TM 5-4310-247-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORGANIZATIONAL, DS, GS,

AND DEPOT MAINTENANCE MANUAL

COMPRESSOR, ROTARY,

DIESEL ENGINE DRIVEN, AIR,

TRAILER MOUNTED, 250 CFM, 100 PSI

(JOY MODEL RPV 250 DC20MS1)

FSN 4310-952-7142

This reprint includes all changes in effect at the time of publication; changes 1 through 3.

HEADQUARTERS, DEPARTMENT OF THE ARMY

APRIL 1965

SAFETY PRECAUTIONS

BEFORE OPERATION

Do not use a lifting device with a capacity of less than 10,000 pounds. Do not allow the compressor to swing back and forth when it is suspended in the air.

When servicing batteries, avoid contact with electrolyte as it contains sulfuric acid which can cause severe burns. Should the electrolyte come in contact with the body or clothing, rinse immediately with clean water.

Do not smoke or use an open flame in the vicinity when servicing batteries. Batteries generate hydrogen, a highly explosive gas.

The ether primer tank contains Ethyl Ether which is under pressure and extremely flammable. Keep the tank away from heat, sparks and open flames. Do not puncture or incinerate the tank. DO NOT STORE the tank at a temperature above 200° F. Avoid contact with skin. Avoid breathing of vapor.

When handling fuel, do not smoke. Always provide a metal-to-metal contact between container and tank. This will prevent a spark from being generated as fuel flows over the metallic surfaces.

Do not play with compressed air. Pressurized air can cause serious injuries to personnel.

Always be sure the trailer brakes are locked when the trailer is disconnected from the towing vehicle.

When connecting the trailer to the towing vehicle be sure the lunette is properly connected to the pintle and securely locked in position. Connect the safety chains to the towing vehicle. This precaution must be taken to prevent the trailer from becoming detached should the pintle or lunette fail.

Be sure that the intervehicular cable from the lights and the intervehicular air hose for the trailer brakes are properly connected when the trailer is to be towed. Inspect to see if all lights are operating properly.

Keep a fully charged fire extinguisher, in good working order, mounted in the bracket and ready for quick use.

When disconnecting the trailer from the towing vehicle always be sure that the trailer hand brakes are set and that the casters are lowered and locked in position before the towing vehicle is moved from the trailer.

DURING OPERATION

Do not remove any guards, shields, or screens while the compressor is in operation.

Do not operate the compressor in an enclosed area unless the exhaust gases are piped to the outside. Inhalation of exhaust fumes will result in serious illness or death.

Do not perform maintenance services when the compressor is in operation.

Do not lubricate or adjust any assembly or part while the compressor is in operation.

Do not leave tools or other objects on the engine or compressor.

Do not fill fuel tank while the engine is in operation.

AFTER OPERATION

Do not touch the muffler or engine with bare hands. Severe burns could result from carelessness while servicing a hot engine.

When testing nozzle holder assembly, keep hands away from fuel spray at all times. The spray has a high velocity which can puncture the skin and cause blood poisoning.

Before disassembly of the eqiupment, release all pressure in the tank and compressor.

CHANGE

NO. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D. C., *31 October 1991*

ORGANIZATIONAL, DS, GS, AND DEPOT MAINTENANCE MANUAL COMPRESSOR, ROTARY, DIESEL ENGINE DRIVEN, AIR, TRAILER MOUNTED, 250 CFM, 100 PSI (JOY MODEL RPV 250 DC20MS1) FSN 4310-952-7142

TM 5-4310-247-15, 5 April 1965 is changed as follows:

1. Remove old pages and insert new pages as indicated below.

2. New or changed material is indicated by a vertical bar in the margin of the page.

3. Add the following WARNING to the inside front cover of the manual:

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

Remove Pages	*Insert Pages*
11 and 12	11 and 12
17 thru 22	17 thru 22
29 and 30	29 and 30
41 and 42	41 and 42
43 and 44	43 and 44

4. File this change sheet in front of the publication for reference purposes.

Approved for public release; distribution is unlimited.

