuts, washers and bolts, and reassemble in clamps on line.	

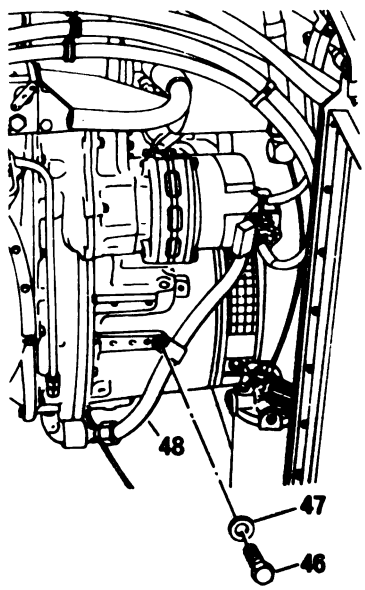




2-14. ENGINE ASSEMBLY REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
6. Fuel and oil lines (cont)	e. Fuel line (40)	Disconnect, tag, and identify.	Lay line over center bulkhead. Cap and plug openings.
	f. Oil inlet line (41)	Disconnect, tag, and identify.	Cap and plug openings.
	g. Cap (42) and nut (43)	Remove from valve and fitting (44).	Remove valve from base (45) later.
	h. Bolt (46) and washer (47)	Remove and reassemble on clamp.	Do not remove clamp from hose.
	i. Oil line (48)	Disconnect, tag, and identify.	Cap and plug openings.





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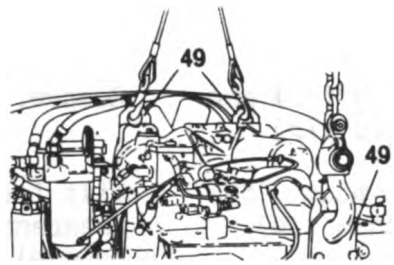
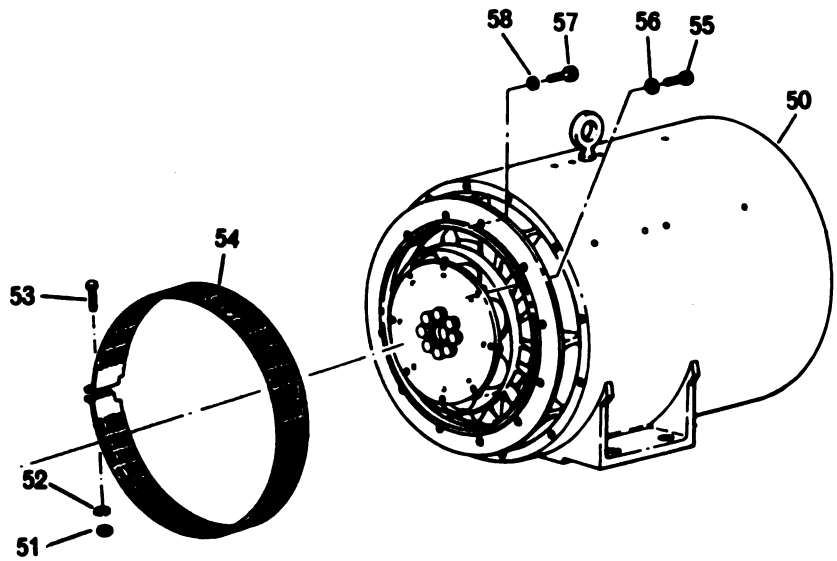
LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
7. Engine	Lifting eyes (49)	Attach hoist and apply tension to cables.	
8. Alternator (50)	a. Nut (51), lock washer (52), and bolt (53)	Remove.	
	b. Screen (54)	Remove.	
	c. 8 bolts (55) and lock washers (56)	Remove and discard bolts and lock washers.	
	d. 12 bolts (57) and lock washers (58)	Remove and discard lock washers.	





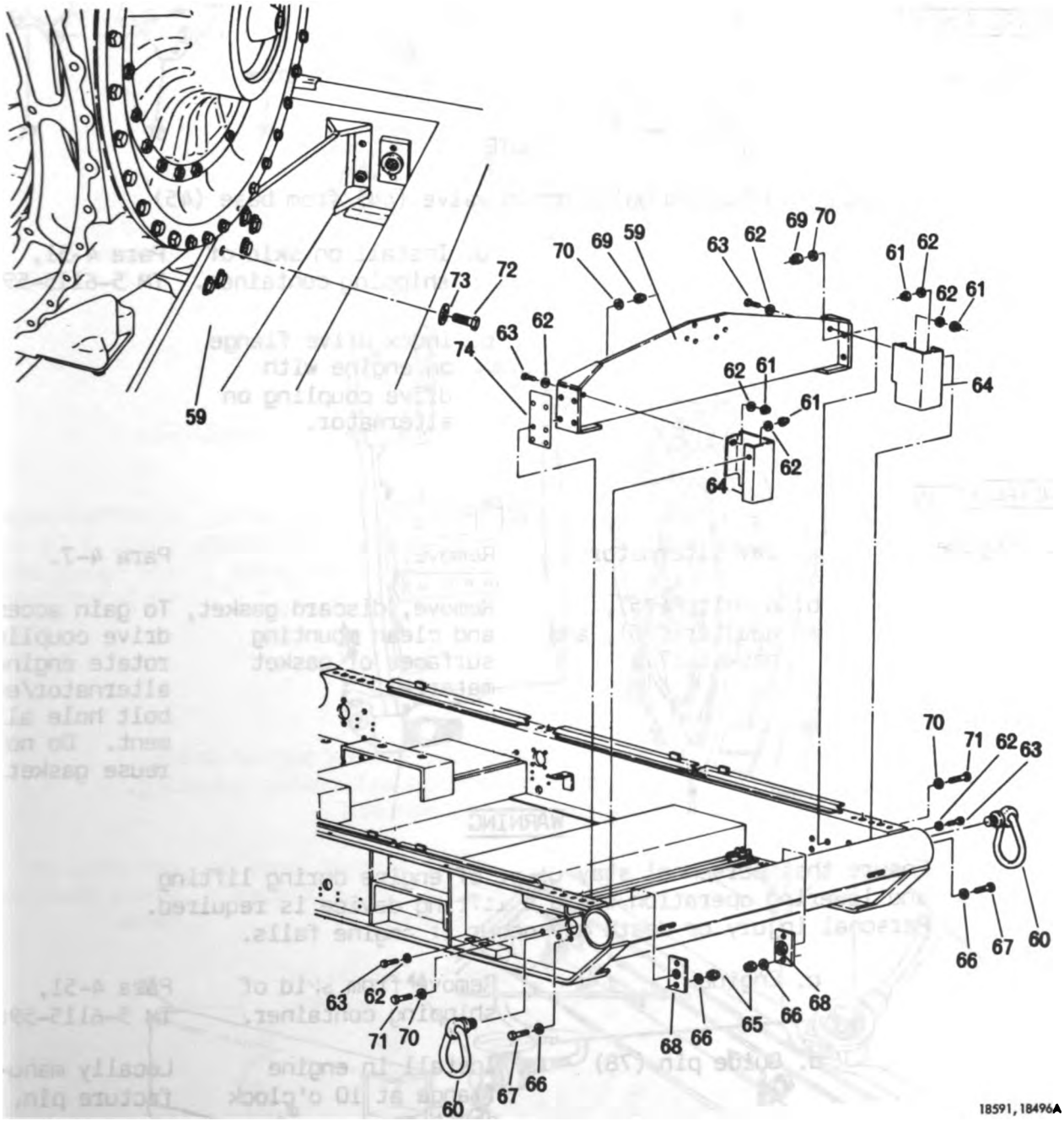
2-14. ENGINE ASSEMBLY REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
9. Front mount (59)	a. 2 cargo rings (60)	Remove.	
	b. 4 nuts (61), 8 washers (62), 4 bolts (63), and 2 ducts (64)	Remove.	
	c. 4 nuts (65), 8 washers (66), 4 bolts (67), and 2 plates (68)	Remove.	
	d. 8 nuts (69), 16 washers (70), and 8 bolts (71)	Remove.	
	e. 6 bolts (72) and washers (73)	Remove.	
	f. Front mount (59) and shim (74)	Tilt forward to allow clearance for engine removal.	Removal not required. If shim(s) must be replaced, calculate the required shim(s) by subtracting the length stamped on the front mount from the length stamped on the base.

WARNING

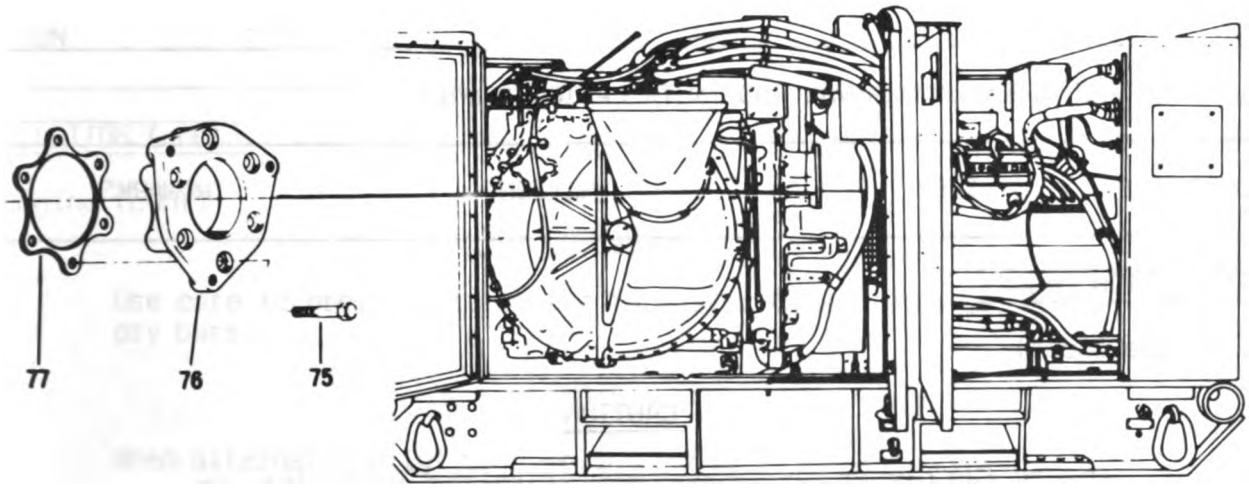
Ensure that personnel stay clear of engine during lifting or lowering operation. Personal injury or death may occur if engine falls.

10. Engine	a. Operate hoist to move engine from base and enclosure.		2 technicians reqd; 1 to operate hoist and 1 to guide engine.



2-14. ENGINE ASSEMBLY REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
10. Engine (cont)			
		NOTE	
	As engine is lifted guide drain valve (44) from base (45).		
		b. Install on skid of shipping container.	Para 4-51, TM 5-6115-598-12.
		c. Index drive flange on engine with drive coupling on alternator.	
INSTALLATION			
11. Engine	a. 24V alternator	Remove.	Para 4-7.
	b. 6 bolts (75), adapter (76), and gasket (77)	Remove, discard gasket, and clean mounting surfaces of gasket material.	To gain access to drive coupling to rotate engine for alternator/engine bolt hole alignment. Do not reuse gasket.
		WARNING	
	Ensure that personnel stay clear of engine during lifting and lowering operation where a lifting device is required. Personal injury or death may occur if engine falls.		
	c. Engine	Remove from skid of shipping container.	Para 4-51, TM 5-6115-598-12.
	d. Guide pin (78)	Install in engine flange at 10 o'clock position.	Locally manufacture pin.



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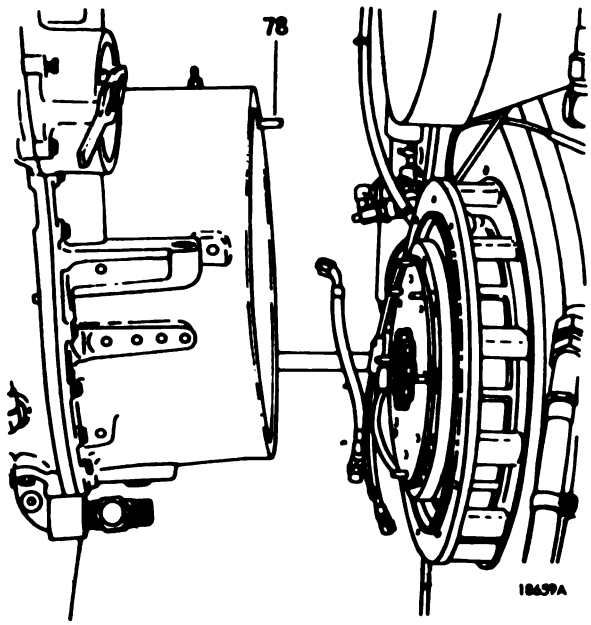

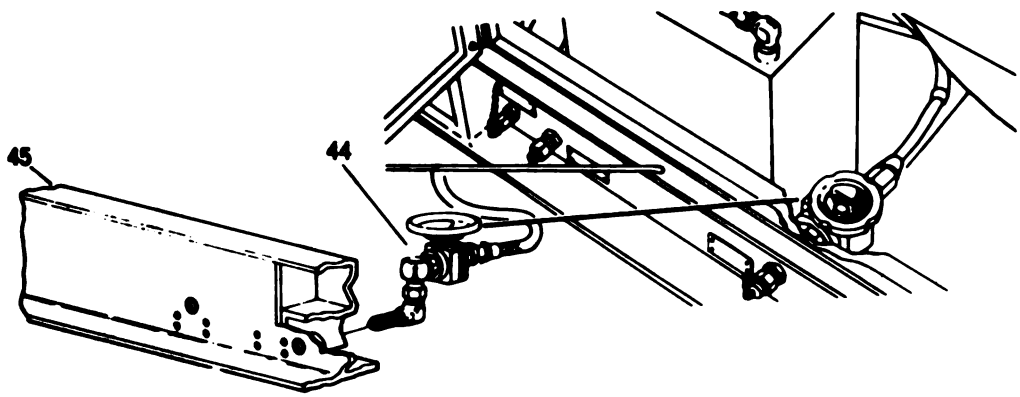

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2-14. ENGINE ASSEMBLY REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS

INSTALLATION (cont)

11. Engine (cont)

CAUTION

Ensure fan blades do not contact shroud during engine installation. Contact could damage the equipment.

NOTE

- Lightly lubricate the outside diameter of alternator coupling with petrolatum.
- Insert drain valve (44) into hole in base (45) as engine is lowered into position.

	e. Engine	Lower engine and move forward to align mounting flange and guide pin (78) with alternator.	3 technicians reqd; 1 to operate hoist and 2 to guide engine.

NOTE

Turn 24 V alternator drive coupling to rotate engine drive flange to align index mark with mark on alternator coupling, when reinstalling the same engine as removed.

	f. Drain valve assy (44)	Insert through base as engine is positioned in place.	Use care to avoid damaging hose.
	g. 11 bolts (57) and new lock washers (58)	Insert but do not tighten.	

LOCATION	ITEM	ACTION	REMARKS

INSTALLATION (cont)

11. Engine (cont)

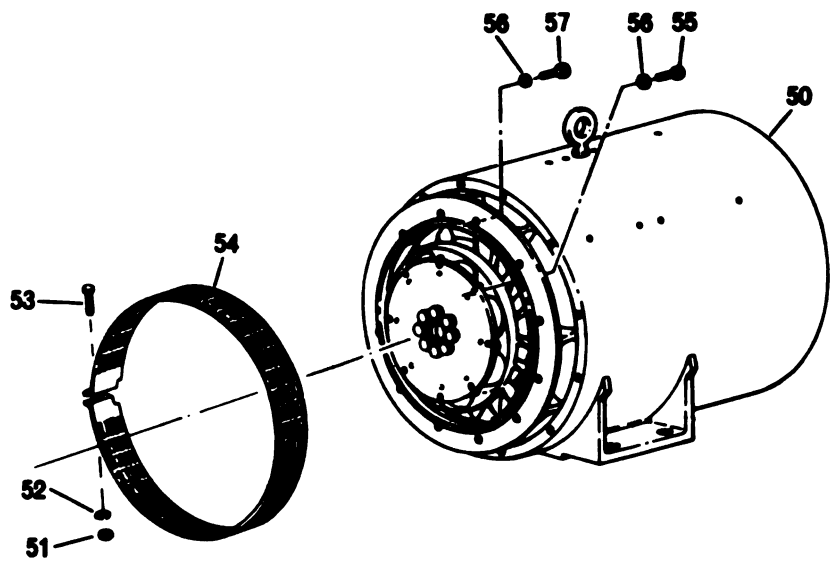
CAUTION

Use care to prevent alternator fan blade damage when using pry bars.

NOTE

When alternator pilot on coupling contacts engine drive flange, pry up gently on both sides of alternator fan, using "soft" metal pry bars to engage engine drive flange.

h. 8 new bolts (55) and 8 new lock washers (56)	Using a mirror and flashlight, check hole alignment in couplings. Install bolts and lock washers in consecutive order and torque to 10 lb-ft.	Turn 24 volt alternator drive coupling to align holes.
i. Guide pin (78)	Remove.	
j. 11 bolts (57) and new lock washers (58)	Tighten.	Prevent fan from turning by inserting "soft" metal rod in alternator fan.



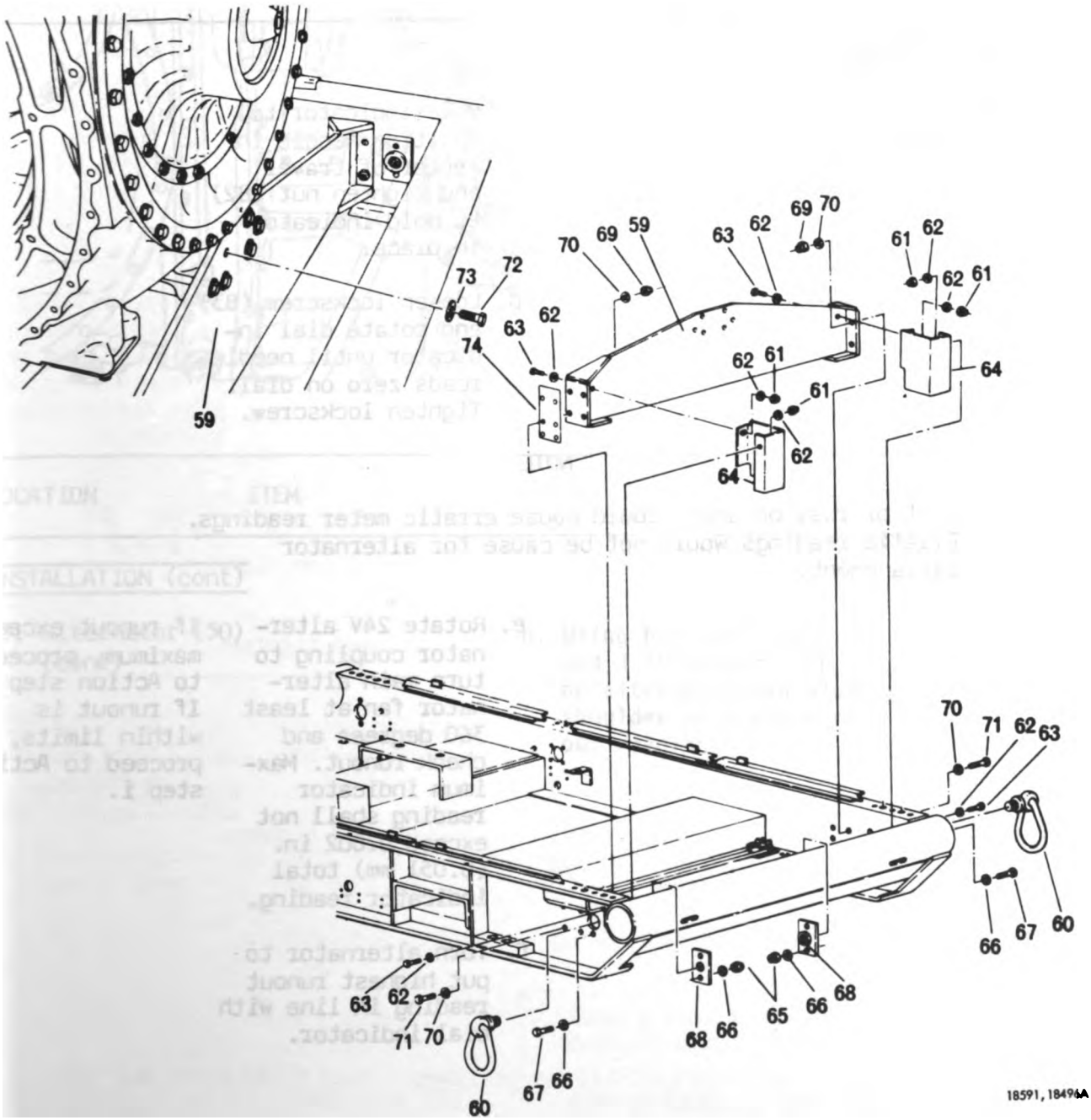
2-14. ENGINE ASSEMBLY REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
12. Front mount (59)	a. Front mount (59)	Place mount in position on engine.	
	b. 6 bolts (72) and washers (73)	Install and tighten bolts.	
	c. Shim (74)	Align bolt holes.	If shim(s) must be replaced, calculate the required shim(s) by subtracting the length stamped on the front mount from the length stamped on the base.
	d. 8 bolts (71), 16 washers (70), and 8 nuts (69)	Install and tighten nuts.	
	e. 2 cargo ring mount plates (68), 4 bolts (67), 8 washers (66), and 4 nuts (65)	Install and tighten nuts.	
	f. 2 cargo rings (60)	Install and tighten.	
	g. 2 ducts (64), 4 bolts (63), 8 washers (62), and 4 nuts (61)	Install and tighten nuts.	

NOTE

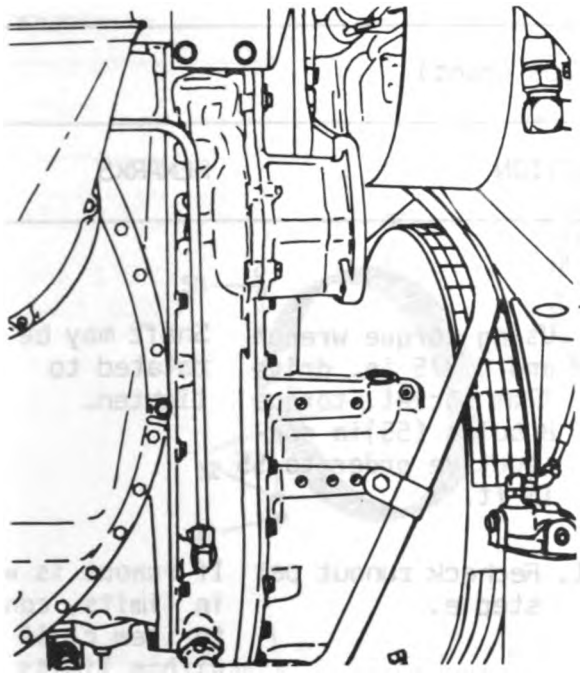
Check oil cooler fan-to-shroud for 1/8 in. (3 mm) minimum clearance. Adjust shroud if required.

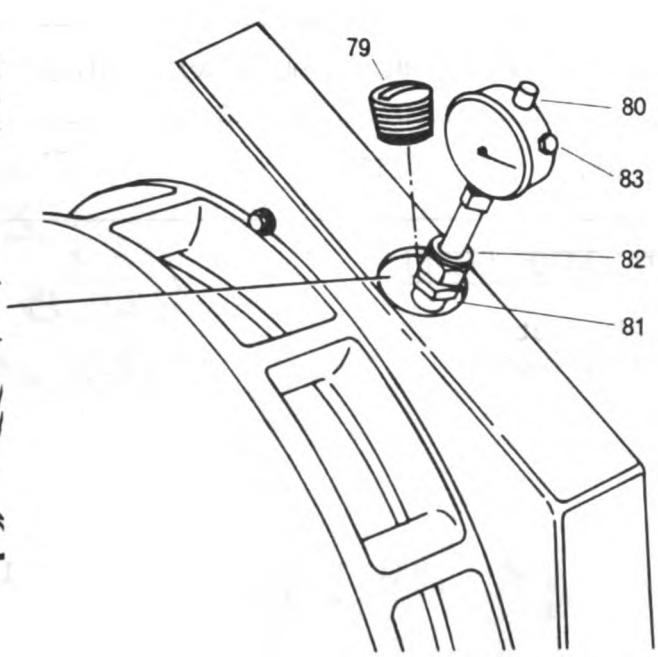
13. Alternator (50)	a. Plug (79)	Remove.	
	b. Dial indicator (80)	a. Install in alternator.	
		b. Thread indicator bushing (81) into alternator.	



2-14. ENGINE ASSEMBLY REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
13.	Alternator (50) (cont)	c. Move indicator to position needle in center of travel and tighten nut (82) to hold indicator in place.	
		d. Loosen lockscrew (83) and rotate dial indicator until needle reads zero on dial. Tighten lockscrew.	
		NOTE Dirt or rust on shaft could cause erratic meter readings. Erratic readings would not be cause for alternator replacement.	
		e. Rotate 24V alternator coupling to turn main alternator fan at least 360 degrees and check runout. Maximum indicator reading shall not exceed 0.002 in. (0.051 mm) total indicator reading.	If runout exceeds maximum, proceed to Action step f. If runout is within limits, proceed to Action step i.
		f. Turn alternator to put highest runout reading in line with dial indicator.	





LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
13. Alternator (50) (cont)		h. Using hardwood block and 4 lb hammer, tap on alternator fan blade shoulder at highest run-out reading.	

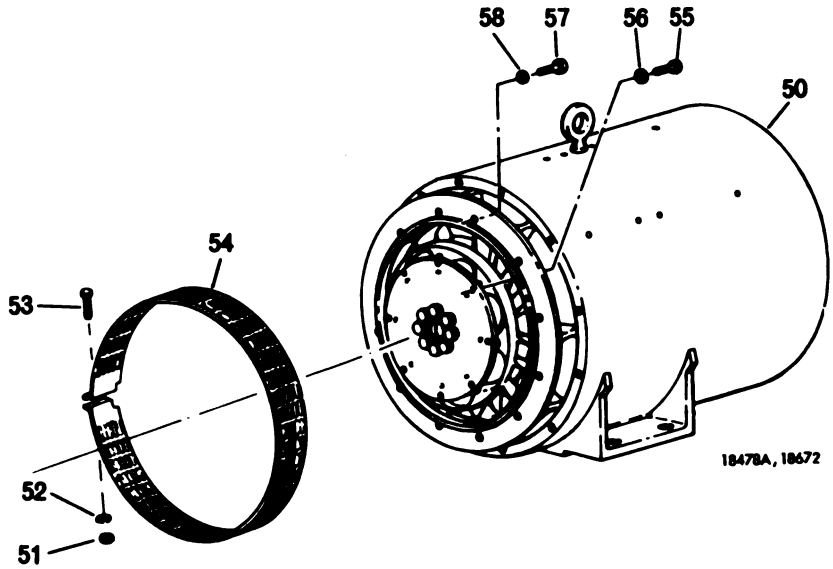
2-14. ENGINE ASSEMBLY REMOVAL AND INSTALLATION (cont)

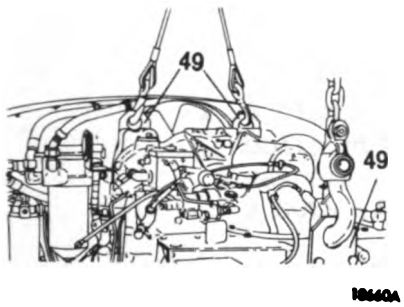
LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
13. Alternator (50) (cont)		k. Using torque wrench and 0.375 in. drive 17mm socket, torque 8 bolts (55)in consecutive order to 55 lb-ft.	Shaft may be rotated to tighten.
		l. Recheck runout per step e.	If runout is within limits, continue to item c. If not within limits, repeat Action steps f. through l.
	c. Plug (79)	a. Remove dial indicator (80).	
		b. Install and tighten plug.	
	d. Bolt (57) and new lock washer (58)	Install and tighten.	
	e. Screen (54)	Position around alternator fan.	Notch should face center bulkhead.
	f. Bolt (53), lock washer (52), and nut (51)	Install and tighten.	
	g. Lifting eyes (49)	Remove hoist.	

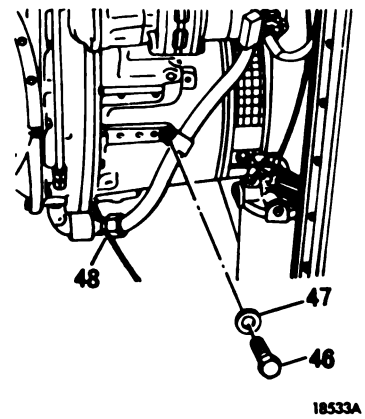
CAUTION

Do not over tighten fittings or lines. Over tightening may damage the equipment.

14. Fuel and oil lines	a. Oil line (48)	Remove tag, cap, and plug. Install and tighten.	

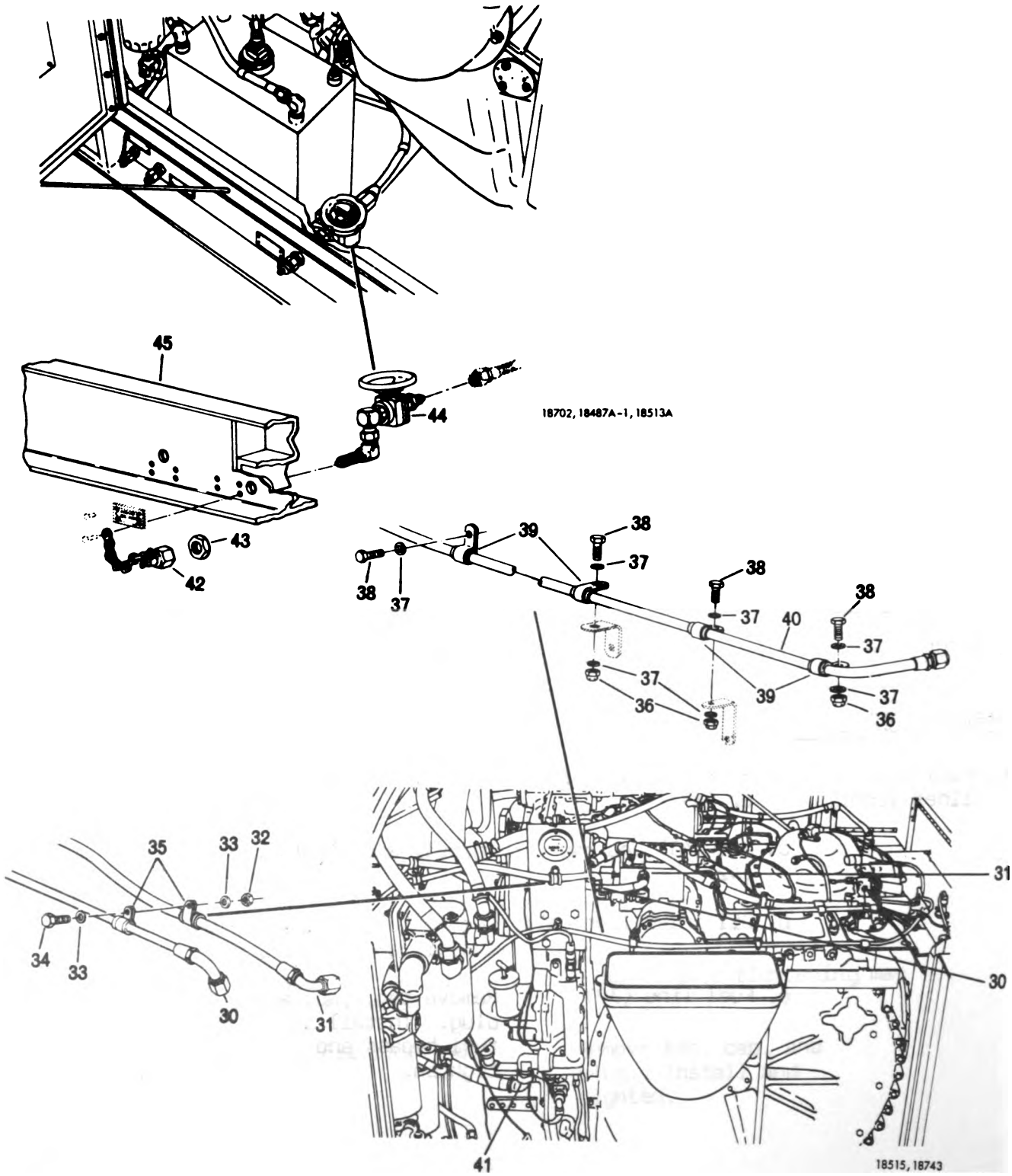




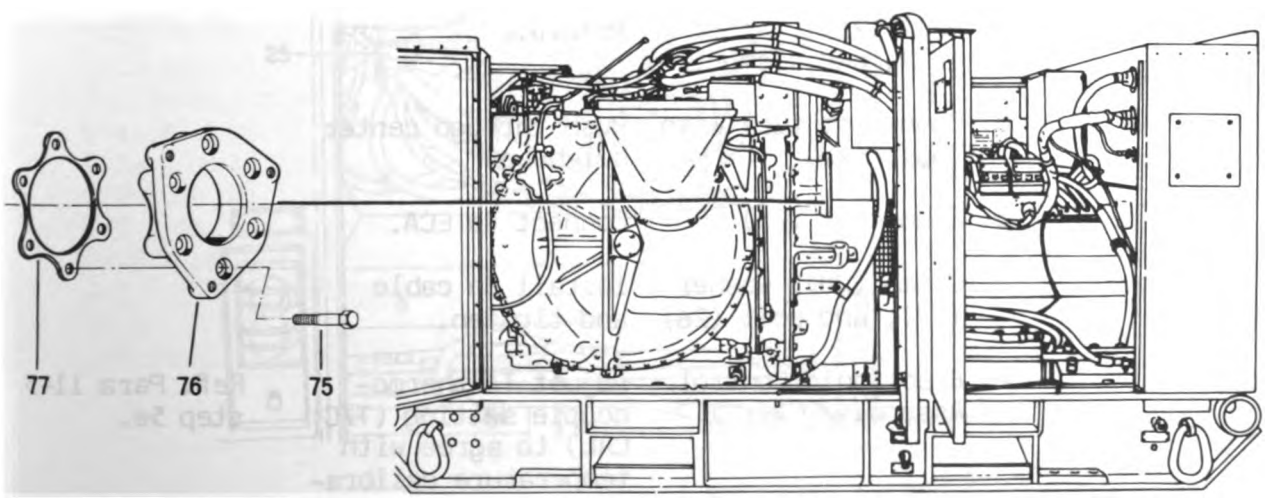


LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
14. Fuel and oil lines (cont)	b. Bolt (46) and washer (47)	Install and tighten.	
	c. Nut (43) and cap (42)	Install and tighten.	
	d. Oil inlet line (41)	Remove tag, cap, and plug. Install and tighten.	
	e. Fuel line (30)	Remove tag, cap, and plug. Install on fuel bypass and tighten.	

2-14. ENGINE ASSEMBLY REMOVAL AND INSTALLATION (cont)



LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
14. Fuel and oil lines (cont)	f. Fuel line (31)	Remove tag, cap, and plug. Install on fuel valve inlet and tighten.	
	g. 2 clamps (35), bolt (34), 2 washers (33), and nut (32)	Install and tighten.	
	h. Fuel line (40)	Remove tag, cap, and plug. Install and tighten.	
	i. 4 clamps (39), bolts (38), 7 washers (37), and 3 nuts (36)	a. Remove nuts, washers and bolts from clamps. b. Install in place and tighten.	
15. Engine	a. New gasket (77) and adapter (76)	Position on engine.	
	b. 6 bolts (75)	Install and tighten.	
	c. 24V alternator	Install.	Para 4-7.



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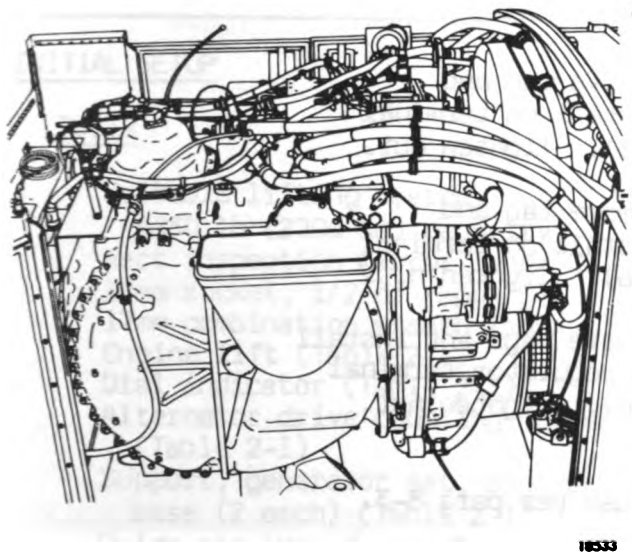
2-14. ENGINE ASSEMBLY REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
15A. Gearbox vent and battery cable support bracket (11A)	a. Bracket (11A), 4 lockwashers (11E), and 4 bolts (11D)	Install and tighten bolts.	
	b. Hose (11C) and 2 clamps (11B)	Install and tighten clamps.	
16. Starter cables (1, 2, 3, and 4)		Remove tags and position on engine.	
	a. 2 bolts (9), washers (10), and 4 clamps (11)	Install clamps on cables and into bracket. Tighten bolts.	
	b. 2 leads (6) and (8)	Retain on starter when other hardware is removed.	
	c. 2 cables (4) and (3), lead (8) and nut (7).	Install and tighten nut.	
	d. Lead (6), 2 cables (2) and (1), and nut (5)	Install and tighten nut.	
17. ECA	a. Bolt (26), washer (27), and clamp (28)	Remove.	
	b. Connector (25) with cable (29)	Push through center bulkhead.	
	c. Connector (25)	Connect to ECA.	
	d. Clamp (28), washer (27), and bolt (26)	Install on cable and tighten.	
	e. Electronic Control Assembly	Adjust T4 thermocouple setting (T/C CAL) to agree with temperature calibration on engine tag (T4).	Ref. Para 11-3 step 5e.



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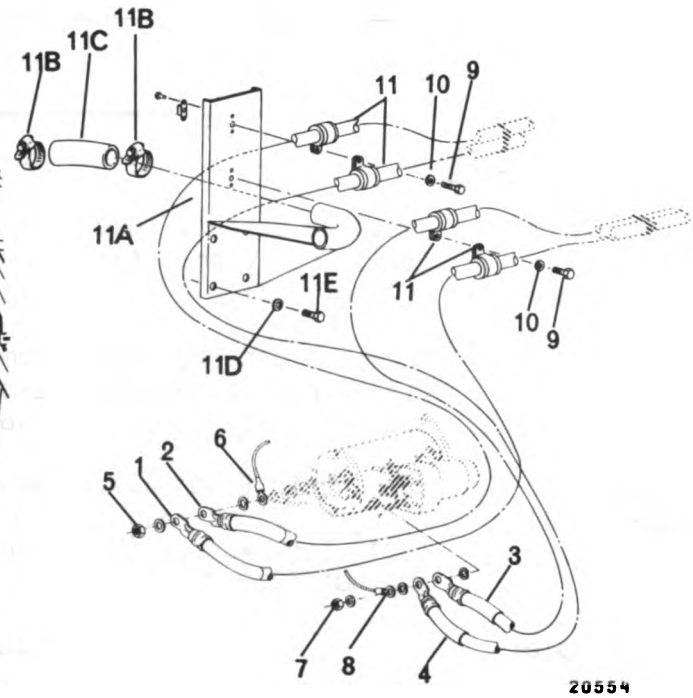

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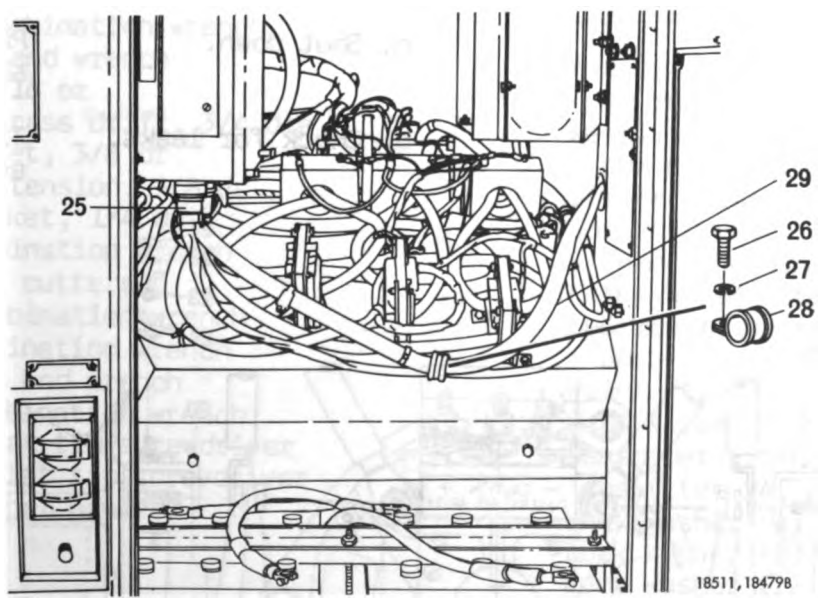

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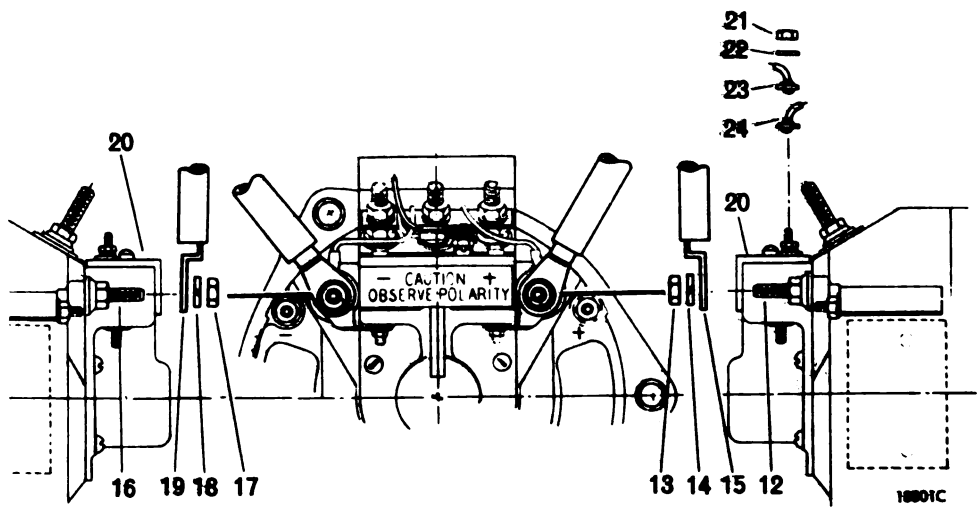
2-14. ENGINE ASSEMBLY REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
18. Alternator positive terminal (12)	Positive battery lead (15), lock washer (14), and nut (13)	Remove tag and install on terminal (12). Tighten nut.	
19. Alternator negative terminal (16)	Negative battery lead (19), lock washer (18) and nut (17)	Remove tag and install on terminal (16). Tighten nut.	
20. Regulator assy (20)	Diode trio lead (24), charging light lead (23), lock washer (22), and nut (21)	Remove tags and install on regulator terminal (20). Tighten nut.	
21. Oil cooler		Flush per para 8-3.	
22. Engine		a. Add oil per para 4-46, TM 5-6115-598-12.	
		b. Start and run 10 minutes.	Para 2-2, 2-3, TM 5-6115-598-12
		c. Shut down.	Para 2-7, TM 5-6115-598-12
		d. Check for leaks.	Tighten fittings as reqd.



2-15. 150 KW AC, BRUSHLESS, AIR-COOLED ALTERNATOR REMOVAL AND INSTALLATION

This task covers:

a. Removal b. Installation

INITIAL SETUP

Tools

Suitable lifting device, 4850 lb (2200 kg) capacity
Rect inspection mirror (appx C)
17mm socket, 1/2 dr (appx C)
17mm combination wrench (appx C)
Engine lift (Table 2-1)
Dial indicator (Table 2-1)
Alternator drive coupling holder (Table 2-1)
Support, generator set, engine to base (2 each) (Table 2-1)
Guide pin (Manuf. per Table 2-2)
Pry bar (2 ea) (manufacture per Table 2-2)
Tool Kit, Master Mechanics (5180-00-699-5273)
3/8-dr ratchet handle
9/16 deep well socket, 1/2 dr
1/2-dr ratchet handle
1 1/8 combination wrench
3/8 box end wrench
Hammer, 16 oz
10-in. brass drift, 3/4 dia
3/8 socket, 3/8 dr
5-in. extension, 3/8 dr
7/16 socket, 1/4 dr
7/8 combination wrench
Diagonal cutters
7/16 combination wrench
1/2 combination wrench
1/2 open end wrench
9/16 combination wrench
1-in. flat tip screwdriver
12-in. flat tip screwdriver
1/4 ratchet handle

Tools (cont)

Mechanical fingers
5/8 deep well socket, 1/2 dr
Putty knife
Shop Equipment, Contact Maintenance, Truck Mounted (4940-00-294-9518)
Marking Crayon
Shop Equipment, Electrical Repair Semitrailer Mounted (4940-00-294-9517)
Flashlight
1 1/2 combination wrench
4 lb hand hammer (appx C)
17mm socket, 0.375 in. square drive (appx C)
5-75 lb-ft torque wrench (appx C)

Materials/Parts

4x4x12-in. wooden blocks (2 reqd) or wooden cradle
Metal straps (2) (Retain from new alternator.)
Straps (plastic ties)
Suitable container
Flywheel housing gasket
Paint brush (item 5, appx B)
Lubricant, petrolatum (item 13, appx B)
Paint (item 16, appx B)
Rags (item 17, appx B)
Sandpaper (item 19, appx B)
Tags (item 24, appx B)
Lock washer (4) (item 40)
Lock washer (8) (item 33)
Lock washer (12) (item 31)
Bolts (8) (item 32)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

2-15. 150 KW AC, BRUSHLESS, AIR-COOLED ALTERNATOR REMOVAL AND INSTALLATION (cont)

INITIAL SETUP (cont)

Troubleshooting References

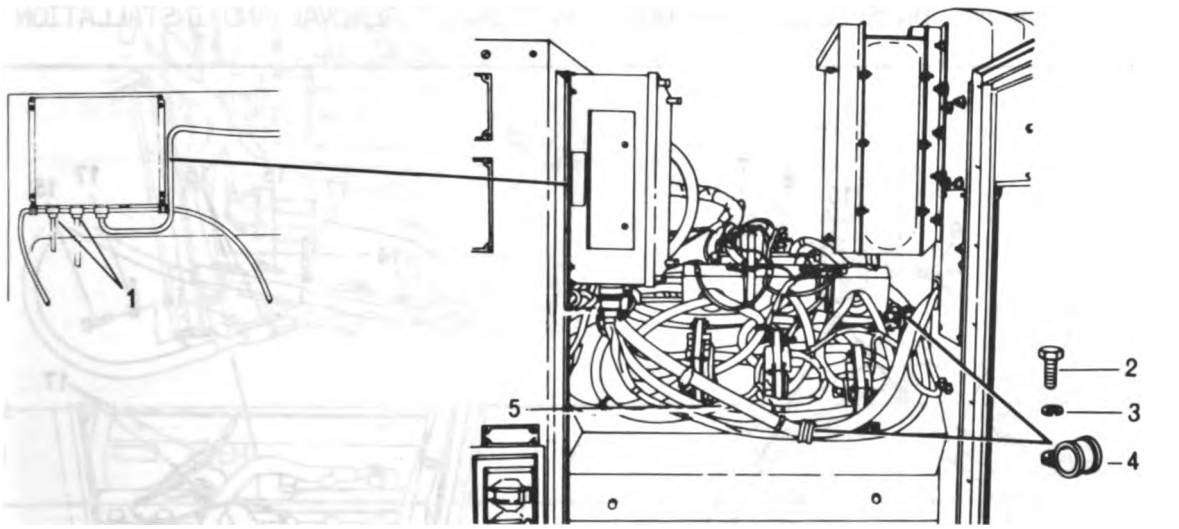
Item	Step	Table
46	6	2-5
47	10	2-5
52	1,2	2-5
54	1	2-5

Equipment Condition

Para	Condition Description
4-13*	Front and rear roofs removed.
4-22*	Batteries removed.
3-4	Rear cabinet panel assy removed.
4-7	24V alternator removed.
6-4	Fuel tank assy removed.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
	INSPECTION-TEST (Refer to para 5-2.)		
	REMOVAL		
1. ECA	a. 2 connectors (1)	Disconnect.	
	b. 2 bolts (2), washers (3), and clamps (4)	Remove.	
	c. Cable (5)	Open clamp and remove cable. Set aside.	
	d. 2 clamps (4), washers (3), and bolts (2)	Assemble loosely on support.	



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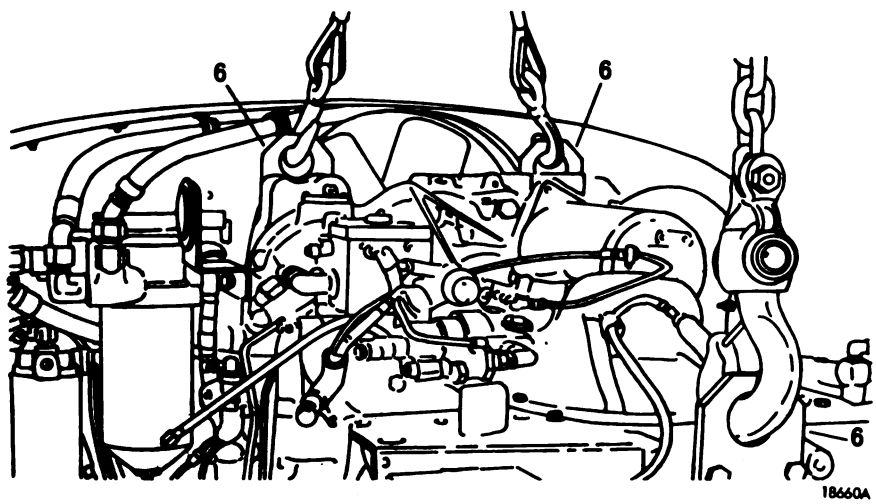
LOCATION	ITEM	ACTION	REMARKS
2. Engine	Hoist	a. Connect hooks to 3 engine lifting eyes (6).	
		b. Take up slack.	This will support rear end of engine.



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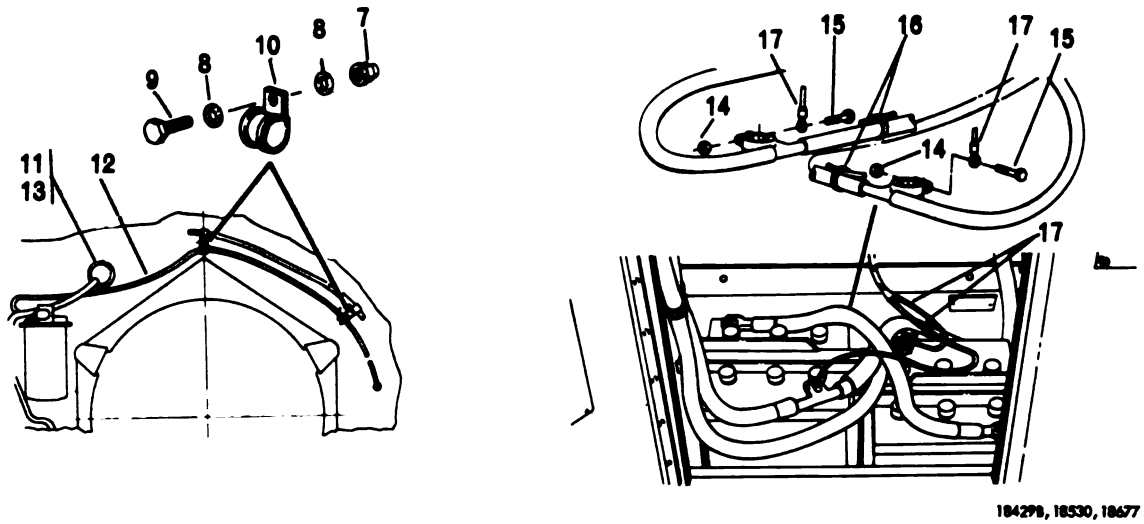
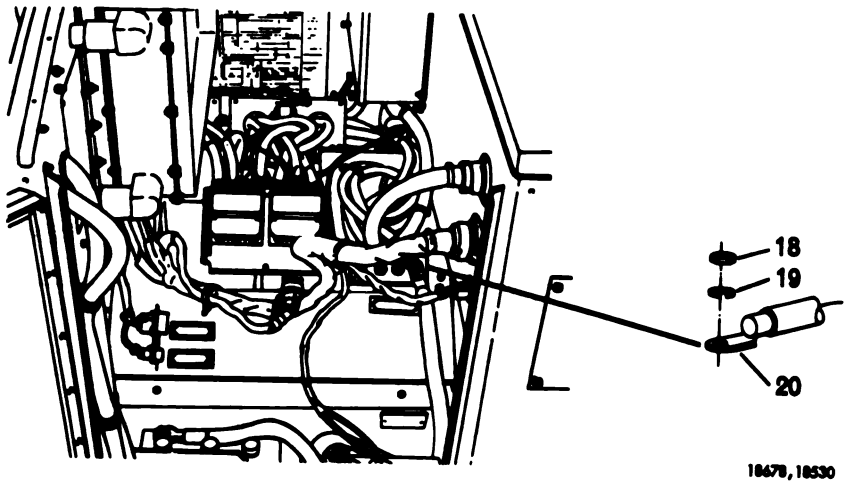
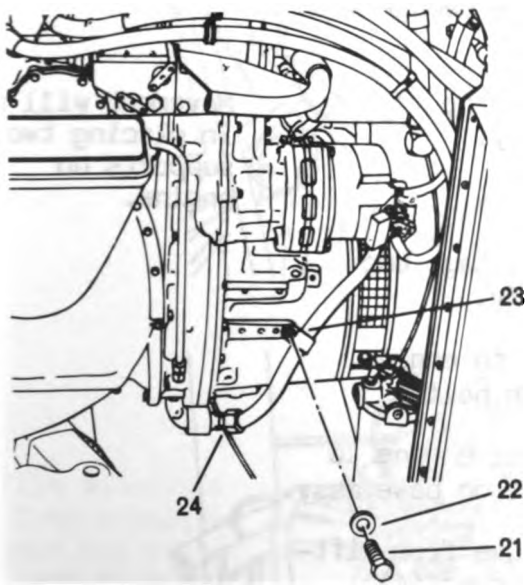
2-15. 150 KW AC, BRUSHLESS, AIR-COOLED ALTERNATOR REMOVAL AND INSTALLATION (cont)

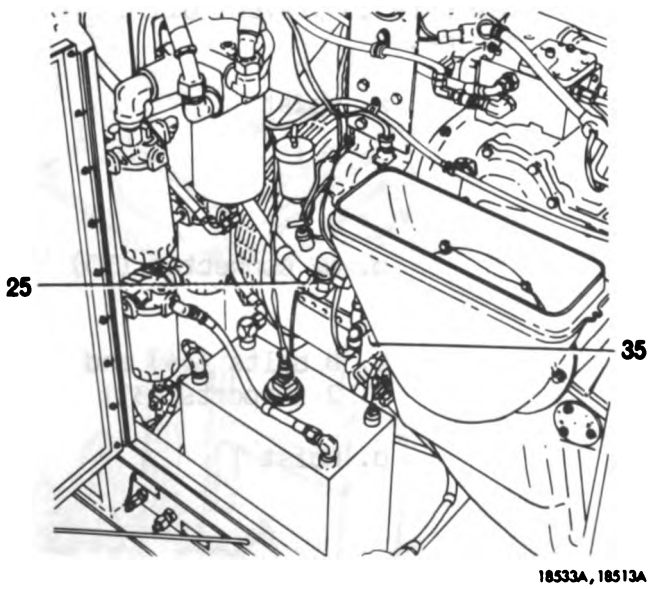


LOCATION	ITEM	ACTION	REMARKS
3. Bulkhead	a. 2 nuts (7), 4 washers (8), 2 bolts (9), and clamps (10)	Remove.	Remove clamp from lead and reassemble hardware on clamp.
	b. Transfer pump lead (11)	Disconnect, tag and identify.	
	c. 24 V alternator lead (12), transfer pump lead (11), and fuel tank lead (13)	Pull through hole in bulkhead.	
4. Battery cables	a. 2 nuts (14) and bolts (15)	Remove.	Reassemble hardware on cable clamp.
	b. Straps (16)	Cut and remove.	
	c. 2 leads (17)	Remove, tag, and identify.	



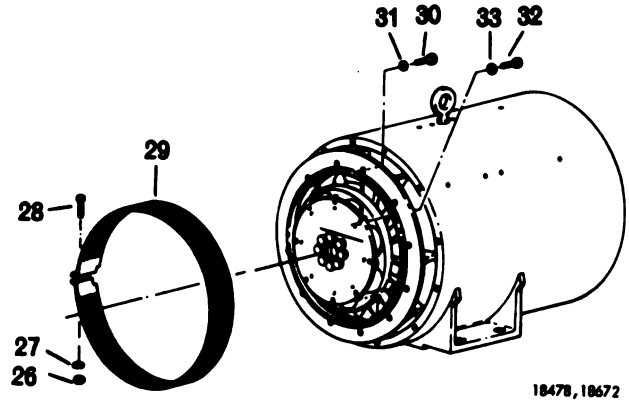
LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
5. Main alternator	Nut (18), washer (19), and strap (20)	Remove. Tag and identify strap.	
6. Engine	a. Bolt (21), washer (22), and clamp (23)	Remove.	Reassemble hardware on hose.
	b. 2 oil lines (24 and 25)	Disconnect, tag, and identify.	

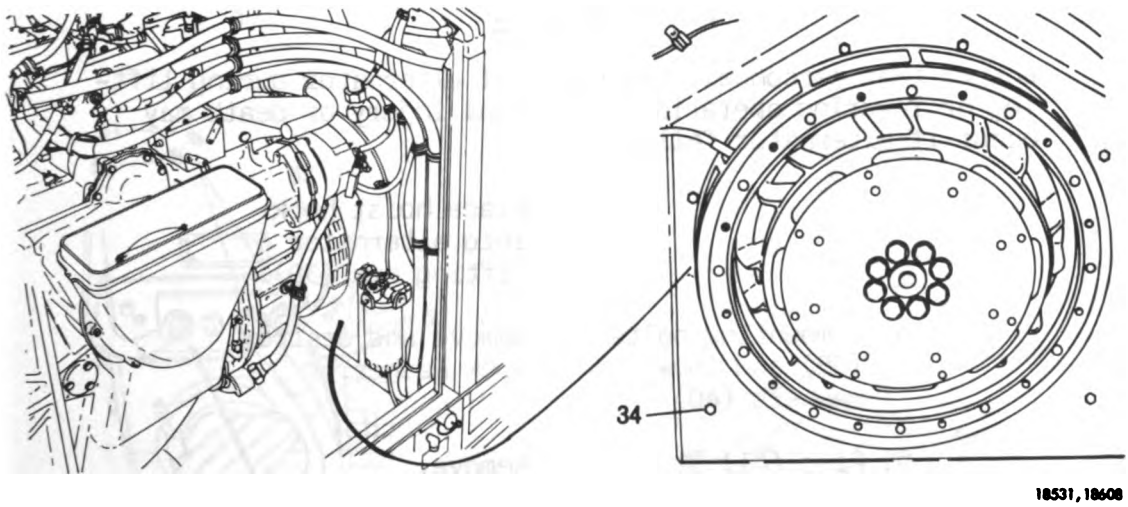


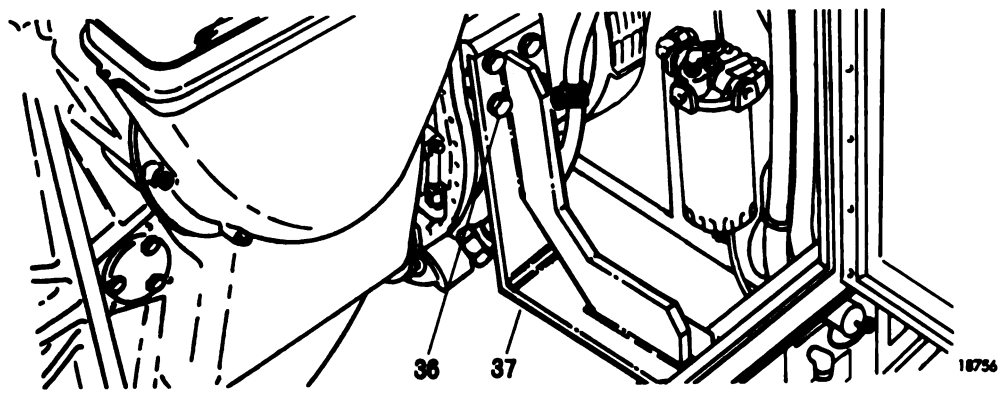


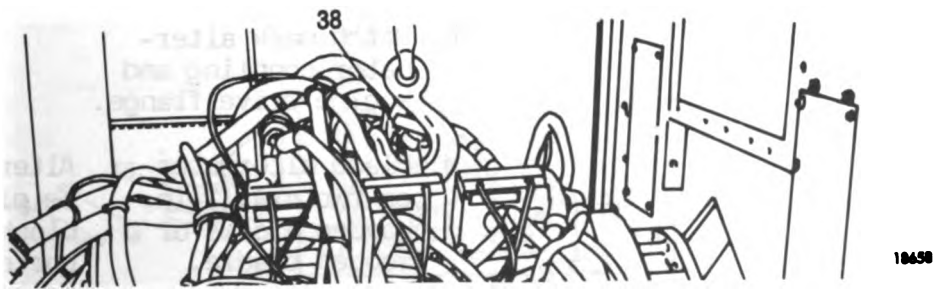
2-15. 150 KW AC, BRUSHLESS, AIR-COOLED ALTERNATOR REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
7. Main alternator	a. Nut (26), washer (27), and bolt (28)	Remove.	
	b. Cooling fan screen (29)	Remove.	
	c. 12 flange bolts (30) and lock washers (31)	Remove and discard lock washers.	
	d. 8 engine drive bolts (32) and lock washers (33)	Remove and discard lock washers.	
	e. 6 bolts (34) fastening alternator to center bulkhead	Remove.	
8. Engine			
	CAUTION		
	Use care to prevent oil cooler fan blade damage when lifting engine.		
	a. Hoist	Lift engine slightly.	Movement will aid in placing two supports on engine.
	b. N2 connector (35)	Remove, tag, and identify.	
	c. 8 bolts (36) and 2 supports (37)	Attach to engine. Tighten bolts.	
	d. Hoist	a. Lower engine to rest on base assy.	
		b. Remove from lifting eyes (6).	



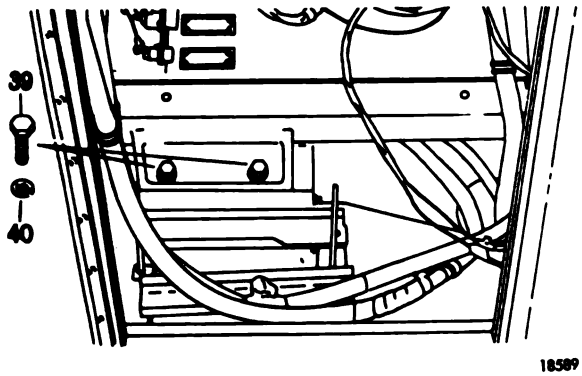


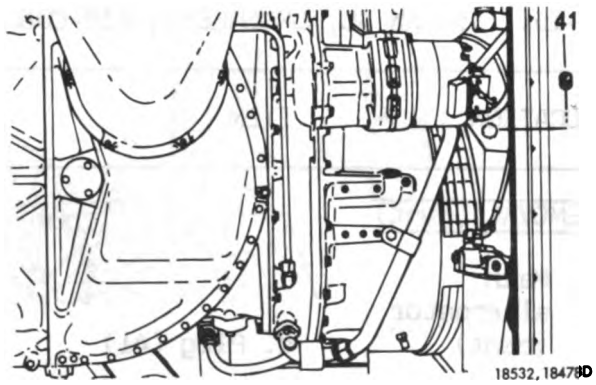


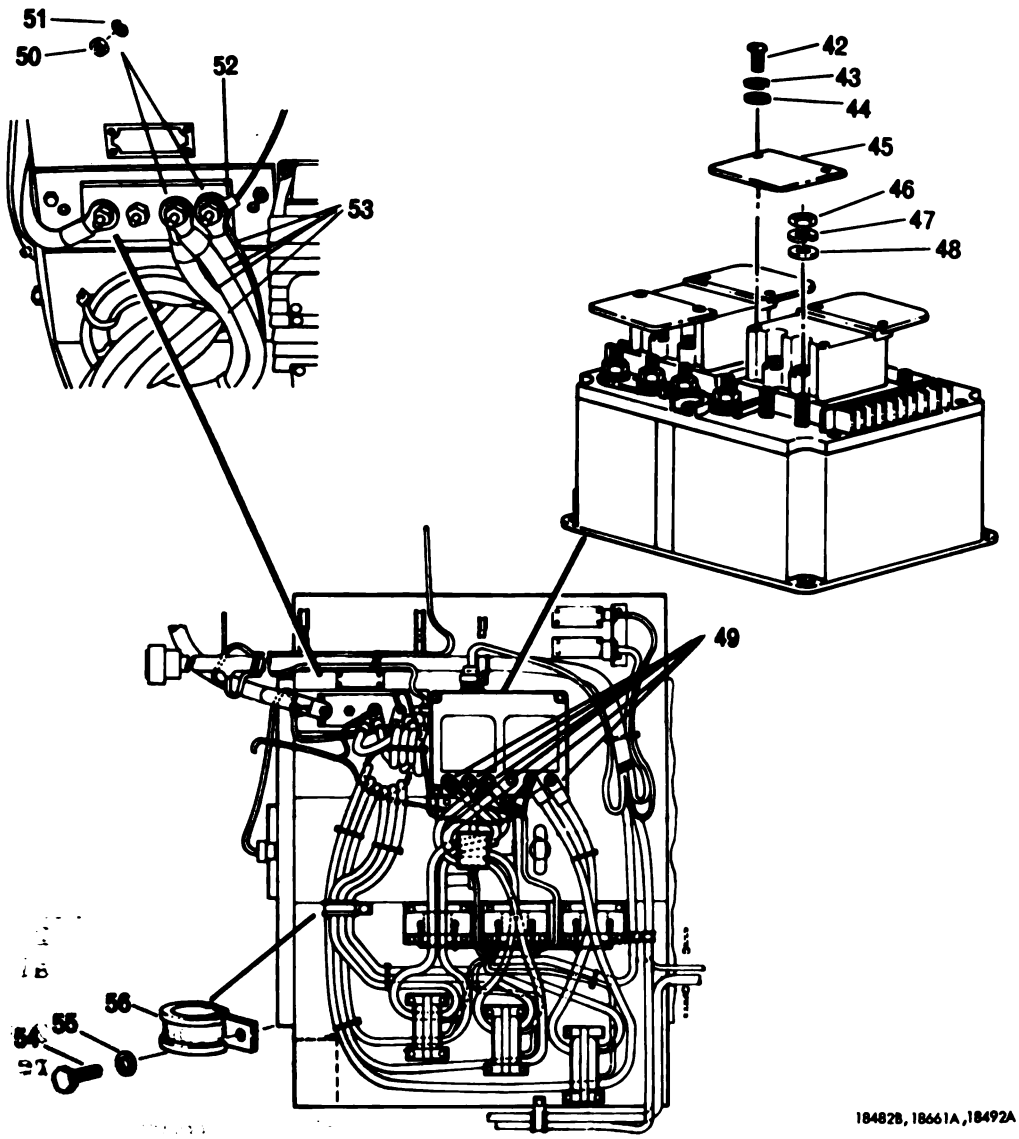


2-15. 150 KW AC, BRUSHLESS, AIR-COOLED ALTERNATOR REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
9. Main alternator			
		WARNING	
		Ensure that personnel stay clear of alternator during lifting or lowering operation. Personal injury or death may occur if alternator falls.	
		Place hoist hook into alternator lifting eye (38).	
	a. 4 mounting bolts (39) and lock washers (40)	Remove and destroy lock washer.	
	b. Plug (41)	Remove.	
		CAUTION	
		Be careful not to damage current transformer on oil cooler housing as alternator is being removed.	
	c. Alternator	a. Lift alternator slightly from base assembly floor.	
		b. Push slightly rearward and lift alternator from enclosure.	
		c. Match mark alternator coupling and engine drive flange.	
		d. Place alternator on two 4x4x12-in. wooden blocks or wooden cradle.	Alternator will be placed on 2 blocks and supported at the rear as reqd.

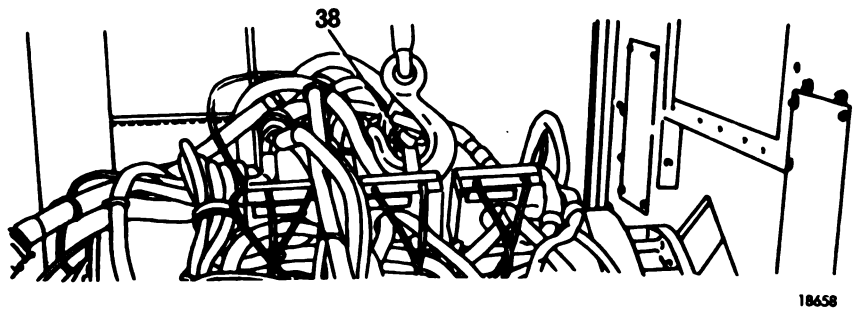


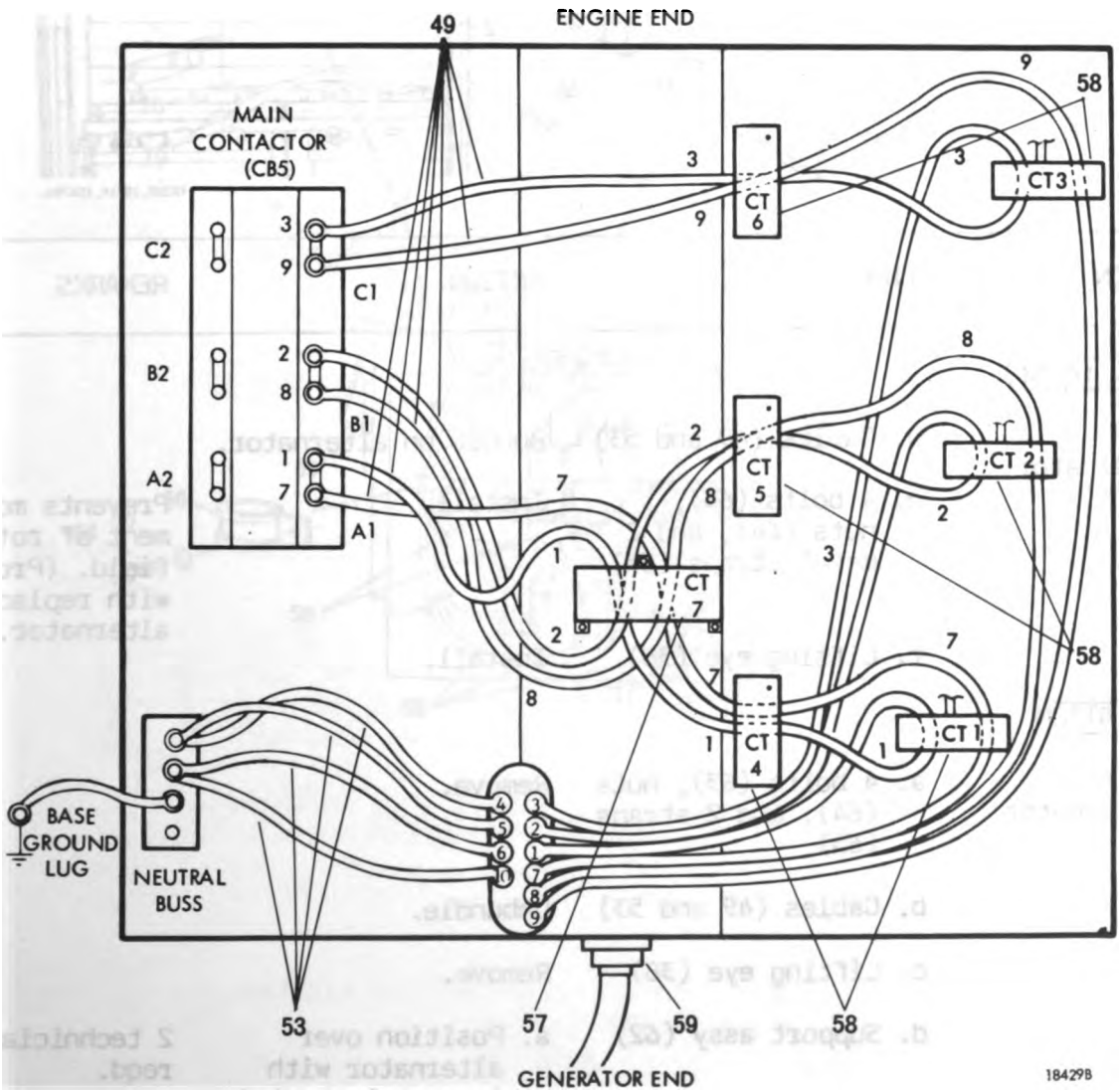




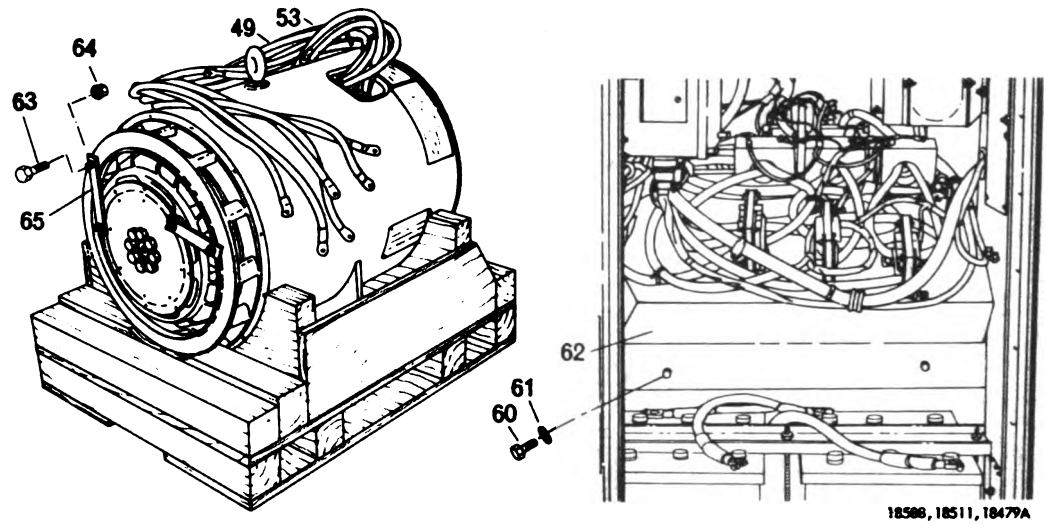
2-15. 150 KW AC, BRUSHLESS, AIR-COOLED ALTERNATOR REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
9. Main alternator (cont)		e. Remove hoist.	
	d. Plug (41)	Install.	
	e. 4 screws (42), lock washers (43), flat washers (44), and 2 covers (45)	Remove.	
	f. 6 nuts (46), lock washers (47), flat washers (48), and 3 small leads	Remove, tag, and identify leads.	
	g. 6 cables (49)	Disconnect, tag, and identify.	
	h. 2 nuts (50), washers (51), and small lead (52)	Remove, tag, and identify leads.	
	i. 4 cables (53)	Remove, tag, and identify.	
	j. Cables (49)	Pull from droop and current transformers.	
	k. Bolt (54), washer (55), and clamp (56)	Remove.	
	l. Lifting eye (38)	Unscrew and remove.	
	m. Connector (59)	Disconnect.	
	n. 4 bolts (60) and washers (61)	Remove.	2 each side of alternator.
	o. Support assembly (62)	Lift support from alternator.	2 technicians reqd.
	p. Cables (49) and (53)	Pull cables through hole in support.	

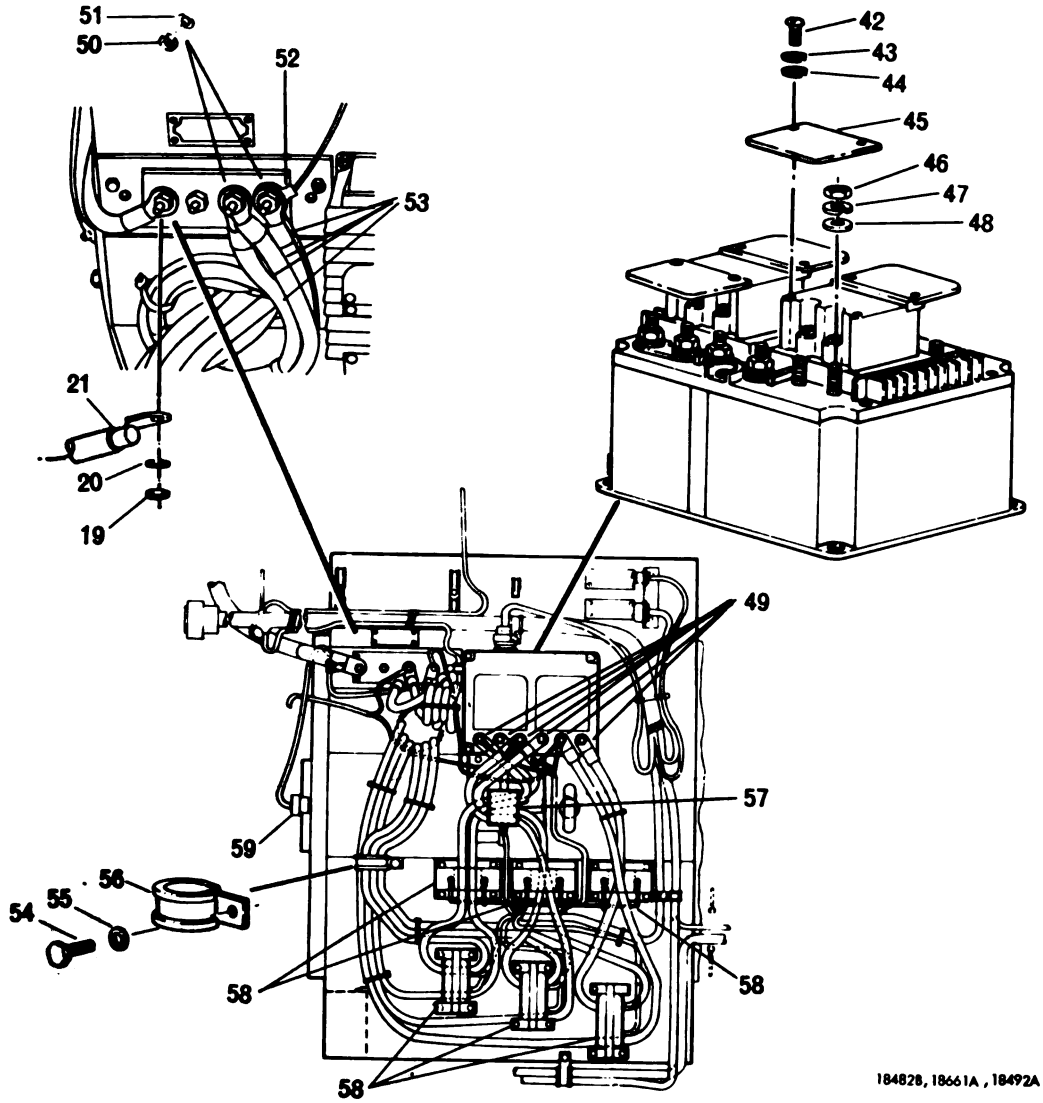




2-15. 150 KW AC, BRUSHLESS, AIR-COOLED ALTERNATOR REMOVAL AND INSTALLATION (cont)

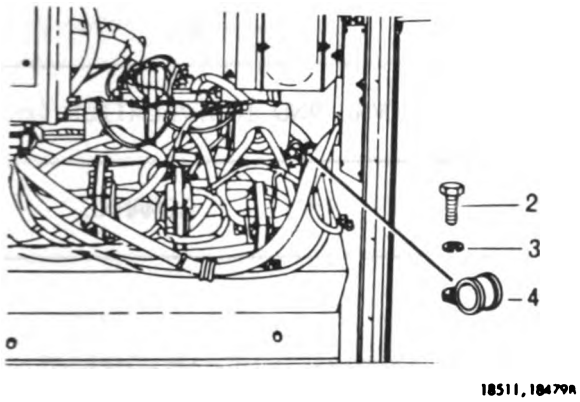


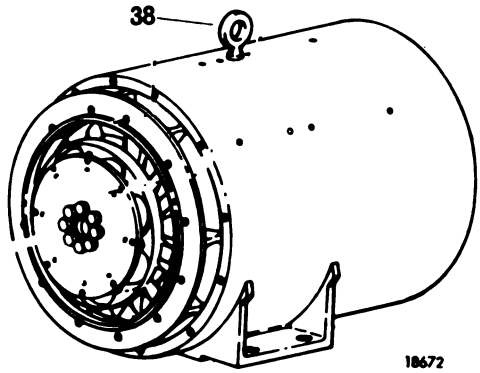
LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
9. Main alternator (cont)	p. Cables (49 and 53)	Bundle on alternator.	
	q. 4 bolts (63), nuts (64), and 2 metal straps (65)	Install.	Prevents movement of rotating field. (Provided with replacement alternator.)
	r. Lifting eye (38)	Install.	
INSTALLATION			
10. Main alternator	a. 4 bolts (63), nuts (64), and 2 straps (65)	Remove.	
	b. Cables (49 and 53)	Unbundle.	
	c. Lifting eye (38)	Remove.	
	d. Support assy (62)	a. Position over alternator with large hole on left side.	2 technicians reqd.



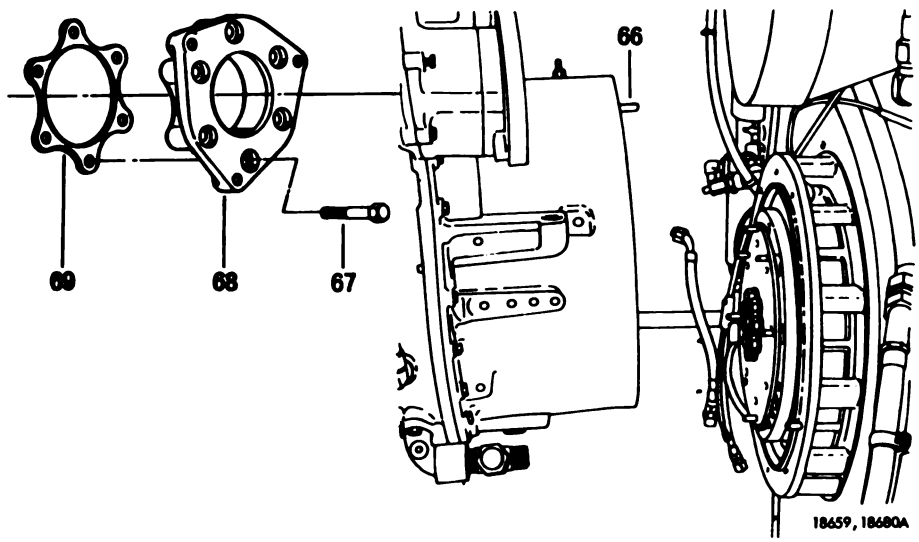
2-15. 150 KW AC, BRUSHLESS, AIR-COOLED ALTERNATOR REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
10. Main alternator (cont)		b. Install cables (49 and 53) through hole.	
		c. Seat support assy on alternator.	Pull cables through hole.
	e. 4 washers (61) and bolts (60)	Install and tighten.	2 each side of alternator.
	f. 6 cables (49)	a. Route through 6 current and droop transformers.	Follow routing on wiring diagram, FO1-2, TM 5-6115-598-12.
		b. Remove tags and install on contactor.	
	g. 3 small leads, 6 flat washers (48), lock washers (47), and nuts (46)	Remove tags, install, and tighten nuts.	
	h. 2 covers (45), 4 washers (44), lock washers (43), and screws (42)	Install and tighten.	Do not over tighten.
	i. 4 cables (53)	Remove tags and install on bus.	
	j. Ground strap (20), washer (19), nut (18), small lead (52), 2 washers (51), and nuts (50)	Remove tag, install, and tighten nuts.	
	k. Clamp (4), washer (3), and bolt (2)	Install and tighten.	



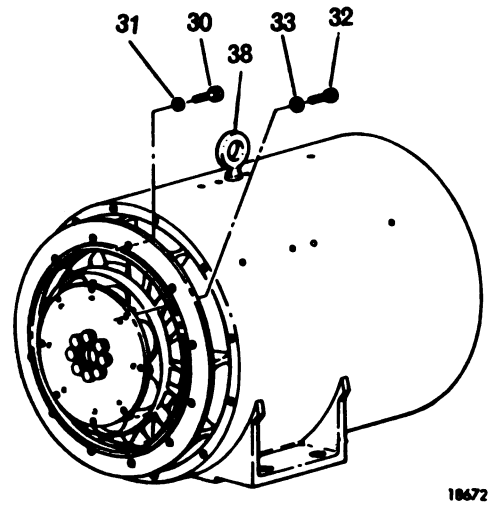


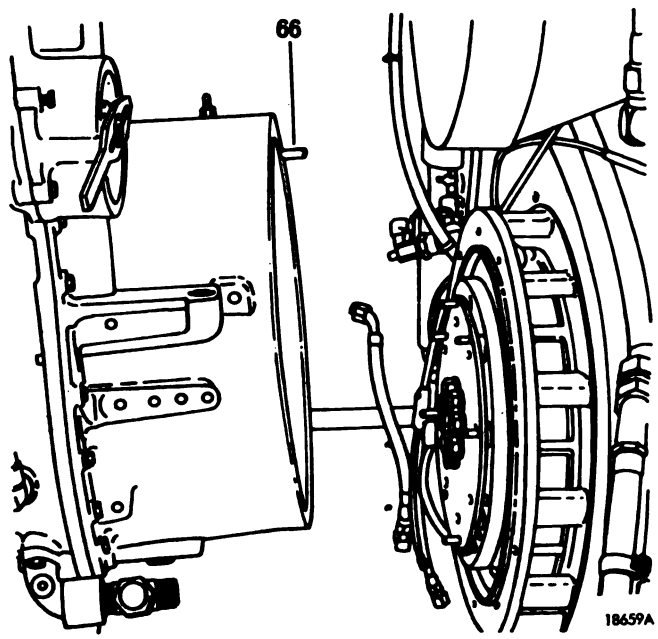
LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
10. Main alternator (cont)	l. Lifting eye (38)	Install and tighten.	
	m. Connector (59)	Connect.	
11. Engine	a. Guide pin (66)	Place in mount flange at approximately 10 o'clock position.	
	b. 6 bolts (67), adapter (68), and gasket (69)	Remove and discard gasket. Clean gasket material from engine and gearbox	To gain access to drive coupling to rotate engine for alternator/ engine bolt hole alignment. Do not reuse gasket.



2-15. 150 KW AC, BRUSHLESS, AIR-COOLED ALTERNATOR REMOVAL AND INSTALLATION (cont)

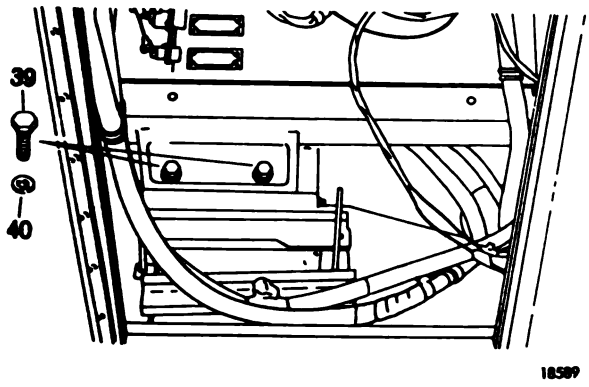
LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
12. Main alternator	a. Outer diameter of alternator coupling	Lubricate lightly.	Use petrolatum.
	b. Hoist	a. Attach to lifting eye (38).	
		b. Lift alternator assy and place on base of generator set.	2 technicians reqd.
	c. Alternator coupling and engine drive flange	Align match marks.	Marked at alternator removal.
	d. Hoist	Move assembly forward to engage guide pin (66).	
	NOTE Do not install a bolt at the 10 o'clock position. This will allow room for tightening the engine coupling bolts.		
	e. 11 bolts (30) and new lock washers (31)	Install and snug.	Do not tighten at this time.
	CAUTION Do not damage alternator fan when lifting with prybar.		
	f. Alternator rotating field	a. Pry up gently on fan, using "soft" metal pry bars to align alternator coupling with engine drive flange.	2 technicians reqd. Tighten 11 bolts (30) in step 12.e. at this time.
		b. Align mount holes in base of alternator with holes in base.	





2-15. 150 KW AC, BRUSHLESS, AIR-COOLED ALTERNATOR REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
12. Main alternator (cont)	g. 4 new lock washers (40) and mounting bolts (39)	Install.	Do not tighten at this time.
	h. 6 bolts (34)	Install and tighten.	Tighten 4 bolts (39) at this time.
	i. Hoist	Remove.	
13. Engine		CAUTION Use care to prevent oil cooling fan damage when lifting engine.	
	a. Hoist	a. Attach to 3 lifting eyes (6). b. Operate hoist to take up slack in cable.	
	b. 8 bolts (36)	Remove.	
	c. 2 supports (37)	Remove.	
	d. N2 connector (35)	Remove tag and install.	
	e. Hoist	Operate to release tension on cables. Remove from lifting eyes.	
14. Main alternator	a. Guide pin (66)	Remove.	



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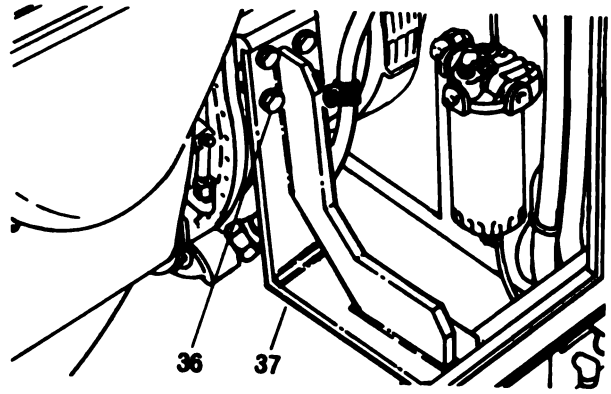

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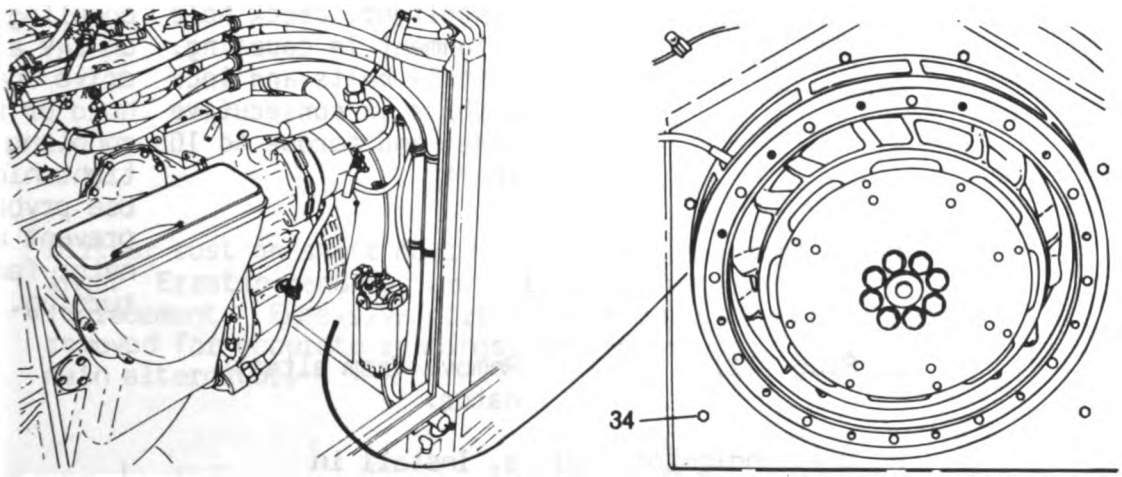

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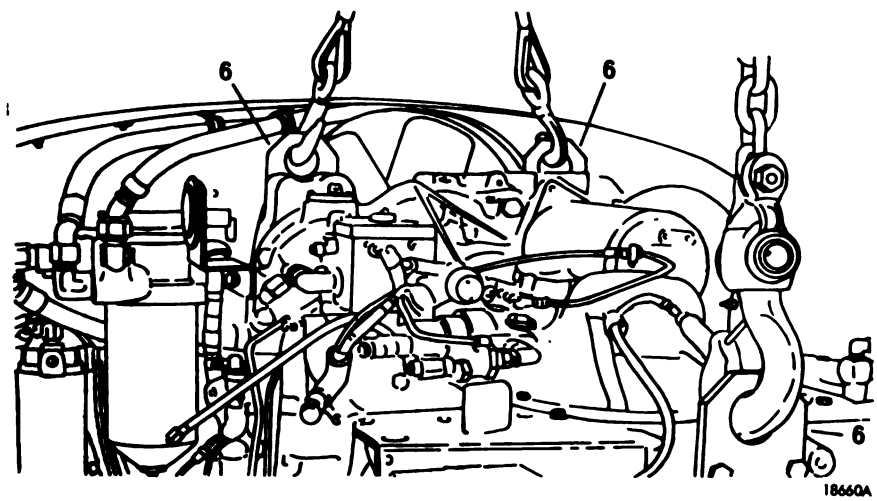

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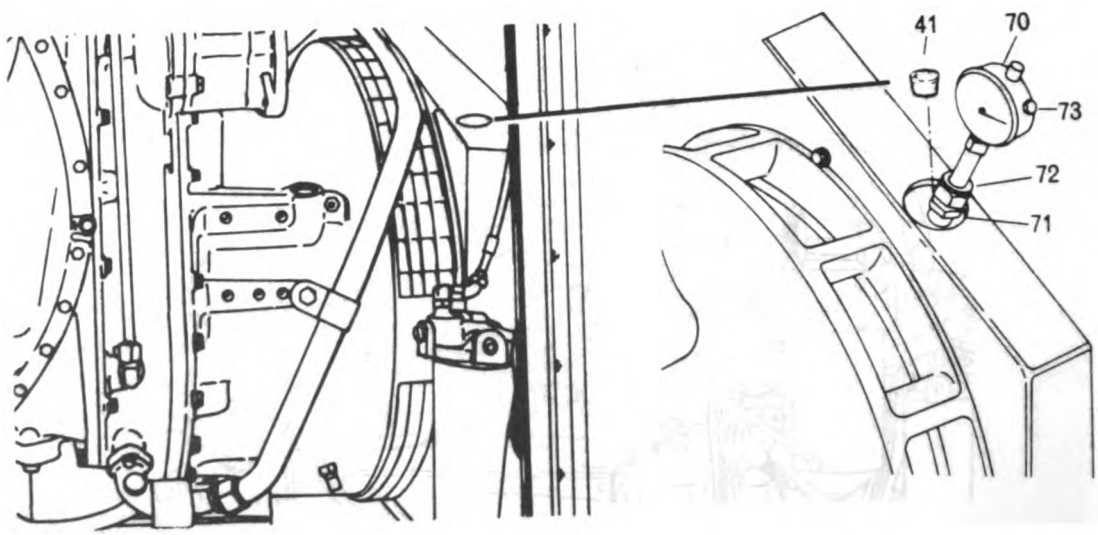
2-15. 150 KW AC, BRUSHLESS, AIR-COOLED ALTERNATOR REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
14. Main alternator (cont)			
		CAUTION	
		Use care to prevent alternator fan blade damage while holding fan with prybar.	
	b. 8 new bolts (32) and 8 new lock washers (33)	Using a mirror and flashlight, check hole alignment in coupling. Install bolts and lock washers in consecutive order and torque to 10 lb-ft.	Use alternator dr coupling holder on 24V alternator drive adapter to hold or rotate coupling while tightening bolts. Use prybar to prevent alternator fan from turning.
	c. Plug (41)	Remove from alternator.	
	d. Dial indicator (70)	a. Install in alternator.	



LOCATION	ITEM	ACTION	REMARKS

INSTALLATION (cont)

14. Main alternator (cont)

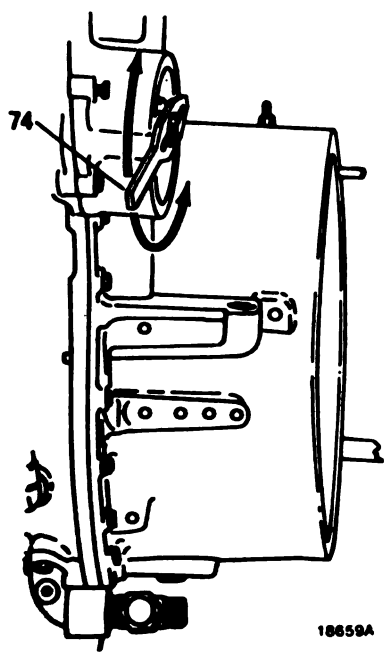
b. Thread bushing (71) into alternator.

c. Move indicator to position needle in center of travel and tighten nut (72) to hold indicator in place.

d. Loosen and rotate dial indicator until needle reads 0 on dial. Tighten lock screw (73).

NOTE

Dirt or rust on shaft could cause erratic indicator readings. Erratic readings are not cause for alternator replacement. Excessive dirt or rust deposits should be removed for accurate readings, and to prevent imbalance to main alternator.

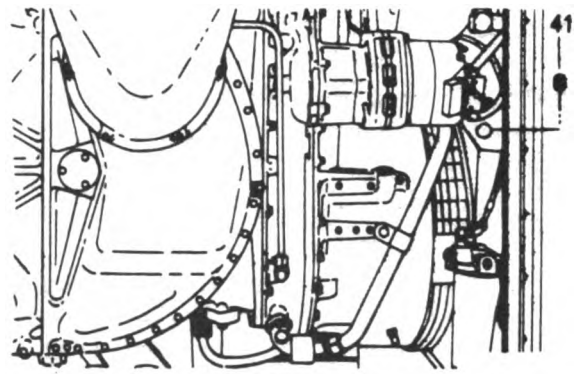


e. Using alternator drive coupling holder (74), rotate 24V alternator coupling a minimum of 1 1/2 turns to turn main alternator fan at least 360 degrees and check runout. Maximum indicator reading shall not exceed 0.002 in.(0.051 mm) total indicator reading.

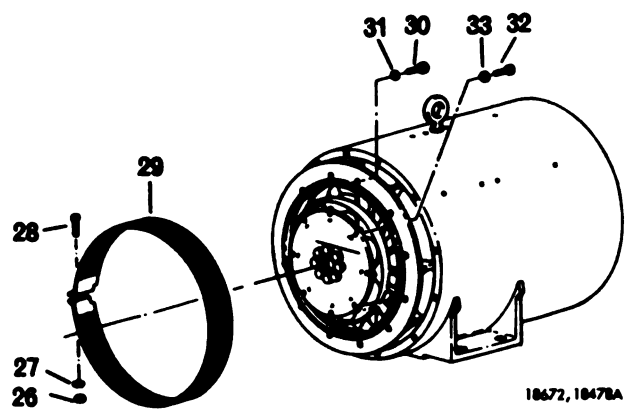
If runout exceeds maximum, proceed to action step f. If runout is within limits, proceed to action step i.

2-15. 150 KW AC, BRUSHLESS, AIR-COOLED ALTERNATOR REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
14.	Main alternator (cont)	f. Turn alternator to put highest runout reading in line with dial indicator.	
		g. Using hardwood block and 4 lb hammer tap on alternator fan blade shoulder at highest runout reading.	

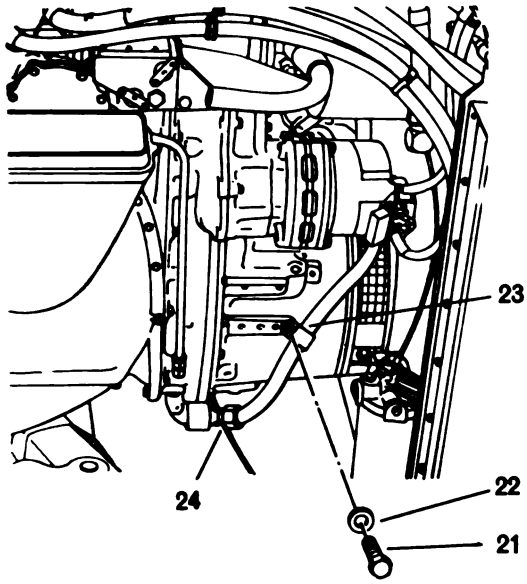


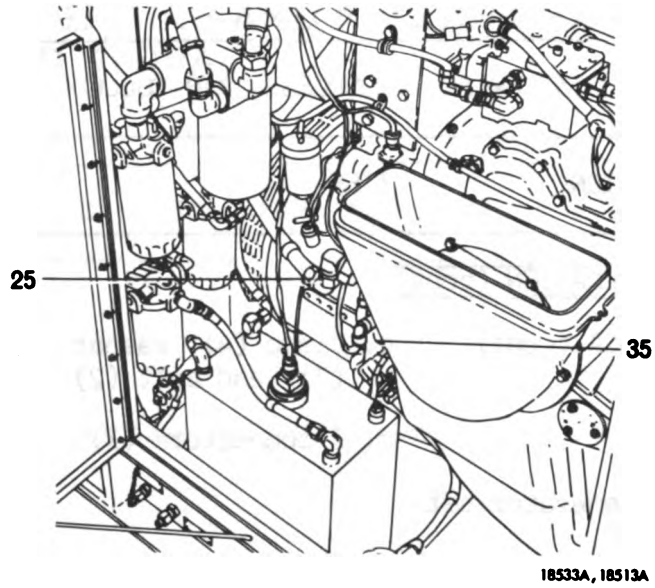
LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
14. Main alternator (cont)		k. Using torque wrench and 0.375 in. drive 17mm socket, torque 8 bolts (32) in consecutive order to 55 lb ft.	Shaft may be rotated to tighten.
		l. Recheck runout per step e.	If runout is within limits, continue to item e. If not within limits, repeat steps f through l.
	e. Dial indicator (70)	Remove.	
	f. Plug (41)	Install and tighten.	
	g. Bolt (30) and new lock washer (31)	Install and tighten.	
	h. Cooling fan screen (29)	Install.	Notch should face center bulkhead.
	i. Bolt (28), washer (27), and nut (26)	Install and tighten.	



2-15. 150 KW AC, BRUSHLESS, AIR-COOLED ALTERNATOR REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
15. Engine			
	CAUTION Do not over tighten fittings or lines. Over tightening may damage the equipment.		
	a. Oil lines (24 and 25)	Remove tags and connect.	
	b. Clamp (23), washer (22), and bolt (21)	Install and tighten.	
	c. New gasket (69), adapter (68), and 6 bolts (67)	Install and tighten bolts.	
16. Battery cables	a. 2 lead terminals (17)	Remove tags and install.	
	b. 2 bolts (15) and nuts (14)	Install but do not tighten.	
	c. Straps (16)	Install.	
17. Bulkhead	a. 24V alternator lead (12), transfer pump lead (11), and fuel tank lead (13)	Insert through hole in bulkhead.	
	b. Transfer pump lead (11)	Remove tag and connect.	
	c. 2 clamps (10), 4 washers (8), 2 bolts (9), and nuts (7)	Install.	2 technicians reqd.
18. ECA	a. Bolt (2), washer (3), and clamp (4)	Remove.	
	b. Cable (5)	Install in clamp.	





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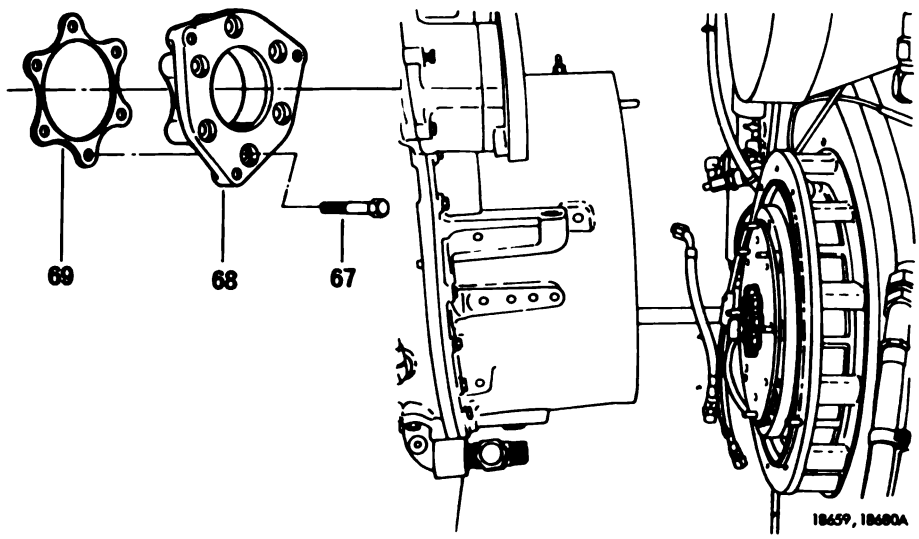

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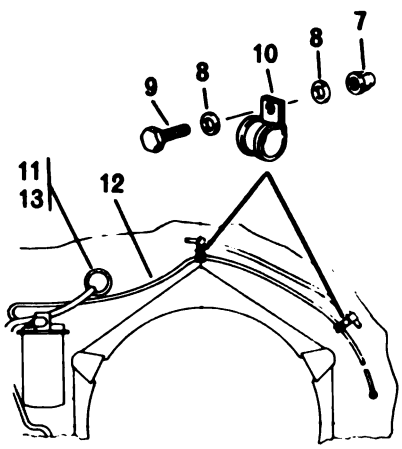

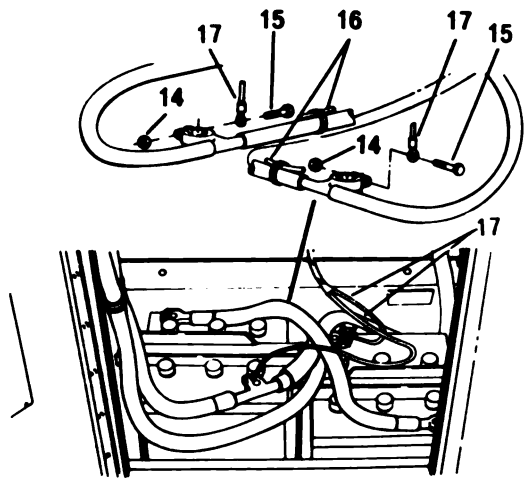

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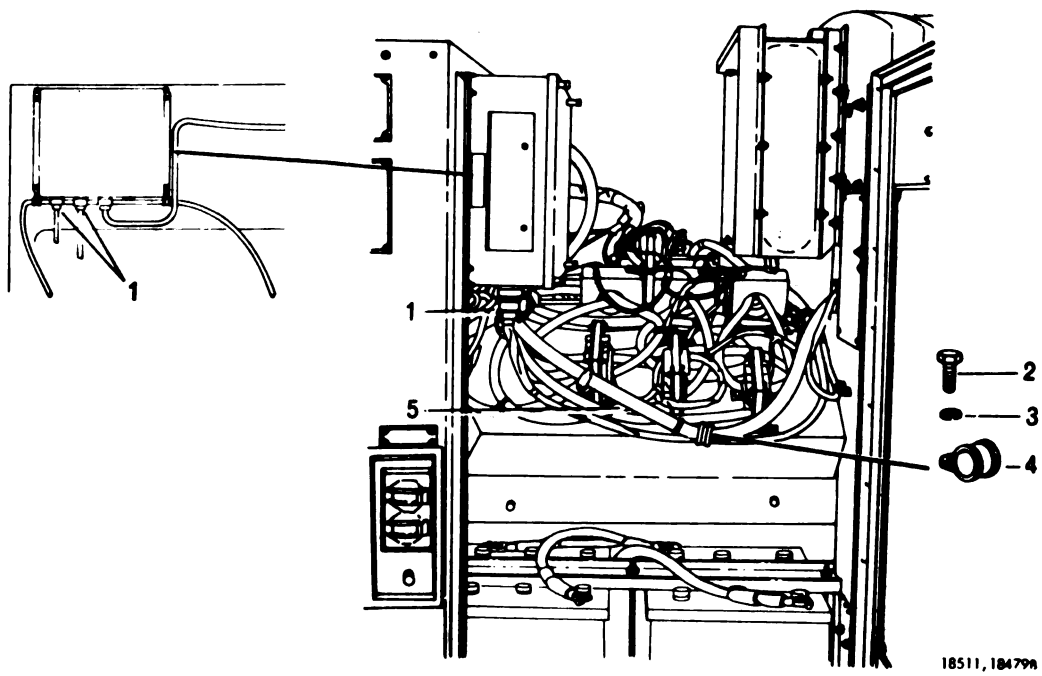
2-15. 150 KW AC, BRUSHLESS, AIR-COOLED ALTERNATOR REMOVAL AND INSTALLATION (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
18. ECA (cont)	c. Clamp (4), washer (3), and bolt (2)	Install and tighten bolt.	
	d. 2 connectors (1)	Connect.	
19. Generator set		Sand and paint as reqd.	
20. Engine		a. Start and run 10 minutes.	Para 2-2 and 2-3. TM 5-6115-598-12.
		b. Shut down.	Para 2-7, TM 5-6115-598-12.
		c. Check oil level and add (proper type) or remove oil as required.	LO 5-6115-598-12. Full level is marked on gage.
		d. Check for leaks.	Tighten fittings as reqd.