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
00053

Distribution:
To be distributed in accordance with DA Form 12-25-EE(Block 0469) Unit, Direct Support, General Support and Depot maintenance requirements for TM5-4310-247-15.

CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *31 January 1967*

Organizational, DS, GS, And Depot Maintenance Manual

COMPRESSOR, ROTARY, DIESEL ENGINE DRIVEN, AIR, TRAILER MOUNTED, 250 CFM, 100 PSI (JOY MODEL RPV 250 DC20MS1) FSN 4310-952-7142

TM 5-4310-247-15, 5 April 1965, is changed as follows:

Page 2. Paragraph 1*c* is superseded as follows:

c. DA Form 2028 (Recommended Changes to DA Publications) will be used for reporting discrepancies and recommendations for improving this equipment publication. This form will be completed by the individual using the manual and forwarded direct to Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMSME-MPD, 4300 Goodfellow Blvd., St. Louis, Mo. 63120.

Page 10. Paragraph 16*b*(3). "Approximately half way" is added after "Valve".

Paragraph 16*b*(4). "Lower" is added after "push" and "twice" is added after "button".

Paragraph 16*b*(6). "The start button" is changed to "both start buttons".

Page 103. In line 21, "Valve, safety relief" is changed to "Valve, oil control".

In line 46, "Valves, service and discharge" is changed to "Valves, service, discharge, and safety relief".

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:
USASA (2)
ACSI (1)
DCSLOG (1)
CNGB (1)
TSG (1)
CofEngrs (3)
CC-E (1)
Dir of Trans (1)
CofSptS (1)
USAMB (1)
USAARTYBD (2)
USAARMBD (2)
USAIB (2)
USAADBD (2)
USAAESWBD (2)
USAAVNBD (2)
USCONARC (3)
OS Maj Comd (5) except
USARJ (2)
USASETAF (2)
USAMC (1)
MDW (1)
Armies (2)
Corps (2)
Div (2)
Engr Bde (1)
Svc Colleges (2)
Br Svc Sch (2)
USACDCEC (10)
USMA (2)
Gen Dep (10)
Engr Dep (10)
A Dep (2) except
TOAD (3)
USA Tml Comd (2)
Army Tml (1)
Div Engr (2)
Dist Engr (2)
USAERDL (3)
USAMEC (46)
Engr Cen (5)
USAREUR Engr Proc Cen (2)
USAREUR Engr Sup Con Agcy (10)
Engr FLDMS (2)
Ft Knox FLDMS (10)
Fld Comd, DASA (8)
AMS (3)
USAREURCOMZ (2)
USAC (1)
MAAG (1)
JBUSMC (1)
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11-25	39-61
11-27	55-128
17-100	55-500
29-16	57-100
29-17	

NG: None.

USAR: Same as Active Army except allowance is one copy to each unit.

For explanation of abbreviations used, see AR 320-50.

GPO 905-249

TM 5-4310-247-15
C 2

CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *16 September 1969*

Operator, Organizational, Direct Support,
General Support and Depot Maintenance Manual

COMPRESSOR, ROTARY, DIESEL ENGINE DRIVEN, AIR, TRAILER MOUNTED, 250 CFM, 100 PSI (JOY MODEL RPV 250 DC20MS1) FSN 4310-952-7142

TM 5-4310-247-15, 5 April 1965, is changed as follows:
Cover page and title page are changed as shown above.
Page 2. Paragraph 1 is superseded as follows:

1. Scope

a. This manual contains instructions for the use of operator, organizational, DS, GS, and depot personnel maintaining the compressor as allocated by the Maintenance Allocation Chart. It provides information on the operation, lubrication, preventive maintenance checks and services and maintenance of the equipment, its accessories and components. This manual also provides information on demolition, shipment, and limited storage.

b. Numbers in parenthesis on illustrations indicate quantity.

Paragraph 2 is superseded as follows:

2. Forms and Records

a. DA Forms and records used for equipment maintenance will be only those prescribed by TM 38-750.