Section VI. PREPARATION FOR ENGINE AND ALTERNATOR SHIPMENT AND STORAGE

2-16. ENGINE ASSEMBLY SHIPPING CONTAINER (WOOD) INSTALLATION AND REMOVAL

a. Engine Assembly Container Installation.

(1) Remove four screws (8) and washers (9) from the shipping container cover (10).

NOTE

The right and left sides of the container are determined facing it from the rear. The rear of the container is the end marked DO NOT FORK LIFT THIS END.

(2) Attach a sling and hoist to the lifting brackets on the cover (10).

(3) Lift the cover (10) from the engine platform (11) and set aside.

(4) Detach the storage sack and remove engine mounting hardware and protective covers.

NOTE

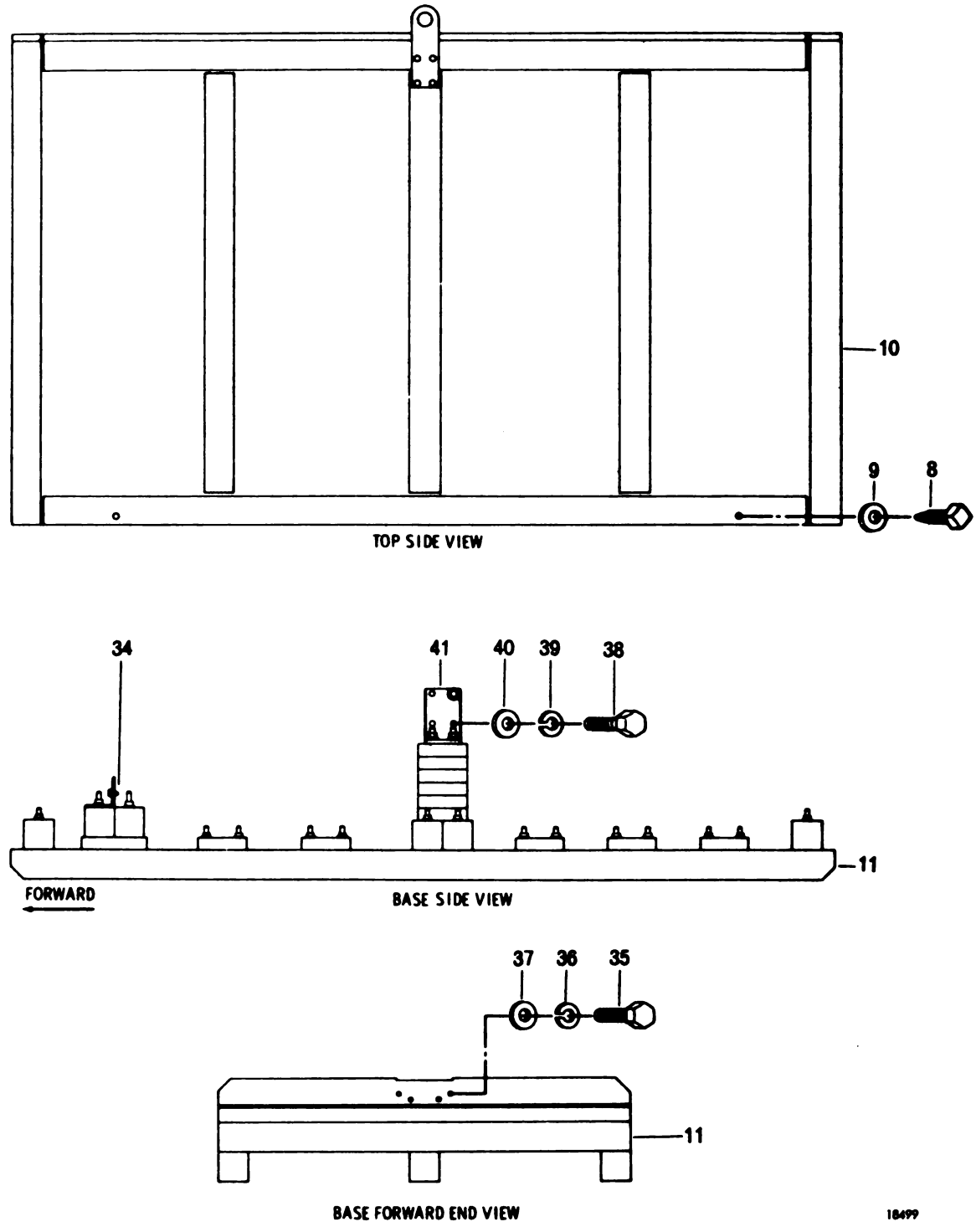
Engine mounting hardware and small protective shipping covers are to be kept in the cloth storage sack and tied to an engine mount on the container platform when not in use. The bell housing cover must be fastened to the mount separately.

(5) Inspect the container cover and engine platform to determine if they are complete and serviceable.

NOTE

Pay particular attention to the engine mounts on the platform. Be certain that they are free of damage and properly secured.

2-16. ENGINE ASSEMBLY SHIPPING CONTAINER (WOOD) INSTALLATION AND REMOVAL (cont)



Engine Assembly Shipping Container

(6) Remove the proper protective shipping covers from the storage sack and install on engine as follows:

Oil outlet port (12)	2 Exhaust ducts (23)
Oil return port (13)	
Fuel drain valve (14)	
Nozzle drain valve (15)	Engine cable assy (26)*
Fuel valve inlet (16)	Engine cable assy (27)*
Electric harness main disconnect (17)	Engine cable assy (28)*
Electronic control assy (18)*	Electronic control cap (29)*
Oil pressure switch (19)	Electronic control cover (30)*
T1 sensor connection (20)	T1 sensor cover (31)*
Compressor inlet (21)	T1 sensor cover (32)*
Breather (22)	Fiberboard carton (33)

*Not shown - These items are normally included with initial engine shipments only, and are integrated into the generator set.

NOTE

The plastic shipping caps and plugs are to be hand tightened. Threaded fasteners must be tightened with a hand wrench. Tighten nonmetal accessory cover fasteners to obtain a snug fit without excessive cover indentation.

(7) Attach a sling or handling fixture to the engine.

(8) With the inlet bell facing forward, move the engine into position over the engine platform keeping it reasonably level. Lower until the engine front mount pad is level with the forward mount (34) on the engine platform.

(9) Start the four bolts (35), lock washers (36) and flat washers (37) into the engine front mount. Hand tighten to locate the forward mount.

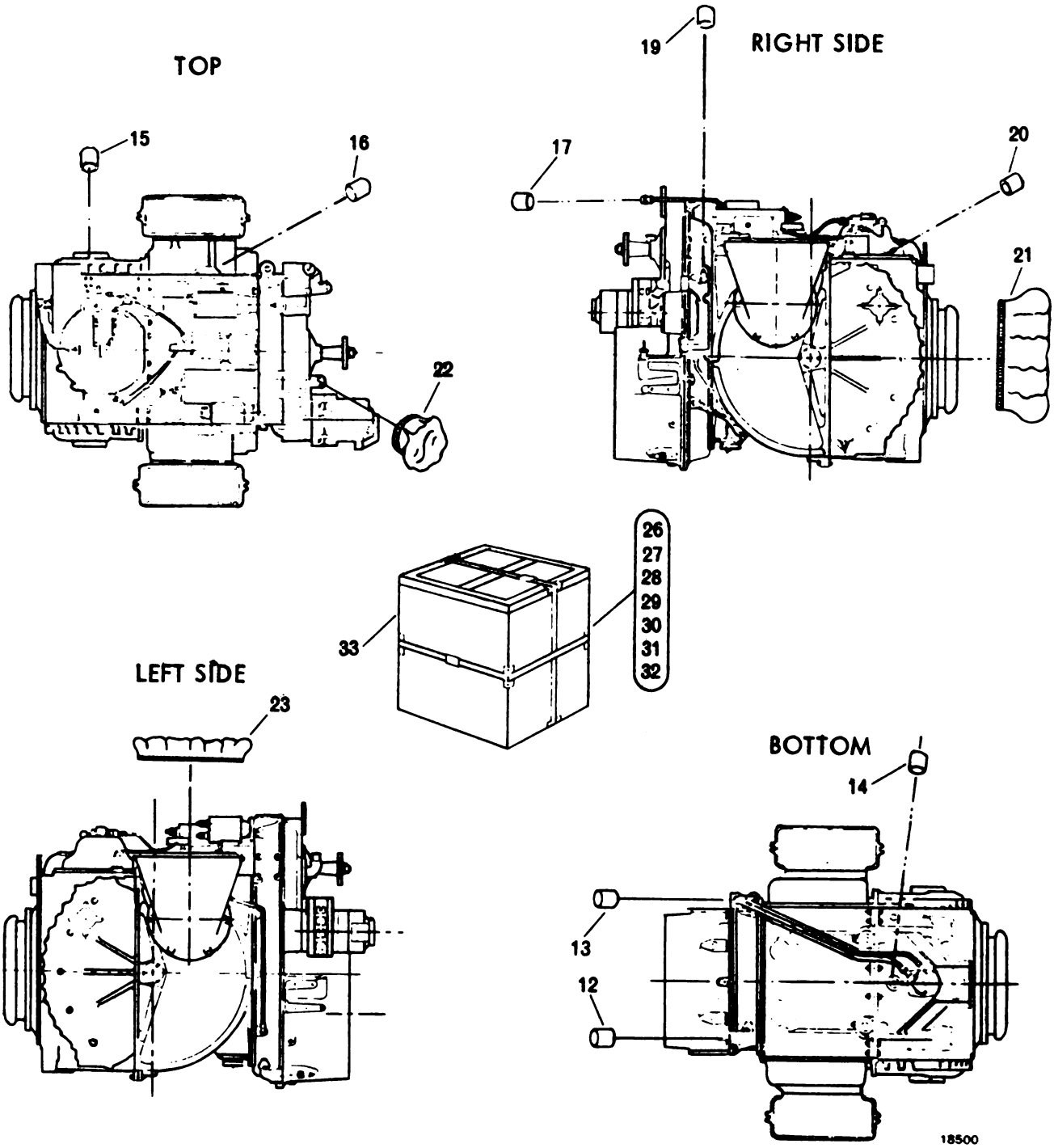
(10) Adjust the engine height as necessary to align the engine side mounts with the side mounts on the platform.

(11) Attach the side mounts to the engine with the eight bolts (38), lock washers (39) and flat washers (40). Torque the front bolts (35) to 205-245 in. lb (23-28 N·m). Torque the side bolts (38) to 53-63 ft lb (72-85 N·m).

(12) Remove the lifting device from the engine assembly.

(13) Packaging instructions for parts shipped in fiberboard cartons (33) consist of the following parts: compressor inlet temperature sensor, electronic control assembly, and engine to ECA cable assembly.

2-16. ENGINE ASSEMBLY SHIPPING CONTAINER (WOOD) INSTALLATION AND REMOVAL (cont)



Engine Shipping Protective Covers

(14) Secure the packaged loose shipped items to the engine platform with metal bands.

(15) Attach a lifting device to the container cover (10). Raise the cover and locate over the engine platforms (11).

CAUTION

Be certain that the cover end marked DO NOT FORK LIFT THIS END is opposite the engine inlet.

(16) Lower the cover (10) onto the engine platform (11).

(17) Attach the cover to the platform with the screws four (8) and washers (9). Tighten the screws (8) until the bearing washers (9) are flush to the cover.

(18) Remove the lifting device from the cover assembly.

NOTE

Special Instructions: Coordinate air shipment with the air carrier. The container will require an air line pallet. The size of the container limits applicable aircraft. (See table 2-6.)

Table 2-6. Engine Wood Container Reference Data

Overall Dimensions	
Length	96.0 in. (2438.4 mm)
Width	48.8 in. (1239.5 mm)
Height	62.2 in. (1579.9 mm)
External Cubage	168.1 cu ft (4.7 m^3)
Empty Container Weight	510 lb (231.5 kg)

b. Engine Assembly Removal.

(1) Remove screws four (8) and washers (9) from the shipping container cover (10).

(2) Attach a sling and hoist to the lifting brackets on the cover (10).

2-16. ENGINE ASSEMBLY SHIPPING CONTAINER (WOOD) INSTALLATION AND REMOVAL (cont)

(3) Lift the cover (10) from the engine platform (11) and set aside.

(4) Remove the loose-ship fiberboard carton from the engine platform.

(5) Attach a sling or handling fixture to the engine. Apply a slight, upward pressure to the lifting device being used.

(6) Remove the eight bolts (38), lock washers (39), and flat washers (40) from the side engine mounts.

(7) Remove the four bolts (35), lock washers (36), and flat washers (37) from the front engine mount.

(8) Carefully lift the engine from the engine platform (11). Place on a clean, dry surface.

(9) Remove the protective shipping covers from the engine.

(10) Place the small covers and the engine mounting hardware into the cloth storage sack.

(11) Fasten the bell housing cover to one of the platform engine mounts (41).

(12) Unpack the following parts shipped in the fiberboard carton (33).

Electronic control assy (18)*	Electronic control cap (29)*
Engine cable assy (26)*	Electronic control cover (30)*
Engine cable assy (27)*	T1 sensor cover (31)*
Engine cable asy (28)*	T1 sensor cover (32)*

*Not shown - These items are normally included with initial engine shipments only, and are integrated into the generator set.

(13) Remove the protective caps and covers and place them in the cloth storage sack. Tie the sack to one of the platform engine mounts (41).

(14) Attach the sling and hoist to the cover lifting brackets. Lift the cover (10) onto the engine platform (11).

CAUTION

Be certain that the cover end marked DO NOT FORK LIFT THIS END is opposite the front engine mount on the engine platform.

(15) Install four washers (9) and screws (8). Tighten the cover to the engine platform.

(16) Remove the lifting device from the cover.

NOTE

Store the engine shipping container in a weatherproof building or cover with polyvinyl sheeting. The container is reuseable.

2-17. ENGINE ASSEMBLY SHIPPING CONTAINER (METAL) INSTALLATION AND REMOVAL

a. General.

(1) Preservation and packaging shall be accomplished in accordance with the specific instructions of this paragraph. The instructions are based on the assumption that the engine will be placed in storage or will be in transit for an indefinite period. Refer to Administrative Storage of Equipment in TM 5-6115-598-12 and TB 740-97-2 Preservation of USAMECOM Mechanical Equipment for Shipment and Storage.

(2) Container reference data is given in table 2-7.

Table 2-7. Engine Metal Container Reference Data

Overall Dimensions	
Length	72.50 in. (1841.5 mm)
Width	61.25 in. (1555.8 mm)
Height	66.12 in. (1679.4 mm)
External Cubage	169.9 cu. ft (4.8 m^3)
Empty Container Weight	1300 lb (589.7 kg)

(3) The pressure relief valves are for relief of excessive internal pressures inside the container. The valves meet specification MIL-V-27166, with tolerance on the specified pressure or vacuum to plus or minus 0.1 psi (0.7 kPa).

(a) Valve (5) is a combination pressure and vacuum relief valve, opening at 5 psi (34.5 kPa) and -1.5 psi (-10.3 kPa) respectively.

(b) Valve (44) is a vacuum relief valve which opens at -1.0 psi (-6.9 kPa).

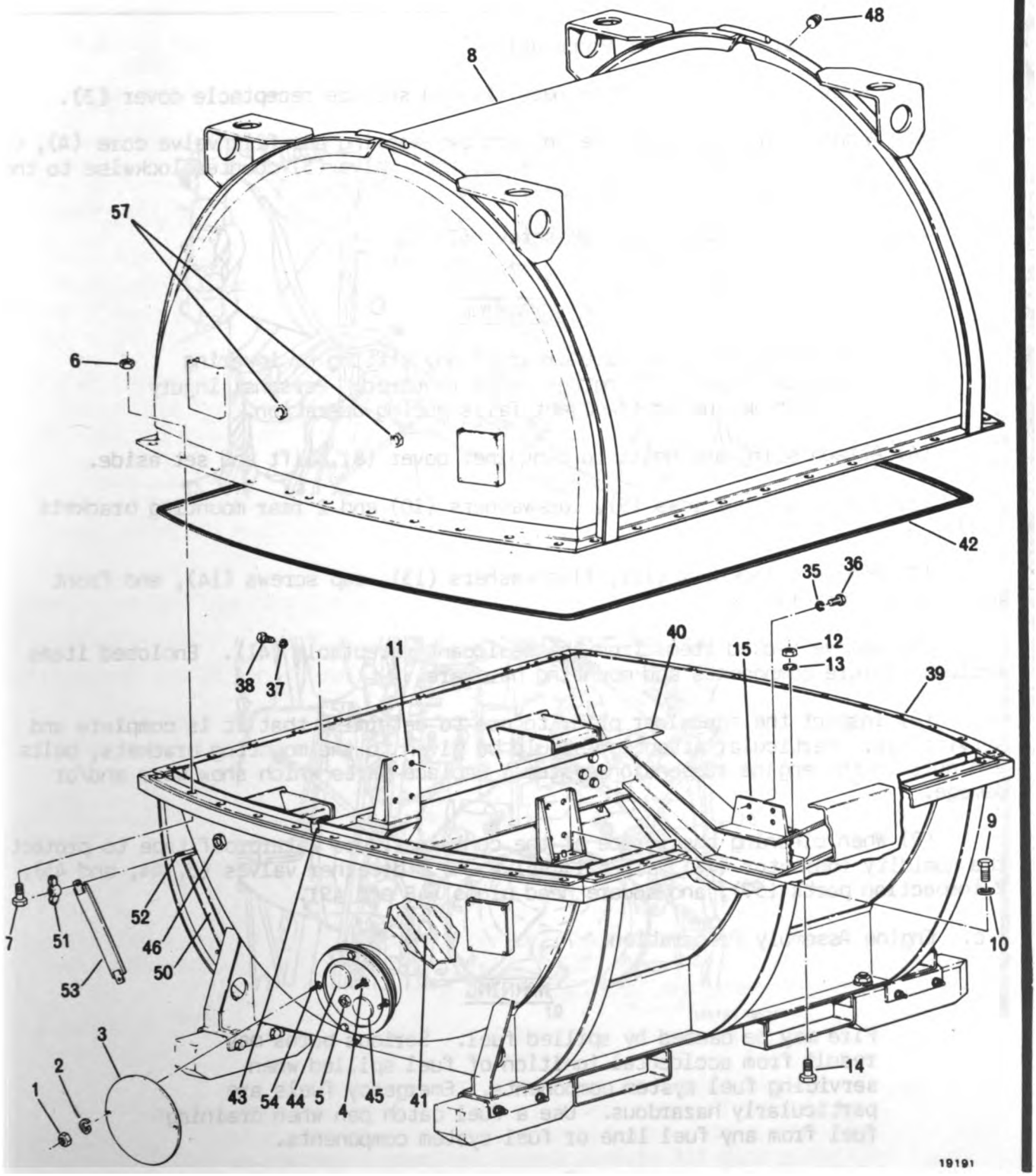
(c) Valve (45) is a pressure relief valve which opens at 5 psi (34.5 kPa).

(4) The container is protected and lettered with paint as follows:

(a) Primer, (item 45, appx B).

(b) Paint, (item 44, appx B).

(c) Paint, (item 43, appx B).



2-17. ENGINE ASSEMBLY SHIPPING CONTAINER (METAL) INSTALLATION AND REMOVAL (cont)

b. Engine Shipping Container Preparation.

(1) Remove 2 nuts (1), lockwashers (2) and service receptacle cover (3).

(2) Reduce container pressure to zero by removing air fill valve core (4), or by turning the knob at the center of the breather valve (5) counterclockwise to the OPEN position as indicated on the label.

(3) Remove 42 nuts (6) and cap screws (7).

WARNING

Ensure all personnel are clear of any lifting or lowering operation where lifting device is required. Personal injury or death may occur if object falls during operation.

(4) Attach sling and hoist to container cover (8), lift and set aside.

(5) Remove 4 cap screws (9), lockwashers (10) and 2 rear mounting brackets (11).

(6) Remove 2 locknuts (12), flat washers (13), cap screws (14), and front mounting bracket (15).

(7) Remove sacked items from the desiccant receptacle (41). Enclosed items include closure components and mounting hardware.

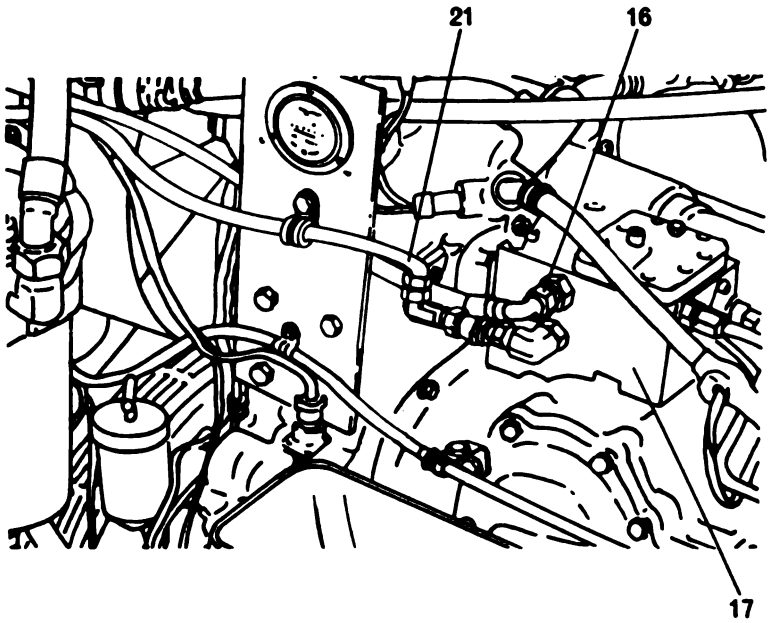
(8) Inspect the container prior to use to determine that it is complete and serviceable. Particular attention should be given to the mounting brackets, bolts and nuts in the engine suspension system. Replace parts which show wear and/or damage.

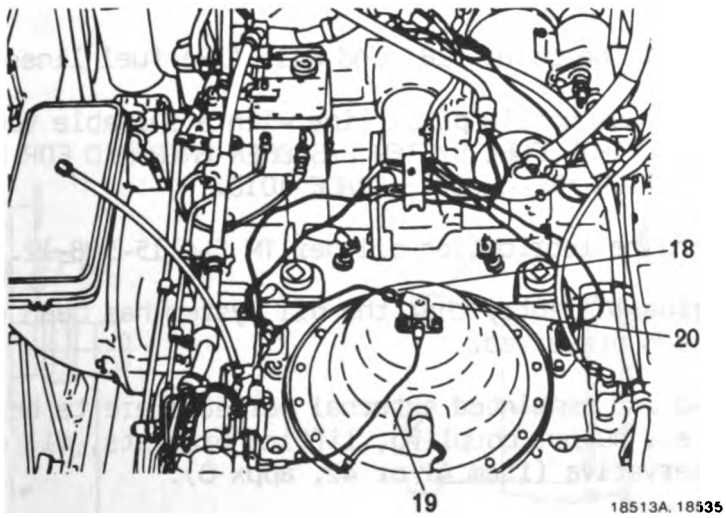
(9) When cleaning the inside of the container, use waterproof tape to protect the humidity indicator (46), air fill valve (4) 3 breather valves (5, 44, and 45), 2 inspection ports (57), and square head plugs (48 and 49).

c. Engine Assembly Preparation.

WARNING

Fire may be caused by spilled fuel. Serious burns may result from accidental ignition of fuel spilled when servicing fuel system components. Emergency fuels are particularly hazardous. Use a fuel catch pan when draining fuel from any fuel line or fuel system components.





2-17. ENGINE ASSEMBLY SHIPPING CONTAINER (METAL) INSTALLATION AND REMOVAL (cont)

(1) Preserve the engine fuel system using oil (item 40, appx B) as follows:

(a) Disconnect the fuel inlet line (16) at the fuel metering valve (17).

(b) Disconnect the fuel nozzle pilot line (18) and fuel nozzle main line (19) at the fuel nozzle (20) and route into a suitable container.

(c) Disconnect the fuel metering valve bypass line (21) at the check valve and route check valve outlet into a suitable container.

(d) Connect a 1 quart (0.95 l) hand held container, or a pressurized supply cart, with a supply of oil (item 40, appx B) to the fuel inlet port of the fuel metering valve.

(e) Motor the engine with the starter for 40 seconds; this will require approximately six start cycles to starter cut-out. The motoring cycles should force approximately 1 pint (500 ml) of oil into the system while purging the fuel.

(f) Cap the fuel nozzle pilot line (18).

(g) Motor the engine for one cycle to obtain oil from the main line which will inhibit the diverter valve.

(h) Remove the preservative oil supply line and cap the fuel inlet port with cap (26).

(i) Reconnect the pilot (18) and main (19) fuel lines to the fuel nozzle.

(j) Tag the fuel nozzle pilot line with a suitable tag with the following information: "THIS FUEL SYSTEM HAS BEEN PREPARED FOR STORAGE WITH OIL CONFORMING TO SPECIFICATION MIL-L-6081, GRADE 1010."

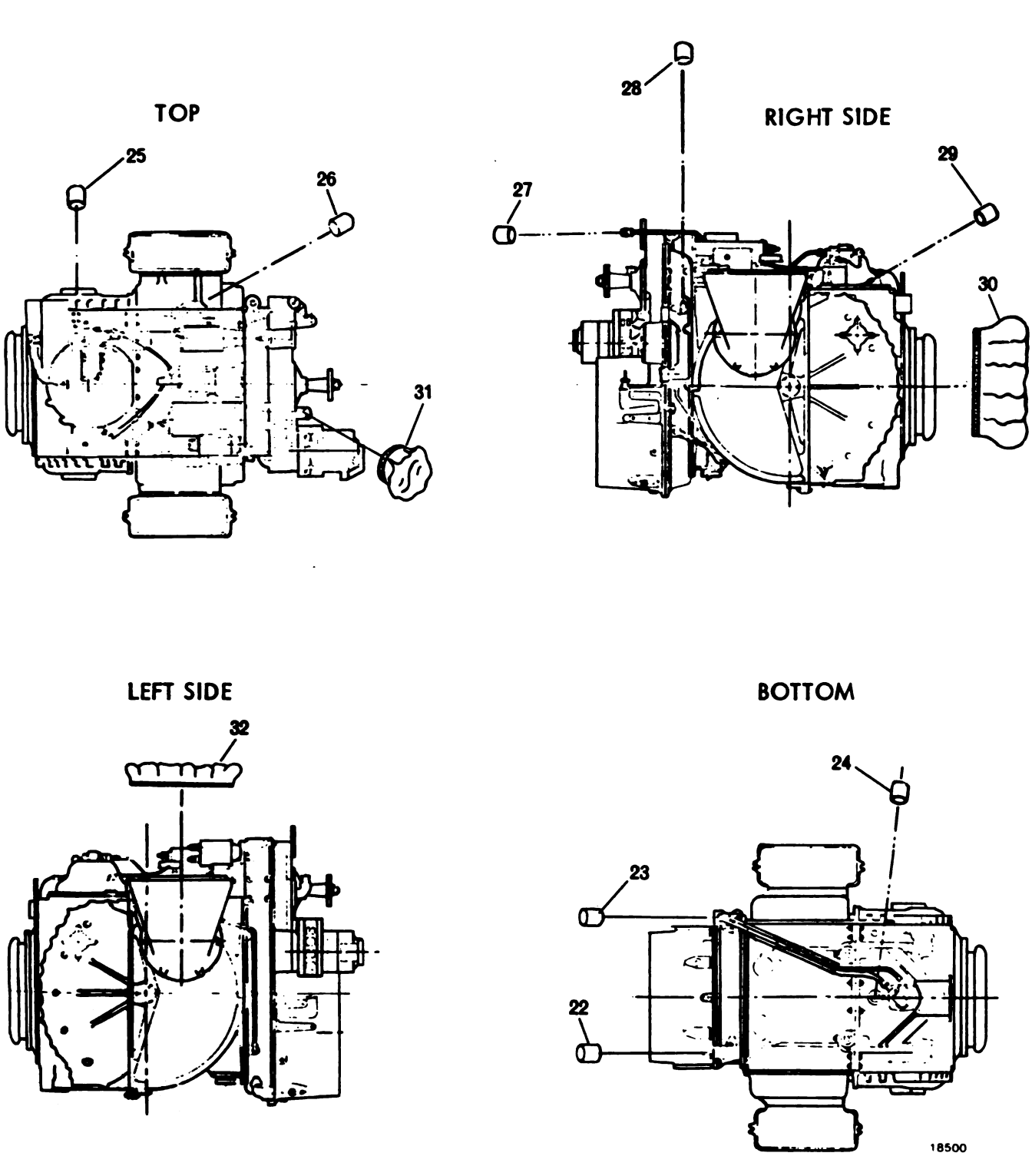
(2) Drain the engine lubrication oil per TM 5-6115-598-12.

(3) Make an engine log entry that the oil system has been drained and that the fuel system has been preserved.

(4) All machined and unpainted external surfaces are to be thoroughly coated with preservative, i.e., output coupling, lifting brackets, oil cooler fan drive shaft, etc. Use preservative (item 41 or 42, appx B).

NOTE

The plastic shipping caps and plugs are to be hand tightened. Threaded fasteners must be tightened with a hand wrench. Tighten nonmetal accessory cover fasteners to obtain a snug fit without excessive cover indentation.



2-17. ENGINE ASSEMBLY SHIPPING CONTAINER (METAL) INSTALLATION AND REMOVAL (cont)

(5) Remove the proper protective shipping covers from the storage sack and install on engine as follows:

Oil outlet port (22)
Oil return port (23)
Fuel drain valve (24)
Nozzle drain valve (25)
Fuel valve inlet (26)
Electric harness main disconnect (27)
Oil pressure switch (28)
T1 sensor connection (29)
Compressor inlet (30)
Breather (31)
2 exhaust ducts (32)

d. Engine Assembly Installation.

WARNING

Ensure all personnel are clear of any lifting or lowering operation where lifting device is required. Personal injury or death may occur if object falls during operation.

(1) Attach the engine lift and raise the engine to a convenient height.

(2) Attach the front mounting bracket (15) to bottom front of the engine block with 4 lockwashers (35) and cap screws (36). Torque the cap screws to 17-21 lb ft (23-28 N·m).

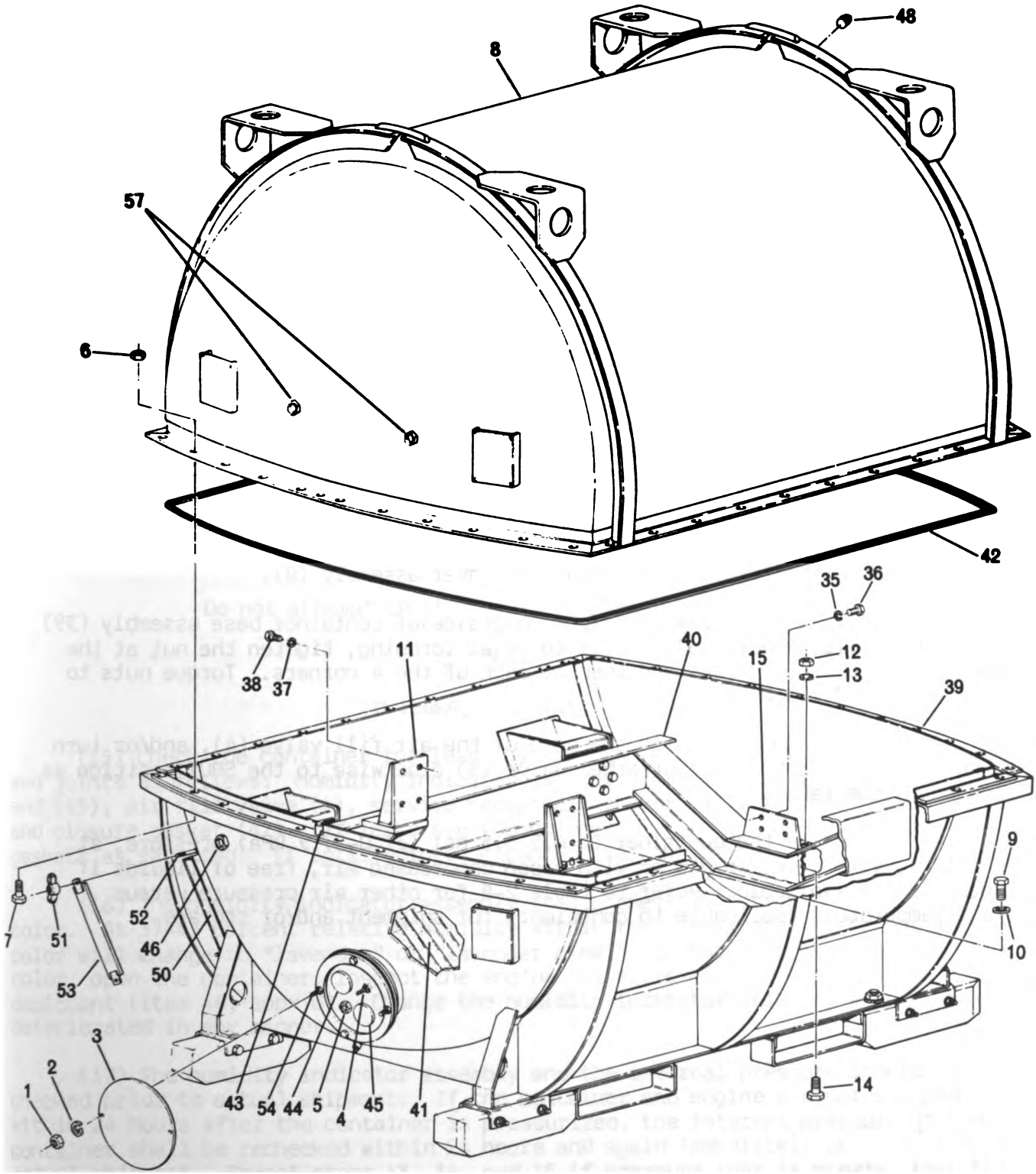
(3) Attach the two rear mounting brackets (11) to the left and right sides of the engine gearbox with 8 lockwashers (37) and cap screws (38). Torque the cap screws to 53-63 lb ft (75-85 N·m).

(4) Raise the engine assembly, move and lower into the container base assembly (39), carefully aligning the pins in the mounting frame assembly (40) with the respective holes in the mounting brackets.

(5) Attach the front mounting bracket (15) to the mounting frame assembly (40) with 2 cap screws (14), flat washers (13) and locknuts (12). Insert cap screws from underside of frame. Torque locknuts to 37-42 lb ft (50-57 N·m).

(6) Attach the 2 rear mounting brackets (11) to the mounting frame assembly (40) with 4 lockwashers (10) and cap screws (9). Torque the cap screws to 37-42 lb ft (50-57 N·m).

(7) Package ship-loose items (if any) in a fiberboard carton of suitable size. Secure carton to inside of shipping container with double faced tape.



2-17. ENGINE ASSEMBLY SHIPPING CONTAINER (METAL) INSTALLATION AND REMOVAL (cont)

(8) Place 7 16-unit bags of MIL-D-3464 desiccant (item 46, appx B) into the desiccant receptacle (41) inside the shipping container base (39).

(9) Check the closure gasket (42) for serviceability and assure that the gasket is properly positioned in the gasket cavity along the top flange of the container base (39).

WARNING

Ensure all personnel are clear of any lifting or lowering operation where lifting device is required. Personal injury or death may occur if object falls during operation.

(10) Attach a lift to the cover assembly (8) and position the cover over the container base. Lower the cover assembly over the sealing flange of the base assembly (39) while engaging the guide pin hole in the rear end of the cover assembly with the pin (43) on the container base. Lower the cover assembly until it seats on the sealing flange of the base assembly.

(11) Remove the lifting hooks from the cover assembly (8).

(12) Insert 42 cap screws (7) from underside of container base assembly (39) flange and install 42 nuts (6). Prior to final torquing, tighten the nut at the middle of each of the 4 sides and then at each of the 4 corners. Torque nuts to 90-140 lb ft (122-190 N·m).

(13) Replace and/or tighten the core of the air fill valve (4), and/or turn the knob at the center of the breather valve (5) clockwise to the SHUT position as indicated on the label.

(14) Pressurize the container to 4.5-5.5 psi (31.0-37.9 kPa) pressure, at 70°F (21°C), with nitrogen gas or with clean compressed air, free of liquids if nitrogen is not available. Refer to table 2-8 for other air pressure versus ambient temperature applicable to containers for shipment and/or storage.

Table 2-8. Engine Container Air Pressure vs Ambient Temperature

Temperature		Pressure		Temperature		Pressure	
°F	(°C)	Psi	(kPa)	°F	(°C)	Psi	(kPa)
+140	(+60)	7.6	(52.4)	+40	(+4)	3.9	(26.9)
+130	(+54)	7.3	(50.3)	+30	(-1)	3.5	(24.1)
+120	(+49)	6.9	(47.6)	+20	(-7)	3.2	(22.1)
+110	(+43)	6.5	(44.8)	+10	(-12)	2.8	(19.3)
+100	(+38)	6.1	(42.1)	0	(-18)	2.4	(16.5)
+ 90	(+32)	5.8	(40.0)	-10	(-23)	2.0	(13.8)
+ 80	(+27)	5.4	(37.2)	-20	(-29)	1.7	(11.7)
+ 70	(+21)	5.0	(34.5)	-30	(-34)	1.3	(9.0)
+ 60	(+16)	4.6	(31.7)	-40	(-40)	0.9	(6.2)
+ 50	(+10)	4.3	(29.6)				

Tolerances on the above requirements are ± 0.5 psi (3.4kPa)

CAUTION

Do not attempt to stop leaks by overtorquing nuts.

NOTE

No leakage is permitted.

(15) Check the container for leaks by brushing a soap solution over all seams and joints as follows: humidity indicator assembly (46), relief valves (5), (44), and (45), air fill valve (4), service receptacle gasket (47), 2 plugs (48 and 49), and closure gasket (42). If leaks are found, check nut torque and/or replace gaskets as required. If satisfactory, clean off soap solution.

(16) The humidity indicator assembly (46) element is normally light blue in color. At 37-43 percent relative humidity within the container, the "light blue" color will change to "lavender" or "lavender pink." If the indicator changes color, open the container, inspect the engine for corrosion and change the desiccant (item 46, appx B). Change the humidity indicator assembly when it has deteriorated in any manner.

(17) The humidity indicator assembly and the internal pressure should be checked prior to actual shipment. If the container and engine are not shipped within 24 hours after the container is pressurized, the internal pressure of the container shall be rechecked within 24 hours and again immediately prior to time of actual shipment. Repeat steps 13, 14, and 15 if pressure loss is greater than the values shown in table 2-8.

2-17. ENGINE ASSEMBLY SHIPPING CONTAINER (METAL) INSTALLATION AND REMOVAL (cont)

(18) Install the service receptacle cover (3), 2 washers (2), and nuts (1). Torque nuts to 15-23 lb. in. (1.7-2.8 N·m).

(19) Applicable engine records are to be inserted in the records receptacle (50). Loosen the top wing nut (51) and swing eyebolt (52) out of the slot. Loosen the bottom wing nut (51) sufficiently to allow cover (53) to be pivoted downward. Place documents in receptacle (50) and swing cover (53) into the closed position. Swing eyebolt (52) into closed position and install the top wing nut (51). Tighten the two wing nuts finger tight.

(20) Apply tamper proof security wires by threading the special wire with lead seal attached through each of the two holes in the left hand rear and right hand front corners of the closure flanges. Crimp seal as required.

(21) Coat the threads and nut ends of 2 eyebolts (52), 2 service receptacle double end bolts (54), 2 service receptacle cap screws (55), 8 skid cap screws (56), and 42 closure flange cap screws (7) with compound (item 39, appx B).

e. Engine Removal from Container and Depreservation.

(1) Remove 2 nuts (1), lock washers (2) and service receptacle cover (3).

(2) Reduce container pressure to zero by removing air fill valve core (4), or by turning the knob at the center of the breather valve (5) counter-clockwise to the OPEN position as indicated on the label.

(3) Remove 42 nuts (6) and cap screws (7).

WARNING

Ensure all personnel are clear of any lifting or lowering operation where lifting device is required. Personal injury or death may occur if object falls during operation.

(4) Attach sling and hoist to container cover (8), lift and set aside.

(5) Attach the engine lift and raise the engine sufficiently to remove weight from mounting brackets and frame (40).

(6) Remove 4 cap screws (9) and lock washers (10) from the 2 rear mounting brackets (11).

(7) Remove 2 locknuts (12), flat washers (13), and cap screws (14) from the front engine mount bracket (15).

(8) Lift engine assembly from container base assembly (39).

(9) Remove 8 cap screws (38), lockwashers (37), and 2 rear mounting brackets (11) from the engine gearbox. Sack the cap screws and lockwashers. Install the rear mounts on the container mounting frame (40) with 4 lockwashers (10) and cap screws (9).

(10) Remove 4 cap screws (36), lockwashers (35), and front mounting bracket (15) from front of the engine block. Sack the cap screws and lockwashers. Install the front mount on the container mounting frame (40) with 2 flat washers (13), cap screws (14) and lock nuts (12).

(11) Remove and sack all protective shipping covers listed in step c (5). Place sacked items in the desiccant receptacle (41).

(12) Complete container closure procedures per step d (8) through step d (18) and step d (21).

(13) Following completion of engine installation in the generator set, refill the engine lube oil system per Lubrication Order LO 5-6115-598-12.

WARNING

Fire may be caused by spilled fuel. Serious burns may result from accidental ignition of fuel spilled when servicing fuel system components. Emergency fuels are particularly hazardous. Use a fuel catch pan when draining fuel from any fuel line or fuel system components.

(14) Depreserve the fuel system following engine installation in the generator set as follows:

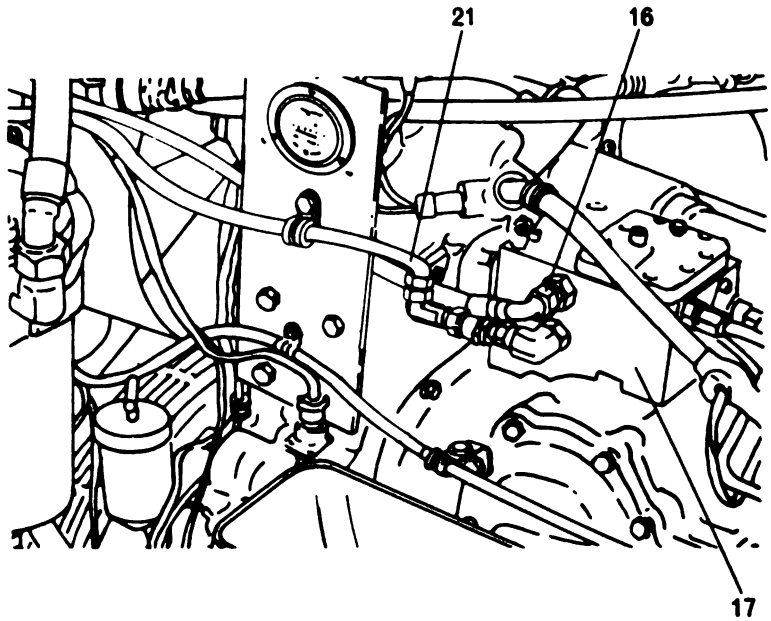
(a) Disconnect the fuel inlet line (16) at the fuel metering valve (17).

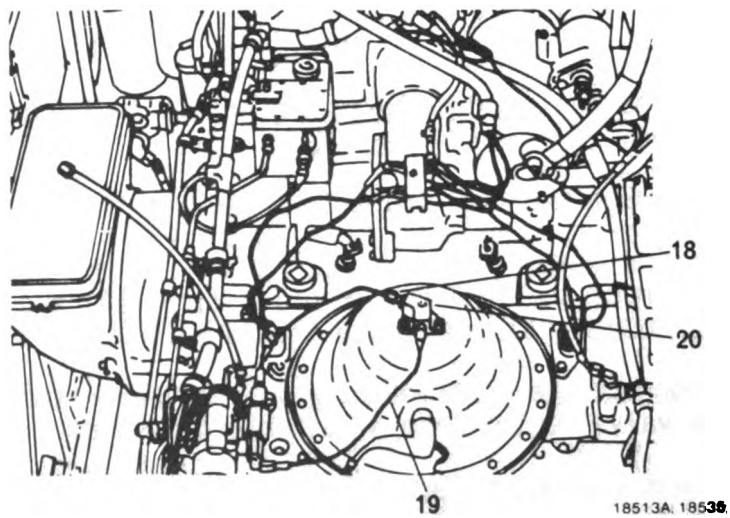
(b) Disconnect the fuel nozzle pilot line (18) and fuel nozzle main line (19) at the fuel nozzle (10) and route into a suitable container.

(c) Disconnect the fuel metering valve bypass line (21) at the check valve and route check valve outlet into a suitable container.

(d) Connect a 1 quart (0.95 l) hand held container, or a pressurized supply cart, with a supply of fuel to the fuel inlet port of the fuel metering valve.

2-17. ENGINE ASSEMBLY SHIPPING CONTAINER (METAL) INSTALLATION AND REMOVAL (cont)





(e) Motor the engine with the starter for 40 seconds; this will require approximately six start cycles to starter cut-out. The motoring cycles should force approximately 1 pint (500 ml) of fuel into the system while purging the preservative oil.

(f) Cap the fuel nozzle pilot line (18).

(g) Motor the engine for one cycle to obtain fuel from the main line which will purge the diverter valve.

(h) Remove the fuel supply line and reconnect the fuel inlet line (16) to the fuel metering valve.

(i) Reconnect the pilot (18) and main (19) fuel lines to the fuel nozzle, and remove the preservation tag.

(j) Reconnect the fuel metering valve bypass line (21) to the check valve.

(k) Check fuel system connections for leaks during initial engine run.

(15) Make an engine log entry that the oil system has been filled and the fuel system depreserved.

2-18. ALTERNATOR ASSEMBLY SHIPPING CONTAINER (METAL) INSTALLATION AND REMOVAL

a. General.

(1) Preservation and packaging shall be accomplished in accordance with the specific instructions of this paragraph. The instructions are based on the assumption that the alternator will be placed in storage or will be in transit for an indefinite period. Refer to Administrative Storage of Equipment in TM 5-6115-598-12 and TB 740-97-2 Preservation of USAMECOM Mechanical Equipment for Shipment and Storage.

(2) Container reference data is given in table 2-9.

Table 2-9. Alternator Metal Container Reference Data

Overall Dimension		
Length	46.00 in.	(1168.4 mm)
Width	33.91 in.	(861.3 mm)
Height	46.85 in.	(1190.0 mm)
External Cubage	42.3 cu. ft	(1.2 m^3)
Empty Container Weight	420 lb	(190.5 kg)

(3) The pressure relief valve (5) is a two-way controlled breathing valve for relieving excessive and insufficient internal pressure in the container. At 70°F (21°C) temperature, the valve will open at a maximum or close at a minimum pressure of 5 psi (34.5 kPa); the valve will open (or close) at a vacuum of -1.0 psi (-6.9 kPa). The tolerance on the valve setting is plus or minus 0.1 psi (0.7 kPa).

(4) The container is protected and lettered with paint as follows:

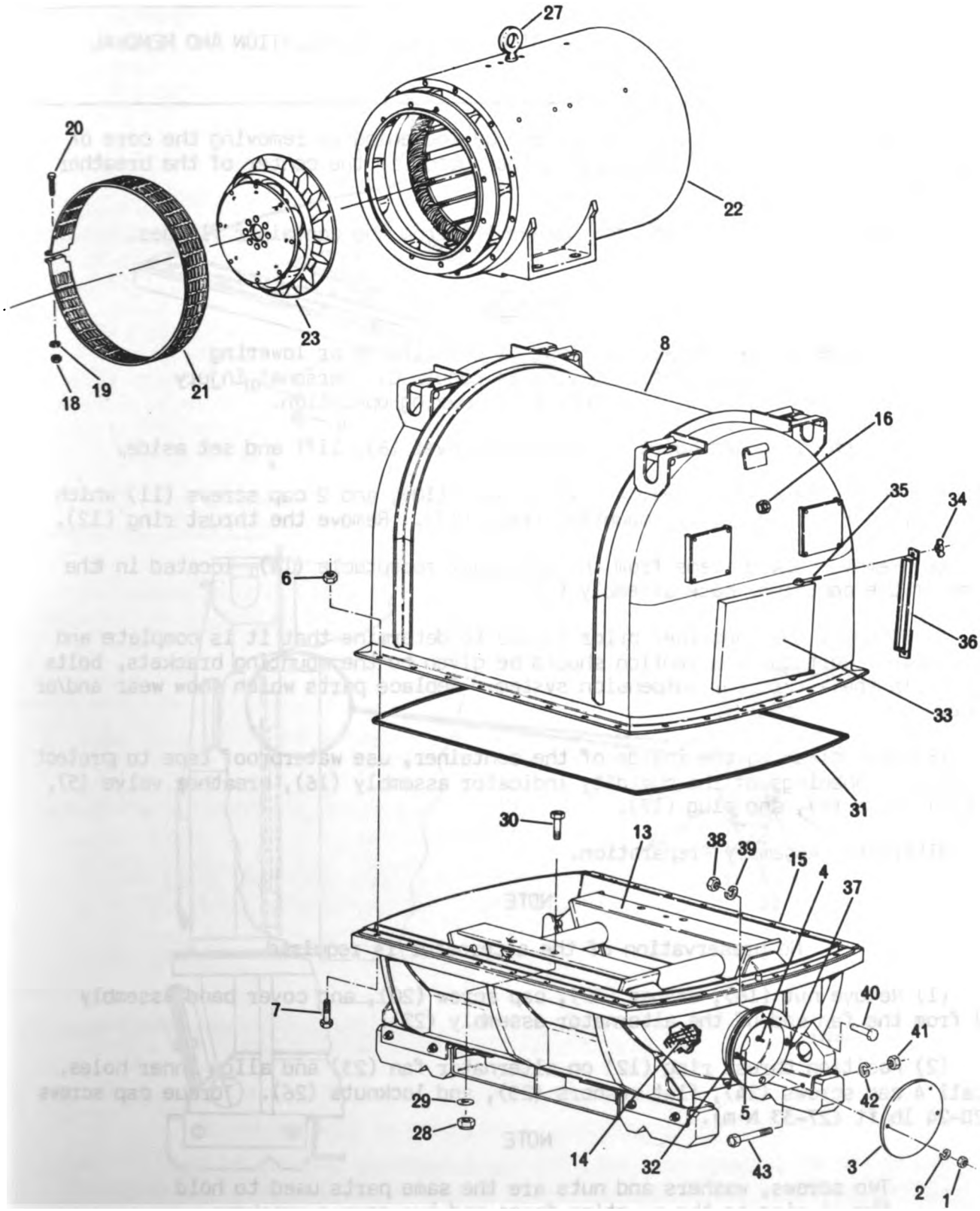
(a) Primer, (item 45, appx B).

(b) Paint, (item 44, appx B).

(c) Paint, (item 43, appx B).

b. Alternator Container Preparation.

(1) Remove 2 nuts (1), lock washers (2) and service receptacle cover (3).



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2-18. ALTERNATOR ASSEMBLY SHIPPING CONTAINER (METAL) INSTALLATION AND REMOVAL (cont)

(2) Reduce container pressure to zero by loosening or removing the core of the air fill valve (4), or by depressing the button in the center of the breather valve (5).

(3) Remove 28 nuts (6) and cap screws (7) from the container flanges.

WARNING

Ensure all personnel are clear of any lifting or lowering operation where lifting device is required. Personal injury or death may occur if object falls during operation.

(4) Attach sling and hoist to container cover (8), lift and set aside.

(5) Remove 2 locknuts (9), 4 flat washers (10), and 2 cap screws (11) which attach thrust ring (12) to the mounting frame (13). Remove the thrust ring (12).

(6) Remove sacked items from the desiccant receptacle (14), located in the bottom of the container base assembly (15).

(7) Inspect the container prior to use to determine that it is complete and serviceable. Particular attention should be given to the mounting brackets, bolts and nuts in the alternator suspension system. Replace parts which show wear and/or damage.

(8) When cleaning the inside of the container, use waterproof tape to protect the interior openings of the humidity indicator assembly (16), breather valve (5), air fill valve (4), and plug (17).

c. Alternator Assembly Preparation.

NOTE

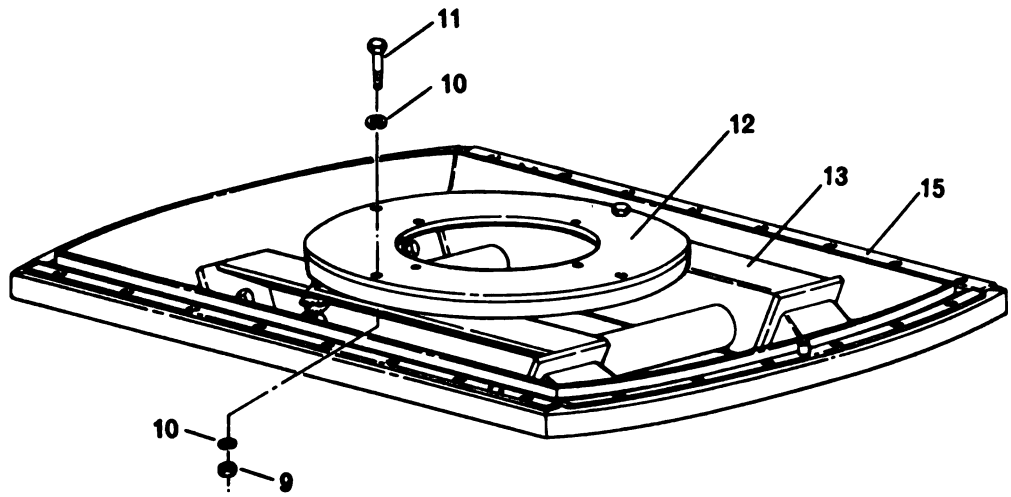
No preservation of the alternator is required.

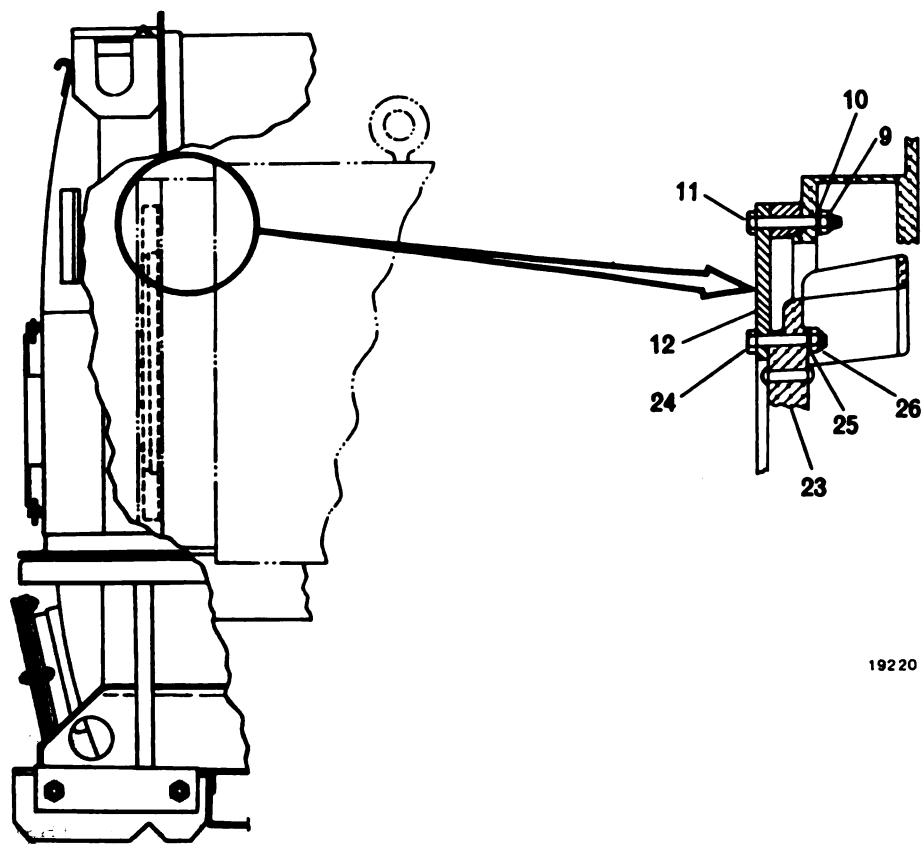
(1) Remove nut (18), washer (19), cap screw (20), and cover band assembly (21) from the fan end of the alternator assembly (22).

(2) Position thrust ring (12) on alternator fan (23) and align inner holes. Install 4 cap screws (24), flat washers (25), and locknuts (26). Torque cap screws to 20-24 lb ft (27-33 N·m).

NOTE

Two screws, washers and nuts are the same parts used to hold thrust ring to the mounting frame and two screws, washers and nuts are sacked items.





2-18. ALTERNATOR ASSEMBLY SHIPPING CONTAINER (METAL) INSTALLATION AND REMOVAL (cont)

(3) Rotate the thrust ring (12) to align the outer holes with the holes in the alternator housing (22). Install 4 cap screws (11), flat washers (10), and lock nuts (9). Torque cap screws to 20-24 lb ft (27-33 N·m).

(4) Place cover band assembly (21) on the fan end of the alternator (22). Install and tighten cap screw (20), washer (19), and nut (18).

d. Alternator Assembly Installation

(1) Check installation of eyebolt (27) to ensure that it is correctly installed in the alternator casing (22).

WARNING

Ensure all personnel are clear of any lifting or lowering operation where lifting device is required. Personal injury or death may occur if object falls during operation.

(2) Attach a hoist to the eyebolt (27) and lift the alternator to a convenient height. Move the container base (15) beneath the assembly, or traverse the lift with alternator over the container base.

NOTE

The thrust ring end of the alternator is positioned at the service receptacle end of the container base.

(3) Lower the alternator assembly into the container, aligning the alternator base holes with the holes in the mounting frame (13).

(4) Install 4 cap screws (30) and then flatwashers (29) from under the mounting frame (13). Install 4 lock nuts (28). Torque nuts to 214-222 lb ft (290-301 N·m).

(5) Remove hoist from eyebolt (27).

(6) Package ship-loose items (if any) in a fiberboard carton of suitable size. Attach to desiccant receptacle (14) with steel banding tape.

(7) Place two 16-unit bags of MIL-D-3464 desiccant (item 46, appendix B) into the desiccant receptacle (14).

(8) Check the closure seal (31) for serviceability and assure that the gasket is properly positioned in the gasket cavity along the top flange of the container base (15).

(9) Attach lifting hooks to the cover assembly (8) and position the cover over the container base. Lower the cover assembly over the sealing flange of the base assembly (15) while engaging the guide pin hole in the front end of the cover assembly with the pin on the container base. Lower the cover assembly until it seats on the sealing flange of the base assembly. Be sure seal (31) is properly seated.

(10) Remove the lifting hooks from the cover assembly (8).

(11) Insert 28 cap screws (7) from underside of container base assembly (15) flange and install 28 nuts (6). Prior to final torquing, tighten the nut at the middle of each of the 4 sides and then at each of the 4 corners. Torque nuts to 20-24 lb ft (27-33 N·m).

(12) Replace and/or tighten the core of the air fill valve (4).

(13) Pressurize the container to 4.5-5.5 psig (31.0-37.9 kPa) pressure, at 70°F (21°C), with nitrogen gas or with clean compressed air, free of liquids if nitrogen is not available. Refer to table 2-10 for other air pressure versus ambient temperature applicable to containers for shipment and/or storage.

Table 2-10. Alternator Container Air Pressure vs Ambient Temperature

Temperature		Pressure		Temperature		Pressure	
°F	(°C)	Psi	(kPa)	°F	(°C)	Psi	(kPa)
+140	(+60)	7.6	(52.4)	+40	(+4)	3.9	(26.9)
+130	(+54)	7.3	(50.3)	+30	(-1)	3.5	(24.1)
+120	(+49)	6.9	(47.6)	+20	(-7)	3.2	(22.1)
+110	(+43)	6.5	(44.8)	+10	(-12)	2.8	(19.3)
+100	(+38)	6.1	(42.1)	0	(-18)	2.4	(16.5)
+ 90	(+32)	5.8	(40.0)	-10	(-23)	2.0	(13.8)
+ 80	(+27)	5.4	(37.2)	-20	(-29)	1.7	(11.7)
+ 70	(+21)	5.0	(34.5)	-30	(-34)	1.3	(9.0)
+ 60	(+16)	4.6	(31.7)	-40	(-40)	0.9	(6.2)
+ 50	(+10)	4.3	(29.6)				

Tolerances on the above requirements are ± 0.5 psi (3.4 kPa)

CAUTION

Do not attempt to stop leaks by overtorquing nuts.

NOTE

No leakage is permitted.

2-18. ALTERNATOR ASSEMBLY SHIPPING CONTAINER (METAL) INSTALLATION AND REMOVAL (cont)

(14) Check the container for leaks by brushing a soap solution over all seams and joints as follows: humidity indicator assembly (16), breather valve (5), air fill valve (4), square plug (17), service receptacle seal (32), and closure seal (31).

(15) The humidity indicator assembly (16) element is normally light blue in color. At 37-43 percent relative humidity within the container, the "light blue" color will change to "lavender" or "lavender pink." If the indicator changes color, open the container, inspect the alternator for corrosion and change the desiccant. Change the humidity indicator assembly when it has deteriorated in any manner.

(16) The humidity indicator assembly and the internal pressure should be checked prior to actual shipment. If the container and alternator are not shipped within 24 hours after the container is pressurized, the internal pressure of the container shall be rechecked within 24 hours and again immediately prior to time of actual shipment. Repeat steps (13), (14), and (15) if pressure loss is greater than the values shown in table 2-10.

(17) Install the service receptacle cover (3), 2 washers (2), and nuts (1). Torque nuts to 15-25 lb in. (1.7-2.8 N·m).

(18) Applicable alternator records are to be inserted in the records receptacle (33). Loosen the top wing nut (34) and swing eyebolt (35) out of the slot. Loosen the bottom wing nut (34) sufficiently to allow cover (36) to be pivoted downward. Place documents in receptacle (33) and swing cover (36) into the closed position. Swing eyebolt (35) into closed position and install the top wing nut (34). Tighten the two wing nuts finger tight.

(19) Apply tamper proof security wires by threading the special wire with lead seal attached through each of the two holes in the left hand rear and right hand front corners of the closure flanges. Crimp seal as required.

(20) Coat the threads and nut ends of 2 eyebolts (35), 2 service receptacle double end bolts (37), 2 service receptacle cap screws (38), 8 skid cap screws (39), and 28 closure flange cap screws (7) with MIL-C-16173, grade 1, compound (item 41, Appendix B).

e. Alternator Assembly Removal

(1) Remove 2 nuts (1), washers (2) and service receptacle cover (3).

(2) Reduce container pressure to zero by loosening or removing the core of the air fill valve (4), or by depressing the button in the center of the breather valve (5).

(3) Remove 28 nuts (6) and cap screws (7) from the container flanges.

WARNING

Ensure all personnel are clear of any lifting or lowering operation where lifting device is required. Personal injury or death may occur if object falls during operation.

(4) Attach sling and hoist to container cover (8), lift and set aside.

(5) Remove 4 locknuts (28), cap screws (30), and flat washers (29) from the alternator (22) flange to mounting frame (13) attachment.

WARNING

Ensure all personnel are clear of any lifting or lowering operation where lifting device is required. Personal injury or death may occur if object falls during operation.

(6) Attach a hoist to the eyebolt (27), lift and remove the alternator assembly (22) from the container base assembly (15). Lower alternator assembly and support with wood blocks under mounting pads and fan end.

(7) Remove nut (18), washer (19), cap screw (20), and cover band assembly (21) from far end of alternator (22).

NOTE

Cover band assembly is not reinstalled until alternator is installed in generator set.

(8) Remove 4 locknuts (9), flat washers (10), and cap screws (11) from thrust ring (12).

(9) Remove 4 locknuts (26), flat washers (25), cap screws (24), and thrust ring assembly (12) from the alternator fan (23).

(10) Position the thrust ring (12) on the mounting frame (13) of the container base assembly and align 2 outer holes of the ring with holes in the mounting frame.

(11) Install 2 cap screws (11), 4 flat washers (10), and 2 locknuts (9) to attach thrust ring to mounting frame. Torque nuts to 20-24 lb ft (27-33 N·m).

(12) Sack all loose mounting hardware and place in desiccant receptacle (14).

(13) Place 2 16-unit bags of MIL-D-3464 desiccant (item 46, appx B) in the desiccant receptacle (14).

(14) Assemble container and preserve per steps d.(8) through (18) and (20).

CHAPTER 3

MAINTENANCE OF FRAME AND HOUSING

3-1. PURPOSE AND FUNCTION

The purpose and function of the frame and housing assembly is to protect the engine-driven generator set during all-weather operation and provide a compact, rugged, transportable container for the complete system.

3-2. GENERATOR COMPARTMENT ROOF PANELS

This task covers:

Repair

INITIAL SETUP

Tools

Insert installation tool (appx C)
Tool Kit, Master Mechanics
(5180-00-699-5273)
7/16 socket, 3/8 dr
3/8-dr ratchet handle
7/16 combination wrench
Hand hammer, 16 oz
Center punch
Screw extractor set
Shop Equipment, Contact Maintenance
Truck Mounted (4940-00-294-9518)
Portable electric disk sander
Electric drill
Twist drill set
Welding Shop, Trailer Mounted
(3431-00-935-7821)
Inert gas shielded arc welding set
Welder's apron
Welder's sleeves
Welder's helmet

Materials/Parts

Paint brush (item 5, appx B)
Face shield (item 8, appx B)
Argon gas (item 9, appx B)
Welder's gloves (item 10, appx B)
Paint (item 16, appx B)

Personnel Required

Utilities Equipment Repairer
MOS 52C
Welder MOS 44B

Equipment Condition

Para	Condition Description
4-13*	Roof panels removed.

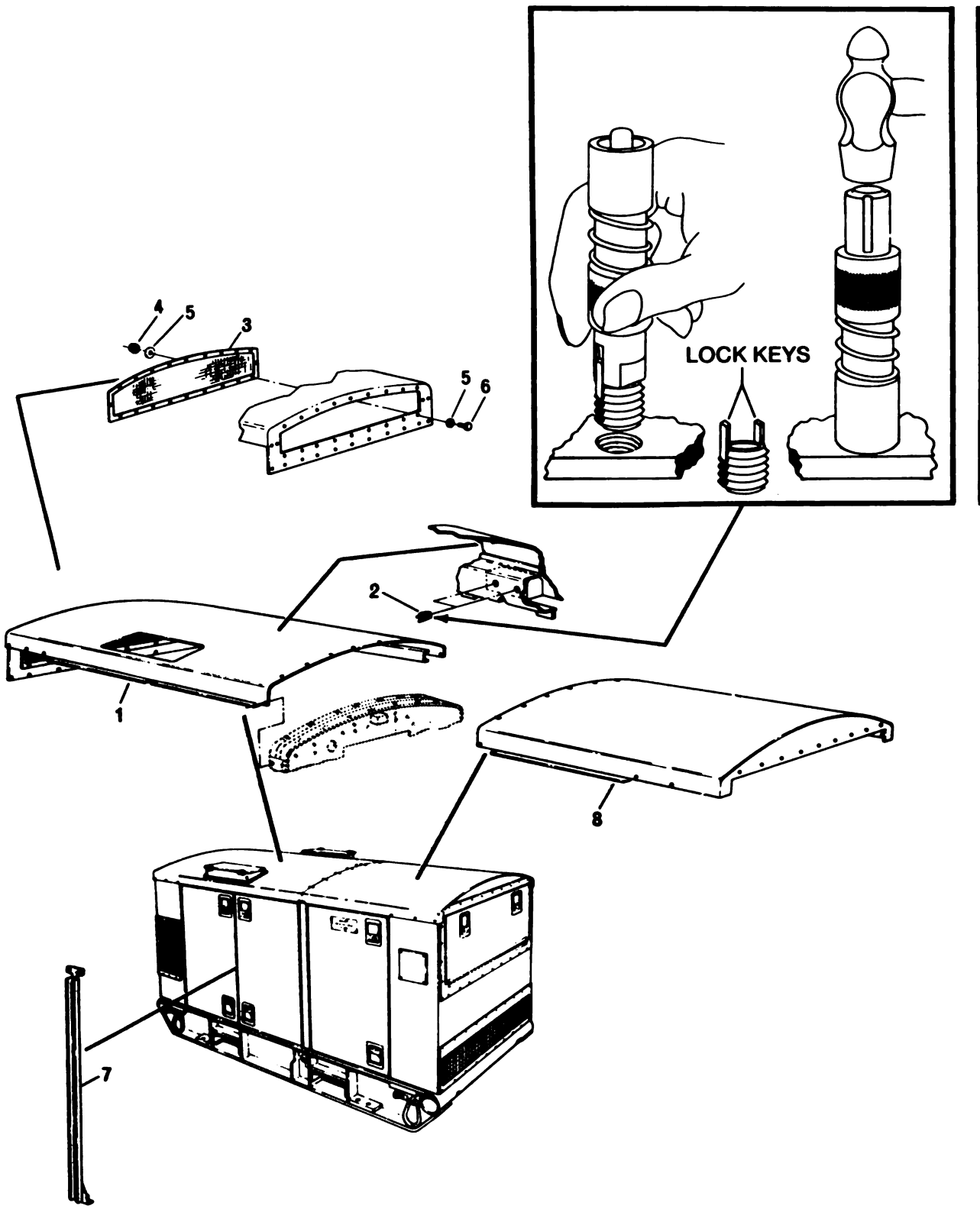
*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS

WARNING

- Use care when using welding equipment. Do not watch welding process without proper eye protection as severe eye damage or blindness could result. Severe burns could result from improper use of equipment.
- Ensure that suitable eye protection is worn when grinding. Metal particles created by grinding can cause severe eye damage.

1.	Front roof (1)		Hammer dented areas, weld rips and tears, sand high spots, and paint as reqd.



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3-2. GENERATOR COMPARTMENT ROOF PANELS (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
1. Front roof (1) (cont)	a. Insert (2)	a. Drill out 3/16 in. (4.8 mm) deep using 11/32 in. (8.7 mm) dia drill bit.	
		b. Bend lock keys inward and break off.	
		c. Remove.	
		d. Install new inserts 0.010-0.030 in. (0.25-0.76 mm) below surface.	
		e. Drive lock keys down flush with top of insert.	Locate lock keys in unused area of hole.
	b. Front screen (3)	Replace if unserviceable.	
	c. 20 nuts (4), 40 washers (5), and 20 bolts (6)	Remove.	
	d. Screen (3)	Remove.	
	e. Screen (3)	Install.	
	f. 20 bolts (6), 40 washers (5), and 20 nuts (4)	Install and tighten.	

LOCATION	ITEM	ACTION	REMARKS

REPAIR (cont)

WARNING

- Use care when using welding equipment. Do not watch welding process without proper eye protection as severe eye damage or blindness could result. Severe burns could result from improper use of equipment.
- Ensure that suitable eye protection is worn when grinding. Metal particles created by grinding can cause severe eye damage.

2. Front roof door pillar (7)	Straighten, weld, sand,and paint as reqd.	Do not paint door seal edges.

WARNING

- Use care when using welding equipment. Do not watch welding process without proper eye protection as severe eye damage or blindness could result. Severe burns could result from improper use of equipment.
- Ensure that suitable eye protection is worn when grinding. Metal particles created by grinding can cause severe eye damage.

3. Rear roof (8)	Hammer dented areas, weld rips and tears, sand high spots, and paint as reqd.	

3-3. FRONT CABINET PANEL ASSEMBLY

This task covers:

Repair

INITIAL SETUP

Tools

Tool Kit, Master Mechanics
(5180-00-699-5273)
Hand hammer, 16 oz
Shop Equipment, Contact Maintenance
Truck Mounted (4940-00-294-9518)
Portable electric disk sander
Welding Shop, Trailer Mounted
(3431-00-935-7821)
Inert gas shielded arc welding set
Welder's apron
Welder's sleeves
Welder's helmet

Materials/Parts

Paint brush (item 5, appx B)
Face shield (item 8, appx B)

Materials/Parts (cont)

Argon gas (item 9, appx B)
Welder's gloves (item 10, appx B)
Paint (item 16, appx B)

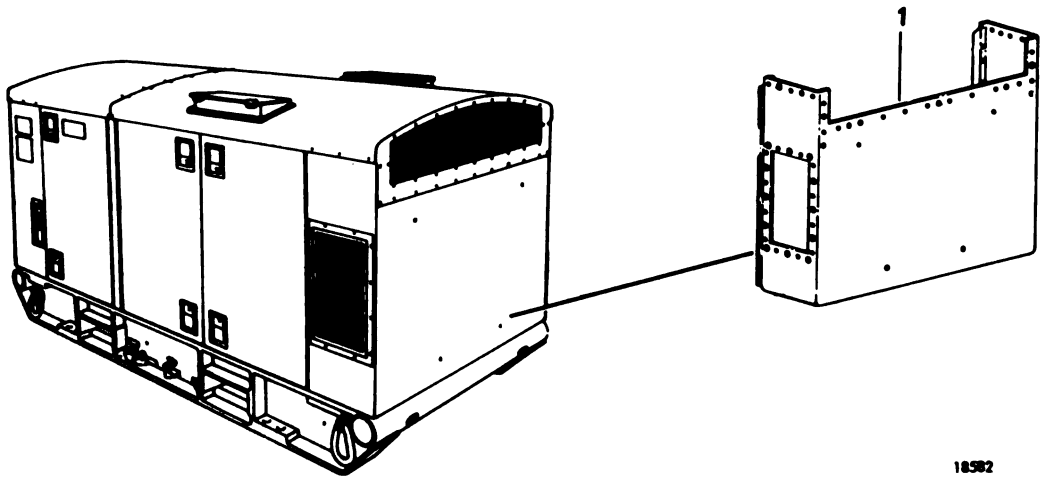
Personnel Required

Turbine Engine Driven Generator
Repairer MOS 52F
Welder MOS 44B

Equipment Condition

Para	Condition Description
4-13*	Front roof removed.
4-14*	Front cabinet panel removed.
4-15*	Two front doors removed.
4-17*	Screens and louvers removed.
4-18*	Air cleaners removed.

*TM 5-6115-598-12



LOCATION	ITEM	ACTION	REMARKS

REPAIR

WARNING

- Use care when using welding equipment. Do not watch welding process without proper eye protection as severe eye damage or blindness could result. Severe burns could result from improper use of equipment.
- Ensure that suitable eye protection is worn when grinding. Metal particles created by grinding can cause severe eye damage.

1.	Front panel (1)	Hammer out dents, weld rips and tears, sand high spots, and paint as reqd.	

3-4. REAR CABINET PANEL ASSEMBLY

This task covers:

a. Removal b. Repair c. Installation

INITAL SETUP

Tools

Blind hand riveter (appx C)
Tool Kit, Master Mechanics
(5180-00-699-5273)
No. 2 cross tip screwdriver
7/16 socket
9/16 socket
Hand hammer, 16 oz
5/8 deep well socket
3/8-dr ratchet handle
6-in. flat tip screwdriver
Shop Equipment, Contact Maintenance,
Truck Mounted (4940-00-294-9518)
Portable electric disk sander
Electric drill
Twist drill set
Shop Equipment, Electrical Repair,
Semitrailer Mounted
(4940-00-294-9517)
Metal cutting shears
Welding Shop, Trailer Mounted
(3431-00-935-7821)
Inert gas shielded
art welding set.
Welder's apron
Welder's sleeves
Welder's helmet

Materials/Parts

Acoustical Foam Adhesive
(item 1, appx B)
Paint brush (item 5, appx B)
Face shield (item 8, appx B)
Argon gas (item 9, appx B)
Welder's gloves (item 10, appx B)
Paint (item 16, appx B)
Blind rivets

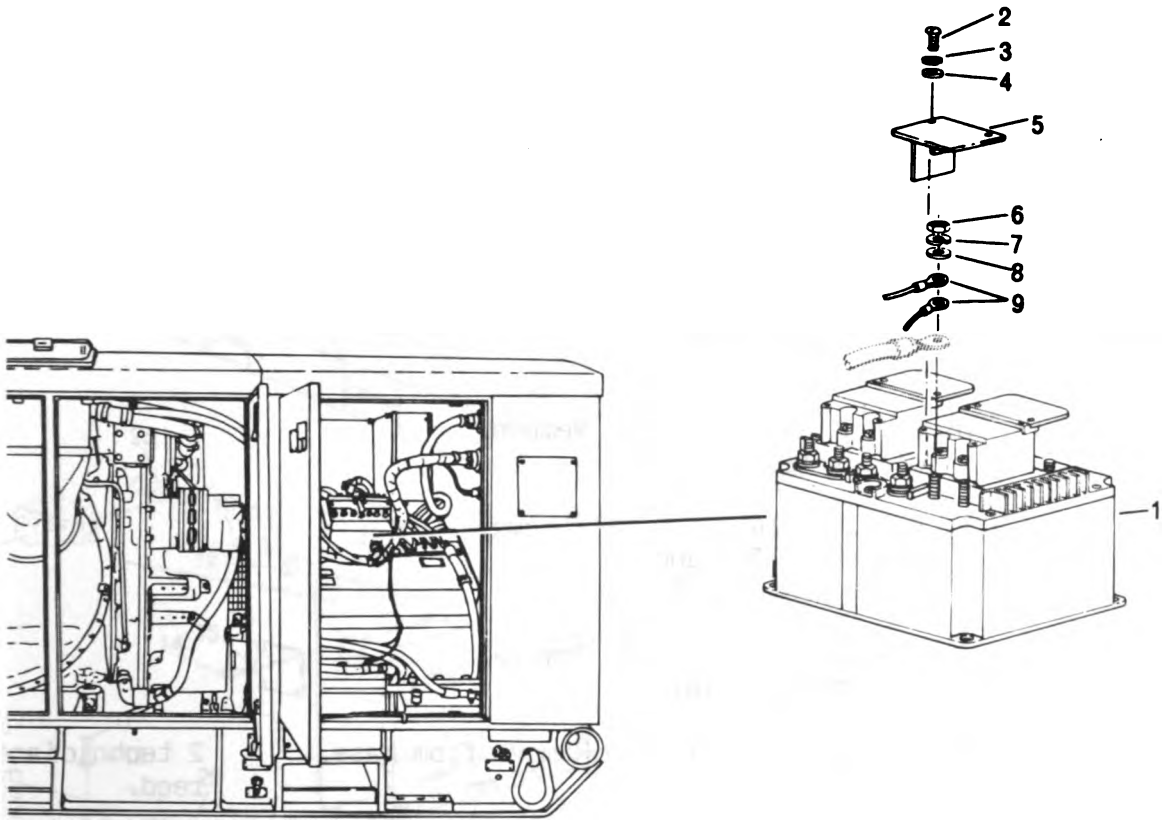
Personnel Required

Turbine Engine Driven Generator
Repairer MOS 52F
Welder MOS 448

Equipment Condition

Para	Condition Description
4-13*	Rear roof removed.
4-15*	Rear doors removed.
4-16*	Rear cabinet screen removed.
4-30*	15-A duplex receptacle removed.
2-13	Control cabinet assy removed.

*TM 5-6115-598-12



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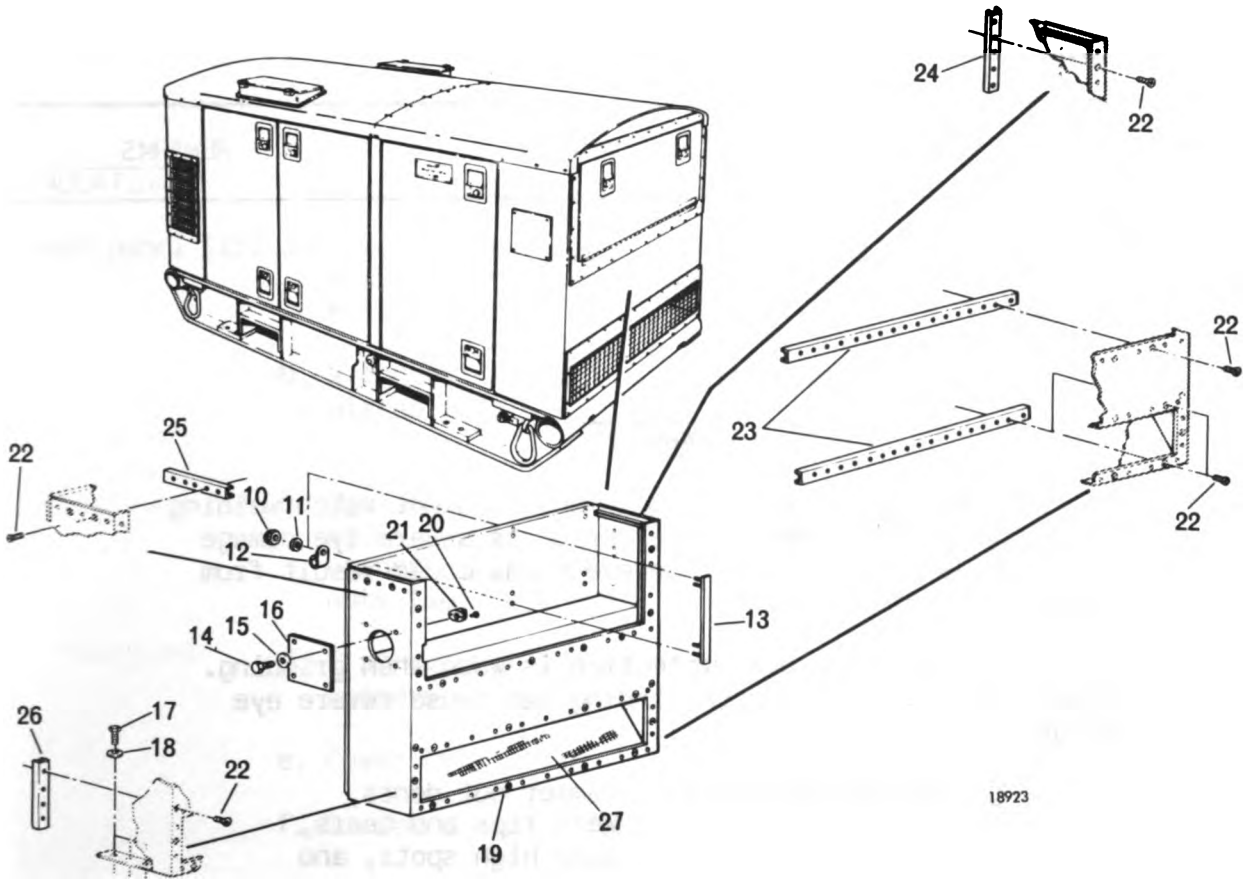
LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Main contactor (1)	a. 2 screws (2), lock washers (3), and washers (4)	Remove.	
	b. Cover (5)	Remove.	
	c. Nut (6), and lock washer (7), and washer (8)	Remove.	
	d. 2 wire terminals (9)	Remove, tag, and identify.	
	e. Cover (5)	Install.	
	f. 2 lock washers (3), washers (4), and screws (2)	Install and tighten.	Do not over tighten.

3-4. REAR CABINET PANEL ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
1. Main contactor (1) (cont)	g. 4 nuts (10), washers (11), 2 clamps (12), and wire (9)	Remove, tag, and identify wire.	
	h. 2 control mount plates (13)	Remove.	
	i. 4 bolts (14), washers (15), and cover plate (16)	Remove.	
	j. 6 bolts (17) and washers (18)	Remove.	
	k. Rear panel (19)	Remove from base.	2 technicians reqd.
REPAIR			
	NOTE Remove only the components required to gain access to areas being repaired.		
2. Rear panel (19)	a. 8 rivets (20) and 4 nut plates (21)	Drill out rivets and remove nut plates.	
	b. 12 screws (22) and 3 nut channels (23)	Remove.	
	c. 4 screws (22) and 2 nut channels (24)	Remove.	



LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
2. Rear panel (19) (cont)	d. 4 screws (22) and 2 nut channels (25)	Remove.	
	e. 4 screws (22) and 2 nut channels (26)	Remove.	
	f. Acoustical attenuation material (27)	Remove.	

3-4. REAR CABINET PANEL ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS

REPAIR (cont)

2. Rear panel (19) (cont)

WARNING

- Use care when using welding equipment. Do not watch welding process without proper eye protection as severe eye damage or blindness could result. Severe burns could result from improper use of equipment.
- Ensure that suitable eye protection is worn when grinding. Metal particles created by grinding can cause severe eye damage.

g.	Damaged panel (19)	Hammer out dents, weld rips and tears, sand high spots, and paint as reqd.
h.	Acoustical attenuation material (27)	Cut to size, apply rubber adhesive and mount in place.
i.	2 nut channels (26) and 4 screws (22)	Install and tighten.
j.	2 nut channels (25) and 4 screws (22)	Install and tighten.
k.	2 nut channels (24) and 4 screws (22)	Install and tighten.
l.	3 nut channels (23) and 12 screws (22)	Install and tighten.
m.	4 nut plates (21) and 8 rivets (20)	Install.

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
3. Rear panel (19)	a. Cover plate (16), 4 washers (15) and bolts (14)	Install and tighten bolts.	
	b. 2 control mount plates (13)	Position on cabinet.	
	c. 2 clamps (12), wire (9), 4 washers (11), and nuts (10)	Remove tags, install and tighten nuts.	
	d. 2 screws (2) and 4 washers (3 and 4)	Remove.	
	e. Cover (5)	Remove.	
	f. 2 wire terminals (9)	Install.	
	g. 4 washers (7 and 8) and 2 nuts (6)	Install and tighten.	
	h. Cover (5)	Position on contactor	
	i. 4 washers (3 and 4) and 2 screws (2)	Install and tighten.	Do not over tighten.
	j. Rear panel (19)	Install on base.	2 technicians reqd.
	k. 6 washers (18) and bolts (17)	Install and tighten.	

3-5. DOOR ASSEMBLY (6)

This task covers:

Repair

INITIAL SETUP

Tools

Tool Kit, Master Mechanics (5180-00-699-5273))
Hand hammer, 16 oz
Shop Equipment, Contact Maintenance Truck Mounted (4940-00-294-9518)
Portable electric disk sander
Welding Shop, Trailer Mounted (3431-00-935-7821)
Inert gas shielded arc welding set
Welder's apron
Welder's sleeves
Welder's helmet

Materials/Parts

Paint brush (item 5, appx B)

Materials/Parts (cont)

Face shield (item 8, appx B)
Argon gas (item 9, appx B)
Welder's gloves (item 10, appx B)
Paint (item 16, appx B)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F
Welder MOS 44B

Equipment Condition

Para	Condition Description
4-15*	Doors removed.

*TM 5-6115-598-12

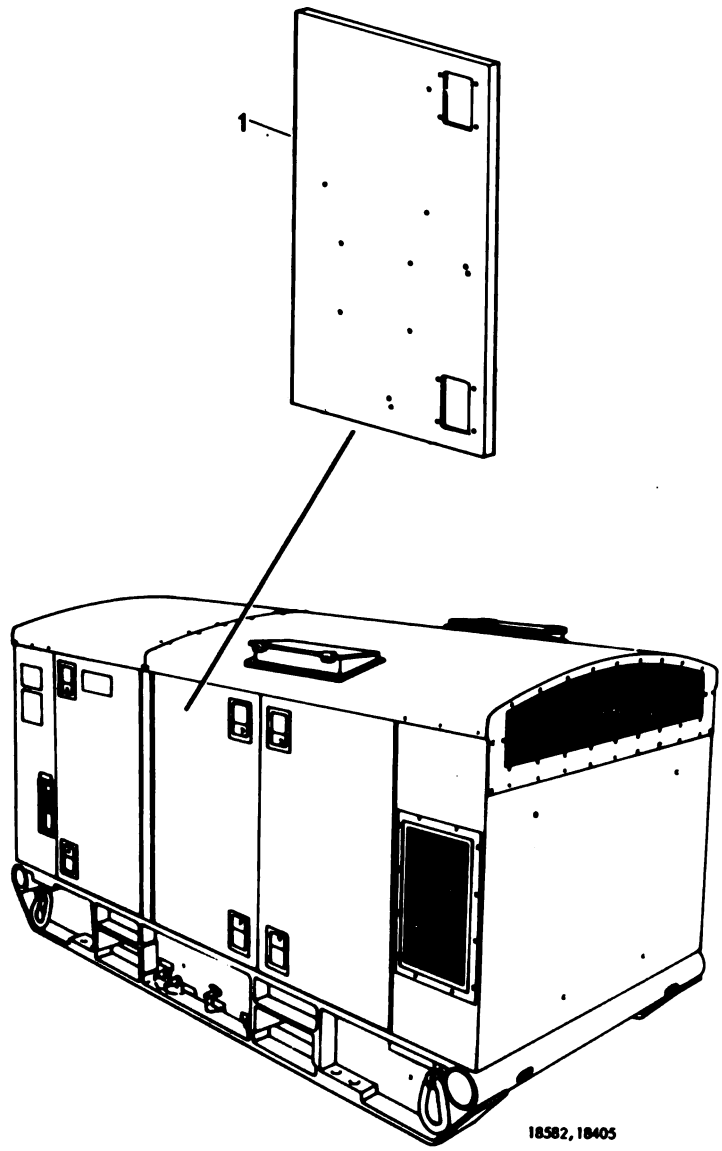
LOCATION	ITEM	ACTION	REMARKS

REPAIR

WARNING

- Use care when using welding equipment. Do not watch welding process without proper eye protection as severe eye damage or blindness could result. Severe burns could result from improper use of equipment.
- Ensure that suitable eye protection is worn when grinding. Metal particles created by grinding can cause severe eye damage.

1.	Door (1) (typical of 6)		Hammer out dents, weld rips and tears, sand high spots, and paint as reqd.



3-6. CENTER BULKHEAD ASSEMBLY

This task covers:

a. Removal b. Repair c. Installation

INITIAL SETUP

Tools

Blind hand riveter (appx C)
1 1/2 crowsfoot attachment, socket wrench (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
6-in. flat tip screwdriver
3/8-dr ratchet handle
7/16 socket
9/16 socket
7/16 combination wrench
3/8 combination wrench
9/16 combination wrench
3/8 socket
1/2 open end wrench
Strap wrench
5-in. extension
1/2 socket
1/2 combination wrench
7/8 combination wrench
16 oz hammer
Shop Equipment, Contact Maintenance, Truck Mounted (4940-00-294-9518)
Portable electric disk sander
Electric drill
Twist drill set
Shop Equipment, Electrical Repair, Semi-trailer Mounted, (4940-00-294-9517)
1 1/2 open end wrench

Tools (cont)

Welding Shop, Trailer Mounted (3431-00-935-7821)
Inert gas shielded arc welding set
Welder's apron
Welder's sleeves
Welder's helmet

Materials/Parts

Rubber seal adhesive (item 1, appx B)
Paint brush (item 5, appx B)
Pipe joint compound (item 7, appx B)
Face shield (item 8, appx B)
Argon gas (item 9, appx B)
Welder's gloves (item 10, appx B)
Paint (item 16, appx B)
Silicone rubber sponge (item 23, appx B)
Tags (item 24, appx B)
Welding electrode

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F
Welder MOS 44B

3-6. CENTER BULKHEAD ASSEMBLY (cont)

Equipment Condition	
Para	Condition Description
4-15*	4 rear doors removed.
4-27*	150 amp circuit breaker removed.
4-33*, 4-34*	Fuel filters removed.
4-39*	Fuel lines removed.
2-14	Engine removed.
2-15	Main alternator removed.
4-8	275 amp rectifier removed.
6-2	Fuel transfer pump removed.

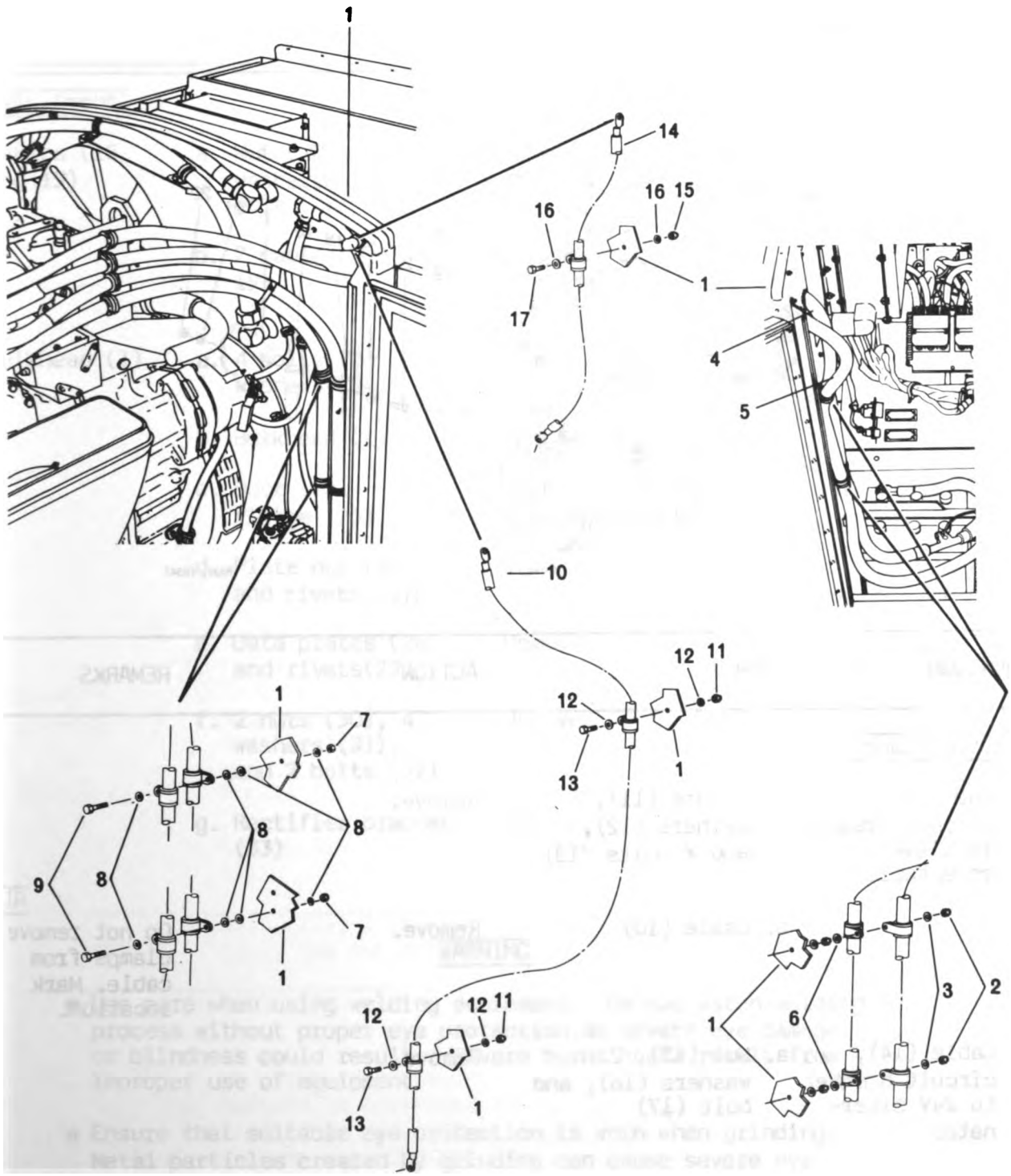
Equipment Condition (cont)	
Para	Condition Description
8-2	Oil filter cooler bypass assy removed.
8-3	Oil cooler removed.
8-4	Oil lines removed.

*TM 5-6115-598-12

General Safety Instructions

Avoid grounding positive battery terminals.

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
	NOTE Remove only components necessary to gain access to area requiring repair. If all cables will be removed, all connectors must be tagged and identified upon removal.		
1. Generator set	Components	Remove.	See equipment condition.
2. Center bulkhead (1)	a. 2 nuts (2) and washers (3)	Remove.	
	b. 2 cables (4 and 5)	Remove. Pull from holes in bulkhead.	Do not remove clamps from cables. Mark location.
	c. 2 washers (6)	Remove.	
	d. 2 nuts (7), 8 washers (8), and 2 bolts (9)	Remove.	Lay cables in base of set. Do not remove clamps from cables. Mark location.



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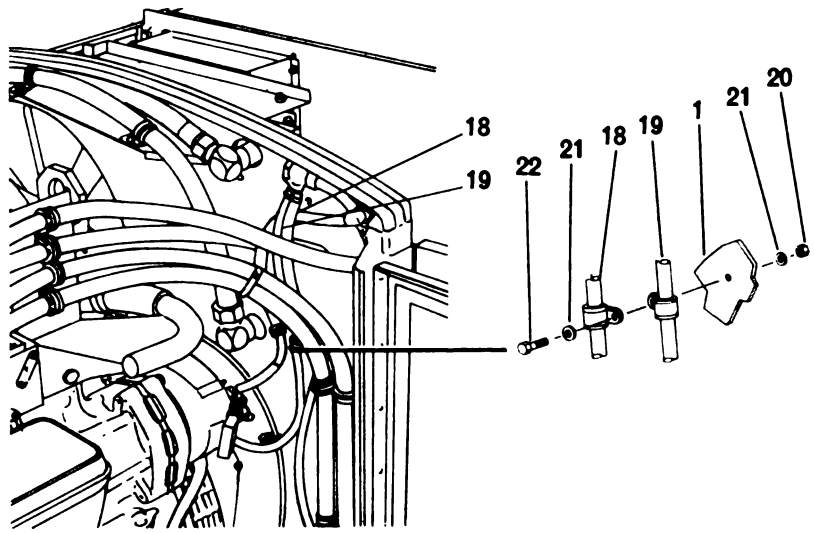
3-6. CENTER BULKHEAD ASSEMBLY (cont)



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LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
3. Cable (10), circuit breaker to slave receptacle	a. 2 nuts (11), 4 washers (12), and 2 bolts (13)	Remove.	
	b. Cable (10)	Remove.	Do not remove clamps from cable. Mark location.
4. Cable (14), circuit breaker to 24V alternator	a. Nut (15), 2 washers (16), and bolt (17)	Remove.	
	b. Cable (14)	Remove.	Do not remove clamp from cable. Mark location.

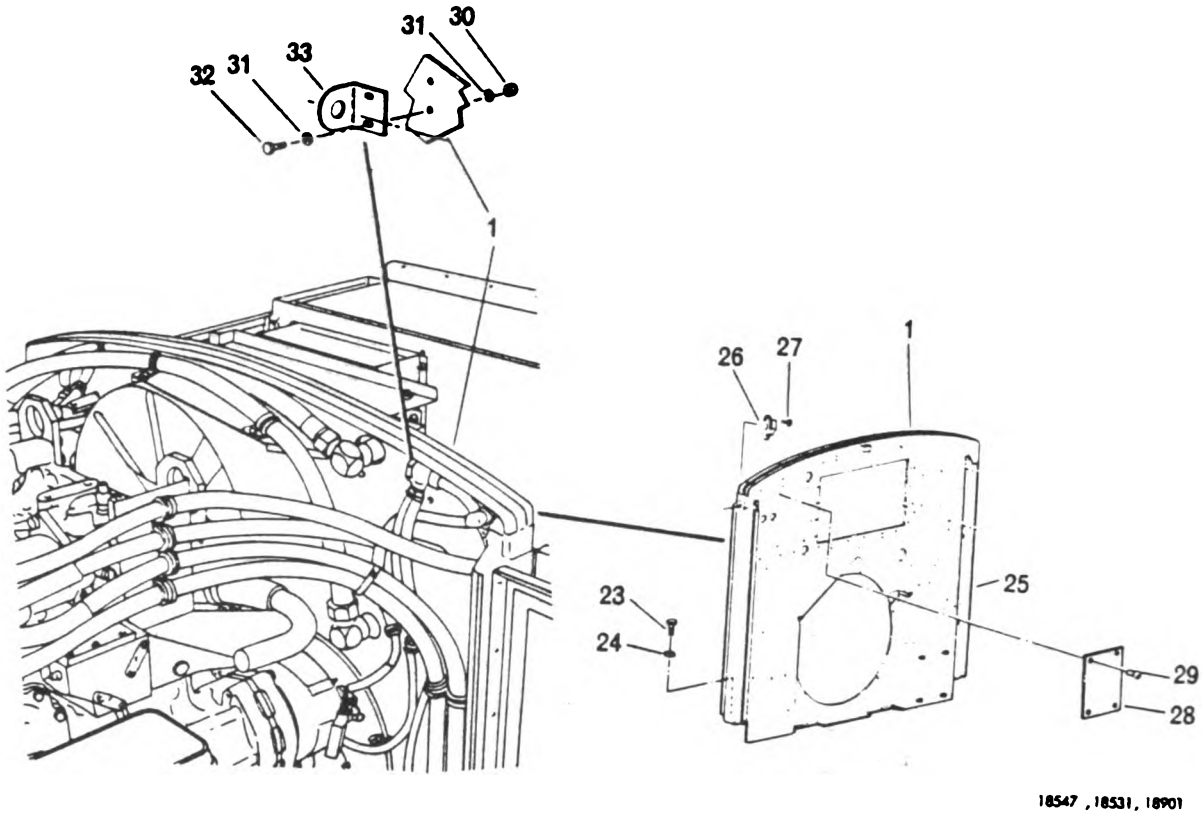
LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
5. Cables (18 and 19)	a. Nut (20), 2 washers (21), and bolt (22)	Remove.	
	b. 2 cables (18 and 19)	Remove.	Do not remove clamps from cables.
6. Bulkhead (1)	a. 4 bolts (23) and washers (24)	Remove.	
	b. Bulkhead (1)	Remove.	
	c. Door seal flange (25)	Grind away welds and remove.	Mark location. See note.
	d. Plate nut (26) and rivets (27)	Remove.	Drill rivet to remove. See note.
	e. Data plates (28) and rivets(29)	Remove.	Drill rivets to remove. See note.
	f. 2 nuts (30), 4 washers (31), and 2 bolts (32)	Remove.	
	g. Rectifier bracket (33)	Remove.	

REPAIR

WARNING

- Use care when using welding equipment. Do not watch welding process without proper eye protection as severe eye damage or blindness could result. Severe burns could result from improper use of equipment.
- Ensure that suitable eye protection is worn when grinding. Metal particles created by grinding can cause severe eye damage.

3-6. CENTER BULKHEAD ASSEMBLY (cont)



LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
7. Bulkhead (1)		Hammer out dents, weld rips or tears, sand high spots, and paint as reqd.	
INSTALLATION			
8. Bulkhead (1)	a. Data plates (28) and rivets (29)	Install.	

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
8. Bulkhead (1) (cont)	b. Plate nut (26) and rivets (27)	Install.	If removed for repair.

WARNING

Use care when using welding equipment. Do not watch welding process without proper eye protection as severe eye damage or blindness could result. Severe burns could result from improper use of equipment.

c. Door seal flange (25)	Install. Weld in place.	Position as marked if removed for repair.
d. Bulkhead (1)	Place in position on base.	
e. 4 washers (24) and bolts (23)	Install and tighten.	
f. Rectifier bracket (33)	Position on bulkhead.	
g. 2 bolts (32), 4 washers (31), and 2 nuts (30)	Install and tighten.	
h. Cables (18 and 19)	Position on bulkhead.	If removed for repair.
i. Bolt (22), 2 washers (21), and nut (20)	Install and tighten.	
j. Cable (14)	Position on bulkhead.	If removed for repair.
k. Bolt (17), 2 washers (16), and nut (15)	Install and tighten.	
l. Cable (10)	Position on bulkhead.	If removed for repair.

3-6. CENTER BULKHEAD ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
8. Bulkhead (1) (cont)	m. 2 bolts (13), 4 washers (12), and 2 nuts (11)	Install and tighten.	
	n. Slave receptacle-to-starter cables	Position on bulkhead.	If removed for repair.
	o. 2 bolts (9), 8 washers (8), and 2 nuts (7)	Install and tighten.	
	p. Cables (4 and 5)	Insert cables through holes in bulkhead.	If removed for repair.
	q. 2 washers (6)	a. Install. b. Position clamps on bolts (9).	
	r. 2 washers (3) and nuts (2)	Install and tighten.	

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3-7. ENGINE AIR INLET PLENUM ASSEMBLY

This task covers:

a. Inspection b. Removal c. Repair d. Installation

INITIAL SETUP

Tools

Blind hand riveter (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
7/16 combination wrench
Shop Equipment, Contact Maintenance Truck Mounted (4940-00-294-9518)
Twist drill set
Electric drill

Materials/Parts

Blind rivets

Personnel Required

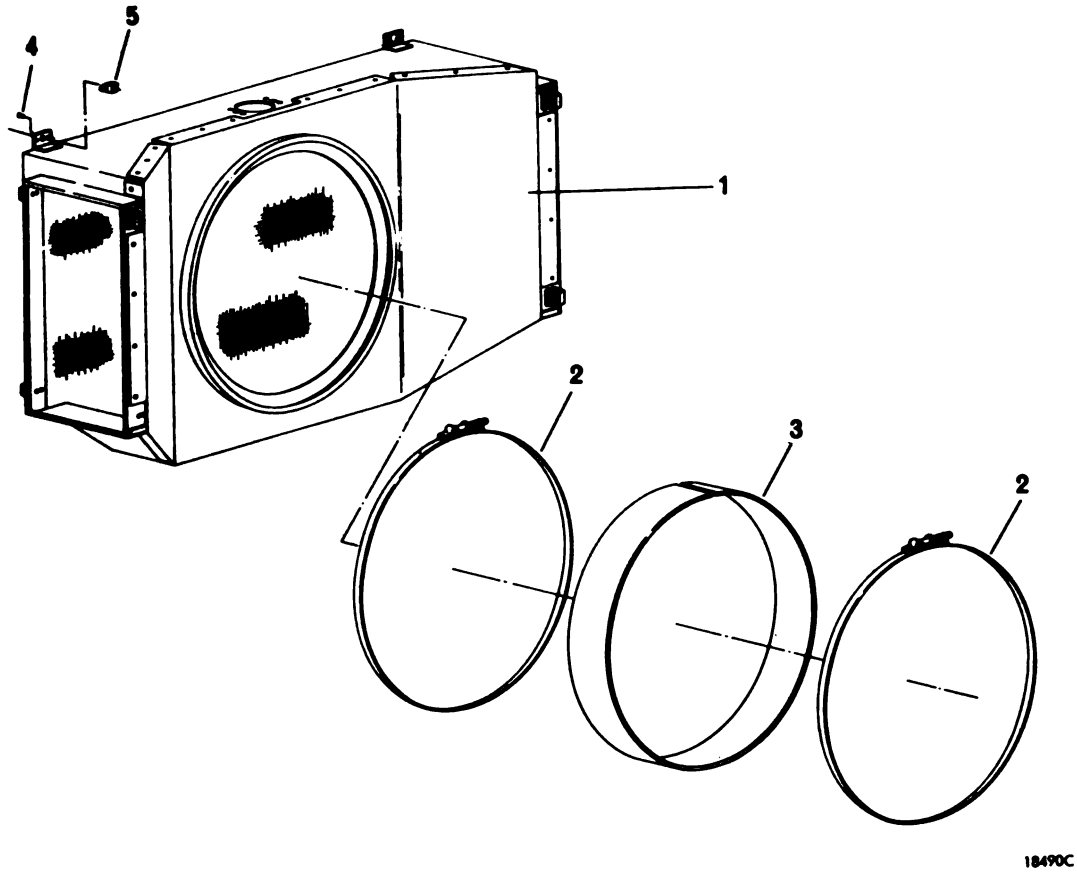
Turbine Engine Driven Generator Repairer MOS 52F

Equipment Condition

Para	Condition Description
4-13*	Front roof removed.
4-14*	Front panel removed.
4-15*	Two front doors removed.
4-17*	Screen and louvers removed.
4-18*	Air cleaners removed.
4-6	TI sensor removed.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
INSPECTION			
1. Plenum (1)		Inspect for damage or missing components.	
REMOVAL			
2. Plenum (1)	a. 2 clamps (2) and seal (3)	Remove.	
	b. Plenum	Remove.	2 technicians reqd.



LOCATION	ITEM	ACTION	REMARKS
REPAIR			
3. Plenum (1)	a. 2 rivets (4) and nut plate (5)	Drill out rivets and remove nut plates.	
	b. Nut plate (5) and 2 rivets (4)	Install.	
INSTALLATION			
4. Plenum (1)	a. Plenum	Position at front of engine.	
	b. Seal (3) and 2 clamps (2)	Install and tighten.	

3-8. GENERATOR SET BASE ASSEMBLY

This task covers:

a. Removal b. Repair c. Installation

INITIAL SETUP

Tools

Insert installation tool (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
Screw extractor set
Center punch
9/16 socket
3/8-dr ratchet handle
6-in. flat tip screwdriver
3/8 combination wrench
Shop Equipment, Contact Maintenance Truck Mounted (4940-00-294-9518)
Electric drill
Twist drill set
Portable electric disk sander
Welding Shop, Trailer Mounted (3431-00-935-7821)
Inert gas shielded arc welding set
Welder's sleeves
Welder's apron
Welder's helmet

Materials/Parts

Bucket (item 4, appx B)
Paint brush (item 5, appx B)
Face shield (item 8, appx B)
Argon gas (item 9, appx B)
Welder's gloves (item 10, appx B)
Paint (item 16, appx B)
Rags (item 17, appx B)
Masking tape (item 26, appx B)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F
Welder MOS 44B

Equipment Condition

Para	Condition Description**
4-15*	Four rear doors removed.
4-19*	Battery trays removed.
4-28*	Load terminal ground stud removed.
4-39*	Fuel lines and fittings removed.
2-14	Engine removed.
2-15	Main alternator removed.
3-6	Center bulkhead removed.
3-9	Data plates removed.
8-4	Oil lines and fittings removed.

*TM 5-6115-598-12
**Remove only as reqd to perform maintenance tasks.

General Safety Instructions

No smoking or open flame.

LOCATION	ITEM	ACTION	REMARKS

REMOVAL

NOTE

When the base assembly has been damaged, inspect to determine if repairs can be done without removing the generator set from the base assembly. Some areas of the base assembly have enough clearance so that a repair can be made without removing major components.

1. Generator set	Components	Remove as reqd.	Refer to equipment condition.

REPAIR

2. Base assy (1)

NOTE

Remove only the parts necessary to gain access to area requiring repair.

a. Cap (2)	Remove.	
b. 4 nuts (3), 8 washers (4), and 4 bolts (5)	Remove.	
c. Receptacle (6), gasket (7), and insulator (8)	Remove.	
d. 4 rivets (9) and stud (10)	Drill out rivets and remove stud.	

WARNING

Ensure that suitable eye protection is worn when grinding. Metal particles created by grinding can cause severe eye damage.

e. Door seal (11)	Grind away welds and remove seal.	Mark location.
f. 2 rivets (12) and nut plate (13)	Remove.	

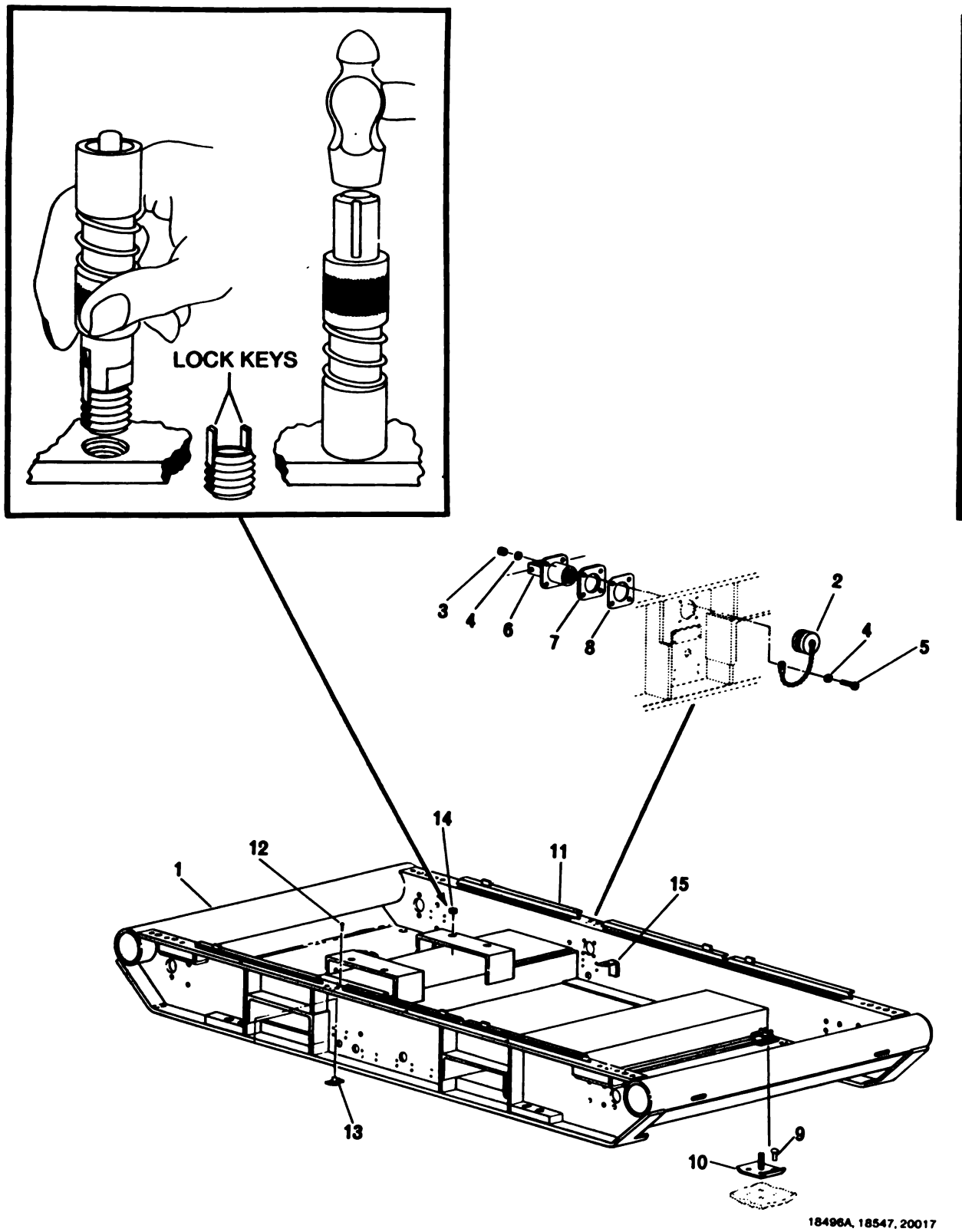
3-8. GENERATOR SET BASE ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
2. Base assy (1) (cont)	g. Inserts (14)	a. Drill out 5/16 in. (8 mm) deep using 31/32 in. (25 mm) dia drill bit.	
		b. Bend lock keys inward and break off.	
		c. Remove insert.	
	h. Bracket (15)	Straighten or grind away welds and remove bracket.	Mark location.

WARNING

- Use care when using welding equipment. Do not watch welding process without proper eye protection as severe eye damage or blindness could result. Severe burns could result from improper use of equipment.
- Ensure that suitable eye protection is worn when grinding. Metal particles created by grinding can cause severe eye damage.

3. Base assy (1)		Hammer out dents, weld tears and punctures, sand high spots, and paint as reqd.	
	a. Bracket (15)	Position on base. Weld in place.	Locate as marked.



3-8. GENERATOR SET BASE ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
3. Base assy (1) (cont)	b. New inserts (14)	a. Install inserts 0.010-0.030 in. (0.25-0.75 mm) below surface.	
		b. Drive lock keys down flush with top of insert.	Locate lock keys in unused area of hole.
	c. Nut plate (13) and 2 rivets (12)	Install.	
	WARNING		
	Use care when using welding equipment. Do not watch welding process without proper eye protection. Severe eye damage or blindness could result.		
	d. Door seal (11)	Position on base. Weld in place.	Locate as marked.
	e. Stud (10) and 4 rivets (9)	Install.	
	f. Insulator (8), gasket (7), and receptacle (6)	Install on base.	
	g. 4 bolts (5), 8 washers (4), and 4 nuts (3)	Install and tighten nuts.	One bolt goes through chain of cap (2).
	h. Cap (2)	Install.	
INSTALLATION			
4. Generator set	Components	Install as reqd.	Refer to equipment condition.

3-9. DATA PLATES

This task covers:

a. Removal b. Installation

INITIAL SETUP

Tools

Blind hand riveter (appx C)
Shop Equipment, Contact Maintenance
Truck Mounted (4940-00-294-9518)
Electric drill
Twist drill set

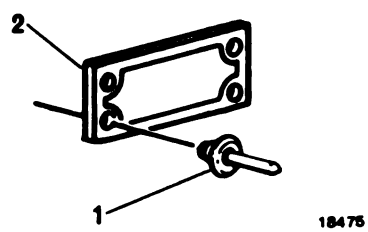
Materials/Parts

Blind rivets

Personnel Required

Turbine Engine Driven Generator
Repairer MOS 52F

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Data plate mounting site	Rivets (1) and data plate (2)	Drill out rivets and remove data plate.	Use appropriate twist drill.
INSTALLATION			
2. Data plate mounting site	Data plate (2) and rivets (1)	Place data plate in position and install rivets.	Use rivet tool.



CHAPTER 4

MAINTENANCE OF DC ELECTRICAL AND CONTROL SYSTEM

4-1. PURPOSE AND FUNCTION

The purpose and function of the dc electrical and control system is to provide power from the 24 volt alternator to the battery. The dc power is regulated to maintain the battery in a fully charged condition. The system further provides power to operate dc powered components and accessories. The 24 volt alternator system has its own rectifier circuit and voltage regulator.

4-2. BATTERY CABLES

This task covers:

Repair

INITIAL SETUP

Tools

Thermal gun (appx C)
Terminal hand crimping tool (appx C)
Tool Kit, Master Mechanics
(5180-00-699-5273)
Hacksaw
Pocket knife

Materials/Parts

Electrical tape (item 25, appx B)
Sleeving (red or black)

Personnel Requirements

Turbine Engine Driven Generator
Repairer MOS 52F

Troubleshooting References

Item	Step	Table
28	12	2-5
29	2	2-5

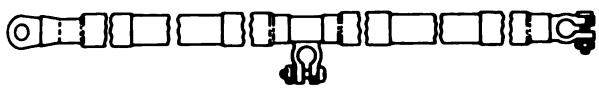
Equipment Condition

Para	Condition Description
4-21*	Battery cables removed.

*TM 5-6115-598-12

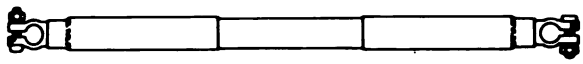
LOCATION	ITEM	ACTION	REMARKS
REPAIR			
1. Cable assy	a. Damaged insulation	Wrap with electrical tape.	
	b. Damaged cable terminals	a. Cut sleeving from damaged connection.	
		b. Saw through terminal to remove from cable.	Use care to prevent damage to wire. Note position of terminal.

STARTER (-) TO BATTERY

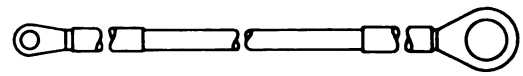


STARTER (-) TO SLAVE RECEPTACLE

BATTERY JUMPER (R.H. SIDE)

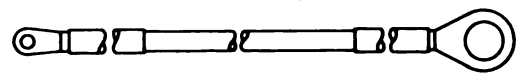


RECTIFIER STUD TO SLAVE RECEPTACLE (-)

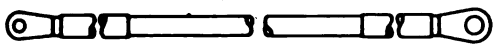


BATTERY

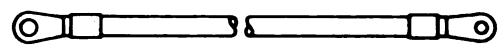
24 VOLT ALTERNATOR (-) TO RECTIFIER



CB TO SLAVE RECEPTACLE (+)

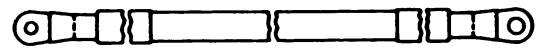


24 VOLT ALTERNATOR (+) TO CB

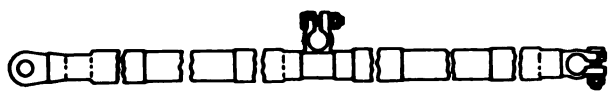


STARTER (+) TO SLAVE RECEPTACLE

LOAD TERMINAL



STARTER (+) TO BATTERY



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4-2. BATTERY CABLES (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
1. Cable assy (cont)		c. Slide piece of sleeving over cable end.	
		d. Install new terminal and crimp in place.	Position as noted in step b.
		e. Slide sleeving over terminal crimp and heat shrink.	
	c. Damaged cable wiring	Replace cable. Attach new terminals per steps c, d, and e.	

4-3. BATTERY (4)

This task covers:

Test

INITIAL SETUP

Test Equipment

Anti-freeze and battery tester (6630-00-105-1418)
Battery charger (6130-00-699-6659)

Tools

Laboratory rubber apron (appx C)
Rubber gloves (appx C)
Shop Equipment, Electrical Repair, Semitrailer Mounted (4940-00-294-0517)
Battery filler

Materials/Parts

Industrial face shield (item 8, appx B)
Rags (item 17, appx B)
Electrical insulating tape (item 25, appx B)
Distilled water (item 27, appx B)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Equipment Condition

Para	Condition Description
4-22*	Battery removed.

*TM 5-6115-598-12

General Safety Instructions

Avoid smoking, sparks, or open flame near batteries.
Avoid contact with battery corrosion or electrolyte.

LOCATION	ITEM	ACTION	REMARKS
TEST			
1.	Batteries	Test per TM 9-6140-200-14.	

4-4. N1 AND N2 MAGNETIC SENSOR PICKUP

This task covers:

a. Test b. Removal c. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

10 mm socket (appx C)
Torque wrench, 0-300 in. lb (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
1/2-dr ratchet handle
Pry bar
5-in. extension

Materials/Parts

Preformed packing (2)
Hex bolt (item 5)
Hex bolt (item 6)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

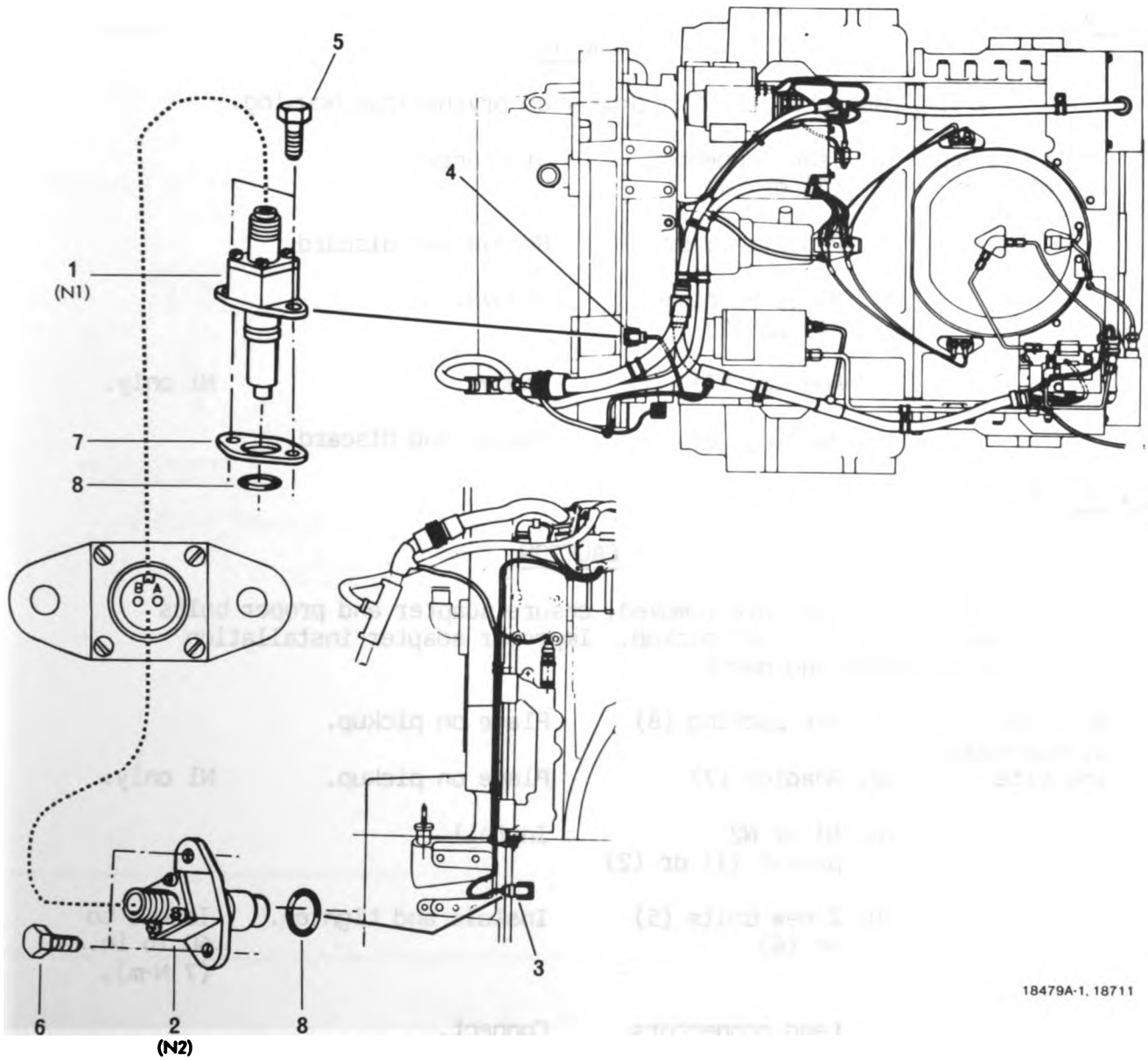
Item	Step	Table
64	9,10	2-5

Equipment Condition

Para	Condition Description
4-13*	Front roof removed.
4-21*	Disarm battery power.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. N1 (1)or N2 (2) pickups	Lead connectors (3) or (4)	a. Remove from pickup.	
		b. Measure resistance from pin A to B.	Set multimeter RX1 scale. Resistance should be 100 to 200 ohms.
		c. Measure resistance from pin A to ground.	Resistance should be infinity.
		d. Connect.	



4-4. N1 AND N2 MAGNETIC SENSOR PICKUP (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
		CAUTION	
	Do not damage N1 or N2 pickup when prying from housing.		
2. N1 (1) or N2 (2) pickups	a. Lead connector (3) or (4)	Disconnect.	
	b. 2 bolts (5 or 6)	Remove and discard.	
	c. N1 or N2 pickup (1) or (2)	Remove.	
	d. Adapter (7)	Remove.	N1 only.
	e. Packing (8)	Remove and discard.	
INSTALLATION			
		CAUTION	
	If both pickups are removed, ensure adapter and proper bolts are installed in N1 pickup. Improper adapter installation will damage equipment.		
3. N1 or N2 pickup mounting site	a. New packing (8)	Place on pickup.	
	b. Adapter (7)	Place on pickup.	N1 only.
	c. N1 or N2 pickup (1) or (2)	Install.	
	d. 2 new bolts (5) or (6)	Install and tighten.	Torque to 60 lb in. (7 N·m).
	e. Lead connectors (3) or (4)	Connect.	

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4-5. T4 SINGLE ELEMENT THERMOCOUPLE ASSEMBLY

This task covers:

a. Inspection b. Test c. Removal d. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

Tool Kit, Master Mechanics (5180-00-699-5273)
- 5/16 open end wrench
- 3/8 combination wrench
- 5/8 combination wrench
- 11/32 open end wrench
- 7/16 socket
- 3/8-dr ratchet handle
- 5-in. extension
- Putty knife

Puller, T4 Guide Tube

Materials/Parts

Tags (item 24, appx B)
Adapter block to engine block gasket (2)
Pipe joint compound (item 7, appx B)
Lock washer (4) (items 11 and 17)
Bolt (4) (items 10 and 16)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

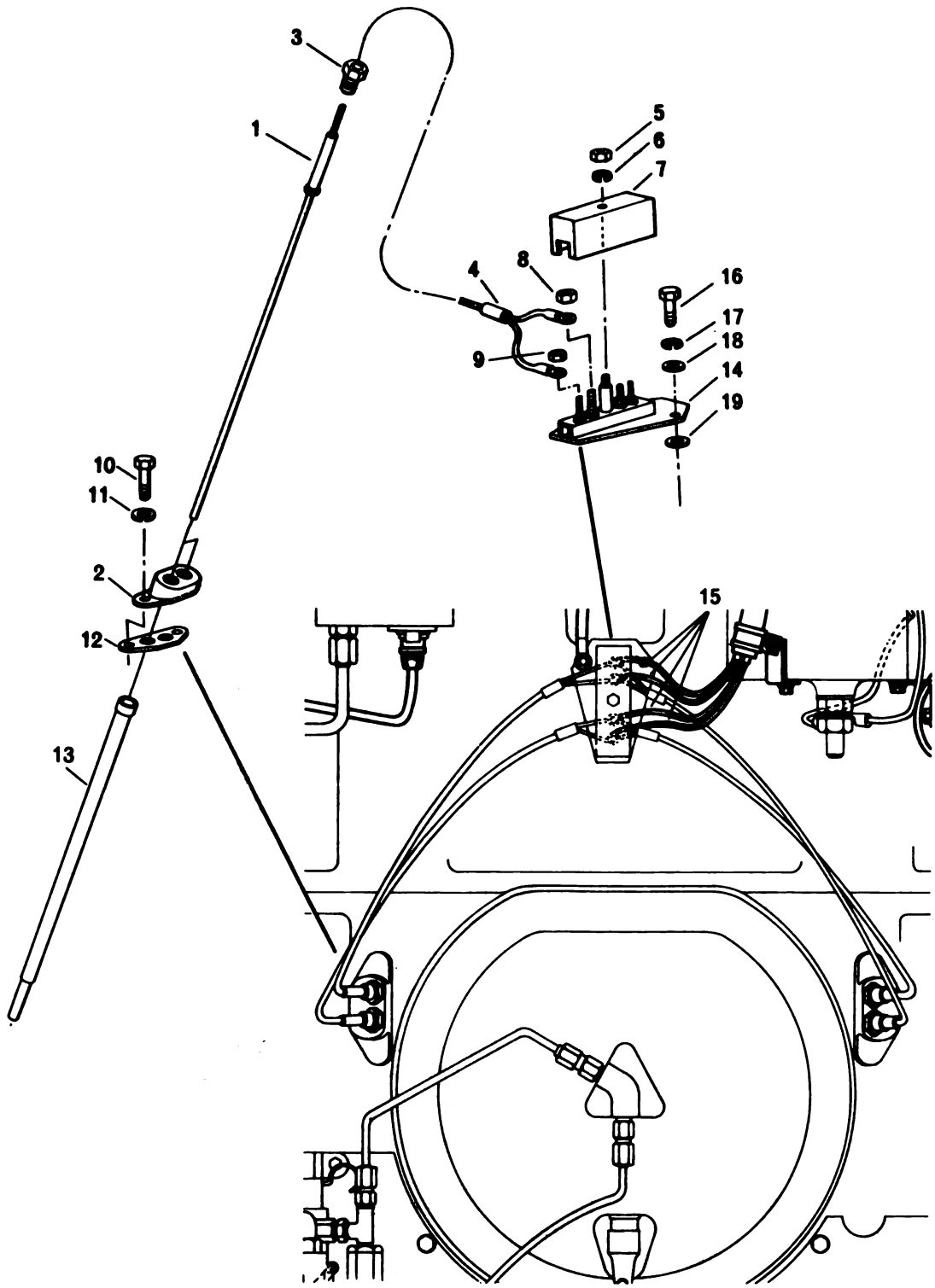
Item	Step	Table
38	1	2-5
46	8	2-5

Equipment Condition

Para	Condition Description
4-13*	Front roof removed.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
INSPECTION			
1. Engine block on each side of burner cover	4 T4 thermocouples (1) (two on each side of burner cover)	Check for damage to adapter blocks (2) or nuts (3). Check electrical leads (4) for burnt or frayed insulation.	



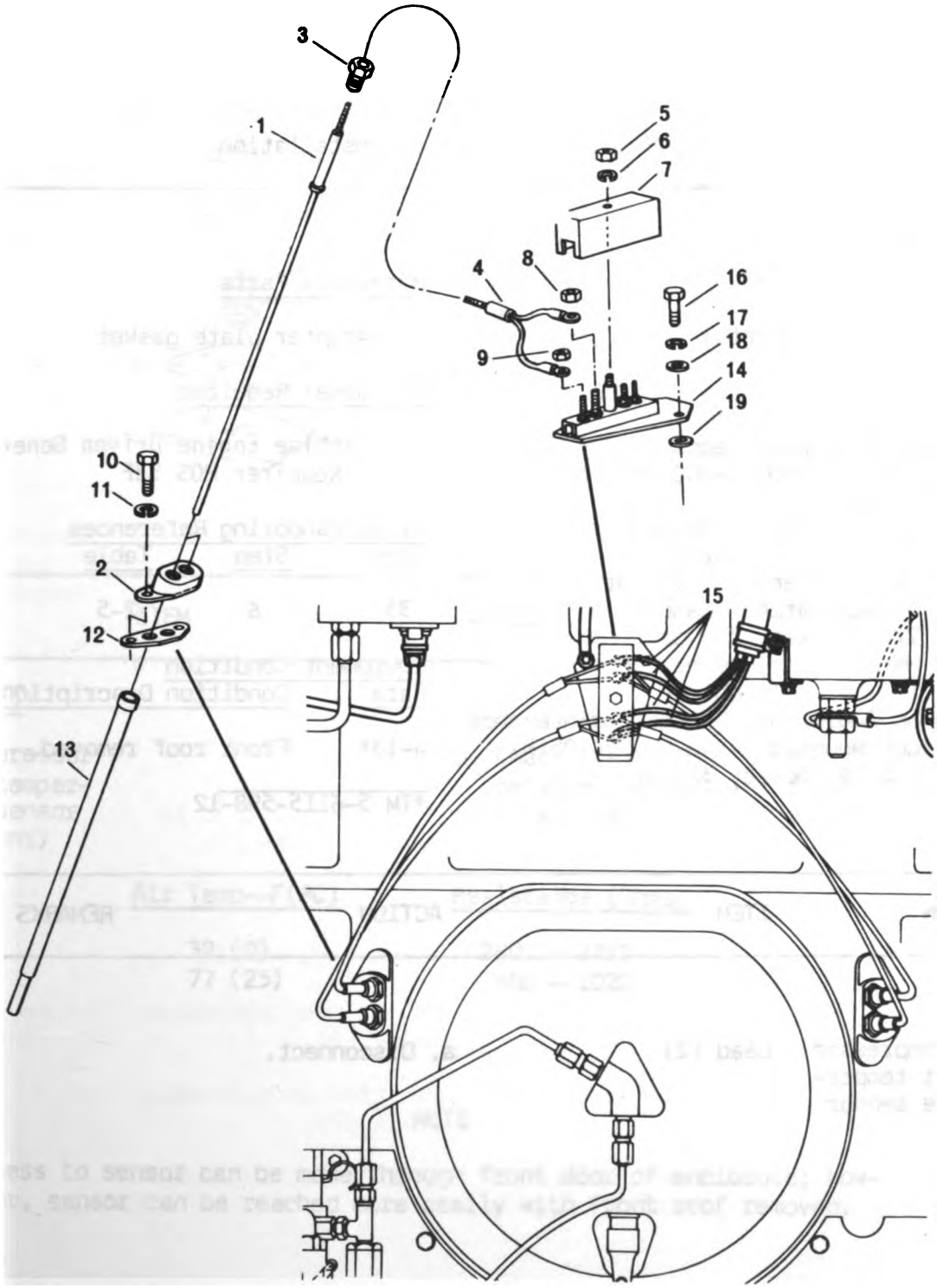
4-5. T4 SINGLE ELEMENT THERMOCOUPLE ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST			
2. T4 thermocouple (1)	a. Nut (5), washer (6), and cover (7)	Remove.	
	b. Nuts (8) and (9)	Remove.	
	c. 2 leads (4)	a. Remove, tag, and identify.	
		b. Check resistance between leads of each thermocouple.	Set multimeter RX1 scale. Resistance should be 0.5 to 5 ohms.
		c. Measure resistance from one thermocouple lead (4) to adapter block (2).	Set multimeter RX10 scale. Resistance should be infinity.
	d. 2 leads (4)	Remove tags and install.	
	e. Nuts (8) and (9)	Install and tighten.	
	f. Cover (7)	Install.	
	g. Washer (6) and nut (5)	Install and tighten.	
3. T4 thermocouple (1)		Test other 3 thermocouples per step 2.	
REMOVAL			
4. T4 thermocouple (1)	a. Nuts (5), lock washer (6), and cover (7)	Remove.	
	b. Nuts (8) and (9)	Remove.	
	c. 2 leads (4)	Remove, tag, and identify.	

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
4. T4 thermocouple (1) (cont)		CAUTION Protect the ends of thermocouples following removal to avoid damage to tips.	
	d. Nut (3) and thermocouple (1)	Remove.	
5. T4 thermocouples (1)		Remove other 3 thermocouples per step 4.	
6. Adapter block (2)	a. 2 bolts (10) and lock washers (11)	Remove and discard bolts and lock washers.	
	b. Block (2) and gasket (12)	Remove and discard gasket. Clean mounting surfaces of gasket material.	Do not reuse gasket.
	c. 2 guide tubes (13)	Remove.	
7. Adapter block (2)		Remove remaining adapter block per step 6.	
8. Terminal block assy (14)	a. 4 leads (15)	Remove, tag, and identify.	
	b. 2 bolts (16), lock washers (17), and flat washers (18)	Remove and discard bolts and lock washers.	
	c. Terminal block (14) and 2 washers (19)	Remove.	

4-5. T4 SINGLE ELEMENT THERMOCOUPLE ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
9. Terminal block assy (14)	a. 2 flat washers (19) and terminal block (14)	Install.	
	b. 2 flat washers (18), new lock washers (17) and bolts (16)	Install and tighten.	
	c. 4 leads (15)	Remove tags and install.	Leads marked CR go on large studs.
10. Adapter block (2)	a. 2 guide tubes (13)	Install.	
	b. New gasket (12) and block (2)	Position on engine.	
	c. 2 new lock washers (11) and bolts (10)	Install and tighten.	
11. T4 thermocouple (1)		Insert thermocouple into guide tube (13) and block adapter (2).	
	a. Nut (3)	Apply pipe joint compound to the threads, install and tighten.	
	b. Thermocouple leads (4)	Remove tags and install.	Each thermocouple has two leads with different diameter terminals. Do not force leads onto studs.
	c. Nuts (8) and (9)	Install and tighten.	Do not over tighten.
	d. Cover (7)	Install.	
	e. Lock washer (6) and nut (5)	Install and tighten.	Use new lock washers.



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4-6. T1 COMPRESSOR INLET TEMPERATURE SENSOR

This task covers:

a. Test b. Removal c. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

Socket adapter (appx C)
Torque wrench, 0-300 in. lb (appx c)
Tool Kit, Master Mechanics (5180-00-699-5273)
5-in. extension, 3/8 dr
3/8-dr ratchet handle
7/16 socket, 3/8 dr
Hand hammer, 16 oz
1/2-in. cold chisel
Shop Equipment, Contact Maintenance Truck Mounted (4940-00-294-9518)
1 5/16 socket, 3/4 dr

Materials/Parts

Adapter plate gasket

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

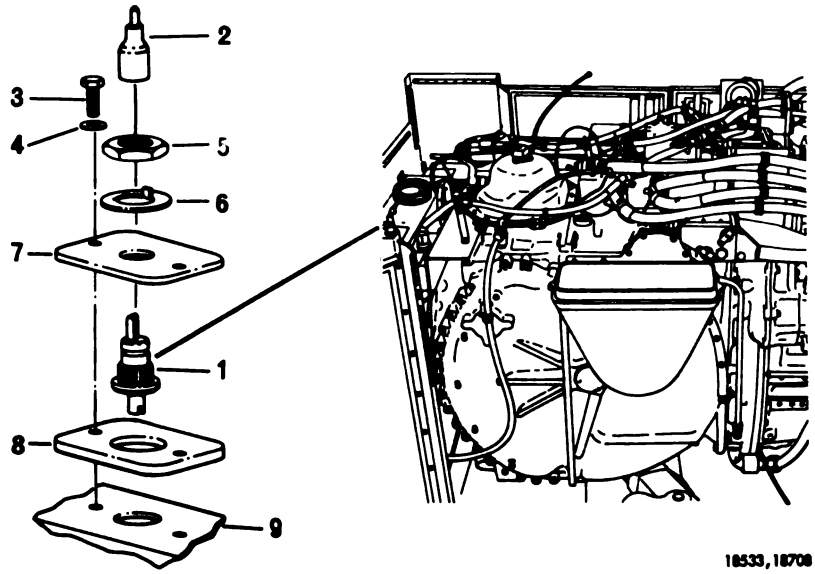
Item	Step	Table
35	6	2-5

Equipment Condition

Para	Condition Description
4-13*	Front roof removed.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. T1 compressor inlet temperature sensor (1)	Lead (2)	a. Disconnect.	



LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
1. T1 compressor inlet temperature sensor (1) (cont)		b. Check resistance between two terminal blades.	Set scale on multimeter based on expected readings.
	Air Temp--F(°C)	Resistance (Ohms)	
	32 (0)	2600 - 2750	
	77 (25)	980 - 1020	

REMOVAL

NOTE

Access to sensor can be made through front door of enclosure; however, sensor can be reached more easily with front roof removed.

4-6. T1 COMPRESSOR INLET TEMPERATURE SENSOR (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
2. T1 compressor inlet temperature sensor (1)	a. Electrical lead (2) to sensor	Disconnect.	Friction fit only.
	b. Lock ring (6)	Straighten away from flat of nut (5).	
	c. Nut (5)	Loosen.	
	d. 2 bolts (3) and washers (4)	Remove.	
	e. Adapter plate (7), gasket (8) and sensor (1)	Remove from compressor inlet (9) as an assembly.	Discard gasket if torn or damaged.
	f. Nut (5), lock ring (6) and sensor (1)	Remove from adapter plate (7).	
INSTALLATION			
3. T1 compressor inlet temperature sensor (1)	a. T1 sensor (1)	Place in position in adapter plate (7).	
	b. Lock ring (6)	Place over sensor.	
	c. Nut (5)	Place over sensor.	
	d. Gasket (8)	Position on compressor inlet (9).	Use new gasket if required.
	e. Adapter plate (7)	Position on compressor inlet (9).	
	f. 2 washers (4) and bolts (3)	Install and tighten.	

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
3. T1 compressor inlet temperature sensor (1) (cont)	g. Nut (5)	Tighten.	Torque to 20-25 lb in. (2.3-2.8 N·m)
	h. Lock ring (6)	Bend against one flat side of nut (5).	
	i. Lead (2)	Connect.	

4-7. 24-VOLT ALTERNATOR

This task covers:

a. Test b. Removal c. Repair d. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

Alternator drive coupling puller (Table 2-1)
Alternator drive coupling holder (Table 2-1)
Ret Inspection Mirror (apx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
1/4-dr ratchet handle
2-in. extension, 1/4 dr
1/2 open end wrench
1/2 combination wrench
9/16 combination wrench
1/4 socket, 1/4 dr
1/4-dr straight handle
5/16 socket, 1/4 dr
3/8 socket, 1/4 dr
3/8-dr ratchet handle
7/16 socket, 3/8 dr
1/2 socket, 3/8 dr
9/16 socket, 3/8 dr
1/2-dr ratchet handle
15/16 socket, 1/2 dr
2-in. flat tip screwdriver 1/4-in. tip
Putty Knife
Shop Equipment, Electrical Repair Semitrailer, Mounted (4940-00-294-9517)
Flashlight
Torque wrench, 1/2-dr, 0-150 ft lb

Material/Parts

Rags (item 17, appx B)
Tags (item 24, appx B)
Paint (item 31, appx B)
Grease (item 32, appx B)
Solvent (item 33, appx B)
Sealant (item 34, appx B)
Cleaner (item 35, appx B)
Tape (item 26, appx B)
Tape (item 36, appx B)
Tape (item 37, appx B)
Adhesive (item 38, appx B)
Alternator adapter gasket
Regulator gasket
Brush holder housing seal ring
Lock washer (item 20)
Lock washer (item 56)
Elec. tie down strap (item 80)
Seal assembly (item 68)

Personnel Required

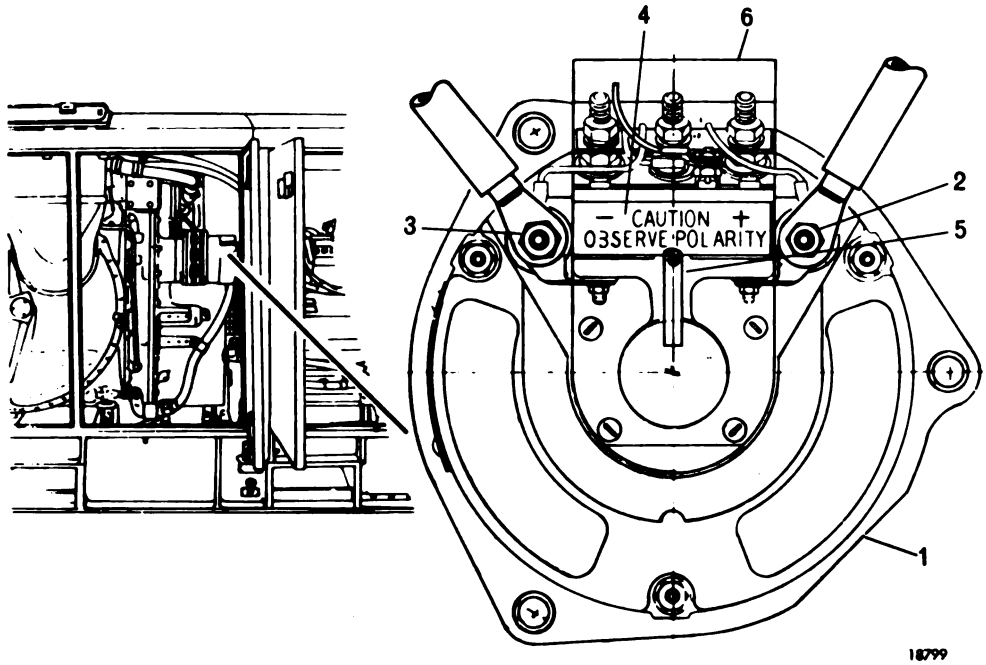
Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
72	1	2-5
73	1	2-5
80	1	2-5

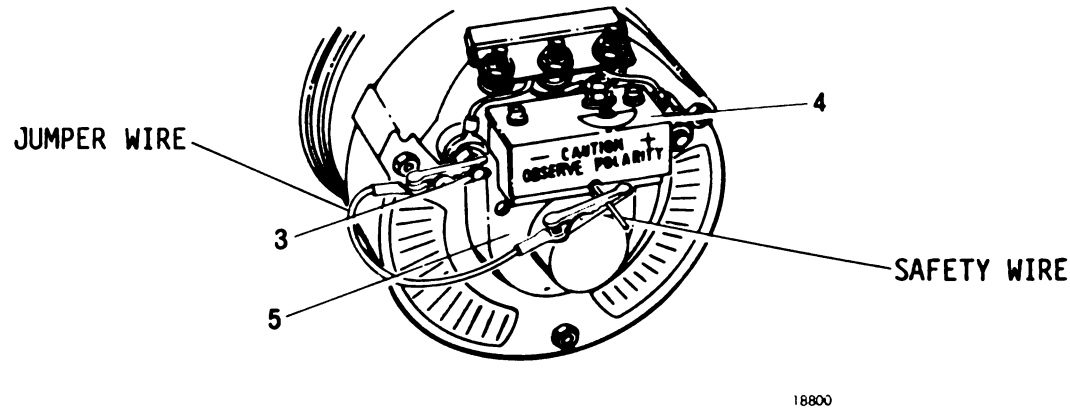
Equipment Condition

Para	Condition Description
4-21*	Disarm batteries (after test).



LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Alternator (1)	Multimeter	a. Set multimeter to 0-50 Vdc scale.	
		b. Connect meter between positive terminal (2) and negative terminal (3).	Engine not running during test setup.
		c. Observe voltage.	Voltage should be 22-26 Vdc.
		1. If voltage is correct, continue test.	Leave meter connected for next test.
		2. If voltage is not correct, check battery cables and batteries.	Para 4-21 and 4-22 TM 5-6115-598-12.

4-7. 24-VOLT ALTERNATOR (cont)

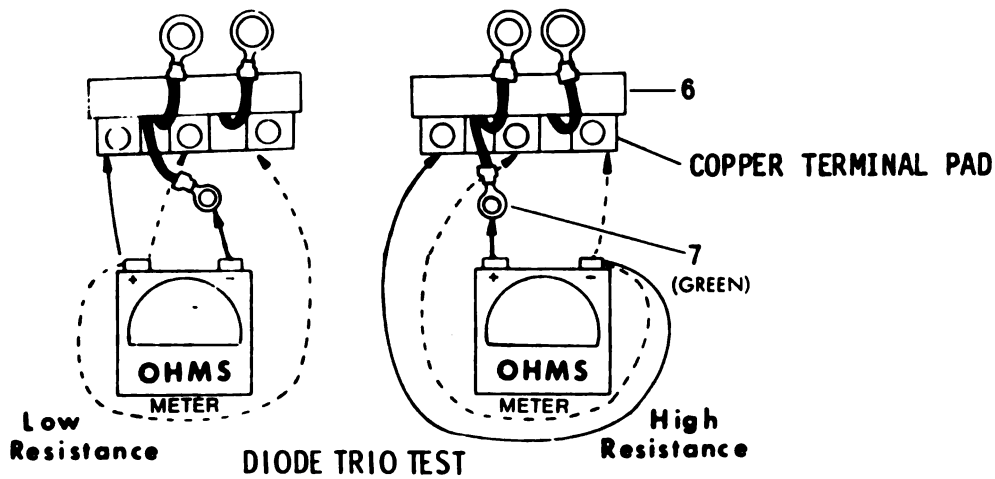


LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. Brush holder housing (5)	a. Sealing tape	Remove.	
	b. Safety wire	Insert in access hole.	A 1-1/2 inch (38.0 mm) long piece of safety wire may be used to short the brush assembly.
	c. Jumper cable	Connect between safety wire and alternator negative terminal (3).	
	d. Engine	Start.	Para 2-2 and 2-3 TM 5-6115-598-12.

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. Brush holder housing (5) (cont)	e. Multimeter	Observe output voltage. 1. If voltage remains the same, the alternator is at fault. Remove and repair alternator. 2. If voltage increases 2 or more volts, the diode trio and/or regulator is at fault. Continue test procedure.	
	f. Engine	Shutdown.	Para 2-7, TM 5-6115-598-12
	g. Multimeter, jumper cable, and safety wire	Remove.	
	h. Batteries	Disarm.	Para 4-21, TM 5-6115-598-12

NOTE

The diode trio assembly must be tested after removal from alternator, due to internal rectifier circuits.

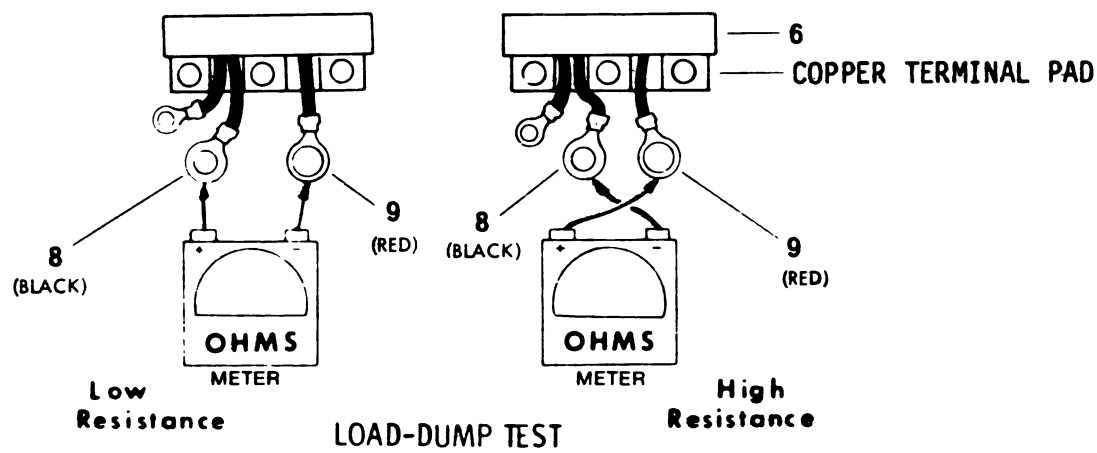


DIODE TRIO TEST

18802

4-7. 24-VOLT ALTERNATOR (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
3. Diode trio assy (6)		Remove.	Refer to steps 4,5,6,8,9, and 10
	Multimeter	a. Set multimeter to RX1 scale.	
		b. Connect meter negative lead to diode trio output lead (7).	
		c. Touch meter positive lead momentarily to each of the 3 copper terminal pads.	Resistance should be less than 100 ohms.
		d. Connect meter positive lead to diode trio output lead (7).	

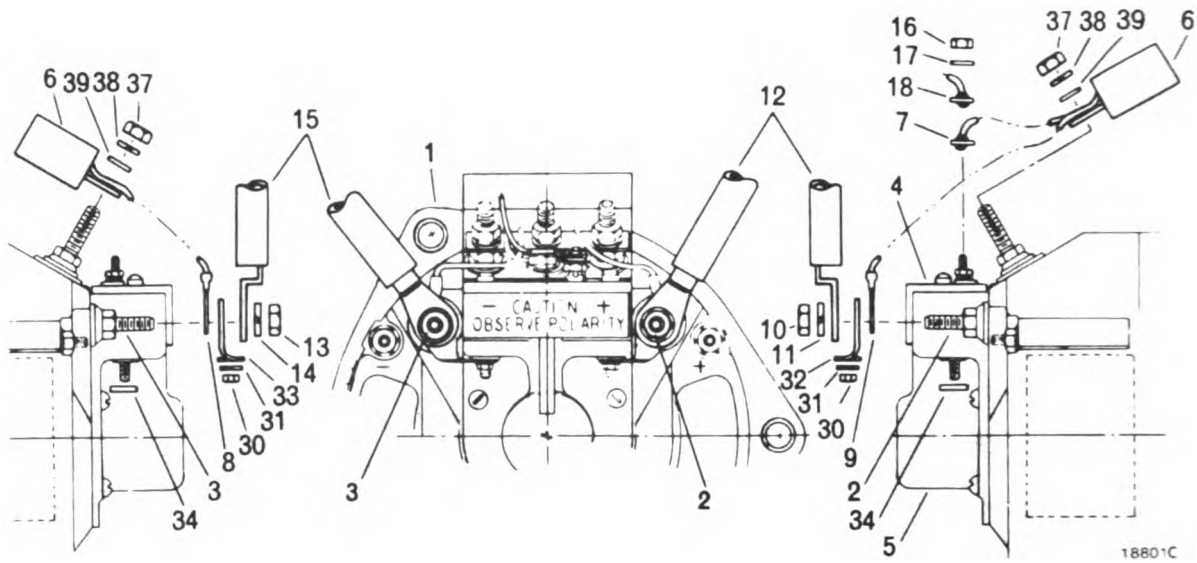


LOAD-DUMP TEST

18802

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
3. Diode trio assy (6) (cont)		e. Touch meter negative lead momentarily to each of the 3 copper terminal pads.	Resistance should be greater than 50,000 ohms.
		f. Connect multimeter positive lead to diode trio negative lead (8).	
		g. Connect multimeter negative lead to diode trio positive lead (9).	Resistance should be less than 60 ohms.
		h. Connect multimeter negative lead to diode trio negative lead (8).	
		i. Connect multimeter positive lead to diode trio positive lead (9).	Resistance should be greater than 50,000 ohms.
		1. If the diode trio is normal, replace the regulator.	
		2. If the diode trio is at fault, replace the diode trio and repeat step 2.	

4-7. 24-VOLT ALTERNATOR (cont)



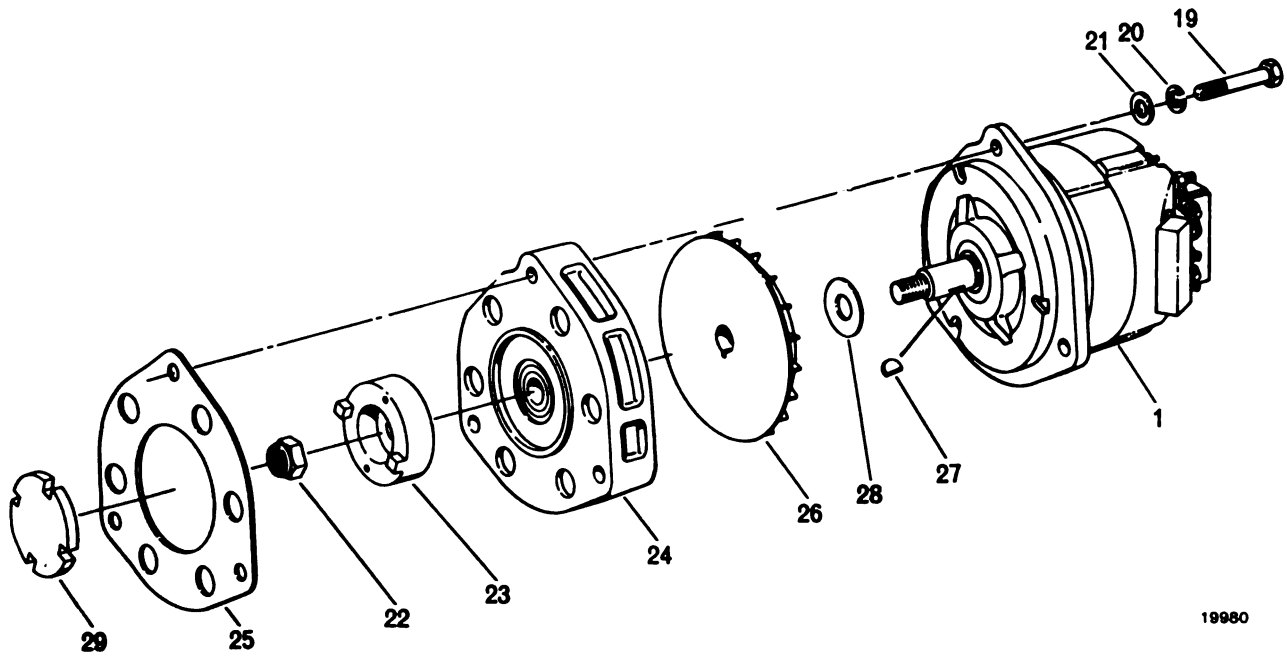
LOCATION	ITEM	ACTION	REMARKS

REMOVAL

CAUTION

Engine-generator connection is directly under 24 volt alternator. Connection area is open and screened for ventilation. A cloth should be placed over opening to prevent alternator fastening hardware from falling through screen.

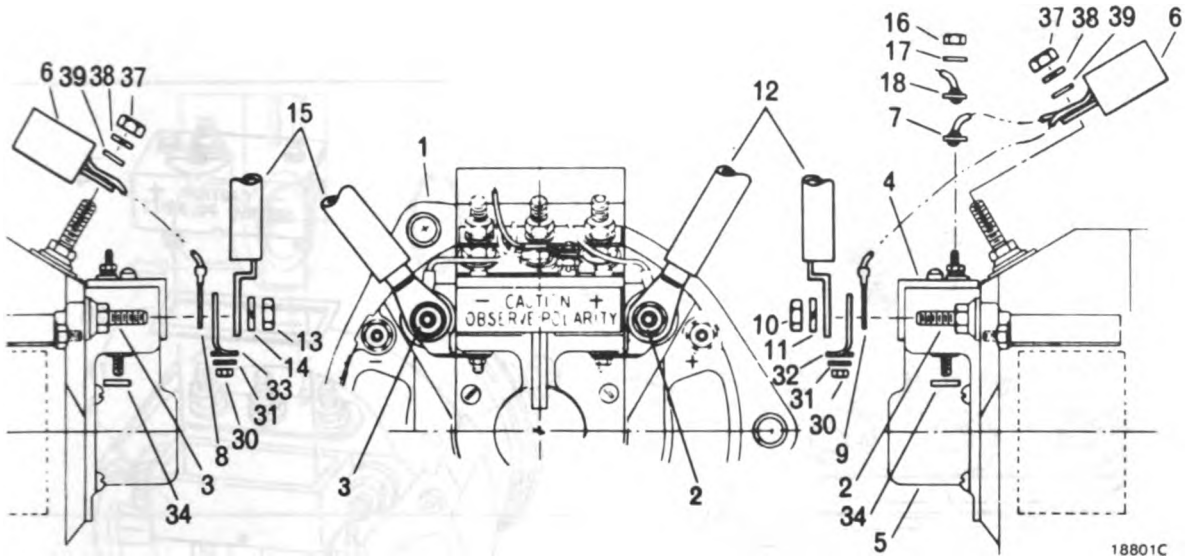
4. Alternator positive terminal (2)	Nut (10), lockwasher (11), and positive battery lead (12)	Remove, tag, and identify lead.	
5. Alternator negative terminal (3)	Nut (13), lockwasher (14), and negative battery lead (15)	Remove, tag, and identify lead.	
6. Regulator (4)	Nut (16), lockwasher (17), charging light lead (18), and diode trio lead (7)	Remove, tag, and identify leads.	



LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
7. Alternator and drive assy (1)	a. 3 bolts (19), lock washers (20), and flat washers (21)	a. Remove and discard lock washers. b. Move alternator assy to suitable work area.	Support alternator during bolt removal.
	b. Drive coupling holder tool	Position on drive hub (23).	
	c. Locknut (22)	Remove.	
	d. Drive coupling puller tool	Install on drive hub (23).	
	e. Drive hub (23)	Remove.	
	f. Fan guard assy (24)	Remove.	
	g. Gasket (25)	Remove and discard.	
	h. Fan (26), woodruff key (27), and spacer (28)	Remove.	

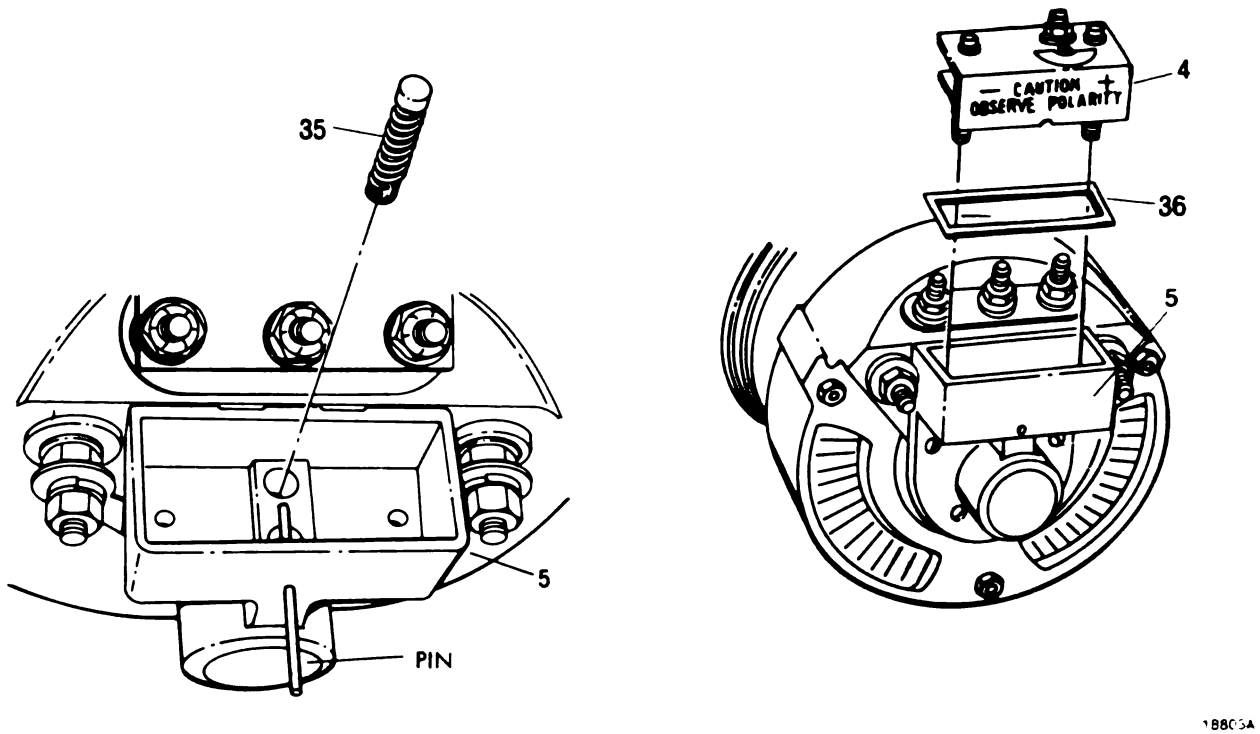
4-7. 24-VOLT ALTERNATOR (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR			
		WARNING ● Dry cleaning solvent is flammable and gives off poisonous vapors. Use only in a well ventilated area. Avoid prolonged breathing of vapors. Keep away from open flames. Do not use in excessive amounts. Failure to do this may result in injury to personnel and damage to equipment. ● Eye shields must be worn when using compressed air. Eye injury can occur if eye shields are not used.	
8. Alternator assy (1)		a. Clean exterior surfaces with a rag dipped in dry cleaning solvent. b. Dry off thoroughly with compressed air.	
9. Brush holder housing (5)	a. 2 nuts (30) and lock washers (31)	a. Apply solvent to nuts. b. Remove.	Use solvent.
	b. Regulator (4)	Slowly lift from housing.	
	c. Regulator jumpers (32) and (33)	Remove.	
	d. 2 sealing washers (34)	Remove.	

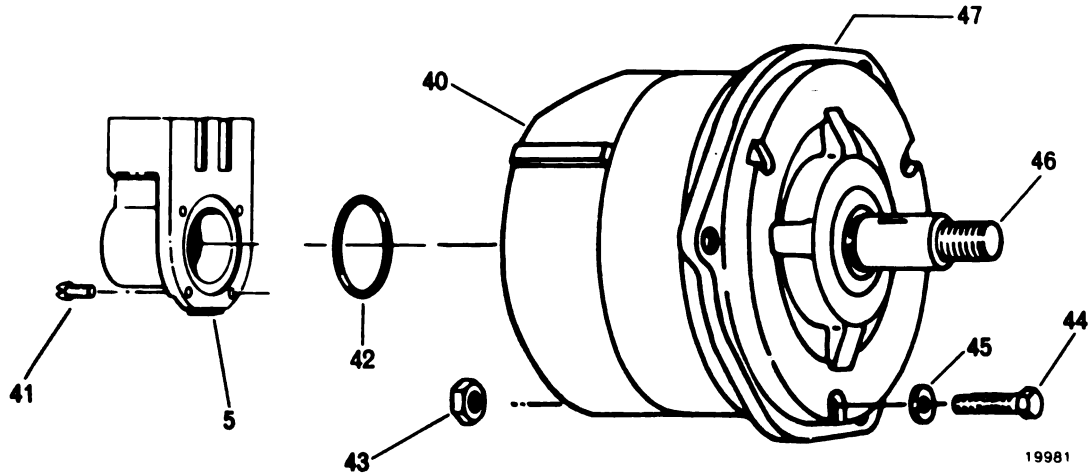


LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
9. Brush holder housing (5) (cont)	e. 2 brushes (35)	a. Remove. b. Inspect as follows: 1. Check brush condition. Replace brush if springs are broken or burned. 2. Measure carbon length at shortest dimension. Replace if worn to less than 1/4 in. (6.5 mm) in length.	
	f. Gasket (36)	Remove and discard.	

4-7. 24-VOLT ALTERNATOR (cont)

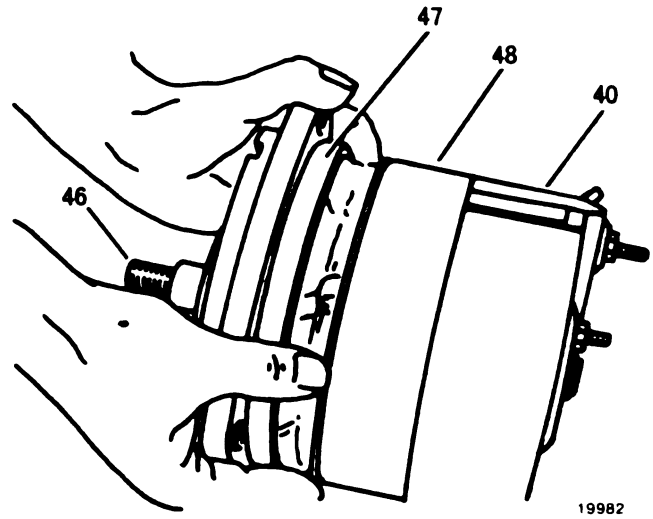


LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
10. Diode Trio (6)	a. Leads (8 and 9)	Remove from terminals.	
	b. 3 nuts (37), lockwashers (38), and guard washers (39)	Remove.	
	c. Diode trio	Remove and test.	Test per step 3.



LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
11. Slip ring end housing (40)	a. 4 screws (41) and brush holder housing (5)	Remove.	
	b. Seal ring (42)	Remove and discard.	
	CAUTION Be sure that drive end housing separates from stator and that stator remains attached to the slip ring end housing to avoid damage to the stator leads.		
12. Alternator assy (1)	a. 3 locknuts (43), screws (44), and guard washers (45)	Remove.	
	b. Rotor (46) and drive end housing assembly (47)	Remove rotor and drive end housing assembly as a unit from the stator (48) and slip ring end housing assembly (40).	If the drive end housing binds on the stator, loosen by tapping gently on mounting ear with a plastic face hammer.

4-7. 24-VOLT ALTERNATOR (cont)



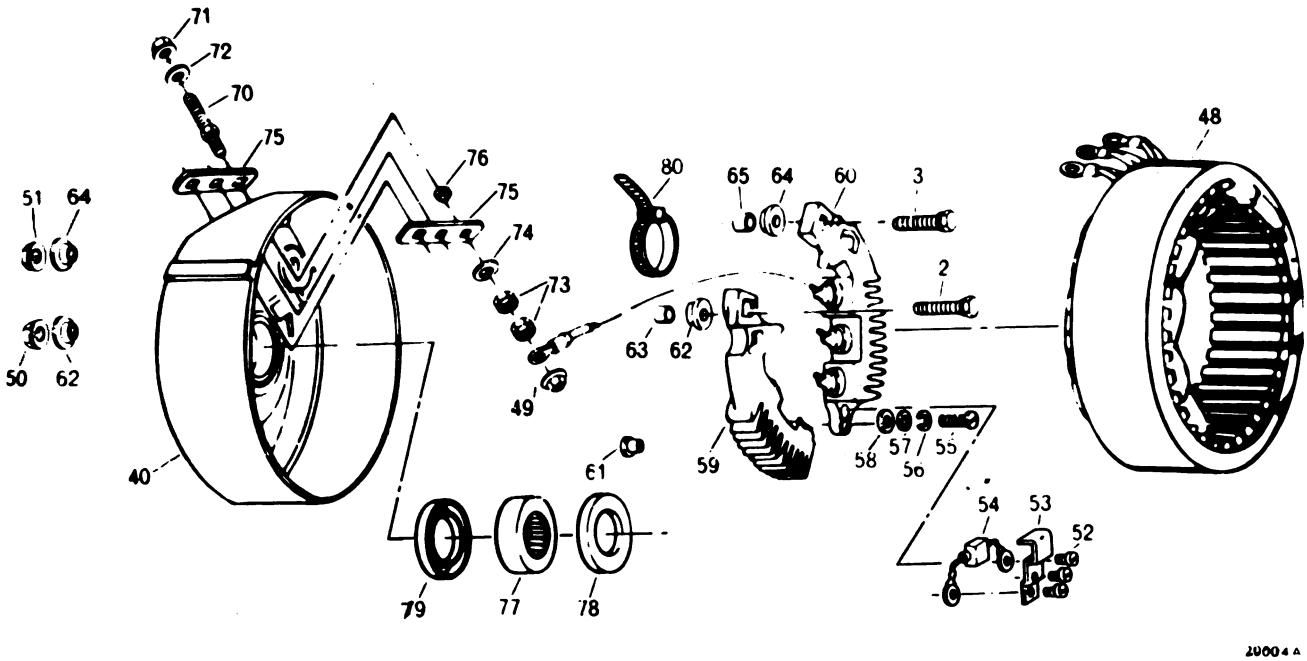
LOCATION	ITEM	ACTION	REMARKS

REPAIR (cont)

NOTE

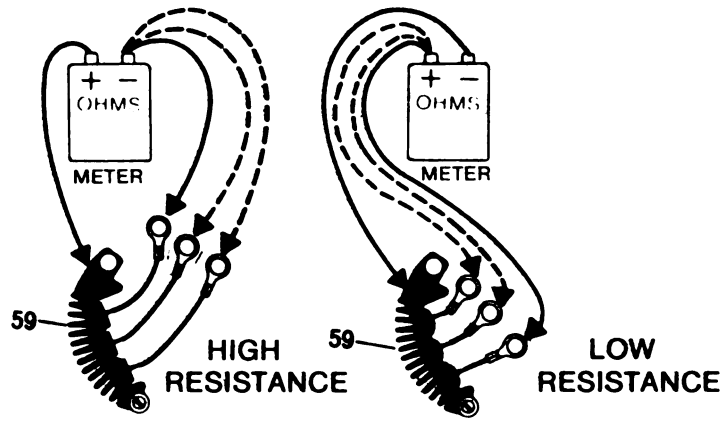
Diode testing of the positive and negative rectifier assembly may be performed without removal from the housing. The stator and diode trio must be removed and the capacitor must be disconnected before test.

13. Slip ring end housing (40)	a. 3 nuts (49), stator leads and stator assy (48)	Remove.	Tag Leads.
	b. Nut (50) and positive terminal screw (2)	Remove.	
	c. Nut (51) and negative terminal screw (3)	Remove.	
	d. 3 screws (52), clamp (53) and capacitor assembly (54)	Remove.	



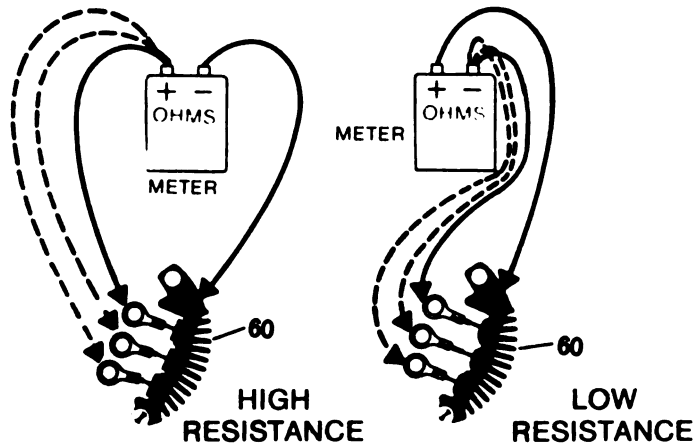
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
13. Slip ring end housing (40) (cont)	e. 2 screws (55), lock washers (56), guard washers (57), and insulation washers (58)	Remove and discard lock washers.	
	f. positive rectifier assy (59) and negative rectifier assy (60)	Remove.	
	g. 2 insulation bushings (61) and tiedown strap (80)	Remove and discard tiedown strap.	Identify bushings for correct reassembly.
	h. 2 insulation bushings (62) and insulation bushing (63)	Remove.	Identify bushings for correct reassembly.

4-7. 24-VOLT ALTERNATOR (cont)



POSITIVE RECTIFIER TEST 20005

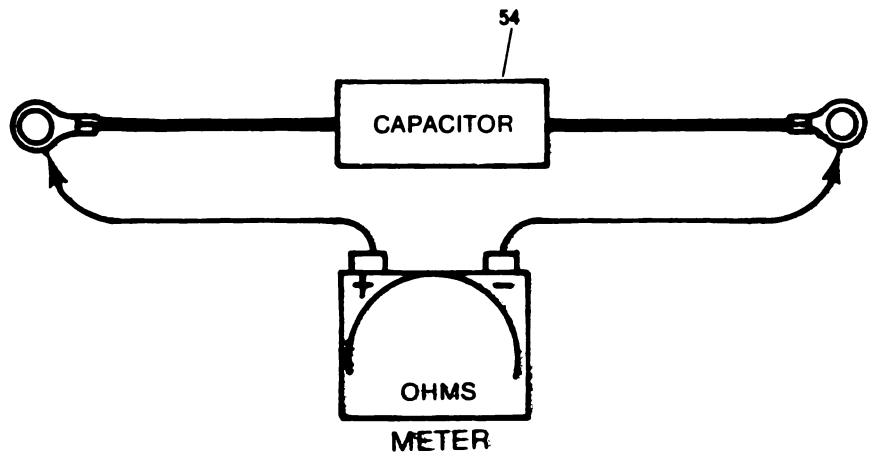
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
13. Slip ring end housing (40) (cont)	i. 2 insulation bushings (64) and insulation bushing (65)	Remove.	Identify bushings for correct reassembly.
14. Positive rectifier assy (59)	Multimeter	a. Set multimeter on RX1 scale.	
		b. Connect multimeter positive lead to rectifier assy.	
		c. Touch multimeter negative lead to each of the three diode lead terminals.	Resistance should be greater than 50,000 ohms.
		d. Connect multimeter negative lead to rectifier assy.	



NEGATIVE RECTIFIER TEST 20005

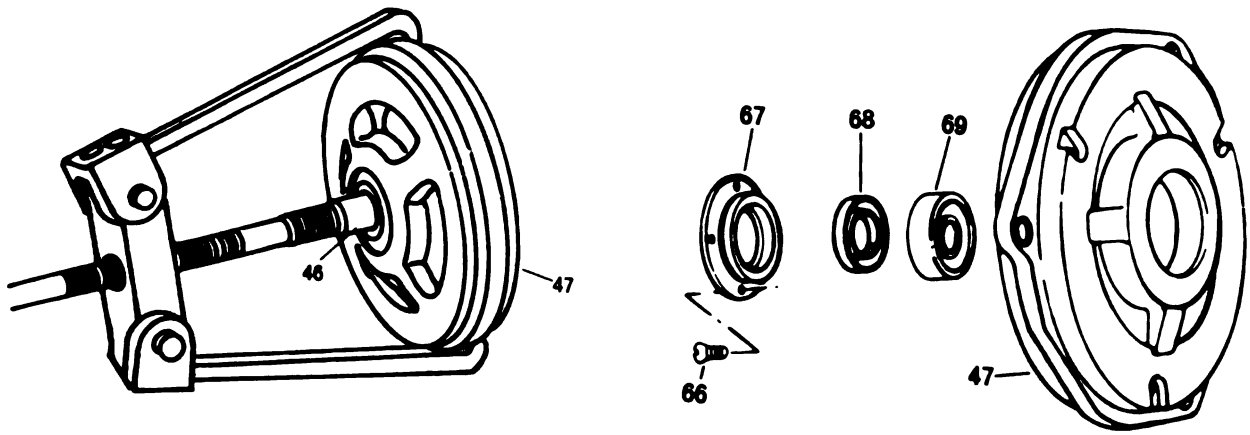
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
14. Positive rectifier assy (59) (cont)		e. Touch multimeter positive lead to each of the three diode lead terminals.	Resistance should be less than 100 ohms.
		f. If readings are not correct, replace rectifier assy.	
15. Negative rectifier assy (60)	Multimeter	a. Set multimeter on RX1 scale.	
		b. Connect multimeter negative lead to rectifier assy.	
		c. Touch multimeter positive lead to each of the three diode lead terminals.	Resistance should be greater than 50,000 ohms.
		d. Connect multimeter positive lead to rectifier assembly.	

4-7. 24-VOLT ALTERNATOR (cont)



CAPACITOR TEST 20006

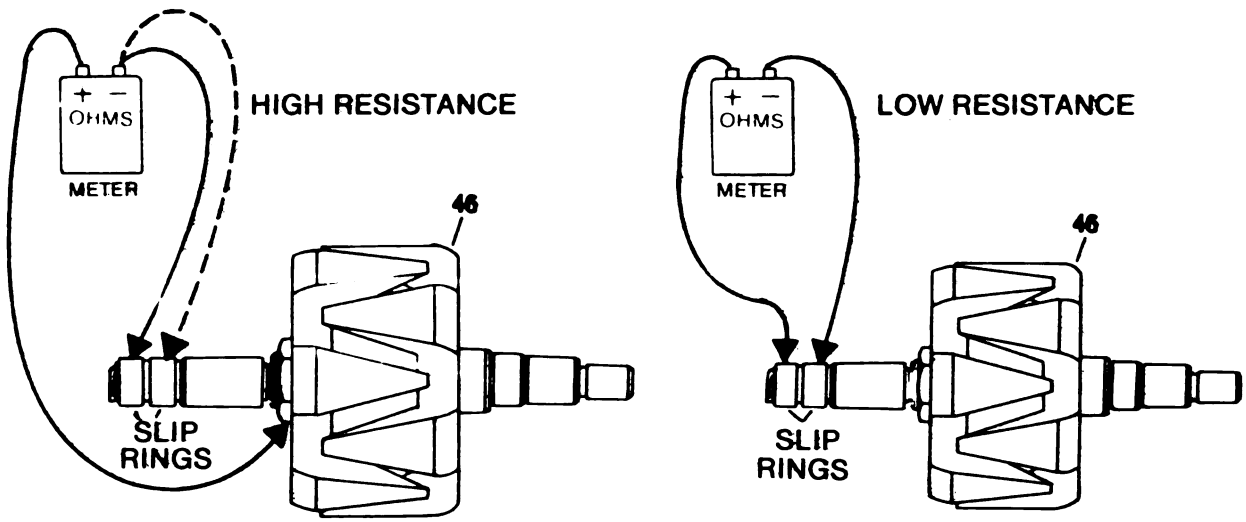
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
15. Negative rectifier assy (60) (cont)		e. Touch multimeter negative lead to each of the three diode lead terminals.	Resistance should be less than 100 ohms.
		f. If readings are not correct, replace rectifier assy.	
16. Capacitor (54)	Multimeter	a. Set multimeter on RX1 scale.	
		b. Connect multimeter positive and negative leads to each of the capacitor leads.	Resistance should be greater than 100,000 ohms.



20007. 20008

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
16. Capacitor (54) (cont)		c. If resistance is not correct, replace capicator.	
17. Rotor (46) and drive end housing (47)	Puller assy	Remove drive end housing.	
18. Drive end housing (47)	a. 4 screws (66)	Remove.	
	b. Bearing retainer (67) and seal assy (68)	Remove.	
	c. Seal assy (68)	Press out of bearing retainer (67) and discard.	
	d. Bearing (69)	Press out of housing (47).	

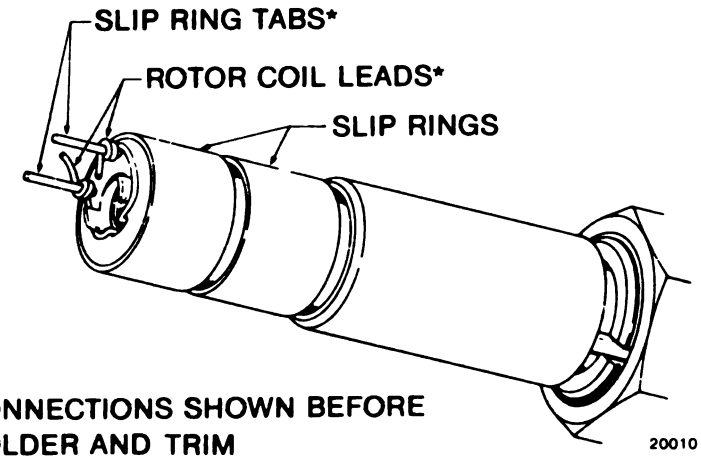
4-7. 24-VOLT ALTERNATOR (cont)



ROTOR COIL GROUND TEST

ROTOR COIL RESISTANCE TEST 20009

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
19. Rotor assy (46)	Multimeter	a. Set multimeter on RX1 scale.	
		b. Connect multimeter positive lead to rotor coil nut.	
		c. Connect multimeter negative lead momentarily to each of the two slip rings.	Resistance should be greater than 50,000 ohms.
		d. Connect multimeter positive lead to one slip ring and negative lead to the other slip ring.	Resistance should be 12.5 to 13.8 ohms.



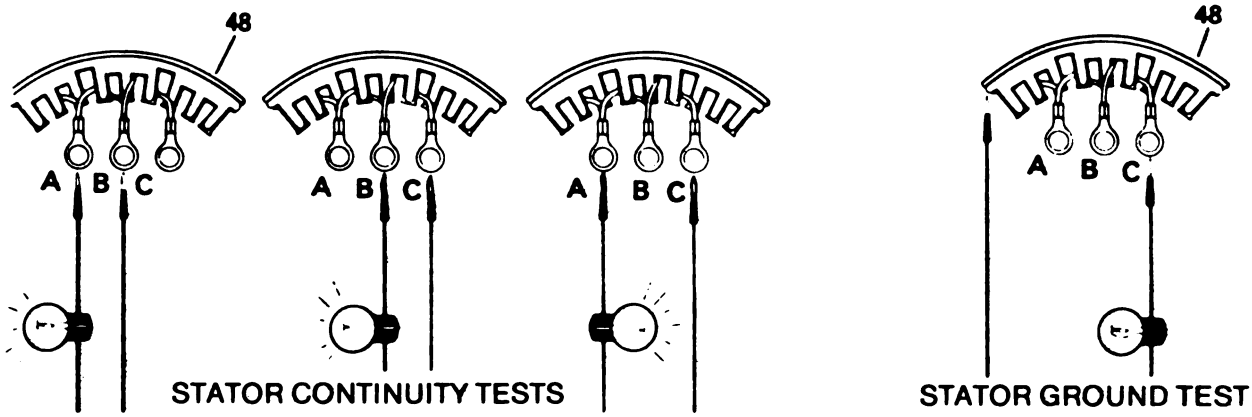
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
19. Rotor assy (46) (cont)		e. Check the two slip ring lead solder connections if high resistance (open coil) is indicated.	

WARNING

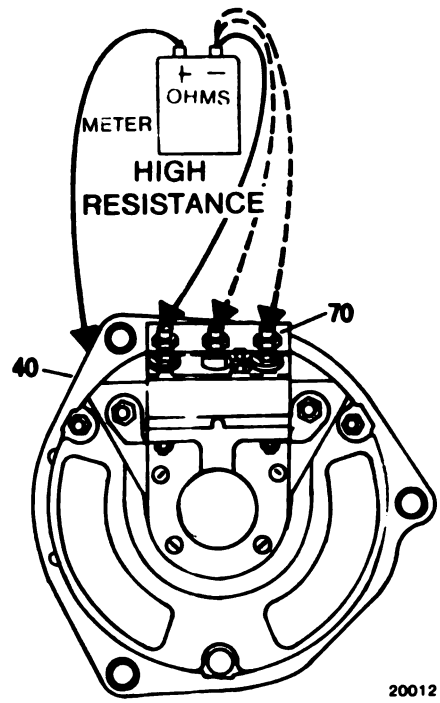
Use care when using soldering equipment. Severe burns could result from improper use of equipment.

		f. Solder slip ring connections as required.	
		g. Repeat coil resistance test per step d.	
		h. Replace rotor assy if resistance is not correct.	

4-7. 24-VOLT ALTERNATOR (cont)

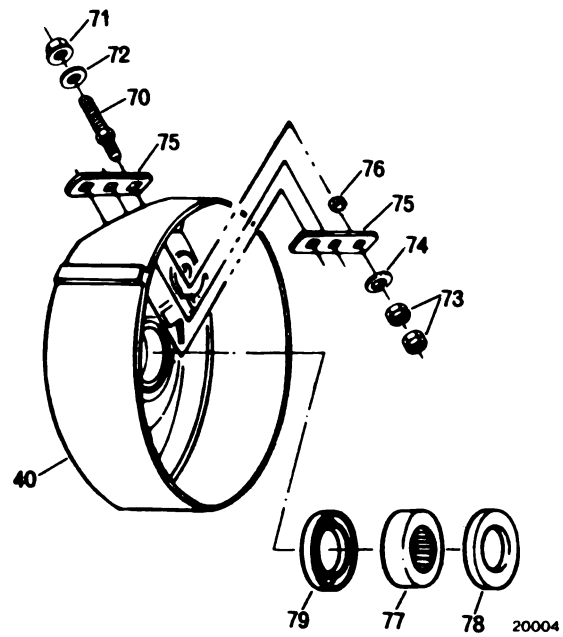


LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
		NOTE Extremely low resistance of the stator windings requires that a 110/220 volt test lamp be used for ground checks and continuity testing between phases.	
20. Stator assy (48)		Examine the stator for signs of overheating and charred insulation.	Replace stator if overheat is indicated regardless of test results.
	Test lamp	a. Connect test lamp between stator leads A-B, B-C and A-C.	Lamp should light on all three tests.

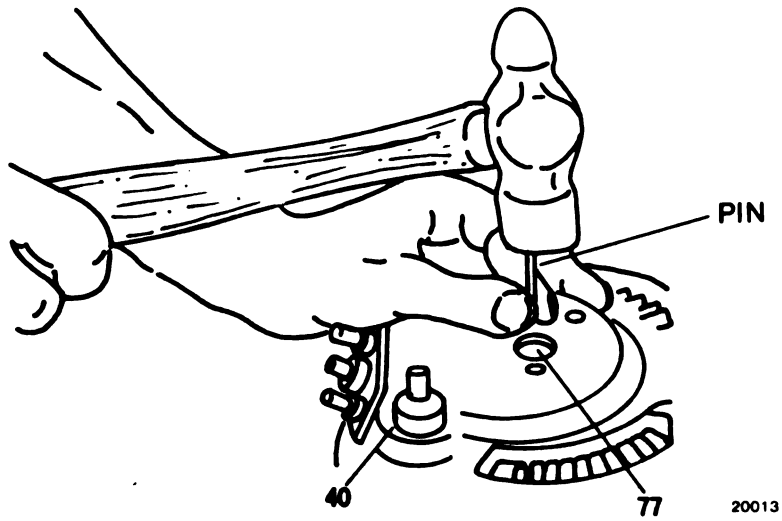


LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
20. Stator assy (48) (cont)		b. Connect test lamp between stator case and each of the three leads A,B and C.	Lamp should not light on any of the three leads.
		c. Replace stator assembly if it does not pass continuity or ground tests.	
21. Slip ring end housing assy (40)	a. Multimeter	a. Set multimeter on RX1 scale.	
		b. Connect multimeter positive lead to slip ring end housing.	

4-7. 24-VOLT ALTERNATOR (cont)

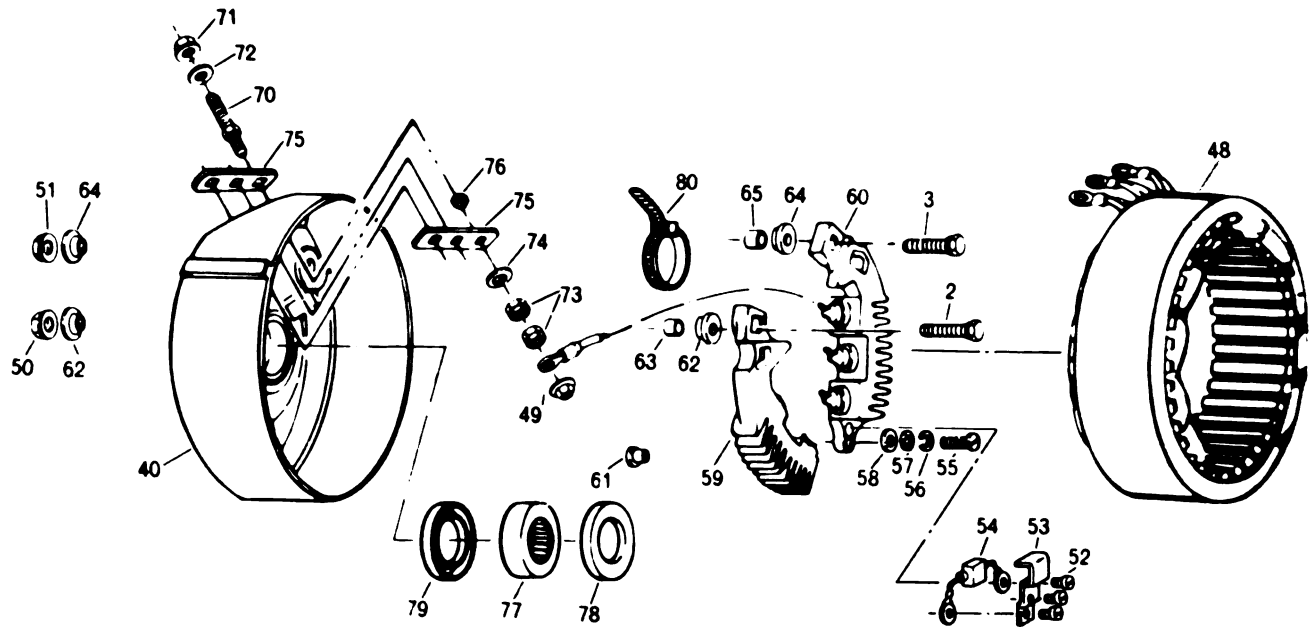


LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
21. Slip ring end housing assy (40) (cont)		c. Touch multimeter negative lead to each of the three terminals studs (70).	Resistance should be greater than 50,000 ohms
		d. If there is low resistance replace terminal studs and insulators.	
	b. 3 nuts (71), 3 lock washers (72), 6 nuts (73), 3 guard washers (74), 3 terminal studs (70), 2 insulators (75), and 3 insulation bushings (76)	Remove.	



LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
21. Slip ring end housing assy (40) (cont)	c. Roller bearing (77)	a. Inspect for overheating and damage.	
		b. Replace only if required.	
	d. Inner oil seal (78)	Remove.	
	e. Roller bearing (77)	Remove.	Use standard puller and pull inward.
	f. Final oil seal (79)	a. Remove only if damaged.	Use two 0.125 inch (0.32mm) diameter pins inserted in housing clearance holes and tap seal inward.
		b. Press new seal into housing.	Seal metal lip should fully contact housing.

4-7. 24-VOLT ALTERNATOR (cont)



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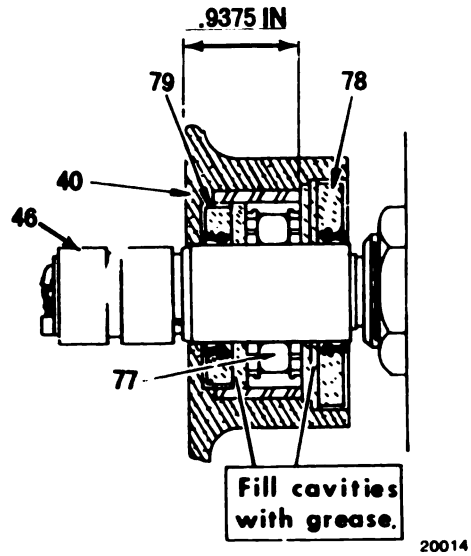
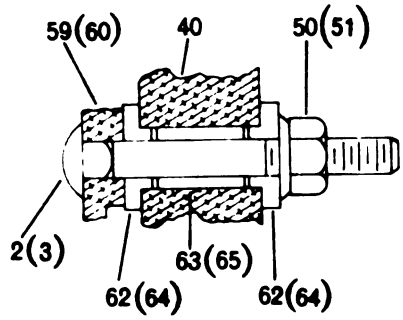
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
21. Slip ring end housing assy (40) (cont)		c. Fill the seal cavity with grease.	
	g. Roller bearing (77)	a. Fill new bearing with grease.	The bearing must have a minimum of 50% grease fill within the void of the outer race, case, and roller assembly.
		b. Press bearing into housing to 0.9375 inch (23.8 mm) dimension.	

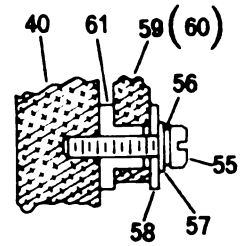


LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
21. Slip ring end housing assy (40) (cont)	h. Inner oil seal (78)	a. Fill the seal cavity with grease.	
		b. Press seal into housing.	Seal metal lip is toward the inside of the housing.
	i. 3 insulation bushings (76), 2 insulators (75), 3 terminal studs (70), 3 guard washers (74), 6 nuts (73), 3 lock washers (72), and 3 nuts (71)	Install and tighten nuts.	
	NOTE Be sure mating surfaces on rectifiers, terminals and terminal bolts are clean and free of paint to insure good electrical connection.		
22. Positive rectifier assy (59)	a. Insulation bushing (61)	Install.	
	b. Positive terminal screw (2)	Install.	

4-7. 24-VOLT ALTERNATOR (cont)

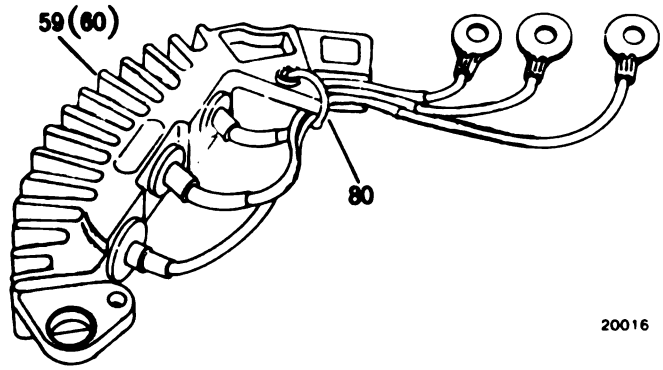


RECTIFIER TERMINAL MOUNT



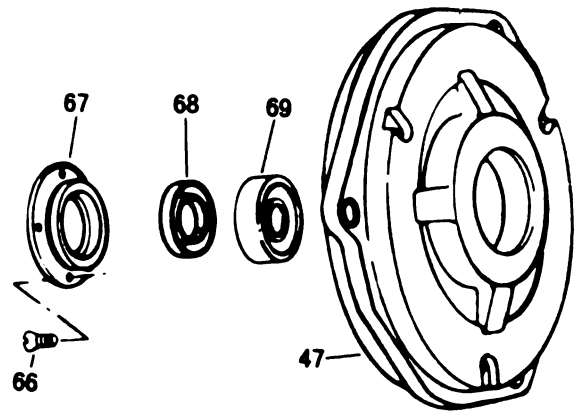
RECTIFIER LOWER MOUNT

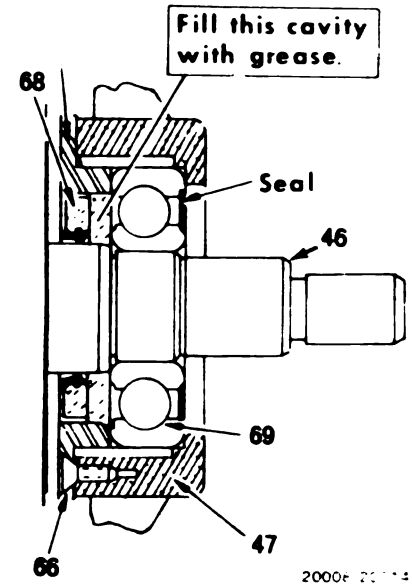
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
22. Positive rectifier assy (59) (cont)	c. 2 insulation bushings (62) and (63)	Install.	
	d. Rectifier assy (59)	Position on end housing (40).	
	e. Insulation washer (58), guard washer (57), new lock washer (56), and screw (55)	Install and tighten screw.	
	f. Insulation bushing (62) and nut (50)	Install and tighten nut.	
	g. Rectifier assy (59)	Remove tags. Route leads and position on terminal studs (70).	
	h. New tiedown strap (80)	a. Secure leads with tie through hole in rectifier.	
		b. Cut off excessive tie.	



LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
23. Negative rectifier assy (60)	a. Insulation bushing (61)	Install.	
	b. Negative terminal screw (3)	Install.	
	c. 2 insulation bushings (64) and (65)	Install.	
	d. Rectifier assy (60)	Position on end housing (40).	
	e. Insulation washer (58), guard washer (57), new lock washer (56), and screw (55)	Install and tighten screw.	
	f. Insulation bushing (64) and nut (51)	Install and tighten nut.	
	g. Rectifier assy (60)	Remove tags. Route leads and position-on terminal studs (70).	
	h. New tiedown strap (80)	a. Secure leads with tie through hole in rectifier.	
		b. Cut off excessive tie.	

4-7. 24-VOLT ALTERNATOR (cont)

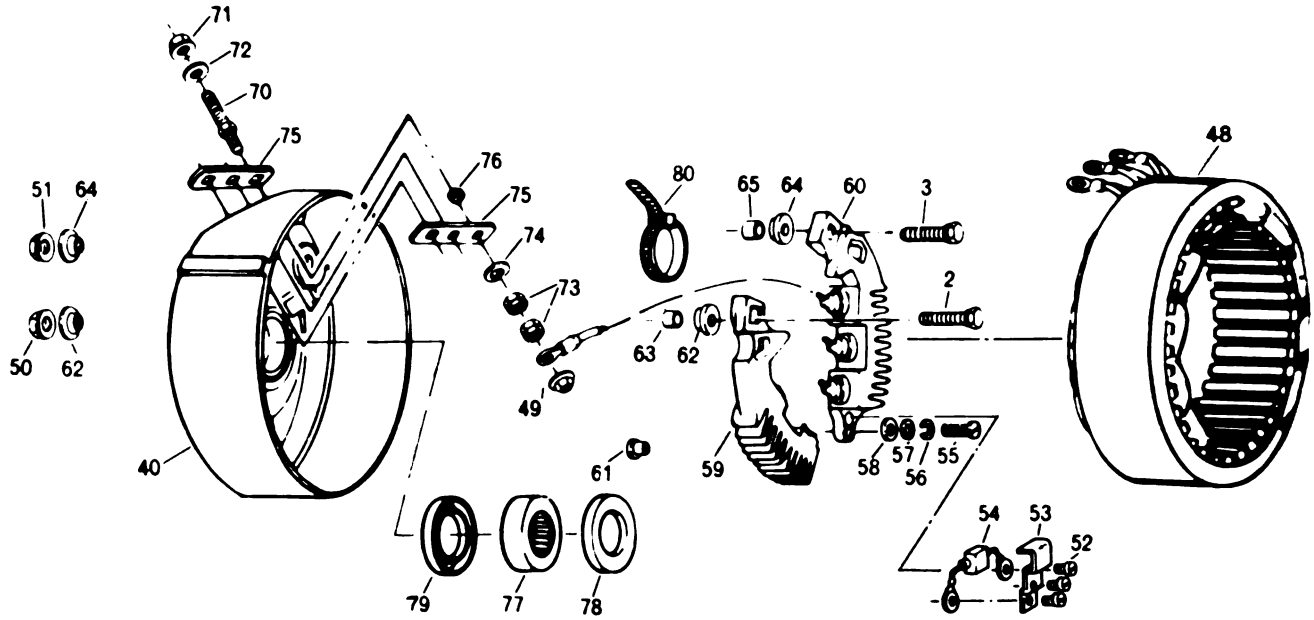




LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
24. Slip ring end housing assy (40)	a. Capacitor assy (54) and clamp (53)	Position on housing.	
	b. 3 screws (52)	Install and tighten.	
25. Drive end housing (47)	a. Bearing (69)	Press bearing into housing with seal facing outward.	Pressure should be applied to outer race to prevent damage.
	b. New seal assy (68)	a. Press into bearing retainer (67). b. Fill seal cavity with grease.	
	c. Retainer (67) and seal (68)	Install in drive end housing (47).	
	d. 4 screws (66)	Install and tighten.	

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
25. Drive end housing (47) (cont)	e. Bearing seal (68)	Lubricate seal lip with grease.	
	f. Rotor assy (46)	Press bearing and housing on rotor shaft.	Use a sleeve around shaft to exert force on bearing inner race.
26. Stator assy (48)	a. End windings	a. Inspect for exposed wires. b. Paint as required. c. Wipe excess paint from inside diameter.	
	b. Slip ring end housing assy (40)	Position on stator assy.	
	c. 3 screws (44)	Temporarily install in housing to align stator.	
	d. 3 stator leads	Remove tags and position on terminals (70).	
27. Slip ring end housing (40)	a. 3 nuts (49)	Install and tighten.	
	b. Oil seal (78)	Mask seal area.	
	c. 3 terminals (70)	Spray paint all leads and connections.	
	d. Oil seals (78 and 79)	a. Remove masking. b. Lubricate seal lips with grease.	

4-7. 24-VOLT ALTERNATOR (cont)



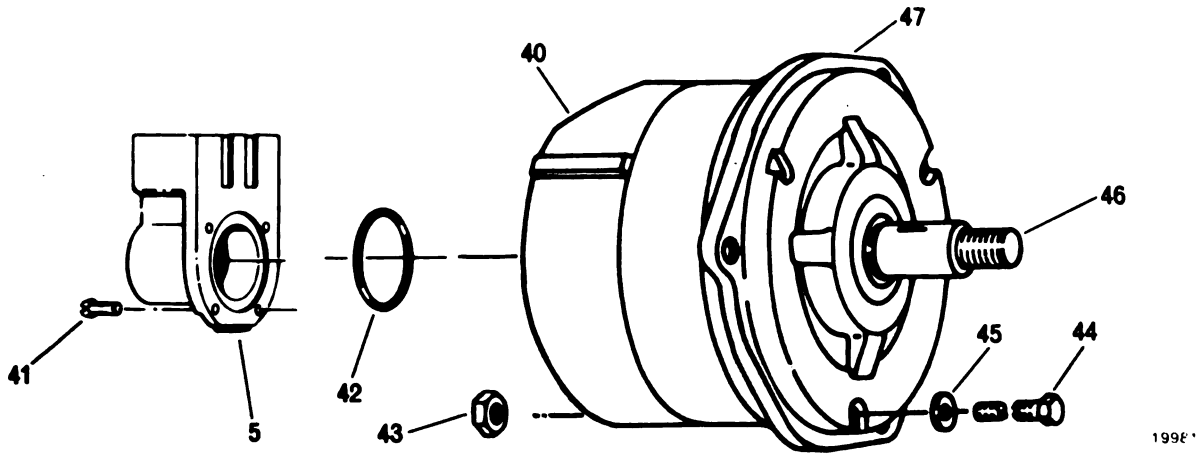
LOCATION	ITEM	ACTION	REMARKS

REPAIR (cont)

CAUTION

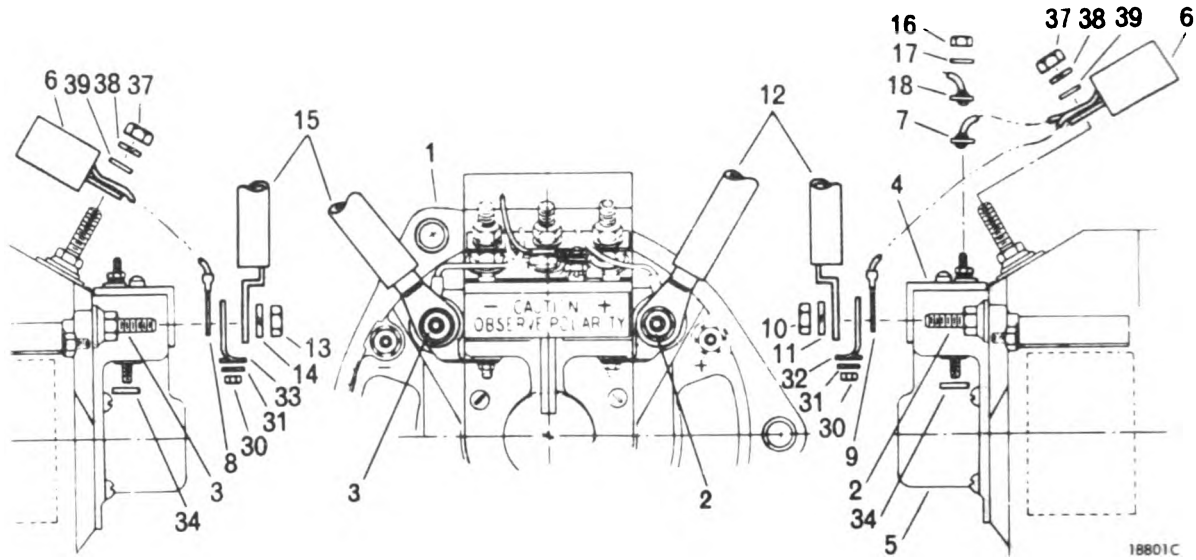
Protect slip ring surfaces from damage while installing slip ring end housing (40) and stator (48) on rotor and drive end housing.

28. Rotor (46) and drive end housing (47)	a. Slip ring end housing (40)	Mask.	Use tape.
	b. Slip ring end housing (40) and stator (48)	Install on rotor and drive end assy.	
	c. 3 screws (44)	Remove.	
	d. Slip ring end housing (40)	Remove masking.	Ensure that all adhesive material is removed from slip ring surfaces.

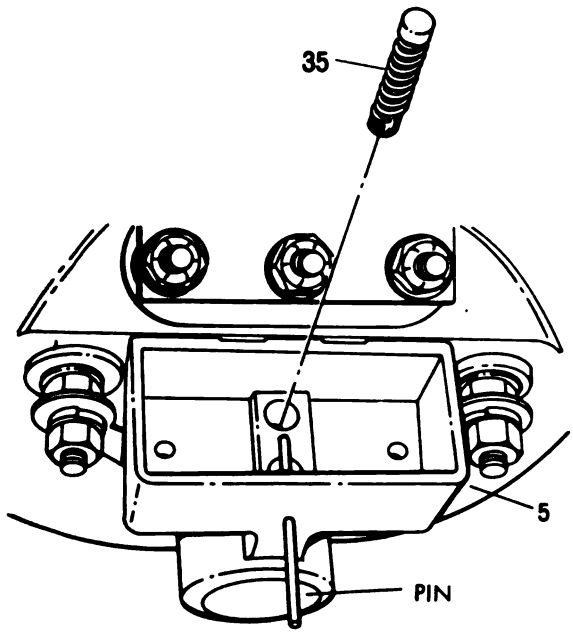


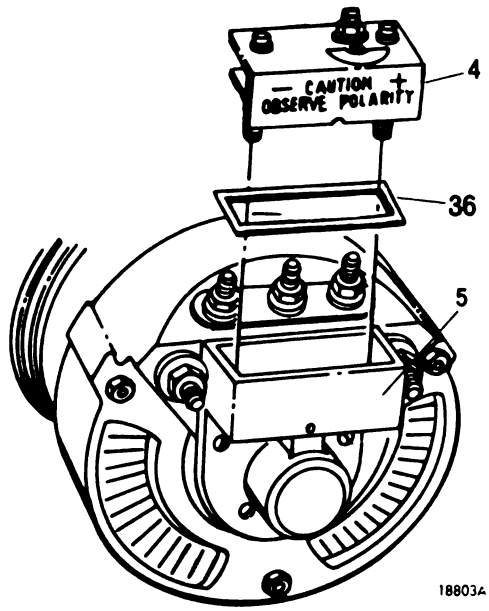
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
29. Slip ring end housing assy (40)	a. 3 guard washers (45), screws (44), and locknuts (43)	Install and tighten nuts.	Torque to 50-60 lb. in. (6-7 N.m.).
	b. Brush holder housing (5)	a. Clean mating face.	Use cleaner.
		b. Seal small hole in mating face with tape.	
	c. New seal ring (42)	Install.	
	d. Brush holder housing (5)	Position on slip ring end housing (40).	
	e. 4 screws (41)	a. Apply adhesive to threads.	Use sealant.
	f. Diode trio (6)	b. Install and tighten.	
		Position on terminals (70) with copper strips facing alternator.	

4-7. 24-VOLT ALTERNATOR (cont)



LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
29. Slip ring end housing assy (40) (cont)	g. 3 guard washers (39), lockwashers (38), and nuts (37)	Install and tighten.	
	h. Negative lead (8), and regulator jumper (33)	a. Remove tags. b. Clean mating surfaces. c. Position on terminal (3).	
	i. Positive lead (9) and regulator jumper (32)	a. Remove tags. b. Clean mating surfaces. c. Position on terminal (2).	





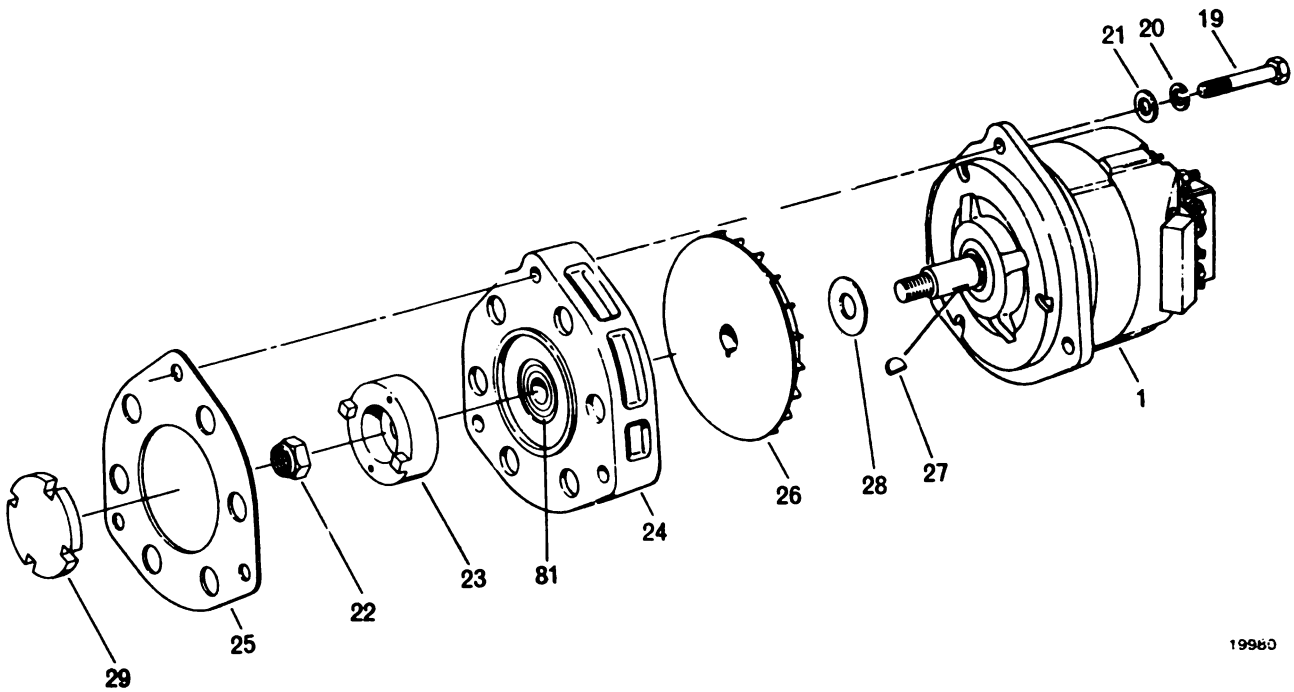
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
30. Brush holder housing (5)	a. Outer brush (35)	a. Insert in housing.	
		b. Compress spring.	Use small screw. driver.
	b. Brush pin	Insert pin through hole in housing to retain brush.	Pin can be made from a short piece of safety wire.
	c. Inner brush (35)	a. Insert in housing.	
		b. Compress spring.	
	d. Brush pin	Push pin further into housing to retain brush.	
	e. New gasket (36)	Position on regulator (4).	

4-7. 24-VOLT ALTERNATOR (cont)

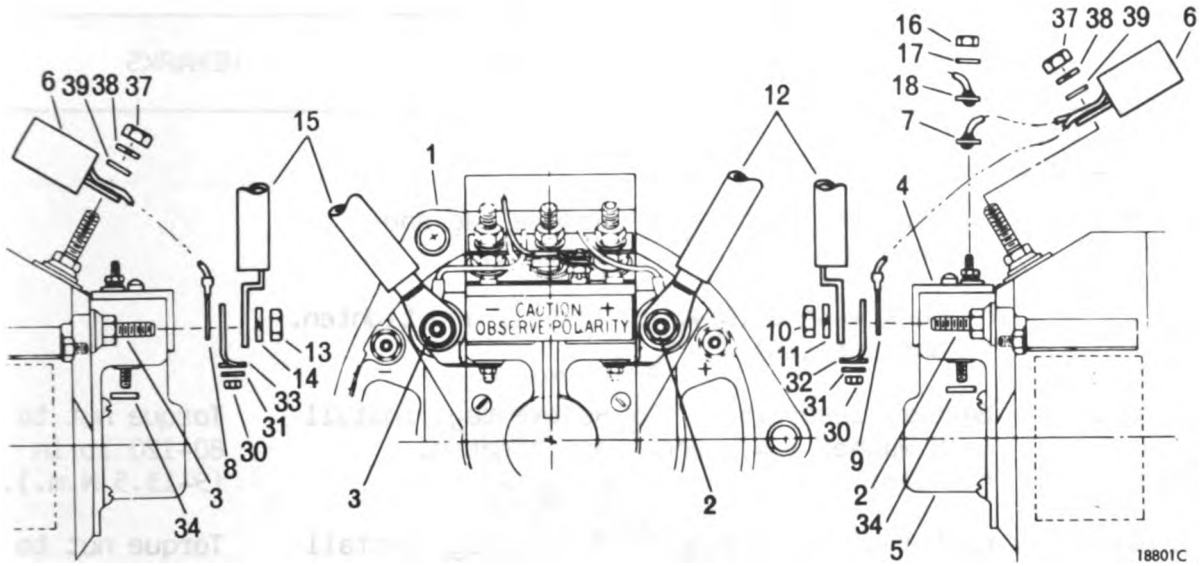
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
30. Brush holder housing (5) (cont)	f. Regulator (4)	Carefully push into housing.	
	g. 2 sealing washers (34) and regulator jumpers (32 and 33)	Install on regulator terminals.	
	CAUTION Do not tighten regulator nuts with brush pin in place as damage to the regulator will result.		
	h. 2 lockwashers (31) and nuts (30)	Install and tighten nuts only finger tight.	
	i. Brush pin	Remove.	
	j. 2 nuts (30)	a. Tighten.	
		b. Seal.	Use sealant.
	k. Diode trio lead (7)	Remove tag and position on regulator terminal.	
	l. Lockwasher (17) and nut (16)	Install and finger tighten.	
	m. Tape	Cover brush access hole	Use tape.
31. Alternator assy (1)		a. Clean per step 8.	
		b. Mask all terminals, identification and instruction tags and the drive end mating face.	Use tape.

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
31. Alternator assy (1) (cont)		c. Spray paint.	
		d. Remove masking.	
32. Engine drive adapter	Alternator drive coupling (29)	a. Inspect for damage at slots.	
		b. Replace if worn or cracked.	
33. Fan guard assy (24)	Lip seal (81)	a. Inspect seal for wear or damage.	
		b. If unserviceable, replace seal as follows:	
		1. Press out seal from housing fan side.	
		2. Press new seal into housing from engine side.	Seal metal flange is toward fan side.
INSTALLATION			
34. Alternator assy (1)	a. Spacer (28)	Install.	
	b. Woodruff key (27)	Install.	
	c. Fan (26)	Install.	
	d. Fan guard assy (24)	Position and align mounting holes.	

4-7. 24-VOLT ALTERNATOR (cont)



LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
34. Alternator assy (1) (cont)	e. Drive hub (23)	Position on shaft.	
	f. Drive coupling holder tool	Position on drive hub.	
	g. Locknut (22)	Install and tighten.	Torque nut to 70-80 lb ft (95-108 N.m.).
	h. New gasket (25)	Position gasket on fan guard assy.	



LOCATION	ITEM	ACTION	REMARKS

INSTALLATION (cont)

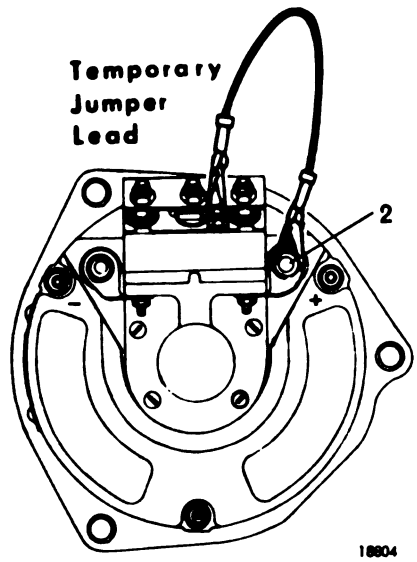
CAUTION

Engine-generator connection is directly under 24 volt alternator. Connection area is open and screened for ventilation. A cloth should be placed over opening to prevent alternator fastening hardware from falling through screen.

35. Alternator and drive assy	a. Drive hub (23)	Rotate hub to align tabs with slots in coupling (29).	
	b. Alternator and drive	Position on adapter and align mounting holes.	
	c. 3 flat washers (21), new lock washers (20), and bolts (19)	Install and tighten.	
36. Regulator (4)	a. Nut (16) and new lock wasner (17)	Remove.	

4-7. 24-VOLT ALTERNATOR (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
36. Regulator (4) (cont)	b. Charging light lead (18)	Remove tag and install.	
	c. Lock washer (17), and nut (16)	Install and tighten.	
37. Alternator negative terminal (3)	Battery lead (15), lock washer (14), and nut (13)	Remove tag, install and tighten.	Torque nut to 80-120 lb in (9-13.5 N.m.).
38. Alternator positive terminal (2)	Battery lead (12), lock washer (11), and nut (10)	Remove tag, install and tighten.	Torque nut to to 50-60 lb in (5.7-6.8 N.m.).
39. Batteries	Battery cables	Reconnect batteries.	Para 4-21 TM 5-6115-598-12.
40. Alternator positive terminal (2)	Jumper cable	a. Connect one end of jumper cable to terminal (2).	
		b. Momentarily touch to regulator output terminal.	Momentary contact "flashes" the field to restore residual magnetism which may be lost during servicing.
		c. Remove jumper cable.	
41. Alternator assy (1)		Test and adjust as required.	Para 4-24, TM 5-6115-598-12.



4-8. 275 AMPERE AVERAGE, 5000 AMPERE SURGE RECTIFIER

This task covers:

a. Test b. Removal c. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

Tool Kit, Master Mechanics
(5180-00-699-5273)
5-in. extension
3/8-dr ratchet handle
7/16 socket
1-in. combination wrench
7/16 combination wrench
Shop Equipment, Electrical Repair,
Semitrailer Mounted
(4940-00-294-9517)
1 1/4 open end wrench

Materials/Parts

Tags (item 24, appx B)

Personnel Required

Turbine Engine Driven Generator
Repairer MOS 52F

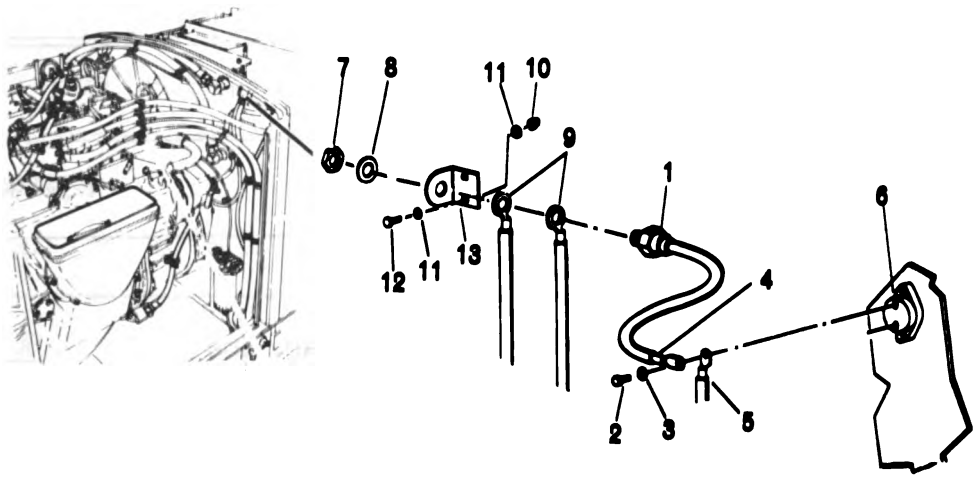
Troubleshooting References

Item	Step	Table
29	1	2-5

Equipment Para*	Condition Description
4-21*	Disarm battery power.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Rectifier (1)	a. Bolt (2), washer (3), and leads (4 and 5)	Remove. Tag and identify leads.	



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LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
1. Rectifier (1) (cont)	b. Rectifier (1)	Check continuity in both directions between lead (4) and stud of rectifier.	Set multimeter RX10 scale. Resistance should be 400-600 ohms. Set multimeter 200 K scale. Resistance should be 50,000 ohms minimum in opposite direction
	c. 2 leads (5 and 4)	Remove tags and position on circuit breaker (6).	
	d. Washer (3) and bolt (2).	Install and tighten.	Do not over tighten.

4-8. 275 AMPERE AVERAGE, 5000 AMPERE SURGE RECTIFIER (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
2. Rectifier (1)	a. Bolt (2), washer (3), and 2 leads (4) and (5)	Remove, tag, and identify leads.	
	b. Nut (7) and washer (8)	Remove.	
	c. Rectifier (1)	Remove.	
	d. 2 leads (9)	Remove, tag, and identify.	
	e. 2 nuts (10), 4 washers (11), 2 screws (12), and bracket (13)	Remove.	
INSTALLATION			
3. Rectifier (1)	a. Bracket (13), 2 screws (12), 4 washers (11), and 2 nuts (10)	Install and tighten nuts.	
	b. 2 leads (9)	Remove tags and install.	
	c. Rectifier (1)	Install.	
	d. Washer (8) and nut (7)	Install and tighten.	
	e. Leads (4) and (5), washer (3), and bolt (2)	Remove tags. Install and tighten bolt.	Do not over tighten.

4-9. RELAY PANEL ASSEMBLY

This task covers:

a. Removal b. Test c. Repair d. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

0-30 VDC power supply (with 3 amp current limiting)
110 V, 60 Hz power sourece
Thermal gun (appx C)
16 gage jumper wires (4) (Table 2-2)
Tool Kit, Master Mechanics (5180-00-699-5273)
1/4 combination wrench
1/4 open end wrench
5/16 combination wrench
3/8 socket
1/4-dr ratchet handle
2-in. extension
11/16 combination wrench
3/4 combination wrench
15/16 open end wrench
3/8 open end wrench
Pocket knife
5/16 socket
4-in. flat tip screwdriver
7/16 combination wrench
Shop Equipment, Electrical Repair. Semitrailer Mounted (4940-00-294-9517)
Electronic tool kit (K600)

Materials/Parts

Tags (item 24, appx B)
Heat shrink tubing

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
2	2	2-5
28	9	2-5
30	3	2-5
31	4	2-5

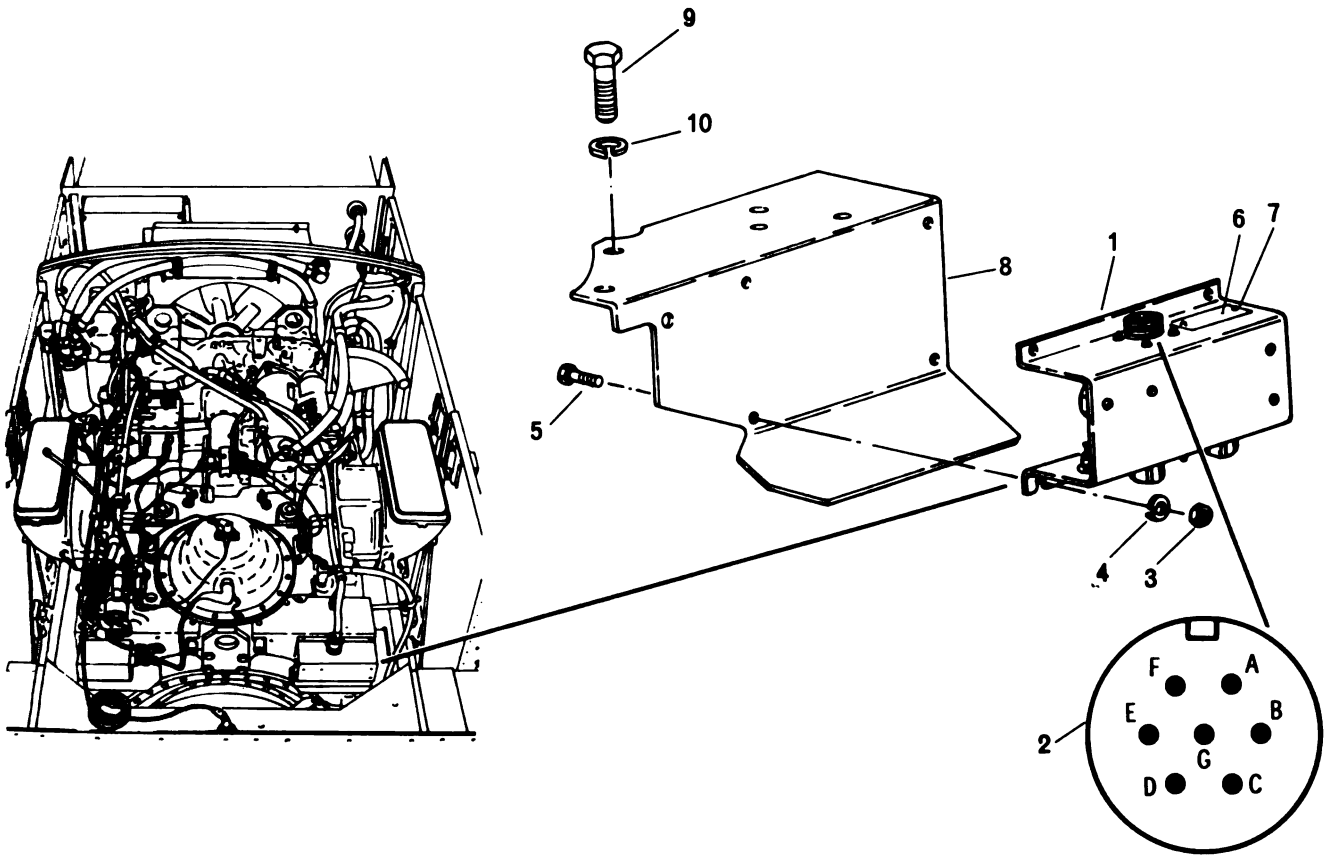
Equipment Condition

Para	Contition Description
4-13*	Front roof removed.
4-21*	Disarm batteries.

*TM 5-6115-598-12

4-9. RELAY PANEL ASSEMBLY

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
	NOTE The on-the-set tests of the relay panel assume that there is no fault in the related engine wiring. Ensure that the wiring is servicable before proceeding (para 11-2 and 12-9).		
1. Relay panel assy (1)	a. Harness connector (2)	Disconnect.	
	b. 4 nuts (3), lock washers (4), and bolts (5)	Loosen 2 bottom bolts and remove 2 top bolts and lock washers.	
	c. Relay panel assy (1)	Lift and remove.	
	d. 2 bottom nuts (3) and lock washers (4)	a. Remove. b. Install 2 new lock washers and loosely install 2 nuts.	
2. Data plate (6)	4 rivits (7) and data plate (6)	Drill out rivets and remove.	
2A. Relay panel bracket (9)	2 bolts (9), lock washers (10), and bracket (8)	Remove and discard lock washers.	Do not reuse lock washers.



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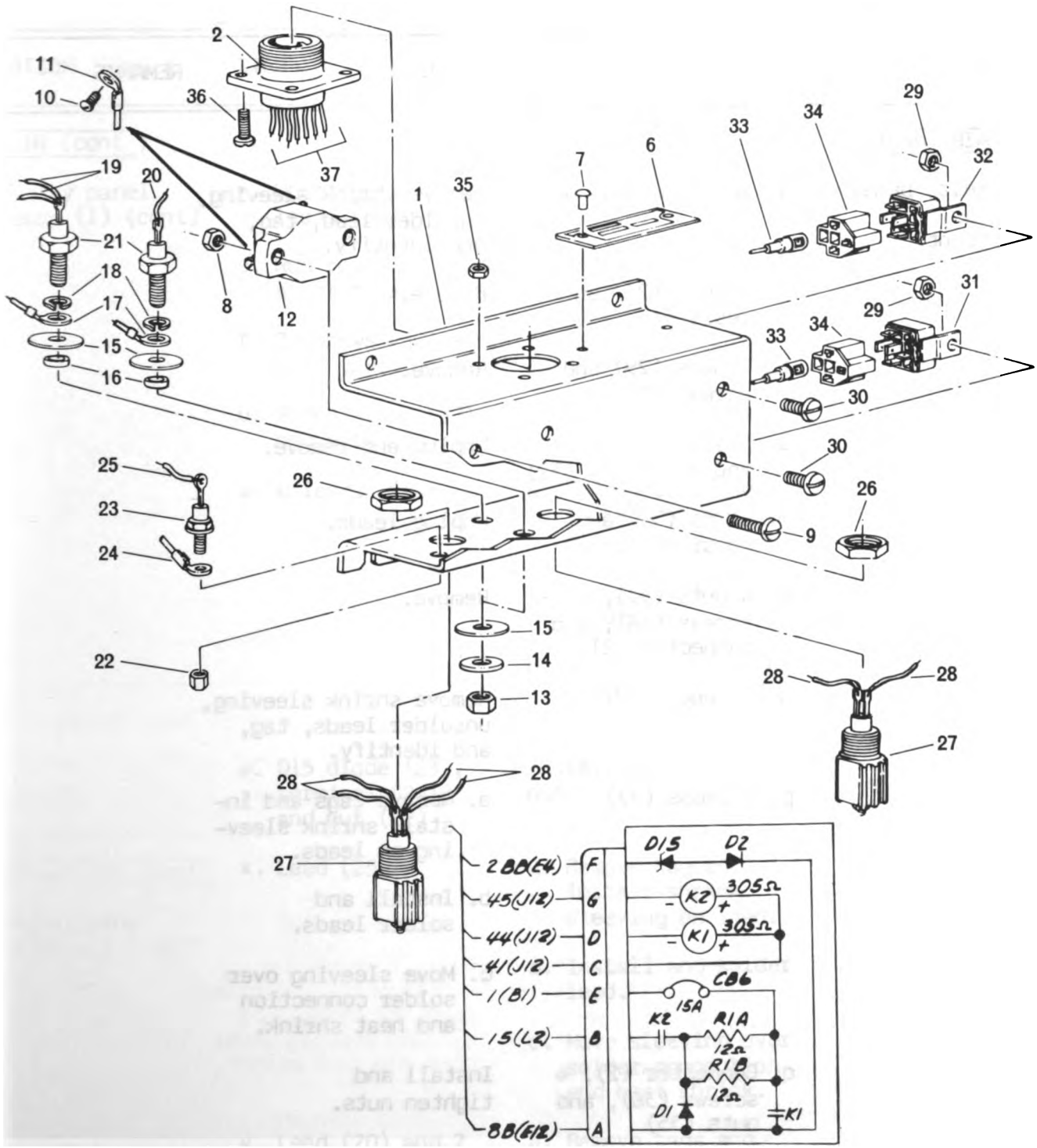
4-9. RELAY PANEL ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST			
3. Relay panel assy (1)	Connector (2)	a. Connect 0-30 Vdc power supply positive leads (Red) to pins C and E and ground leads (black) to D and G.	Use jumper leads. Set power to 24 Vdc.
		b. Check voltage from pin A to ground.	Set multimeter on 0.50 Vdc scale. Voltage should read 22-26 volts. If reading is not within limits, replace relay K1.
		c. Check voltage from pin B to ground.	Voltage should read 21.5 - 25.5 volts. If reading is not within limits, replace relay K2.
		d. Disconnect ground lead from multimeter to pin D.	
		e. Check voltage from pin B to ground.	Voltage should read 22-26 volts. If reading is not within limits, replace resisters R1A and R1B.

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
3. Relay panel assy (1) (cont)		f. Check voltage from pin A to ground.	Voltage should read 0 volts. If reading is not correct, replace relay K1.
		g. Disconnect ground lead from pin G.	
		h. Check voltage from pin B to ground.	Voltage should read 0 volts. If reading is not correct, replace relay K2.
		i. Disconnect positive lead from pin E and connect ground lead to pin G.	Set multimeter RX1 ohm scale.
		j. Connect red lead of multimeter to pin A and black lead to pin B and check resistance.	Reading should be 20-100 ohms.
		k. Reverse red and black leads to pin A and B and check resistance.	Reading should be infinity. If reading is incorrect, replace diode D1.
		l. Connect leads to pins E and B and check resistance.	Reading should be 4-8 ohms. If not within limits, replace resistors R1A and R1B.
		m. Remove all leads from connector and connect multimeter leads to pins A and F.	Reading should be infinity. If reading is not correct, replace diodes D2 and D3.

4-9. RELAY PANEL ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR			
4. Relay panel assy (1)	a. 2 nuts (8) and screws (9)	Remove.	
	b. 2 screws (10) and leads (11)	Remove, tag, and identify leads.	
	c. Circuit breaker (12)	Remove.	
	WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.		
	d. 2 leads (19) and lead (20)	Remove shrink, sleeving, unsolder leads, tag, and identify.	
	e. 2 nuts (13), flat washers (14), 4 mica washers (15), 2 teflon bushings (16), terminals (17), split washers (18), and D1 and D2 diodes (21)	Remove.	
	f. Nut (22)	Remove.	
	g. D15 diode (23) and terminal (24)	Remove.	
	h. Lead (25)	Remove shrink sleeving, unsolder lead, tag, and identify.	



18915, 18942

4-9. RELAY PANEL ASSEMBLY (cont)

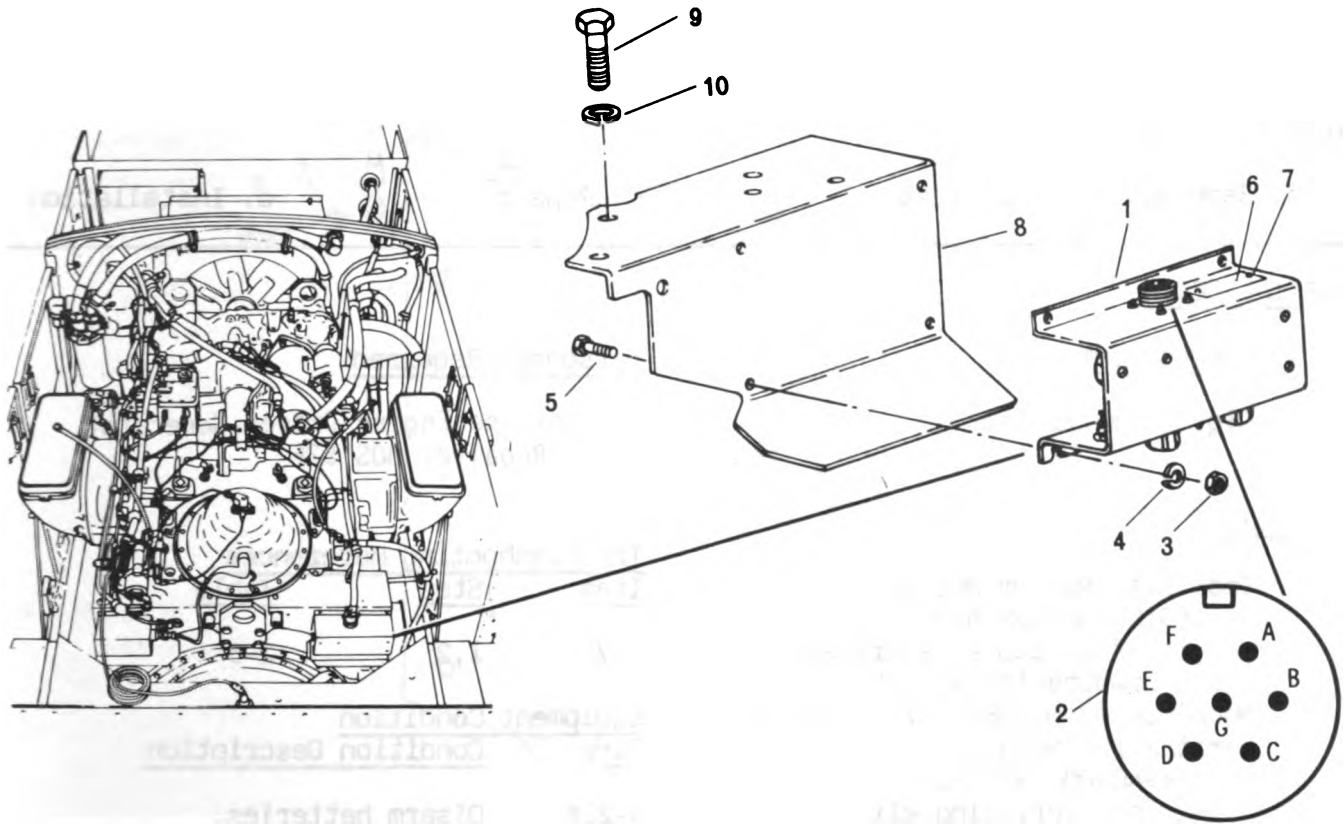
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
4. Relay panel assy (1) (cont)	i. 6 leads (28)	Remove shrink sleeving, unsolder lead, tag, and identify.	
	j. 2 nuts (26) and resistors (27)	Remove.	
	k. 2 nuts (29) and screws (30)	Remove.	
	l. Start relay (31) and run relay (32)	Unplug and remove.	
	m. Leads (33) and housings (34)	Unplug leads.	
	n. 4 nuts (35), screws (36), and connector (2)	Remove.	
	o. 7 leads (37)	Remove shrink sleeving, unsolder leads, tag, and identify.	
	p. 7 leads (37)	a. Remove tags and install shrink sleeving on leads. b. Install and solder leads. c. Move sleeving over solder connection and heat shrink.	
	q. Connector (2), 4 screws (36), and nuts (35)	Install and tighten nuts.	

4-9. RELAY PANEL ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
4. Relay panel assy (1) (cont)	r. Housing (34) and leads (33)	Plug leads into housing.	
	s. Run relay (32) and start relay (31)	Install and plug in.	
	t. 2 screws (30) and nuts (29)	Install and tighten.	
	u. 2 resistors (27) and nuts (26)	Install and tighten nuts.	
	v. 6 leads (28)	a. Remove tags and install shrink sleeving on leads.	
		b. Install and solder leads.	
		c. Move sleeving over solder connection and heat shrink.	
	w. D15 diode (23), terminal (24), and nut (22)	Install and tighten nut.	
	x. Lead (25)	a. Remove tag and install shrink sleeving on lead.	
		b. Install and solder lead.	
		c. Move sleeving over solder connection and heat shrink.	
	y. Lead (20) and 2 leads (19)	a. Remove tags and install shrink sleeving on leads.	
		b. Install and solder leads.	

4-9. RELAY PANEL ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
4. Relay panel assy (1) (cont)		c. Move sleeving over solder connection and heat shrink.	
	z. D1 and D2 diodes (21), 2 split washers (18), leads (17), teflon bushings (16), 4 mca washers (15), 2 flat washers (14), and nuts (13)	Install and tighten nuts.	
	aa. 2 leads (11) and screws (10)	Remove tags, install and tighten.	
	ab. Circuit breaker (12)	Install.	
	ac. 2 screws (9) and nuts (8)	Install and tighten.	
INSTALLATION			
4A. Relay panel bracket (9)	Relay panel bracket (9), 2 lock washers (10) and bolts (9)	Install.	
5. Relay panel assy (1)	a. Data plate (6) and 4 rivits (7)	Install.	
	b. Bottom 2 bolts (5), lock washers (4), and nuts (3)	Install in bottom slotted holes of relay mounting bracket by sliding bracket under nuts and lock washer.	



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4-9. RELAY PANEL ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
5. Relay panel assy (1) (cont)	c. Relay panel assy (1)	Install on bottom bolts.	
	d. 2 bolts (5), washers (4), and nuts (3)	a. Install and tighten top set.	
		b. Tighten bottom set.	
	e. Harness connector (2)	Conntect and tighten.	
6. Batteries		Connect.	Para 4-21, TM 5-6115-598-12.

4-10. DC WIRING

This task covers:

a. Removal b. Test c. Repair d. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

Tool Kit, Master Mechanics
(5180-00-699-5273)
4-in. flat tip screwdriver
3/8 combination wrench
Shop Equipment, Electrical Repair,
Semitrailer Mounted
(4940-00-294-9517)
Terminal servicing kit

Materials/Parts

Electrical tape (item 25, appx B)

Personnel Required

Turbine Engine Driven Generator
Repairer MOS 52F

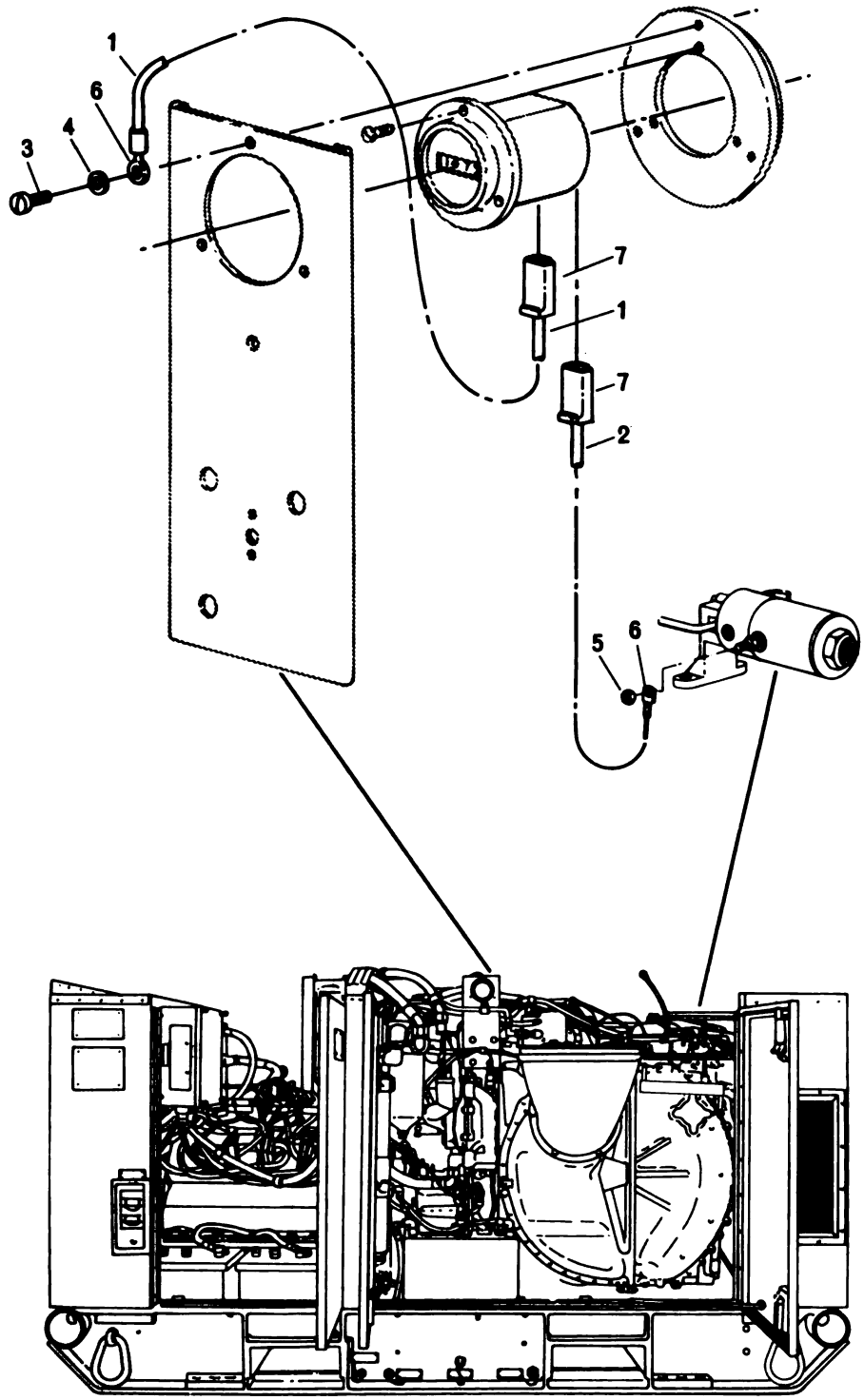
Troubleshooting References

Item	Step	Table
77	1,2	2-5

Equipment Condition

Para	Condition Description
4-21*	Disarm batteries.

*TM 5-6115-598-12



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4-10. DC WIRING (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Hourmeter leads (1 and 2)	a. Screw (3) and washer (4)	Remove.	
	b. Nut (5)	Remove.	
	c. Leads (1 and 2)	Unplug at hourmeter and remove.	
TEST			
2. Leads (1 and (2)		Check continuity.	Set multimeter RX1 scale. Should read 0-1 ohm.
REPAIR			
3. Leads (1 and 2)		Repair defective insulation by taping.	
	Damaged terminals (6 and 7)	a. Cut wire to remove terminal.	
		b. Strip wire back 1/4 in. (6 mm).	
		c. Install new terminal.	Be sure bare wire contacts inner diameter of terminal.
		d. Crimp terminal to wire.	

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
4. Leads (1 and 2)		Install one end onto back of hourmeter and remaining ends to solenoid and hourmeter bracket.	
	a. Nut (5)	Install and tighten.	
	b. Screw (3) and washer (4)	Install and tighten.	

CHAPTER 5

MAINTENANCE OF ELECTRICAL POWER GENERATOR AND CONTROL SYSTEM

5-1. PURPOSE AND FUNCTION

The purpose and function of the electrical power generator and control system is to provide controlled output from the generator of 208/120 volts ac, 3-phase, 400 Hz electric power.

5-2. MAIN AC CONTACTOR

This task covers:

a. Removal b. Test c. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

Tool Kit, Master Mechanics (5180-00-699-5273)
7/16 socket
4-in. flat tip screwdriver
5/8 socket
5-in. extension
Socket head screw key set
3/8-dr ratchet handle

Materials/Parts

Tags (item 24, appx B)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
11	4,5,6,7	2-5
50	4,10	2-5
54	2	2-5
65	1	2-5
81	10	2-5

Equipment Condition

Para	Condition Description
4-21*	Disarm battery power.

*TM 5-6115-598-12

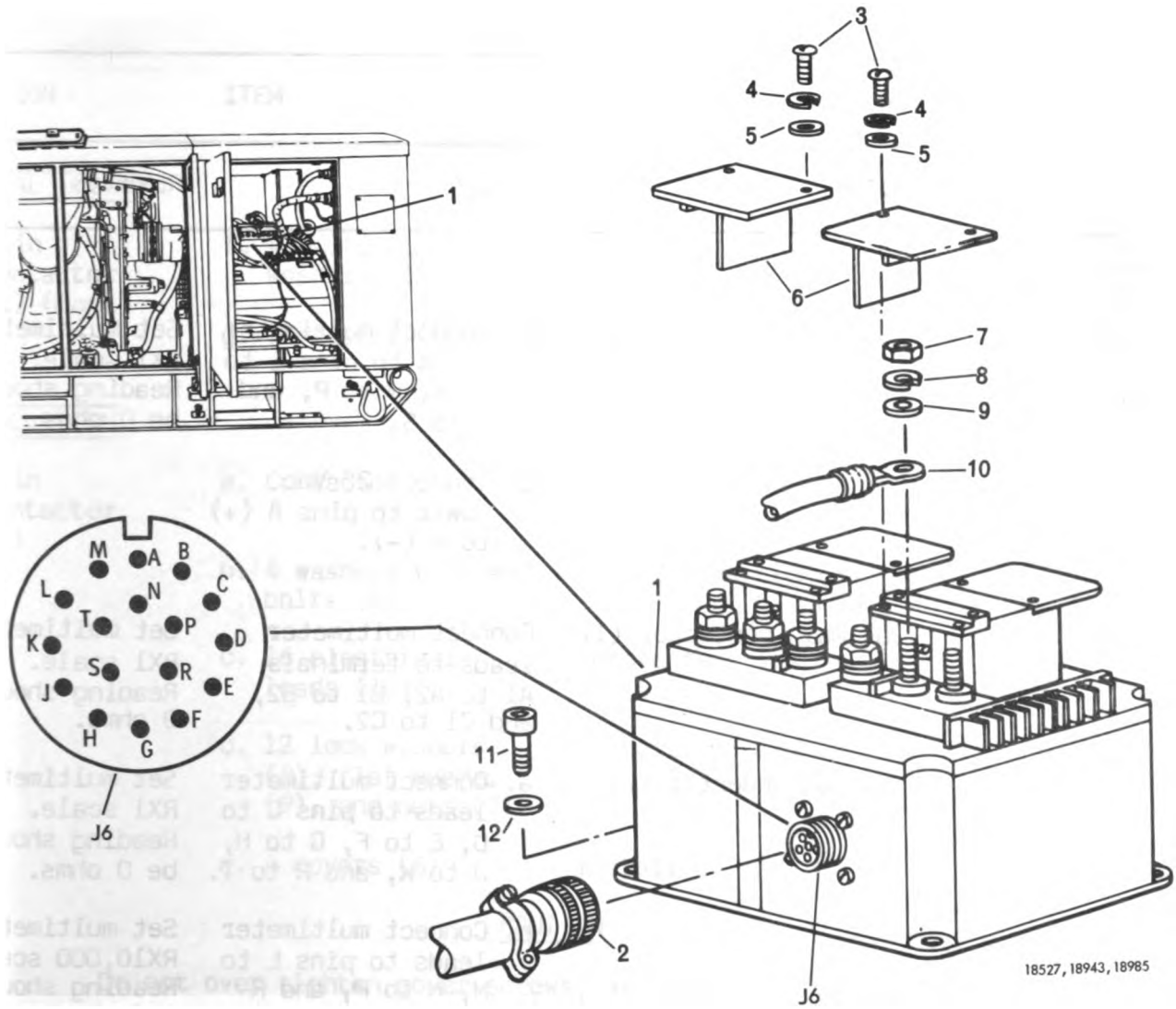
LOCATION	ITEM	ACTION	REMARKS

TEST

NOTE

If any of the following test readings are incorrect, replace main contactor.

1.	Main contactor (1)	Connect multimeter leads to terminals A1 to A2, B1 to B2, and then C1 to C2.	Set multimeter RX1 scale. Readings should be infinity.



LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
1. Main contactor (1) (cont)	a. J6 connector (2)	a. Disconnect.	
		b. Connect multimeter leads to pins C to to D, E to F, G to H, J to K, and then R to T.	Set multimeter RX1 scale. Readings should be infinity.

5-2. MAIN CONTACTOR (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
1. Main contactor (1) (cont)		c. Connect multimeter leads to pins L to to M, N to P, and R to S.	Set multimeter RX1 scale. Reading should be 0 ohms.
		d. Connect 28 Vdc power to pins A (+) to B (-).	
	b. Main contactor (1)	Connect multimeter leads to terminals A1 to A2, B1 to B2, and C1 to C2.	Set multimeter RX1 scale. Reading should be 0 ohms.
	c. J6 connector (2)	a. Connect multimeter leads to pins C to D, E to F, G to H, J to K, and R to T.	Set multimeter RX1 scale. Reading should be be 0 ohms.
		b. Connect multimeter leads to pins L to M, H to P, and R to S.	Set multimeter RX10,000 scale. Reading should be infinity.
REMOVAL			
2. Main contactor (1)	a. Connector (2)	Disconnect.	
	b. 8 screws (3), lock washers (4), and flat washers (5)	Remove.	
	c. 4 covers (6)	Remove.	
	d. 12 nuts (7), lock washers (8), and flat washers (9)	Remove.	
	e. 16 electrical leads (10)	Remove, tag, and identify.	

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
2. Main contactor (1) (cont)	f. 4 bolts (11) and washers (12)	Remove.	
	g. Contactor (1)	Remove.	
INSTALLATION			
3. Main contactor (1)	a. Contactor (1)	Install.	
	b. 4 washers (12) and bolts (11)	Install and tighten.	
	c. 16 electrical leads (10)	Remove tags and install.	
	d. 12 lock washers (8), flat washers (9), and nuts (7)	Install and tighten.	
	e. 4 covers (6)	Install.	

CAUTION

Do not over tighten cover screws, as this could damage the covers.

f. 8 flat washers (5), lock washers (4), and screws (3)	Install and tighten.	
g. Connector (2)	Connect.	

5-3. CURRENT TRANSFORMER ASSEMBLY

This task covers:

a. Test b. Removal c. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

Thermal gun (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
3/8 socket, 3/8 dr
11/32 socket, 1/4 dr
5/8 deep socket, 3/8 dr
5-in. extension, 3/8 dr
3/8-dr ratchet handle
3/8-dr speed handle
Pocket knife
3/8 socket, 1/4 dr
1/4-dr ratchet handle
1/4-dr straight handle
3/8 combination wrench
11/32 open end wrench
1-in. flat tip screwdriver
Shop Equipment, Electrical Repair, Semitrailer Mounted (4940-00-294-9517)
Terminal servicing kit

Materials/Parts

Tags (item 24, appx B)
Heat shrink sleeving

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

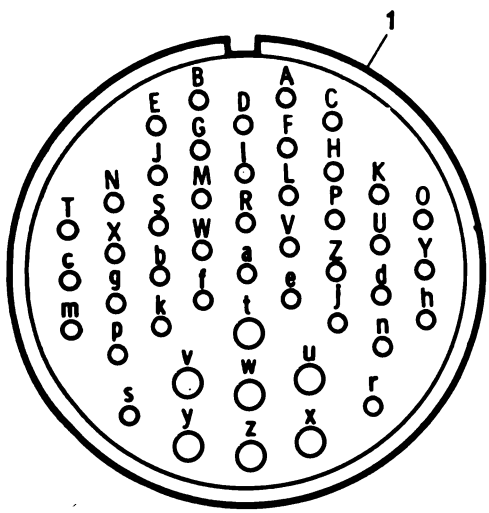
Item	Step	Table
50	11	2-5
54	5	2-5

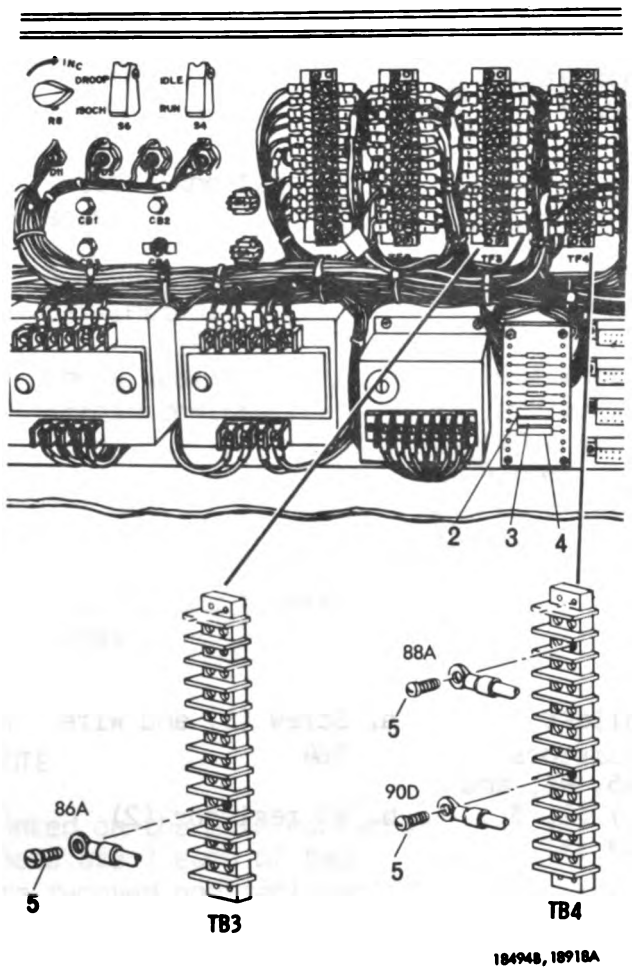
Equipment Condition

Para	Condition Description
4-21*	Disarm battery power.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Control cabinet	a. P1 connector (1)	Disconnect from rear of cabinet.	
	b. 6 current transformers and wiring harness	a. Check circuits at harness end of connector as follows:	



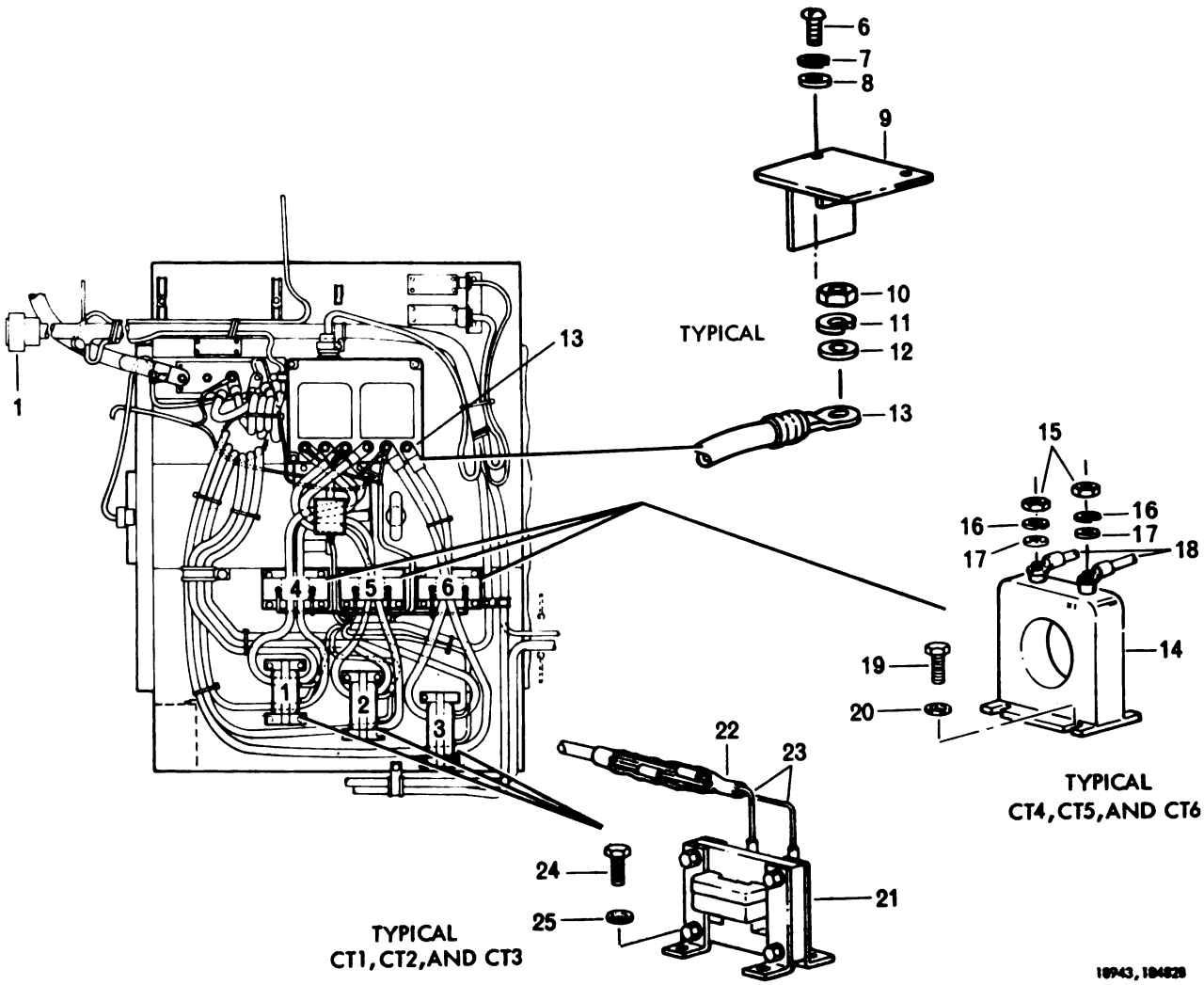


5-3. CURRENT TRANSFORMER ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
1. Control cabinet (cont)		Transformer / Pins / Resistance (ohms): 1 — P - V: 230 ± 12 P-Gnd: 10,000 min 2 — R - h: 230 ± 12 R-Gnd: 10,000 min 3 — U - p: 230 ± 12 U-Gnd: 10,000 min 4 — O - s: 0.4 ± 0.1 O-Gnd: 10,000 min 5 — n - s: 0.4 ± 0.1 n-Gnd: 10,000 min 6 — r - s: 0.4 ± 0.1 r-Gnd: 10,000 min	
		b. Replace transformer or wiring as reqd if not within limits.	See steps 3 thru 9 for replacement.
2. Ballast resistors (R5, R6, and R7) (2, 3 and 4)	a. Screw (5) and wire 86A	Remove from TB 3, terminal 9.	
	b. R5 resistor (2)	Check resistance across resistor.	Set multimeter RX1 scale. Resistance should read 12.4 ohms. Replace per para 12-11.
	c. Wire 86A and screw (5)	Install and tighten screw.	
	d. Screw (5) and wire 88A	Remove from TB4, terminal 2.	

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. Ballast resistors (R5, R6, and R7) (2, 3 and 4) (cont)	e. R6 resistor (3)	Check resistance across resistor.	Set multimeter RX1 scale. Resistance should read 12.4 ohms. Replace per para 12.11.
	f. Wire 88A and screw (5)	Install and tighten screw.	
	g. Screw (5) and wire 90D	Remove from TB4, terminal 8.	
	h. R7 resistor (4)	Check resistance across resistor.	Set multimeter RX1 scale. Resistance should 12.4 ohms. Replace per para 12-11.
	i. Wire 90D and screw (5)	Install and tighten screws.	
REMOVAL			
	NOTE 6 current transformers are mounted on the main contactor support assembly. Although there are 3 each of two different part numbers, all are removed and replaced in a similar manner.		
3. Transformer leads		Determine which 2 leads must be pulled through transformer opening to allow the transformer to be removed from its mount.	Refer to wiring route as shown or in FO1-2, TM 5-6115-598-12.
4. Main contactor	a. 2 screws (6), lock washers (7), flat washers (8), and cover (9)	Remove.	

5-3. CURRENT TRANSFORMER ASSEMBLY (cont)



LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
4. Main contactor (cont)	b. 2 nuts (10), lock washers (11), and flat washers (12)	Remove.	
	c. 2 leads (13)	a. Remove, tag, and identify. b. Pull leads through center of transformer being removed.	
5. Current transformer (14)	a. 2 nuts (15), lockwashers (16), flat washers (17), and leads (18)	Remove, tag and identify leads.	
	b. 4 bolts (19) and washers (20)	Remove.	
	c. Transformer (14)	Remove.	
6. Current transformer (21)	a. Sleeving (22)	Remove.	
	b. 2 leads (23)	Cut to remove splice, tag, and identify.	
	c. 4 bolts (24) and washers (25)	Remove.	
	d. Transformer (21)	Remove.	
INSTALLATION			
7. Current transformer (21)	a. Transformer (21)	Install.	
	b. 4 washers (25) and bolts (24)	Install and tighten bolts.	
	c. 2 leads (23)	a. Strip insulation back approximately 1/4 in. (6 mm) on harness leads and transformer leads.	

5-3. CURRENT TRANSFORMER ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
7. Current transformer (21) (cont)		b. Install shrink sleeving over harness leads.	
		c. Connect leads using solderless connectors and crimp.	
		d. Move shrink sleeving over repair and heat shrink.	
8. Current transformer (14)	a. Transformer (14)	Install.	
	b. 4 washers (20) and bolts (19)	Install and tighten. bolts.	
	c. 2 leads (18), flat washers (17), lockwashers (16), and nuts (15)	Remove tags, install and tighten nuts.	
9. Main contactor	a. 2 leads (13)	a. Pass through transformer.	Follow wiring route as shown in this paragraph or in FO1-2, TM 5-6115-598-12.
		b. Remove tags and install on contactor terminals.	
	b. 2 flat washers (12), lock washers (11), and nuts (10)	Install and tighten nuts.	
	c. Cover (9), 2 flat washers (8), lock washers (7), and screws (6)	Install and tighten screws.	Do not over tighten.

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5-4. DROOP TRANSFORMER

This task covers:

a. Test b. Removal c. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

Thermal gun (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
Pocket knife
3/8-dr ratchet handle
5/8 deep well socket
7/16 deep well socket
5-in. extension
1-in. flat tip screwdriver
Shop Equipment, Electrical Repair Semitrailer Mounted (4940-00-294-9517)
Terminal servicing kit

Materials/Parts

Tags (item 24, appx B)
Heat shrink sleeving

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

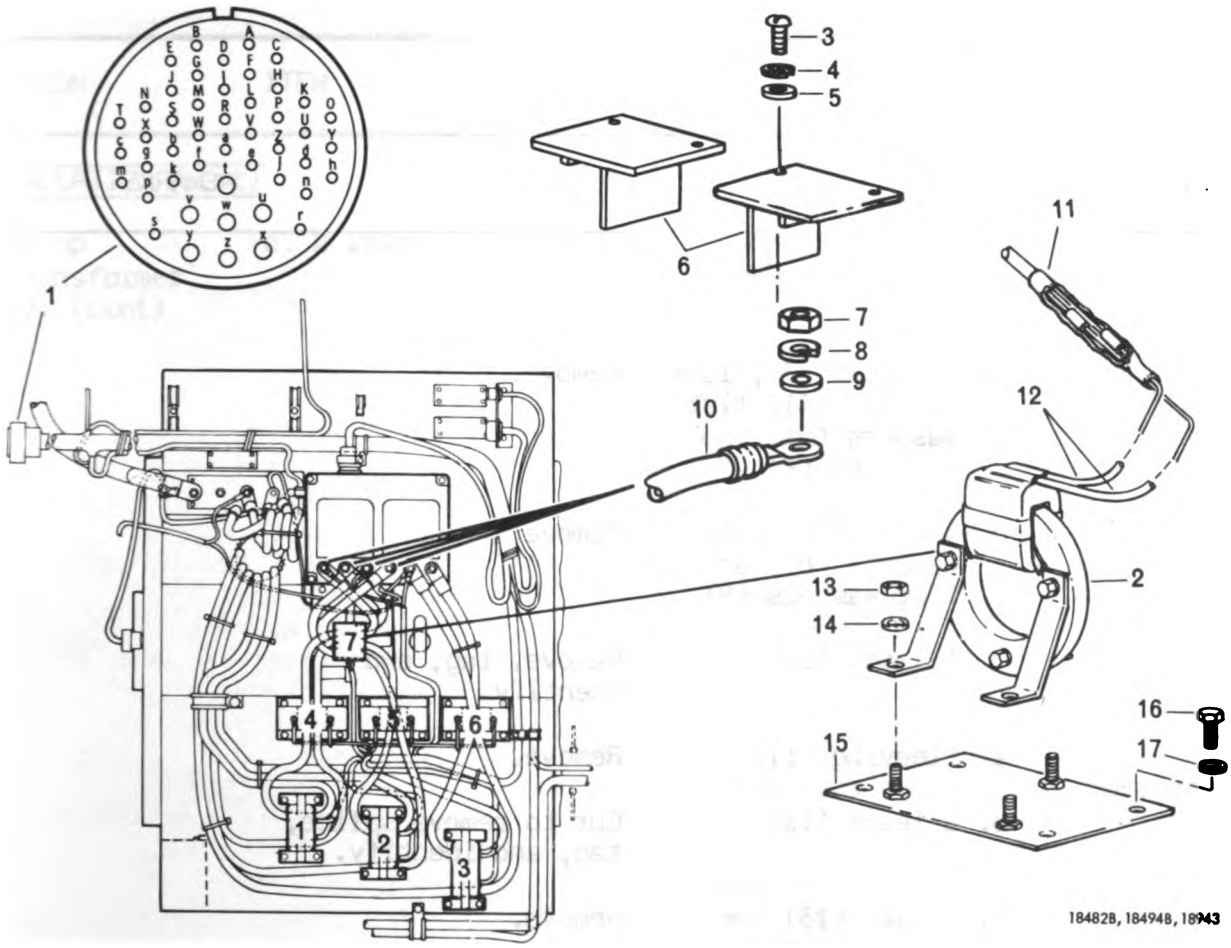
Item	Step	Table
63	7	2-5

Equipment Condition

Para	Condition Description
4-21*	Disarm battery power.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Control cabinet	P1 connector (1)	a. Disconnect. b. Measure droop transformer and harness resistance and short circuit possibility as follows:	



LOCATION	ITEM	ACTION	REMARKS

TEST (cont)

1. Control cabinet (cont)

Transformer	Pins	Resistance (ohms)
7	Y - Z	18.0 ± 1.0
	Y-Gnd	10,000 min

c. Replace droop transformer if not in limits. — See steps 2 thru 7.

5-4. DROOP TRANSFORMER (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
2. Main contactor	a. 4 screws (3), lock washers (4), flat washers (5), and 2 covers (6)	Remove.	
	b. 4 nuts (7), lock washers (8), and flat washers (9)	Remove.	
	c. 4 leads (10)	Remove, tag, and identify.	
3. Droop transformer (2)	a. Sleeving (11)	Remove.	
	b. 2 leads (12)	Cut to remove splice, tag, and identify.	
	c. 3 nuts (13) and washers (14)	Remove.	
	d. Transformer (2)	Remove.	
4. Plate assembly (15)	a. 4 bolts (16) and flat washers (17)	Remove.	
	b. Plate (15)	Remove.	
INSTALLATION			
5. Plate assembly (15)	a. Plate (15)	Install.	
	b. 4 flat washers (17) and bolts (16)	Install and tighten.	
6. Droop transformer (2)	a. Transformer (2)	Install.	
	b. 3 washers (14) and nuts (13)	Install and tighten nuts.	

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
6. Droop transformer (2) (cont)	c. 2 leads (12)	a. Remove ring terminals.	Transformer is shipped with terminals that must be removed.
		b. Strip insulation back approximately 1/4 in. (6 mm) on harness leads and transformer leads.	
		c. Install shrink sleeving over harness leads.	
		d. Connect leads using solderless connectors and crimp.	
		e. Move shrink sleeving over repair and heat shrink.	
7. Main contactor	a. 4 leads (10)	a. Pass through droop transformer.	Follow route as shown in this paragraph or in FO1-2, TM 5-6115-598-12.
		b. Remove tags and install on main contactor terminals.	
	b. 4 flat washers (9), lock washers (8), and nuts (7)	Install and tighten nuts.	
	c. 2 covers (6), flat washers (5), lock washers (4), and screws (3)	Install and tighten screws.	Do not over tighten.

5-5. MAIN AC CONTACTOR CURRENT TRANSFORMER SUPPORT ASSEMBLY

This task covers:

a. Removal b. Repair c. Installation

INITIAL SETUP

Tools

Tool Kit, Master Mechanics (5180-00-699-5273)
- Pry bar
- Pocket knife
- 5-in. extension
- 7/16 socket
- 3/8 combination wrench
- 7/16 combination wrench
- 16 oz hammer
- 3/8-dr ratchet handle
- 9/16 deep well socket
- 7/16 open end wrench

Shop Equipment, Contact Maintenance Truck Mounted (4940-00-294-9518)
- Portable electric disk sander
- Vise

Welding Shop, Trailer Mounted (3431-00-935-7821)
- Inert gas shielded arc welding set
- Welder's helmet
- Welder's sleeves
- Welder's apron

Materials/Parts

- Paint brush (item 5, appx B)
- Face shield (item 8, appx B)
- Argon gas (item 9, appx B)
- Welder's gloves (item 10, appx B)
- Paint (item 16, appx B)
- Tags (item 24, appx B)
- Masking tape (item 26, appx B)
- Grommet material

Personnel Required

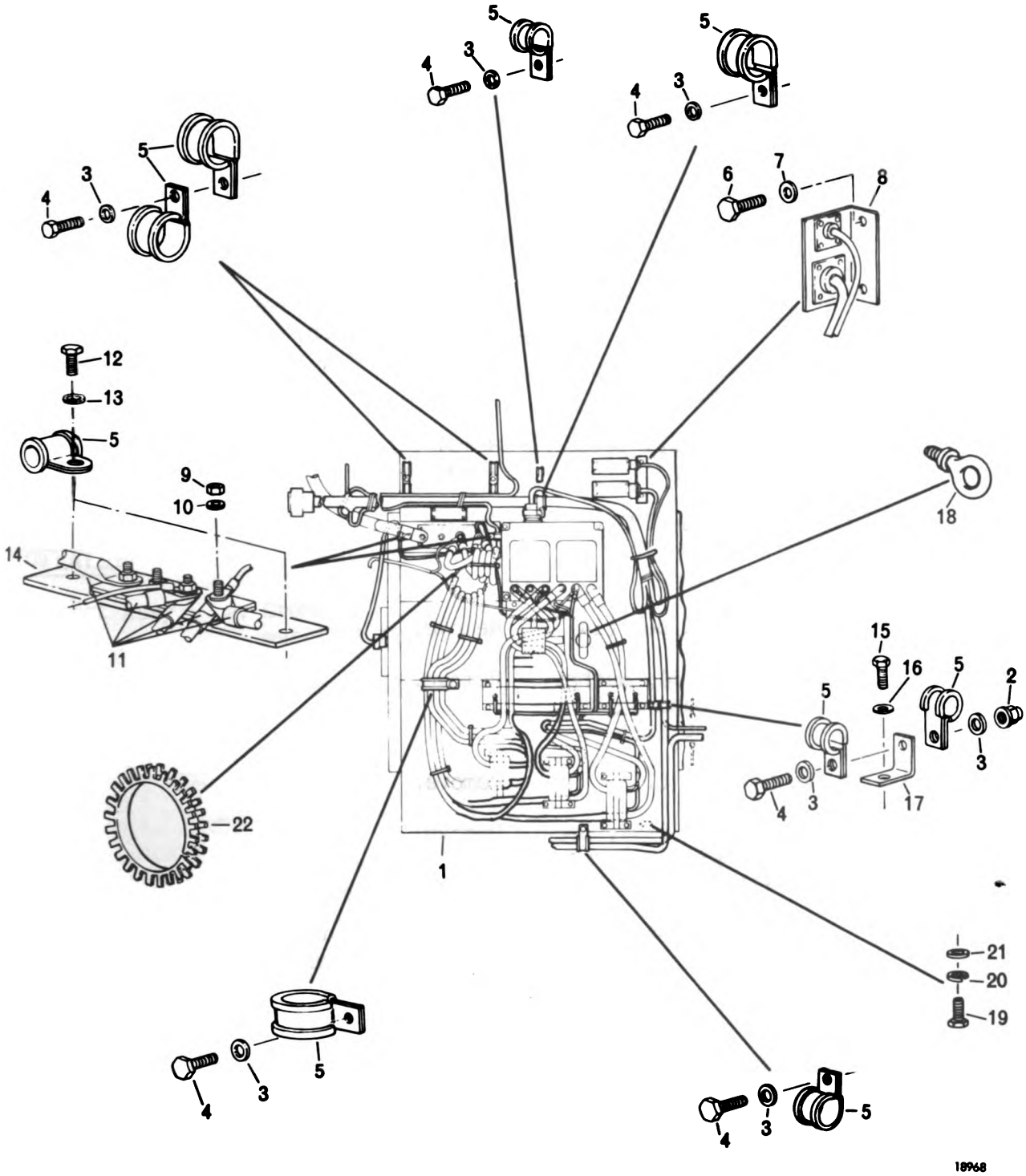
Turbine Engine Driven Generator Repairer MOS 52F
Welder MOS 44B

Equipment Condition

Para	Condition Description
4-13*	Rear roof removed.
4-22*	Batteries removed.
3-4	Rear cabinet removed with control cabinet installed.
5-2	Main contactor removed.
5-3	Current transformers removed.
5-4	Droop transformer removed.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Support assy (1)	a. Nut (2), 8 washers (3), 7 bolts (4), and 10 clamps (5)	Remove.	Note clamp locations and positions for reassembly.



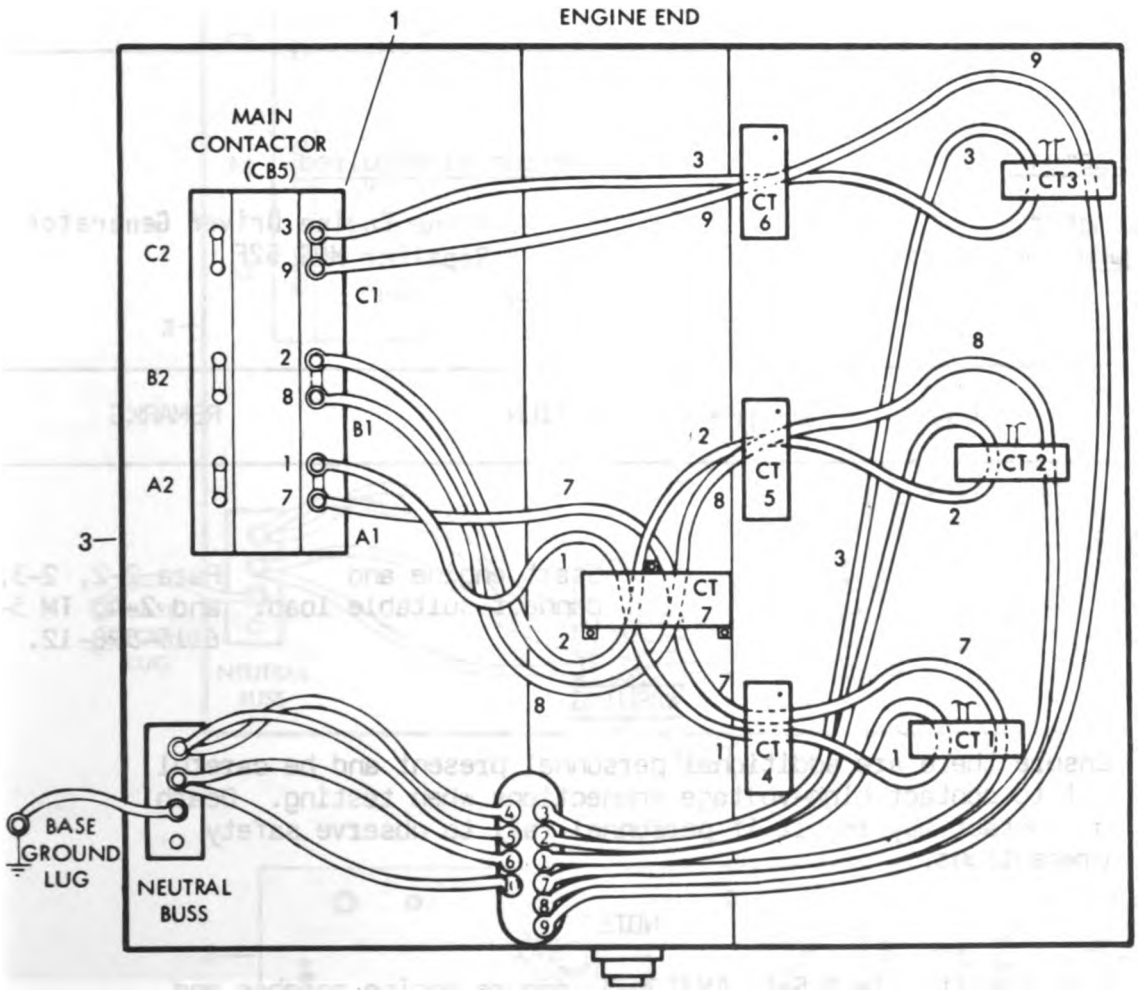
5-5. MAIN AC CONTACTOR CURRENT TRANSFORMER SUPPORT ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
1. Support assy (1) (cont)	b. 2 bolts (6) and washers (7)	Remove.	
	c. Receptacle and bracket (8)	Remove.	
	d. 4 nuts (9) and washers (10)	Remove.	
	e. Electrical leads (11)	Remove, tag, and identify.	
	f. 2 bolts (12), washers (13), and clamps (5)	Remove.	
	g. Neutral bus (14)	Remove.	
	h. Bolt (15), washer (16), and angle bracket (17)	Remove.	
	i. Eyebolt (18)	Remove.	
	j. 4 bolts (19), lock washers (20), and flat washers (21)	Remove.	
	k. Support assy (1)	Guide leads thru access hole and remove.	Two technicians reqd. Exercise care when removing alternator leads from access hole to prevent damage.
	l. Grommet material (22)	Remove.	

LOCATION	ITEM	ACTION	REMARKS
REPAIR			
	NOTE It may be necessary to remove one or more of the data plates to repair the support assy. (See para 3-9.)		
	WARNING Use care when using welding or grinding equipment. Do not watch welding process or use grinder without proper eye protection. Severe eye damage or blindness may result.		
2. Support assy (1)		Hammer out dented areas, weld rips and tears, sand high spots, and paint as reqd.	Mask data plates.
INSTALLATION			
3. Support assy (1)	a. Grommet material (22)	Install.	
	b. Support (1)	Position on top of main alternator with leads routed thru access hole.	Two technicians reqd. Exercise care when routing leads thru access hole to avoid damage.
	c. 4 flat washers (21), lock washers (20), and bolts (19)	Install and tighten bolts.	
	d. Eyebolt (18)	Install and tighten.	
	e. Angle bracket (17)	Position on support.	
	f. Washer (16) and bolt (15)	Install and tighten bolt.	
	g. Neutral bus (14)	Position on support.	

5-5. MAIN AC CONTACTOR CURRENT TRANSFORMER SUPPORT ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
3. Support assy (1) (cont)	h. 2 clamps (5), washers (13), and bolts (12)	Install and tighten bolts.	
	i. Electrical leads (11)	Remove tags and install.	
	j. 4 washers (10) and nuts (9)	Install and tighten nuts.	
	k. Receptacle and bracket (8)	Position on support.	
	l. 2 washers (7) and bolts (6)	Install and tighten bolts.	
	m. 10 clamps (5), 7 bolts (4), 8 washers (3), and nut (2)	Install and tighten bolts and nut.	



5-6. 150 kW AC, BRUSHLESS, AIR COOLED, 400 Hz ALTERNATOR

This task covers:

Test

INITIAL SETUP

Test Equipment

Multimeter
Frequency meter set

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Engine		Start engine and connect suitable load.	Para 2-2, 2-3, and 2-4, TM 5-6115-598-12.

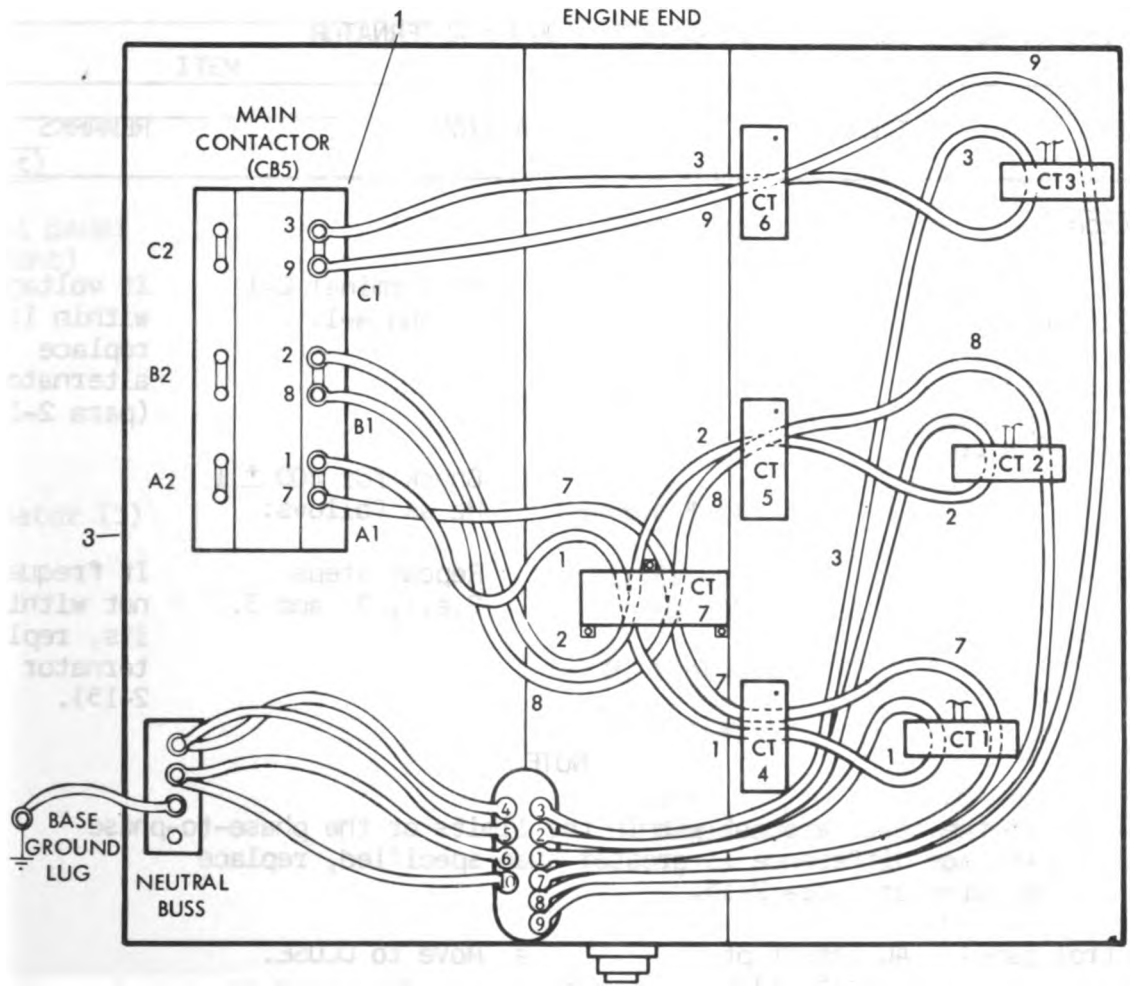
WARNING

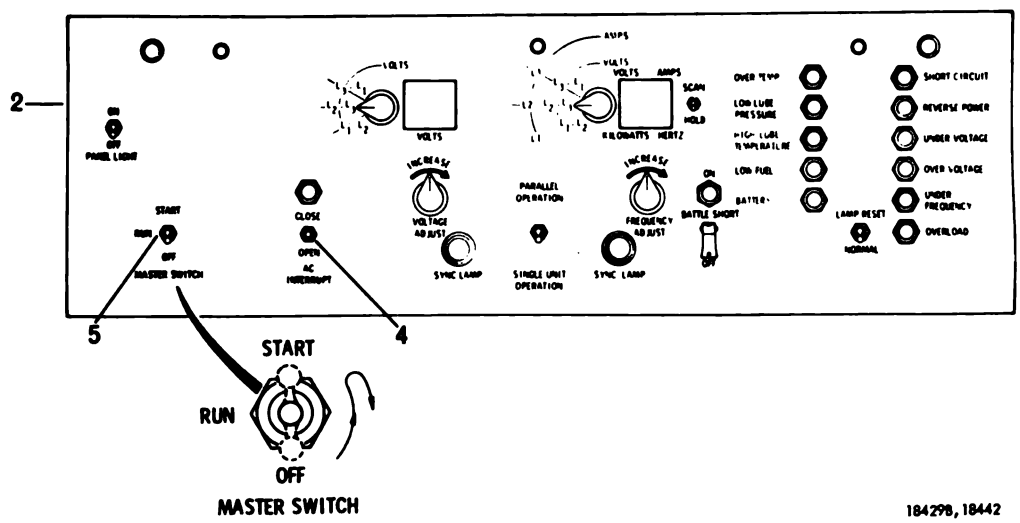
Ensure there are additional personnel present and be careful not to contact high-voltage connections when testing. Death on contact may result if personnel fail to observe safety precautions.

NOTE

Using Monitor Test Set, AN/TJM-3, ensure engine reaches and maintains 100% rated speed, before attempting 150 kW AC, 400 Hz alternator test.

2. Main contactor (1)		a. Check for 208 ± 2 volts AC as follows:	Two technicians reqd.
		1. Terminal A-1 and B-1.	
		2. Terminal B-1 and C-1.	





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5-6. 150 kW AC, BRUSHLESS, AIR COOLED, 400 Hz ALTERNATOR

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. Main contactor (1) (cont)		3. Terminal C-1 and A-1.	If voltage is not within limits, replace alternator (para 2-15).
		b. Check for 400 ± 1 Hz as follows:	
		Repeat steps 2.a.1, 2, and 3.	If frequency is not within limits, replace alternator (para 2-15).
		NOTE If the tests are not within the limits or the phase-to-phase voltage difference is greater than specified, replace alternator, para 2-15.	
3. Control panel (2)	AC interrupt switch (4)	a. Move to CLOSE.	
		b. Apply load.	Do not exceed 150 KW.
		c. Check for 208 ± 2 volts as follows:	
		1. Terminal A2 and B2.	
		2. Terminal B2 and C2.	
		3. Terminal C2 and A2.	If voltage is not within limits, replace alternator (para 2-15).

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
3. Control panel (2) (cont)		d. Check for 400 ± 1 Hz as follows:	
		Repeat steps 3.c.1,.2 . and 3.	If frequency is not within limits, replace alternator (para 2-15).
4. Alternator (3)		Observe for:	
		1. Erratic operation.	
		2. Vibration.	
		3. Noise.	
		4. Over temperature.	If any of the above conditions occur, replace alternator (para 2-15).
5. Control panel (2)	a. AC INTERRUPT switch (4)	Move to OPEN.	
	b. MASTER switch (5)	Move to OFF.	

REMOVAL

See para 2-15.

INSTALLATION

See para 2-15.

CHAPTER 6

MAINTENANCE OF FUEL SYSTEM

6-1. PURPOSE AND FUNCTION

The purpose and function of the fuel system is to provide adequate, metered, filtered fuel to the engine. Safe drainage and recycling of surplus fuel is also provided by the fuel system. A day tank provides storage for approximately 5 gallons (19 liters) of fuel. This reserve fuel allows time for the supply tank to be switched without a generator shutdown.

6-2. FUEL TRANSFER PUMP

This task covers:

a. Test b. Removal c. Repair d. Installation

INITIAL SETUP

Test Equipment

Power supply
Digital multimeter

Tools

Safety wire pliers (appx C)
Tool Kit, Master Mechanics
(5180-00-699-5273)
7/16 deep socket
3/8-dr ratchet handle
5-in. extension
3/8 combination wrench
3/4 combination wrench
7/8 combination wrench
4-in. flat tip screwdriver
Socket head screw key set
Shop Equipment, Electrical Repair,
Semitrailer Mounted
(4940-00-294-9517)
Electronic tool kit
Mechanical puller

Materials/Parts

Bucket (item 4, appx B)
Rags (item 17, appx B)
Tags (item 24, appx B)
Safety wire (item 28, appx B)
Fuel transfer pump filter

Materials/Parts (cont)

End plate sleeve seal (2 ea)
Inlet filter seal
Pump seal
Shaft seal

Personnel Required

Turbine Engine Driven Generator
Repairer MOS 52F

Troubleshooting References

Item	Step	Table
5	8,9	2-5
82	7	2-5

Equipment Condition

Para	Condition Description
4-21*	Disarm battery power.

*TM 5-6115-598-12

General Safety Instructions

No smoking or open flame.

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Fuel pump assy (1)	a. P10 electrical lead (2)	Disconnect.	
	b. Electrical connector (3)	Check resistance from positive pin to ground.	Set multimeter Rxl scale. Resistance should be 2 to 10 ohms. If resistance is not within limits, replace pump.
	c. Power supply	a. Connect to positive pin in connector.	
		b. Check ground.	Replace pump if motor fails to run.
		c. Listen to pump operation.	If pump motor is running freely with no noticeable effort, the pump has failed. Replace pump.
	d. Electrical lead (2)	Connect and tighten.	

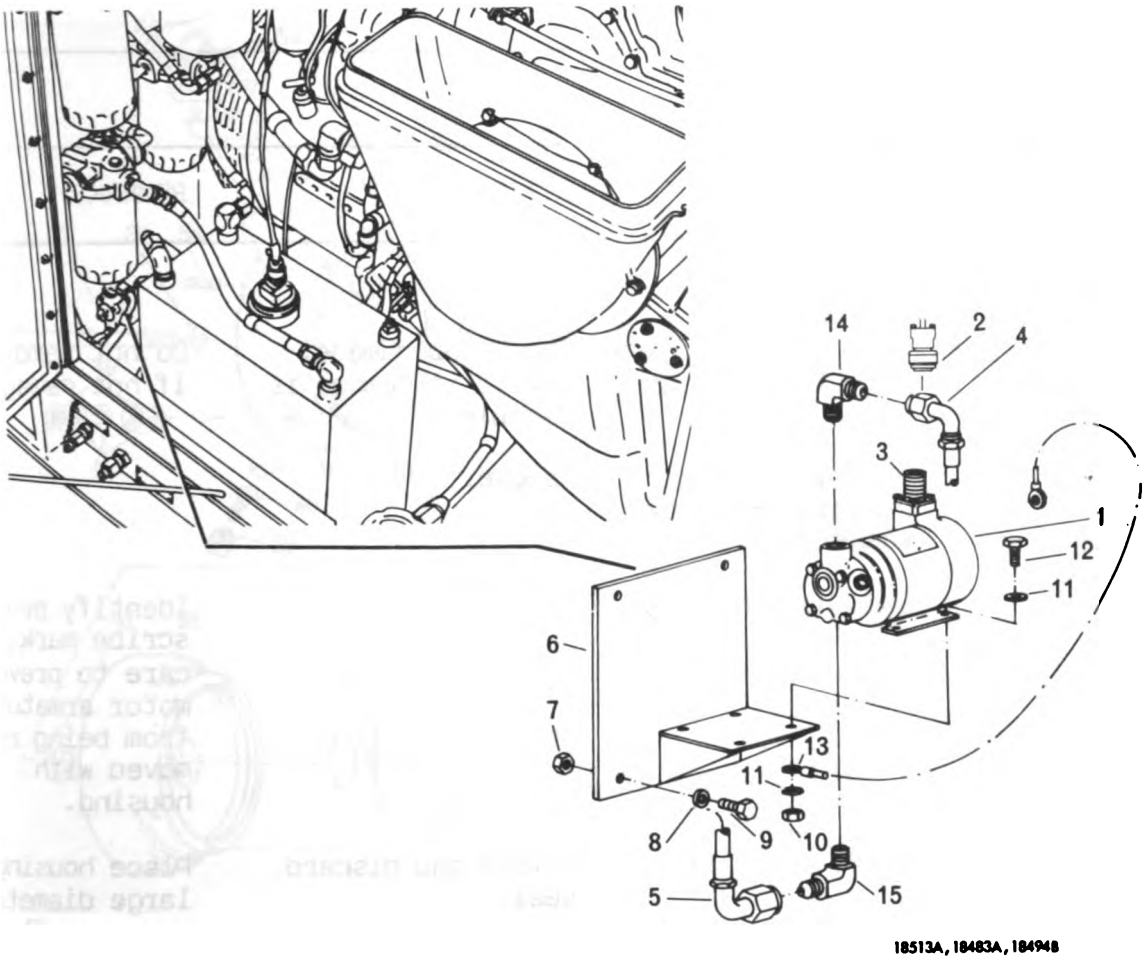
REMOVAL

WARNING

Fire may be caused by spilled fuel. Serious burns may result from accidental ignition of fuel spilled when servicing fuel system components. Emergency fuels are particularly hazardous. Use a fuel catch pan when draining fuel from any fuel line or fuel system component. Be sure that area around fuel nozzle assembly is not contaminated by fuel when testing igniter or ignition exciter. Do not weld fuel tank unless tank has been properly purged.

6-2. FUEL TRANSFER PUMP (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
	CAUTION Catch or wipe fuel runoff when pump fittings are disconnected.		
2. Pump (1)	a. Fuel lines (4 and 5)	Disconnect.	
	b. P10 electrical lead (2)	Disconnect.	
3. Plate (6)	a. 4 nuts (7), washers (8) and bolts (9)	Remove.	
	b. Plate (6) and pump (1)	Remove as an assembly.	
4. Pump (1)	a. 4 nuts (10), 8 washers (11), 4 bolts (12), and lead (13)	Remove.	
	b. Pump (1)	Remove.	
	c. Fitting (14)	Remove.	Note position of fitting for installation.
	d. Fitting (15)	Remove.	Note position of fitting for installation.
REPAIR			
5. Fuel pump assy (1), pump	a. Plug (16), spring (17) and piston (18)	Remove.	
	b. Seal (19), sleeve (20), seal (19), and spring (21)	Remove. Discard seals.	One seal (19) should be removed before sleeve is removed.



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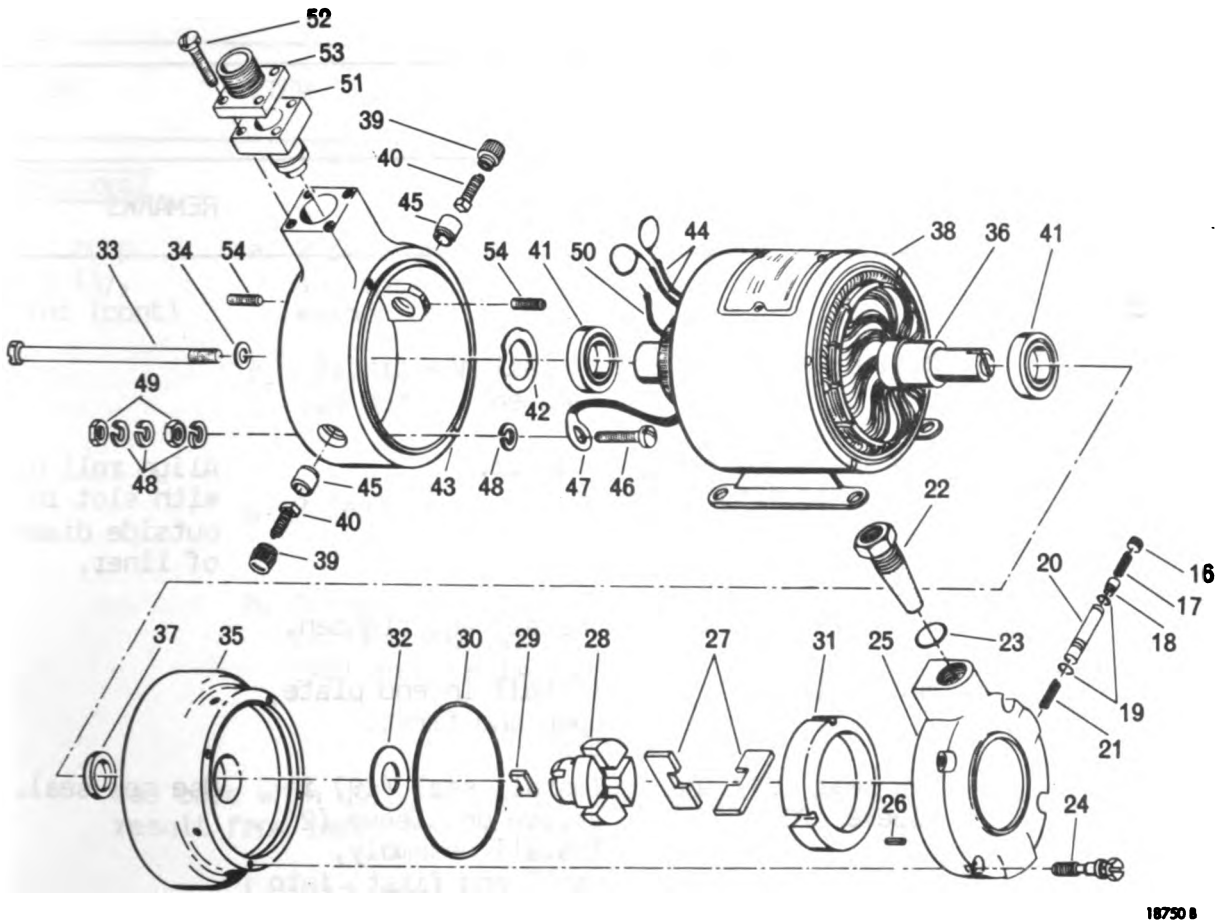
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
5. Fuel pump assy (1), pump (cont)	c. Filter (22) and seal (23)	Remove. Discard seal.	Discard filter if torn or damaged.
	d. Safety wire, 4 screws (24), and end plate (25)	Remove.	
	e. Roll pin (26)	Remove if bent or damaged.	
	f. 2 pump blades (27) shaft (28) and drive blade (29)	Remove and check for damage.	Pump blades are carbon. Handle with care.
	g. Seal (30)	Remove and discard.	

6-2. FUEL TRANSFER PUMP (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
5. Fuel pump assy (1), pump (cont)	h. Pump liner (31) and thrust plate (32)	Check for damage. Remove if damage is visible.	Do not remove if not damaged.
	i. Safety wire, 2 bolts (33), and washers (34)	Remove.	
	j. Pump housing (35)	Remove.	Identify proper scribe mark. Use care to prevent motor armature from being removed with housing.
	k. Shaft seal (37)	Remove and discard seal.	Place housing, large diameter down, on flat surface and press out seal.
	CAUTION Be sure seal is seated in housing.		
	l. New shaft seal (37)	Install with spring side of seal down.	Place housing, small diameter down, on flat surface and press in new seal.
	m. Pump housing (35)	Install over armature shaft and seat against body assy.	Align proper scribe mark on housing with punch mark on body.
	n. 2 washers (34) and bolts (33)	Install and tighten.	



LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
5. Fuel pump assy (1), pump (cont)	o. Thrust plate (32) and liner (31)	Install if removed in step h.	Align large slot in liner with roll pin in end plate.
	p. Drive blade (29)	Install in slot in armature shaft, notched side of blade first.	
	q. Shaft (28) and 2 blades (27)	Install.	Pump blades are carbon. Handle with care.

6-2. FUEL TRANSFER PUMP (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
5. Fuel pump assy (1), pump (cont)	r. Roll pin (26)	Install new pin if removed in step e.	
	s. New seal (30) and end plate (25)	Install.	Align roll pin with slot in outside diameter of liner.
	t. 4 screws (24)	Install and tighten.	
	u. Spring (21)	Install in end plate, open end first.	
	v. New seal (19) and sleeve (20)	Install seal (19) in groove on sleeve (20). Install assembly, small end first, into end plate.	Use new seal.
	w. New seal (19)	Install against end of sleeve (20)	Use new seal.
	x. Piston (18), spring (17) and plug (16)	Install and tighten plug.	
	y. New seal (23) and filter (22)	Install. Tighten filter.	Use new seal.
6. Fuel pump assy (1), motor	a. 2 caps (39) and brushes (40)	Remove.	
	b. 2 bolts (33) and washers (34)	Remove.	
	c. Fuel pump	Remove from motor.	Armature may remain with pump.
	d. Armature (36)	Remove.	

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
6. Fuel pump assy (1), motor (cont)	e. 2 bearings (41) and spring washer (42)	Remove.	
	f. Body and field (38) and head (43)	Separate.	Use care to prevent damage to wiring.
	g. 2 leads (44)	Remove from brush holders (45).	
	h. Screw (46), lead (47), 4 washers (48) and 2 nuts (49)	Remove.	

WARNING

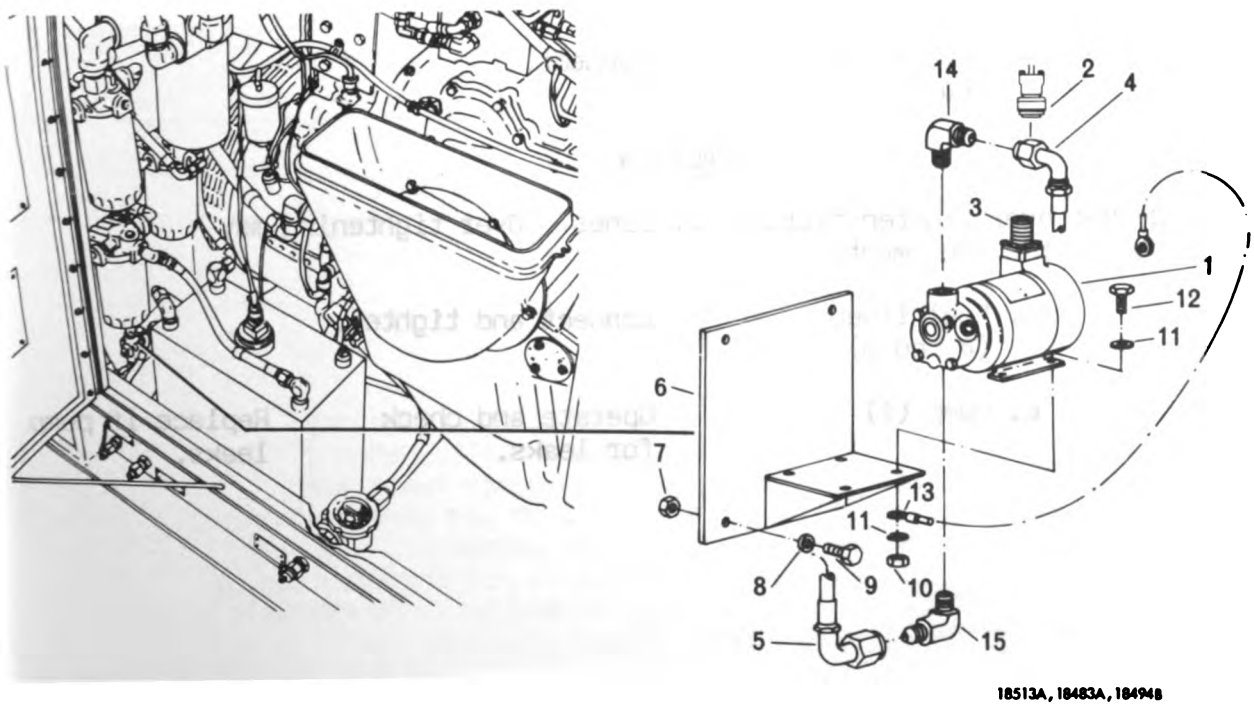
Use care when using soldering equipment. Severe burns could result from improper use of equipment.

	i. Lead (50)	Unsolder from capacitor (51), tag, and identify.	Will completely separate body and field from head.
	j. 4 screws (52), connector (53) and capacitor (51)	Remove.	
	k. 4 sockethead setscrews (54) and 2 brush holders (45)	Remove.	
	l. Armature (36)	Check for broken wires, short circuits or damaged shaft or commutator.	
	m. Body and field (38)	Check for short circuits or open windings.	

6-2. FUEL TRANSFER PUMP (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
6. Fuel pump assy (1), motor (cont)	n. 2 brush holders (45) and 4 setscrews (54)	Install. Tighten setscrews.	Outer end of holder shall be flush with outer diameter of head and square opening shall be straight with splitline surface.
	o. Capacitor (51), connector (53), and 4 screws (52)	Install. Tighten screws.	
	WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.		
	p. Lead (50)	Solder to capacitor (51).	
	q. Screw (46), lead (47), 4 washers (48) and 2 nuts (49)	Install. Tighten one nut to secure lead and screw to head (43).	
	r. 2 leads (44)	Install in grooves in brush holders (45).	
	s. Body and field (38) and head (43)	a. Align 2 setscrews (54) with holes in body and push together.	
		b. Check inside of assembly for wires across opening.	Position wires so they will not interfere with armature.
	t. 2 bearings (41)	Install on armature (36). Seat against shoulder on shaft.	

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
6. Fuel pump assy (1), motor (cont)	u. Spring washer (42)	Install on armature shaft (36) at head end.	
	v. Armature (36)	Install in pump assy. Engage slot in shaft with drive blade (29).	
	w. Pump and armature assy	Install in body (38) and head (43) assy.	Align proper scribe mark on pump with punch mark on body.
	x. 2 washers (34) and bolts (33)	Install and tighten.	
	y. 2 brushes (40) and caps (39)	Install. Tighten caps.	Position curve of brushes to match curve of commutator.
	z. 4 screws (24), 4 screws (52) and 2 bolts (33)	Safety wire as reqd.	



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6-2. FUEL TRANSFER PUMP (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
7. Pump (1)	a. Fitting (14)	Install and tighten.	Position as noted during removal.
	b. Fitting (15)	Install and tighten.	Position as noted during removal.
	c. Plate (6)	Position pump (1) on plate (6).	
	d. 4 bolts (12), lead (13), 8 washers (11), and 4 nuts (10)	Install and tighten.	
8. Plate (6)	a. Plate (6) with pump attached	Position on bulkhead.	
	b. 4 bolts (9), washers (8) and nuts (7)	Install and tighten.	
9. Pump (1)	a. P10 Electrical lead (2)	Connect.	
	CAUTION		
	Do not over tighten fittings or lines. Over tightening may damage the equipment.		
	b. Fuel lines (4 and 5)	Connect and tighten.	
	c. Pump (1)	Operate and check for leaks.	Replace if pump leaks.

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
10. Engine		a. Start and run 10 minutes.	Para 2-2 and 2-3, TM 5-6115-598-12.
		b. Shut down.	Para 2-7, TM 5-6115-598-12
		c. Check for leaks.	Tighten fittings as reqd.

6-3. FUEL LEVEL SWITCH

This task covers:

a. Removal b. Test c. Adjustment d. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

Bristal wrench set (appx C)
Tool Kit, Master Mechanics
(5180-00-699-5273)
Socket head screw set
Shop Equipment, Electrical Repair,
Semitrailer Mounted
(4940-00-294-9517)
1 5/16 open end wrench

Materials/Parts

Loctite pipe sealant (item 12, appx B)
Rags (item 17, appx B)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
5	1,4	2-5
78	1	2-5

Equipment Condition

Para	Condition Description
4-21*	Batteries disarmed.

*TM 5-6115-598-12

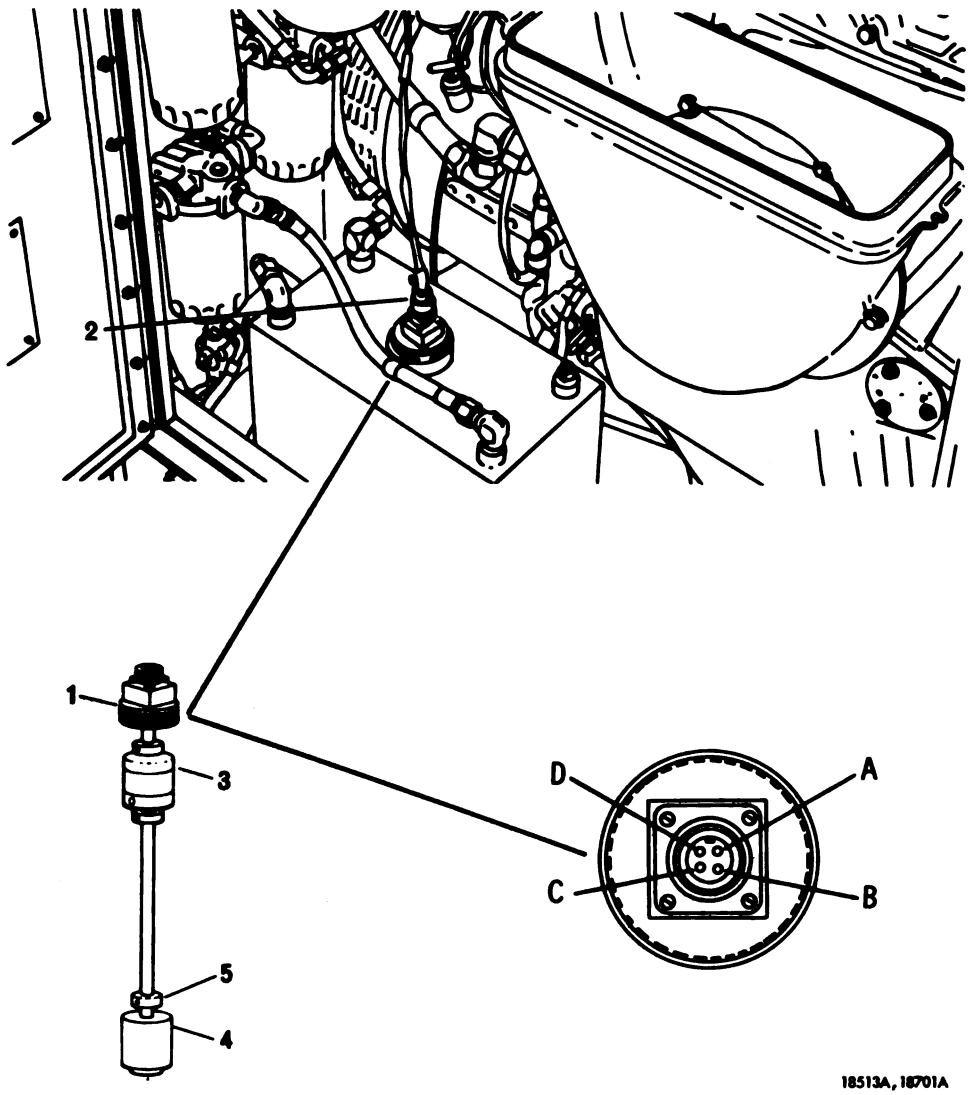
LOCATION	ITEM	ACTION	REMARKS

REMOVAL

WARNING

Fire may be caused by spilled fuel. Serious burns may result from accidental ignition of fuel spilled when servicing fuel system components. Emergency fuels are particularly hazardous. Use a fuel catch pan when draining fuel from any fuel line or fuel system component. Be sure that area around fuel nozzle assembly is not contaminated by fuel when testing igniter or ignition exciter. Do not weld fuel tank unless tank has been properly purged.

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
1. Fuel level switch (1)	a. P9 connector (2) on top of switch	Disconnect.	
	b. Switch (1)	a. Loosen by turning CCW.	
		b. Remove from day tank.	



6-3. FUEL LEVEL SWITCH (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST			
2. Fuel level switch (1)	a. Upper float (3)	a. Place in fully lowered position.	
		b. Check resistance between pins A and B.	Set multimeter RX1 scale. Reading should be 0-1 ohm.
		c. Place in fully raised position.	Set multimeter RX10,000 scale. Reading should read infinity.
	b. Lower float (4)	a. Place in fully lowered position.	
		b. Check resistance between pins C and D.	Set multimeter Rx1 scale. Reading should read 0-1 ohm.
		c. Place in fully raised position.	Set multimeter Rx10,000 scale. Reading should be infinity.
		d. Connect pins A, B, C, and D consecutively to ground.	Resistance should check greater than 10,000 ohms on all pins.
ADJUSTMENT			
3. Fuel level switch (1)	a. Connector	Connect multimeter leads to pins C and D.	
	b. Lower float (4)	Lower to full lowered position.	

LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENT (cont)			
3. Fuel level switch (1) (cont)	c. Collar (5)	Loosen set screws and slide collar half way up the shaft.	
	d. Float (4)	Raise to a point where multimeter shows infinity.	
	e. Collar (5)	a. Measure up 1 1/4 in. (32 mm) from top of float. b. Move collar so that the lower surface is at the measured point. c. Tighten set screw.	
INSTALLATION			
4. Fuel level switch (1)	a. Switch (1)	a. Coat threads with pipe sealant. b. Insert through center hole in top of day tank. c. Tighten.	
	b. P9 electrical connector (2)	Connect.	

6-4. FUEL TANK ASSEMBLY

This task covers:

a. Removal b. Repair c. Installation

INITIAL SETUP

Tools

Tool Kit, Master Mechanics (5180-00-699-5273)

3/4 open end wrench
Socket head screw key set
3/8-dr ratchet handle
5-in. extension, 3/8 dr
9/16 combination wrench
5/8 open end wrench
1-in. open end wrench
7/8 open end wrench
9/16 socket

Shop Equipment, Electrical Repair, Semitrailer Mounted (4940-00-294-9517)

1 5/16 open end wrench

Welding Shop, Trailer Mounted (3431-00-935-7821)

Inert gas shielded arc welding set
Welder's apron
Welder's helmet
Welder's sleeves

Materials/Parts

Bucket (item 4, appx B)
Paint brush (item 5, appx B)

Materials/Parts (cont)

Argon gas (item 9, appx B)
Welder's gloves (item 10, appx B)
Locktite pipe sealant (item 12, appx B)
Paint (item 16, appx B)
Rags (item 17, appx B)
Sandpaper (item 19, appx B)
Tags (item 24, appx B)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F
Welder MOS 44B

Equipment Condition

Para	Condition Description
4-21*	Batteries disarmed.

*TM 5-6115-598-12

General Safety Instructions

No smoking or open flame.

LOCATION	ITEM	ACTION	REMARKS

REMOVAL

WARNING

Fire may be caused by spilled fuel. Serious burns may result from accidental ignition of fuel spilled when servicing fuel system components. Emergency fuels are particularly hazardous. Use a fuel catch pan when draining fuel from any fuel line or fuel system component. Be sure that area around fuel nozzle assembly is not contaminated by fuel when testing igniter or ignition exciter. Do not weld fuel tank unless tank has been properly purged.

CAUTION

Drain all fuel from tank before removal.

1. Fuel tank (1)	a. Drain valve cap (2)	Remove.	
	b. Drain valve (3)	Open to drain fuel.	Drain fuel into container.
	c. Connector (4)	Disconnect, tag, and identify.	
	d. Fuel lines (5 and 7)	Disconnect from fuel tank. Cover openings.	
	e. Fuel line (6)	Remove. Cover openings.	
	f. Plug (8), elbow (9), and fittings with tubes (10) and (11)	Remove.	Note positions of fittings (9, 10, and 11) for location during installation.
	g. Drain valve (3)	Remove.	
	h. Fuel level switch (12)	Remove.	

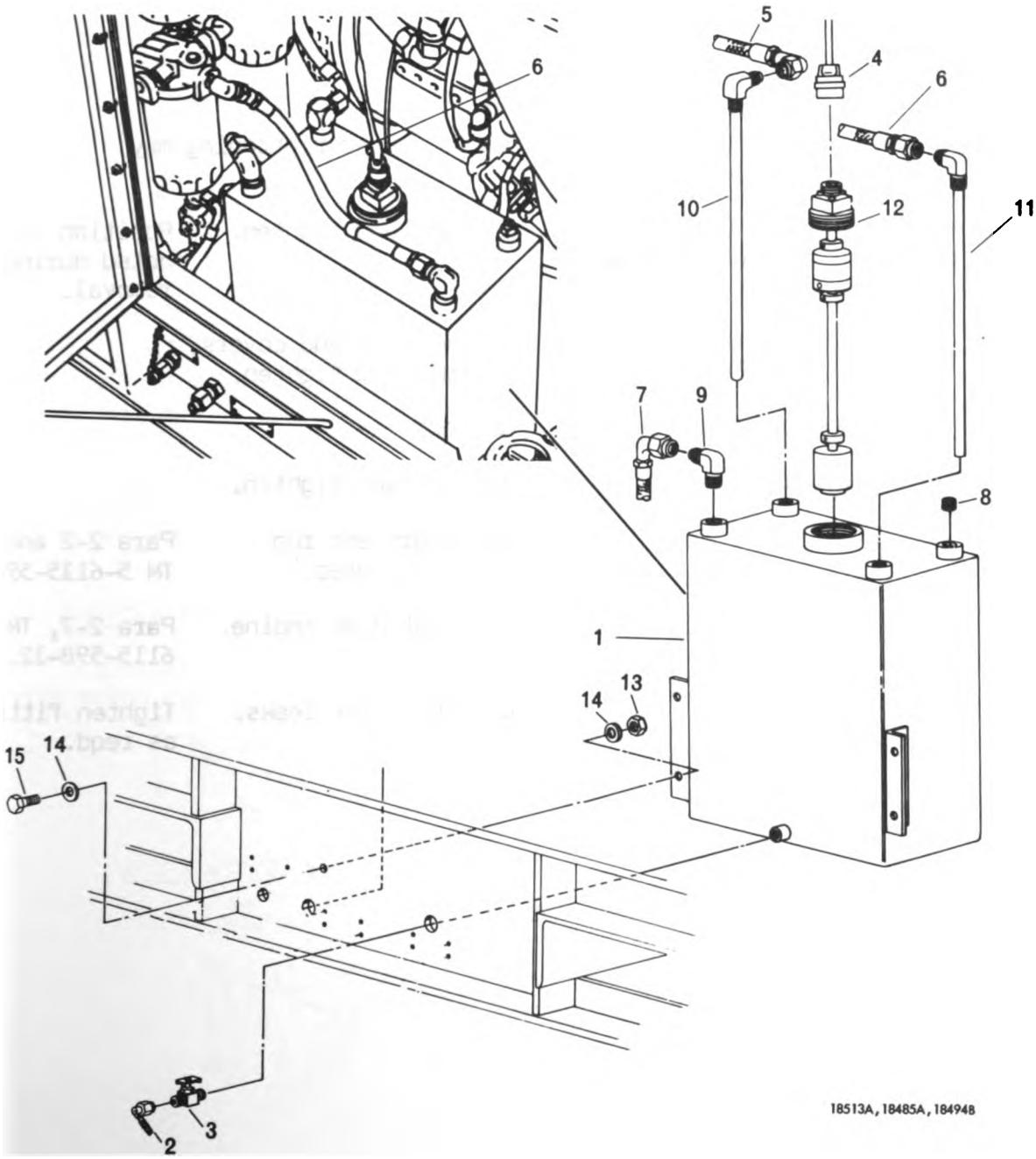
6-4. FUEL TANK ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR			
1. Fuel tank (1) (cont)	i. 4 nuts (13), 8 washers (14) and 4 bolts (15)	Remove.	
	j. Fuel tank (1)	Remove.	

WARNING

- Use care when using welding equipment. Severe burns could result from improper use of equipment. Do not watch welding process without proper eye protection. Severe eye damage or blindness could result.
- All fuel must be drained from fuel tank and tank must be flushed per appropriate TB before beginning repair. Attempting to weld an unpurged fuel tank could result in personal injury or death.

2. Fuel tank (1)		Weld punctures, sand and paint as reqd.	
INSTALLATION			
3. Fuel tank (1)	a. Fuel tank (1)	Position in place in cabinet.	
	b. 4 bolts (15), 8 washers (14), and 4 nuts (13)	Install and tighten.	
	c. Fuel level switch (12)	a. Coat threads with pipe sealant.	
		b. Install and tighten.	
	d. Drain valve (3)	a. Install and tighten.	Position with handle at the top.
		b. Close valve.	



6-4. FUEL TANK ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
		CAUTION	
	Do not over tighten fittings or lines. Over tightening may damage the equipment.		
3. Fuel tank (1) (cont)	e. Plug (8), elbow (9) and fittings with tubes (10 and 11)	Install and tighten.	Position as noted during removal.
	f. 3 fuel lines (5, 6 and 7)	Remove tags and covers, install and tighten.	
	g. Connector (4)	Connect.	
	h. Drain valve cap (2)	Install and tighten.	
4. Engine		a. Start and run 10 minutes.	Para 2-2 and 2-3, TM 5-6115-598-12.
		b. Shut down engine.	Para 2-7, TM 5-6115-598-12.
		c. Check for leaks.	Tighten fittings as reqd.

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6-5. FUEL METERING VALVE AND MECHANICAL FUEL PUMP

This task covers:

a. Test b. Removal c. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

10 mm combination wrench (appx C)
13 mm combination wrench (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
Putty knife
3/8 combination wrench
1 1/16 combination wrench
9/16 combination wrench
1/2 combination wrench
5/16 combination wrench
11/16 combination wrench
7/8 combination wrench
1-in. combination wrench
5/8 combination wrench
3/4 combination wrench

Materials/Parts

Bucket (item 4, appx B)
Rags (item 17, appx B)
Fuel valve IN packing
Fuel pump to fuel valve packing
Fuel valve OUT to tank packing
Fuel valve OUT to solenoid packing
Fuel pump gasket
Lock washers (item 11)
Lock washer (item 18)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
31	6,8,9	2-5
33	1	2-5
35	13,17,18	2-5
44	2,4	2-5
45	4,6	2-5
46	6,7	2-5

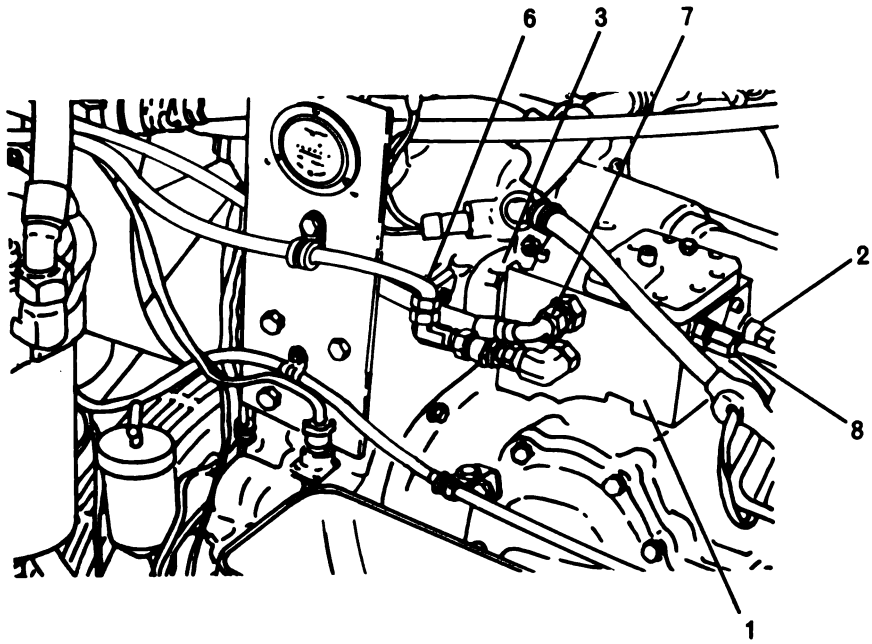
Equipment Condition

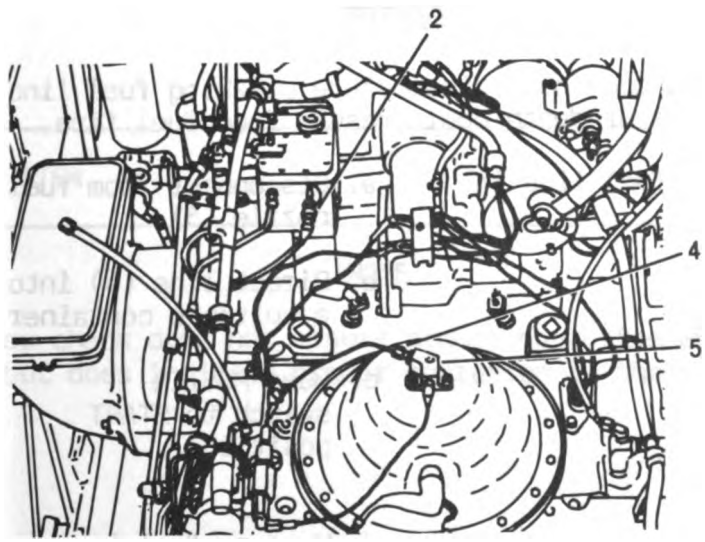
Para	Condition Description
4-13*	Front roof removed.
4-21*	Disarm battery power after test.

*TM 5-6115-598-12

General Safety Instructions

No smoking or open flame.





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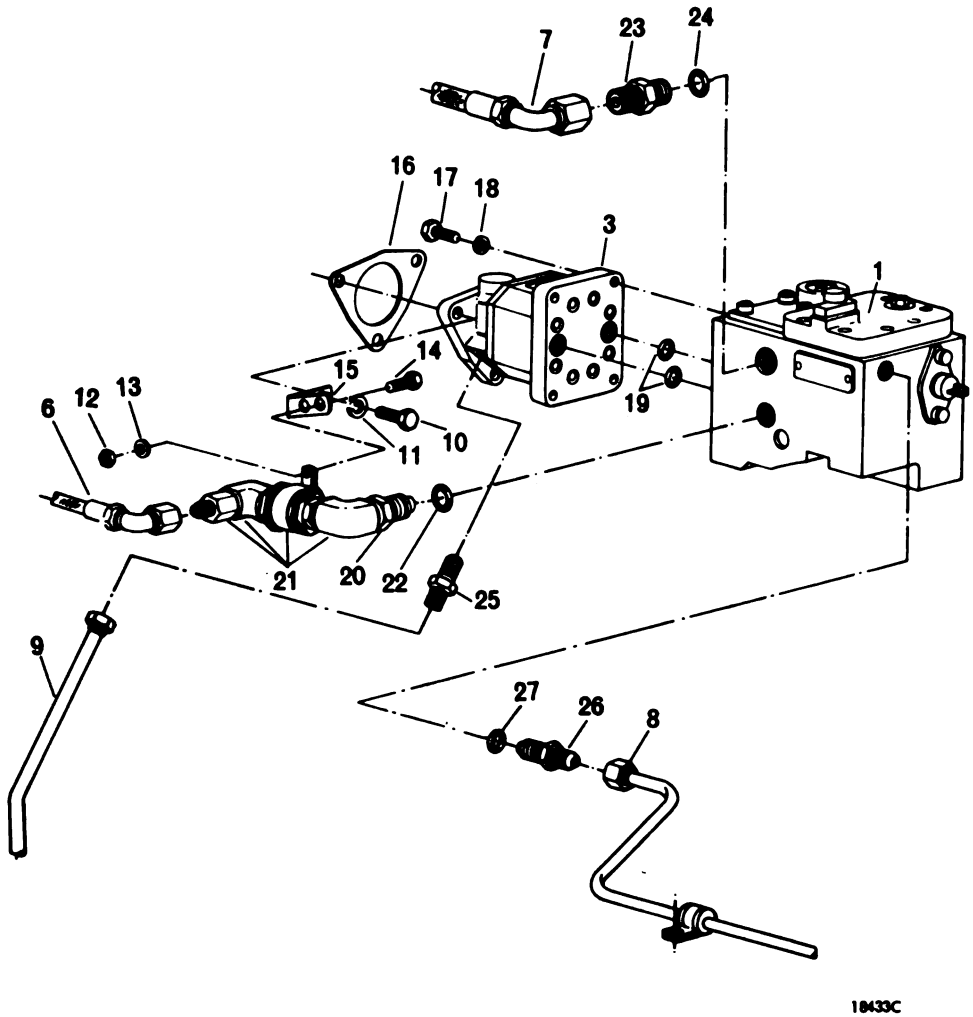
6-5. FUEL METERING VALVE AND MECHANICAL FUEL PUMP (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Fuel metering valve (1)	Electrical connector (2) at valve	a. Disconnect.	
		b. Check continuity between spade lugs.	Set multimeter to RX1. Resistance between male spade lugs should be 8-12 ohms.
		c. Check short to ground using multimeter.	Set multimeter to RX10,000. Resistance to ground from either spade lug should be 10,000 ohms minimum.
		WARNING Allow adequate cool-down time before breaking fuel lines. Personal injury or death could result from fuel fire.	
2. Fuel pump (3)	Pilot fuel line (4)	a. Disconnect from fuel nozzle (5).	
		b. Direct line (4) into a suitable container.	
		c. Move MASTER switch to START position.	Starter will cut off after approx. 6 seconds.
		d. Measure fuel in container.	Amount should measure approx. 1/2 cup. If not within limits, replace pump and valve assembly.



LOCATION	ITEM	ACTION	REMARKS

NOTE

This flow check does not assure proper operation at full power, but does indicate proper operation in the starting range.

REMOVAL

3. Fuel pump (3) and metering valve (1) assy	a. Electrical connector (2)	Disconnect.	

6-5. FUEL METERING VALVE AND MECHANICAL FUEL PUMP (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
	WARNING		
	Fuel spillage must be wiped up to avoid fire danger.		
3. Fuel pump (3) and metering valve (1) assy (cont)	b. 3 fuel lines (6, 7, and 8) to metering valve	Disconnect.	Catch drainage with rag.
	c. Drain line (9)	Remove.	
	d. 3 bolts (10) and lock washers (11)	Remove and discard lock washers.	
	e. Nut (12), washer (13), bolt (14), and bracket (15)	Remove.	For bracket replacement only.
	f. Pump (3) and valve (1) assy	Remove together.	Valve is attached to pump with 4 bolts and lock washers.
	g. Gasket (16)	Remove and clean mounting surfaces. Discard gasket.	
	h. 4 bolts (17) and lock washers (18)	Remove and discard lock washers.	
	i. Valve (1)	Separate from pump.	2 preformed packings fit between valve and pump.
	j. 2 packings (19)	Remove and discard.	
	k. Nut (20)	Loosen.	
	l. Fittings (21) and nut (20)	Remove as an assembly.	Note position for installation.

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (Cont)			
3. Fuel pump (3) and metering valve (1) assy (cont)	m. Packing (22)	Remove and discard.	
	n. Fitting (23) and packing (24)	Remove. Discard packing.	
	o. Fitting (25)	Remove	
	p. Fitting (26) and packing (27)	Remove. Discard packing.	
INSTALLATION			
4. Fuel pump (3) and metering valve (1)	a. 2 new preformed packings (19)	Place packings between pump (3) and valve (1).	
	b. 4 bolts (17) and new lock washers(18)	Install and tighten.	Care should be taken that 2 packings remain in proper seating.
	c. New packing (27) and fitting (26)	a. Install packing on fitting. b. Install and tighten fitting.	
	d. Fitting (25)	Install and tighten.	
	e. New packing (22)	Install on fitting (21).	
	f. Fittings (21) and nut (20)	Install as an assembly. Tighten nut (20).	Position as noted during removal.
	g. Fitting (23) and new packing (24)	Install and tighten.	
	h. Bracket (15), bolt (14), washer (13) and nut (12)	Install and tighten nut (if removed).	

6-5. FUEL METERING VALVE AND MECHANICAL FUEL PUMP (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
4. Fuel pump (3) and metering valve (1) (cont)	i. New gasket (16)	Position on pump.	
	j. Pump (3) and valve (1) assy	Install.	Ensure gear shaft is properly engaged into gearbox.
	k. 3 bolts (10) and new lock washers (11)	Install and tighten.	

CAUTION

Do not over tighten fittings or lines. Overtightening may damage the equipment.

	l. 3 fuel lines (6, 7, and 8)	Connect.
	m. Drain line (9)	Connect.
	n. Electrical connector (2)	Connect.

NOTE

Fuel leakage from drain line while engine is running indicates a defective fuel metering valve.

5. Engine		a. Start and run 10 minutes.	Para 2-2 and 2-3, TM 5-6115-598-12.
		b. Shut down engine.	Para 2-7, TM 5-6115-598-12.
		c. Check for fuel leaks.	Tighten fittings as reqd.

CHAPTER 7
MAINTENANCE OF IGNITION SYSTEM

7-1. PURPOSE AND FUNCTION

The purpose and function of the ignition system is to motor the engine and ignite the fuel and air mixture in the combustion chamber burner.

7-2. STARTER

This task covers:

a. Test b. Repair

INITIAL SETUP

Test Equipment

Multimeter
110 Volt test lamp
Armature test set
D.C. ammeter
Tachometer, mechanical, hand held

Tools

Tool Kit, Master Mechanics
(5180-00-699-5273)
7/16 socket, 3/8 dr
4-in. flat tip screwdriver
3/8-dr ratchet handle
5-in. extension
3/4 deep well socket
Pry bar (2)
12-in. flat tip screwdriver
Socket head screw key set
1/4-in. nut driver
No. 4 cross tip screwdriver
Rule, steel, machinists
Shop Equipment, Electrical Repair
Semitrailer Mounted
(4940-00-294-9517)
Armature, undercutter, electrical

Materials/Parts

Cleaning solvent (item 22, appx B)
Rags (item 17, appx B)
Sand paper (item 19, appx B)
Tags (item 24, appx B)
Grease (item 29, appx B)
Oil (item 30, appx B)
4 brushes
Insulators and insulator kits
Insulator, Brush Holders
Insulator, Plate
Insulator, Terminal
Packing (item 47)
Cup plug
Felt plug

Personnel Required

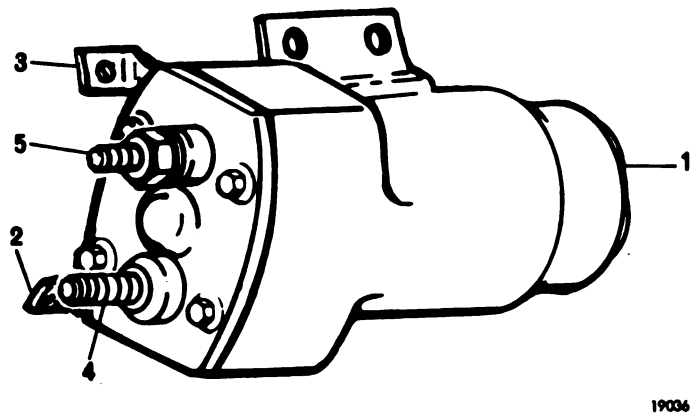
Turbine Engine Driven Generator Repairer MOS 52F

Equipment Condition

Para	Condition Description
4-13*	Front roof removed.
4-40*	Starter removed.

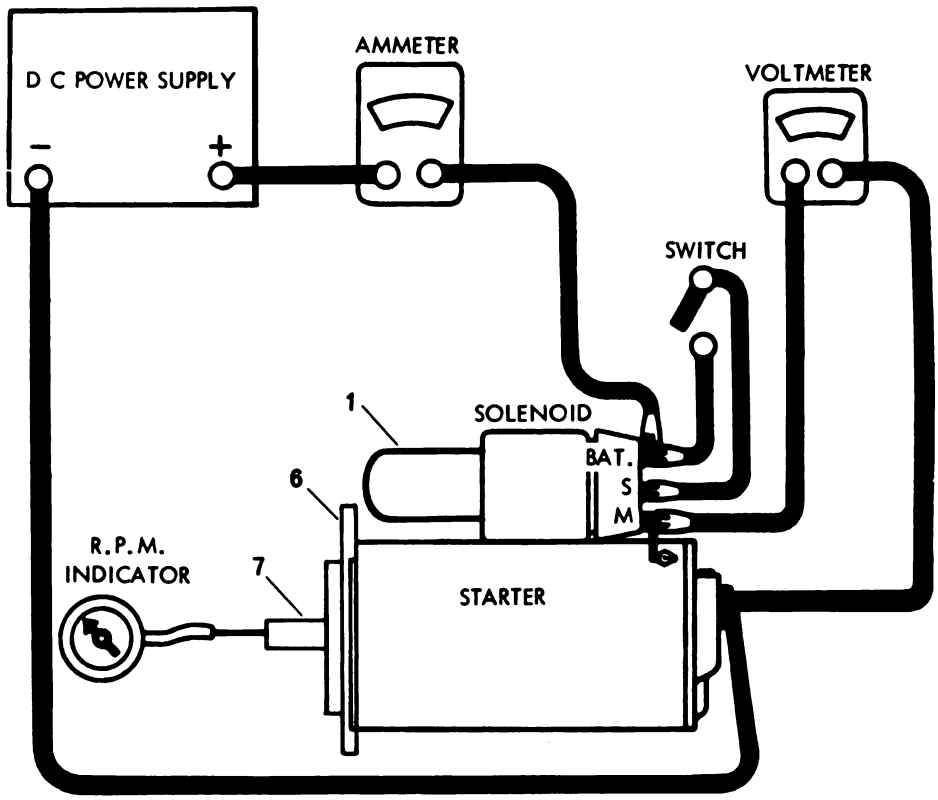
*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Solenoid (1)	a. Coil terminals (2 and 3)		Set multimeter to RX1 scale.
		Test as follows:	
		1. Connect meter between switch terminal (2) and ground terminal (3).	Resistance should be 3.6 to 4.0 ohms. If resistance is correct, do step b.



LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
1. Solenoid (1) (cont)		2. If resistance is not correct, replace solenoid (1).	
	b. Contactor terminals (4 and 5)	Test as follows: 1. Check between terminals (4 and 5).	Set multimeter to RX1 scale.
		2. Apply battery power (12 Vdc) between switch terminals, (2) positive, and (3) negative.	Resistance should be 0-1 ohm.
		3. If resistance is correct, do step 2.	
		4. If resistance is not correct, replace solenoid (1).	
2. Starter (6)	a. Armature shaft (7)	Turn armature shaft by hand: 1. If armature turns freely, make a no-load test per step 2, item b.	

7-2. STARTER (cont)



NO LOAD TEST CIRCUIT

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LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. Starter (6) (cont)		2. If armature does not turn freely, repair starter; do not perform the no load test.	Tight bearings, a bent armature shaft, or a loose pole shoe screw will cause armature tightness.

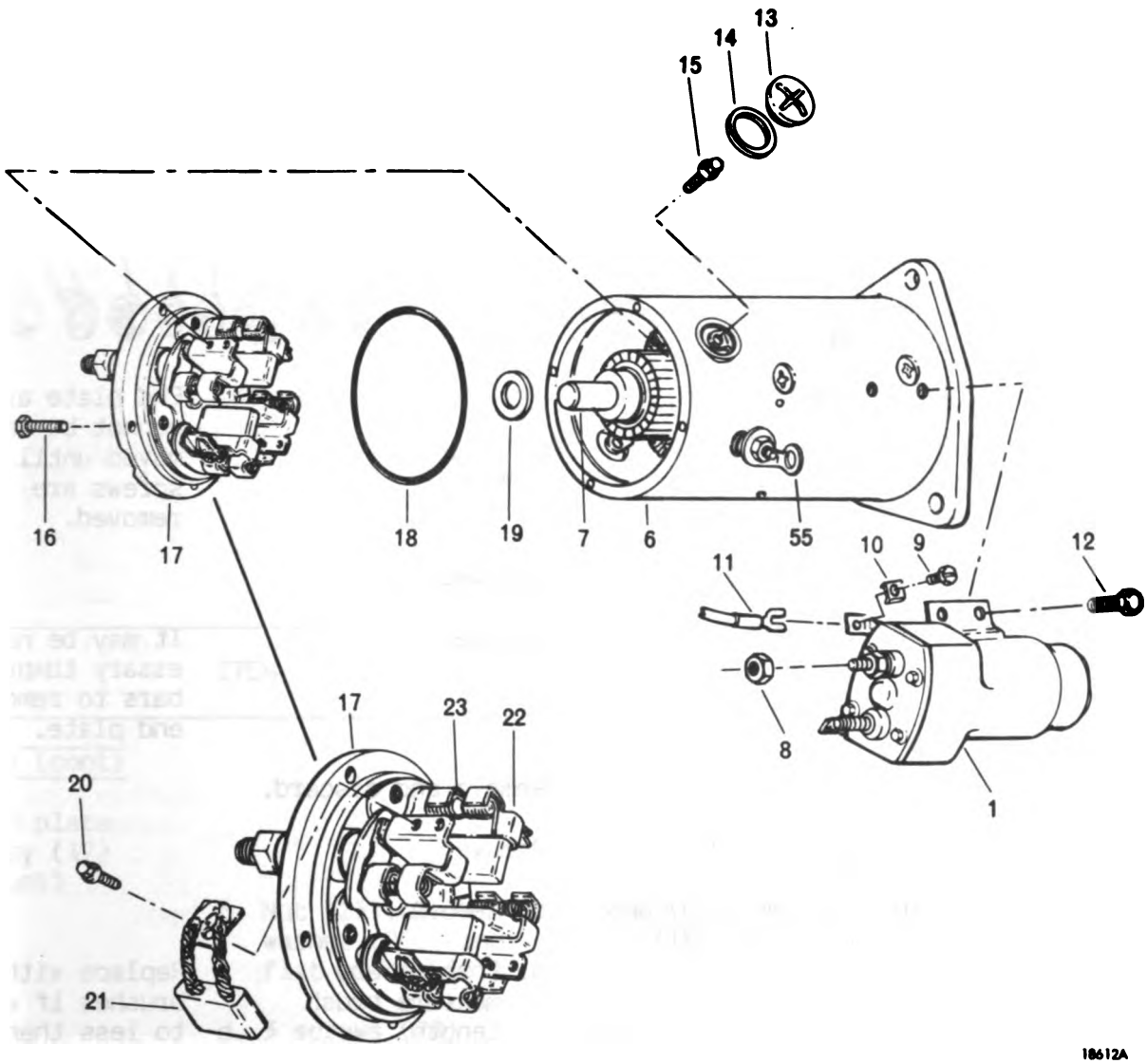
NOTE

No-load test isolates the problem area. Allow starter to cool for at least five minutes between tests.

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. Starter (6) (cont)	b. No-load test	a. Connect circuit to starter, as shown.	
		b. Close switch and observe volts, amps, and rpm.	Normal conditions are 75 to 120 amps at 23 volts and 5800 to 10,000 rpm.
		c. If test shows low free speed and high current draw, check for:	
		1. Too much friction.	
		2. Tight, dirty, or worn bearings.	
		3. Bent armature shaft or loose pole shoes.	
		4. Shorted armature.	
		5. Grounded armature or fields.	
		d. If test shows failure to operate with high current draw, check for:	
		1. Terminal or fields grounded.	
		2. Defective bearings.	Determine by hand turning armature.
		e. If test shows failure to operate with no current draw, check for:	

7-2. STARTER (cont)

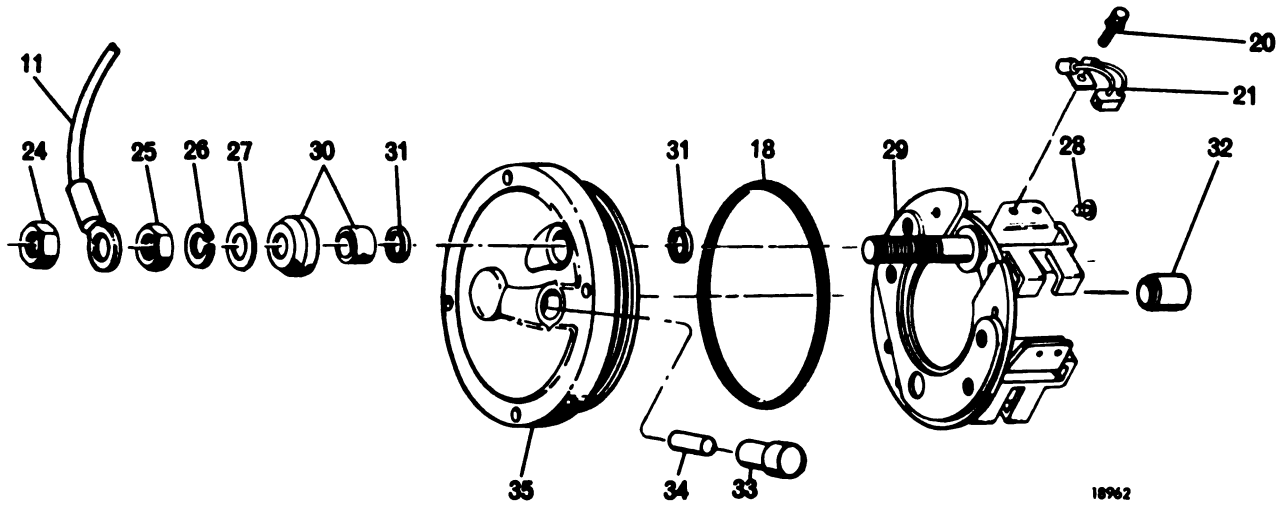
LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. Starter (6) (cont)		1. Open field circuit.	Check by test lamp after disassembly.
		2. Open armature coils.	Indicated by badly burned commutator bars after disassembly.
		3. Broken brush springs.	
		4. Worn brushes.	
		5. High insulation between commutator bars.	
		6. Lack of good contact between brushes and commutator.	
		f. If test shows low no-load speed and low current draw, check for:	
		1. Poor connections.	
		2. Dirty commutator.	
		3. Any cause in step e.	
		g. If test shows high free speed and high current draw, check for:	
		Shorted fields.	Replace coil assy as req'd.



LOCATION	ITEM	ACTION	REMARKS
REPAIR			
3. Solenoid (1)	a. Nut (8)	Remove.	
	b. Screw (9), lock clip (10) and ground lead (11)	Loosen screw and lock clip and remove lead.	
	c. 4 bolts (12)	Remove.	
	d. Solenoid (1)	Remove.	

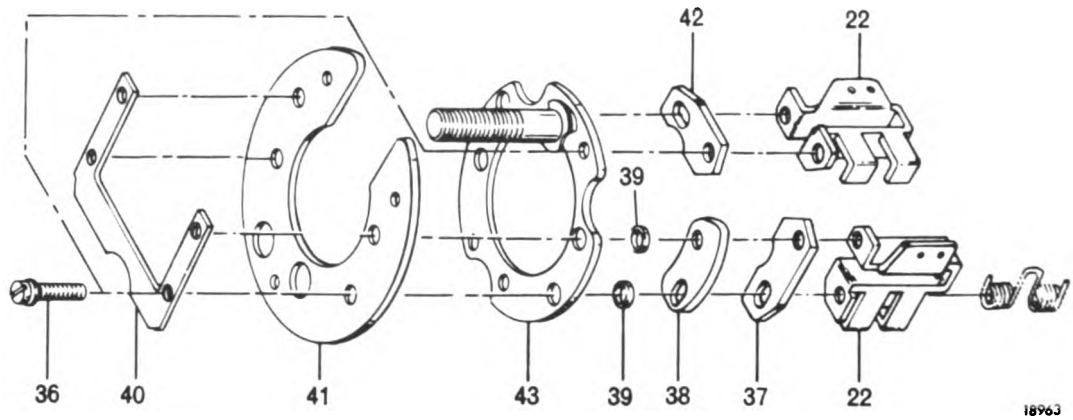
7-2. STARTER (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
4. Starter (6)	a. 2 plugs (13) and gaskets (14)	Remove.	
	b. 2 screws (15)	Remove.	End plate assy cannot be removed until 2 screws are removed.
	c. 4 bolts (16)	Remove.	
	d. End plate assy (17)	Remove.	It may be necessary to use pry bars to remove end plate.
	e. Packing (18)	Remove and discard.	
	f. Washer (19)	Remove.	
	g. 4 screws (20) and 4 brushes (21)	a. Remove.	
		b. Inspect and measure brush length.	Replace with new brushes if worn to less than 3/8 inch (9 mm) long.
5. End plate assy (17)	a. Nut (24)	Remove.	
	b. Ground lead (11)	a. Remove, tag, and identify.	



LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
5. End plate assy (17) (cont)		b. Inspect lead for damage.	Repair or replace as reqd.
	c. Nut (25), lock washer (26), and flat washer (27)	Remove.	
	d. 3 screws (28)	Remove.	
	e. Brush holder assy (29)	Remove.	
	f. Terminal insulators (30)	Remove and discard.	
	g. 2 insulating washers (31)	Remove and discard.	
	NOTE Do not drill, ream, or machine a sintered bronze bearing.		
	h. Commutator end bushing (32)	a. Wipe clean.	

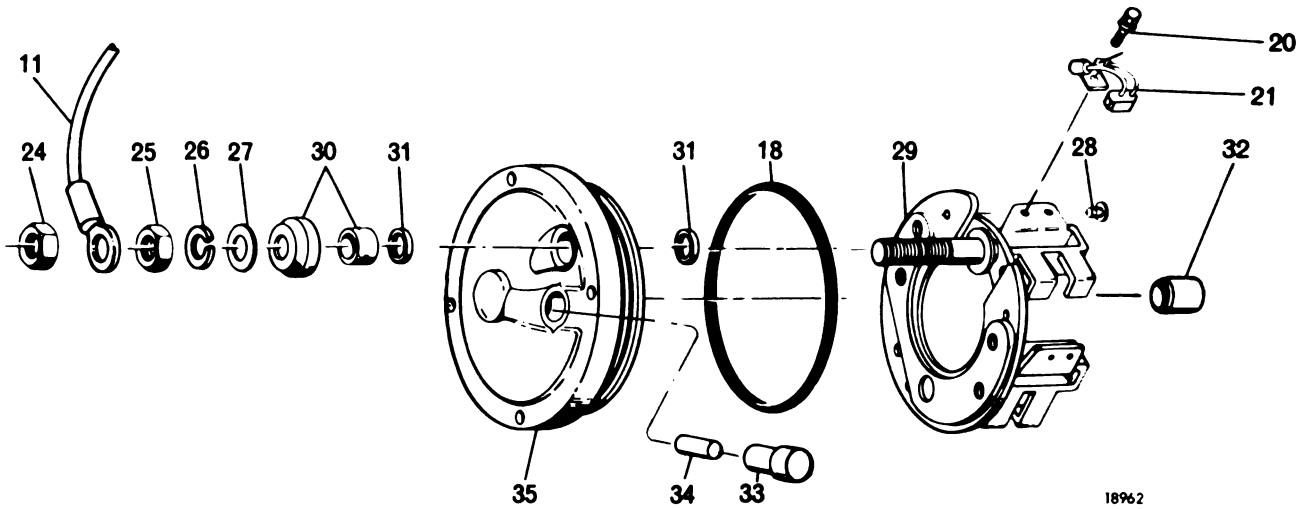
7-2. STARTER (cont)



LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
5. End plate assy (17) (cont)		b. Inspect for wear.	Bushing inside diameter should be 0.562-0.565 in. (14.27-14.35 mm).
		c. Replace bushing if worn beyond limits.	
	i. Oil reservoir cup plug (33)	Remove and discard.	
	j. Felt plug (34)	Remove and discard.	
	k. End plate (35)	Inspect for damage.	
6. Brush holder assy (29)	a. 4 screws (36)	Remove.	
	b. 2 brush holders and spring assy (22)	Remove.	
	c. 2 insulator plate holders (37)	Remove.	

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
6. Brush holder assy (29) (cont)	d. 2 brush holder insulators (38) and 4 washers (39)	Remove and discard insulators holders.	
	e. Conductor (40)	Remove.	
	f. Insulator plate (41)	Remove and discard.	
	g. 4 screws (36)	Remove.	
	h. 2 brush holders and spring assy (22)	Remove.	
	i. 2 ground plates (42)	Remove.	
	j. Plate and stud assy (43)	Inspect for damage.	Replace as reqd.
	k. 4 brush holders and spring assy (22)	Inspect holder and springs for damage.	If springs are discolored or distorted, replace the assembly.
	l. 2 ground plates (42)	Position on plate and stud assy.	
	m. 2 brush holders and spring assy (22)	Position on ground plates.	
	n. 4 screws (36)	Install and tighten.	Torque screws to 14-25 in. lb (1.6-2.8 N·m).
	o. New insulator plate (41)	Position on plate and stud assy.	

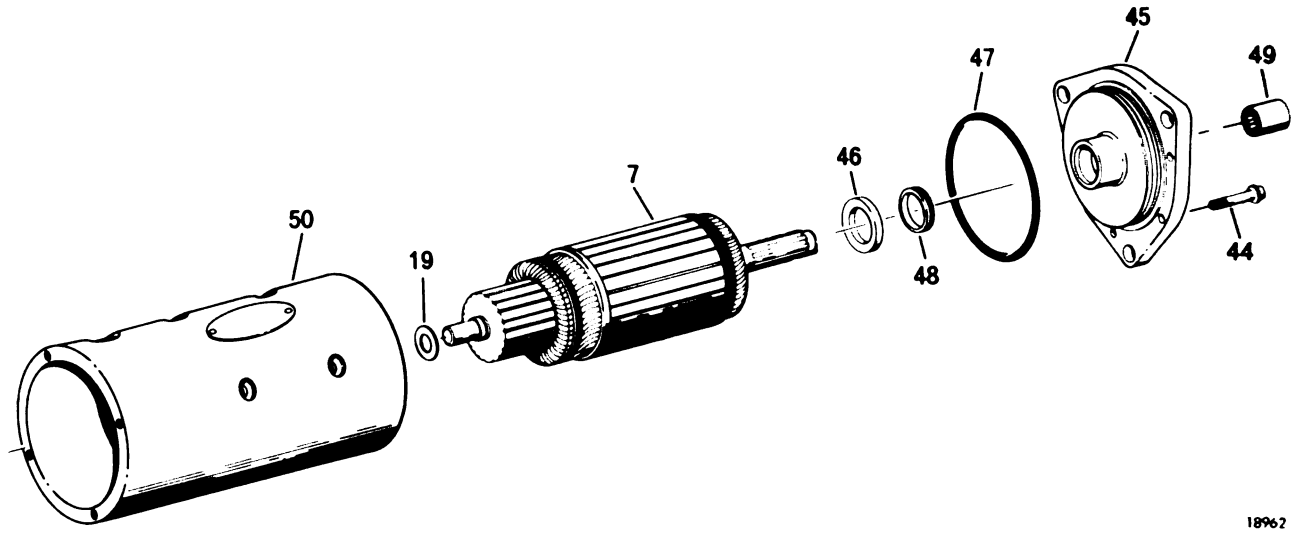
7-2. STARTER (cont)



LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
6. Brush holder assy (29) (cont)	p. Conductor (40)	Position on insulator plate.	
	q. 4 washers (39)	Insert in plate and stud assy.	
	r. 2 new brush holder insulators (38)	Position on plate and stud assy.	
	s. 2 insulator plate holders (37)	Position on brush holder insulators.	
	t. 2 brush holders and spring assy (22)	Position on insulator plate holders.	
	u. 4 screws (36)	Install and tighten.	Torque screws to 14-25 in. lb (1.6-2.8 N·m).
7. End plate assy (17)	a. New felt plug (34)	a. Saturate with oil. b. Install in end plate.	

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
7. End plate assy (17) (cont)	b. New oil reservoir cup plug (33)		Install.
	c. 2 new insulating washers (31)	Install on terminal stud.	
	d. New packing (18)	Install.	
	e. Brush holder assy (29)	Position on end plate.	
	f. 3 screws (28)	Install and tighten.	
	g. Insulator kit (30)	Install on terminal,	
	h. Flat washer (27), lock washer (26), and nut (25)	Install and tighten.	Torque nut to 20-25 lb-ft (27-34 N·m).
	i. Ground lead (11)	Position on terminal.	
	j. Nut (24)	Install and tighten.	
	k. 4 brushes (21)	a. Install in holders (22), from the inside, with lead end first.	Leads must be positioned so flat side of lead contacts brush holder.
		b. Lift brush spring (23) and move brush (21) outward until spring rests on side of brush.	
	l. 4 screws (20)	Install through brush lead and into holder (22). Tighten screws.	

7-2. STARTER (cont)



LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
8. Starter (6)	a. 5 bolts (44)	Remove.	
	b. Drive end housing (45) and armature (7)	Remove as a unit.	Use pry bars as reqd to loosen.
	c. Armature assy (7)	Remove from housing (45).	Use care when removing armature to prevent damage to bearing.
	d. Washer (19)	Remove from armature commutator end shaft.	
	e. Spacer (46)	Remove.	
9. Drive end housing (45)	a. Packing (47)	Remove and discard.	
	b. Oil seal (48)	a. Examine seal lip for wear and overheating.	

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
9. Drive end housing (45) (cont)	b. Oil seal (48) (cont)	b. If seal is damaged, remove and discard.	
		c. Press new seal into housing with seal flange end toward bearing.	Should be flush with countersink to seal bore intersection.
	c. Roller bearing (49)	a. Clean.	
		b. Inspect rollers for:	
		1. Freedom of movement.	
		2. Overheating.	
		3. Damage.	
		c. If bearing is serviceable repack with grease.	
		d. If damaged, replace bearing assembly as follows:	
		1. Remove oil seal (48).	
		2. Press bearing out of bore.	Push from the drive end of housing.
		3. Pack new bearing with grease.	
		4. Install new bearing by pressing into bore at the seal end.	Bearing end should be flush with bearing bore at the seal end.

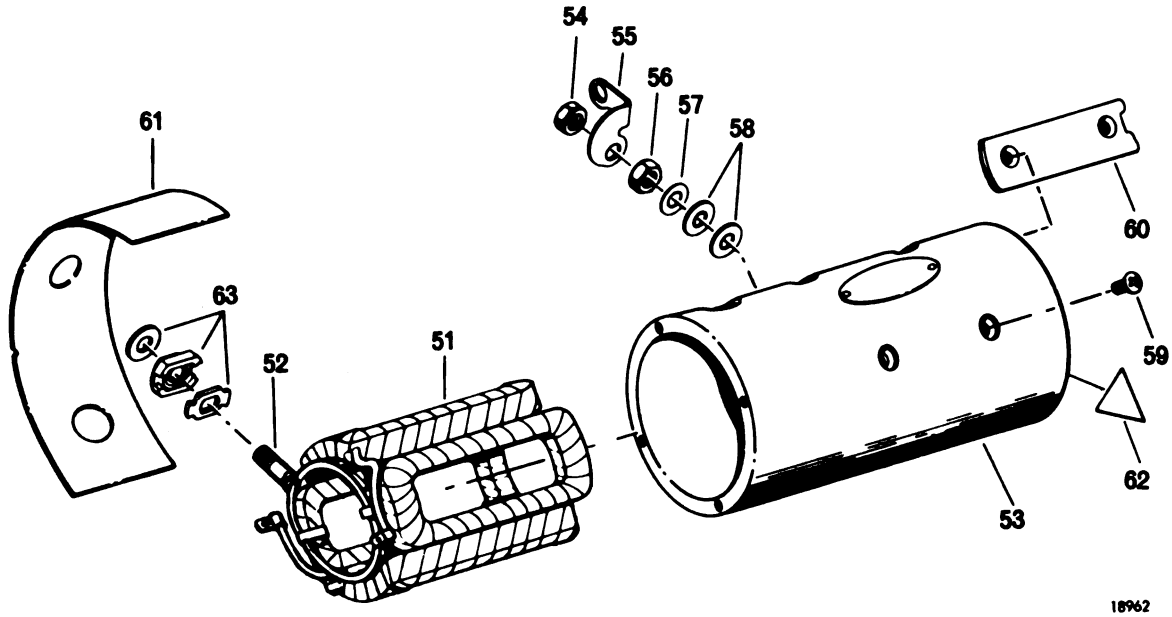
7-2. STARTER (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
9. Drive end housing (45) (cont)		5. Install new oil seal.	
		CAUTION Do not clean starter parts in a degreasing tank or with grease dissolving solvents since insulation will be damaged.	
10. Armature (7)		a. Clean armature.	Use mineral spirits and brush for cleaning.
		b. Check armature shaft runout.	If runout is is greater than 0.013 in. total indicator reading, replace armature.
		c. Inspect the commutator as follows:	If commutator requires repair, do steps d. thru f. If commutator is serviceable, do step g.
		1. Wear, burning, and dirt.	
		2. Out of round.	
		3. High insulation.	
		d. Place armature in fixture and turn down commutator.	

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
10. Armature (7) (cont)		e. Under cut insulation 1/32 in. (0.8 mm) wide and 1/32 in. (0.8 mm) deep and clean debris from slots.	
		CAUTION Do not use emery cloth to clean commutator as this can result in damage to the commutator.	
		f. Remove burrs by lightly sanding commutator with No. 00 sandpaper.	
		g. Inspect for open circuits or loose connections at the joint between the conductors and commutator bars.	Open circuits are caused by excessively long cranking periods, which will cause arcing and burning of the commutator bars.
		1. If burning is excessive or commutator bars are badly damaged, replace armature.	
		WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.	
		2. If bars are not badly burned, repair leads by soldering using rosin flux and turning commutator per steps d thru f.	

7-2. STARTER (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
10. Armature (7) (cont)		h. Check for short circuits using the growler (armature test set) as follows: 1. Place armature in growler and turn on power. 2. Run a steel strip over the armature surfaces. If the coil is shorted, the steel strip will become magnetized and vibrate. 3. Rotate armature and repeat test for one complete revolution. 4. If there are shorts, clean slots between bars to eliminate brush material or copper dust. 5. If short cannot be eliminated, replace armature.	
		i. Check armature for grounds between commutator bars and armature shaft. If test lamp lights, replace armature.	Use 110 V test lamp. Grounds occur as a result of insulation failure resulting from overheating the starter motor.



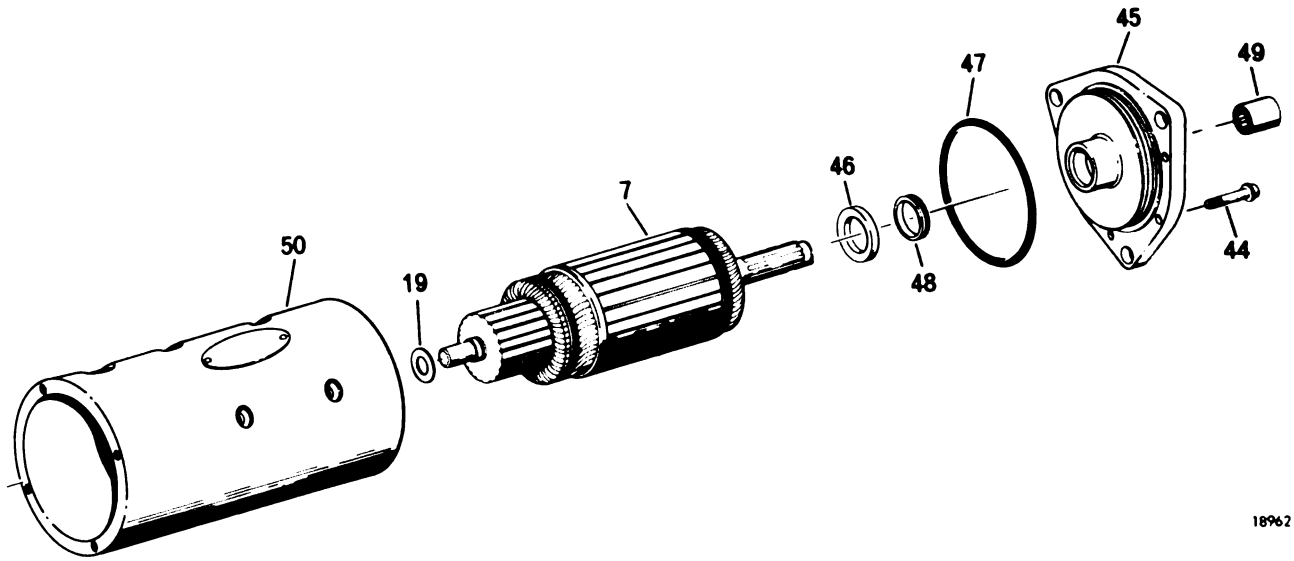
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
11. Frame and field assy (50)	a. Field coil (51)	a. Check for short to ground with 110 volt test lamp connected between the field terminal (52) and the frame (53). If test lamp lights, replace field coil assembly. b. Connect test lamp leads between the field terminal (52) and the ends of each of the four coils. 1. If the lamp does not light, there is an open circuit in the field coil. Replace field coil assembly.	

7-2. STARTER (cont)

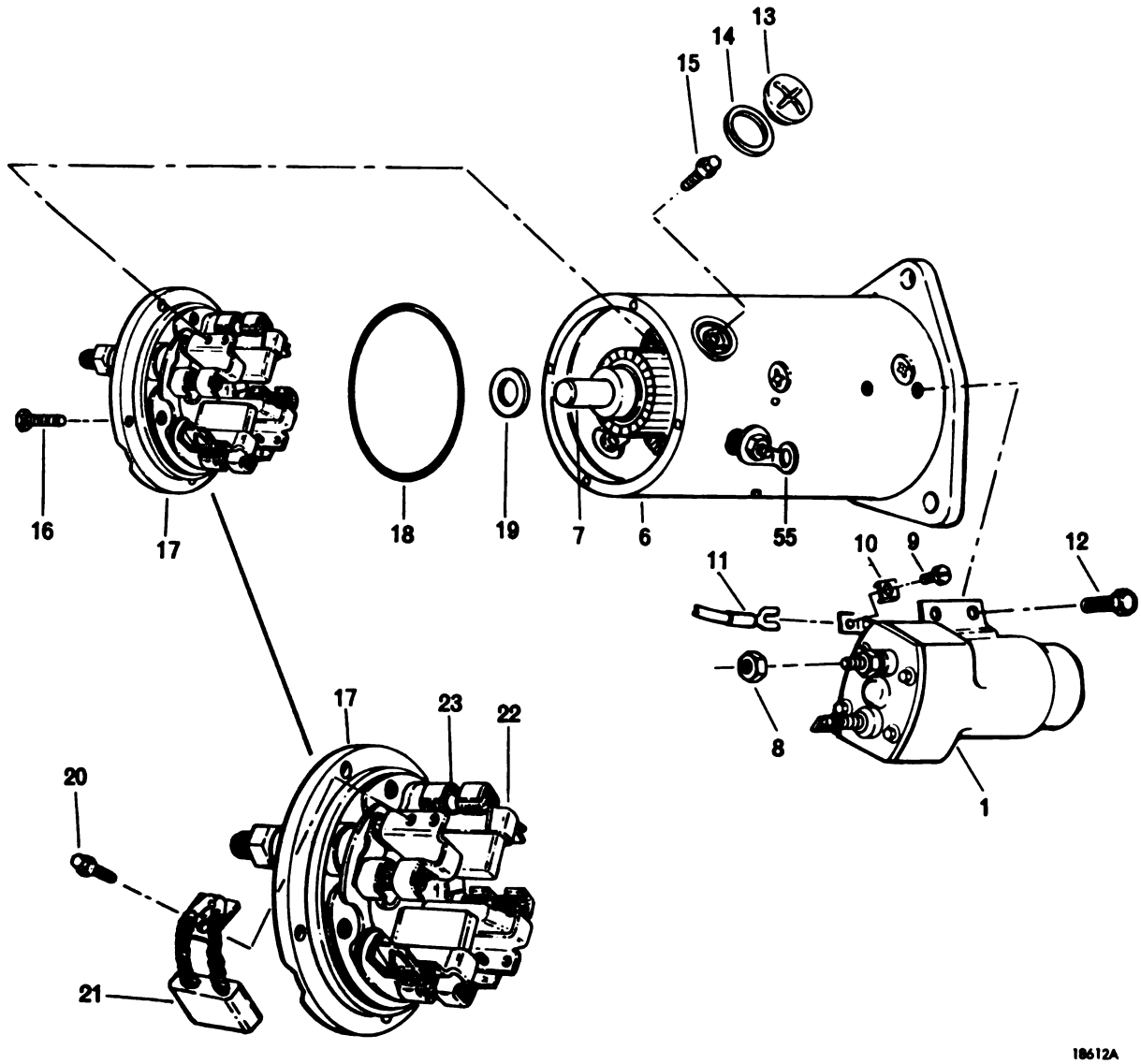
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
11. Frame and field assy (50) (cont)			
		CAUTION Do not clean starter parts in a degreasing tank, or with grease dissolving solvents since insulation will be damaged.	
		2. If the lamp lights, field coil (51) is normal. Clean the frame and field assembly (50); do step 12.	Clean with mineral spirits and brush.
	b. Nut (54) and connector (55)	Remove.	
	c. Nut (56), washer (57), and 2 insulator washers (58)	Remove.	
	d. 8 screws (59)	Remove.	
	e. 4 pole shoes (60)	Remove.	
	f. Field coil (51)	Push field terminal (52) into frame (53) and remove field coil assembly.	
	g. Insulator (61) and 2 insulators (62)	Remove and discard insulators.	

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
11. Frame and field assy (50) (cont)	h. Frame (53)	Clean and inspect.	Replace if damaged.
	i. New insulator (61)	Position in frame.	
	j. New field coil (51)	a. Install new bushing insulator kit (63) on field terminal (52).	
		b. Install in housing and push field terminal (52) through insulator (61) and frame (53).	
	k. 2 new insulators (62)	Position between coil and frame at coil connection strips at drive end.	
	l. 4 pole shoes (60)	Carefully position pole shoes to retain field coils, with the wide lip of the shoe in the clockwise direction as viewed from the commutator end.	
	m. 8 screws (59)	Install and tighten.	Observe that coil insulators are correctly positioned before screws are tightened.
	n. Field coil assy (51)	Repeat electrical checks per step 11, item a.	Check reqd to confirm insulation is not damaged.
	o. 2 insulator washers (58), washer (57), and nut (56)	Install on field terminal and tighten nut.	Torque nut to 20-25 lb-ft (27-34 N·m).

7-2. STARTER (cont)



LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
11. Frame and field assy (50) (cont)	p. Connector (55)	Position on terminal (52) to accept solenoid motor terminal.	
	q. Nut (54)	Install and tighten.	Torque nut to 20-25 lb-ft (27-34 N·m).
12. Starter (6)	a. Armature (7)	Position in field and frame assy (50).	
	b. Washer (19)	Position on armature commutator end shaft.	
	c. Spacer (46)	Position on armature drive shaft.	
	d. New packing (47)	Install on drive end frame.	



LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
12. Starter (6) (cont)	e. Drive end frame (45)	Position carefully on armature drive shaft and align attaching bolt holes with frame.	
	f. 5 bolts (44)	Install and tighten.	Torque bolts to 7-10 lb ft (9.5-14 N·m)

7-2. STARTER (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
12. Starter (6) (cont)	g. Armature (7)	Move out of frame approximately 2 in. (51 mm).	
	h. New packing (18) and end plate assy (17)	a. Install packing on end plate then position on armature (7) commutator.	
		b. Lift springs and seat brushes on commutator.	
		c. Check that brushes contact commutator squarely.	
		d. Move armature and end plate into frame.	
		e. Align holes with holes in frame.	
	i. 4 bolts (16)	Install and tighten.	
	j. Armature (7)	a. Check rotation by turning shaft counter clockwise.	Should turn without binding.
		b. Check end play.	Axial end play should be 0.28-1.70 in. (7.1-43.2 mm).
		c. Pull shaft and measure distance from the end of the shaft and starter mounting face.	Shaft end to flange face should be 1.315-1.365 in. (33.41-34.68 mm).

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
12. Starter assy (6) (cont)	k. 2 screws (15)	Install through field coil terminals and into brush holder (22). Tighten screws.	
	l. 2 gaskets (14) and plugs (13)	Install and tighten.	
	m. Solenoid (1)	Position on frame with motor stud through connector (55).	
	n. 4 bolts (12)	Install and tighten.	
	o. Screw (9) and clip (10)	Loosen.	
	p. Ground lead (11)	Install lead terminal.	
	q. Screw (9)	Tighten.	
	r. Nut (8)	Install and tighten.	Torque nut to 20-25 lb ft (27-34 N·m)
	s. Starter (6)	a. Conduct no load test per step 2.	
		b. Paint as reqd.	

Pages 7-27 and 7-28 are deleted.

CHAPTER 8

MAINTENANCE OF LUBRICATION SYSTEM

8-1. PURPOSE AND FUNCTION

The purpose and function of the lubrication system is to provide positive lubrication and cooling flow at all times. High volume flow provides both lubrication and cooling for engine bearings.

8-2. OIL FILTER COOLER BYPASS ASSEMBLY

This task covers:

a. Removal b. Installation

INITIAL SETUP

Tools

1 5/8 open end wrench (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
5/8 socket
7/16 socket
9/16 open end wrench
5-in. extension
Socket head screw key set
3/8-dr ratchet handle
9/16 socket, 3/8 dr
9/16 combination handle
Shop Equipment, Electrical Repair, Semitrailer Mounted (4940-00-294-9517)
1 1/4 open end wrench
1 1/2 open end wrench

Materials/Parts

Bucket (item 4, appx B)
Pipe joint compound (item 7, appx B)
Engine oil (item 14 or 15, appx B)
Rags (item 17, appx B)
Tags (item 24, appx B)
Lube oil shell gasket

Materials/Parts (cont)

Thermostat cover gasket
Plug gasket
Oil filter element
Thermostat housing seal

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
40	3	2-5

Equipment Condition

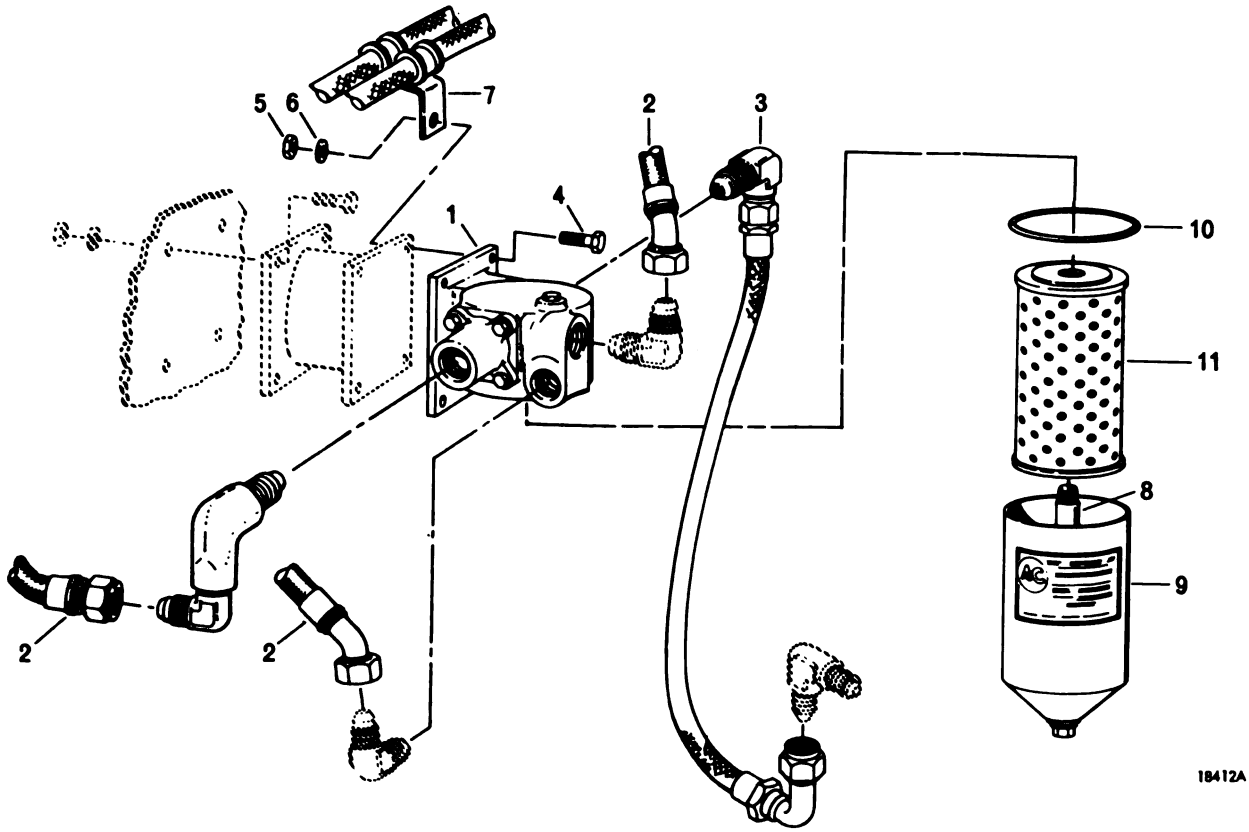
Para	Condition Description
4-13*	Front roof removed.

*TM 5-6115-598-12

General Safety Instructions

No smoking or open flame.

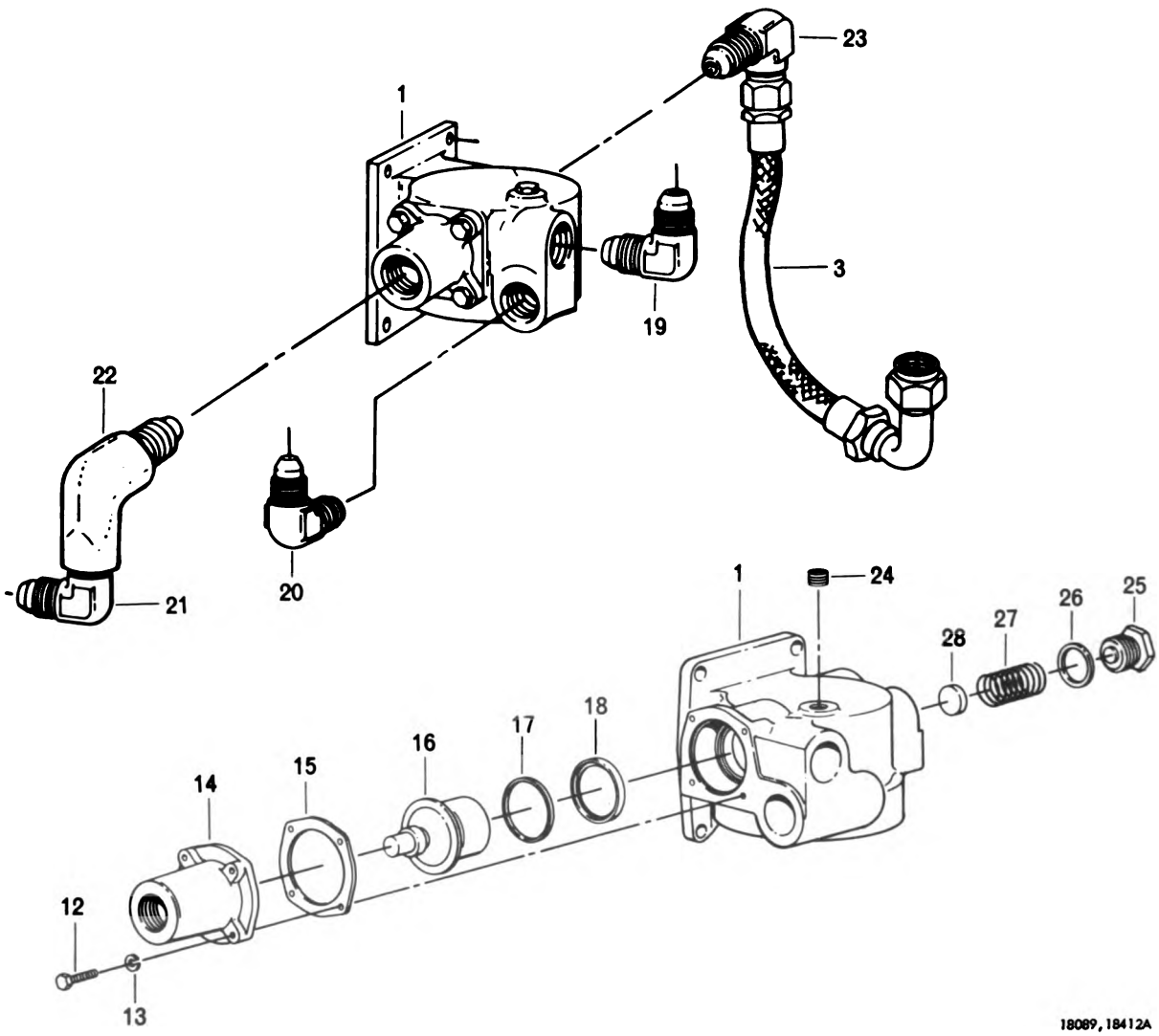
LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Oil filter cooler bypass housing (1)	a. 3 oil lines (2)	Disconnect, tag, identify and cover openings.	



LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
	WARNING Lube oils MIL-L-23699 and MIL-L-7808 are highly toxic. Wash at once with soap and water if oil comes in contact with skin. If irritation occurs, get medical attention.		
1. Oil filter cooler bypass housing (1) (cont)	b. Oil line (3) with fitting	Disconnect, tag, identify and cover openings.	Clean any oil spillage.
	c. 4 bolts (4), nuts (5), and washers (6)	Remove.	Nut and bolt on upper right-hand side of housing assy fastens a bracket (7) and 2 fuel lines.
	d. Housing assy (1)	Remove.	Place on clean work surface.

8-2. OIL FILTER COOLER BYPASS ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
1. Oil filter cooler bypass housing (1) (cont)	e. Bolt (8), shell (9), and gasket (10)	Loosen bolt and remove. Discard gasket.	
	f. Filter element (11)	Remove and discard.	



LOCATION	ITEM	ACTION	REMARKS

REMOVAL (cont)

1. Oil Filter cooler bypass housing (1) (cont)

NOTE

If necessary to replace the oil cooler thermostat, accomplish the following steps g through i.

g.	4 bolts (12) and washers (13)	Remove.	
h.	Cover (14) and gasket (15)	Remove. Discard gasket.	
i.	Thermostat (16), retaining ring (17), and seal (18)	Remove. Discard seal.	

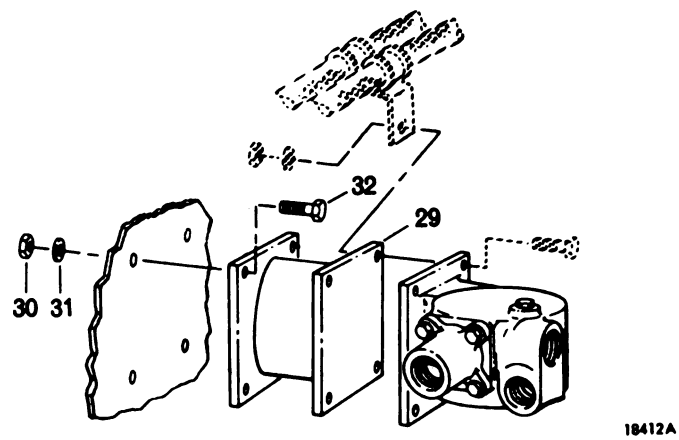
NOTE

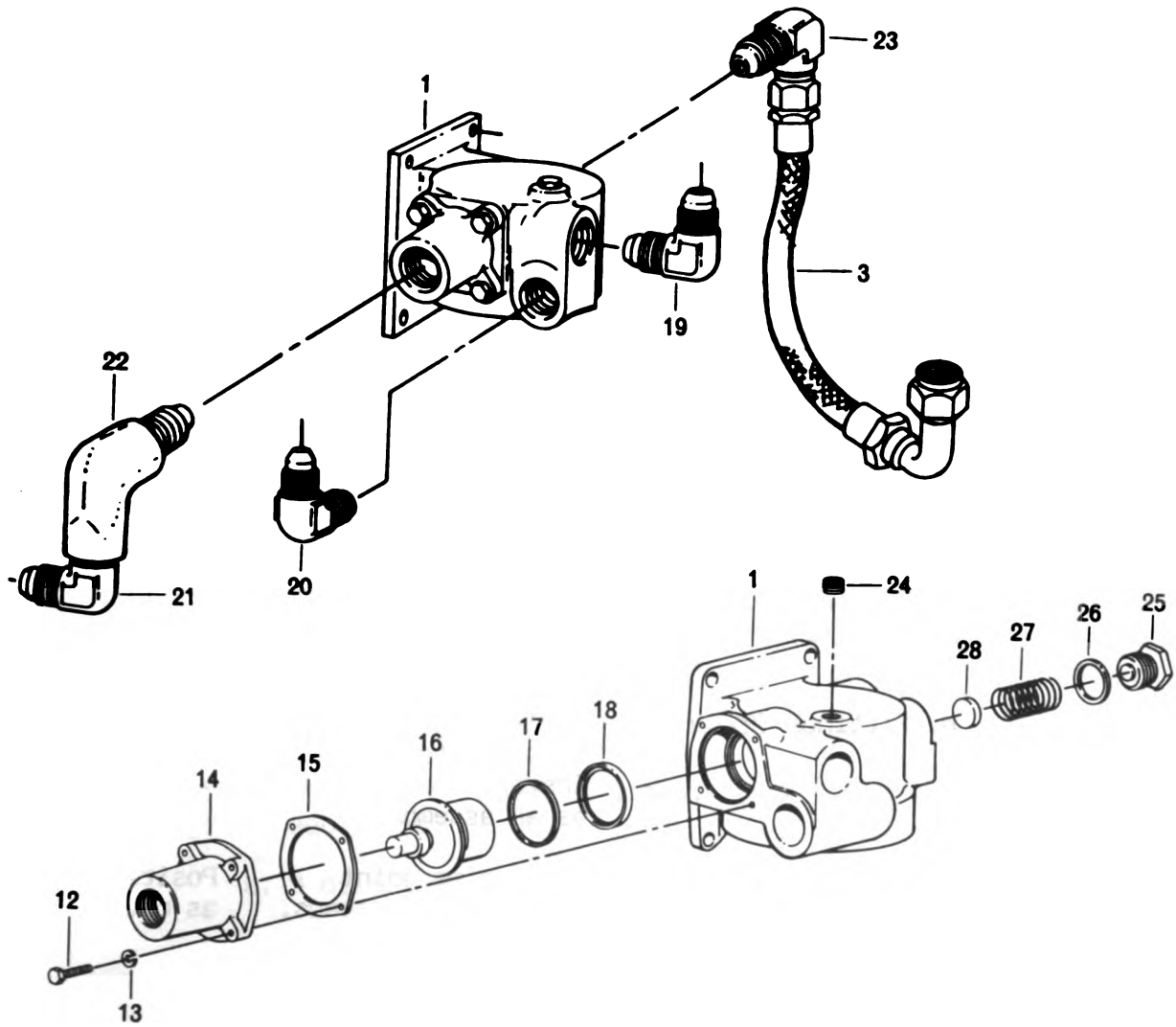
If necessary to replace bypass housing assembly, accomplish steps j through n.

j.	Fittings (19 and 20)	Remove.	Note position for reassembly.
k.	Fittings (21 and 22)	Remove from cover as an assembly.	Note position for reassembly.
l.	Fitting (23) and hose (3)	Remove from cover as an assembly and cover openings.	Note position for reassembly.
m.	Plug (24)	Remove.	
n.	Plug (25), gasket (26), spring (27), and valve (28)	Remove. Discard gasket.	

8-2. OIL FILTER COOLER BYPASS ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
	NOTE Remove mounting bracket for repair only.		
2. Mounting bracket (29)	a. 4 nuts (30), washers (31), and bolts (32)	Remove.	
	b. Bracket (29)	Remove.	
INSTALLATION			
3. Mounting bracket (29)	a. Bracket (29)	Position on bulkhead.	If removed for repair.
	b. 4 bolts (32), washers (31), and nuts (30)	Install and tighten.	





LOCATION	ITEM	ACTION	REMARKS

INSTALLATION (cont)

4. Oil filter cooler bypass housing (1)

NOTE

If bypass housing is replaced, proceed as follows:

a. Valve (28), spring (27), new gasket (26), and plug (25) — Install. Tighten plug.

8-2. OIL FILTER COOLER BYPASS ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
4. Oil filter cooler bypass housing (1) (cont)	b. Plug (24)	Install and tighten.	
	CAUTION		
	Do not over tighten fittings or lines. Over tightening may damage the equipment.		
	c. Fitting (23) with hose (3) attached	Apply pipe joint compound to threads, install and tighten.	Position fittings as noted.
	d. Fittings (22 and 21)	Apply pipe joint compound to threads, install and tighten as an assembly.	Position fittings as noted.
	e. Fittings (20 and 19)	Apply pipe joint compound to threads, install and tighten.	Position fittings as noted.
	NOTE		
	If the oil cooler thermostat was removed, proceed as follows:		
5. Oil cooler thermostat (16)	a. New seal (18) and retaining ring (17)	Install in housing (1).	Closed side of ring first.
	b. Thermostat (16)	Install.	
	c. New gasket (15) and cover (14)	Mount on housing.	
	d. 4 washers (13) and bolts (12)	Install and tighten.	
6. Shell (9)	a. New filter element (11)	Install in shell.	

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
6. Shell (9) (cont)	b. New gasket (10)	Lubricate and position on shell.	
	c. Filter shell (9) and bolt (8)	Install and tighten bolt.	
7. Oil filter cooler bypass assy		Position on mounting adapter on bulkhead.	
	a. 4 bolts (4), flat washers (6), nuts (5), and bracket (7)	Install and tighten.	Bracket (7) is mounted between washer (6) and mounting bracket in upper right-hand side of bracket.

CAUTION

Do not over tighten fittings or lines. Over tightening may damage the equipment.

b. 3 oil lines (2)	Remove tags and covers; connect and tighten.	
c. Fitting with oil line (3)	Remove cover; connect and tighten.	
d. Oil level	Add proper type oil as reqd.	LO 5-6115-598-12.
e. Engine	a. Start and run 10 minutes.	Para 2-2 and 2-3, TM 5-6115-598-12.
	b. Shut down.	Para 2-7, TM 5-6115-598-12.
	c. Check for oil leaks.	Tighten fittings as reqd.

WARNING

Lube oils MIL-L-23699 and MIL-L-7808 are highly toxic. Wash at once with soap and water if oil comes in contact with skin. If irritation occurs, get medical attention.

8-3. ENGINE OIL COOLER AND FRAME ASSEMBLY

This task covers:

a. Removal b. Service c. Installation

INITIAL SETUP

Tools

17mm socket (appx C)
13mm socket (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
1/2 combination wrench
7/16 open end wrench
7/16 combination wrench
1/2-dr ratchet handle
5-in. extension, 3/8 dr
3/8-dr ratchet handle
1/2 socket, 3/8 dr
1/2 open end wrench
Shop Equipment, Electrical Repair, Semitrailer Mounted (4940-00-294-9517)
1 1/2 open end wrench

Materials/Parts

Bucket (item 4, appx B)
Paint brush (item 5, appx B)
Engine oil (item 14 or 15, appx B)

Materials/Parts (cont)

Rags (item 17 appx B)
Cleaning solvent (item 22, appx B)
Tags (item 24, appx B)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
34	1	2-5

Equipment Condition

Para	Condition Description
4-13*	Roof panels removed.

*TM 5-6115-598-12

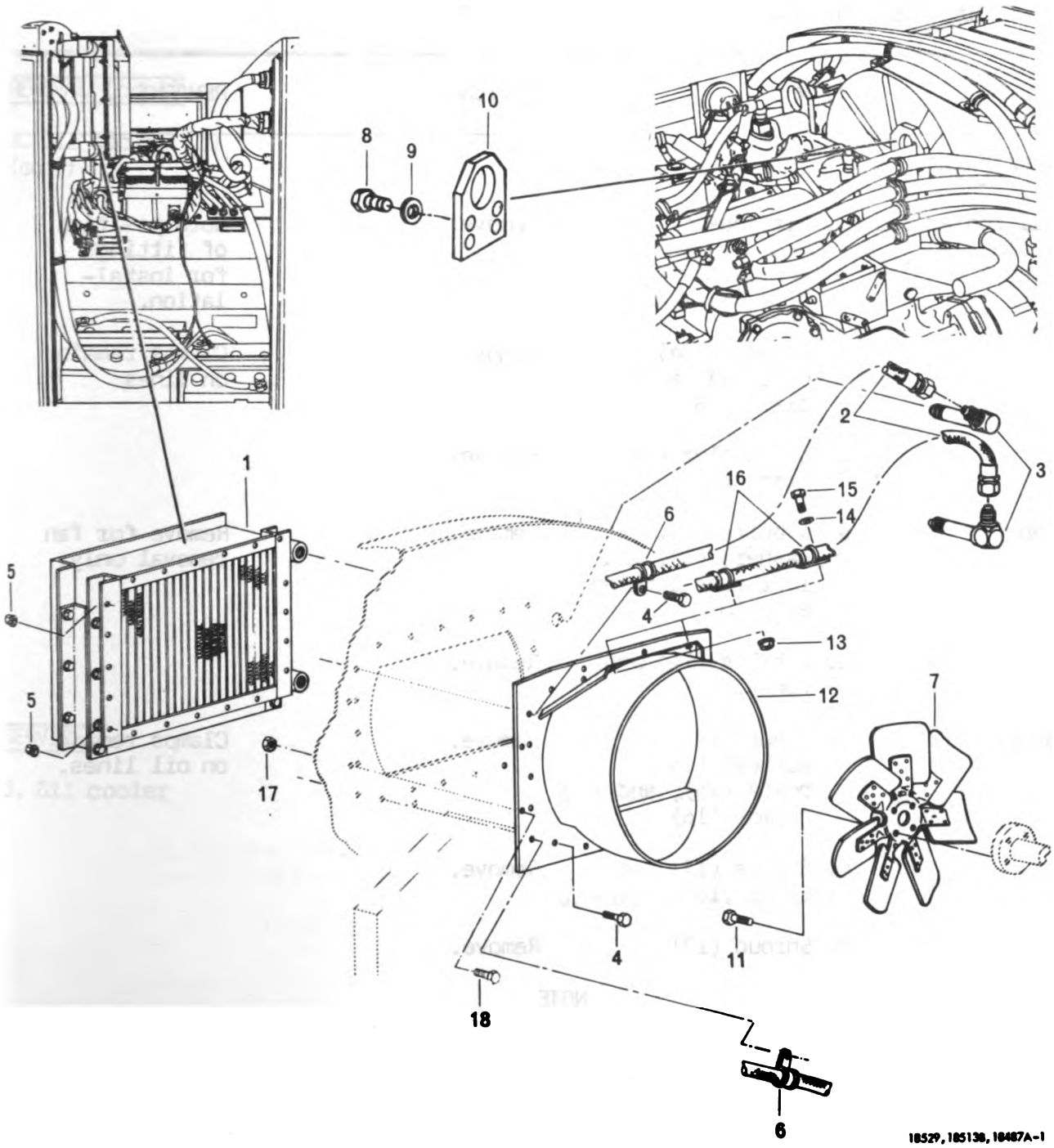
LOCATION	ITEM	ACTION	REMARKS

REMOVAL

WARNING

Lube oils MIL-L-23699 and MIL-L-7808 are highly toxic. Wash at once with soap and water if oil comes in contact with skin. If irritation occurs, get medical attention.

1. Oil cooler and frame (1)	a. 2 lines (2)	Disconnect, tag, identify, and cover openings.	



8-3. ENGINE OIL COOLER AND FRAME ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
1. Oil cooler and frame (1) (cont)	b. Fittings (3)	Remove.	Note position of fittings for installation.
	c. 21 bolts (4) nuts (5), and 2 clamps (6)	Remove.	Clamps remain on lines.
	d. Oil cooler and frame (1)	Remove.	
2. Fan (7)	a. 4 bolts (8), washers (9), and left rear lifting eye (10)	Remove.	Remove for fan removal only.
	b. 4 bolts (11) and fan (7)	Remove.	
3. Shroud (12)	a. 2 nuts (13), washers (14), bolts (15), and clamps (16)	Remove.	Clamps remain on oil lines.
	b. 8 nuts (17) and bolts (18)	Remove.	
	c. Shroud (12)	Remove.	
	NOTE If oil cooler is being removed because lubrication system is contaminated by metal particles, perform the following step before returning cooler to depot.		
4. Oil cooler (1)		a. Tag with DD Form 1577-2. In "Reason for Reparable Condition" block, show that cooler is being returned for decontamination.	

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
	4. Oil cooler (1) (cont)	b. Manufacture metal tag as follows: 1. Cut out 3/4-in. by 2 1/2-in. sheet of 0.040 gage SO aluminum material. 2. Drill a hole 3/8-in. from each end of tag. 3. Using die stamp, stamp words "METAL CONT" on tag.	
		c. Bend tag to conform to to core of oil cooler to prevent damage to cooler.	
		d. Attach tag to oil cooler.	
SERVICE			
	5. Oil cooler	a. Flush with solvent.	Ensure all oil and debris is removed.
		b. Flush with clean oil.	Ensure that all solvent is removed.
INSTALLATION			
	6. Shroud (12)	Position on center bulkhead.	

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
6. Shroud (12) (cont)	a. 8 bolts (18) and nuts (17)	Install and tighten.	
	b. 2 clamps (16), bolts (15), washers (14), and nuts (13)	Position clamps. Install and tighten nuts.	
7. Fan (7)		Position on end drive flange.	Fan rivet heads face toward oil cooler.
	a. 4 bolts (11)	Install and tighten.	
	b. Lifting eye (10), 4 bolts (8), and washers (9)	Install and tighten nuts.	
8. Oil cooler and frame (1)		Position on center bulkhead.	
	a. 2 clamps (6), 21 bolts (4), and nuts (5)	Position clamps. Install bolts and nuts and tighten.	
	CAUTION		
	Do not over tighten fittings or lines. Over tightening may damage the equipment.		
	b. Fittings (3)	Install and tighten.	Position as noted during removal.
	c. 2 lines (2)	Remove tags and covers, connect and tighten.	
	d. Engine	a. Start and run 10 minutes.	Para 2-2 and 2-3 TM 5-6115-598-12.
		b. Shut down.	Para 2-7, TM 5-6115-598-12.
		c. Check for oil leaks.	Tighten fittings as required.

8-4. OIL SYSTEM LINES AND FITTINGS

This task covers:

a. Removal b. Installation

INITIAL SETUP

Tools

1 5/8 open end wrench (appx C)
1 1/2-in. crows foot (appx C)
17 mm socket (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
11/16 combination wrench
7/8 combination wrench
1-in. combination wrench
5-in. extension, 3/8 dr
5-in. extension, 1/2 dr
3/8-dr ratchet handle
1/2-dr ratchet handle
7/16 combination wrench
1/2 combination wrench
1 1/8 combination wrench
7/16 open end wrench
3/8 combination wrench
Shop Equipment, Electrical Repair, Semitrailer Mounted (4940-00-294-9517)
1 1/4 open end wrench
1 5/16 and 1 1/2 open end wrench

Materials/Parts

Bucket (item 4, appx B)
Pipe joint compound (item 7, appx B)
Rags (item 17, appx B)
Tags (item 24, appx B)
Metallic gasket

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Equipment Condition

Para	Condition Description
4-13*	Front roof removed.
4-45*	Oil system drained.

*TM 5-6115-598-12

General Safety Instructions

No smoking or open flame.

LOCATION	ITEM	ACTION	REMARKS

REMOVAL

WARNING

Lube oils MIL-L-23699 and MIL-L-7808 are highly toxic. Wash at once with soap and water if oil comes in contact with skin. If irritation occurs, get medical attention.

CAUTION

As lines are disconnected, container must be provided for oil drainage. Spilled oil must be wiped up.

LOCATION	ITEM	ACTION	REMARKS

REMOVAL (cont)

WARNING

Lube oils MIL-L-23699 and MIL-L-7808 are highly toxic. Wash at once with soap and water if oil comes in contact with skin. If irritation occurs, get medical attention.

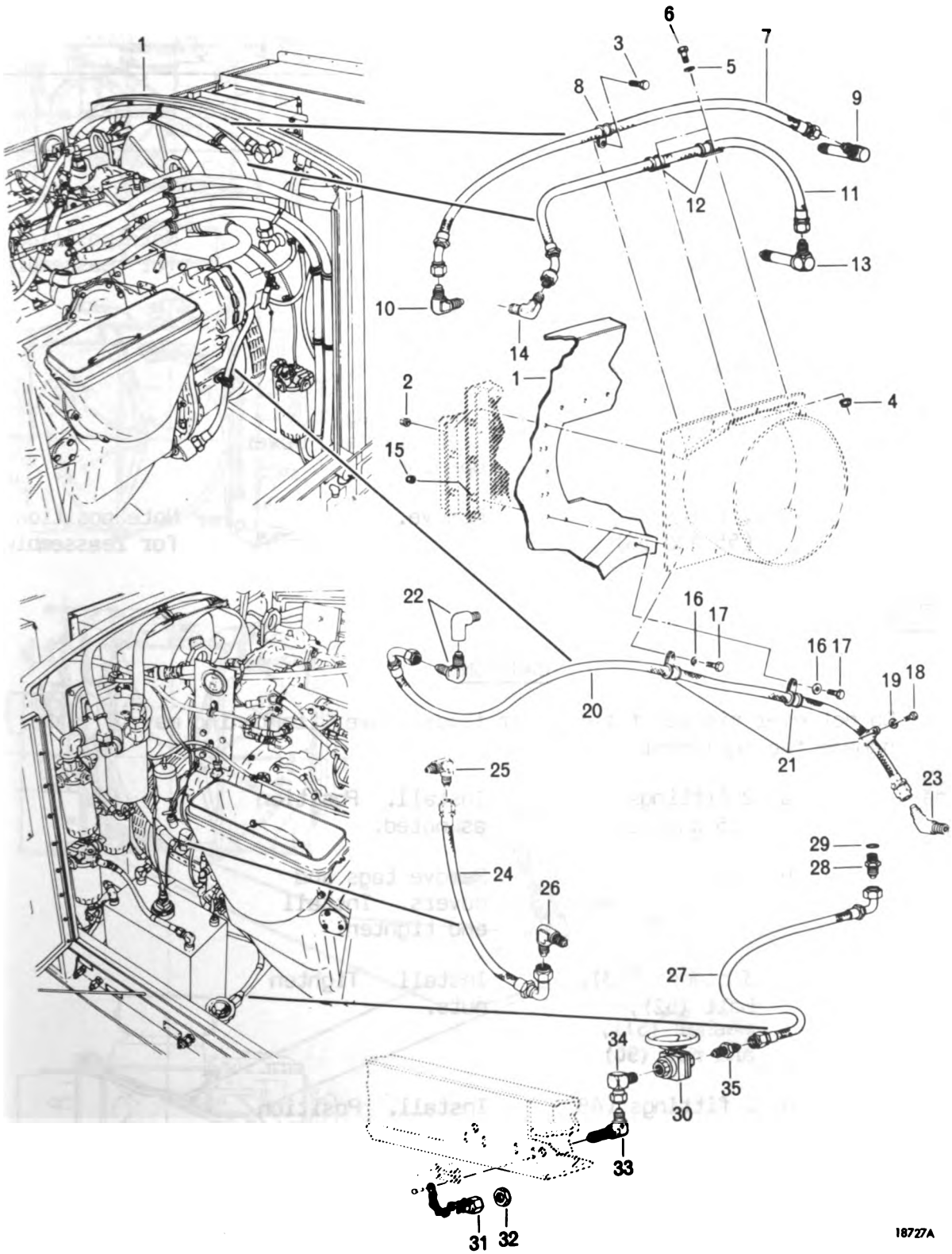
CAUTION

As lines are disconnected, container must be provided for oil drainage. Spilled oil must be wiped up.

c. Line (7)	Remove, tag, identify, and cover openings.	
d. Clamp (8)	Remove.	
e. 2 fittings (9 and 10)	Remove.	Note position for reassembly.
f. Line (11)	Remove, tag, identify, and cover openings.	
g. 2 clamps (12)	Remove.	
h. Fittings (13 and 14)	Remove.	Note position for reassembly.
i. Nut (15), 2 washers (16), and bolts (17)	Remove.	
j. Bolt (18) and washer (19)	Remove.	
k. Line (20)	Remove, tag, identify, and cover openings.	
l. 3 clamps (21)	Remove.	
m. 2 fittings (22 and 23)	Remove.	Note position for reassembly.

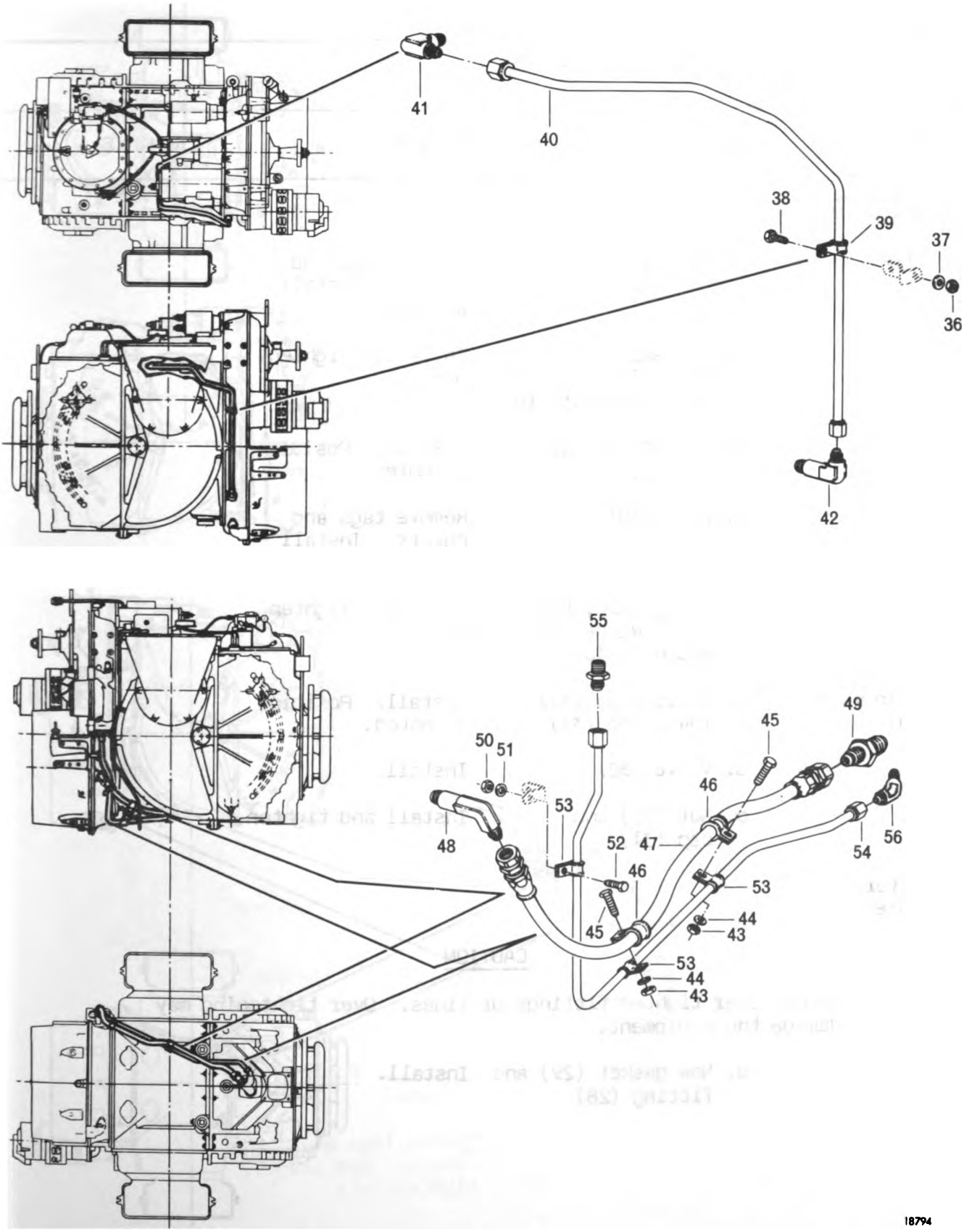
8-4. OIL SYSTEM LINES AND FITTINGS (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
2. Filter cooler	a. Line (24)	Remove, tag, identify, and cover openings.	
	b. 2 fittings (25 and 26)	Remove.	Note position for reassembly.
	c. Line (27)	Remove, tag, identify, and cover openings.	
	d. Fitting (28) and gasket (29)	Remove. Discard gasket.	
3. Drain valve (30)	a. Cap (31) and nut (32)	Remove.	
	b. Fittings (33, 34, and 35)	Remove from valve.	Note position for reassembly.
	c. Valve (30)	Remove.	
4. Engine	a. Nut (36), washer (37), bolt (38), and clamp (39)	Remove.	
	b. Line (40)	Remove, tag, identify, and cover openings.	
	c. 2 fittings (41 and 42)	Remove.	Note position for reassembly.
	d. 2 nuts (43), washers (44), bolts (45), and clamps (46)	Remove.	
	e. Line (47)	Remove, tag, identify, and cover openings.	



8-4. OIL SYSTEM LINES AND FITTINGS (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
4. Engine (cont)	f. 2 fittings (48 and 49)	Remove.	Note position for reassembly.
	g. Nut (50), washer (51), bolt (52), and 3 clamps (53)	Remove.	
	h. Line (54)	Remove, tag, identify, and cover openings.	
	i. 2 fittings (55 and 56)	Remove.	Note position for reassembly.
INSTALLATION			
	CAUTION Do not over tighten fittings or lines. Over tightening may damage the equipment.		
5. Engine	a. 2 fittings (55 and 56)	Install. Position as noted.	
	b. Line (54)	Remove tags and covers. Install and tighten.	
	c. 3 clamps (53), bolt (52), washer (51), and nut (50)	Install. Tighten nuts.	
	d. 2 fittings (48 and 49)	Install. Position as noted.	



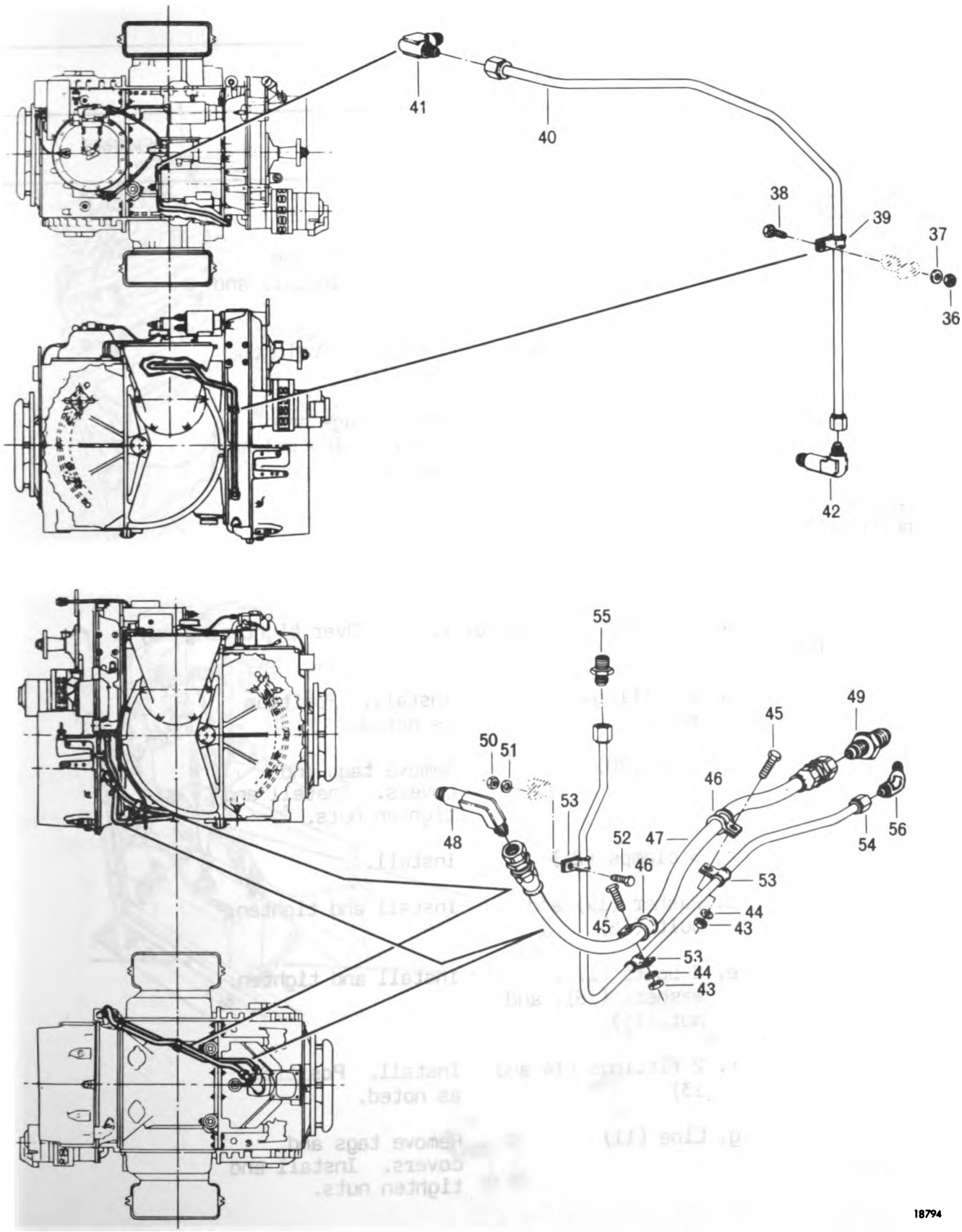
8-4. OIL SYSTEM LINES AND FITTINGS (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
5. Engine (cont)	e. Line (47)	Remove tags and covers. Install and tighten.	
	f. 2 clamps (46), bolts (45), washers (44), and nuts (43)	Install. Tighten nuts.	
	g. 2 fittings (41) and (42)	Install. Position as noted.	
	h. Line (40)	Remove tags and covers. Install and tighten.	
	i. Clamp (39), bolt (38), washer (37), and nut (36)	Install. Tighten nut.	
6. Drain valve (30)	a. 3 fittings (35), (34), and (33)	Install. Position as noted.	
	b. Valve (30)	Install.	
	c. Nut (32) and cap (31)	Install and tighten.	
7. Filter cooler			

CAUTION

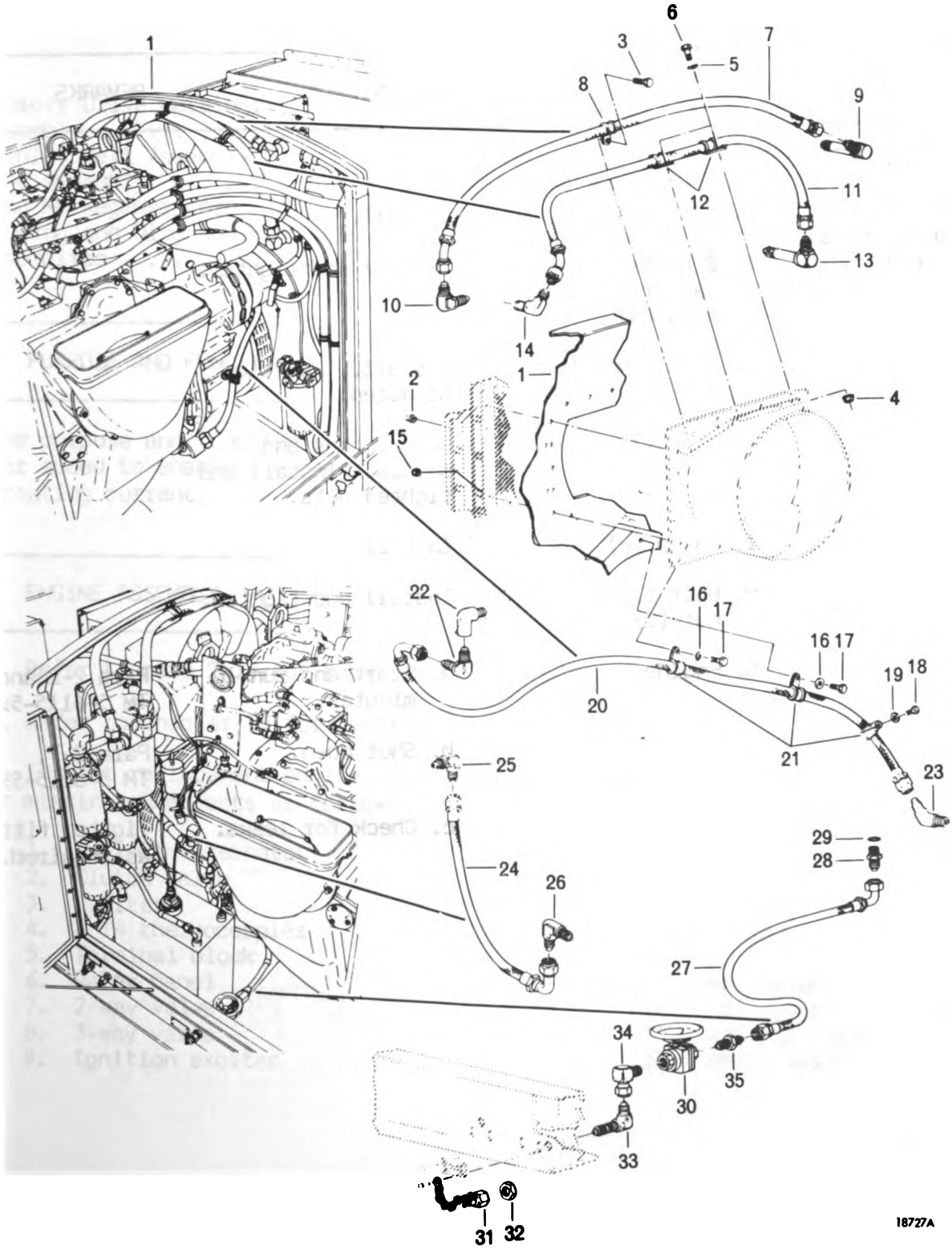
Do not over tighten fittings or lines. Over tightening may damage the equipment.

	a. New gasket (29) and fitting (28)	Install.



8-4. OIL SYSTEM LINES AND FITTINGS (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
7. Filter cooler (cont)	b. Line (27)	Remove tags and covers. Install and tighten.	
	c. 2 fittings (26 and 25)	Install. Position as noted.	
	d. Line (24)	Remove tags and covers. Install and tighten.	
8. Center bulkhead (1)			
	CAUTION Do not over tighten fittings or lines. Over tightening may damage the equipment.		
	a. 2 fittings (23 and 22)	Install. Position as noted.	
	b. Line (20)	Remove tags and covers. Install and tighten nuts.	
	c. 3 clamps (21)	Install.	
	d. Washer (19) and bolt (18)	Install and tighten.	
	e. 2 bolts (17), washers (16), and nut (15)	Install and tighten.	
	f. 2 fittings (14 and 13)	Install. Position as noted.	
	g. Line (11)	Remove tags and covers. Install and tighten nuts.	



8-4. OIL SYSTEM LINES AND FITTINGS (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
8. Center bulkhead (1) (cont)	h. 2 clamps (12)	Install.	
	i. 2 bolts (6), washers (5), and nuts (4)	Install and tighten.	
	j. 2 fittings (10 and 9)	Install. Position as noted.	
	k. Line (7)	Remove tags and covers. Install and tighten nuts.	
	l. Clamp (8)	Install.	
	m. Bolt (3) and nut (2)	Install and tighten.	
	n. Engine	a. Start and run 10 minutes.	Para 2-2 and 2-3 TM 5-6115-598-12.
		b. Shut down.	Para 2-7, TM 5-6115-598-12.
		c. Check for leaks.	Tighten fittings as required.

CHAPTER 9

MAINTENANCE OF ENGINE SYSTEM

9-1. PURPOSE AND FUNCTION

The purpose and function of the engine system is to turn the generator at the proper speed to enable the generator to produce an output of 150 kW, 400 Hz, alternating current.

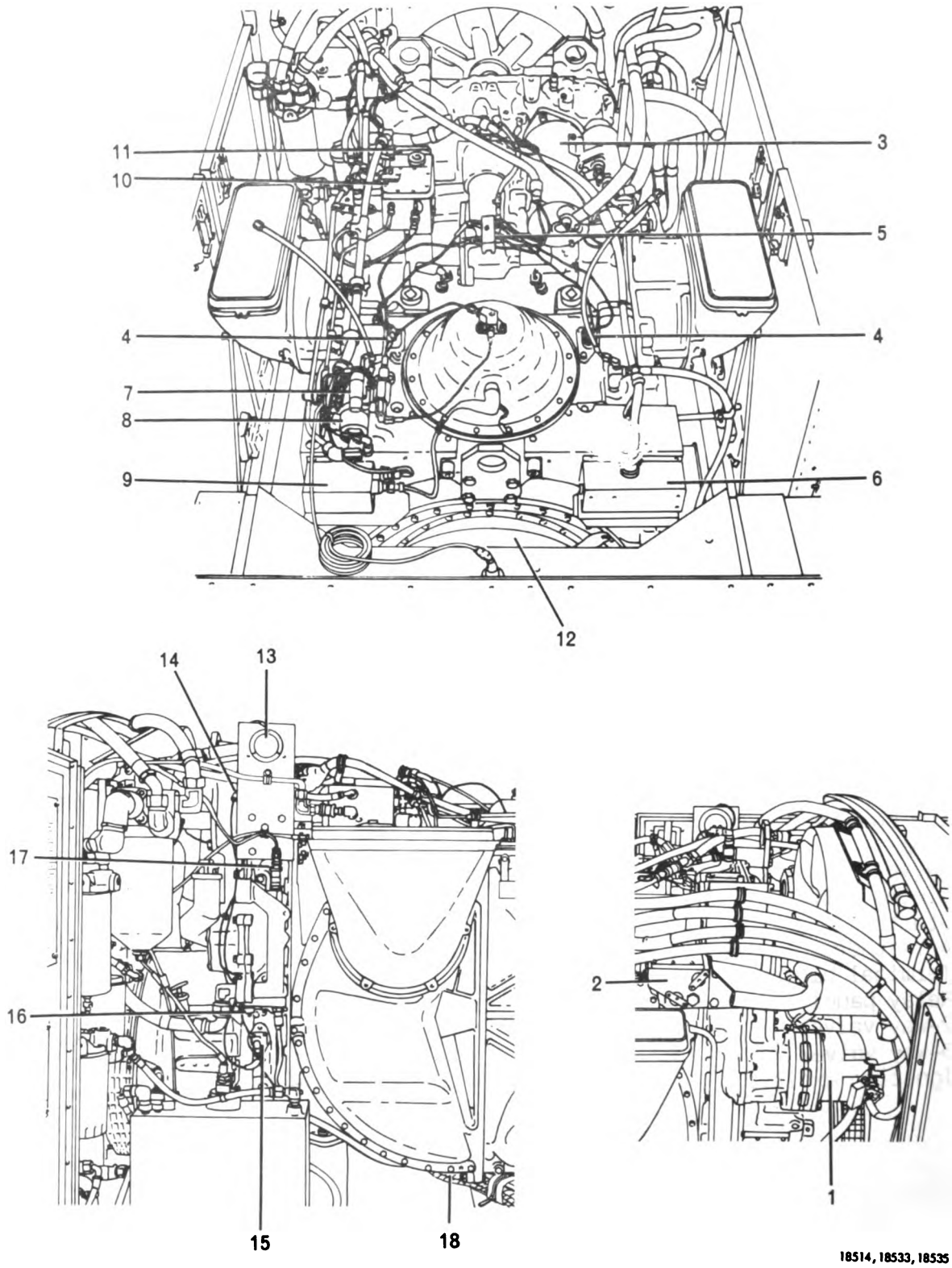
9-2. ENGINE ASSEMBLY

a. Refer to para 2-14 for replacement of engine.

b. Refer to chapter 13 for testing the engine.

c. Inspect replacement engine assemblies for damage to engine or loose, damaged, or missing components as follows:

1. 24 volt alternator
2. Clutch valve
3. Starter
4. 4 T4 thermocouples
5. Terminal block
6. Relay panel
7. 2-way valve
8. 3-way valve
9. Ignition exciter
10. Fuel valve
11. Fuel pump
12. Inlet bell
13. Hourmeter
14. N1 pickup
15. N2 pickup
16. Oil temperature sensor
17. Oil pressure sensor
18. Drain valve



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9-3. LH AND RH REGENERATOR HOUSING AND DISC AND RING GEAR ASSEMBLIES

This task covers:

a. Removal b. Repair (Housing) c. Inspection (Disc) d. Installation

INITIAL SETUP

Tools

Lifting device, minimum 500 lb capacity
24-in. gaging bar (appx C)
Torque wrench, 0-300 in. lb (appx C)
Inside and outside calipers (appx C)
Regenerator cover stand (Table 2-1)
Regenerator disc lift (Table 2-1)
Safety strap (Table 2-1)
Regenerator cover and disc lift (Table 2-1)
Regenerator cover mounting plates (Table 2-1)
Guide pins (2) (Table 2-1)
Seal ring installation tool (Table 2-1)
Tool Kit, Master Mechanics (5180-00-699-5273)
7/16 socket, 3/8 dr
Hammer, 16 oz
5 3/4 x 1/2 hand chisel
Slip joint pliers
4-in. flat tip screwdriver
Feeler guage
6-in. rule
5-in. extension, 3/8 dr
3/8-dr ratchet handle
3/8-dr speed handle
1/2 socket, 3/8 dr
Putty knife
Pry bar
Plastic face hammer

Tools (cont)

Shop Equipment, Electrical Repair Semitrailer Mounted (4940-00-294-9517)
1-in micrometer
Slide caliper

Materials/Parts

Work gloves (item 11, appx B)
Rags (item 17, appx B)
RTV silicone compound (item 18, appx B)
Lock washers (item 12)
Lock washers (item 4)
Retaining rings (item 15)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

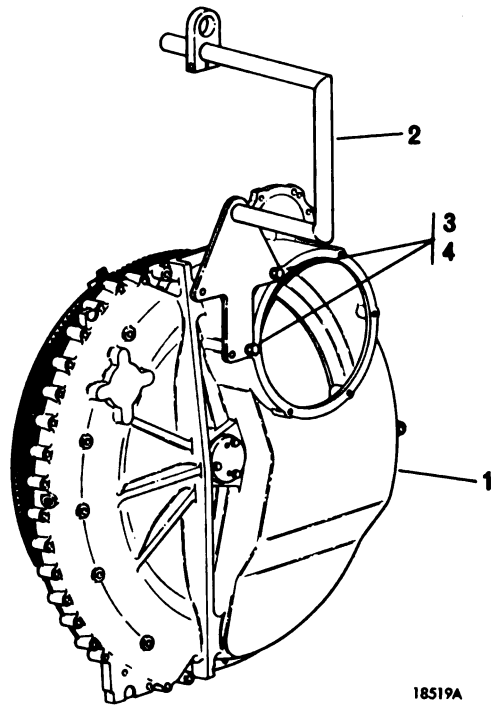
Troubleshooting References

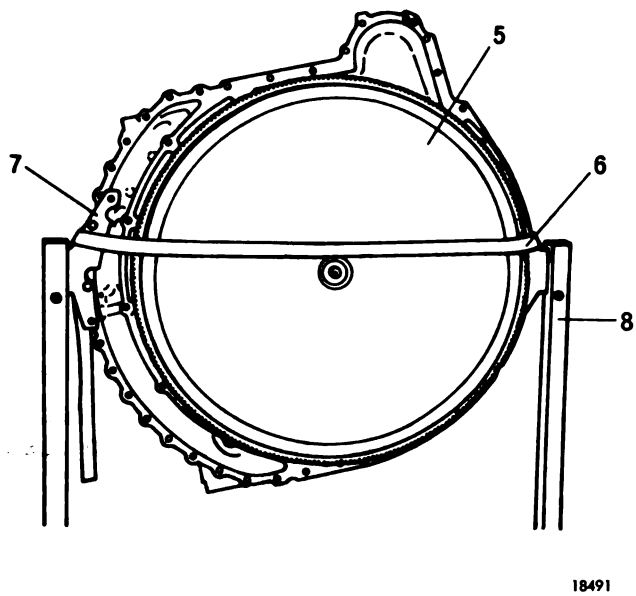
Item	Step	Table
35	8,9	2-5

Equipment Condition

Para	Condition Description
4-13*	Front roof removed.
10-4	LH or RH exhaust elbow removed.

*TM 5-6115-598-12





9-3. LH AND RH REGENERATOR HOUSING AND DISC AND RING GEAR ASSEMBLIES (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
1. Regenerator housing (1) LH or RH	a. Lift (2)	Install. Use 2 bolts (3) and washers (4).	2 technicians reqd.
	b. Hoist	Attach to lift. Adjust to remove slack from cable.	
	c. One bolt (3) and lock washer (4) at 3 and 9 o'clock positions	Remove and install guide pins. Discard lock washer.	
	d. Air lines and brackets	Remove as necessary to gain access to housing.	

NOTE

There are 49 5/16-in. bolts in five different lengths fastening the regenerator housing to the engine block. Note bolt length locations during removal.

	e. Remaining 45 bolts (3) and lock washers (4)	Remove and discard lock washers.	Note any bracket locations for reinstallation.

WARNING

Personal injury may result if disc separates from housing. Remove housing from block only far enough to strap disc in place to prevent disc from falling from housing.

CAUTION

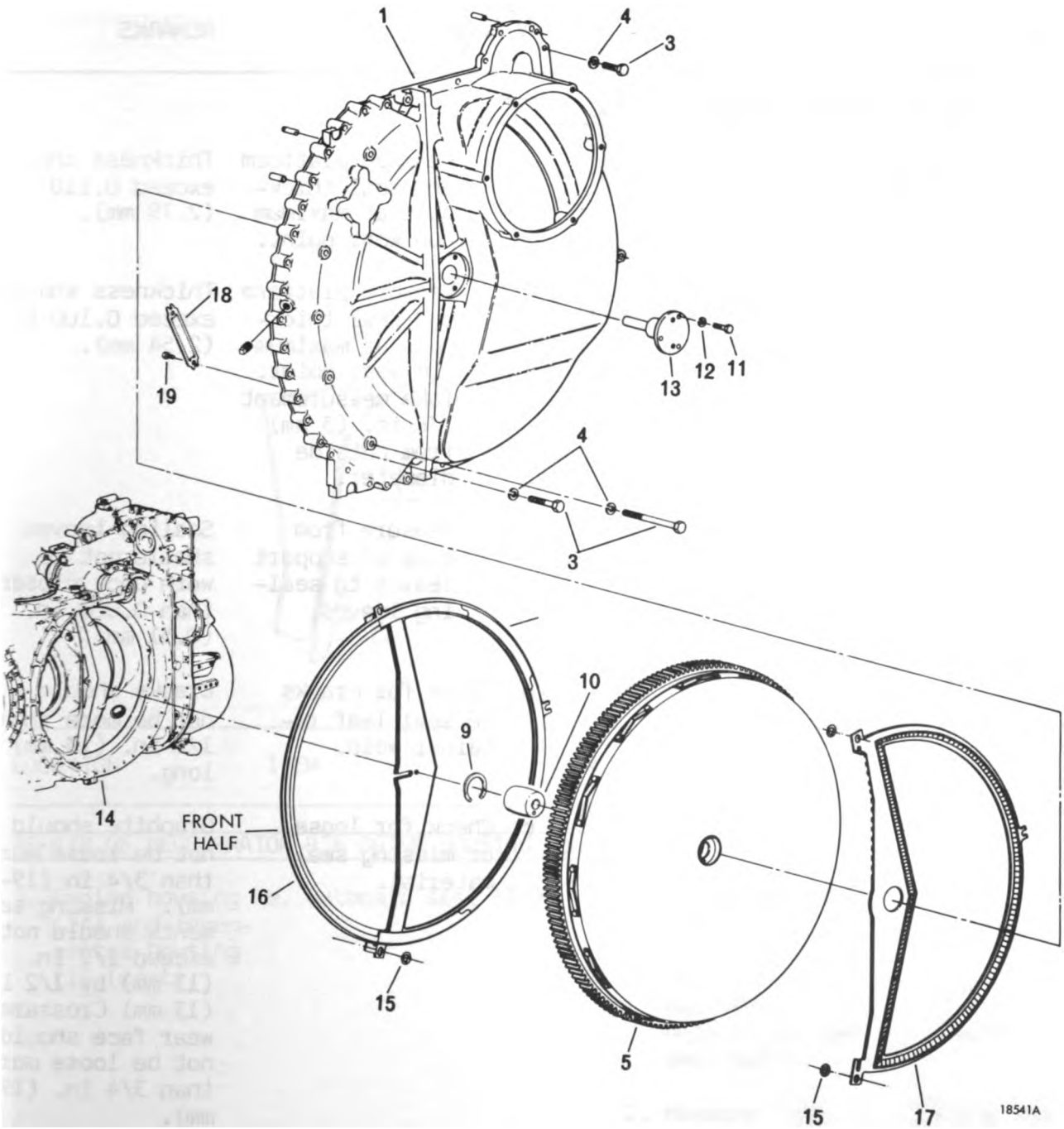
- Carbon bushing is very fragile. Use care when removing disk to avoid damage.
- Do not allow dirt, debris, or other matter to enter engine block when removing or installing regenerator housings and disc and ring gear assemblies.

	f. Regenerator housing (1)	Remove. Secure disc (5) to housing with strap (6).	2 technicians reqd.

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
		NOTE It may be necessary to pry regenerator housing from block.	
1. Regenerator housing (1) LH or RH (cont)	g. Regenerator housing and disc assembly	a. Install mounting plates (7) with 4 bolts and nuts furnished with plates and insert into regenerator housing stand (8). b. Remove hoist.	
		WARNING Gloves will be worn when handling disc to avoid personal injury.	
	h. Disc (5)	a. Install disc lift and remove strap (6). b. Remove disc assy from housing. c. Place in disc holding device and remove hoist.	
2. Regenerator disc and ring gear (5) LH or RH	a. Snap ring (9) and bearing (10)	Remove.	
		NOTE It may be necessary to turn 2 bolts into threaded holes in shaft to remove shaft.	
	b. 3 bolts (11, lock washers (12), and shaft (13)	Remove and discard lock washers.	

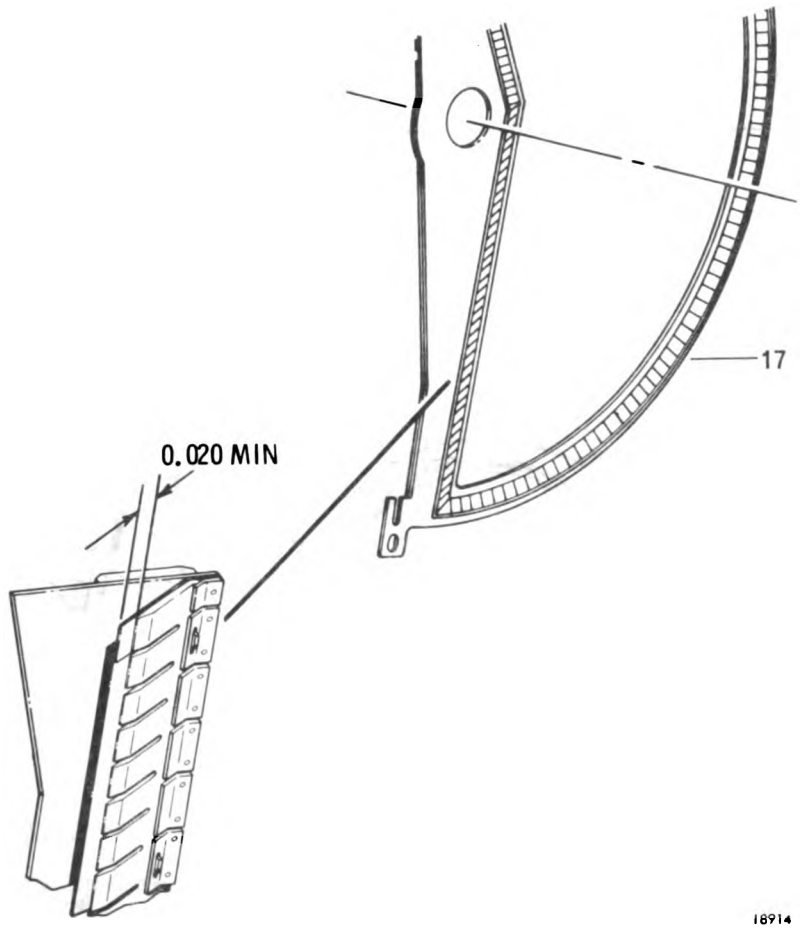
9-3. LH AND RH REGENERATOR HOUSING AND DISC AND RING GEAR ASSEMBLIES (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR OF REGENERATOR RIM DRIVE HOUSING			
3. Engine housing (14) and regenerator housing (1)			
		CAUTION	
	After installation of a new disc or new seals, a break-in run will be performed. Failure to perform break-in may damage the equipment.		
	a. Splitline surfaces	Scrape to remove sealant.	
	b. 2 retaining rings (15)	Remove and discard rings.	Use hammer and chisel to spread retaining ring.
		WARNING	
	Gloves will be worn when handling seals to avoid personal injury.		
		CAUTION	
	Ensure that all seal slots are engaged over pins. This prevents seals from being installed backwards, which could cause damage to the equipment.		
	c. Seal (16 or 17)	Remove.	
		NOTE	
	It will be necessary to find the point of greatest wear when measuring the regenerator seals. Wear should be checked at a minimum of four locations.		
	d. Inboard seal (16)	a. Check for wear as follows:	



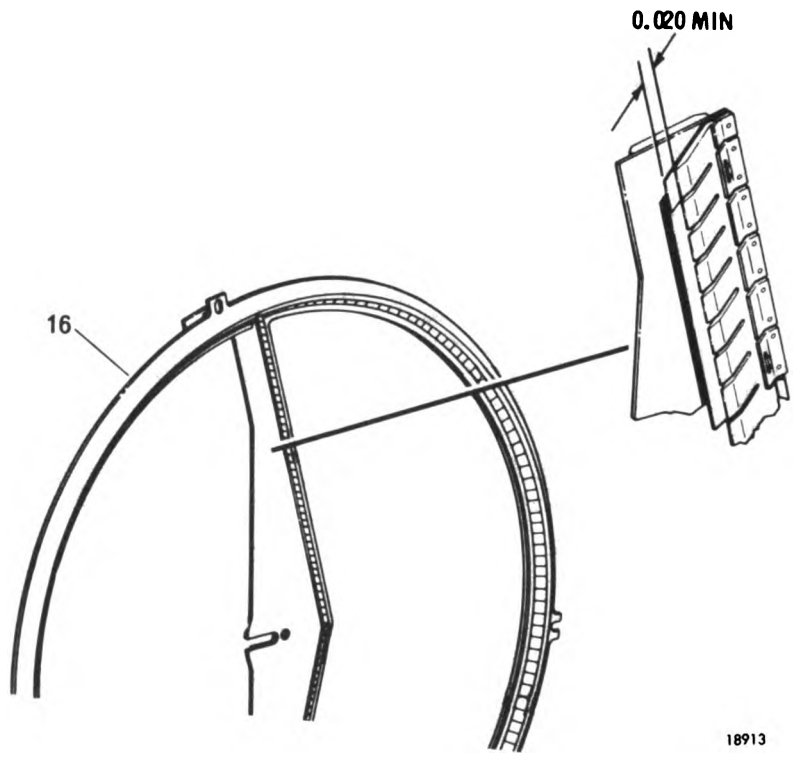
9-3. LH AND RH REGENERATOR HOUSING AND DISC AND RING GEAR ASSEMBLIES (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR OF REGENERATOR RIM DRIVE HOUSING (cont)			
3. Engine housing (14) and regenerator housing (1) (cont)		1. Measure platform and seal thickness at maximum hub wear point.	Thickness should exceed 0.110 in. (2.79 mm).
		2. Measure platform and seal thickness at maximum rim wear point. Take measurement 1/8 in. (3 mm) from outside diameter.	Thickness should exceed 0.100 in. (2.54 mm).
		3. Measure from ends of support leaves to sealing leaves.	Sealing leaves should not be worn back closer than 0.020 in. (0.51 mm).
		b. Check for cracks in seal leaf retainer weld.	Cracks should not be more than 1/2 in. (13 mm) long.
		c. Check for loose or missing seal material.	Graphite should not be loose more than 3/4 in (19-mm). Missing segments should not exceed 1/2 in. (13 mm) by 1/2 in. (13 mm) Crossarm wear face should not be loose more than 3/4 in. (19-mm).
		d. Check for bent sealing leaves.	Straighten any bent leaves.



LOCATION	ITEM	ACTION	REMARKS
REPAIR OF REGENERATOR RIM DRIVE HOUSING (cont)			
3. Engine housing (14) and regenerator housing (1) (cont)	e. Outboard seal (17)	a. Check for wear as follows:	
		1. Measure platform and seal thickness at maximum wear point.	Thickness should exceed 0.140 in. (3.56 mm).
		2. Measure from ends of support leaves to sealing leaves.	Sealing leaves should not be worn back closer than 0.020 in. (0.51 mm).

9-3. LH AND RH REGENERATOR HOUSING AND DISC AND RING GEAR ASSEMBLIES (cont)



LOCATION	ITEM	ACTION	REMARKS
REPAIR OF REGENERATOR RIM DRIVE HOUSING (cont)			
3.	Engine housing (14) and regenerator housing (1) (cont)	b. Check for loose or missing seal material.	Graphite should not be loose more than 3/4 in. (19 mm). Missing segments should not exceed 1/2 in. (13 mm) by 1/2 in. (13 mm).
		c. Check for bent sealing leaves.	Straighten any bent leaves; do not exceed crack limits.

LOCATION	ITEM	ACTION	REMARKS
REPAIR OF REGENERATOR RIM DRIVE HOUSING (cont)			
3. Engine housing (14) and regenerator housing (1) (cont)	f. Shaft (13)	Check for cracks and scoring.	Replace if cracked or scored.
	g. Seal (16 or 17)	Position new seals in place.	Front half of seal (16) mounted prior to rear half
	h. 2 new retaining rings (15)	a. Install on pins.	Use installation tool.
		b. Crimp rings into grooves in pins.	
	i. Spacer bars (18)	a. Inspect for wear.	Replace if worn below .260 in. (6.6 mm) thick.
		b. Bend metal tabs to allow 2 bolts (19) to be removed from each spacer bar.	
	j. 2 bolts (19)	Remove.	
	k. Spacer bar (18)	a. Remove.	
		b. Place new spacer bar in position.	
	l. 2 bolts (19)	a. Install and tighten.	
		b. Bend metal tabs to lock bolts.	
4. Regenerator disc and ring gear (5) LH or RH	a. Face	a. Check for wear:	
		1. Measure disc face wear bands or grooves.	Bands should not be more than 1 in. (25.4 mm) wide and 0.020 in. (0.55 mm) deep if new seals are being installed. Grooves should not be more than 3/8 in. (9 mm) wide and 1/4 in. (6 mm) deep.
		2. Measure inboard face dish (engine side).	Dish should not be more than 0.090 in. (2.29 mm) deep.

9-3. LH AND RH REGENERATOR HOUSING AND DISC AND RING GEAR ASSEMBLIES (cont)

LOCATION	ITEM	ACTION	REMARKS
INSPECTION OF REGENERATOR DISC AND RING GEAR			
4. Regenerator disc and ring gear (5) LH or RH (cont)		b. Check for damage.	Local gouges should not be more than 3/4 in. (19 mm) wide, 2 in. (51 mm) long, and 1/2 in. (13 mm) deep).
		c. Check for smearing.	Disc openings should not be smeared closed in a band more than 3 in. (76 mm) wide, or 1 in. (25.4 mm) wide if new seals are being installed.

CAUTION

Bearing is made of carbon and is very fragile. Use care when handling to avoid damage.

	b. Bearing (10)	Check for wear or damage	The inside diameter of disc bearing should not exceed 0.765 in. (19.45 mm). Outside diameter of bearing should not be less than 1.985 in. (50.4 mm). Replace bearing if cracked or broken.

NOTE

The bearing pins in the regenerator discs, NSN 2835-01-126-4056 and NSN 2835-01-126-4064, break regularly because the welds are not strong enough. The turbine manufacturer has stated that the bearing pins are not required for proper operation of the turbine engine. When the pins do break they are trapped inside the discs where they cause no damage. The bearing and regenerator disc do not need to rotate at the same rpm. The two regenerator discs in the engine operate independently of each other. The turbine engine does not have to be removed from service to repair or replace a broken regenerator disc pin. If the regenerator disc is removed from the engine for some other reason, broken pins should be removed and discarded. A regenerator disc does not need to be replaced if the bearing pin breaks.

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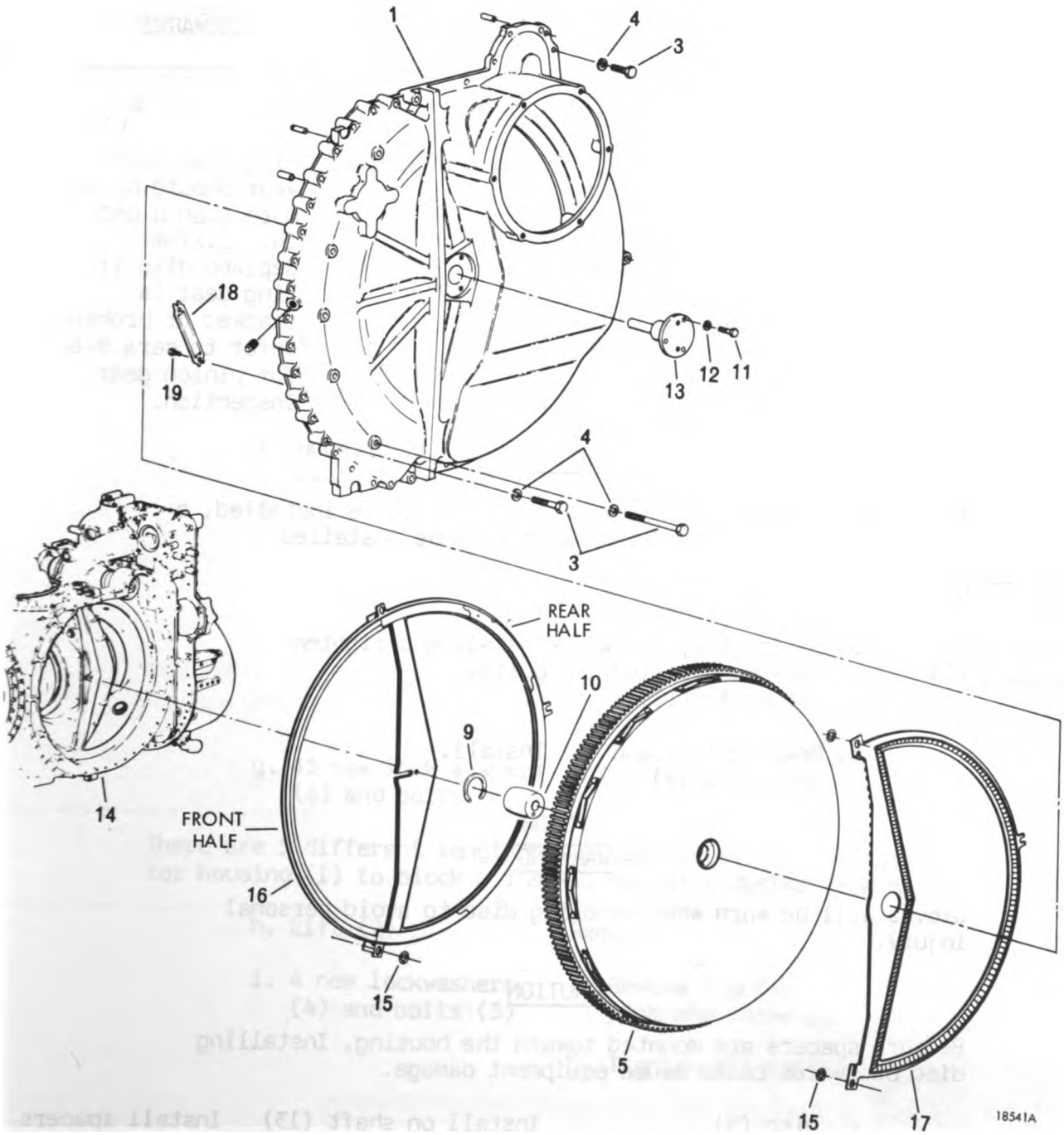
9-3. LH AND RH REGENERATOR HOUSING AND DISC AND RING GEAR ASSEMBLIES (cont)

LOCATION	ITEM	ACTION	REMARKS
INSPECTION OF REGENERATOR DISC AND RING GEAR (cont)			
		d. Check bearing (10) for wear or damage.	The inside diameter of the disc bearing should not exceed 0.765 in. (19.45 mm). The outside diameter of the bearing should not be less than 1.985 in. (50.40 mm). Replace bearing if cracked or broken.



9-3. LH AND RH REGENERATOR HOUSING AND DISC AND RING GEAR ASSEMBLIES (cont)

LOCATION	ITEM	ACTION	REMARKS
INSPECTION OF REGENERATOR DISC AND RING GEAR (cont)			
4. Regenerator disc and ring gear (5) LH or RH (cont)	c. Gear tooth	e. Check for wear or damage.	Ring gear tooth wear should be no more than 0.050 in. (1.27mm). Replace disc if ring gear is cracked or broken, refer to para 9-6 for pinion gear inspection.

CAUTION

If a new or different regenerator disc is to be installed, a new or re-coated inboard seal must also be installed.

INSTALLATION

5. Regenerator housing (1)	a. Shaft (13), 3 new lock washers (12), and bolts (11)	Install and tighten bolts.	
	b. Bearing (10) and snap ring (9)	Install.	

WARNING

Gloves will be worn when handling disc to avoid personal injury.

CAUTION

Be sure spacers are mounted toward the housing. Installing disc backwards could cause equipment damage.

	c. Disc (5)	Install on shaft (13) in housing (1). Wrap with strap to hold together.	Install spacers (18) toward the housing.

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
5. Regenerator housing (1) (cont)	d. Housing (1) and disc (5) assembly	a. Coat splitline surface of housing and block with RTV sealant.	
		b. Attach hoist to lift and remove assembly from stand.	
	e. 4 nuts and bolts with mounting plate (7)	Remove.	2 technicians required.
	f. Housing (1) and disc (5) assembly	a. Position assembly guide pins in block.	2 technicians required.
		b. Remove strap (6) from housing/disc assembly.	
		c. Complete installation of housing-to-block.	
	g. 45 new lock washers (4) and bolts	Install.	
	NOTE There are 5 different length bolts used to secure regenerator housing (1) to block. Install as noted during removal.		
	h. Lift (2)	Remove.	
	i. 4 new lockwashers (4) and bolts (3)	a. Remove 2 guide pins and install.	
		b. Tighten all bolts.	Torque to 120-150 lb. in. (14-17 N·m).
	CAUTION Ensure that disc does not fall out of housing when strap is removed.		
6. Generator set	New disc or seals	Perform break-in run.	See Chapter 13

9–4. PRECHAMBER BURNER ASSEMBLY

This task covers:
a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools
Brush, stainless steel, (Appx. C)
Torque wrench, 0–300 in. lb (Appx. C)
Tool Kit, Master Mechanics (5180–00–699–5273)
6–in. machinist rule
5/16 combination wrench
1/2 socket, 3/8 dr
7/16 open end wrench
13/16 deep well socket
3/8–dr hinge handle
3/8–dr speed handle
7/16 combination wrench
Shop Equipment, Contact Maintenance
Truck Mounted (4940–00–294–9518)
Torque wrench, 0–150 ft lb

Materials/Parts
Anti–seize (item 2, Appx B)
Rags (item 17, Appx B)
Fuel nozzle gasket

Materials/Parts (cont.)
Burner cover gasket
Spark igniter gasket
Fuel nozzle nut

Personnel required
Turbine Engine Driven Generator Repairer MOS 52F

Equipment Condition

Para	Condition Description
4–21*	Disarm battery power.
4–13*	Front roof removed.

* TM 5–6115–598–12

General Safety Instructions
No smoking or open flame.

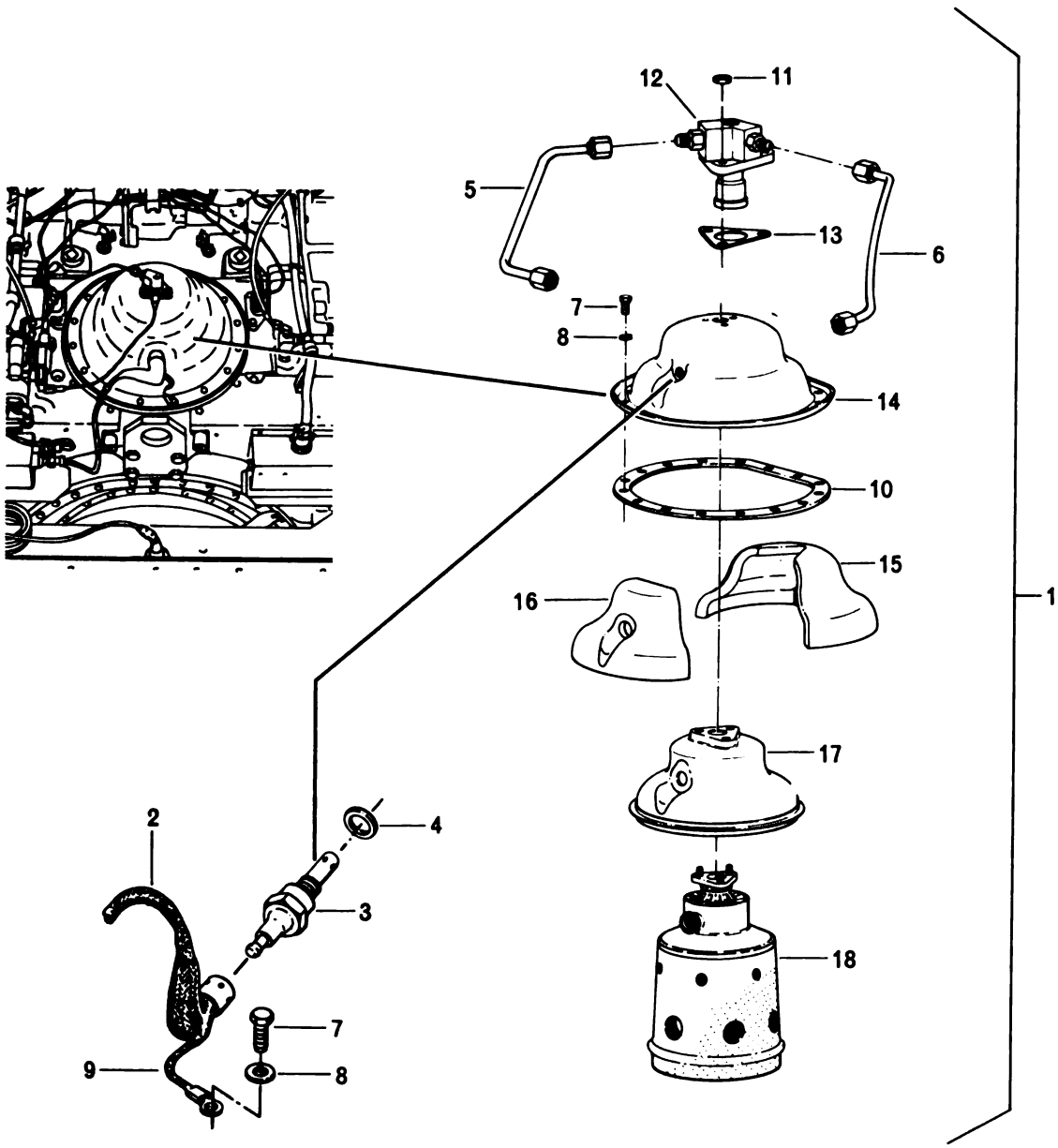
LOCATION	ITEM	ACTION	REMARKS

REMOVAL

1. Burner assy. (1).	a. Igniter lead (2).	Disconnect and ground.	

NOTE

Spark igniter shall not be removed for burner inspection.



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9-4. PRECHAMBER BURNER ASSEMBLY

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
1. Burner assy (1) (cont)	b. Spark igniter (3) and gasket (4)	Remove and discard gasket.	Remove for burner replacement only.
	c. Fuel lines (5 and 6)	a. Disconnect at nozzle.	
		b. Loosen other end and swing lines outward.	
	d. 16 bolts (7), washers (8), and ground wire (9)	Remove.	Note ground wire position for reassembly.
	e. Burner assy (1) and metal gasket (10)	Remove and discard gasket.	
	NOTE		
	Steps f and g are for replacement only. They need not be performed for inspection only.		
	f. 3 nuts (11), nozzle (12), and gasket (13)	Remove and discard nuts and gasket.	Remove for burner replacement only.
	CAUTION		
	The insulation in the burner asembly is fragile. Handle carefully to avoid damage.		
	g. Cover (14), insulation (15 and 16), shield (17), and prechamber burner (18)	Invert assembly and carefully separate burner assy components.	

LOCATION	ITEM	ACTION	REMARKS

INSPECTION

WARNING

Use care when handling burner assembly parts; debris can cause infection to eyes or open cuts.

2. Burner assy. (1).

a. Invert burner.

CAUTION

Do not use solvents to remove deposits or buildup. Solvents could cause engine damage.

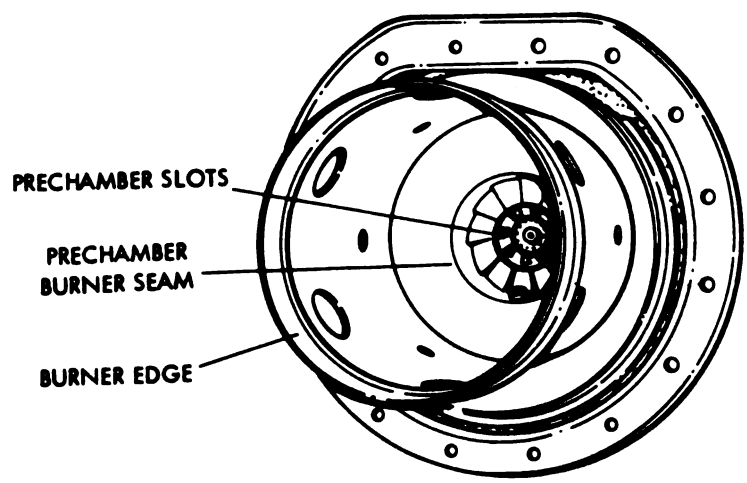
CAUTION

When removing hard carbon deposits with a stainless steel brush, exert only enough pressure on the brush to loosen and remove deposits. Excessive pressure on the brush will distort or damage the flame centering holes or damage the surface of the liner.

b. Remove soft carbon deposit with rag.
   (1) Remove hard carbon deposits with a stainless steel brush (NSN 7920-00-900-3577).

c. Invert again and let debris fall out.

d. Inspect for:



9-4. PRECHAMBER BURNER ASSEMBLY

LOCATION	ITEM	ACTION	REMARKS
INSPECTION (cont)			
		1. Distortion.	Check with straight-edge. Replace if prechamber burner (18) distortion exceeds 1/8 in. (3 mm).
		2. Burns (blistering).	Replace prechamber burner (18) if any delamination is found.
		3. Cracks	Replace prechamber burner (18) if any cracks are found near small slots surrounding spray nozzle. Replace if cracks exceeding 2 in. (51 mm) in length are found at seam where burner
2. Burner assy (1) (cont)			and prechamber join. Replace if cracks exceeding 1 in. (25 mm) in length are found through all three layers of burner lamilloy. Replace if cracks exceeding 1 in. (25 mm) are found in the bottom burner edge. Replace if cracks are converging or indicate possible piece breakout.
		e. Reinstall burner assy if servicable. (See step 3.)	

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
3. Burner assy (1)	a. Prechamber burner (18), shield (17), insulation (15 and 16), and cover (14)	Assemble.	
	NOTE Be certain that mating surfaces of prechamber burner, shield and cover are properly seated before tightening fuel nozzle nuts.		
	b. New gasket (13) fuel nozzle (12), and 3 new nuts (11)	Install and tighten nuts.	
	c. New gasket (10)	Install.	
	d. Burner assy (1)	Install.	
	e. Ground wire (9), 16 washers (8), and bolts (7)	Install and tighten.	Torque to 80-90 in. lb (9-10 N·m)
	f. Fuel lines (5 and 6)	Connect and tighten.	
	g. New gasket (4) and spark igniter (3)	a. Apply anti-seize compound to igniter threads.	
		b. Install and tighten.	Torque to 22-27 ft lb (30-37 N·m).
	h. Igniter lead (2)	Connect.	

9-5. AIR INLET BELL ASSEMBLY

This task covers:

a. Inspection b. Removal c. Installation

INITIAL SETUP

Tools

Torque wrench, 0-300 in. lb (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
1/2 socket, 3/8 dr
3/8-dr speed handle

Material/Parts

Lock washers (item 4)

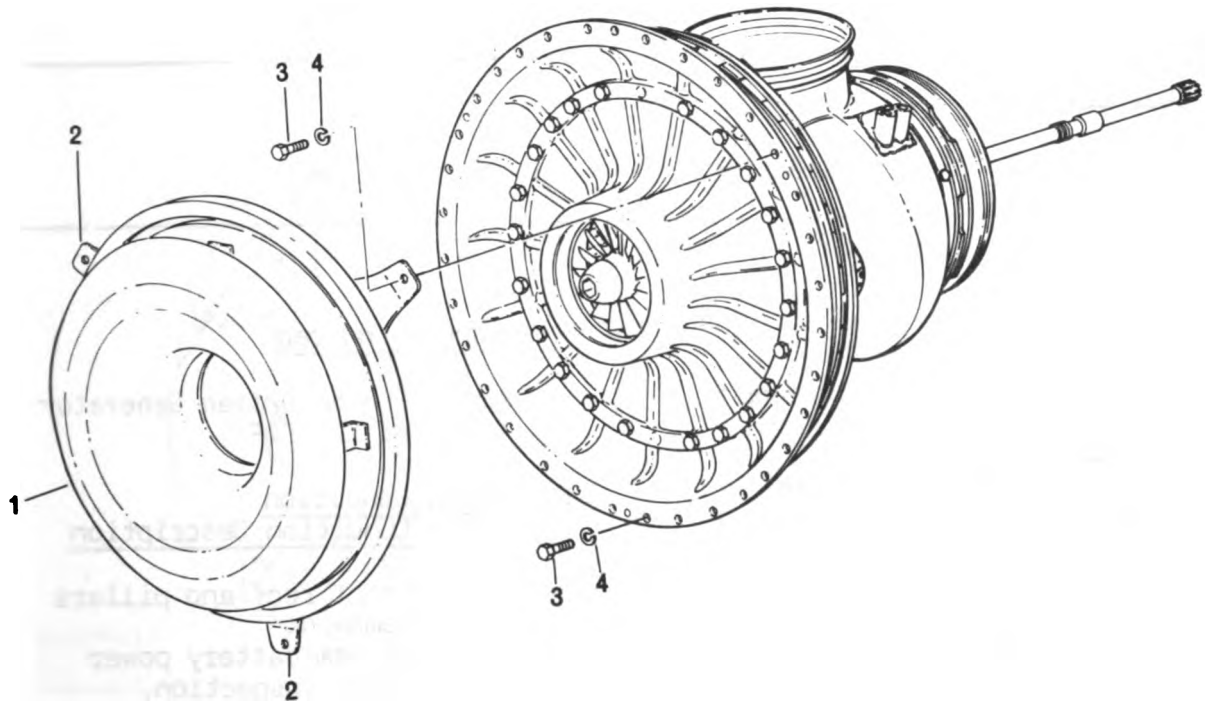
Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Equipment Condition

Para	Condition Description
3-7	Air inlet plenum removed.

LOCATION	ITEM	ACTION	REMARKS
INSPECTION			
1. Air inlet bell assembly (1)	a. 3 mounting feet (2)	Inspect for cracks.	Replace if cracked.
	b. Bell assembly (1)	Check for cracks.	Replace if cracked.
	c. 3 mount bolts (3)	Check for security.	Tighten if loose.
REMOVAL			
2. Air inlet bell assembly (1)	a. 3 bolts (3) and lock washers (4)	Remove and discard lock washers.	
	b. Bell assembly (1)	Remove.	2 technicians reqd.



LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
3. Air inlet bell assembly (1)	a. Bell assembly (1)	Place in position.	2 technicians reqd.
	b. 3 bolts (3) and new lock washers (4)	Install and tighten.	Torque bolts to 120-150 in. lb (14-17 N·m).

9-6. REGENERATOR DRIVE GEARBOX ASSEMBLY (PINION DRIVE GEAR)

This task covers:

a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

Regenerator pinion drive shaft gear and worm gear puller (Table 2-1)
Tool Kit, Master Mechanics (5180-00-699-5273)
5-in. extension, 3/8 dr
3/8-dr ratchet handle
1/2 socket, 3/8 dr
Plastic face hammer

Materials/Parts

Anti-seize (item 2, appx B)
Rags (item 17, appx B)
Lock washers (item 3)

Personnel Required

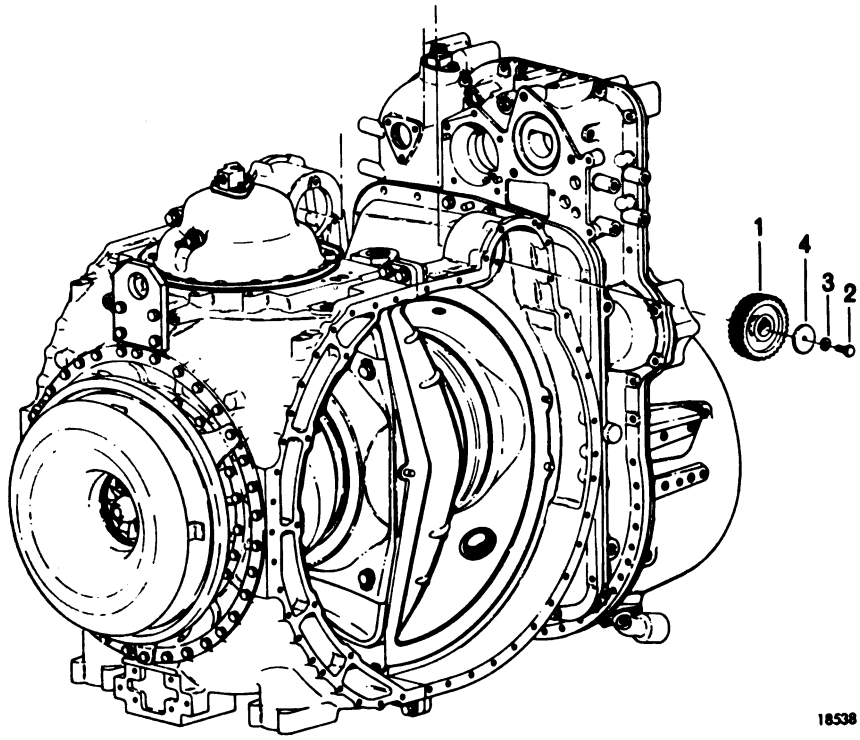
Turbine Engine Driven Generator Repairer MOS 52F

Equipment Condition

Para*	Condition Description
4-13*	Front roof and pillars removed.
4-21*	Disarm battery power after inspection.
9-3	RH or LH regenerator housing and disc removed.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Regenerator drive pinion gear (1)	a. Bolt (2), lock washer(3), and plate (4)	Remove and discard lock washer.	Use same procedure for LH and RH sides.
	b. Pinion gear (1)	Remove.	Use gear puller.



LOCATION	ITEM	ACTION	REMARKS
INSPECTION			
2. Regenerator drive pinion gear (1)		Inspect for tooth wear.	Wear not to exceed 0.020 in. (0.51 mm).
INSTALLATION			
3. Regenerator drive pinion gear (1)	a. Pinion gear (1)	Install.	
	b. Plate (4), new lock washer (3), and bolt (2)	Install. Tighten bolt.	

9-7. ACCESSORY DRIVE RETAINER ASSEMBLY

This task covers:

a. Removal b. Installation

INITIAL SETUP

Tools

17 mm socket (appx C)
19 mm socket (appx C)
29 mm socket (appx C
Tool Kit, Master Mechanics (5180-00-699-5273)
1/2-dr ratchet handle
Brass drift, 3/4 x 10 in.
Putty knife
Plastic face hammer
Shop Equipment, Contact Maintenance Truck Mounted (4940-00-294-9518)
Mechanical puller
Machinist's vise
Shop Equipment, Electrical Repair, Semitrailer Mounted (4940-00-294-9517)
Retaining pliers

Material/Parts

Oil lip type seal
Flywheel housing gasket
Rags (item 17, appx B)
Lock washer (item 5))

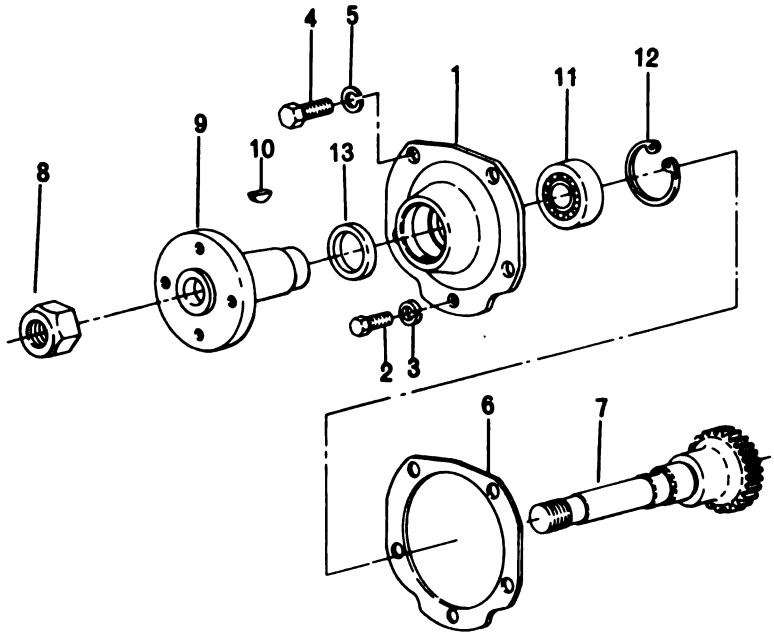
Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Equipment Condition

Para	Condition Description
8-3	Cooling fan removed.

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Retainer assy (1)	a. Bolt (2), washer (3), 4 bolts (4), and lock washers (5)	Remove.	Discard lock washer.
	b. Retainer assembly (1) and gasket (6)	Remove.	Discard gasket.
2. Drive shaft (7)	a. Nut (8)	Remove.	
	b. Hub (9)	Remove.	
	c. Shaft (7) and woodruff key (10)	Remove.	



LOCATION	ITEM	ACTION	REMARKS

REMOVAL (cont)

CAUTION

If bearing inspection reveals damage sufficient to cause oil contamination, inspect oil filter for metal particles. If metal particles are present, replace engine.

3. Bearing (11)	a. Retaining ring (12) and bearing (11)	Remove.	
	b. Seal (13)	Remove and discard.	

9-7. ACCESSORY DRIVE RETAINER ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
4. Bearing (12)	a. New seal (13)	Install.	Open side of seal into retainer.
		CAUTION	
		Be sure retaining ring is seated in groove.	
	b. Bearing (11) and retaining ring (12)	Install.	
5. Drive shaft (7)	a. Woodruff key (10) and shaft (7)	a. Install key in shaft.	
		b. Install shaft.	Seat shaft shoulder against bearing.
	b. Hub (9)	Install.	Align keyway with key.
	c. Nut (8)	Install and tighten.	
6. Retainer assy (1)	a. New gasket (6) and retainer assy (1)	Position on gearbox.	
	b. 4 new lock washers (5) and bolts (4)	Install and tighten.	
	c. Washer (3) and bolt (2)	Install and tighten.	

CHAPTER 10

MAINTENANCE OF ENGINE EXHAUST SYSTEM

10-1. PURPOSE AND FUNCTION

The purpose and function of the engine exhaust system is to provide adequate ducting to channel engine exhaust out of the frame and housing assembly. The system protects the engine from weather by automatically closing duct covers when the engine is not operating.

10-2. LH AND RH CYLINDER ASSEMBLY

This task covers:

a. Test b. Removal c. Installation

INITIAL SETUP

Tools

Tool Kit, Master Mechanics (5180-00-699-5273)
5/16 combination wrench
1/2 combination wrench
9/16 combination wrench
Slip joint pliers
Socket head screw key set

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
76	1	2-5

Materials/Parts

Cotter pin

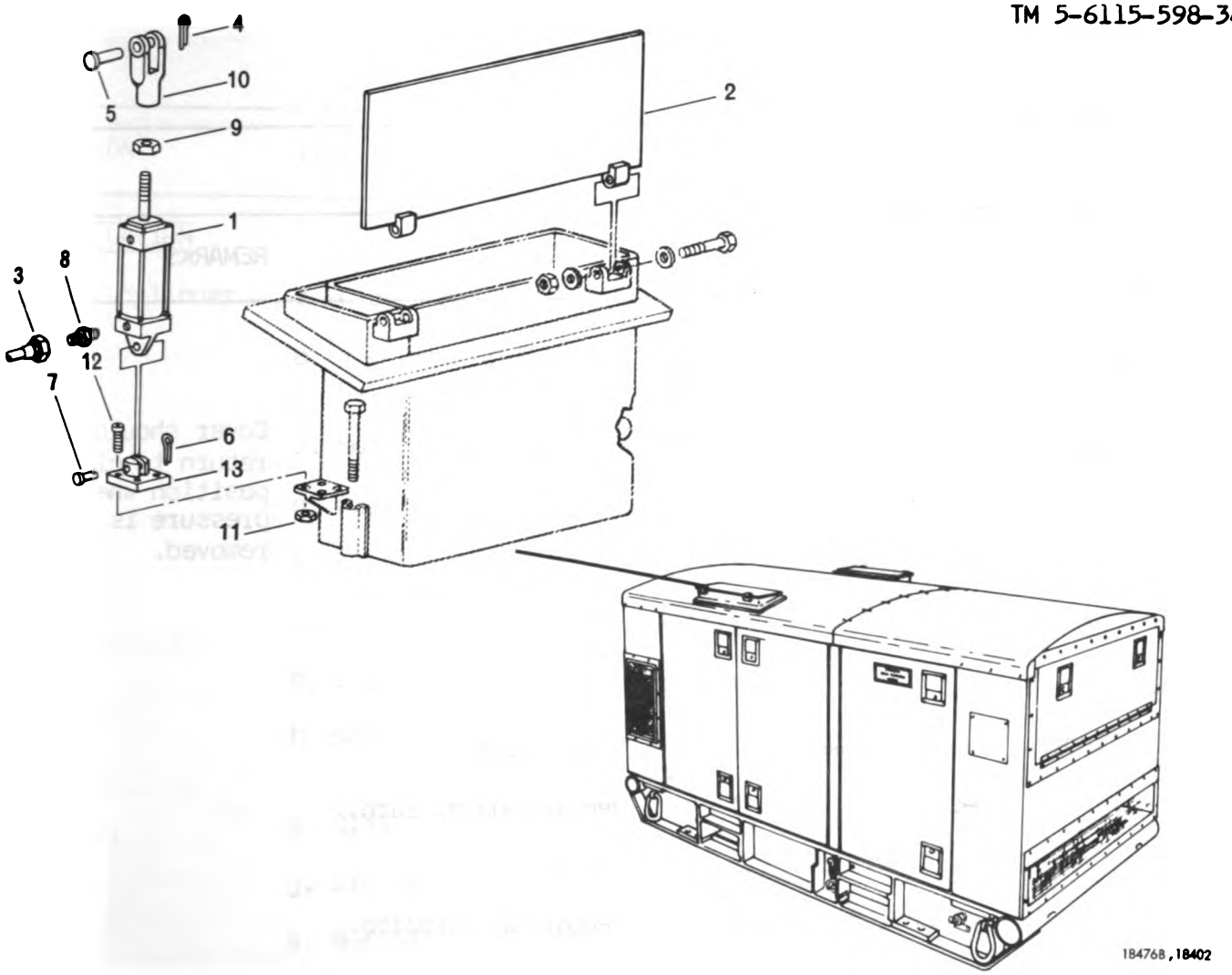
LOCATION	ITEM	ACTION	REMARKS

TEST

WARNING

Do not service exhaust system if generator set has been running and exhaust duct covers are still hot. Severe burns may result.

1. Air cylinder (1)	a. Exhaust duct cover (2)	Manually open and close to check for mechanical freedom of cylinder and linkage.	
	b. Cylinder (1)	a. Disconnect hose (3).	



LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
1. Air cylinder (1) (cont)		b. Apply air pressure.	Cylinder should open duct cover to within 85°-90° of horizontal with a minimum of 2 psi (14 kPa).

10-2. LH AND RH CYLINDER ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
1. Air cylinder (1) (cont)		c. Release air pressure.	Cover should return to closed position when pressure is removed.
	c. Air hose (3)	Connect.	
REMOVAL			
2. Air cylinder (1)	a. Air hose (3)	Disconnect.	
	b. Cotter pin (4)	Remove and discard.	
	c. Clevis pin (5)	Remove.	
	d. Cotter pin (6)	Remove and discard.	
	e. Clevis pin (7)	Remove.	
	f. Cylinder (1)	Remove.	
	g. Fitting (8)	Remove.	
	h. Nut (9)	Loosen.	
	i. Clevis (10)	Remove.	
	j. Nut (9)	Remove.	
	k. 4 nuts (11) and screws (12)	Remove.	
	l. Clevis bracket (13)	Remove.	

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
3. Air cylinder (1)	a. Clevis bracket (13)	Position in place.	
	b. 4 screws (12) and nuts (11)	Install and tighten.	
	c. Nut (9)	Install.	
	d. Clevis (10)	Install.	
	e. Fitting (8)	Install and tighten.	
	f. Air cylinder (1)	Position on bracket.	
	g. Clevis pin (7)	Install.	
	h. New cotter pin (6)	Install and spread ends.	
	i. Clevis (10)	Position on door.	
	j. Clevis pin (5)	Install.	
	k. Nut (9)	Tighten against clevis.	
	l. New cotter pin (4)	Install and spread ends.	
	m. Air hose (3)	Connect.	
4. Air cylinder (1)		Repeat test procedure.	

10-3. LH AND RH EXHAUST DUCT ASSEMBLY

This task covers:

Repair

INITIAL SETUP

Tools

Tool Kit, Master Mechanics (5180-00-699-5273)
- 3/8 open end wrench
- 3/8 combination wrench
- 3/8 dr ratchet handle
- 3/8 socket
- Ball peen hand hammer, 16 oz

Welding Shop, Trailer Mounted (3431-00-935-7821)
- Inert gas shielded arc welding set
- Portable electric disk sander
- Welder's apron
- Welder's sleeves
- Welder's helmet

Materials/Parts

- Paint brush (item 5, appx B)
- Face shield (item 8, appx B)
- Argon gas (item 9, appx B)

Materials/Parts (cont)

- Welder's gloves (item 10, appx B)
- Paint (item 16, appx B)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F
Welder MOS 44B

Troubleshooting References

Item	Step	Table
76	1	2-5

Equipment Condition

Para	Condition Description
10-2	Cylinder removed.
4-47*	Exhaust ducts removed.

*TM 5-6115-598-12

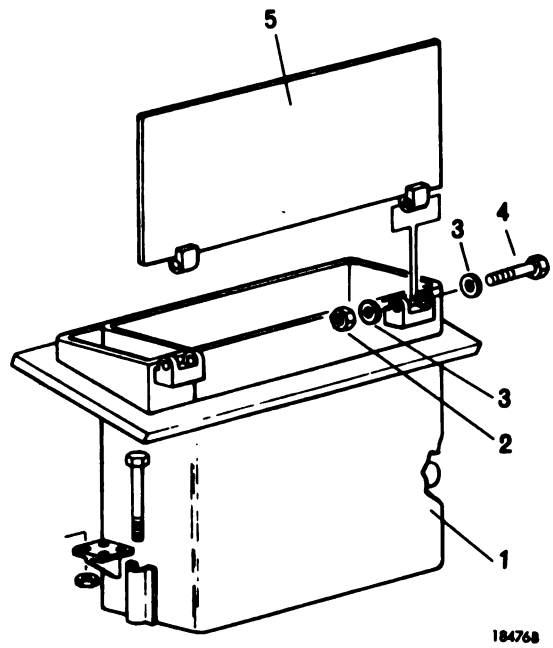
LOCATION	ITEM	ACTION	REMARKS

WARNING

Be sure generator set has cooled down sufficiently to allow the handling of parts safely. Severe burns may result from handling hot parts.

REPAIR

1.	Exhaust duct assembly (1)	a. 2 nuts (2), 4 washers (3), and 2 bolts (4)	Remove.
		b. Duct cover (5)	Remove.



LOCATION	ITEM	ACTION	REMARKS

REPAIR (cont)

WARNING

Use care when using grinding or welding equipment. Do not watch welding process or use grinding equipment without proper eye protection as severe eye damage or blindness could result.

1. Exhaust duct assembly (cont)	c. Duct cover (5) and duct (1)	Hammer out dents, weld punctures, sand high spots and paint as reqd.	
	d. Duct cover (5)	Position on duct.	
	e. 2 bolts (4), 4 washers (3), and 2 nuts (2)	Install and tighten nuts.	

10-4. LH AND RH EXHAUST ELBOW

This task covers:

a. Removal b. Repair c. Installation

INITIAL SETUP

Tools

Safety wire pliers (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
1/2 socket
3/8-dr ratchet handle
Socket head screw key set
Diagonal cutting pliers
Putty knife
Wire brush

Materials/Parts

Exhaust duct elbow gasket
Paint brush (item 5, appx B)
Face shield (item 8, appx B)
Paint (item 16, appx B)
Rags (item 17, appx B)
Safety wire (item 28, appx B)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Equipment Condition

Para	Condition Description
4-47*	Exhaust ducts removed.

*TM5-6115-598-12

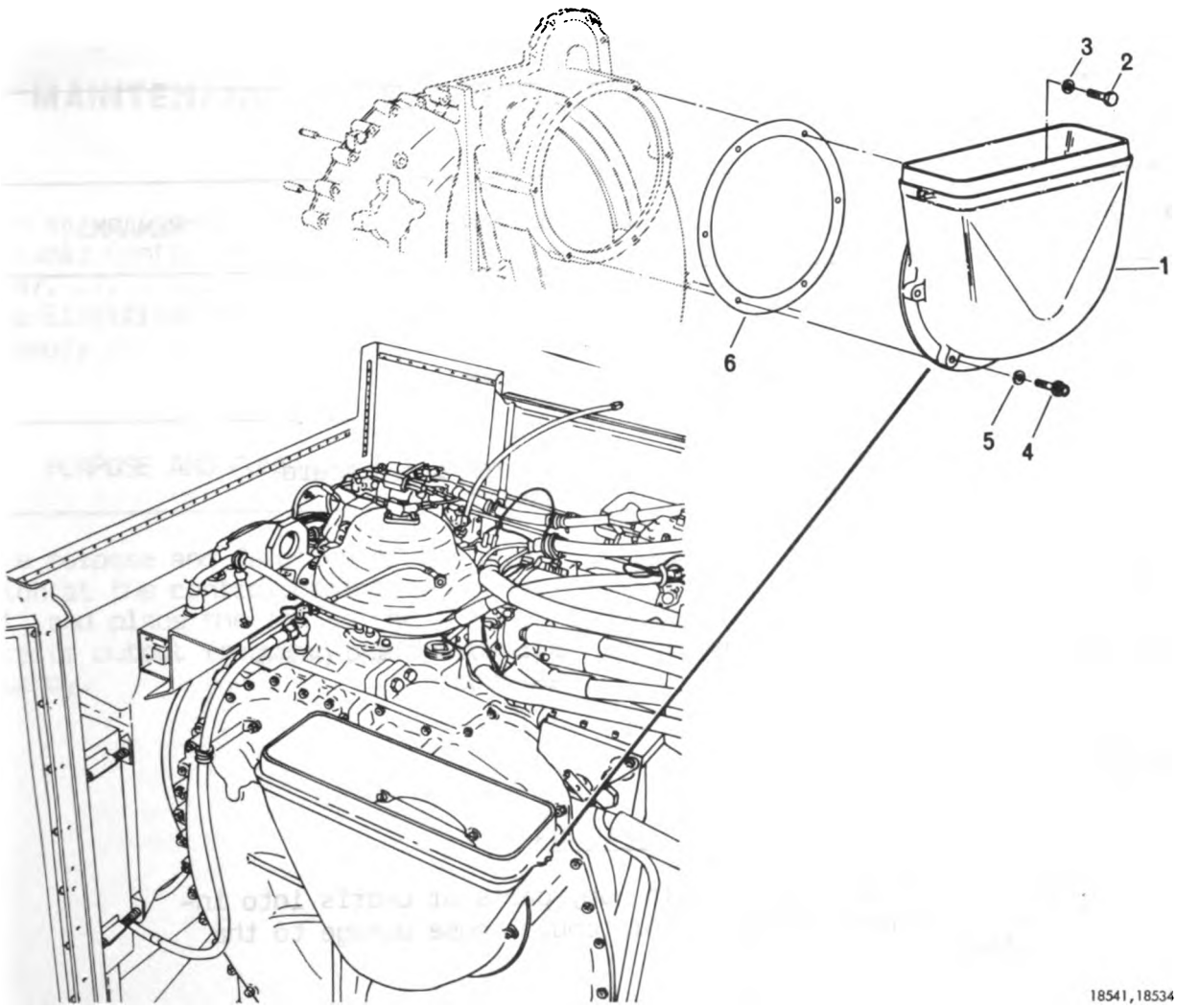
LOCATION	ITEM	ACTION	REMARKS

REMOVAL

WARNING

Be sure generator set has cooled down sufficiently to allow the handling of parts safely. Severe burns may result from handling hot parts.

1. Exhaust elbow (1)	a. Safety wire	Remove from 2 bolts (2).	



LOCATION	ITEM	ACTION	REMARKS

REMOVAL (cont)

CAUTION

Ensure that no pieces of safety wire are allowed to fall into the regenerator housing. This could cause damage to the equipment.

1. Exhaust elbow (1) (cont)	b. 2 bolts (2) and washers (3)	Remove.	

10-4. LH AND RH EXHAUST ELBOW (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
1. Exhaust elbow (1) (cont)	c. 4 screws (4) and and washers (5)	Remove.	
	d. Exhaust elbow (1) and gasket (6)	Remove and discard gasket.	
REPAIR			
2. Exhaust elbow (1)		Wire brush and paint as reqd.	
INSTALLATION			
	CAUTION Use care to prevent dropping any parts or debris into installed exhaust elbows. This could cause damage to the equipment.		
3. Exhaust elbow (1)	a. New gasket (6) and elbow (1)	Install; align bolt holes.	
	b. 4 screws (4) and washers (5)	Install and tighten.	
	c. 2 bolts (2) and washers (3)	Install and tighten.	
	d. Safety wire	Install on 2 bolts (2).	

CHAPTER 11

MAINTENANCE OF ENGINE CONTROLS AND INSTRUMENTS

11-1. PURPOSE AND FUNCTION

The purpose and function of the engine controls and instruments is to provide a station at the control cabinet where an operator can turn the set on, initiate a start, and place the set on the line. The engine electronic control senses generator output frequency and controls engine speed to maintain a constant output frequency.

11-2. ENGINE ELECTRICAL HARNESS ASSEMBLY

This task covers:

a. Test b. Removal c. Repair d. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

Thermal gun (appx C)
13mm socket (appx C)
Tool Kit, Master Mechanic
(5180-00-699-5273)
7/16 socket, 3/8 dr
5-in. extension, 3/8 dr
3/8-dr ratchet handle
7/16 combination wrench
1/2 socket, 3/8 dr
4-in. flat tip screwdriver
1/2 dr ratchet handle
5-in extension, 1/2 dr
3/4 combination wrench
11/32 open end wrench
5/16 open end wrench
3/8 combination wrench
Pocket knife
Shop Equipment, Electrical Repair
Semi-Trailer Mounted
(4940-00-294-9517)
Electronic tool kit
Terminal servicing kit

Materials/Parts

Tags (item 24, appx B)
Tape (item 25, appx B)
Elect tiedown straps

Personnel Required

Turbine Engine Driven Generator
Repairer MOS 52F

Troubleshooting References

Item	Step	Table
28	8,9	2-5
30	2	2-5
31	1,3,4,7	2-5
35	6,14	2-5
37	8	2-5
38	1	2-5
39	2	2-5
40	2	2-5
64	9,10	2-5

Equipment Condition

Para	Condition Description
4-13*	Front roof removed.
4-21*	Disarm battery power.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS

TEST

1. Engine harness assy (1 and 2)

NOTE

With specific trouble symptoms, check harness circuit in question for continuity, open circuit and short circuit using appropriate schematic diagrams (TM 5-6115-598-12). Each circuit shall have a minimum insulation resistance of 10,000 ohms to each connector shell and to each other circuit.

REMOVAL

NOTE

This procedure covers the engine harness assembly which includes the engine electrical harness and the engine to ECA harness. The assembly links the engine to the ECA and makes connections at the following locations:

Engine electrical harness (1)

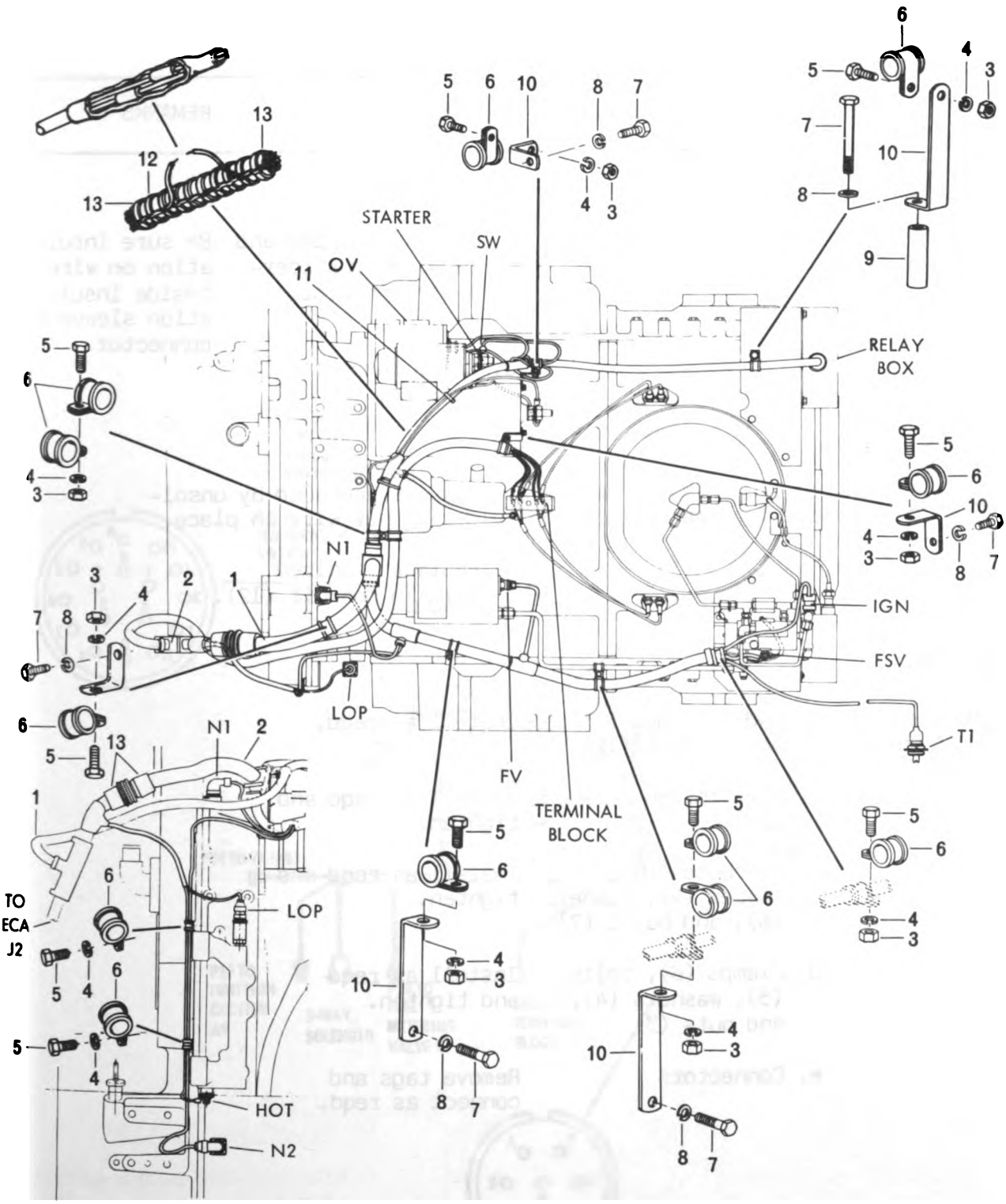
Engine to ECA harness
T1 sensor (T1)
Ignition exciter (IGN)
3-way solenoid (FSV)
Fuel metering valve (FV)
N2 sensor (N2)
N1 sensor (N1)
Engine terminal block
Starter motor
Starter solenoid (SN)
Clutch valve (CV)
Engine relay box

Engine to ECA harness (2)

Engine electrical harness
Engine terminal block
Oil temperature switch (HOT)
Low oil pressure switch (LOP)
ECA J2 connector (ECA-J2)

11-2. ENGINE ELECTRICAL HARNESS ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
2. Engine harness assy (1 and 2)		Disconnect, tag, and identify connector from harness requiring repair.	
	NOTE If damaged harness is being repaired on the unit, it will not be necessary to remove complete harness assembly.		
	a. Nuts (3), washers (4), bolts (5), and clamps (6)	Remove as reqd.	Note location for installation.
	b. Bolts (7), washers (8), spacer (9), and brackets (10)	Remove as reqd.	Note location for installation.
	c. Tiedown straps (11)	Cut, remove, and discard as reqd.	
	d. Conduit (12) and end fittings (13)	Remove as reqd.	
REPAIR			
3. Engine harness assy (1 and 2)		a. Cut to remove damaged wire section. b. Strip wire end back approximately 3/8 in. (10 mm).	
	NOTE If it is necessary to remove a damaged section of wire, a new piece may be spliced in place.		



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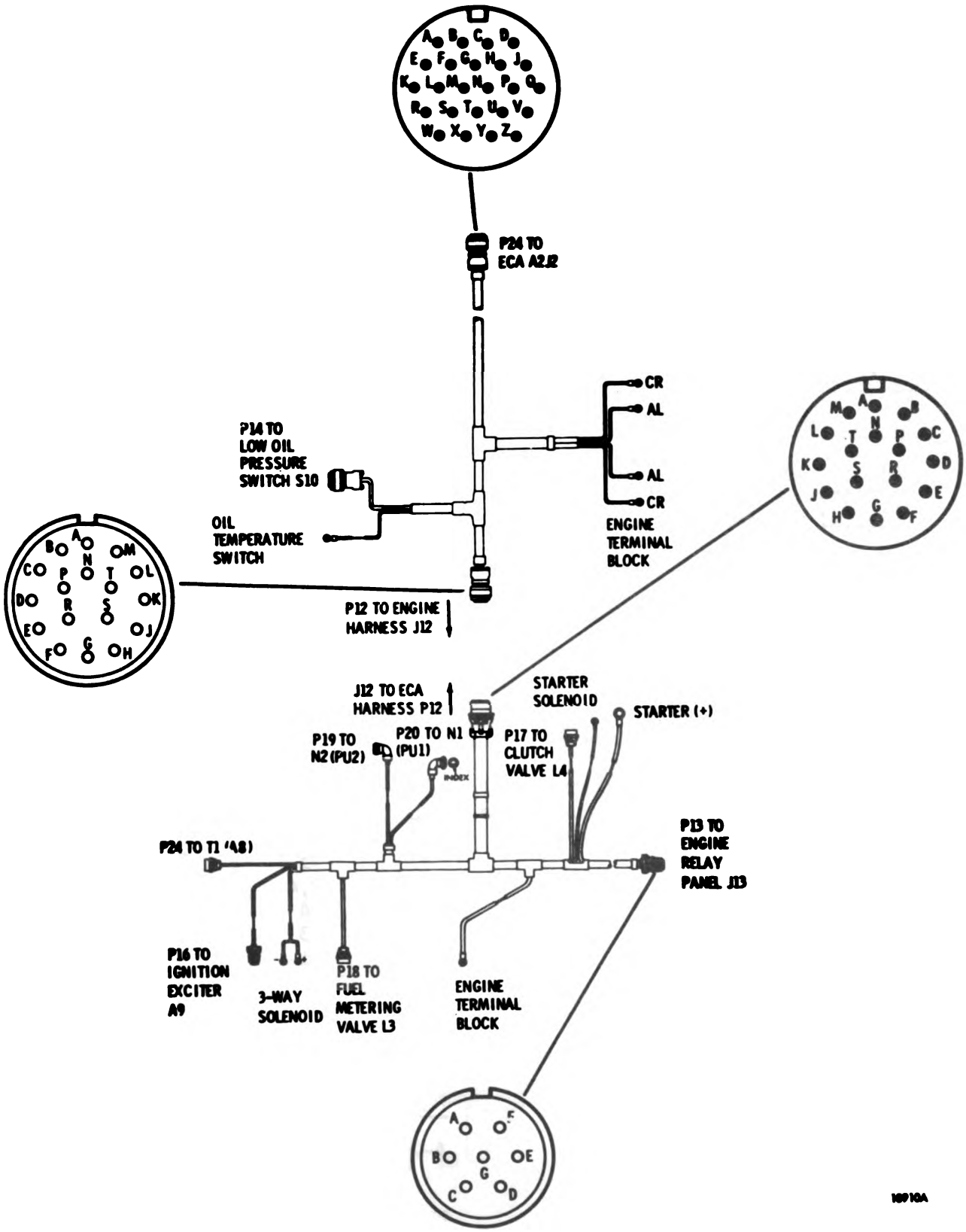
11-2. ENGINE ELECTRICAL HARNESS ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
3. Engine harness assy (1 and 2) (cont)		c. Insert stripped end of wire in solderless connector.	Be sure insulation on wire is inside insulation sleeve of connector.
		d. Crimp connector to wire.	
	NOTE The entire length of a damaged wire may be replaced by unsoldering wire from connectors and soldering new wire in place.		
		e. Replace repaired wire in conduit (12).	
INSTALLATION			
4. Engine harness assy (1 and 2)	a. End fittings (13), and conduit (12)	Install as reqd.	
	b. New tiedown straps (11)	Install as reqd and tighten.	
	c. Brackets (10), spacer (9), washers (8), and bolts (7)	Install as reqd and tighten.	
	d. Clamps (6), bolts (5), washers (4), and nuts (3)	Install as reqd and tighten.	
	e. Connectors	Remove tags and connect as reqd.	



11-3. ELECTRONIC CONTROL ASSEMBLY (ECA)

This task covers:

a. Removal b. Installation c. Adjustment

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INITIAL SETUP

Test Equipment

Electrical simulator test set (Table 2-1)
Digital multimeter

Tools

Tool Kit, Master Mechanics (5180-00-699-5273)
7/16 deep well socket
5-in. extension
3/8-dr ratchet handle
2-in. flat tip screwdriver, 1/8-in. blade
4-in. flat tip screwdriver
Shop Equipment, Contact Maintenance Truck Mounted (4940-00-294-9518)
AC power supply

Materials/Parts

Tags (item 24, appx B)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

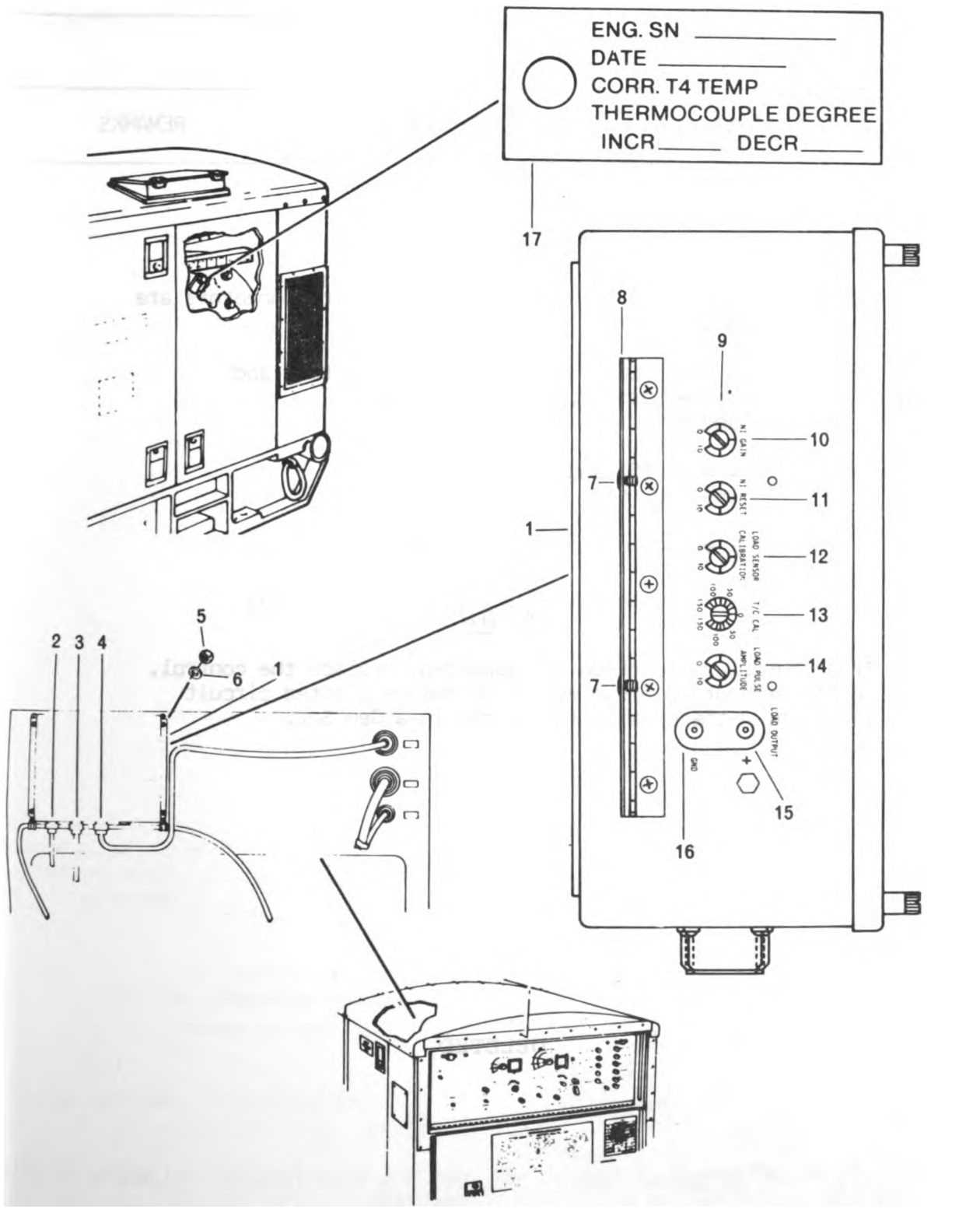
Troubleshooting References

Item	Step	Table
2	2	2-5
3	1	2-5
4	1	2-5
6	1	2-5
14	1	2-5
28	8	2-5
30	4	2-5
31	5	2-5
33	1	2-5
35	10	2-5
36	2	2-5
37	6	2-5
39	1,4	2-5
40	1,4	2-5
44	3	2-5
45	5	2-5
46	2,4	2-5
58	4	2-5
64	3	2-5
66	1	2-5
71	1,2	2-5
81	8	2-5
83	6	2-5

Equipment Condition

Para	Condition Description
4-21*	Disarm battery power except for test.

*TM 5-6115-598-12



18434D, 18518A, 18907, 18909A, 19983

11-3. ELECTRONIC CONTROL ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS

REMOVAL

WARNING

Do not allow cables to fall on batteries when connectors are being disconnected.

1. Electronic control (1)	a. 3 electrical connectors (2, 3 and 4)	Disconnect, tag, and identify.	
	b. 4 nuts (5) and washers (6)	Remove.	
	c. Electronic control (1)	Remove.	

CAUTION

If a control malfunction is suspected, replace the control. Do not attempt to troubleshoot or remove printed circuit cards while the control is mounted in a Gen Set.

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11-3. ELECTRONIC CONTROL ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
	COPY DELETED		
2. Electronic control (1)		Place in position.	
	a. 4 washers (6), and nuts (5)	Install and tighten.	
	b. 3 electrical connectors (2, 3, and 4)	Connect.	
ADJUSTMENT			
3. Electronic control (1)	a. 2 screws (7) and access cover (8)	Loosen screws and open cover.	
	b. Adjustment panel (9)	Make adjustments as follows.	Panel contains 5 field adjustable potentiometers.

CAUTION

The following adjustments must be made when replacing an ECA on the generator set. Failure to adjust properly could cause overtemperature damage to engine.

c. N1 Gain (10)	30° CW from full CCW position.	Engine stability.
d. N1 Reset (11)	30° CCW from full CW position.	Engine stability.
e. T/C Cal (13)	Set to agree with metal tag (17) reading on front of engine.	Engine temperature calibration.

LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENT (cont)			
		NOTE If a load bank is not available, match load sensor (POT) (12) adjustment position with other generator set ECA. Load output voltage must be equal on two sets to load share properly when operating in parallel.	
3. Electronic control (1) (cont)	f. Load sensor calibration (12)	a. Connect multimeter to +(15) and GND (16) jacks on ECA.	Set multimeter to dc volt scale.
		b. Start engine and apply load.	Para 2-2, 2-3, and 2-4, TM 5-6115-598-12.
		c. Adjust for 0-3 Vdc as follows:	Balances load sharing in parallel operation.
		1. Observe averaged current.	
		2. Divide by 520 and then multiply by 3.	
		3. Adjust LOAD SENSOR CALIBRATION to the value obtained in step 2.	
	g. Load pulse amplitude (14)	Set to mid-range as follows:	Helps prevent speed loss when load is applied.
		1. Open AC INTERRUPT switch.	
		2. Scan to Hz on regulator monitor.	

11-3. ELECTRONIC CONTROL ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
ADJUSTMENT (cont)			
3. Electronic control (1) (cont)		3. Observe Hz while AC INTERRUPT switch is closed.	Hz should not droop below 394 Hz and should recover to 400 Hz within 1 second. If out of limit, adjust.
		4. Adjust as required. Do not exceed 1/8 turn in either direction.	Turn clockwise to increase and counter-clockwise to decrease.
		5. Repeat adjustment procedure as required to obtain limits.	

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11-4. RHEOSTAT (FREQUENCY ADJUST)

This task covers:

a. Test b. Removal c. Installation

INITIAL SETUP

Test Equipment

Multimeter

Tools

Tool Kit, Master Mechanics (5180-00-699-5273)
4-in. flat tip screwdriver
Pocket knife
Socket head screw key set
1/2 combination wrench
Shop Equipment, Electrical Repair, Semi-Trailer Mounted (4940-00-294-9517)
Electronic tool kit

Materials/Parts

Tin alloy solder (item 21, appx B)
Tags (item 24, appx B)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

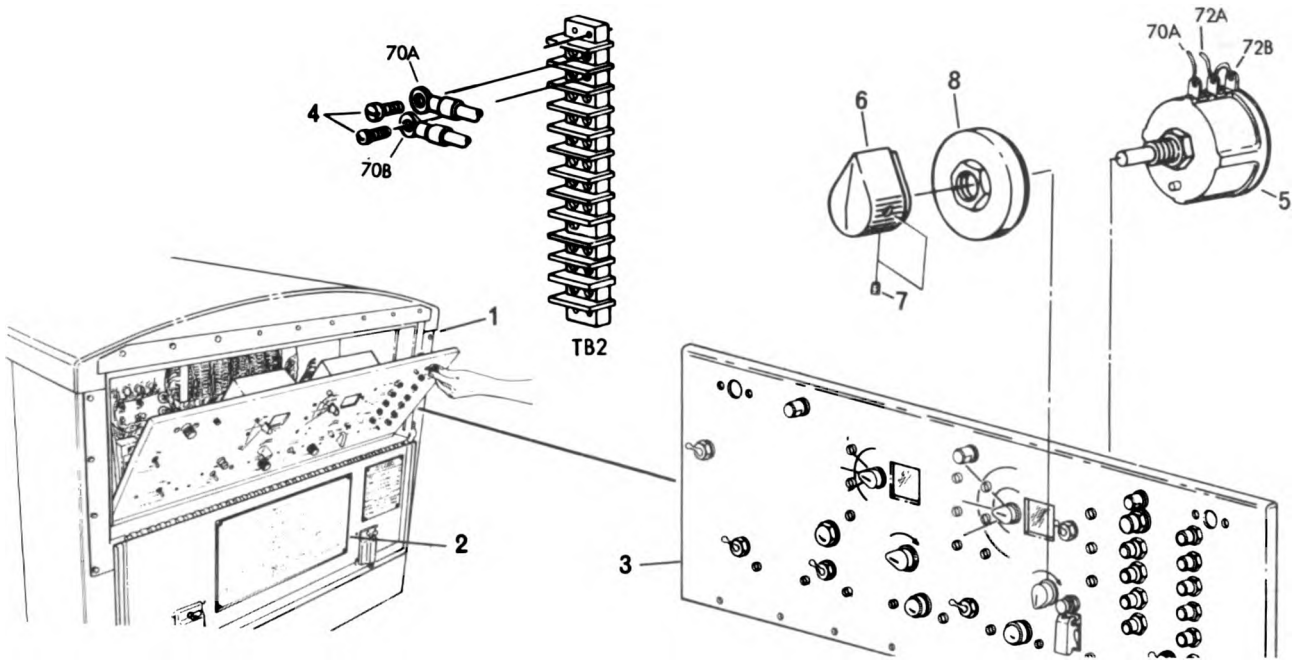
Item	Step	Table
35	10	2-5
45	2	2-5
61	3	2-5

Equipment Condition

Para	Condition Description
4-21*	Batteries disarmed.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Control cabinet (1)	a. Outer door (2)	Unlatch and open.	
	b. Inner door (3)	Turn knobs to right to unlock and open.	
	c. 2 screws (4) and leads (70A from TB2-1 and 72A from TB2-2)	Remove, tag, and identify leads.	



18598A, 18819A, 18522A, 18918A

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
1. Control cabinet (1) (cont)	d. Rheostat (5)	a. Check resistance between leads.	Set multimeter RX10 scale.
		b. Turn adjusting knob (6) fully clockwise.	Reading should be 0 ohm.

11-4. RHEOSTAT (FREQUENCY ADJUST) (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
1. Control cabinet (1) (cont)		c. Turn adjusting knob (6) fully counter-clockwise.	Reading should be 970-1030 ohms.
		d. Replace if defective.	
	e. 2 leads (70A and 72A) and screws (4)	Remove tags, install and tighten screws.	
	f. Inner door (3)	Close and turn knobs to left to lock.	
	g. Outer door (2)	Close and latch.	
REMOVAL			
2. Control cabinet (1)	a. Outer door (2)	Unlatch and open.	
	b. Inner door (3)	Turn knobs to right and open.	

WARNING

Use care when using soldering equipment. Severe burns could result from improper use of equipment.

3. Rheostat (5)	a. 3 leads (No. 70A, 72A, and 72B)	Unsolder connections, remove, tag, and identify.	
	b. 2 socket head screws (7)	Loosen.	Need not remove.
	c. Knob (6)	Remove.	
	d. Locking knob (8)	Loosen and remove.	
	e. Rheostat (5)	Remove from rear of panel.	

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
4. Rheostat (5)			
	WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.		
	a. Rheostat (5)	Install from rear of panel.	
	b. Locking knob (8)	Install on shaft and tighten.	
	c. Knob (6)	Install on shaft.	
	d. 2 socket head screws (7) in knob	Tighten.	
	e. 3 leads (No. 70A, 72A, and 72B)	a. Remove tags and install shrink sleeving on leads. b. Install and solder leads. c. Move sleeving over soldered connection and heat shrink.	
5. Control cabinet (1)	a. Inner door (3)	Close and turn knobs to left to lock.	
	b. Control cabinet outer door (2)	Close and latch.	

11-5. LIGHT ASSEMBLIES

This task covers:

a. Test b. Removal c. Installation

INITIAL SETUP

Test Equipment

Multimeter

Tools

Thermal gun (appx C)
Tool Kit, Master Mechanics
(5180-00-699-5273)
3/4 socket
3/8-dr rachet handle
1 1/8 combination wrench
3/4 combination wrench
Pocket knife
Shop Equipment, Electrical Repair,
Semi-Trailer Mounted
(4940-00-294-9517)
Electronic tool kit

Materials/Parts

Tags (item 24, appx B)
Shrink sleeving

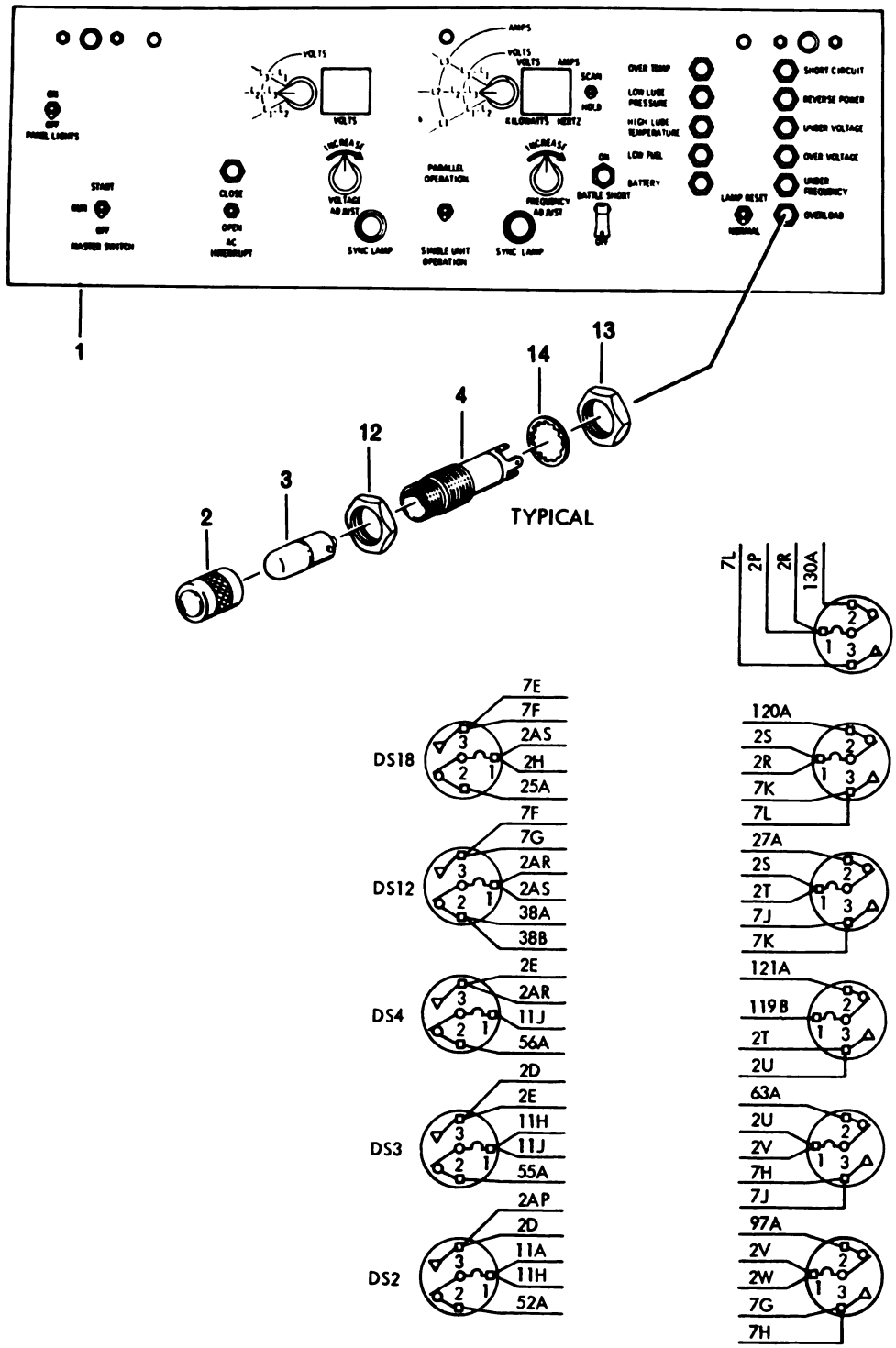
Personnel Required

Turbine Engine Driven Generator
Repairer MOS 52F

Troubleshooting References

Item	Step	Table
13	5	2-5
14	2	2-5
15	2	2-5
16	2	2-5
17	2	2-5
18	2	2-5
19	2	2-5
20	2	2-5
21	2	2-5
22	2	2-5
23	2	2-5
24	2	2-5
25	2	2-5
26	2	2-5
27	2	2-5
81	5	2-5

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Control cabinet outer door		Unlatch and open.	
2. Inner door (1)	a. Cap (2) and bulb (3)	a. Remove.	



WARNING LIGHT CONNECTIONS

16268D, 18958, 18966A

11-5. LIGHT ASSEMBLIES (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. Inner door (1) (cont)		b. Check resistance of bulb element.	Set multimeter RX1 scale. Reading should be approximately 30 ohms (bulb element resistance).
	b. Inner door (1)	Turn knobs to right and open.	

WARNING

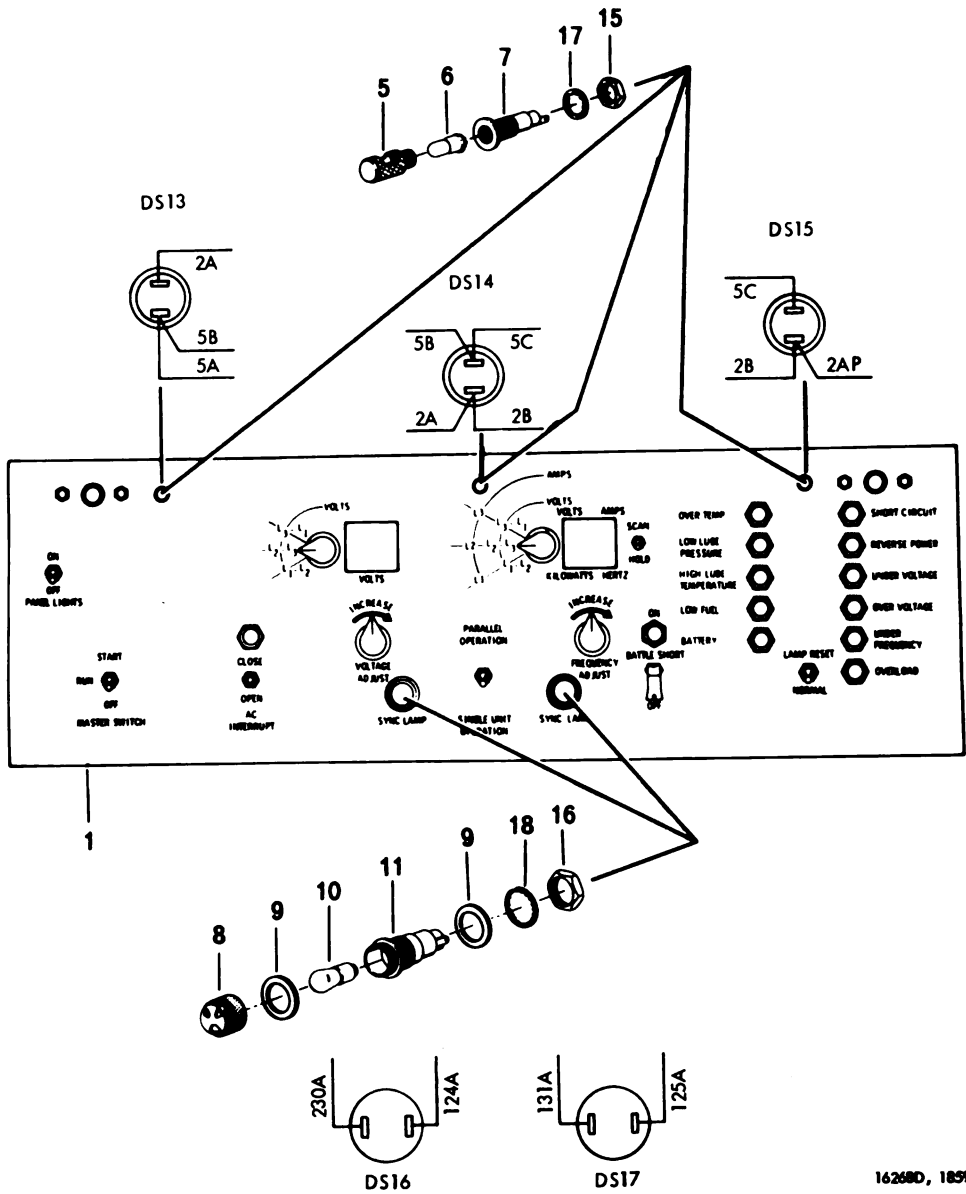
Use care when using soldering equipment. Severe burns could result from improper use of equipment.

	c. Light socket (4)	Remove sleeve, unsolder leads, tag, and identify.	
	d. Bulb (3) and cap (2)	Install.	
	e. Light socket (4)	a. Check resistance between terminals 1 and 2.	Set multimeter RX1 scale. Reading should be approximately 30 ohms (bulb element resistance). If reading is not correct, replace socket.
		b. Press bulb cover and check resistance between terminals 1 and 3.	Resistance should be approximately 30 ohms (bulb element resistance). If reading is not correct, replace socket.

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. Inner door (1) (cont)		c. Release cover and check resistance between terminals 2 and 3 and then between 1 and 3.	Reading should be infinity. If reading is incorrect, replace socket.
	f. Cap (2) and bulb (3)	Remove.	
	g. Light socket (4)	a. Remove tags and install shrink sleeving on leads.	
		b. Install and solder leads.	
		c. Move sleeving over solder connection and heat shrink.	
	h. Bulb (3) and cap (2)	Install.	
	i. Cap (5) and bulb (6)	a. Remove.	
		b. Check resistance of bulb element.	Set multimeter to RX1 scale. Reading should be approximately 200 ohms (bulb element resistance).
	j. Light socket (7)	Remove sleeve, unsolder leads, tag, and identify.	
	k. Bulb (6) and cap (5)	Install.	

11-5. LIGHT ASSEMBLIES (cont)

TEST (cont)



16268D, 18598A, 18599D, 18959

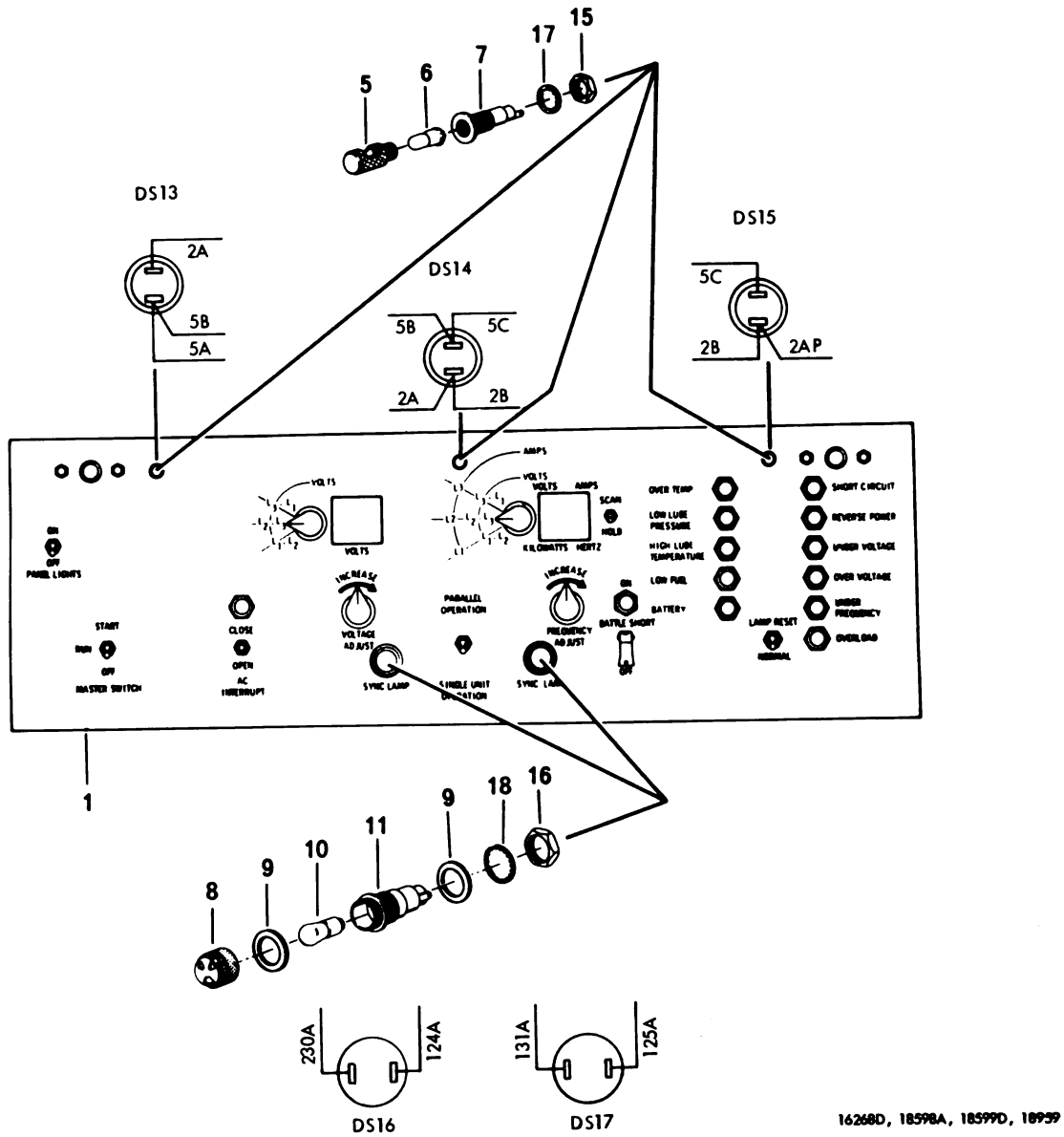
LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. Inner door (1) (cont)	l. Light socket (7)	Check resistance between terminals.	Set multimeter RX1 scale. Reading should be approximately 200 ohms (bulb element resistance). If reading is incorrect, replace socket.
	m. Cap (5) and bulb (6)	Remove.	
	n. Light socket (7)	a. Remove tags and install shrink sleeving on leads.	
		b. Install and solder leads.	
		c. Move sleeving over solder connection and heat shrink.	
	o. Bulb (6) and cap (5)	Install.	
	p. Cap (8), gasket (9), and bulb (10)	a. Remove.	
		b. Check resistance of bulb element.	Set multimeter RX1 scale. Reading should be approximately 500 ohms (bulb element resistance).
	q. Light socket (11)	Remove sleeve, unsolder leads, tag, and identify.	
	r. Bulb (10), gasket (9), and cap (8)	Install.	

11-5. LIGHT ASSEMBLIES (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. Inner door (1) (cont)	s. Light socket (11)	Check resistance between terminals.	Set multimeter RX1 scale. Reading should be approximately 500 ohms (bulb element resistance). If reading is incorrect, replace socket.
	t. Cap (8), gasket (9), and bulb (10)	Remove.	
	u. Light socket (11)	a. Remove tags and install shrink sleeving on leads. b. Install and solder leads. c. Move sleeving over solder connection and heat shrink.	
	v. Bulb (10), gasket (9), and cap (8)	Install.	
	w. Inner door (1)	Close and turn knobs to left to lock.	
	x. Outer door	Close and latch.	
REMOVAL			
3. Control cabinet outer door		Unlatch and open.	

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
		WARNING	
		Use care when using soldering equipment. Severe burns could result from improper use of equipment.	
4. Inner door (1)		Turn knobs to right and open.	
	a. Cap (2) and bulb (3)	Remove.	
	b. Leads	Remove sleeve, unsolder leads, tag, and identify.	
	c. Nut (12)	Remove.	
	d. Nut (13), washer (14), and light socket (4)	Remove as a unit.	
	e. Caps (5 or 8) and bulbs (6 or 10)	Remove.	
	f. Leads	Remove sleeve, unsolder leads, tag, and identify.	Removal procedure is the same for either assembly.
	g. Nuts (15 or 16) and washers (17 or 18)	Remove.	
	h. Light sockets (7 or 11) and gasket (9)	Remove.	

11-5. LIGHT ASSEMBLIES (cont)



LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
5. Inner door (1)	a. Gasket (9) and light socket (11 or 7)	Install in panel from the front.	

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
5. Inner door (1) (cont)	b. Washers (18 or 17) and nuts (16 or 15)	Install and tighten nuts.	
		WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.	
	c. Light sockets (11 or 7)	a. Remove tags and install shrink sleeving on leads. b. Install and solder leads. c. Move sleeving over solder connection and heat shrink.	
	d. Bulbs (10 or 6), gasket (9) and caps (8 or 5)	Install.	
	e. Light socket (4), washer (14), and nut (13)	Install in panel from the front as a unit.	
	f. Nut (12)	Install and tighten.	
	g. Light socket (4)	a. Remove tags and install shrink sleeving on lead. b. Install and solder leads. c. Move sleeving over solder connection and heat shrink.	
	h. Bulb (3) and cap (2)	Install.	

11-5. LIGHT ASSEMBLIES (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
5. Inner door (1) (cont)	i. Inner door (1)	Close and turn knobs to left to lock.	
	j. MASTER switch	Move to RUN.	UNDER FREQUENCY and BATTERY lamps will light.
	k. BATTLE SHORT switch	Raise cover, place switch to ON position and wait 10 seconds.	UNDER VOLTAGE lamp will light.
	l. Light socket	Press to test lamp as required.	
	m. BATTLE SHORT switch	Close cover.	
	n. MASTER switch	Move to OFF.	
6. Control cabinet outer door		Close and latch.	

Page 11-31 is a blank page.

11-6. RELAYS (ENGINE)

This task covers:

a. Removal b. Test c. Installation

INITIAL SETUP

Test Equipment

Multimeter

Tools

Tool Kit, Master Mechanics (5180-00-699-5273)
No. 1 crosstip screwdriver
Shop Equipment, Electrical Repair, Semitrailer (4940-00-294-9517)
Power supply 0-50 Vdc

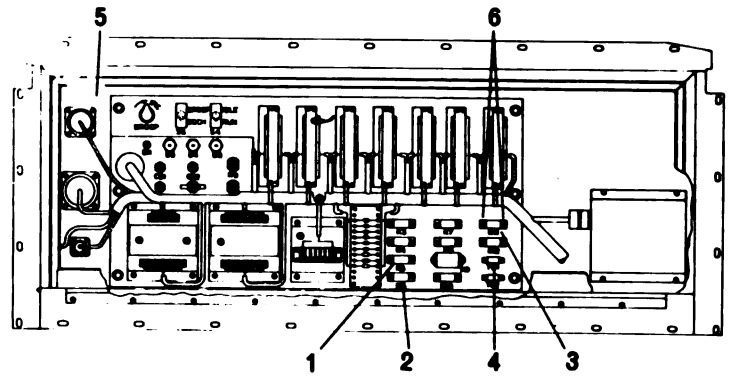
Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
5	5,11,12,14,15	2-5
13	1,2	2-5
15	4,5	2-5
16	4,5	2-5
17	4,5	2-5
36	4	2-5
64	6	2-5
78	2,3	2-5
80	2	2-5
82	5	2-5
83	5	2-5

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1.	Control cabinet outer door	Unlatch and open.	
2.	Inner door	Turn knobs to right and open.	



18473A

LOCATION	ITEM	ACTION	REMARKS

REMOVAL (cont)

3. Chassis (5)

NOTE

The following relays (engine) are mounted on the chassis with 2 screws:

K5 Fuel pump (1)
K6 Low fuel lamp (2)
K11 DC alternator charging (3)
TD1 Fuel transfer pump (4)

a. 2 screws (6) — Remove.

b. Relay — Remove.

TEST

NOTE

Wait 10 seconds for TDI to operate.

4. Relays (1, 2, 3 or 4)

a. Check resistance as follows:

1. Between pins 1 and 3 and also 6 and 8. — Set multimeter RX1 scale. Reading should be 0-1 ohm.

11-6. RELAYS (ENGINE) (cont)

LOCATION	ITEM	ACTION	REMARKS
Test (cont)			
4. Relays (1, 2, 3 or 4) (cont)		2. Between pins 2 and 7.	Reading should be 250-350 ohms.
		3. Between pins 1 and 5 and also 4 and 8.	Set multimeter RX10K scale. Reading should be infinity.
		b. Apply 24 Vdc across pins 2 and 7.	
		c. Check resistance between pins 3 and 5 and also 4 and 6.	Set multimeter RX1 scale. Reading should be 0-1 ohm.
		d. Replace as reqd.	
INSTALLATION			
5. Relays	a. Relays (1, 2, 3, or 4)	Install.	TD1 relay has a blue dot around pin 2 which must be installed at the top of socket.
	b. 2 screws (6)	Install and tighten.	
6. Inner door		Close and turn knobs to left to lock.	
7. Control cabinet outer door		Close and latch.	

Page 11-35 is a blank page.

11-7. CLUTCH VALVE ASSEMBLY

This task covers:

a. Inspection b. Service c. Test d. Removal

e. Installation

INITIAL SETUP

Test Equipment

Pressure gage 0-300 psi
Monitor test set AN/TJM-3
(Table 2-1)
Multimeter

Tools

Torque wrench, 0-150 ft lb (appx C)
13 mm socket (appx C)
Tool Kit, Master Mechanics
(5180-00-699-5273)
1/2-dr ratchet handle
10-in. extension
3/8 socket
3/8 combination wrench
1-in. combination wrench

Materials/Parts

Bucket (item 4, appx B)
Paint brush, (item 5, appx B)
Paint (item 16, appx B)
Seal
Clutch valve gasket
Lock washers (item 11)

Material/Parts (cont)

Rags (item 17, appx B)
Clutch valve gasket
Oil tube packings
Magnetic plug seal

Personnel Required

Turbine Engine Driven Generator
Repairer MOS 52F

Troubleshooting References

Item	Step	Table
37	7,10	2-5

Equipment Condition

Para	Condition Description
4-47*	Left side duct removed.
4-21*	Disarm batteries (except for step 5 and 7)

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS

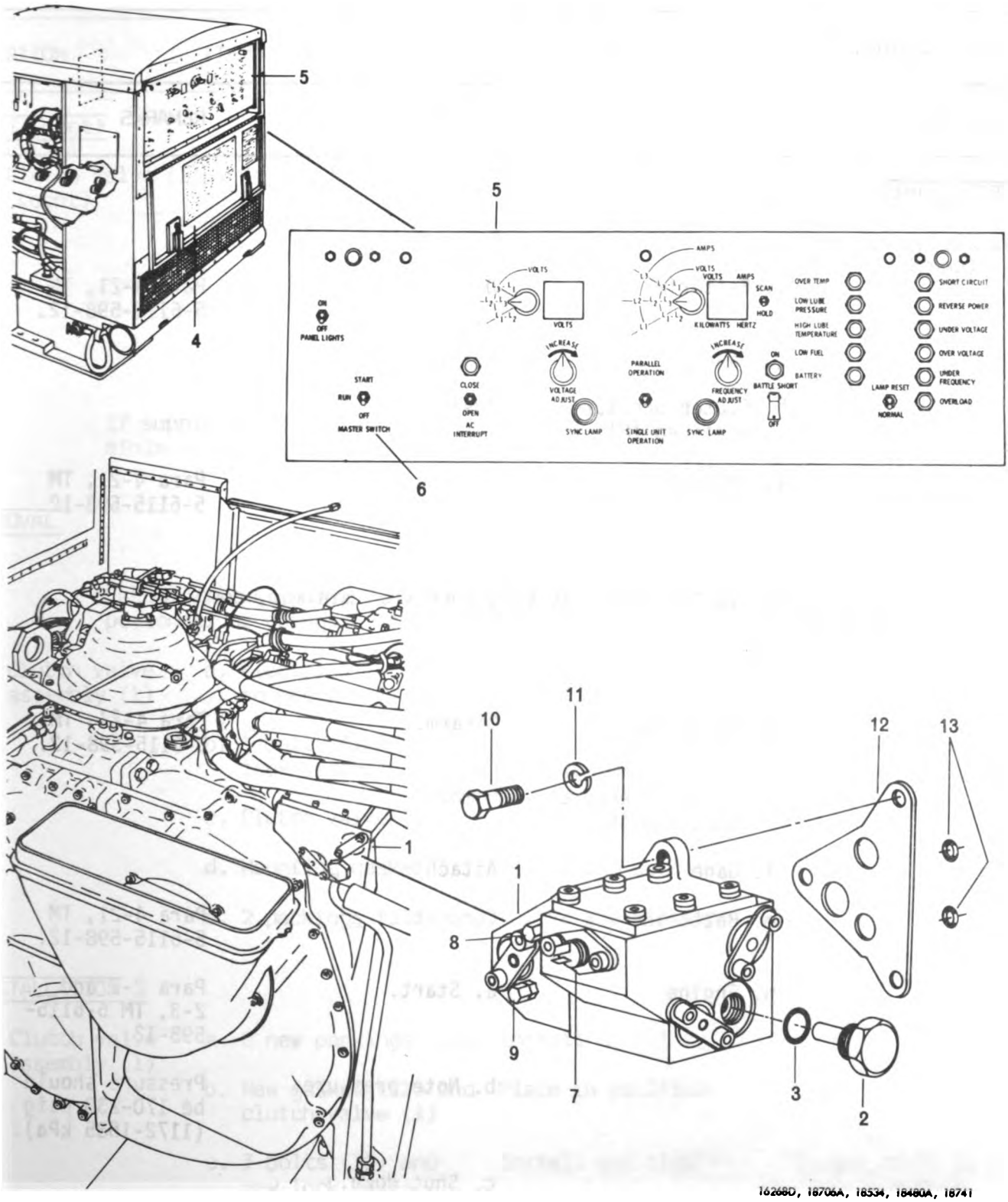
WARNING

Lube oils MIL-L-23699 and MIL-L-7808 are highly toxic. Wash at once with soap and water if oil comes in contact with skin. If irritation occurs, get medical attention.

LOCATION	ITEM	ACTION	REMARKS
INSPECTION			
1. Clutch valve (1)		Inspect for:	
		1. Leaks.	Repair or replace valve as required
		2. Cracks.	
SERVICE			
2. Clutch valve (1)	a. Magnetic plug (2) and seal (3)	a. Remove and discard seal.	
		b. Check for metal particles.	Small amounts of metallic particles are normal and not cause for replacement.
		c. Clean plug	Use rag.
	b. New seal (3) and plug (2)	Install and tighten plug.	
TEST			
3. Monitor test set AN/TJM-3		Attach to electronic control assembly at J4 connector.	Refer to para 2-3.
4. Control cabinet outer door (4)		Unlatch and open.	
5. Inner door (5)	a. MASTER switch (6)	Start engine.	Para 2-2 and 2-3, TM 5-6115-598-12.
	b. Monitor test set AN/TJM-3	Observe.	N1 should read between 35,000 and 39,000 rpm. N2 should read between 2850 and 3150 rpm.

11-7. CLUTCH VALVE ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
5. Inner door (5) (cont)	c. Engine	Shut down.	Para 2-7, TM 5-6115-598-12.
		NOTE If results are as indicated in Remarks column, clutch valve is operational. If not, test further:	
6. Clutch valve (1)	a. Electrical connector (7)	a. Disconnect.	
		b. Connect multimeter to both terminal lugs.	Set multimeter RX1 scale. Resistance should measure 8-12 ohms.
		c. Check resistance to ground from each connector terminal.	Set multimeter RX10,000 scale. Resistance should measure infinity on each terminal.
	b. Electrical connector (7)	Connect.	
7. Clutch valve (1)	a. Batteries	Disarm.	Para 4-21, TM 5-6115-598-12.
	b. Clutch pressure port cap (8)	Remove.	
	c. Gage	Attach.	
	d. Batteries	Connect.	Para 4-21, TM 5-6115-598-12.
	e. Engine	a. Start.	Para 2-2 and 2-3, TM 5-6115-598-12.
		b. Note pressure.	Pressure should be 140 psig (965 kPa) minimum.
		c. Shut down.	



16268D, 18706A, 18534, 18480A, 18741

11-7. CLUTCH VALVE ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
7. Clutch valve (1) (cont)	f. Batteries	Disconnect.	Para 4-21, TM 5-6115-598-12.
	g. Gage	Remove.	
	h. Clutch pressure port cap (8)	Install.	
	i. Batteries	Connect.	Para 4-21, TM 5-6115-598-12.
	NOTE If pressure is less than 140 psig (965 kPa) minimum, complete Step 7.		
	j. Batteries	Disarm.	Para 4-21, TM 5-6115-598-12.
	k. Supply pressure port cap (9)	Remove.	
	l. Gage	Attach.	
	m. Batteries	Connect.	Para 4-21, TM 5-6115-598-12.
	n. Engine	a. Start.	Para 2-2 and 2-3, TM 5-6115-598-12.
		b. Note pressure.	Pressure should be 170-230 psig (1172-1585 kPa).
		c. Shut down.	
	o. Batteries	Disarm.	Para 4-21, TM 5-6115-598-12.

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
7. Clutch valve (1) (cont)	p. Gage	Removal.	
	q. Supply pressure port cap (9)	Install.	
	r. Batteries	Connect.	Para 4-21, TM 5-6115-598-12

NOTE

If supply pressure is within limits and clutch pressure is below minimum, replace the clutch valve.

REMOVAL

WARNING

Catch or wipe up oil spillage to prevent injury or death to personnel or damage to the equipment.

8. Clutch valve assembly (1)	a. Electrical connector (7)	Disconnect.	
	b. 3 bolts (10) and lock washers (11)	Remove and discard lock washers.	
	c. Clutch valve (1)	Remove.	
	d. Mounting gasket (12)	Remove and discard.	
	e. 2 packings (13)	Remove and discard.	

INSTALLATION

9. Clutch valve assembly (1)	a. 2 new packings (13)	Install on oil tubes.	
	b. New gasket (12) and clutch valve (1)	Place in position.	
	c. 3 bolts (10) and new lock washers (11)	Install and tighten.	Torque bolts to 12 ft lb (16 N·m).
	d. Electrical connector (7)	Connect.	

CHAPTER 12

MAINTENANCE OF GENERATOR CONTROLS AND INDICATORS

12-1. PURPOSE AND FUNCTION

The purpose and function of generator controls and instruments is to provide a station at the control cabinet where the engine and generator can be controlled and monitored. The generator regulator/monitor senses generator output voltage and maintains it at a constant level.

12-2. CONTROL CABINET ASSEMBLY

This task covers:

a. Repair b. Test

INITIAL SETUP

Tools

Pop rivet tool (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
3/8 socket, 3/8 dr
7/16 socket, 3/8 dr
4-in. flat-tip screwdriver
7/16 combination wrench
11/32 socket, 1/4 dr
1/4-dr straight handle
Hammer, 16 oz
3/8-dr ratchet handle
7/16 combination wrench

Shop Equipment, Contact Maintenance, Truck Mounted (4940-00-294-9518)
Portable electric disk sander
110 V power source
3/8-in. electric drill
Twist drill set
Welding Shop, Trailer Mounted (3431-00-935-7821)
Welder's helmet
Welder's sleeves
Welder's apron
Inert gas shielded arc welding set

Materials/Parts

Paint brush (item 5, appx B)
Face shield (item 8, appx B)
Argon gas (item 9, appx B)
Welder's gloves (item 10, appx B)
Paint (item 16, appx B)
Welding electrode
Bulk wire as required

Personnel Required

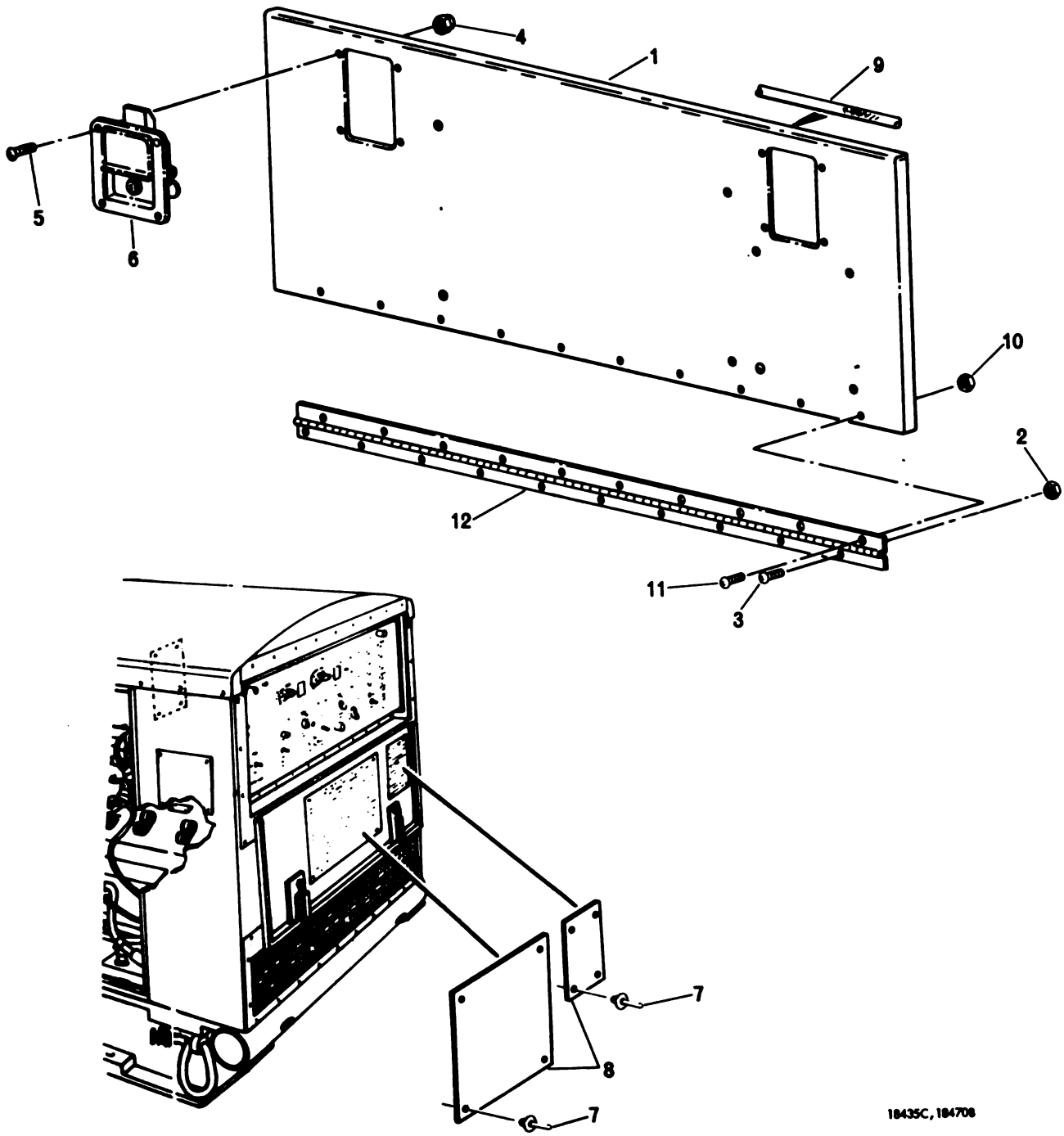
Turbine Engine Driven Generator Repairer MOS52F
Welder MOS 44B

Equipment Condition

Para	Condition Description
4-21*	Disarm batteries.
2-13	Control cabinet removed.
12-10	Chassis removed.
12-11	Phase paralleling switch removed.

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
REPAIR			
1. Control cabinet outer door (1)	a. Outer door (1)	Unlatch and open.	



12-2. CONTROL CABINET ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
1. Control cabinet outer door (1) (cont)	b. 10 nuts (2), screws (3), and outer door (1)	Remove.	
	c. 8 nuts (4), screws (5), and 2 paddle locks (6)	Remove.	
	d. 8 rivets (7)	Drill out and remove.	
	e. 2 data plates (8)	Remove.	
	f. Mesh seal (9)	Remove.	
	g. 10 nuts (10), screws (11) and hinge (12)	Remove.	

WARNING

- Use care when using welding equipment. Do not watch welding process without proper eye protection as severe eye damage or blindness could result. Severe burns could result from improper use of equipment.
- Ensure that suitable eye protection is worn when grinding. Metal particles created by grinding can cause severe eye damage.

	h. Outer door (1)	Hammer out dents, weld rips and tears, sand high spots, and paint as reqd.
	i. Hinge (12)	Position on door.
	j. 10 screws (11) and nuts (10)	Install and tighten.
	k. Mesh seal (9)	Install.

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
1. Control cabinet outer door (1) (cont)	l. 2 data plates (8)	Position on door.	
	m. 8 rivets (7)	Install.	
	n. 2 paddle locks (6)	Position on door.	
	o. 8 screws (5) and nuts (4)	Install and tighten.	
	p. Outer door assy (1)	Position on cabinet.	
	q. 10 screws (3) and nuts (2)	Install and tighten.	
	r. Outer door (1)	Close.	
2. Control cabinet inner door assy (13)	a. Control cabinet outer door (1) assy	Unlatch and open.	
	b. Inner door (13)	Turn knobs to right and open.	

NOTE

Do not remove wire from components except for 2 SYNC LAMPS and 3 panel lights.

c. Light assemblies	Remove, tag, and identify.	Para 11-5.
d. Toggle switches	Remove.	Para 12-5.
e. Battle short switch	Remove.	Para 4-49, TM 5-6115-598-12.
f. 9 nuts (14), washers (15), and screws (16)	Remove.	Hold cable anchors.
g. Voltmeter control assembly	Remove.	Para 12-3.

12-2. CONTROL CABINET ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
2. Control cabinet inner door assy (13) (cont)	h. Voltage regulator and monitor assembly	Remove.	Para 12-8.
	i. 4 nuts (17), washers (18), and bolts (19)	Remove.	
	j. Twist grip latch (20)	Remove.	
	k. Mesh seal (21)	Remove.	
	l. 10 nuts (22) and screws (23)	Remove.	
	m. 11 nuts (24) and screws (25)	Remove.	
	n. Hinge (26) and door (13)	Remove.	
	o. Hinge (26)	Align holes with door.	
	p. 11 screws (25) and nuts (24)	Install and tighten.	
	q. 10 screws (23) and nuts (22)	Install and tighten.	
	r. Mesh seal (21)	Install.	
	s. Twist grip latch (20)	Install.	Position open side of latch to top of door.
	t. 4 bolts (19), washers (18), and nuts (17)	Install and tighten.	

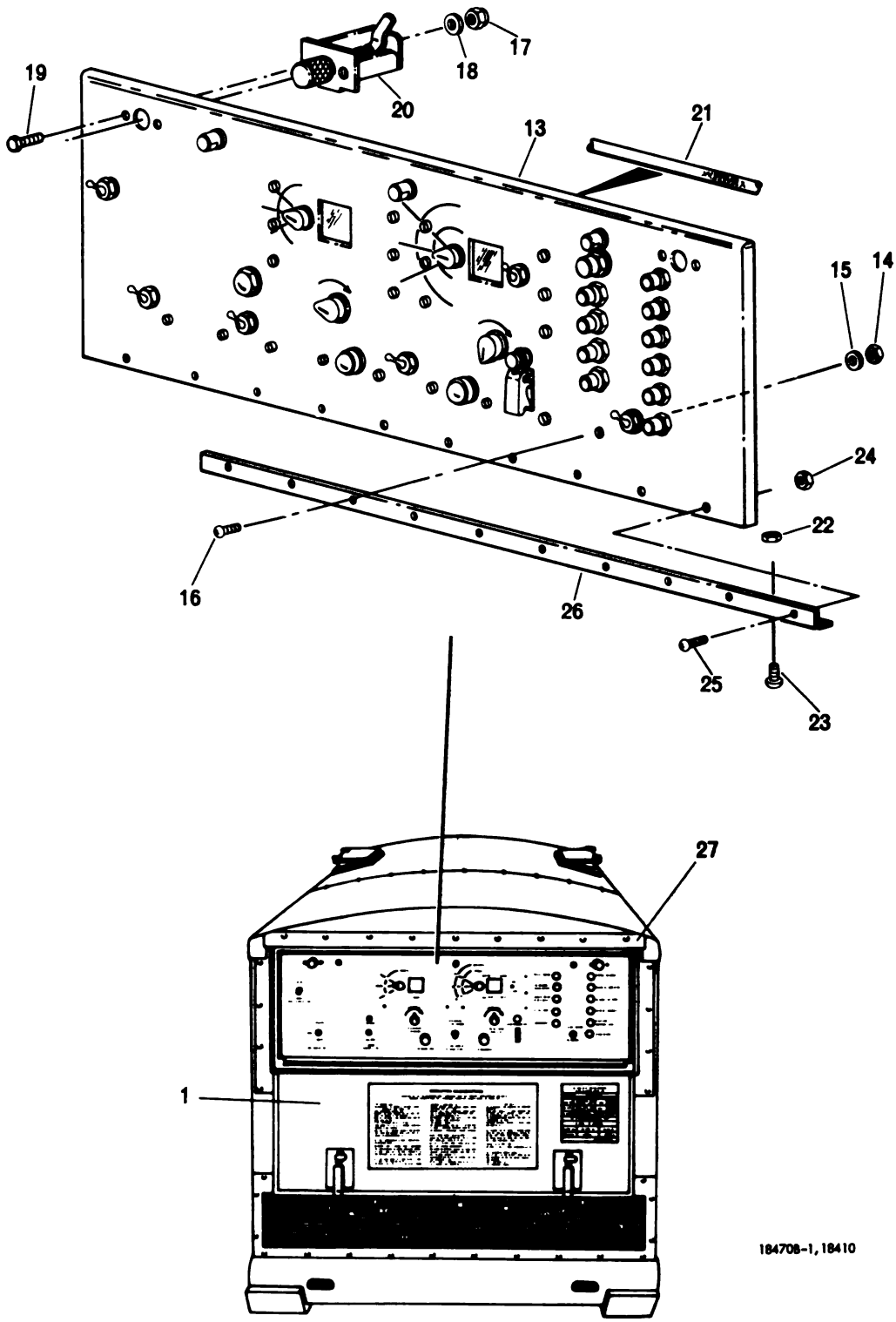
LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
2. Control cabinet inner door (13) assy (cont)	u. Voltage regulator and monitor assembly	Install.	Para 12-8.
	v. Voltmeter control assembly	Install.	Para 12-3.
	w. 9 screws (16), washers (15), and nuts (14)	Install and tighten.	Holds cable anchors.
	x. Battle short switch	Install	Para 4-49, TM 5-6115-598-12.
	y. Toggle switches	Install	Para 12-5.
	z. Light assemblies	Install. Remove tags.	Para 11-5.
	aa. Inner door (13)	Close and turn knobs to left to lock.	
3. Control cabinet assembly (27)	a. Outer door assembly (1)	Remove.	See step 1.
	b. Inner door assembly (13)	Remove.	See step 2.
	c. Chassis assembly	Remove.	Para 12-10.

WARNING

- Use care when using welding equipment. Do not watch welding process without proper eye protection as severe eye damage or blindness could result. Severe burns could result from improper use of equipment.
- Ensure that suitable eye protection is worn when grinding. Metal particles created by grinding can cause severe eye damage.

	d. Control cabinet (27)	Hammer out dents, weld rips and tears, sand high spots, and paint as reqd.

12-2. CONTROL CABINET ASSEMBLY (cont)



LOCATION	ITEM	ACTION	REMARKS
REPAIR (cont)			
3. Control cabinet assembly (27) (cont)	e. Chassis assembly	Install.	Para 12-10.
	f. Inner door assembly (13)	Install.	See step 2.
	g. Outer door (1)	Install.	See step 1.

TEST

Test of the control cabinet assembly consists of point-to-point wiring "wring out" as required. The following listings of control cabinet connectors and control cabinet wiring are an aid to assist in making wiring checks. Also refer to the foldout diagrams in TM 5-6115-598-12. Replace faulty wire(s) with appropriate length(s) of bulk wire of same gage.

12-2. CONTROL CABINET ASSEMBLY (cont)

WIRING OF CONTROL CABINET CONNECTORS

J1 CONNECTOR

Wire No.	From	To
23A	J1-A	TB2-6
32C	J1-B	TB2-7
103C	J1-C	TB3-1
33B	J1-D	TB2-8
99B	J1-E	TB2-10
35D	J1-F	TB2-9
40D	J1-G	TB2-11
81K	J1-H	TB3-4
82K	J1-I	TB3-5
83F	J1-J	TB3-6
105E	J1-K	TB3-8
86B	J1-L	TB3-9
	J1-M	
84L	J1-N	TB3-7
111B	J1-O	TB3-11
85B	J1-P	TB3-12
87B	J1-R	TB3-10
88B	J1-S	TB4-2
104C	J1-T	TB3-2
89B	J1-U	TB4-4
86D	J1-V	TB3-9
81L	J1-W	TB3-4
	J1-X	
96E	J1-Y	TB4-6
98D	J1-Z	TB4-7
	J1-a	
82F	J1-b	TB3-5
90B	J1-c	TB4-8
67B	J1-d	TB4-9
64D	J1-e	TB1-6
9G	J1-f	TB4-11
20C	J1-g	TB4-12
88D	J1-h	TB4-2
110B	J1-j	TB5-1
	J1-k	
84M	J1-m	TB3-7
112A	J1-n	TB5-3
90A	J1-p	TB4-8
113A	J1-r	TB5-4

J1 CONNECTOR (cont)

Wire No.	From	To
114A	J1-s	TB5-5
2AM	J1-t	TB5-7
1C	J1-u	TB5-9
108B	J1-v	TB5-6
36C	J1-w	TB5-8
19K	J1-x	TB5-10
65E	J1-y	TB2-3
83G	J1-z	TB3-6

J2 CONNECTOR

Wire No.	From	To
	J2-A	
	J2-B	
	J2-C	
	J2-D	
47C	J2-E	TB1-1
50B	J2-F	TB1-2
	J2-G	
	J2-H	
	J2-J	
	J2-K	
	J2-L	
	J2-M	
52B	J2-N	TB1-3
	J2-P	
	J2-R	
	J2-S	
55B	J2-T	TB1-4
56B	J2-U	TB1-5
	J2-V	
64E	J2-W	TB1-6
	J2-X	
	J2-Y	
	J2-X	
11D	J2-a	TB1-8
12C	J2-b	TB1-9
48B	J2-c	TB1-10
	J2-d	

WIRING OF CONTROL CABINET CONNECTORS (cont)

J2 CONNECTOR (cont)

Wire No.	From	To
39G	J2-e	TB1-11
	J2-f	
70B	J2-g	TB2-1
72C	J2-h	TB2-2
65D	J2-j	TB2-3
66B	J2-k	TB2-4
68B	J2-m	TB2-5
	J2-n	
	J2-p	
	J2-r	
	J2-s	

P5 CONNECTOR

81F	P5-A	TB7-5
84D	P5-B	TB7-8
84S	P5-B	P5-D
108D	P5-C	TB5-6
46B	P5-F	TB4-10
17D	P5-G	TB7-10

J4 CONNECTOR

Wire No.	From	To
2J	J4-A	TB6-12
	J4-B	

J4 CONNECTOR (cont)

Wire No.	From	To
9E	J4-C	TB4-11
12B	J4-D	TB1-9
11E	J4-E	TB1-8
	J4-F	
	J4-G	
40A	J4-H	D8(-)
35A	J4-J	TB2-9
19G	J4-K	TB5-10
22C	J4-L	TB5-11
36A	J4-M	TB5-8
	J4-N	
	J4-P	
	J4-Q	
47A	J4-R	TB1-1
103B	J4-S	TB3-1
104B	J4-T	TB3-2
84K	J4-U	TB3-7
83E	J4-V	TB3-6
82D	J4-W	TB3-5
81E	J4-X	TB3-4
	J4-Y	
	J4-Z	
10E	J3-A	D11(-)
37C	J3-B	TB6-6
22F	J3-C	TB5-11
34C	J3-D	TB4-5
39D	J3-E	TB6-9

12-2. CONTROL CABINET ASSEMBLY (cont)

POINT-TO-POINT WIRING OF CONTROL CABINET

Wire No.	From	To	Wire No.	From	To
1B	CB1	CB2	7B	S5-2	S1-2
1C	TB5-9	J1-u	7C	S1-2	DS6-3
1D	TB5-9	CB1	7D	DS6-3	DS5-3
2A	DS13	DS14	7E	DS5-3	DS18-3
2AA	TD2-7	TD1-7	7F	DS18-3	DS12-3
2AB	K10-7	TD2-7	7G	DS12-3	DS10-3
2AC	K10-7	K8-7	7H	DS10-3	DS7-3
2AD	K8-7	K7-3	7J	DS7-3	DS11-3
2AE	K4-7	K7-3	7K	DS11-3	DS9-3
2AF	K5-7	K4-7	7L	DS9-3	DS19-3
2AG	K6-7	K5-7	7M	TB4-1	CB1
2AH	CB4-4	K6-7	9B	TB4-11	TB7-11
2AJ	TB5-7	D5(+)	9C	TB4-11	D3(+)
2AK	TB5-7	TB6-12	9D	TB4-11	J4-C
2AL	TB6-12	D11(+)	9E	TB7-11	S1-1
2AM	TB5-7	J1-t	9F	TB7-11	K11-6
2AN	TB2-12	TB5-7	9G	TB4-11	J1-f
2AP	DS15	DS2-3	9P	D3(+)	D4(+)
2AR	DS12-1	DS4-3	10A	TB7-1	S3-2
2AS	DS18-1	DS12-1	10B	TB4-3	D3(-)
2B	DS14	DS15	10C	TB4-3	CB-3
2D	DS3-3	DS2-3	10D	TB4-3	D11(-)
2E	DS4-3	DS3-3	10E	D11(-)	J3-A
2H	TB6-12	DS18-1	10F	TB4-3	S1-5
2J	TB6-12	J4-A	10G	TB7-1	CB3
2K	TB6-11	TB6-12	10H	TB7-1	K6-6
2L	TB6-11	A1-B(-)	10J	TB7-1	K3-3
2M	M1-B(-)	A1-B(-)	11A	TB6-1	DS2-1
2N	DS6-1	DS5-1	11B	TB6-1	K6-1
2P	DS5-1	DS19-1	11C	TB1-8	TB6-1
2R	DS9-1	DS19-1	11D	TB1-8	J2-a
2S	DS11-1	DS9-1	11E	TB1-8	J4-6
2T	DS8-3	DS11-1	11F	TB1-8	S6-2
2U	DS7-1	DS8-3	11G	56-2	S4-2
2V	DS10-1	DS7-1	11H	DS3-1	DS2-1
2W	TB6-11	DS10-1	11J	DS4-1	DS3-1
2X	TB6-11	K11-7	12A	TB1-9	S1-4
2Y	K12-7	K11-7	12B	TB1-9	J4-D
2Z	TD1-7	K12-7	12C	TB1-9	J2-b
5A	S5-3	DS13	17A	TB7-10	S2-2
5B	DS13	DS14	17B	TB7-10	K9-A3
5C	DS14	DS15	17C	K9-A3	K9-B3
7A	TB4-1	S5-2	17D	TB7-10	P5-G

POINT-TO-POINT WIRING OF CONTROL CABINET (cont)

Wire No.	From	To	Wire No.	From	To
18A	TB6-7	S7-7	37B	TB6-6	K6-2
18B	TB6-7	K9-A2	37C	TB6-6	J3-B
18C	K9-A2	K9-BZ	37D	TB6-6	D14(-)
19G	TB5-10	J4-K	38A	D14(+)	DS12-2
19H	TB5-10	K5-4	38B	K6-4	DS12-2
19J	K5-3	K5-4	39A	S3-3	DS5-2
19K	TB5-10	J1-x	39B	S3-3	A1-BS
20A	TB4-12	S2-5	39C	TB6-9	S3-3
20B	S2-3	S2-5	39D	TB6-9	J3-E
20C	TB4-12	J1-g	39E	TB1-11	TB6-9
21A	TB3-3	CB-3	39F	TB1-11	D8(+)
21B	TB3-3	K6-3	39G	TB1-11	J2-e
22A	S2-6	S3-11	40A	D8(-)	J4-H
22B	TB5-11	S2-6	40B	CB4-1	D8(-)
22C	TB5-11	J4-L	40C	TB2-11	D8(-)
22D	TB5-11	K3-6	40D	TB2-11	J1-G
22E	TB5-11	K10-6	40G	TB2-11	K3-5
22F	TB5-11	J3-C	40H	K3-5	TD2-2
23A	TB2-6	J1-A	40J	TD2-3	TD2-2
23B	TB2-6	K11-2	42A	CB4-2	A1-HZ
24A	K3-4	A4-NC	46A	TB4-10	S7-8
25A	K11-8	DS18-2	46B	TB4-10	P5-F
26A	A5-NC	A4-NC	46C	TB4-10	CB2
27A	A1-OV	DS11-2	46D	TB4-10	K5-6
27B	CB4-3	A1-OV	47A	TB1-1	J4-R
28A	K7-6	A5-NC	47B	TB1-1	K3-7
29A	TD2-5	S8-2	47C	TB1-1	J2-E
29B	A5-NO	S8-2	48A	TB1-10	S4-3
30A	TB6-8	K7-8	48B	TB1-10	J2-c
30B	TB6-8	A6-5	50A	TB1-2	S6-3
32C	TB2-7	J1-B	50B	TB1-2	J2-F
32D	TB2-7	A1-B(+)	52A	TB1-3	DS2-2
32E	TB2-7	D4(-)	52B	TB1-3	J2-N
32F	M1-B(+)	A1-B(+)	55A	TB1-4	DS3-2
33A	TB2-8	S3-5	55B	TB1-4	J2-T
33B	TB2-8	J1-D	56A	TB1-5	DS4-2
34A	TB4-5	S3-12	56B	TB1-5	J2-U
34B	TB4-5	A6-6	59A	K5-2	D5(-)
34C	TB4-5	J3-D	59B	TD1-5	K5-2
34D	TB4-5	K10-2	63A	A5-NO	DS7-2
35A	TB2-9	J4-J	63B	K8-4	A5-NO
35B	TB2-9	TD1-2	63C	K8-2	K8-4
35C	TD1-3	TD1-2	64D	TB1-6	J1-e
35D	TB2-9	J1-F	64E	TB1-6	J2-W
36A	TB5-8	J4-M	65A	TB2-12	S6 Shield
36B	TB5-8	K10-4	65B	TB1-7	TB2-12
36C	TB5-8	J1-w	65C	TB1-7	TB2-3
37A	TB6-6	S3-4	65D	TB2-3	J2-j

12-2. CONTROL CABINET ASSEMBLY (cont)

POINT-TO-POINT WIRING OF CONTROL CABINET (cont)

Wire No.	From	To	Wire No.	From	To
65E	TB2-3	J1-y	83L	M1-Vc	A1-Vc
66A	TB2-4	S6-5	84D	TB7-8	P5-B
66B	TB2-4	J2-K	84E	TB7-8	TB7-9
66B & 68B	TB2-3	Shielding	84F	TB7-8	A5-4
67A	TB4-9	S6-4	84G	TB3-7	TB7-8
67B	TB4-9	J1-d	84H	A5-4	A4-6
68A	TB2-5	S6-6	84J	A4-6	A6-4
68B	TB2-5	J2-m	84K	TB3-7	J4-U
70A	TB2-1	R3 cw	84L	TB3-7	J1-N
70A & 72A	TB2-3	Shielding	84M	TB3-7	J1-m
70B	TB2-1	J2-g	84N	TB7-9	K9-X2
70B & 72C	TB2-3	Shielding	84P	TB7-9	A1-N
71A	TB6-4	D9(-)	84R	M1-N	A1-N
71B	D7(-)	D9(-)	84S	P5-B	P5-D
71C	TB6-4	K7-5	85A	TB3-12	A1-Ia
72A	TB2-2	R3 ccw	85B	TB3-12	J1-P
72B	R3 wiper	R3 ccw	86A	TB3-9	R5
72C	TB2-2	J2-h	86B	TB3-9	J1-L
81D	TB3-4	TB7-5	86D	TB3-9	J1-V
81E	TB3-4	J4-X	87A	TB3-10	A1-Ib
81F	TB7-5	P5-A	87B	TB3-10	J1-R
81G	TB7-5	A5-3	88A	TB4-2	R6
81H	A5-3	A4-5	88B	TB4-2	J1-S
81J	A4-5	A6-1	88D	TB4-2	J1-h
81K	TB3-4	J1-H	89A	TB4-4	A1-Ic
81L	TB3-4	J1-W	89B	TB4-4	J1-U
81M	TB7-5	R9	90A	TB4-8	J1-p
81N	M1-Va	A1-Va	90B	TB4-8	J1-c
81P	R9	A1-Va	90D	TB4-8	R7
82B	TB7-6	A6-2	96A	TB4-6	S7-11
82D	TB3-5	J4-W	96B	S7-11	A1-P1
82E	TB3-5	TB7-6	96C	TB4-6	R8 cw
82F	TB3-5	J1-b	96D	R8 center	R8 right
82G	TB3-5	J1-I	96E	TB4-6	J1-y
82H	TB7-6	A1-Vb	97A	TB7-12	DS10-2
82J	M1-Vb	A1-Vb	97B	TB7-12	D6(+)
83D	TB3-6	TB7-7	97C	TB7-12	K4-6
83E	TB3-6	J4-V	98A	TB4-7	R8 ccw
83F	TB3-6	J1-J	98B	TB4-7	S7-10
83G	TB3-6	J1-z	98C	S7-7	A1-P2
83H	TB7-7	A6-3	98D	TB4-7	J1-Z
83J	TB7-7	R10	99A	TB2-10	DS6-2
83K	R10	A1-Vc	99B	TB2-10	J1-E

POINT-TO-POINT WIRING OF CONTROL CABINET (cont)

Wire No.	From	To	Wire No.	From	To
101A	R4-ccw	A1-RH	117B	TB7-2	K7-7
101B	R4 left	R4 center	117C	TB6-3	TB7-2
102A	R4-cw	A1-RH	117D	TB6-3	D7(+)
103A	TB3-1	A1-F(+)	117E	D10(+)	D7(+)
103B	TB3-1	J4-S	119A	K7-2	S8-3
103C	TB3-1	J1-C	119B	S8-3	DS8-1
104A	TB3-2	A1-F(-)	119C	TB7-4	S8-3
104B	TB3-2	J4-T	119D	TB7-4	K4-4
104C	TB3-2	J1-T	119E	TB7-4	D10(-)
105A	TB3-8	A1-C	119F	TB7-3	TB7-4
105B	TB3-8	R7	119G	TB7-3	K8-6
105D	R6	R7	119H	TB7-3	A4-NO
105E	TB3-8	J1-K	119J	TB7-3	K12-5
105F	R5	R6	120A	K3-1	DS9-2
108B	TB5-6	J1-v	121A	TB6-5	DS8-2
108C	TB5-6	K10-3	121B	TB6-5	D9(+)
108D	TB5-6	P5-C	124A	DS16	S7-6
108E	TB5-6	S7-5	125A	S7-3	DS17
110B	TB5-1	J1-j	130A	TB5-2	DS19-2
110C	TB5-1	S7-2	130B	TB5-2	K12-3
111A	TB3-11	A5-5	130C	TB5-2	A4-NO
111B	TB3-11	J1-O	130D	K12-2	K12-3
112A	TB5-3	J1-n	131A	R10	DS17
112B	TB5-3	A4-2	150A	K10-1	K9-X1
113A	TB5-4	J1-r	201A	A6-7	D6(-)
113B	TB5-4	A4-3	201B	K4-2	A6-7
114A	TB5-5	J1-s	203A	A5-6	A4-1
114B	TB5-5	A4-4	230A	R9	DS16
117A	TB7-2	A1-UV			

12-3. DIGITAL VOLTMETER CONTROL ASSEMBLY

This task covers:

a. Test b. Removal c. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

Tool Kit, Master Mechanics (5180-00-699-5273)
1/4-dr ratchet handle
11/32 socket
4-in. flat-tip screwdriver
Socket head screw key set

Materials/Parts

Tags (item 24, appx B)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
41	1	2-5
81	8	2-5

Equipment Condition

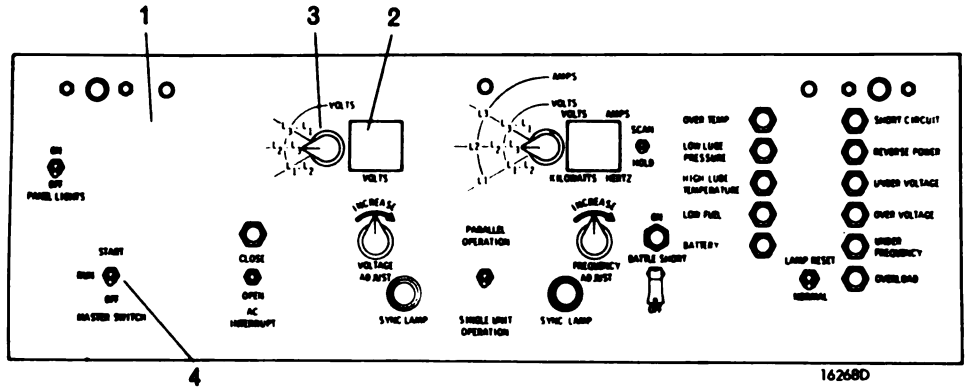
Para	Condition Description
4-21*	Batteries disarmed (after test).

*TM 5-6115-598-12

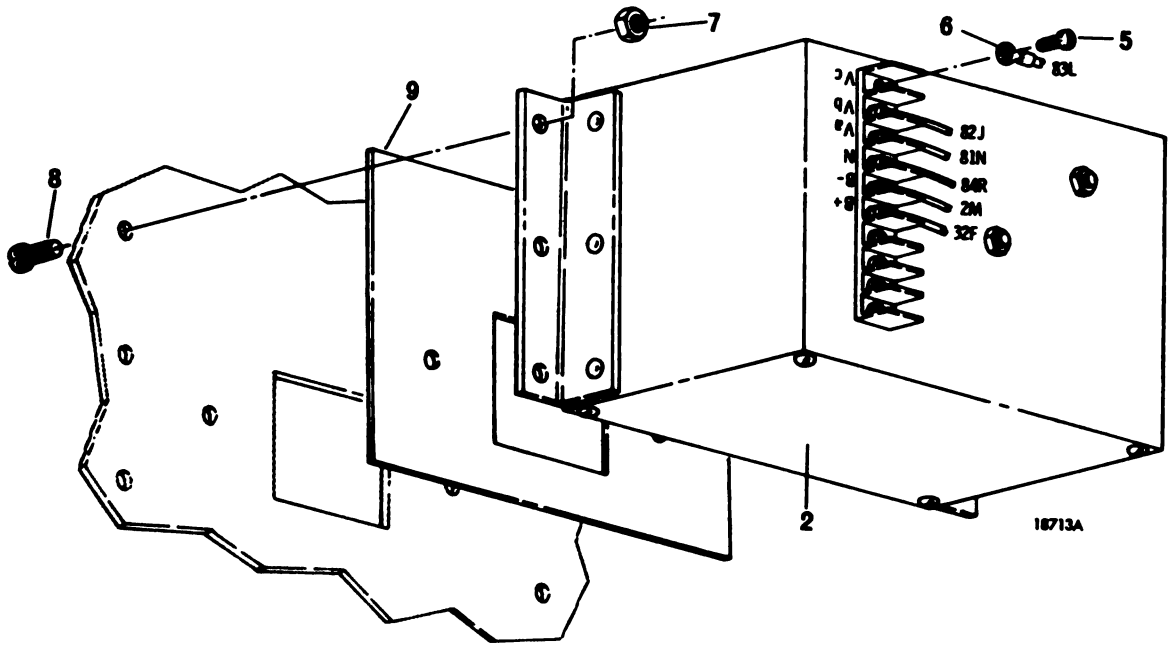
LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Control cabinet outer door		Unlatch and open.	
2. Inner door (1)	a. Engine	Start.	Para 2-2 and 2-3, TM 5-6115-598-12.

LOCATION	ITEM	ACTION	REMARKS
		WARNING	
		High voltage is used in the operation of this equipment. Death on contact may result if personnel fail to observe safety precautions. Be careful not to contact high-voltage connections when working inside control cabinet with set running.	
TEST			
2. Inner door (1) (cont)	b. Inner door (1)	Turn knobs to right and open.	
3. Digital voltmeter control assy (2)		Measure and record AC voltage from terminals Va to Vb Vb to Vc, and Vc to Va.	Set multimeter 250 Vac scale. Readings should be 208 Vac on multimeter.
4. Inner door (1)		Close and turn knobs to left to lock.	
	a. Phase select knob (3)	a. Place in L1-L2 position and read AC voltage on voltmeter (2).	Should read the same as Vac recorded for Va to to Vb ± 3 Vac.
		b. Move to L2-L3 position and read AC voltage on voltmeter (2).	Should read the same as Vac recorded for Vb to to Vc ± 3 Vac.
		c. Move to L3-L1 position and read AC voltage on voltmeter (2).	Should read the same as Vac recorded for Vc to Va. Replace voltmeter per steps 6, 7, and 8 if out of limits.
	b. MASTER switch (4)	Place to OFF.	
5. Control cabinet outer door		Close and latch.	

12-3. DIGITAL VOLTMETER CONTROL ASSEMBLY (cont)



LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
6. Digital voltmeter control assembly (2)	a. Phase switch control knob (3)	Loosen 2 socket head set screws and remove.	
	b. Inner door (1)	Turn knobs to right and open.	
	c. 6 screws (5) and leads (6)	Remove, tag, and identify leads.	
	d. 6 nuts (7) and screws (8)	Remove.	
	e. Voltmeter (2) and gasket (9)	Remove.	
INSTALLATION			
7. Digital voltmeter control assembly (2)	a. Gasket (9)	Place in position.	Use new gasket if old gasket is damaged.



LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
7. Digital voltmeter control assembly (2) (cont)	b. Voltmeter control assembly (2)	Place over gasket.	
	c. 6 screws (8) and nuts (7)	Install and tighten.	
	d. 6 leads (6) and screws (5)	Remove tags, install, and tighten screws.	
	e. Inner door (1)	Close and turn knobs to left to lock.	
	f. Phase switch control knob (3)	Install and tighten 2 socket head set screws.	Align to proper position.
8. Control cabinet outer door		Close and latch.	

12-4. RHEOSTATS

This task covers:

a. Test b. Removal c. Installation

INITIAL SETUP

Test Equipment

Multimeter

Tools

Thermal gun (appx C)
Tool Kit, Master Mechanics
(5180-00-699-5273)
Socket head screw key set
9/16 deep well socket
3/8-dr ratchet handle
5-in. extension, 3/8 dr
No. 1 cross tip screwdriver
1/2 socket, 3/8 dr
1/2 combination wrench
5/16 socket, 1/4 dr
1/4-dr straight handle
2-in. flat tip screwdriver, 1/8 tip
7/16 socket, 3/8 dr
11/32 socket, 1/4 dr
1/4 socket, 1/4 dr
Pocket knife
Shop Equipment, Electrical Repair, Semitrailer Mounted
(4940-00-294-9517)
Electronic tool kit

Materials/Parts

Tags (item 24, appx B)
Shrink sleeving

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

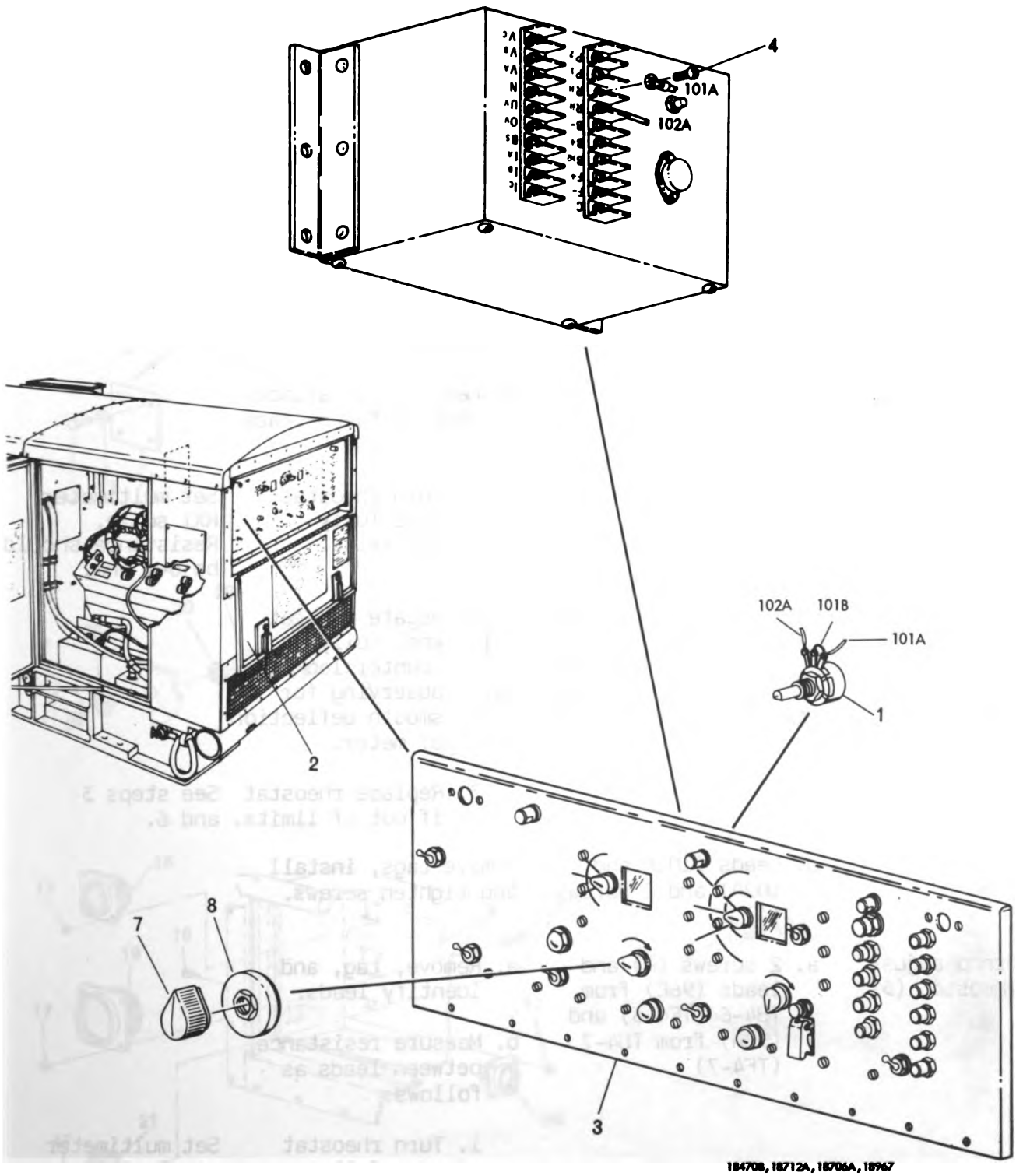
Item	Step	Table
48	2	2-5
59	3	2-5
60	5	2-5
63	6	2-5

Equipment Condition

Para	Condition Description
4-21*	Batteries disarmed.

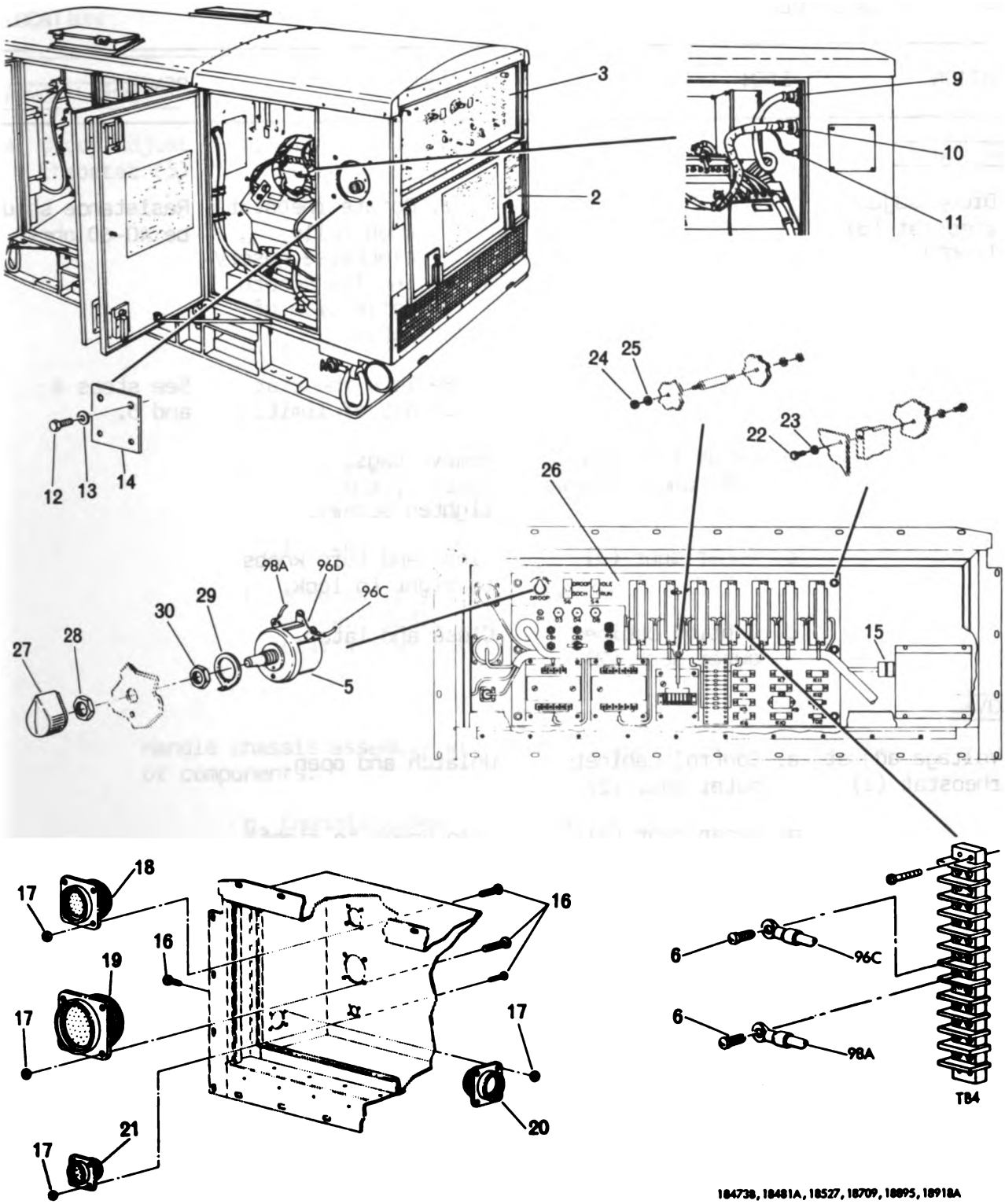
*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Voltage adjust rheostat (1)	a. Control cabinet outer door (2)	Unlatch and open.	
	b. Inner door (3)	Turn knobs to right and open.	



12-4. RHEOSTATS (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
1. Voltage adjust rheostat (1) (cont)	c. 2 screws (4) and leads (101A and 102A)	a. Remove from terminal Rh on rear of monitor regulator and tag and identify leads.	
		b. Measure resistance. Check between leads as follows:	
		1. Turn rheostat knob fully clockwise.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.
		2. Rotate reostat knob fully counterclockwise, observing for smooth deflection of meter.	
		3. Replace rheostat if out of limits.	See steps 3 and 6.
	d. Leads (101A and 102A) and 2 screws (4)	Remove tags, install and tighten screws.	
2. Droop adjust rheostat (5)	a. 2 screws (6) and leads (96C) from TB4-6 (TF4-6) and (98A) from TB4-7 (TF4-7)	a. Remove, tag, and identify leads.	
		b. Measure resistance between leads as follows:	
		1. Turn rheostat knob fully counter-clockwise.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.



184738, 18481A, 18527, 18709, 18895, 18918A

12-4. RHEOSTATS (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. Droop adjust rheostat (5) (cont)		2. Rotate rheostat knob fully clockwise observing for smooth deflection of meter.	Resistance should be 40-60 ohms.
		c. Replace rheostat if out of limit.	See steps 4 and 5.
	b. Leads (96C and 98A) and 2 screws (6)	Remove tags, install, and tighten screws.	
	c. Inner door (3)	Close and turn knobs to right to lock.	
	d. Control cabinet outer door (2)	Close and latch.	
REMOVAL			
3. Voltage adjust rheostat (1)	a. Control cabinet outer door (2)	Unlatch and open.	
	b. Inner door (3)	Turn knobs to right and open.	
	c. 3 leads (101A, 101B, and 102A)	Remove sleeving, unsolder, tag. and identify.	
	d. Control knob (7)	Loosen 2 set screws and remove knob.	Use socket head wrench.
	e. Lock knob (8)	Remove.	
	f. Voltage adjust rheostat (1)	Remove.	

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
4. Droop adjust rheostat (5)	a. Electrical connectors (9, 10, and 11)	Disconnect	
	b. 4 bolts (12), washers (13), and cover plate (14)	Remove.	
	c. Inner door (3)	Turn knobs to right and open.	
	d. Connector (15)	Disconnect.	
	e. 16 screws (16), nuts (17), and 4 connectors (18, 19, 20, and 21)	Remove.	
	f. 6 bolts (22) and washers (23), 1 nut (24) and washer (25)	Remove.	
	CAUTION		
	Handle chassis assembly with care to avoid damage to wiring or components.		
	g. Chassis assembly (26)	Pull forward carefully.	
	h. 3 leads (96C, 96D, and 98A)	Remove sleeving, unsolder, tag and identify.	
	i. Control knob (27)	Loosen 2 set screws and remove knob.	
	j. Nut (28)	Remove.	
	k. Rheostat (5), nut (29), and washer (30)	Remove.	

12-4. RHEOSTATS (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
5. Droop adjust rheostat (5)	a. Rheostat (5), washer (30), and nut (29)	Install.	Position terminals toward bottom of support.
	b. Nut (28)	Install and tighten.	
	c. Control knob (27)	Install. Tighten 2 set screws.	Turn shaft to center of travel and position knob to point up.
	d. 3 leads (96C, 96D, and 98A)	a. Remove tags and install shrink sleeving.	

WARNING

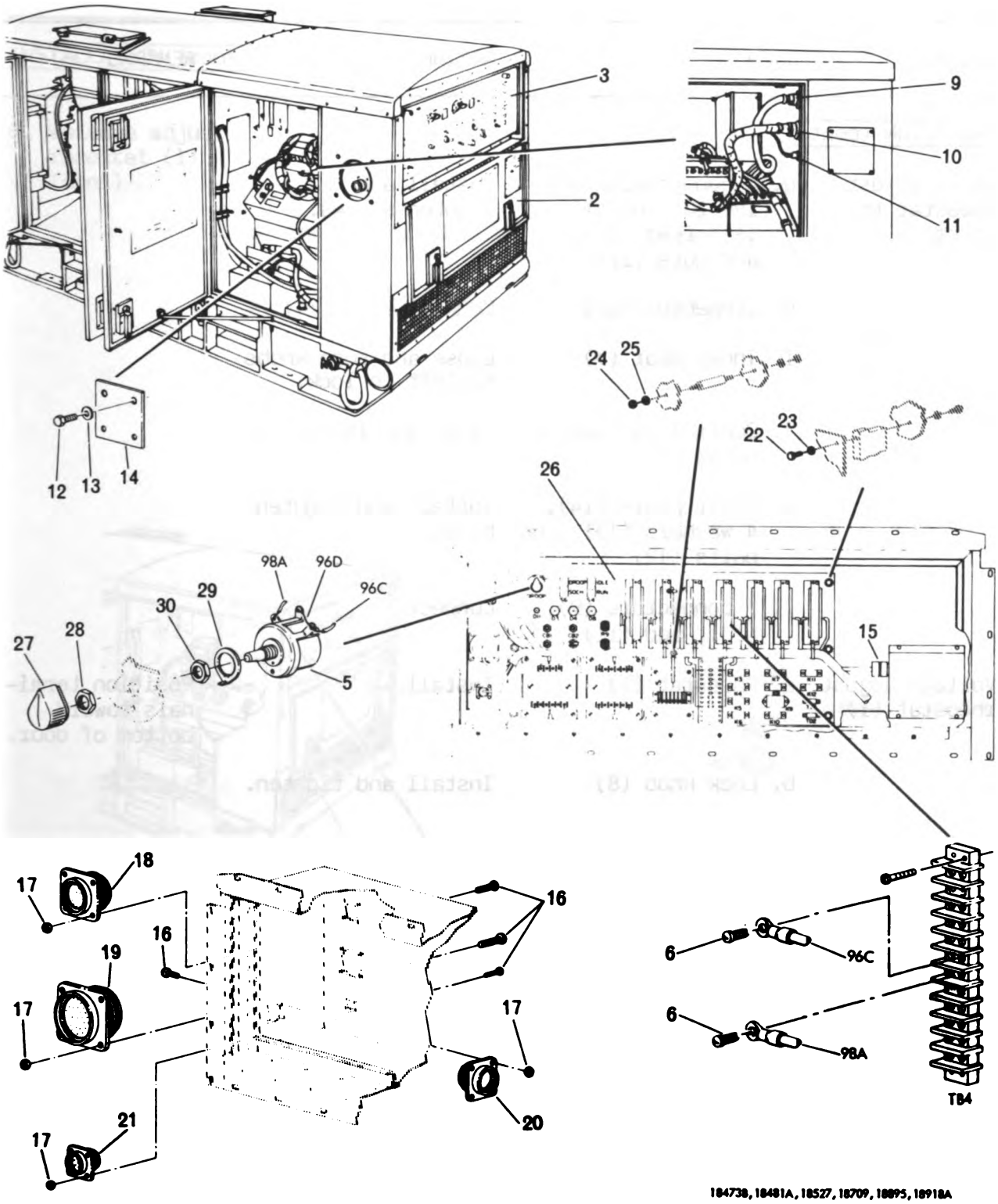
Use care when using soldering equipment. Severe burns could result from improper use of equipment.

		b. Install leads and solder.
		c. Move sleeving over soldered connection and heat shrink.

CAUTION

Handle chassis assembly with care to avoid damage to wiring or components.

	e. Chassis assembly (26)	Place in position.
	f. Washer (25), nut (24), 6 washers (23), and bolts (22)	Install and tighten.



184738, 18481A, 18527, 18709, 18895, 18918A

12-4. RHEOSTATS (cont)

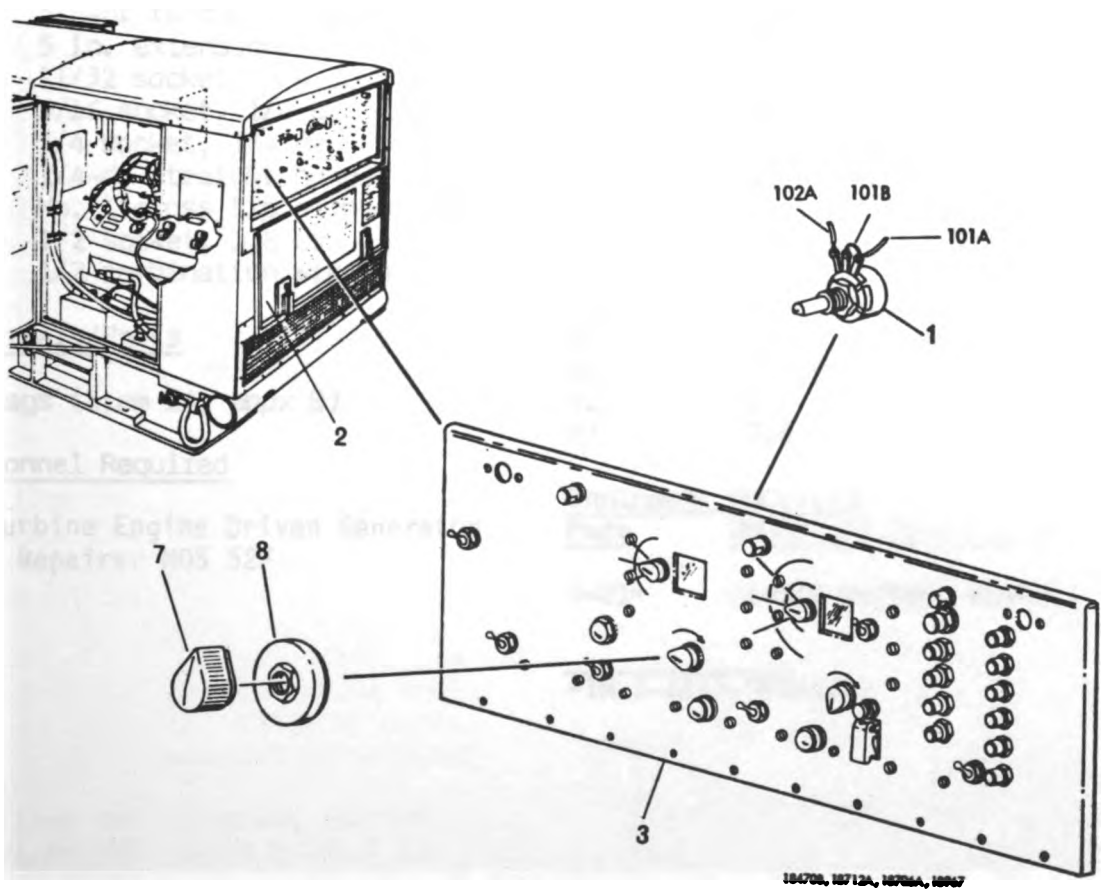
LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
5. Droop adjust rheostat (5) (cont)	g. 4 connectors (18, 19, 20, and 21) 16 screws (16), and nuts (17).	Install and tighten screws.	
	h. Connector (15)	Connect.	
	i. Inner door (3)	Close and turn knobs to left to lock.	
	j. Control cabinet outer door (2)	Close and latch.	
	k. Cover plate (14), 4 washers (13), and bolts (12)	Install and tighten bolts.	
	l. 3 connectors (9), (10), and (11)	Connect.	
6. Voltage adjust rheostat (1)	a. Rheostat (1)	Install.	Position terminals toward bottom of door.
	b. Lock knob (8)	Install and tighten.	
	c. 3 leads (101A, 101B, and 102A)	a. Remove tags and install shrink sleeving.	

WARNING

Use care when using soldering equipment. Severe burns could result from improper use of equipment.

b. Install leads and solder.

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
6. Voltage adjust rheostat (1) (cont)		c. Move sleeving over soldered connection and heat shrink.	
	d. Inner door (3)	Close and turn knobs to left to lock.	
	e. Control knob (7)	Install. Tighten 2 set screws.	Turn shaft to center of travel and position knob to point up.
	f. Outer door (2)	Close and latch.	



12-5. TOGGLE SWITCHES (5)

This task covers:

a. Test b. Removal c. Installation

INITIAL SETUP

Test Equipment

Multimeter

Tools

Thermal gun (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
9/16 combination wrench
4-in. flat tip screwdriver
7/16 socket ,3/8 dr
3/8-dr ratchet handle
5 in. extension, 3/8 dr
11/32 socket, 1/4 dr
5/16 socket, 1/4 dr
1/4 socket, 1/4 dr
1/4-dr straight handle
No. 1 cross tip screwdriver
1/2 socket, 3/8 dr
1/2 combination wrench

Materials/Parts

Tags (item 24, appx B)

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
1	2	2-5
2	1	2-5
11	1	2-5
13	4	2-5
14	7	2-5
15	7	2-5
16	7	2-5
17	7	2-5
22	6,7	2-5
28	2,10	2-5
30	5	2-5
36	4	2-5
37	2	2-5
47	8	2-5
50	9	2-5
63	8	2-5
64	5	2-5
65	2	2-5
66	2	2-5
68	2	2-5
81	5,7,8,	2-5
82	2	2-5
83	7,8	2-5

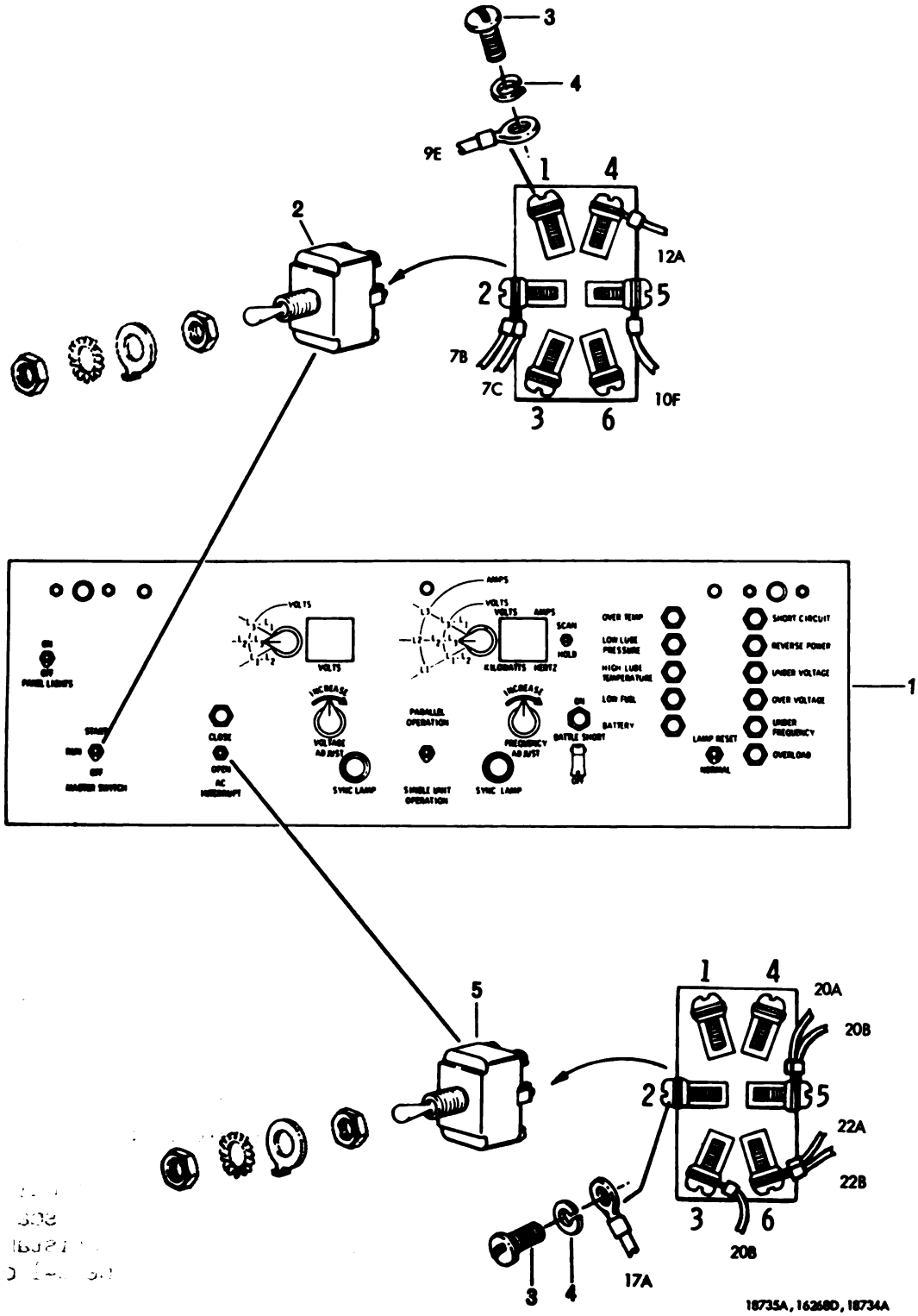
Equipment Condition

Para	Condition Description
4-21*	Disarm battery power.

*TM 5-6115-598-12

12-5. TOGGLE SWITCHES (5) (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Control cabinet	a. Outer door	Unlatch and open.	
	b. Inner door (1)	Turn knobs to right and open.	
2. MASTER switch (2)	a. 4 screws (3), washers (4), and 5 leads (9E, 7B, 7C, 10F, and 12A)	a. Remove, tag and identify leads.	
		b. Make continuity check with switch in OFF position as follows:	
		1. Between posts 2 to 3 and 5 to 6.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.
		2. Between posts 2 to 1 and 4 to 5.	Set multimeter RX10,000 scale. Resistance should be infinity.
		c. Make continuity check with switch in RUN position as follows:	
		Between posts 5 to 6 and 2 to 1.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.
		d. Make continuity check while holding switch in START position as follows:	
		1. Between posts 4 to 5 and 1 to 2.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.



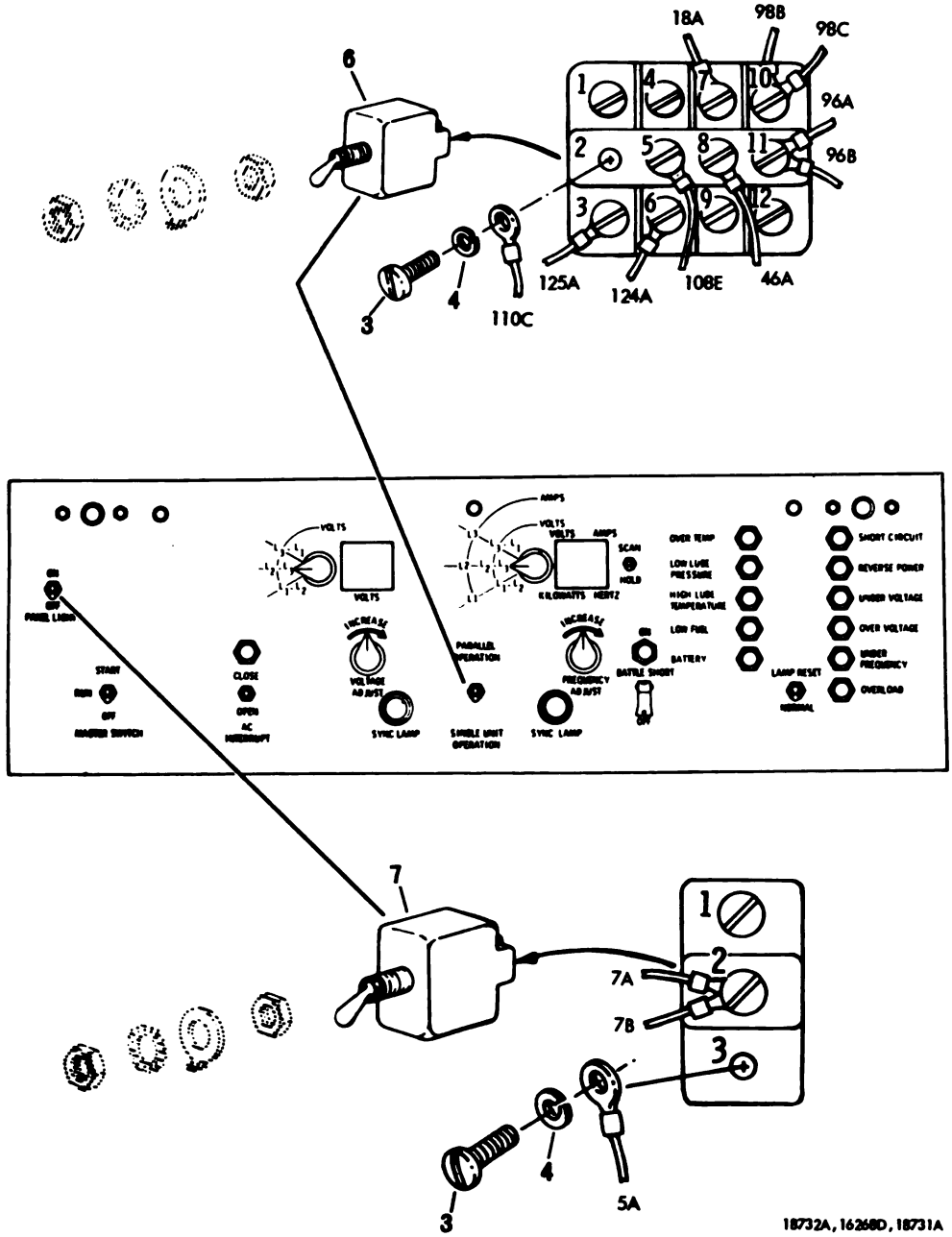
12-5. TOGGLE SWITCHES (5) (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. MASTER switch (2) (cont)		2. Between posts 5 to 6 and 2 to 3.	Set multimeter RX10,000 scale. Resistance should be infinity.
	b. 5 leads (12A, 10F, 7C, 7B, and 9E), washers (4), and screws (3)	Remove tags and install and tighten screws.	
3. AC INTERRUPT switch (5)	a. 4 screws (3), washers (4), and 6 leads (17A, 20A, 20B, 22A, and 22B)	a. Remove, tag, and identify leads.	
		b. Make continuity check while holding switch in CLOSE position as follows:	
		1. Between posts 2 to 3 and 5 to 6.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.
		2. Between posts 2 to 1 and 4 to 5.	Set multimeter RX10,000 scale. Resistance should be infinity.
		c. Make continuity check while holding switch in OPEN position as follows:	
		1. Between posts 2 to 1 and 5 to 4.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
3. AC INTERRUPT switch (5) (cont)		2. Between posts 5 to 6 and 3 to 2.	Set multimeter RX10,000 scale. Resistance should be infinity.
		d. Make continuity check with switch in center position as follows:	
		1. Between posts 2 to 1 and 5 to 6	Set multimeter RX1 scale. Resistance should be 0-1 ohm.
		2. Between posts 5 to 4 and 2 to 3.	Set multimeter RX10,000 scale. Resistance should be infinity.
	b. 6 leads (22A, 22B, 20B, 20A, and 17A), 4 washers (4), and screws (3)	Remove tags and install and tighten screws.	
4. SINGLE UNIT--PARALLEL switch	a. 8 screws (3), washers (4), and 10 leads (18A, 46A, 96A, 96B, 98B, 98C, 108E, 110C, 124A, and 125A)	a. Remove, tag and identify leads.	
		b. Make continuity check with switch in PARALLEL position as follows:	
		1. Between posts 1 to 2, 4 to 5, 7 to 8, and 10 to 11.	Set multimeter RX10,000 scale. Resistance should be infinity.
		2. Between posts 2 to 3, 5 to 6, 8 to 9, and 11 to 12.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.

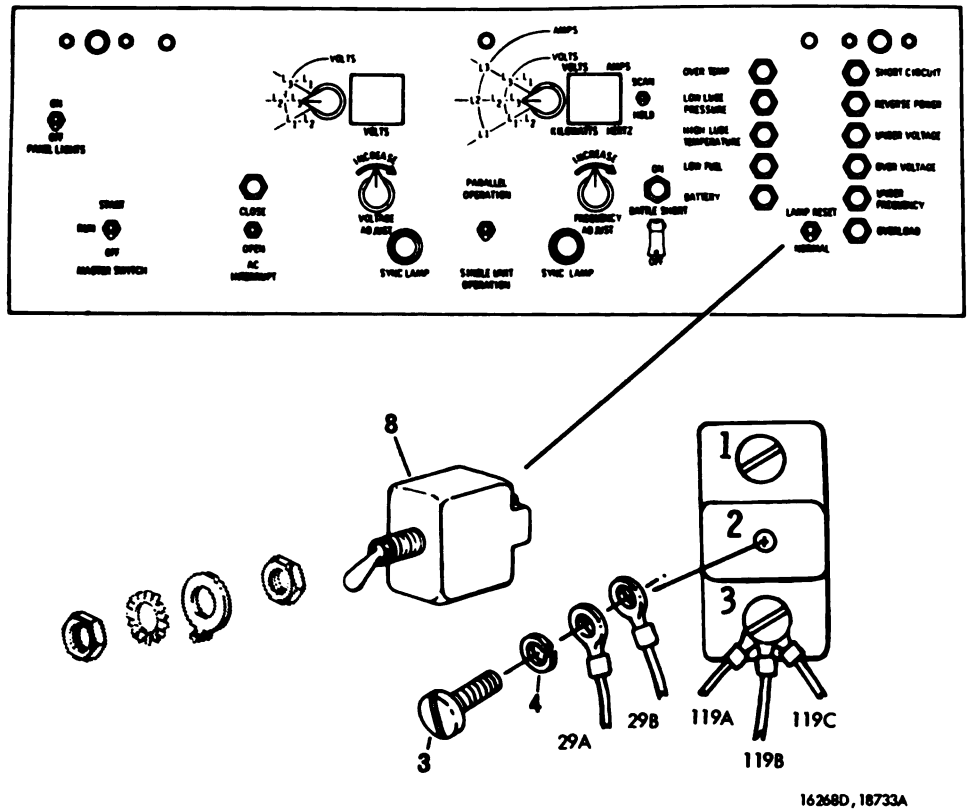
12-5. TOGGLE SWITCHES (5) (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
4. SINGLE UNIT--PARALLEL switch (cont)		c. Make continuity check with switch in SINGLE UNIT position as follows:	
		1. Between posts 1 to 2, 4 to 5, 7 to 8, and 10 to 11.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.
		2. Between posts 2 to 3, 5 to 6, 8 to 9, and 11 to 12.	Set multimeter RX10,000 scale. Resistance should be infinity.
	b. 10 leads (125A, 124A, 110C, 108E, 98C, 98B, 96B, 96A, 46A and 18A), 8 washers (4), and screws (3)	Remove tags and install and tighten screws.	
5. PANEL LIGHT switch (7)	a. 2 screws (3), washers (4), and leads (5A, 7A, and 7B)	a. Remove, tag, and identify leads.	
		b. Make continuity check with switch in ON position as follows:	
		1. Between posts 1 to 2.	Set multimeter RX10,000 scale. Resistance should be infinity.
		2. Between posts 2 to 3.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.



12-5. TOGGLE SWITCHES (5) (cont)

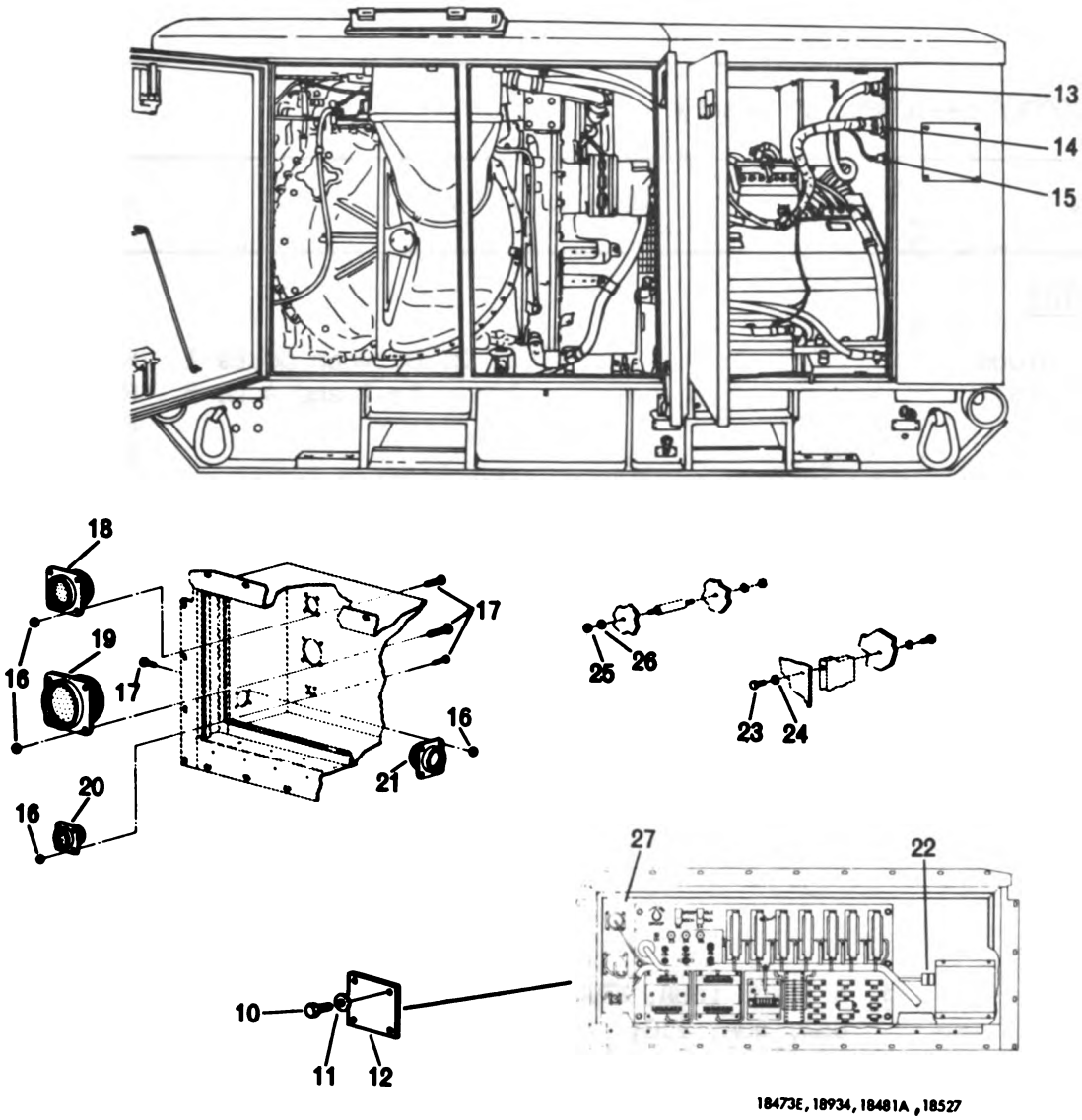
LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
5. PANEL LIGHT switch (7) (cont)		c. Make continuity check with switch in OFF position as follows:	
		1. Between posts 1 to 2.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.
		2. Between posts 2 to 3.	Set multimeter RX10,000 scale. Resistance should be infinity.
	b. 3 leads (7B, 7A, and 5A), 2 washers (4) and screws (3)	Remove tags and install and tighten screws.	
6. LAMP RESET switch (8)	a. 2 screws (3), washers (4), and 5 leads (29A, 29B, 119A, 119B, and 119C)	a. Remove, tag, and identify leads.	
		b. Make continuity check with switch in NORMAL position as follows:	
		1. Between posts 2 to 3.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.
		2. Between posts 1 to 2.	Set multimeter RX10,000 scale. Resistance should be infinity.



LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
6. LAMP RESET switch (8) (cont)		c. Make continuity check while holding switch in RESET position as follows:	
		1. Between posts 2 to 3.	Set multimeter RX10,000 scale. Resistance should be infinity.
		2. Between posts 1 to 2.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.
	b. 5 leads (119C, 119B, 119A, 29B 29A), 2 washers (4), and screws (3)	Remove tags and install and tighten screws.	

12-5. TOGGLE SWITCHES (5) (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
7. ISOCH DROOP switch (9)	a. 4 bolts (10), washers (11), and cover plate (12)	Remove.	
	b. 3 connectors (13, 14, and 15)	Disconnect.	
	c. 16 nuts (16) and screws (17)	Remove.	
	d. 4 connectors (18, 19, 20, and 21)	Remove.	
	e. Connector (22)	Disconnect.	
	f. 6 bolts (23) and washers (24)	Remove.	
	g. Nut (25) and washer (26)	Remove.	
	CAUTION Handle chassis assembly with care to prevent damage to wiring or components.		
	h. Chassis assembly (27)	Tilt forward to rest on inner door.	
	i. 5 screws (3), washers (4), and 6 leads (11F, 11G, 50A, 66A, 67A, and 68A)	a. Remove, tag, and identify leads.	



18473E, 18934, 18481A, 18527

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
7. ISOCH DROOP switch (9) (cont)		b. Make continuity check with switch in DROOP position as follows:	
		1. Between posts 2 to 3 and 5 to 6.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.

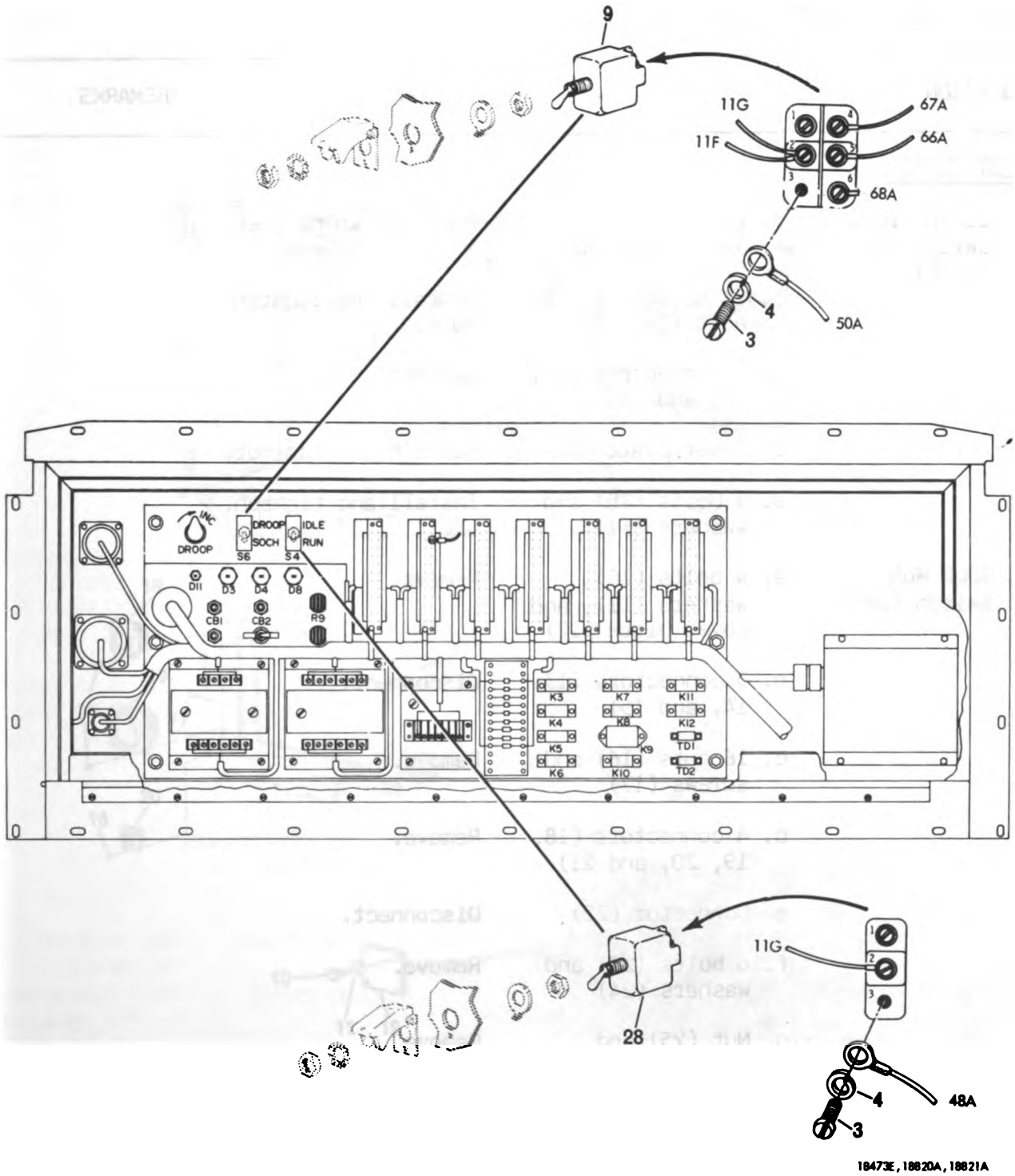
12-5. TOGGLE SWITCHES (5) (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
7. ISOCH Droop switch (9) (cont)		2. Between posts 1 to 2 and 4 to 5.	Set multimeter RX10,000 scale. Resistance should be infinity.
		c. Make continuity check with switch in ISOCH position as follows:	
		1. Between posts 1 to 2 and 4 to 5.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.
		2. Between posts 2 to 3 and 5 to 6.	Set multimeter RX10,000 scale. Resistance should be infinity.
	j. 6 leads (68A, 67A, 66A, 50A, 11G, and 11F), 5 washers (4) and screws (3)	Remove tags, install and tighten screws.	

CAUTION

Handle chassis assembly with care to prevent damage to wiring or components.

k. Chassis assembly (27)	Position on stud in cabinet.	
l. Washer (26) and nut (25)	Install and tighten.	
m. 6 washers (24) and bolts (23)	Install and tighten.	
n. Connector (22)	Connect.	



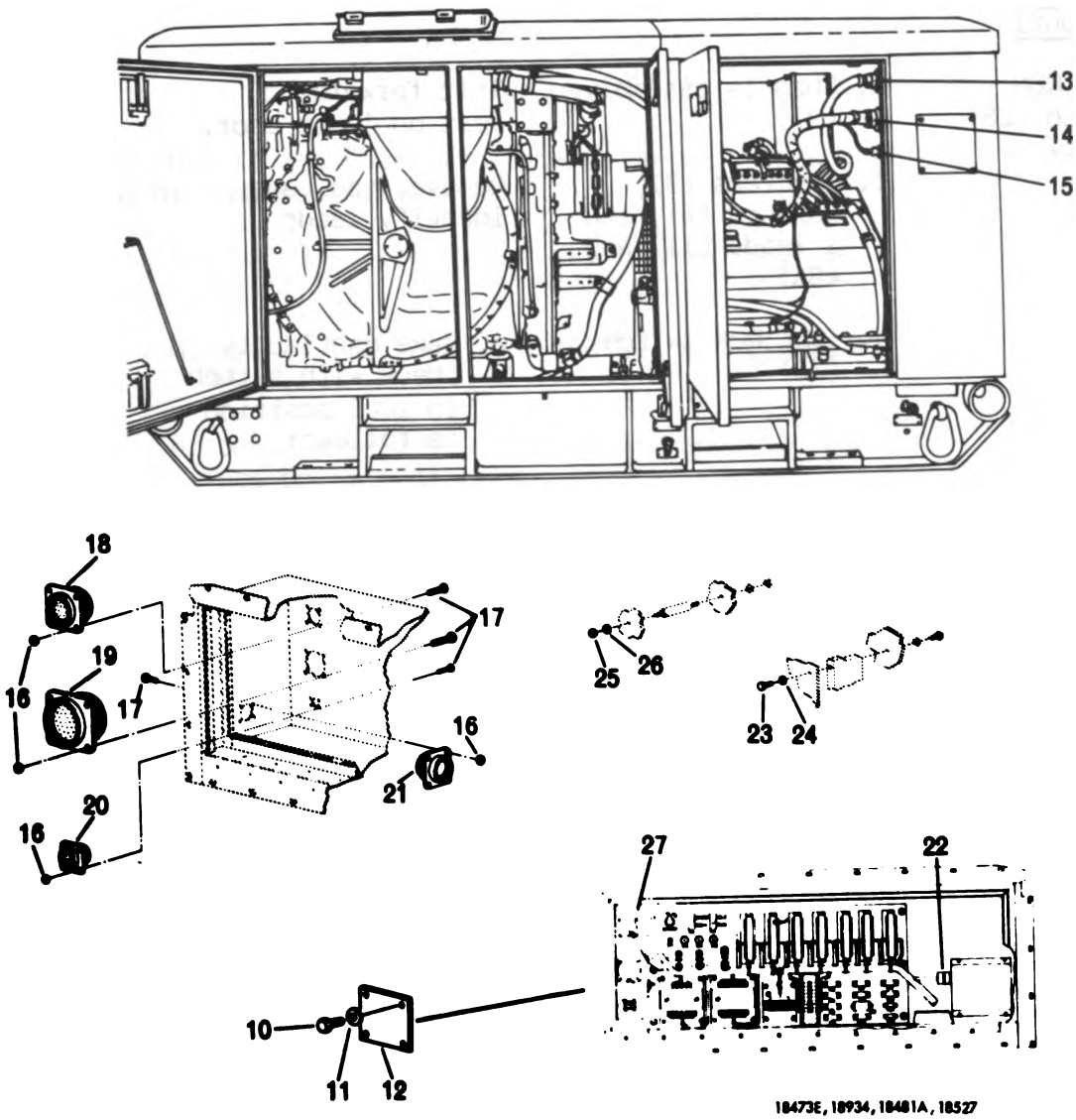
18473E, 18820A, 18821A

12-5. TOGGLE SWITCHES (5) (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
7. ISOCH Droop switch (9) (cont)	o. Connectors (18, 19, 20 and 21)	Position in cabinet.	
	p. 16 screws (17) and nuts (16)	Install and tighten nuts.	
	q. 3 connectors (13, 14, and 15)	Connect.	
	r. Cover plate (12)	Position on cabinet.	
	s. 4 bolts (10) and washers (11)	Install and tighten.	
8. IDLE RUN switch (28)	a. 4 bolts (10), washers (11), and cover plate (12)	Remove.	
	b. 3 connectors (13, 14, and 15)	Disconnect.	
	c. 16 nuts (16) and screws (17)	Remove.	
	d. 4 connectors (18, 19, 20, and 21)	Remove.	
	e. Connector (22)	Disconnect.	
	f. 6 bolts (23) and washers (24)	Remove.	
	g. Nut (25) and washer (26)	Remove.	

CAUTION

Handle chassis assembly with care to prevent damage to wiring or components.



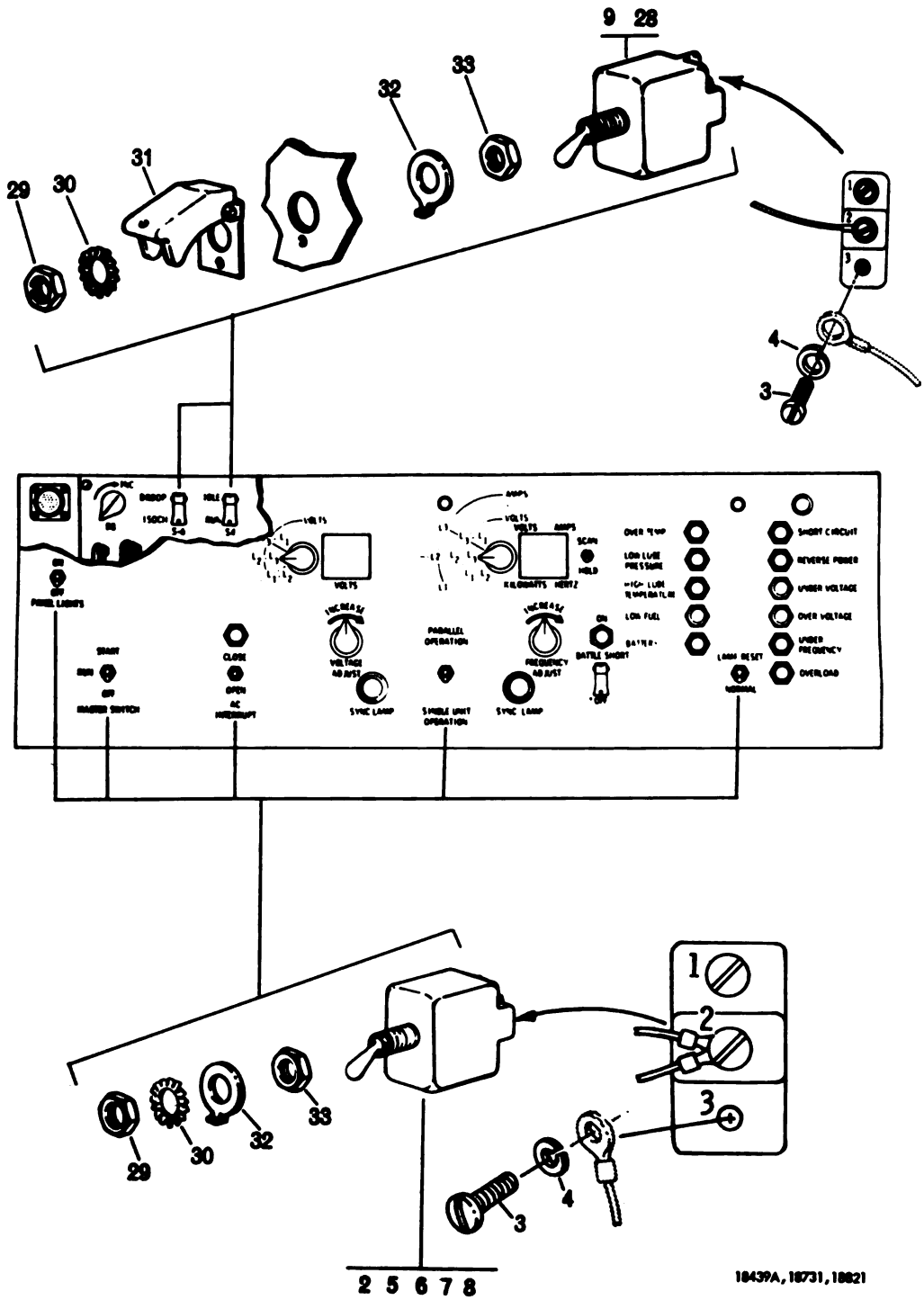
12-5. TOGGLE SWITCHES (5) (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
8. IDLE RUN switch (28) (cont)	h. Chassis assembly (27)	Tilt forward to rest on inner door.	
	i. 2 screws (3), washers (4), and 2 leads (11G and 48A)	Remove, tag, and identify leads.	
	j. IDLE RUN switch (28)	a. Make continuity check with switch in IDLE position as follows:	
		1. Between posts 2 to 3.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.
		2. Between posts 1 to 2.	Set multimeter RX10,000 scale. Resistance should be infinity.
		b. Make continuity check with switch in RUN position as follows:	
		1. Between posts 1 to 2.	Set multimeter RX1 scale. Resistance should be 0-1 ohm.
		2. Between posts 2 to 3.	Set multimeter RX10,000 scale. Resistance should be infinity.
	k. 2 leads (11G and 48A), 2 washers (4), and screws (3)	Remove tags; install and tighten screws.	

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
8. IDLE RUN switch (28) (cont)			
		CAUTION	
	Handle chassis assembly with care to prevent damage to wiring or components.		
	l. Chassis assembly (27)	Position on stud in cabinet.	
	m. Washer (26) and nut (25)	Install and tighten.	
	n. 6 washers (24) and bolts (23)	Install and tighten.	
	o. Connector (22)	Connect.	
	p. 4 connectors (18, 19, 20, and 21)	Position in cabinet.	
	q. 16 screws (17) and nuts (16)	Install and tighten nuts.	
	r. 3 connectors (13, 14, and 15)	Connect.	
	s. Cover plate (12)	Position on cabinet.	
	t. 4 bolts (10) and washers (11)	Install and tighten.	
9. Control cabinet	a. Inner door (1)	Close and turn knobs to left to lock.	
	b. Outer door	Close.	
REMOVAL			
10. Control cabinet	a. Outer door	Unlatch and open.	
	b. Inner door (1)	Turn knobs to right and open.	

12-5. TOGGLE SWITCHES (5) (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
	NOTE Steps 7.a. through h. must be completed before ISOCH DROOP and IDLE RUN switches can be removed.		
11. Toggle switches MASTER (2), AC INTERRUPT (5), SINGLE UNIT--PARALLEL (6), PANEL LIGHTS (7), LAMP RESET (8), ISOCH DROOP (9), and IDLE RUN (28)	a. Screws (3), washers (4), and leads	Remove, tag, and identify leads.	
	b. Nut (29) and star washer (30)	Remove.	
	c. Switch cover (31)	Remove.	On ISOCH DROOP and IDLE RUN switches only.
	d. Switch	Remove.	
	e. Tab washer (32) and nut (33)	Remove.	
INSTALLATION			
	NOTE Steps 7.k. through s. must be completed after ISOCH DROOP and IDLE RUN switches are installed.		
12. Toggle switches MASTER (2), AC INTERRUPT (5), SINGLE UNIT--PARALLEL (6),PANEL LIGHTS (7), LAMP RESET (8), ISOCH DROOP (9), IDLE RUN (28)	a. Nut (33) and tab washer (32)	Install.	Position tang of washer toward control panel.
	b. Switch	Install.	
	c. Switch cover (31)	Install.	On ISOCH DROOP and IDLE RUN switches only.
	d. Star washer (30) and nut (29)	Install and tighten.	
	e. Leads, washers (4) and screws (3)	Remove tags, install, and tighten.	



12-5. TOGGLE SWITCHES (5) (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
13. Control cabinet	a. Inner door (1)	Close and turn knobs to left to lock.	
	b. Outer door	Close and latch.	

12-6. CIRCUIT BREAKERS

This task covers:

a. Test b. Removal c. Installation

INITIAL SETUP

Test Equipment

Multimeter

Tools

Thermal gun (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
7/16 socket, 3/8 dr
3/8-dr ratchet handle
5 in. extension, 3/8 dr
9/16 deep well socket, 3/8 dr
4-in. flat-tip screwdriver
1/2 socket, 3/8 dr
1/2 combination wrench
No. 1 cross tip screwdriver
11/32 socket, 1/4 dr
5/16 socket, 1/4 dr
1/4 socket, 1/4 dr
1/4-dr straight handle
Pocket knife
Shop Equipment, Electrical Repair, Semitrailer Mounted (4940-00-294-9517)
Electronic tool kit

Materials/Parts

Tags (item 24, appx B)
Shrink sleeving

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
1	6	2-5
14	7	2-5
15	7	2-5
16	7	2-5
17	7	2-5
18	4	2-5
19	4	2-5
20	4	2-5
21	4	2-5
22	7	2-5
23	4	2-5
24	4	2-5
25	4	2-5
26	4	2-5
27	4	2-5
28	10	2-5
36	4	2-5
47	7,8	2-5
50	9,10	2-5
60	3	2-5
64	5,7	2-5
81	2	2-5
82	4	2-5
84	4	2-5

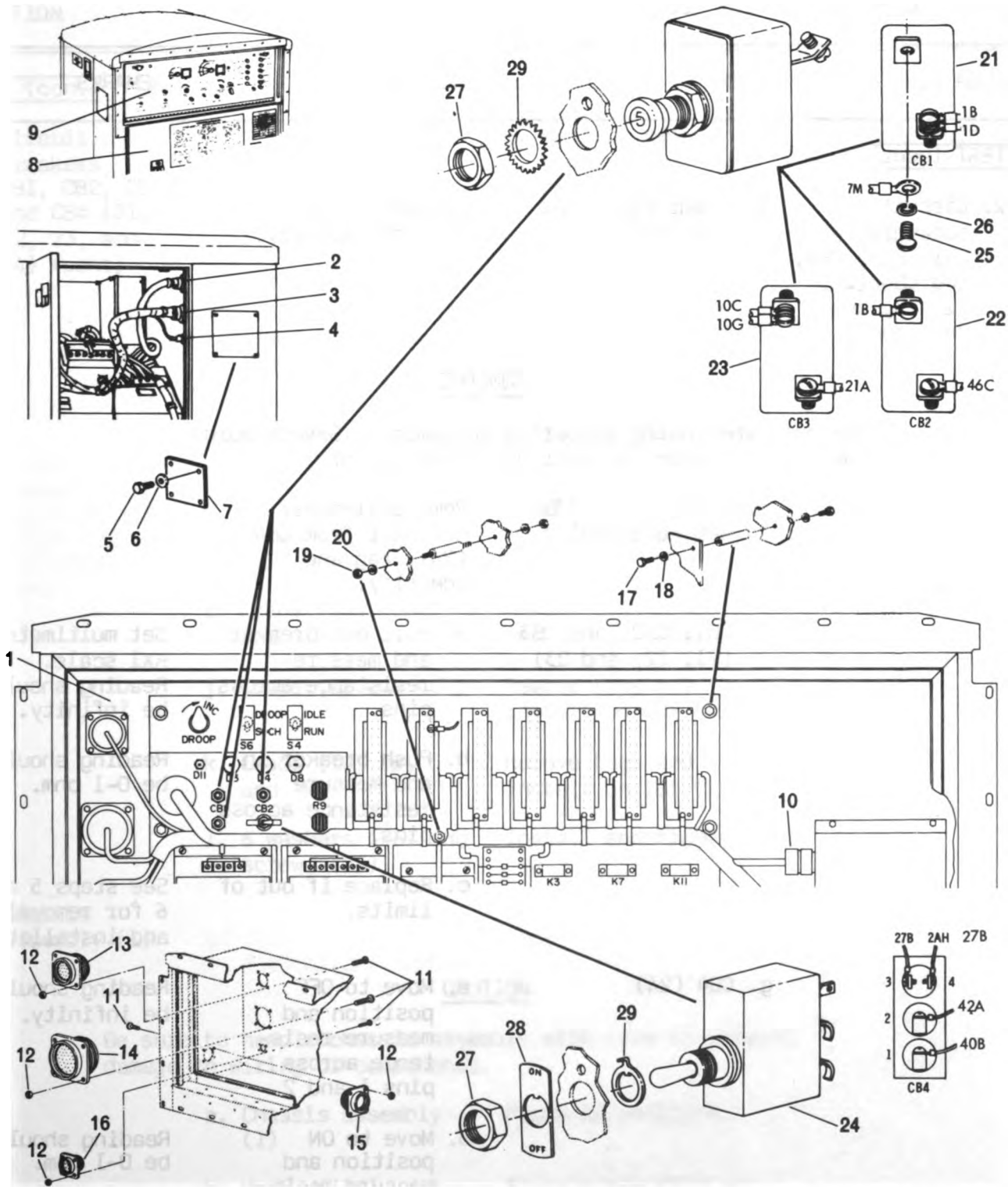
Equipment Condition

Para	Condition Description
4-21*	Disarm battery power.

*TM 5-6115-598-12

12-6. CIRCUIT BREAKERS (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Chassis assembly (1)	a. 3 connectors (2, 3, and 4)	Disconnect.	
	b. 4 bolts (5), washers (6), and cover plate (7)	Remove.	
	c. Control cabinet outer door (8)	Unlatch and open.	
	d. Inner door (9)	Turn knobs to right and open.	
	e. Connector (10)	Disconnect.	
	f. 16 screws (11), nuts (12), and 4 connectors (13, 14, 15 and 16)	Remove.	
	g. 6 bolts (17) and washers (18), nut (19), and washer (20)	Remove.	
	CAUTION Be sure to handle chassis assembly with care to prevent damage to wiring or components.		
	h. Chassis assembly (1)	Pull forward carefully.	
2. Circuit breakers CB1, CB2, CB3, and CB4 (21, 22, 23, and 24)	a. 6 screws (25) and washers (26)	Remove.	
	b. Leads (1D, 1B, and and 7M)	Remove from CB1 (21). Tag and identify.	
	c. Leads (1B and 46C)	Remove from CB2 (22). Tag and identify.	



18473E, 18737B, 18736A, 18481A, 18527, 18492B, 18934

12-6. CIRCUIT BREAKERS (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. Circuit breakers CB1, CB2, CB3, and CB4 (21, 22, 23, and 24) (cont)	d. Leads (10C, 10G and 21A)	Remove from CB3 (23). Tag and identify.	
	WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.		
	e. Leads (2AH, 27B 40B, and 42A)	Remove sleeves, unsolder from CB4 (24), tag and identify.	
	f. CB1, CB2, and CB3 (21, 22, and 23)	a. Pull out breaker and measure resistance across pins.	Set multimeter RX1 scale. Reading should be infinity.
		b. Push breaker in and measure resistance across pins.	Reading should be 0-1 ohm.
		c. Replace if out of limits.	See steps 5 and 6 for removal and installation.
	g. CB4 (24)	a. Move to OFF position and measure resistance across pins 1 and 2.	Reading should be infinity.
		b. Move to ON position and measure resistance across pins 1 and 2.	Reading should be 0-1 ohm.

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
2. Circuit breakers CB1, CB2, CB3, and CB4 (21, 22, 23, and 24) (cont)		c. Measure resistance across pins 3 and 4.	Reading should be 500-750 ohms.
		d. Replace if out of limits.	See steps 5 and 6 for removal and installation.
	h. Leads (2AH, 27B, 40B, and 42A)	a. Remove tags and install shrink sleeving.	
		b. Install on CB4 (24) and solder.	
		c. Move sleeving over soldered connection and heat shrink.	
	i. Leads (10C, 10B, and 21A)	Remove tags and install on CB3 (23).	
	j. Leads (1B and 46C)	Remove tags and install on CB2 (22).	
	k. Leads (1D, 1B, and 7M)	Remove tags and install on CB1 (21).	
	l. 6 washers (26) and screws (25)	Install and tighten.	
3. Chassis assembly (1)			

CAUTION

Be sure to handle chassis assembly with care to prevent damage to wiring or components.

	a. Chassis assembly (1)	Place in position.
	b. Washer (20), nut (19), 6 washers (18) and bolts (17)	Install and tighten.

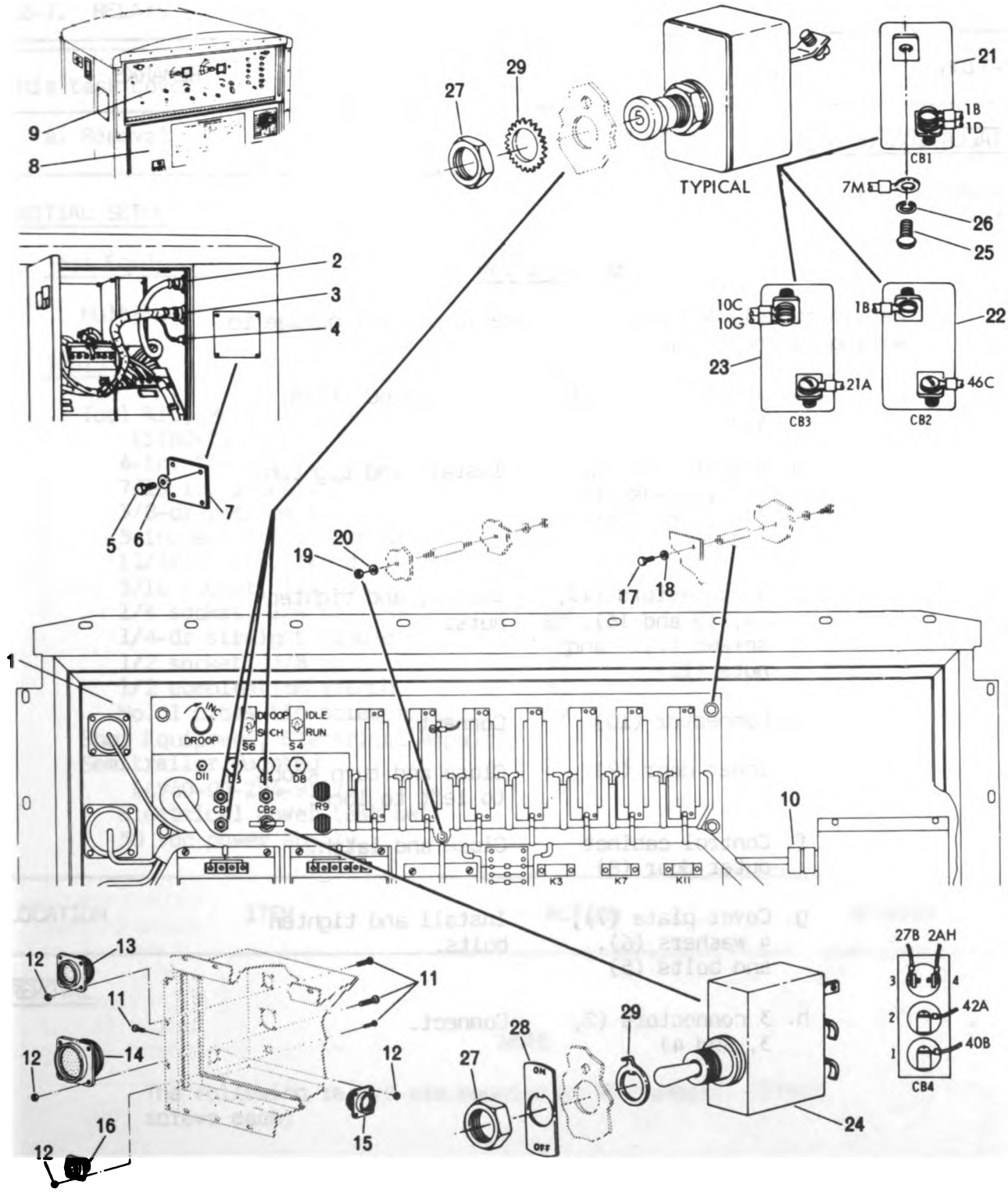
12-6. CIRCUIT BREAKERS (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
3. Chassis assembly (1) (cont)	c. 4 connectors (13, 14, 15 and 16), 16 screws (11) and nuts (12).	Install and tighten screws.	
	d. Connector (10)	Connect.	
	e. Inner door (9)	Close and turn knobs to left to lock.	
	f. Control cabinet outer door (8)	Close and latch.	
	g. Cover plate (7), 4 washers (6), and bolts (5)	Install and tighten bolts.	
	h. 3 connectors (2, 3, and 4)	Connect.	
REMOVAL			
4. Chassis assy (1)	a. 3 connectors (2, 3, and 4)	Disconnect.	
	b. 4 bolts (5), washers (6), and cover plate (7)	Remove.	
	c. Control cabinet outer door (8)	Unlatch and open.	
	d. Inner door (9)	Turn knobs to right and open.	
	e. Connector (10)	Disconnect.	
	f. 16 screws (11), nuts (12), and 4 connectors (13, 14, 15 and 16)	Remove.	

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
4. Chassis assy (1) (cont)	g. 6 bolts (17) and washers (18), nut (19), and washer (20)	Remove.	
	CAUTION Handle chassis assembly with care to prevent damage to wiring or components.		
	h. Chassis assembly (1)	Pull forward carefully.	
5. Circuit breakers CB1 (21), CB2 (22), (CB3) (23), and (CB4) (24)	a. 6 screws (25) and washers (26)	Remove.	
	b. 3 leads (1D, 1B, and 7M)	Remove from CB1 (21), tag, and identify.	
	c. 2 leads (1B and 46C)	Remove from CB2 (22), tag ,and identify.	
	d. 3 leads (10C, 10G, and 21A)	Remove from CB3 (23), tag, and identify.	
	e. 4 leads (2AH, 27B 40B, and 42A)	Remove sleeves, unsolder, tag and identify.	
	f. 4 nuts (27) and ON-OFF plate (28)	Remove.	ON-OFF plate on CB4 only.
	g. CB1 (21), CB2, (22), CB3 (23), CB4 (24), and 4 lock washers (29)	Remove.	

12-6. CIRCUIT BREAKERS (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
	NOTE CB2 and CB1 are 15 amp breakers. CB3 is a 7 1/2 amp breaker.		
6. Circuit breakers CB1 (21), CB2 (22), CB3 (23), and CB4 (24)	a. 4 lockwashers, (29) CB1 (21), CB2 (22), CB3 (23), and CB4 (24)	Install.	
	b. ON-OFF plate (28) and 4 nuts (27)	Install and tighten nuts.	ON-OFF plate on CB4.
	c. 4 leads (2AH, 27B 40B, and 42A)	a. Remove tags and install shrink sleeving.	
	WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.		
		b. Install leads on CB4 and solder.	
		c. Move sleeving over soldered connection and heat shrink.	
	d. 3 leads (10C, 10G and 21A)	Remove tags and install on CB3.	
	e. 2 leads (1B and 46C)	Remove tags and install on CB2 (22).	
	f. 3 leads (1D, 1B, and 7M)	Remove tags and install on CB1.	
	g. 6 washers (26) and screws (25)	Install and tighten.	



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12-6. CIRCUIT BREAKERS (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
7. Chassis assy (1)			
		CAUTION	
		Handle chassis assembly with care to prevent damage to wiring or components.	
	a. Chassis assembly (1)	Place in position.	
	b. Washer (20, nut (19), 6 washers (18), and bolts (17)	Install and tighten.	
	c. 4 connectors (13, 14, 15 and 16), 16 screws (11), and nuts (12)	Install and tighten nuts.	
	d. Connector (10)	Connect.	
	e. Inner door (9)	Close and turn knobs to left to lock.	
	f. Control cabinet outer door (8)	Close and latch.	
	g. Cover plate (7), 4 washers (6), and bolts (5)	Install and tighten bolts.	
	h. 3 connectors (2, 3, and 4)	Connect.	

12-7. RELAYS (GENERATOR)

This task covers:

a. Removal b. Test c. Installation

INITIAL SETUP

Test Equipment

Multimeter

Tools

Tool Kit, Master Mechanics (5180-00-699-5273)
- 4-in. flat-tip screwdriver
- 7/16 in. socket, 3/8 dr
- 3/8-dr ratchet handle
- 5-in. extension, 3/8 dr
- 11/32 socket, 1/4 dr
- 5/16 socket, 1/4 dr
- 1/4 socket, 1/4 dr
- 1/4-dr straight handle
- 1/2 socket, 3/8 dr
- 1/2 combination wrench
- No. 1 cross tip screwdriver

Shop Equipment, Electrical Repair, Semitrailer Mounted (4940-00-294-9517)
- Electrical power test set
- 50 Vdc power supply

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
6	3	2-5
7	1,2	2-5
8	2	2-5
10	2,3	2-5
14	2,3	2-5
22	4,5	2-5
47	5,6	2-5
50	7,9,10,11	2-5
56	3	2-5
57	2	2-5
65	3	2-5
82	2	2-5

LOCATION	ITEM	ACTION	REMARKS

REMOVAL

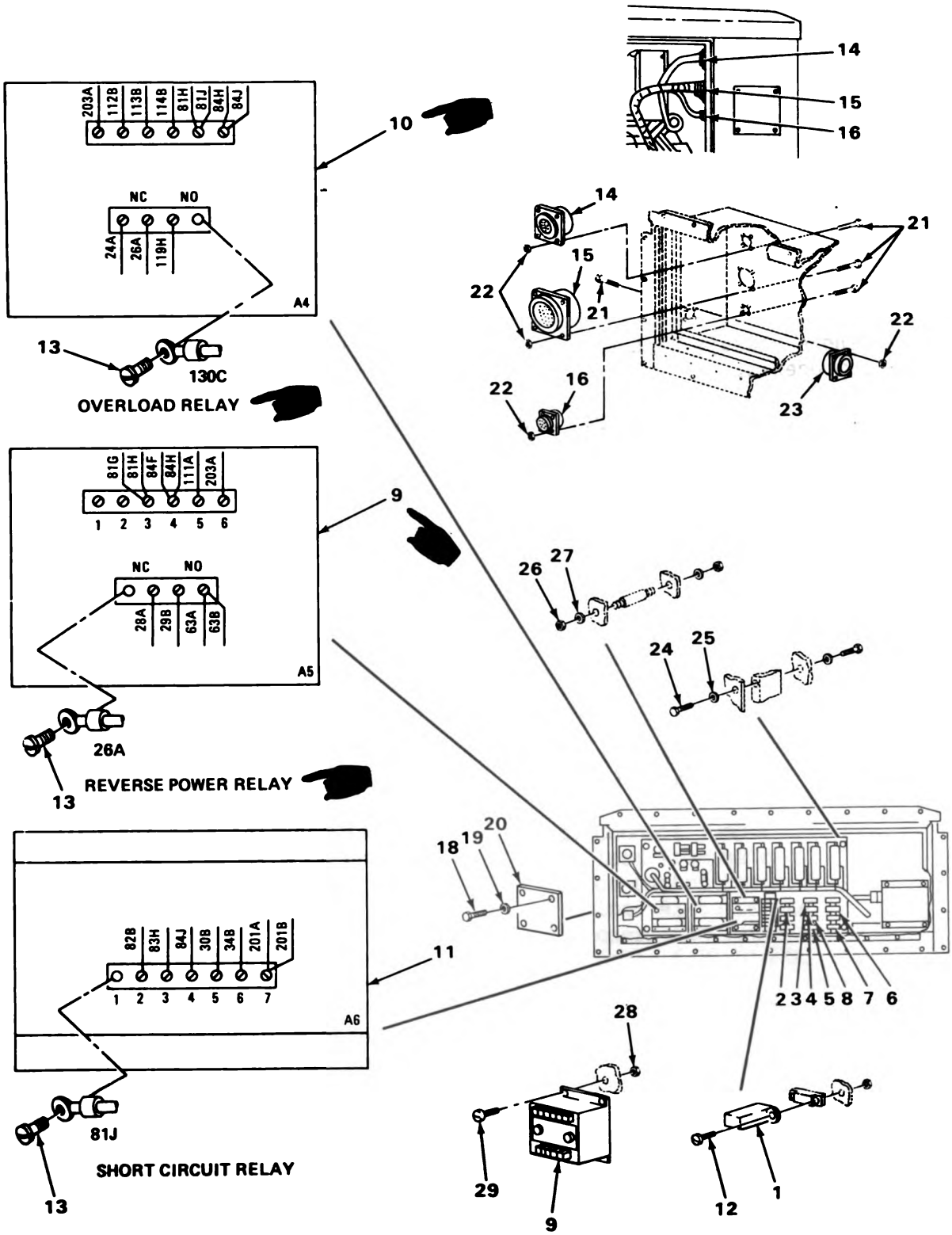
NOTE

The following relays are mounted on the chassis with 2 screws each:

K3 Underfrequency (1)
K4 Short circuit (2)
K7 Undervoltage (3)

12-7. RELAYS (GENERATOR) (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
	K8 Reverse power latch (4) K10 Main contactor (5) K12 Overload latching (6) TD2 Generator warning lamps (7) K9 AC dead bus (8) In addition to the above 8 relays, 3 larger relays are also mounted on the support with 4 nuts, 4 screws, and 4 washers each. Wire terminals are connected to the following relay terminals with screws. Reverse power relay (9) Overload relay (10) Short circuit relay (11)		
1. Control cabinet outer door		Unlatch and open.	
2. Inner door		Turn knobs to right and open.	
3. Relays (1 thru 8)	a. 16 screws (12)	Remove.	
	b. Relays (1 thru 8)	Remove.	
4. Relays (9 thru 11)	a. Terminal screws (13) and leads	Remove, tag, and identify leads.	Relays are located in lower LH chassis assembly. Removal from chassis assembly is not required for test.
	b. 3 connectors (14, 15, and 16)	Disconnect.	
	c. 4 bolts (18), washers (19), and cover plate (20)	Remove.	



12-7. RELAYS (GENERATOR) (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
4. Relays (9 thru 11) (cont)	d. 16 screws (21) and nuts (22)	Remove.	
	e. 4 connectors (14, 15, 16, and 23)	Remove.	
	CAUTION Handle chassis with care to avoid damage to wiring or components.		
	f. 6 bolts (24) and washers (25), nut (26) and washer (27)	Remove.	Lay chassis assembly forward.
	g. 12 nuts (28) and screws (29)	Remove.	
	h. Relays (9, 10 and 11)	Remove.	
TEST			
5. Relay removed for test	a. Relays (1) through (7)	a. Check resistance as follows:	
		1. Between pins 1 and 3, also 6 and 8.	Set multimeter RX1 scale. Reading should be 0-1 ohm.
		2. Between pins 2 and 7.	Reading should be 250-350 ohms.
		3. Between pins 1 and 5, also 4 and 8.	Set multimeter RX10,000 scale. Reading should be infinity.
		b. Apply 24 Vdc across pins 2 and 7.	

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
5. Relay removed for test (cont)		c. Check resistance between pins 3 and 5, also 4 and 6.	Set mmultimeter RX1 scale. Reading should be 0-1 ohm.
		d. Replace as reqd. if out of limits.	
	b. Relay (8)	a. Make resistance check as follows:	
		1. Between pins A1 and A2, also B1 and B2.	Set multimeter RX1 scale. Reading should be 0-1 ohm.
		2. Between pin X1 and X2.	Set multimeter RX100 scale. Reading should be 1550 to 1750 ohms.
		3. Between pins A2 and A3, also B2 and B3.	Set multimeter RX10,000 scale. Reading should be infinity.
		b. Make power-on check as follows:	
		1. Connect jumper lead from main contactor terminal A1 to remote operation receptacle (J7) pin G.	
		2. Remove connector (P5) from paralleling phase switch.	
		3. Start engine.	Para 2-2 and 2-3, TM 5-6115-598-12.

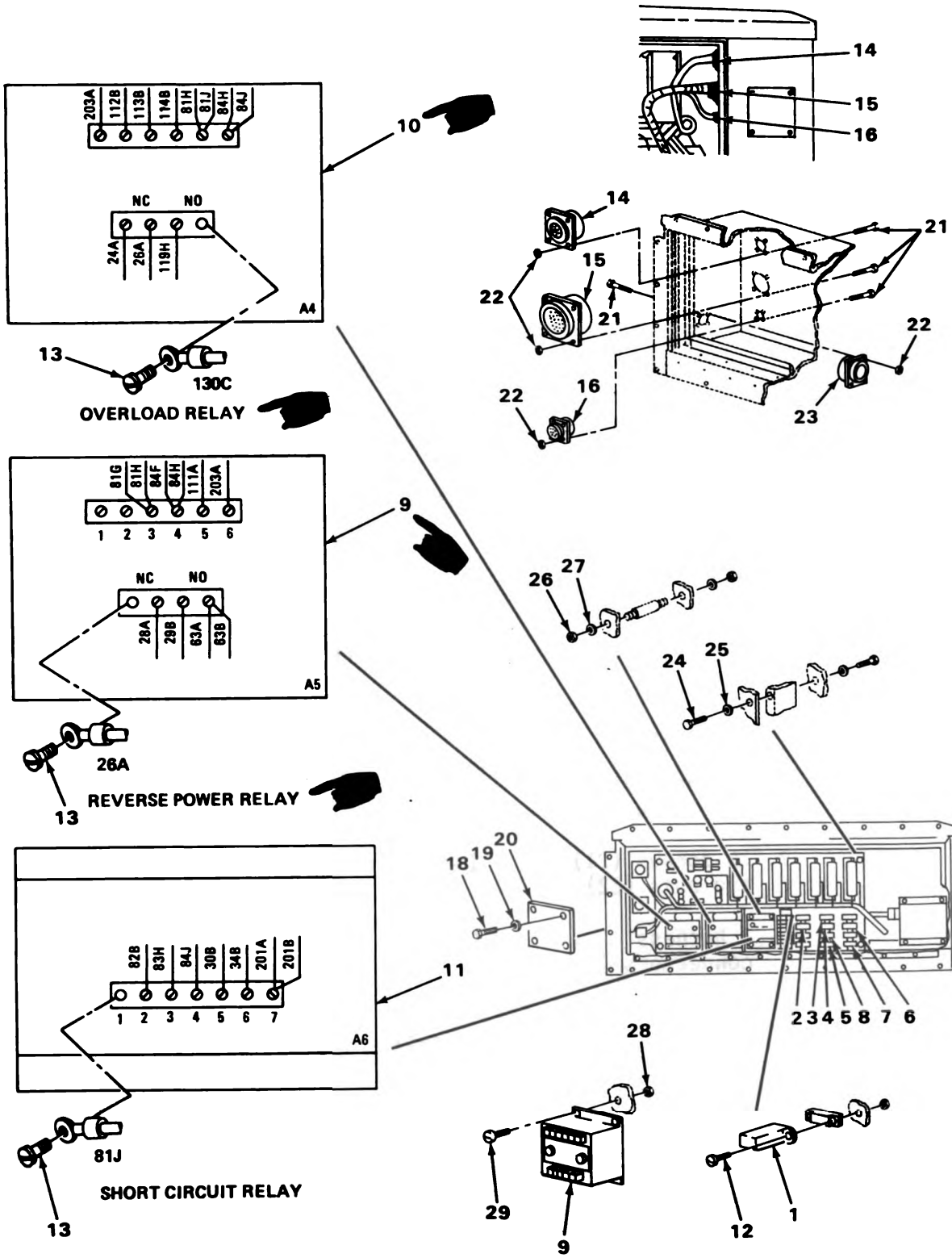
12-7. RELAYS (GENERATOR) (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
5. Relay removed for test (cont)		4. Operate engine at no load.	
		5. Place UNIT PARALLEL switch to SINGLE UNIT OPERATION.	
		6. Move AC INTERRUPT switch to CLOSE.	Interrupter should not close. Light will be off.
		7. Shut down engine.	
		8. Replace if out of limits.	
	c. Reverse power relay (9)	a. Make resistance check as follows:	
		1. Between 2 NC terminals.	Set multimeter RX1 scale. Reading should be 0-1 ohm.
		2. Between 2 NO terminals.	Set multimeter RX10,000 scale. Reading should be infinity.
		3. Terminals 3, 4, 5, and 6 to case.	Reading should be infinity.
		4. Between terminals 3 to 4, 5 to 4, and 6 to 4.	Set multimeter RX1 scale. Reading should be 0-1 ohm.

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
5. Relay removed for test (cont)		b. Make power-on check as follows:	
		1. Reverse leads 5 and 6.	
		2. Start engine.	Para 2-2 and 2-3, TM 5-6115-598-12.
		3. Adjust voltage to 208V.	
		4. Adjust frequency to 400Hz.	
		5. Connect 11 kw (30 amp) load to set. Move AC INTERRUPT switch to CLOSE.	AC INTERRUPT must open within 3.0-3.5 seconds.
		6. Adjust as reqd. if out of limits.	
		c. Adjust relay as follows:	
		1. Set time pot to minimum.	
		2. Adjust level set pot for instant interrupter opening when AC INTERRUPT switch is moved to closed.	
		3. Readjust time pot for 3.0-3.5 second interrupter opening.	

12-7. RELAYS (GENERATOR) (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
5. Relay removed for test (cont)		b. Reapply 11 kw (30 amp) load 2 additional times to verify adjustment.	If not within limits, replace relay.
	d. Overload relay (10)	Make resistance check as follows:	
		1. Between 2 NC terminals.	Set multimeter RX1 scale. Reading should be 0-1 ohm.
		2. Between 2 NO terminals.	Set to multimeter RX10,000 scale. Reading should be infinity.
		3. Between terminal 4 to case.	Reading should be infinity.
		4. Between terminals 1 to 4, 2 to 4, 3 to 4, 5 to 6.	Set multimeter RX1 scale. Reading should be 0-1 ohm.
	e. Short circuit relay (11)	Make resistance check as follows:	
		1. Terminals 5 to 6 and 4 to case.	Set multimeter to RX10,000 scale. Reading should be infinity.
		2. Terminals 5 to 7.	Set multimeter RX1 scale. Reading should be 0-1 ohm.
		3. Terminals 1 to 4, 2 to 4, and 3 to 4.	Reading should be 0-1 ohm.



12-7. RELAYS (GENERATOR) (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
6. Relays (1 thru 8)	a. Relays (1 thru 7)	Install in socket.	
	b. 14 screws (12)	Install and tighten.	
	c. Relay (8)	Install in socket.	Pin with blue bead is mounted on top.
	d. 2 screws (12)	Install and tighten.	
7. Relays (9 thru 11)	a. Relays	Place in position on chassis panel.	
	b. 12 screws (29) and nuts (28)	Install and tighten.	
	c. Chassis assembly	Position in control cabinet.	
	d. Washer (27) and nut (26), 6 washers (25), and bolts (24)	Install and tighten.	
	e. 4 connectors (23, 16, 15, and 14)	Position in cabinet.	
	f. 16 screws (21) and nuts (22)	Install and tighten.	
	g. 3 harness connectors (14, 15, and 16)	Connect.	
	h. Cover plate (19), 4 washers (18), and bolts (17)	Install. Tighten bolts.	

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
7 Relays (9 thru 11) (cont)	i. Leads and screws (13)	Remove tags; install and tighten screws.	Position as tagged during removal.
8. Inner door		Close and turn knobs to left to lock.	
9. Control cabinet outer door		Close and latch.	

12-8. VOLTAGE REGULATOR AND MONITOR ASSEMBLY

This task covers:

a. Test b. Removal c. Installation

INITIAL SETUP

Test Equipment

Digital multimeter

Tools

Tool Kit, Master Mechanics (5180-00-699-5273)
4-in. flat-tip screwdriver
11/32 socket
1/4-dr handle
2-in. flat tip screwdriver, 1/8 tip

Materials/Parts

Tags (item 24, appx B)
Regulator and monitor gasket

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

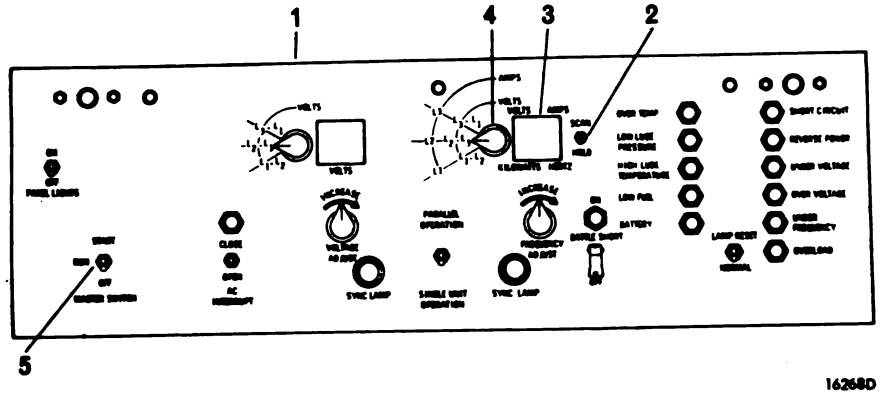
Item	Step	Table
8	1	2-5
9	1	2-5
41	1	2-5
42	1	2-5
43	1	2-5
44	1	2-5
45	1	2-5
46	1	2-5
47	4	2-5
48	2	2-5
49	1	2-5
54	3	2-5
59	1,2,4	2-5
60	1,6	2-5
61	1,4	2-5
63	5	2-5
81	8	2-5
84	2	2-5

Equipment Condition

Para	Condition Description
4-21*	Disarm batteries (after test).

*TM 5-6115-598-12

LOCATION	ITEM	ACTION	REMARKS
TEST			
1. Control cabinet outer door		Unlatch and open.	



LOCATION	ITEM	ACTION	REMARKS
TEST			
2. Inner door (1)	a. Engine	Start.	Para 2-2 and 2-3, TM 5-6115-598-12.
	b. SCAN HOLD switch (2)	a. Place to SCAN position.	
		b. Move to HOLD when VOLTS lamp on regulator and monitor (3) comes on.	

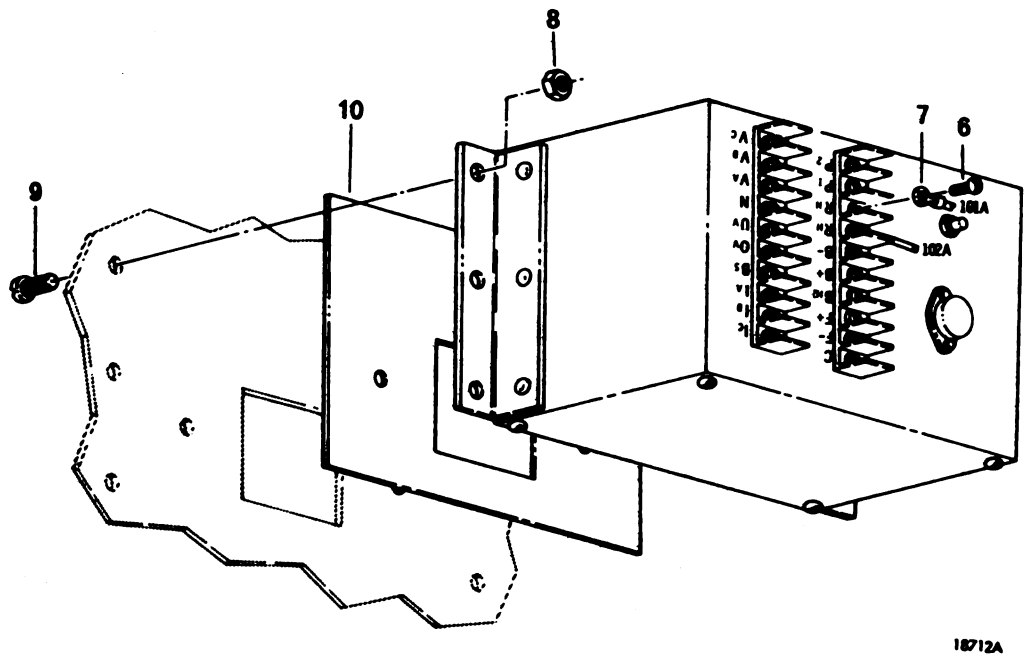
WARNING

High voltage is used in the operation of this equipment. Death on contact may result if personnel fail to observe safety precautions. Be careful not to contact high-voltage connections when working inside control cabinet with set running.

	c. Inner door (1)	Turn knobs to right and open.	
3. Voltage regulator and monitor assy (3)		Measure and record AC voltage from terminals Va to Vb, Vb to Vc, and Vc to Va.	Set multimeter 250 Vac scale. Reading should be 208 Vac.

12-8. VOLTAGE REGULATOR AND MONITOR ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
4. Inner door (1)		Close and turn knobs to left to lock.	
	a. Phase select knob (4)	a. Place in L1-L2 position and read AC voltage on regulator and monitor (3).	Should read the same as Vac recorded for Va to Vb ± 3 Vac.
		b. Move to L2-L3 position and read AC voltage on regulator and monitor (3).	Should read the same as Vac recorded for Vb to Vc ± 3 Vac.
		c. Move to L3-L1 position and read AC voltage on regulator and monitor (3).	Should read the same as Vac recorded for Vc to Va. Replace regulator and monitor per steps 6, 7, and 8 if out or limits.
	b. MASTER switch (5)	Place to OFF.	
5. Control cabinet outer door		Close and latch.	
REMOVAL			
6. Control cabinet outer door		Unlatch and open.	



LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
7. Voltage regulator and monitor (3)	a. Phase selection knob (4)	Loosen set screw and remove knob.	Note knob position on shaft.
	b. Inner door (1)	Turn knobs to right and open.	
	c. Screws (6) and leads (7)	Remove. Tag and identify leads.	
	d. 6 nuts (8) and screws (9)	Remove.	
	e. Voltage regulator and monitor (3)and gasket (10)	Remove.	

12-8. VOLTAGE REGULATOR AND MONITOR ASSEMBLY (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
8. Voltage regulator and monitor (3)	a. Gasket (10)	Position on inner door.	Use new gasket if old gasket is damaged.
	b. Voltage regulator and monitor (3)	Install.	
	c. 6 screws (9) and nuts (8)	Install and tighten.	
	d. Leads (7) and screws (6)	Remove tags and connect leads. Install and tighten screws.	
	e. Inner door (1)	Close and turn knobs to left to lock.	
	f. Phase selection knob (4)	Install and tighten set screws.	Position on shaft as noted.
9. Control cabinet outer door		Close and latch.	

12-9. WIRING HARNESS

This task covers:

a. Test b. Removal c. Repair d. Installation

INITIAL SETUP

Test Equipment

Multimeter

Tools

Thermal gun (appx C)
Diagonal cutting pliers
Tool Kit, Master Mechanics
(5180-00-699-5273)
4-in. flat tip screwdriver
11/32 combination wrench
7/16 socket, 3/8 dr
3/8-dr ratchet handle,
5-in extension, 3/8 dr
5/8 deep well, socket, 3/8 dr
9/16 deep well, socket, 3/8 dr
3/8 socket ,3/8 dr
3/8 combination wrench
7/16 combination wrench
Pocket knife
Shop Equipment, Electrical Repair,
Semitrailer Mounted
(4940-00-294-9517)
Electronics tool kit
Terminal servicing kit

Materials/Parts

Tags (item 24, appx B)
Electrical tape (item 25, appx B)
Plastic cable ties
Heat shrink sleeving

Personnel Required

Turbine Engine Driven Generator
Repairer MOS 52F

Troubleshooting References

Paragraph 12-9 is referenced in the majority of troubleshooting steps. As a result of the number of references, individual steps are not listed.

Equipment Condition

Para	Condition Description
4-13*	Rear roof removed.
4-21*	Batteries disarmed.

*TM 5-6115-598-12

12-9. WIRING HARNESS (cont)

LOCATION	ITEM	ACTION	REMARKS

TEST

1. Wiring harness

NOTE

With specific trouble symptoms, check harness circuit in question for continuity, open circuit and short circuit using appropriate schematic diagrams in TM 5-6115-598-12. Each circuit shall have a minimum insulation resistance of 1 megohm to each connector shell and to each other circuit.

REMOVAL

NOTE

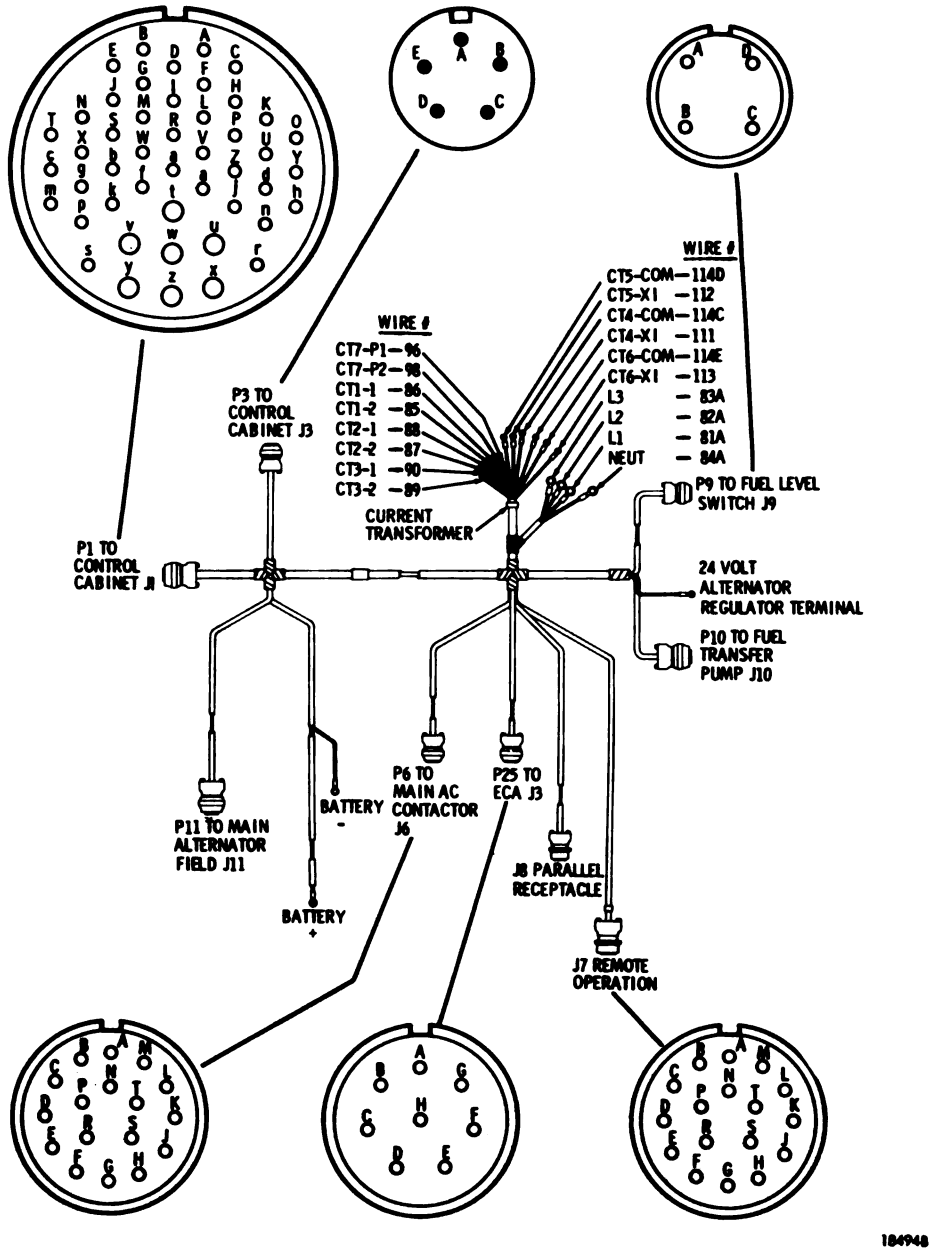
This procedure covers 1 cable and 1 harness. The cable connects the electronic control assembly J1 connector to control module J2 connector. The harness connects ECA control module to the following accessories:

Harness Assembly

Remote Operation - Set Disc
Parallel Receptacle - P Disc
Electronic Control Assy - J1
Main Contactor - AC Interrupt
Battery Cable - Battery -
Battery Cable - Battery +
Rear of Alternator - Generator Field
Back of Control Module - J1
Back of Control Module - J3
Current Transformer - CT
Fuel Level Switch - FLS
24 Volt Alternator - Alt AC
Fuel Transfer Pump - FTP

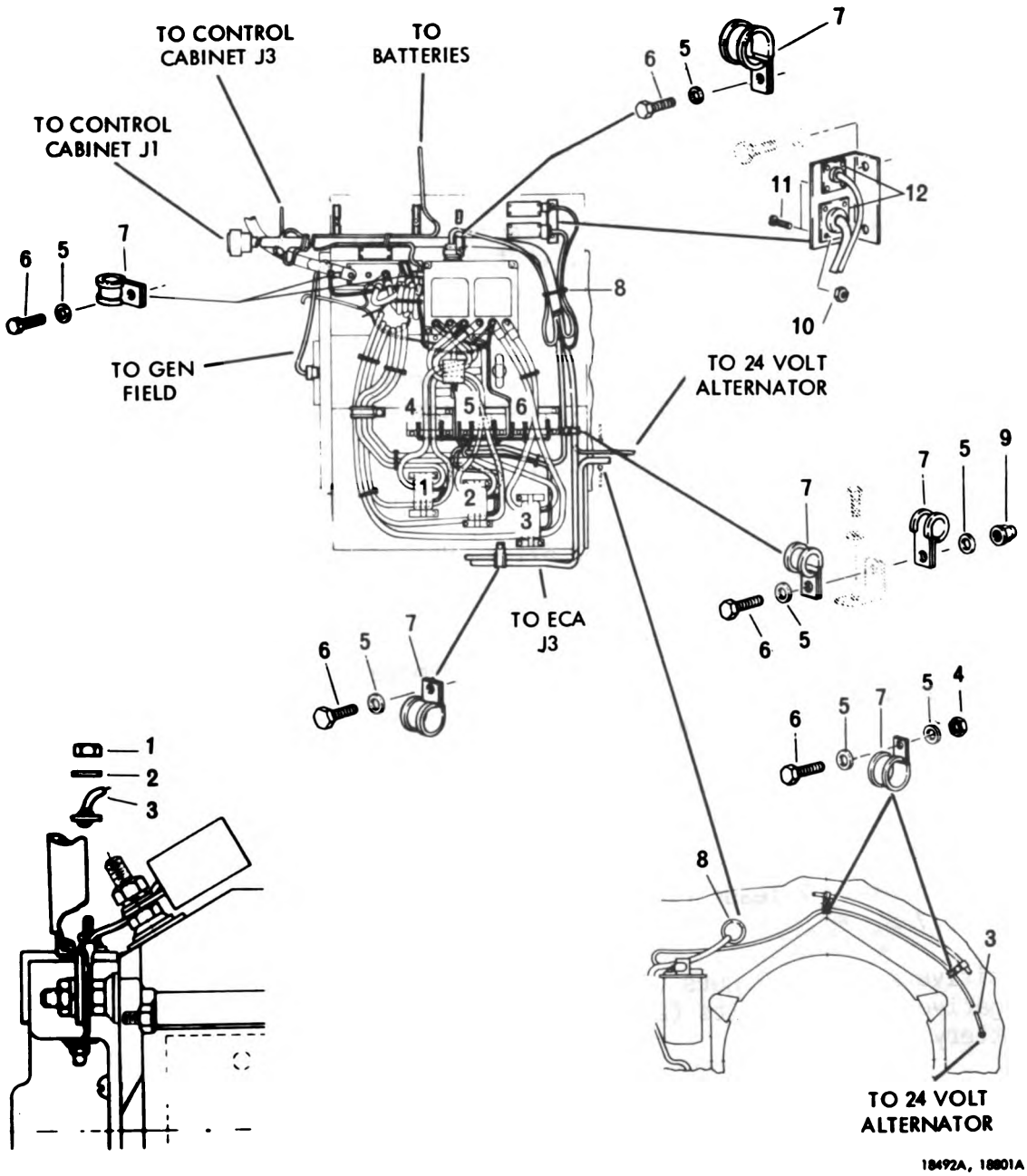
Cable Assembly

ECA - J1
Control Module - J2



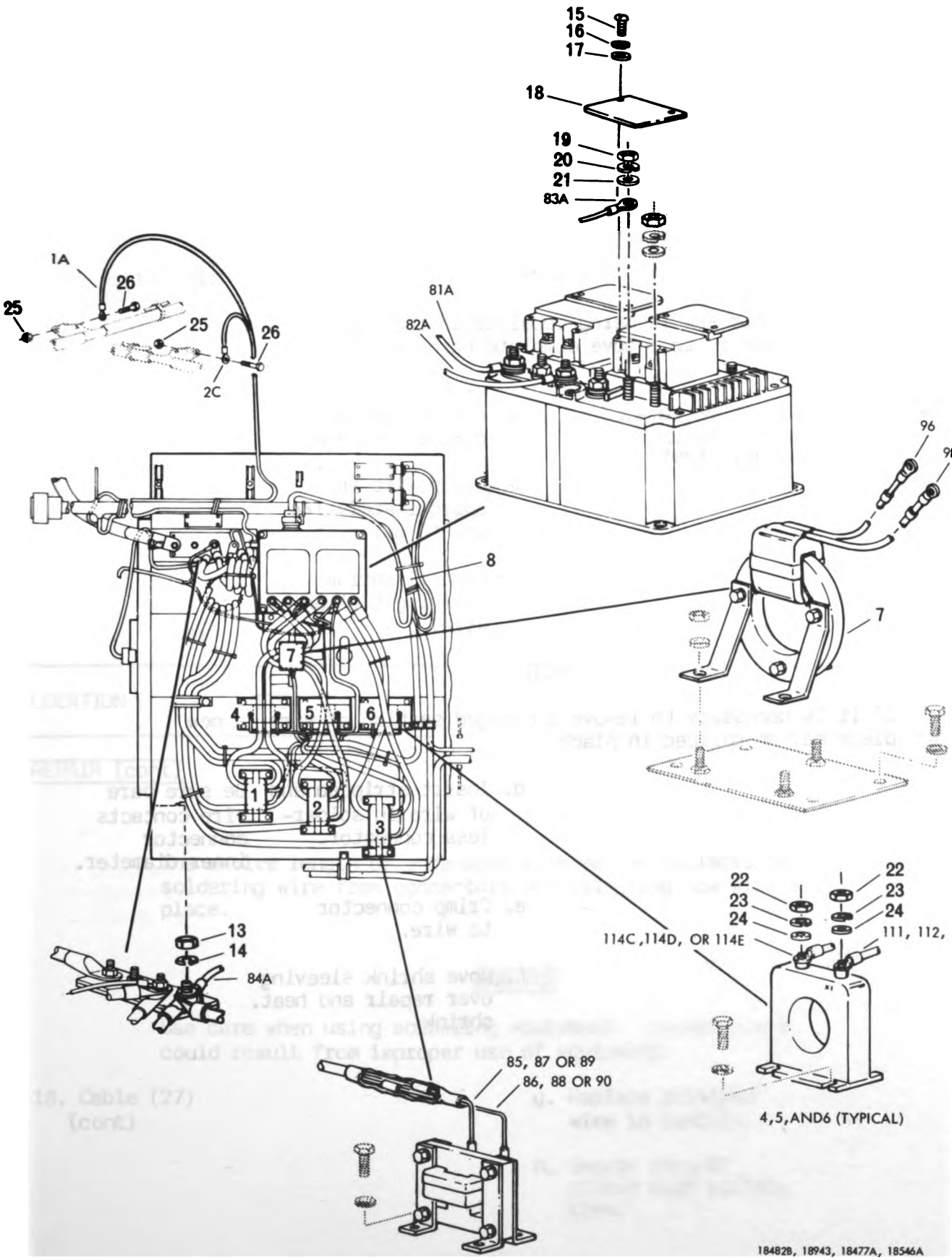
12-9. WIRING HARNESS (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
2. ECA	3 cable connectors at J1, J2, and J3 connectors	Disconnect, tag, and identify.	
3. Control module	3 cable connectors at J1, J2, and J3 connector	Disconnect, tag, and identify.	
4. Main contactor	Cable connector at J6 connector	Disconnect, tag, and identify.	
5. Main alternator	Cable connector at J11 connector	Disconnect, tag, and identify.	
6. Fuel tank	Cable connector at J9 connector	Disconnect, tag, and identify.	
7. Fuel transfer pump	Cable connector at J10 connector	Disconnect, tag, and identify.	
8. 24 volt alternator	a. Nut (1), washer (2), and lead (3)	Remove, tag, and identify lead.	
	b. 2 nuts (4), 4 washers (5), 2 bolts (6), and clamps (7)	Remove.	Mark clamp locations.
9. Center bulkhead	Harness (8)	Push harness through center bulkhead.	
10. Contactor and transformer support assy	a. Nut (9), 6 washers (5), 5 bolts (6), and clamps (7)	Remove.	Mark clamp locations.
	b. 8 nuts (10) and screws (11)	Remove.	
	c. 2 connectors (12)	Remove, tag, and identify.	



12-9. WIRING HARNESS (cont)

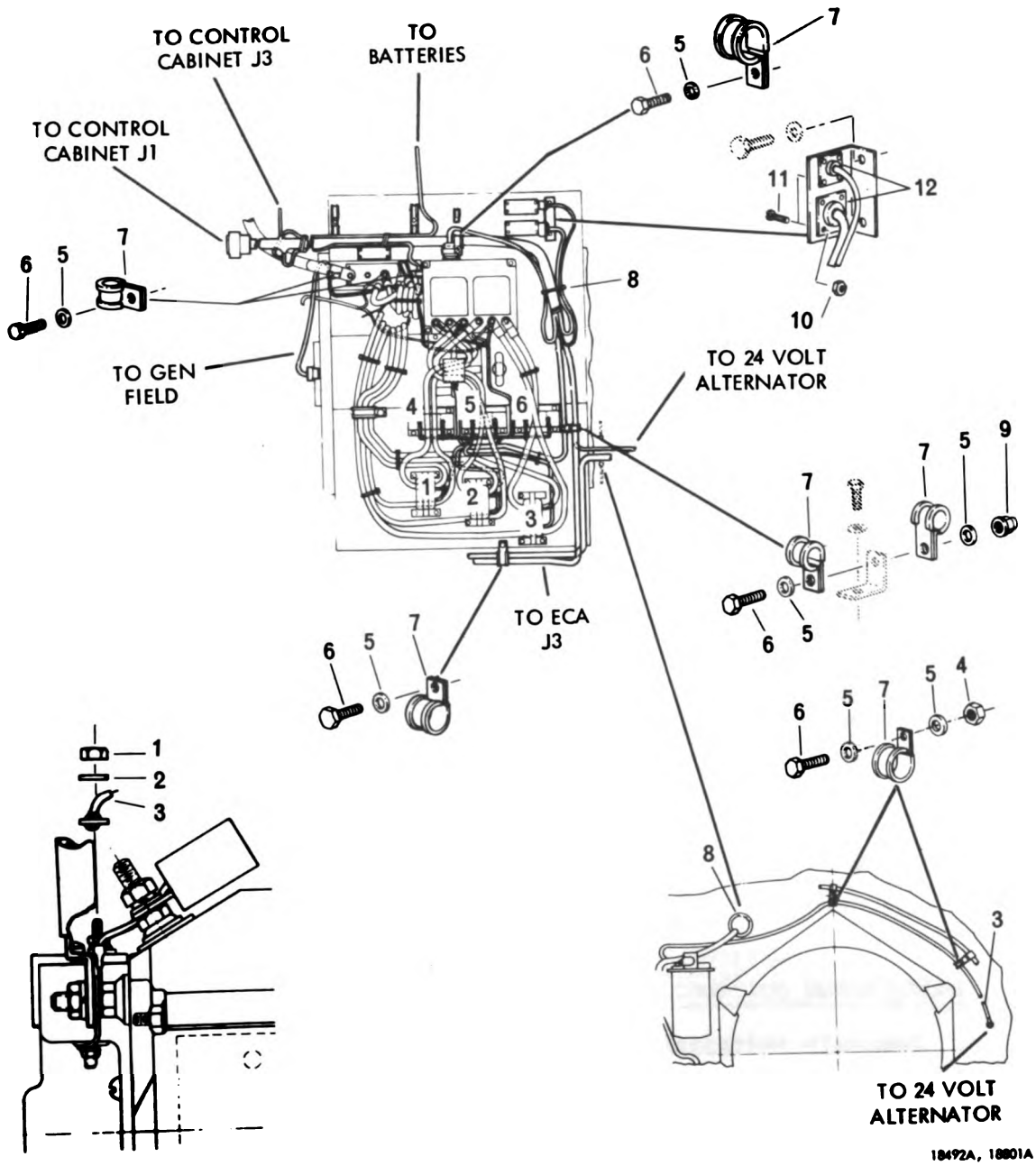
LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
24. Current transformers 1, 2, and 3	6 leads (85, 86, 87, 88, 89, and 90)	a. Strip wire end approximately 1/4 in. (6 mm).	
		b. Install shrink sleeving on wire.	
		c. Insert stripped end of wire in solderless connector.	Be sure bare wire contacts connector inner diameter.
		d. Crimp connector to wire.	
		e. Move shrink sleeving over repair and heat shrink.	
25. Main contactor	a. 3 leads (81A, 82A, and 83A)	Remove tags and install.	
	b. 3 flat washers (21), lock washers (20), and nuts (19)	Install and tighten.	
	c. 2 covers (18)	Position on contactor.	
	d. 4 flat washers (17), lock washers (16), and nuts (15)	Install and tighten.	Do not over tighten.
26. Bus bar	a. Lead (84A)	Remove tag and install.	
	b. Washer (14) and nut (13)	Install and tighten.	
27. Contactor and transformer support assembly	a. 2 connectors (12)	Remove tags and position in brackets.	



1, 2, AND 3 (TYPICAL)

12-9. WIRING HARNESS (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
27 Contactor and transformer support assembly (cont)	b. 8 screws (11) and nuts (10).	Install and tighten.	
	c. 6 clamps (7), 5 bolts (6), 6 washers (5), and nut (9)	Install and tighten.	
28. Center bulkhead	Harness (8)	Push through center bulkhead.	
29. 24 volt alternator	a. Lead (3) and 2 clamps (7)	Position on bulkhead as marked.	
	b. 2 bolts (6), washers (5), and nuts (4)	Install and tighten.	
	c. Lead (3)	Remove tag and install on alternator.	
	d. Washer (2) and nut (1)	Install and tighten.	
30. Fuel transfer pump	Cable connector P10	Remove tag and connect.	
31. Fuel tank	Cable connector P9	Remove tag and connect.	
32. Main alternator	Cable connector P11	Remove tag and connect.	
33. Main contactor	Cable connector P6	Remove tag and connect.	
34. Control module	3 cable connectors P1, P2, and P3	Remove tags and connect.	
35. ECA	3 cable connectors P25, P2, and P3.	Remove tags and connect.	



12-10. CHASSIS

This task covers:

a. Removal b. Test c. Repair d. Installation

INITIAL SETUP

Test Equipment

Multimeter

Tools

Thermal gun (appx C)
Tool Kit, Master Mechanics (5180-00-699-5273)
7/16 combination wrench
11/32 socket, 1/4 dr
5/16 socket, 1/4 dr
1/4 socket, 1/4 dr
1/4-dr straight handle
No. 1 cross tip screwdriver
1/2 combination wrench
11/16 combination wrench
Pocket knife
15/16 combination wrench
4-in flat-tip screwdriver
3/8-dr ratchet handle
5-in. extension
3/8 socket, 3/8 dr
7/16 socket, 3/8 dr
1/2 socket, 3/8 dr
Shop Equipment, Electrical Repair, Semi-Trailer Mounted (4940-00-294-9517)
Electronic tool kit

Materials/Parts

Tags (item 24, appx B)
Shrink sleeving

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
6	2	2-5
14	7	2-5
15	7	2-5
16	7	2-5
17	7	2-5
22	7	2-5
28	10	2-5
35	6	2-5
36	4	2-5
47	8	2-5
64	7	2-5
68	2	2-5
81	6	2-5

Equipment Condition

Para	Condition Description
4-21*	Batteries disarmed.

*TM 5-6115-598-12

12-10. CHASSIS (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1. Control cabinet	a. 3 connectors (1, 2, and 3)	Disconnect.	
	b. Outer door (4)	Unlatch and open.	
	c. Inner door (5)	Turn knobs to right and open.	
2. Chassis assembly (6)	a. Connector (7)	Disconnect.	
	b. 4 bolts (8), washers (9) and cover plate (10)	Remove.	
	c. 16 nuts (11) and screws (12)	Remove.	
	d. Connectors (13, 14, 15 and 16)	Remove.	
	e. Nut (17) and washer (18), 6 bolts (19) and washers (20)	Remove.	

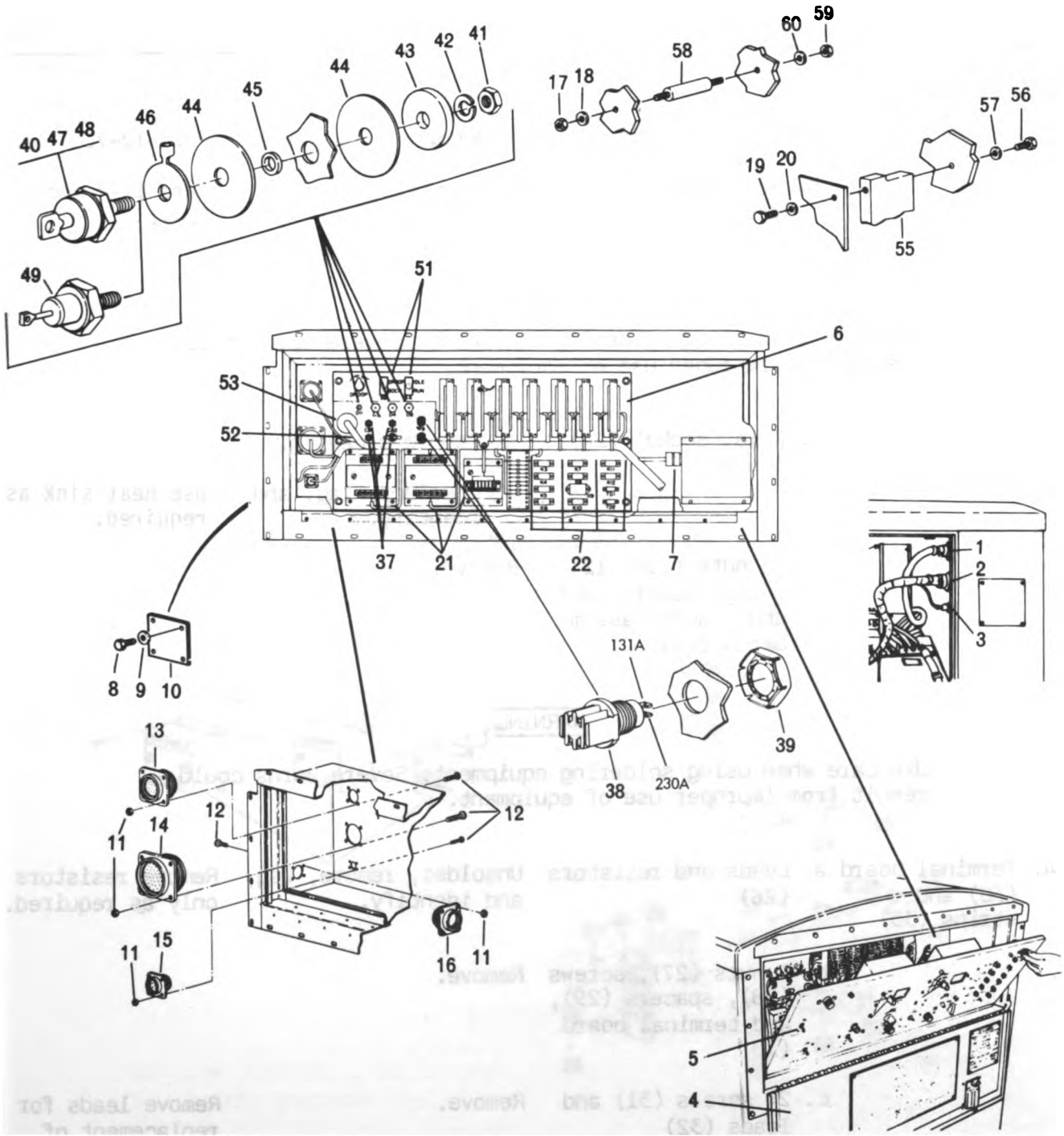
CAUTION

Handle chassis assembly with care to prevent damage to wiring or components.

	f. Chassis assembly (6)	Tilt forward.	To gain access to back of support.

NOTE

Leads need to be removed from individual components only as required for removal of chassis assembly.

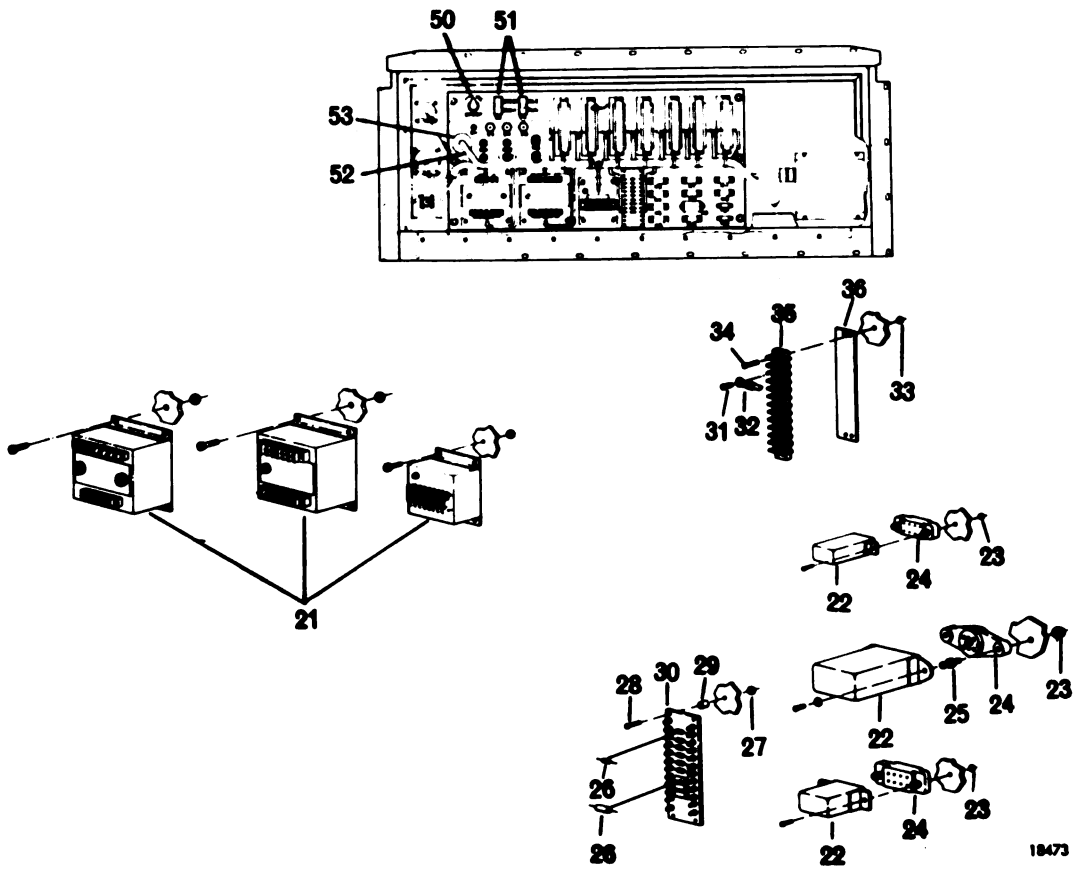


18473E, 18527, 18934, 18522A, 18481A

12-10. CHASSIS (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
3. Relays	a. 3 relays (21)	Remove.	Para 12-7.
	b. 12 engine and generator relays (22)	Remove.	Para 11-7 and 12-7.
		WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.	
	c. Relay socket (24) leads	a. Remove sleeving.	
		b. Unsolder, tag, and identify.	Use heat sink as required.
	d. 24 nuts (23), 12 relay sockets (24) and 2 screw assemblies (25)	Remove.	
		WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.	
4. Terminal board (30) and strips (35)	a. Leads and resistors (26)	Unsolder, remove, tag, and identify.	Remove resistors only as required.
	b. 4 nuts (27), screws (28), spacers (29), and terminal board (30)	Remove.	
	c. 24 screws (31) and leads (32)	Remove.	Remove leads for replacement of strips only as required.

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
4. Terminal board (30) and strips (35) (cont)	d. Nuts (33) and screws (34)	Remove.	
	e. 7 terminal strips (35) and marker strips (36)	Remove.	



12-10. CHASSIS (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
5. 4 circuit breakers (37)		Remove.	Para 12-6.
	WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.		
6. 2 resistors (R9 or R10) (38)	a. 2 leads (230A or 131A)	Remove sleeves, unsolder, tag and identify.	
	b. 2 nuts (39) and resistors (38)	Remove.	
	WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.		
7. Rectifier (D3) (40)	a. Leads (9C, 9P, and 10B)	Remove sleeves, unsolder, tag and identify.	Use heat sink as required.
	b. Nut (41), lock washer (42), flat washer (43), 2 mica washers (44), insulator (45), terminal (46), and rectifier (40)	Remove.	

LOCATION	ITEM	ACTION	REMARKS

REMOVAL (cont)

WARNING

Use care when using soldering equipment. Severe burns could result from improper use of equipment.

8. Rectifier (D4) (47)	a. Leads (9P and 32D)	Remove sleeves, unsolder, tag, and identify.	
	b. Nut (41), lock washer (42), flat washer (43), 2 mica washers (44), insulator (45), terminal (46), and rectifier (47)	Remove.	

WARNING

Use care when using soldering equipment. Severe burns could result from improper use of equipment.

9. Rectifier (D8) (48)	a. Leads (39F, 40A, 40B, and 40C)	Remove sleeves, unsolder, tag, and identify.	
	b. Nut (41), lock washer (42), flat washer (43), 2 mica washers (44), insulator (45), terminal (46), and rectifier (48)	Remove.	

WARNING

Use care when using soldering equipment. Severe burns could result from improper use of equipment.

10. Diode (D11) (49)	a. Leads (2AL, 10D, and 10E)	Remove sleeves, unsolder, tag, and identify.	

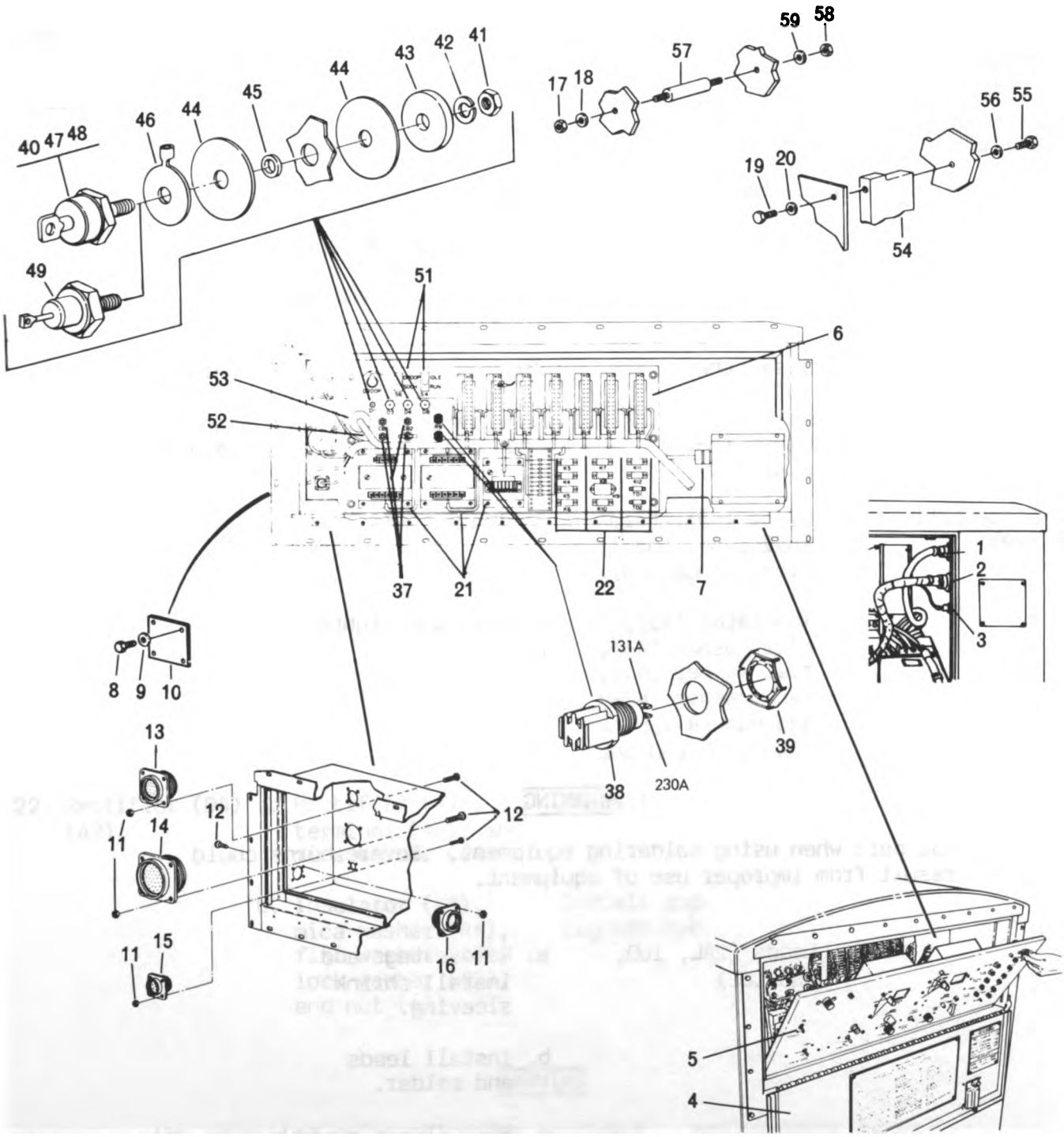
12-10. CHASSIS (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
10. Diode (D11) (49) (cont)	b. Nut (41), lock washer (42), flat washer (43), 2 mica washers (44), insulator (45), terminal (46), and diode (49)	Remove.	
11. Chassis (6)	a. Droop rheostat (50)	Remove.	Para 12-4.
	b. 2 switches (51)	Remove.	Para 12-5.
	c. Wiring (52)	Push through hole in chassis.	
	d. Grommet (53)	Remove.	
	e. Chassis (6)	Remove.	
12. 2 chassis supports (54)	a. 6 bolts (55) and washers (56)	Remove.	
	b. 2 supports (54)	Remove.	
13. Standoff (57)	a. Nut (58), washer (59)	Remove.	
	b. Standoff (57)	Remove.	
TEST			
	WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.		
14. 3 rectifiers (40, 47, 48) and diode (49)	a. Leads	Remove sleeves, unsolder, tag, and identify.	

LOCATION	ITEM	ACTION	REMARKS
TEST (cont)			
14. 3 rectifiers (40, 47, and 48) and diode (49) (cont)	b. Rectifiers (40, 47, and 48) and diode (49)	Check resistance as follows:	
		1. Stud to terminal.	Set multimeter RX1 scale. Reading should be 0-1 ohm.
		2. Reverse multimeter leads.	Reading should be infinity.
	c. Leads	a. Remove tags and install shrink sleeving.	
		b. Install leads and solder.	
		c. Move sleeving over soldered connection and heat shrink.	
		WARNING	
		Use care when using soldering equipment. Severe burns could result from improper use of equipment.	
15. 2 resistors (R9 or R10) (38)	a. Leads	Remove sleeves, unsolder, tag, and identify.	
	b. Resistors (38)	Check resistance as follows:	
		Stud to terminal.	Set multimeter RX10 scale. Reading should be 2250-2750 ohms.

12-10. CHASSIS (cont)

LOCATION	ITEM	ACTION	REMARKS
REMOVAL (cont)			
15. 2 resistors (R9 or R10) (38) (cont)	c. Leads	a. Remove tags and install shrink sleeving. b. Install leads and solder. c. Move sleeving over soldered connection and heat shrink.	
REPAIR			
		WARNING o Use care when using welding equipment. Do not watch welding process without proper eye protection as severe eye damage or blindness could result. Severe burns could result from improper use of equipment. o Ensure that suitable eye protection is worn when grinding. Metal particles created by grinding can cause severe eye damage.	
16. Chassis (6)		Hammer out dents, weld rips and tears, sand high spots, and paint as reqd.	
INSTALLATION			
17. Standoff (57)	a. Standoff	Install in cabinet.	
	b. Washer (59) and nut (58)	Install and tighten.	
18. 2 chassis supports (54)	a. Chassis supports	Position in cabinet.	
	b. 6 washers (56) and bolts (55)	Install and tighten.	



18473E, 18527, 18934, 18522A, 18481A

12-10. CHASSIS (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
19. Chassis (6)	a. Grommet (53)	Install.	
	b. Chassis (6)	Position in cabinet.	
	c. Wiring (52)	Push through hole in chassis.	
	d. 2 switches (51)	Install.	Para 12-5.
	e. Droop rheostat (50)	Install.	Para 12-4.
20. Diode (D11) (49)	a. Diode (49), terminal (46), and mica washer (44)	Install.	
	b. Insulator (45), mica washer (44), flat washer (43), lock washer (42), and nut (41)	Install and tighten nut.	

WARNING

Use care when using soldering equipment. Severe burns could result from improper use of equipment.

c. Leads (2AL, 10D, and 10E)	a. Remove tags and install shrink sleeving.	
	b. Install leads and solder.	
	c. Move sleeve over solder connection and heat shrink.	

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
21. Rectifier (D8) (48)	a. Rectifier (48), terminal (46), and mica washer (44)	Install.	
	b. Insulator (45), mica washer (44), flat washer (43), lock washer (42), and nut (41)	Install and tighten nut.	
	WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.		
	c. Leads (39F, 40A, 40B, and 40C)	a. Remove tags and install shrink sleeving. b. Install leads and solder. c. Move sleeve over solder connection and heat shrink.	
22. Rectifier (D4) (47)	a. Rectifier (47), terminal (46), and mica washer (44)	Install.	
	b. Insulator (45), mica washer (44), flat washer (43), lock washer (42), and nut (41)	Install and tighten nut.	
	WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.		

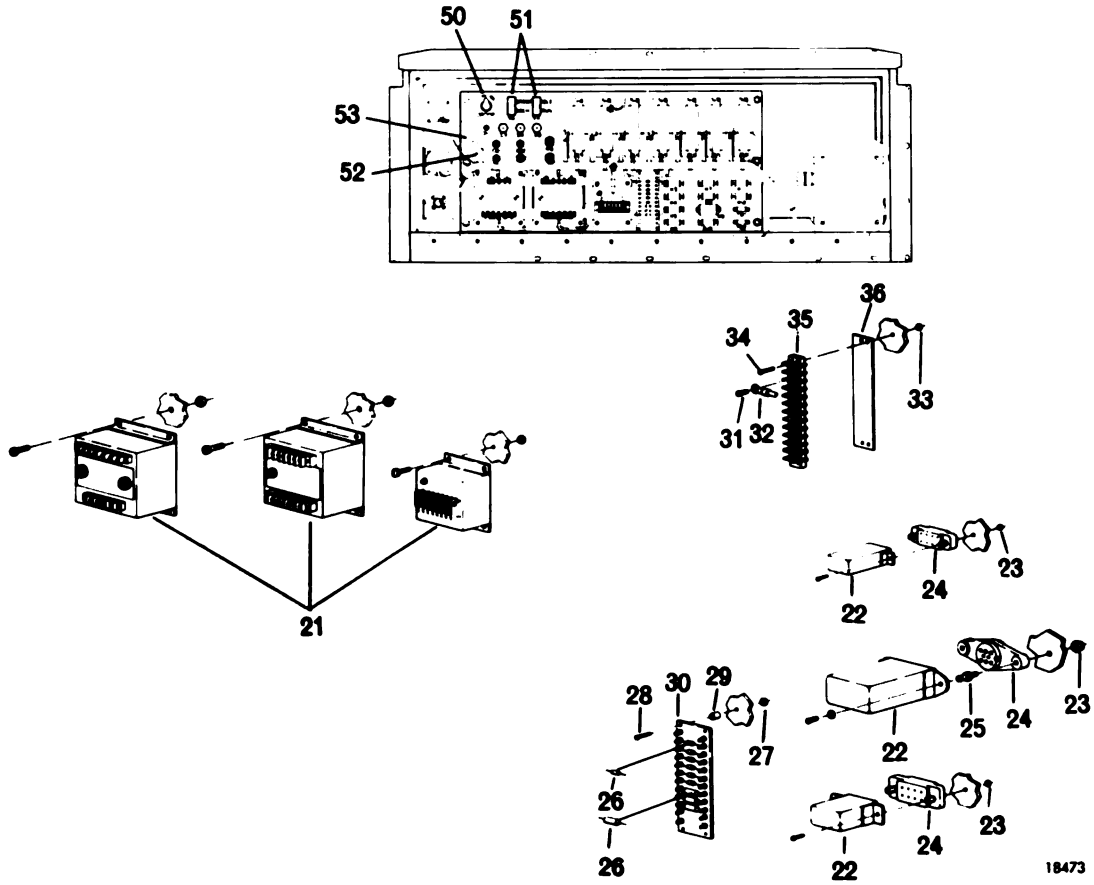
12-10. CHASSIS (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
22. Rectifier (D4) (47) (cont)	c. Leads (9P and 32D)	a. Remove tags and install shrink sleeving. b. Install leads and solder. c. Move sleeve over solder connection and heat shrink.	
23. Rectifier (D3) (40)	a. Rectifier (40), terminal (46), and mica washer (44)	Install.	
	b. Insulator (45), mica washer (44), flat washer (43), lock washer (42), and nut (41)	Install and tighten nut.	
	WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.		
	c. Leads (9C, 9P, and 10B)	a. Remove tags and install shrink sleeving. b. Install leads and solder. c. Move sleeve over solder connection and heat shrink.	
24. 2 resistors (R9 or R10) (38)	a. Resistor (38) and nut (39)	Install and tighten nut.	

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
24. 2 resistors (R9 or R10) (38) (cont)			
		WARNING	
	Use care when using soldering equipment. Severe burns could result from improper use of equipment.		
	b. Leads (230A or 131A)	a. Remove tags and install shrink sleeving.	
		b. Install leads and solder.	
		c. Move sleeve over solder connection and heat shrink.	
25. 4 circuit breakers (37)		Install.	Para 12-6.
26. Terminal board (30) and strips (35)	a. 7 marker strips (36) and terminal strips (35)	Position on chassis.	
	b. 14 screws (34) and nuts (33)	Install and tighten.	
	c. Leads (32) and screws (31)	Install and tighten screws.	
	d. 4 spacers (29), terminal board (30) 4 screws (28), and nuts (27)	Install and tighten nuts.	
		WARNING	
	Use care when using soldering equipment. Severe burns could result from improper use of equipment.		
	e. Leads and resistors (26)	Remove tags, install and solder.	Use heat sink as required.

12-10. CHASSIS (cont)

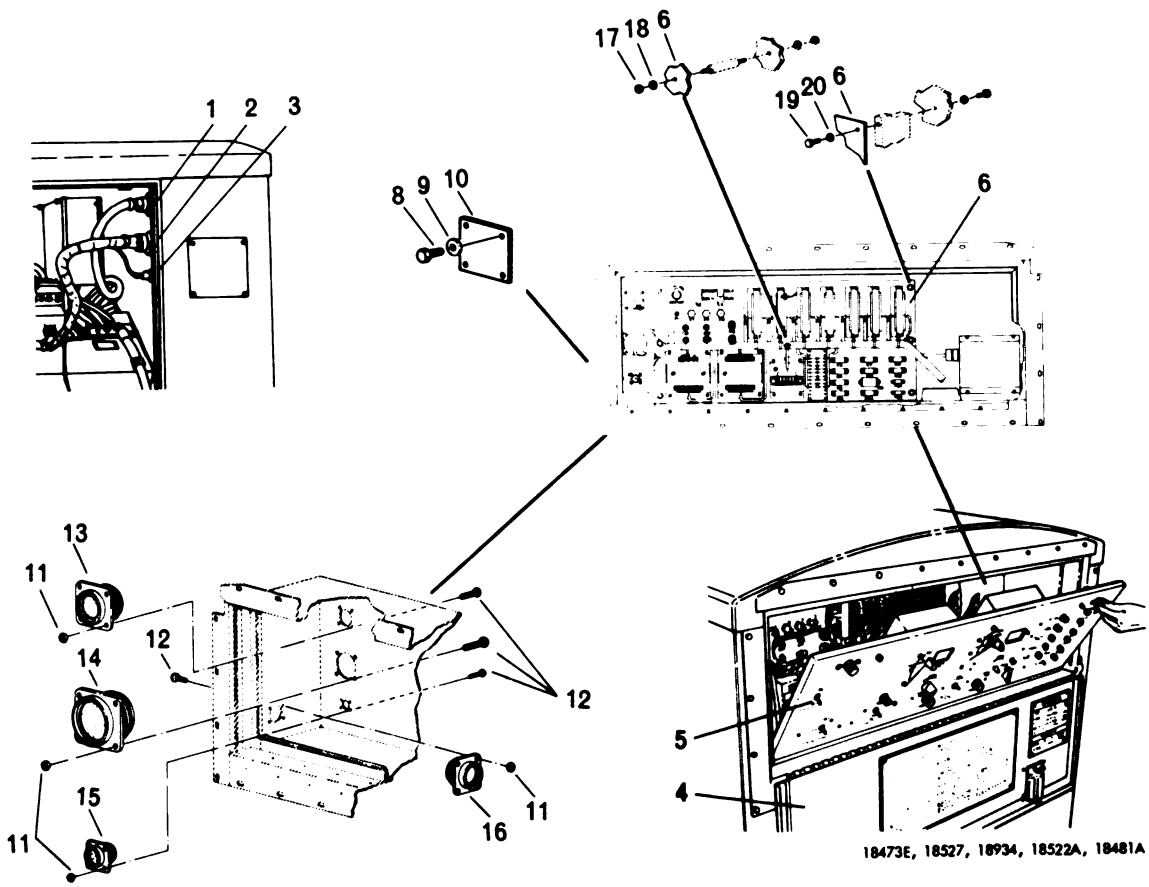
LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
27. Relays	a. 3 relays (21)	Install.	Para 12-7.
	b. 12 sockets (24), 2 screw assemblies (25) and 24 nuts (23)	Install and tighten.	
	WARNING Use care when using soldering equipment. Severe burns could result from improper use of equipment.		
	c. Socket (24) leads	a. Remove tags and install shrink sleeving.	
		b. Install leads and solder.	Use heat sink as required.
		c. Move sleeving over soldered connection and heat shrink.	
	d. 12 relays (22)	Install.	Para 11-7 and 12-7.
	CAUTION Handle chassis assembly with care to prevent damage to wiring or components.		
28. Chassis assembly (6)	a. Chassis assembly (6)	Install in cabinet.	
	b. 6 washers (20) and bolts (19)	Install and tighten.	
	c. Washer (18) and nut (17)	Install and tighten.	



LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
28. Chassis assembly (6) (cont)	d. Connectors (13, 14, 15, and 16)	Install.	
	e. 16 screws (12) and nuts (11)	Install and tighten.	

12-10. CHASSIS (cont)

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION (cont)			
28. Chassis assembly (6) (cont)	f. Cover plate (10), 4 washers (9), and bolts (8)	Install and tighten.	
29. Control cabinet	a. Inner door (5)	Close and turn knobs to left to lock.	
	b. Outer door (4)	Close and latch.	
	c. 3 connectors (1, 2, and 3)	Connect.	



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12-11. PHASE PARALLELING SWITCH

This task covers:

a. Removal b. Inspection c. Installation

INITIAL SETUP

Tools

Tool kit, Master Mechanics (5180-00-699-5273)
11/32 socket, 1/4 dr
1/4-dr straight handle

Personnel Required

Turbine Engine Driven Generator Repairer MOS 52F

Troubleshooting References

Item	Step	Table
70	7	2-5
82	3	2-5

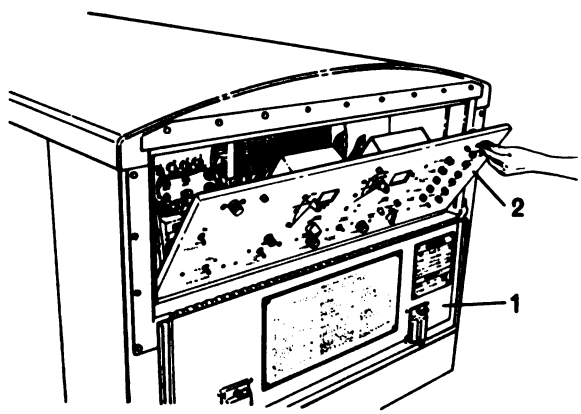
Equipment Condition

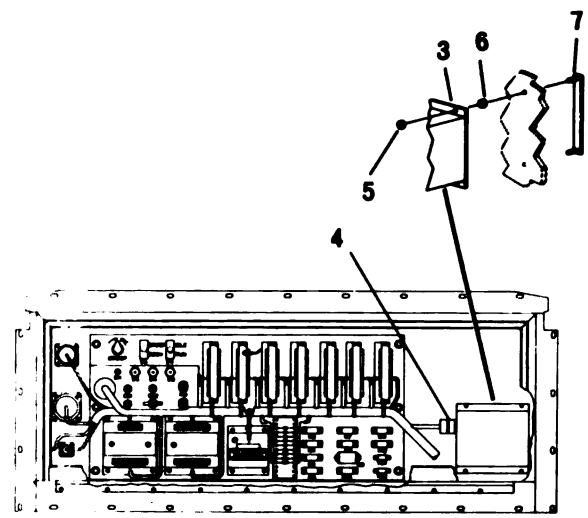
Para	Condition Description
4-21*	Batteries disarmed.

*TM 5-6115-598-34

LOCATION	ITEM	ACTION	REMARKS
REMOVAL			
1.	Control cabinet outer door (1)	Unlatch and open.	
2.	Inner door (2)	Turn knobs to right and open.	
3. Phase switch (3)	a. Connector (4)	Disconnect.	
	b. 4 nuts (5) and switch (3)	Remove.	
	c. 4 nuts (6) and 2 plate assemblies (7)	Remove.	
INSPECTION			
4. Phase switch (3)		Inspect for loose, damaged, or missing parts.	Replace as reqd.

LOCATION	ITEM	ACTION	REMARKS
INSTALLATION			
5. Phase switch (3)	a. 2 plate assemblies (7) and nuts (6)	Install and tighten nuts.	
	b. Switch (3) and 4 nuts (5)	Install and tighten nuts.	
	c. Connector (4)	Connector.	
6. Inner door (2)		Close and turn knobs to left to lock.	
7. Control cabinet outer door (1)		Close and latch.	





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CHAPTER 13
GENERATOR SET INSPECTION AND TEST AFTER REPAIR OR OVERHAUL

13-1. GENERAL REQUIREMENTS

a. The activity performing the repair is responsible for the performance of all applicable tests and inspections specified herein. Activities performing maintenance on any portion of the generator set must perform those tests and inspections required by the applicable component or system repair instruction.

b. Operational test will consist of operating the generator set and inspecting for abnormal conditions during start, running and shutdown. No special test equipment is required.

c. Three types of operational test are outlined as follows:

(1) Operational test after repair or installation of replacement engine, 150 kW alternator, fuel metering valve, and/or clutch valve.

(2) Operational test after replacement of regenerator inner (hot) seal and/or disc.

(3) Operational test after repair or replacement of any fuel or oil system line or component.

d. Check the log book for the reason for the repair. Give particular attention to the item(s) during operational test.

e. Recording of individual engine or generator parameters during operational test is not required. The type of test and corrective action, if required, should be noted in the log book.

13-2. INSPECTION

When a new, repaired or overhauled generator set is received by the using organization, an inspection for the following conditions will be made:

a. Damage during shipping as a result of mishandling. Examine all enclosure panels and mounting base for dents, tears or punctures.

b. Check that all doors or panels open and close freely.

c. Check fuel and oil lines for loose connections, improper routing, missing clamping, and/or damaged or missing components.

d. Check electrical lines for loose connections, damaged insulation, incorrect routing, missing clamps, and/or damaged or missing components.

13-3. OPERATIONAL TEST AFTER INSTALLATION OR REPAIR OF THE ENGINE, 150 KW ALTERNATOR, FUEL METERING VALVE, AND/OR CLUTCH VALVE

a. Repairs involving any of the following components require an operational test.

Engine
Alternator, 150 kW
Fuel metering valve
Clutch valve

b. Check for the following conditions during all operational testing:

CAUTION

Shut down set and repair as required if any of the following faults are detected. Failure to shut down may cause damage to the equipment.

(1) Oil, fuel, and/or hot air leaks.

(2) Excessive vibration and/or noise during start, run and coastdown conditions.

(3) Odor of burnt insulation.

(4) Note any fault indicator lamps on.

c. Start engine and run at idle as follows:

WARNING

High voltage passes through some components on the chassis support. The MASTER switch (1) on the inner door must be placed in OFF position before changing position of IDLE RUN switch (2).

(1) Complete prestart procedures (para 2-2, TM 5-6115-598-12).

(2) Be sure MASTER switch (1) is OFF and open inner door.

(3) Raise cover and place IDLE RUN switch (2) to IDLE and close and lock inner door.

(4) Start engine (para 2-3, TM 5-6115-598-12).

(5) Run at idle for 1 minute.

(6) Shut down engine (para 2-7, TM 5-6115-598-12).

d. Run engine at 100% with no load on generator as follows:

(1) Be sure MASTER switch (1) is OFF and open inner door.

(2) Place IDLE RUN switch (2) to RUN and close and lock inner door.

(3) Start engine (para 2-3, TM 5-6115-598-12).

(4) Run engine for 10 minutes.

(5) Shut down engine (para 2-7, TM 5-6115-598-12).

e. Run engine at 100% with load on generator as follows:

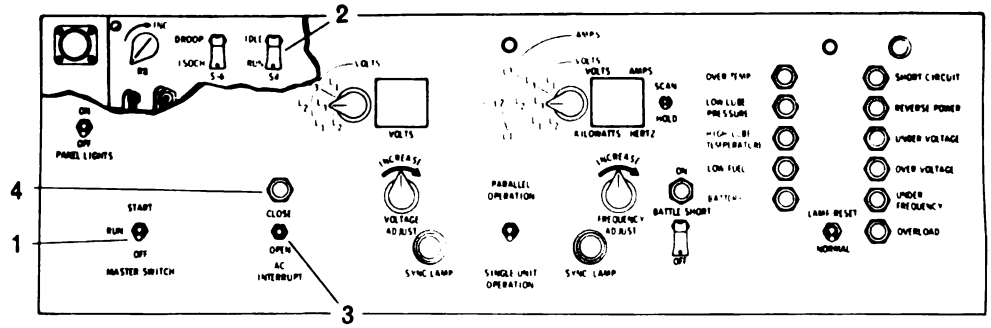
(1) Connect generator to the available load (150 kW maximum).

(2) Start the engine (para 2-3, TM 5-6115-598-12).

(3) Run engine for 5 minutes with no load on generator.

(4) Load generator by placing AC INTERRUPT switch (3) momentarily to the CLOSE position. When AC INTERRUPT lamp (4) comes on, release switch (3) to neutral position.

13-3. OPERATIONAL TEST AFTER INSTALLATION OR REPAIR OF THE ENGINE, 150 KW ALTERNATOR, FUEL METERING VALVE, AND/OR CLUTCH VALVE (cont)



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(5) Run generator in this loaded condition for 10 minutes.

(6) Disconnect load for 3 minutes by placing AC INTERRUPT switch (3) momentarily to the OPEN position. When the AC INTERRUPT lamp (4) goes off, release switch (3) to neutral position.

(7) Repeat steps (4) and (5).

(8) Disconnect generator load by placing AC INTERRUPT switch (3) momentarily to the OPEN position. When the AC INTERRUPT lamp (4) goes off, release switch (3) to neutral position.

(9) Shut down the engine (para 2-7, TM 5-6115-598-12).

(10) Disconnect the available load from the generator.

13-4. OPERATIONAL TEST AFTER REPLACEMENT OF REGENERATOR INNER (HOT) SEAL AND/OR REGENERATOR DISC

Check for conditions during testing per para 13-3, step b.

WARNING

High voltage passes through some components on the chassis support. The MASTER switch (1) on the inner door must be placed in OFF position before changing position of IDLE RUN switch (2).

(1) Be sure MASTER switch (1) is OFF.

(2) Raise cover and place IDLE RUN switch (2) to IDLE position and close and lock inner door.

(3) Start engine (para 2-3, TM 5-6115-598-12).

(4) Run generator at idle for 5 minutes.

(5) Shut down the engine (para 2-7, TM 5-6115-598-12).

(6) Start engine (para 2-3, TM 5-6115-598-12).

(7) Run at idle for 1 hour.

(8) Shut down the engine (para 2-7, TM 5-6115-598-12).

(9) Open inner door.

(10) Place IDLE RUN switch (2) in RUN position.

(11) Close and lock inner door.

(12) Connect generator to the available load (150 kW maximum).

(13) Start engine (para 2-3, TM 5-6115-598-12).

(14) Load generator by placing AC INTERRUPT switch (3) momentarily to the CLOSE position. When AC INTERRUPT lamp (4) comes on, release switch (3) to neutral position.

(15) Run generator for 40 minutes.

(16) Disconnect generator load by placing AC INTERRUPT switch (3) momentarily to the OPEN position. When AC INTERRUPT lamp (4) goes off, release switch (3) to neutral position.

(17) Shut down the engine (para 2-7, TM 5-6115-598-12).

(18) Disconnect the available load from the generator.

13-5. OPERATIONAL TEST AFTER ANY REPAIR OR REPLACEMENT OF ANY FUEL OR OIL SYSTEM LINE OR COMPONENT

Check for conditions during testing per para 13-3, step b.

(1) Start engine (para 2-3, TM 5-6115-598-12).

(2) Run generator for 10 minutes.

(3) Shut down the engine (para 2-7, TM 5-6115-598-12).

APPENDIX A

REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, and technical manuals referenced in this manual.

A-2. FORMS

Equipment Improvement Recommendations (EIR). . . . . DD Form 368
Equipment Inspection and Maintenance Work Sheet. . . . . .DA Form 2404
Recommended Changes to Equipment Technical Manuals . . . . . .DA Form 2028-2
Recommended Changes to Publications and Blank Forms. . . . . .DA Form 2028

A-3. FIELD MANUALS

First Aid for Soldiers. . . . . .FM 21-11

A-4. TECHNICAL MANUALS

Direct Support Maintenance Manual, Including Repair Parts and Special Tools List . . . . . .TM 5-6115-607-30&P
Operator Crew and Organizational Maintenance Manual. . . . . .TM 5-6115-598-12
Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tool List . . . . . TM 5-6115-598-24P
Preservation of USAMECOM Mechanical Equipment for Shipment and Storage. . . . . TM 740-97-2
The Army Maintenance Management System . . . . . .DA PAM 738-750
Lubrication Order. . . . . .LO 5-6115-598-12

A-5. SPECIFICATIONS

Gaseous Products Pressure Equalizing Valve. MIL-V-27166

APPENDIX B

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

B-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the Electric Generator Set. These items are authorized to you by CTA 50-970, Expendable Items (except Medical, Class V, Repair Parts, and Heraldic Items).

B-2. EXPLANATION OF COLUMNS

a. Column 1 - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use adhesive, item 1, Appendix B").

b. Column 2 - Category. This column identifies the lowest category of maintenance that requires the listed item.

F - Direct Support Maintenance
H - General Support Maintenance

c. Column 3 - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column 4 - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. Column 5 - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

ITEM NUMBER	CATEGORY	NATIONAL STOCK NUMBER	DESCRIPTION	U/M
1	F	8040-00-656-0929	Adhesive, Acoustical Foam	gl
2	F		Anti-seize	
3	F	6810-00-264-6618	Baking Soda	gl
4	F		Bucket (approx 5-gallon (19 liter) capacity)	ea
5	F		Brush, Paint	ea
6	F		Compound, Coating	lb
7	F		Compound, Pipe Joint	lb
8	F		Face Shield, Industrial	ea
9	F		Gas, Argon	cyl
10	F		Gloves, Welders	pr
11	F		Gloves, Work	pr
12	F		Locktite Pipe Sealant (with Teflon) (Locktite 59231) PS/T (05972)	pt
13	F		Lubricant, Petrolatum	pt
14	F		Oil, Engine, MIL-L-23699	gl
15	F	8030-01-136-5601	Oil, Engine, MIL-L-7808	gl
16	F		Paint, Green CARC (383)	gl
17	F	7920-00-205-1711	Rags, Wiping, Cotton and Cotton Synthetic	lb
18	F		RTV Silicone Compound	oz
19	F		Sandpaper, Non Metallic	sh
20	F	3439-00-243-1882	Solder, Lead Alloy	lb
21	F	3439-00-273-2536	Solder, Tin Alloy	lb

ITEM NUMBER	CATEGORY	NATIONAL STOCK NUMBER	DESCRIPTION	U/M
22	F		Solvent, Cleaning	gl
23	F		Sponge, Silicone Rubber (AMS 3195)	ea
24	F		Tags	ea
25	F	5970-00-222-6383	Tape, Insulation, Electrical (1-inch)	ro
26	F		Tape, Masking (3-inch)	ro
27	F		Water, Distilled	gl
28	F	5120-00-305-2306	Wire, Safety	ft
29	F		Grease, MIL-G-23827 (or equivalent)	lb
30	F		Oil, MIL-L-21260, grade 30 (or equivalent)	lb
31	F		Paint, Epoxy Enamel, Air Dry -Westinghouse Industrial, B-6-665 Red	qt
32	F		Grease, MIL-G-81322	lb
33	F	6850-00-218-1485	Solvent, Dry Cleaning (Fed Spec P-D-680)	qt
34	F		Sealant, Non Hardening (MIL-S-45180C Type 2) -Permatex Industrial, No. 2	oz
35	F		Cleaner, Plastic (Fed Spec P-P560 Type 1)	pt
36	F		Tape, Glass Cloth, Acrylic, Non Thermo setting -3M Corp. No. 79	ro
37	F		Tape, Adhesive, Polyester Film -3M Corp. No. 74	ro
38	F		Adhesive (MIL-S-22473) -Loctite Corp - Grade "A"	oz
39	F		Compound, MIL-C-16173, Grade 1	lb
40	F		Oil, Preservative MIL-L-6081, Grade 1010	gl

ITEM NUMBER	CATEGORY	NATIONAL STOCK NUMBER	DESCRIPTION	U/M
41	F		Preservative MIL-C-16173	lb
42	F		Preservative MIL-C-11796	lb
43	F		Paint, Olive Drab TT-E-529	gl
44	F		Paint, White Enamel MIL-L-5556	gl
45	F		Primer, Red Oxide TT-P-664	gl
46	F		Desicant MIL-D-3464	bg

APPENDIX C
ADDITIONAL AUTHORIZATION LIST (AAL)
Section I. INTRODUCTION

C-1. SCOPE

This appendix lists additional items you are authorized for the support of the 150 kW generator set.

C-2. GENERAL

This list identifies items that do not have to accompany the 150 kW generator set and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

C-3. EXPLANATION OF LISTING

National stock numbers and descriptions are provided, where available, to help you identify and request the additional items you require to support this equipment.

Section II. ADDITIONAL AUTHORIZATION LIST

NATIONAL STOCK NUMBER	PART NUMBER & FSCM	DESCRIPTION	U/M	QTY AUTH
	TD 428L	Installation Tool, Insert	ea	1
	THD 121OL	Installation Tool, Insert	ea	1
5120-00-287-4150		Socket, 10mm	ea	1
		Wrench, Combination, 10mm	ea	1
5120-00-305-2306		Pliers, Wire Twist	ea	1
6625-01-139-2512	AN/PSM-45	Multimeter, Digital	ea	1
7920-00-900-3577		Brush, Stainless Steel	ea	1

NATIONAL STOCK NUMBER	PART NUMBER & FSCM	DESCRIPTION	U/M	QTY AUTH
5120-00-263-4137	SWM131	Socket, 13 mm	ea	1
5120-00-017-2849		Riveter, Blind Hand	ea	1
		Wrench, Combination, 13 mm	ea	1
5120-00-278-9926		Mirror, Inspection, Ret	ea	1
5120-00-240-1428	SWM191	Socket, 19 mm	ea	1
5120-00-144-5207		Adapter, Socket	ea	1
5120-00-293-1284		Crowsfoot Attachment, Socket Wrench	ea	1
		Wrench, 1 5/8 Open End	ea	1
5120-00-263-4143		Socket, 17 mm	ea	1
5120-00-247-2536		Wrench, Torque, 0-300 in. lb	ea	1
5120-00-077-2106		Wrench, Combination, 17 mm	ea	1
4940-00-561-1002		Gun, Thermal	ea	1
8415-00-634-5023		Apron, Laboratory Rubber	ea	1
8415-00-171-5641		Gloves, Rubber	pr	1
5120-00-221-2091		Caliper, Slide 5 in.	ea	1
		Wrench Set, Bristol	ea	1
		Bar, Gaging, 24 in.	ea	1
5120-00-263-4146		Socket, 29 mm	ea	1
5120-00-288-9997		Wrench, Open and Box 1/4 in.	ea	1
5120-00-293-0463		Crimping Tool, Terminal Hand	ea	1
		Gage, Pressure, 0-300 PSI	ea	1
5120-01-024-6144	FM-17(55719)	Socket, 17mm, 0.375in. square drive	ea	1
5120-00-554-7292		Wrench, Torque, 5-75 lb. ft.	ea	1
5120-00-224-4141	41H760(80372)	Hammer, Hand, Striking, 4 lb.	ea	1

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INDEX (cont)

INDEX (cont)

INDEX (cont)

INDEX (cont)

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

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To be distributed in accordance with DA Form 12-25D, Direct and General Support Maintenance requirements for Generator Sets, Engine Driven, 150 KW 400 HZ Precise Power.

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RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 5-6115-598-34	18 Oct 82	Generator Set, Gas Turbine Engine Driven, 150 KW, Model D424A

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:

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

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4300 GOODFELLOW BOULEVARD
ST. LOUIS, MO 63120

UX 002 217 648

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 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 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 milliliters = .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