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

Page 9. Figure 5① is superseded as follows:

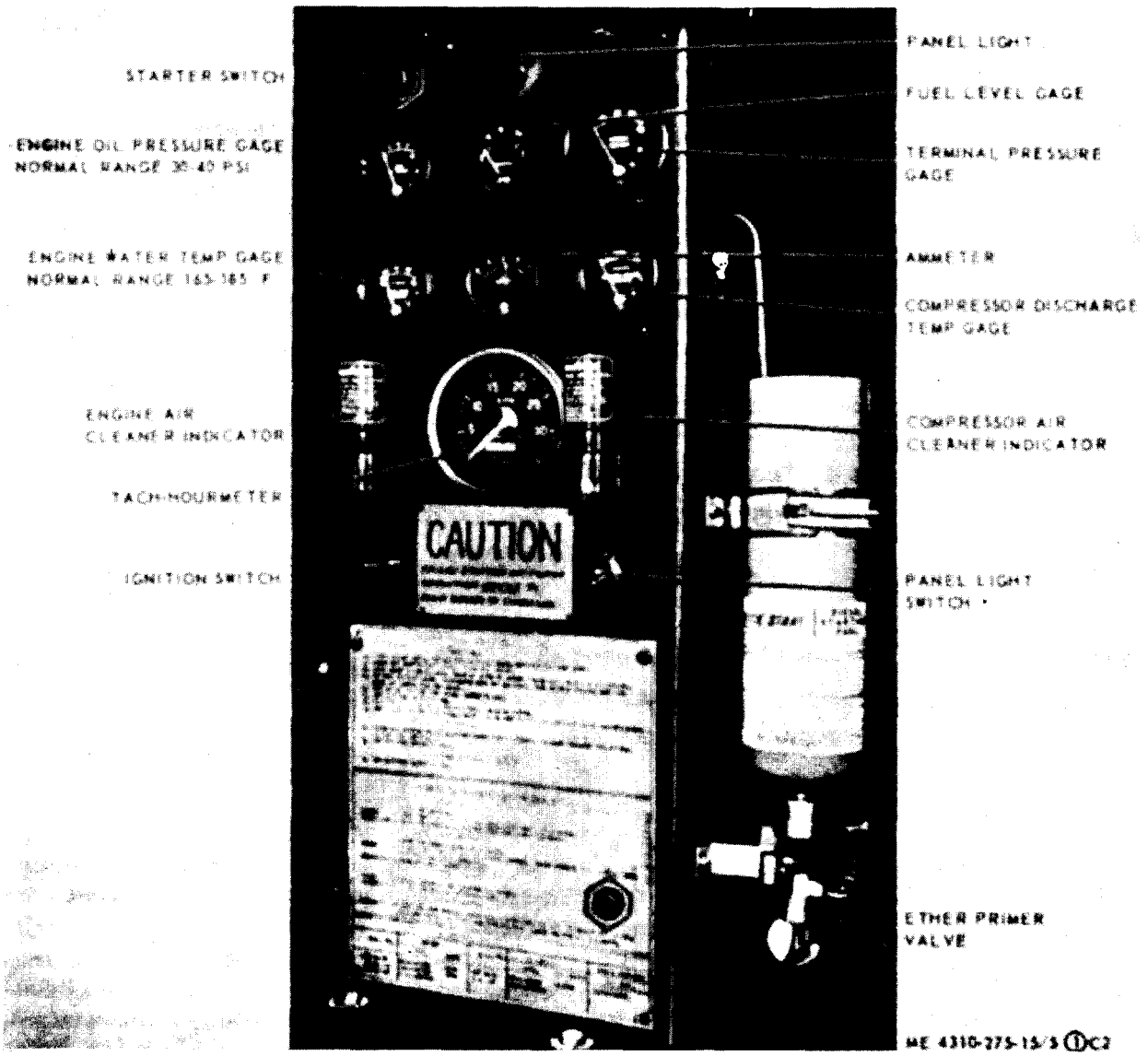
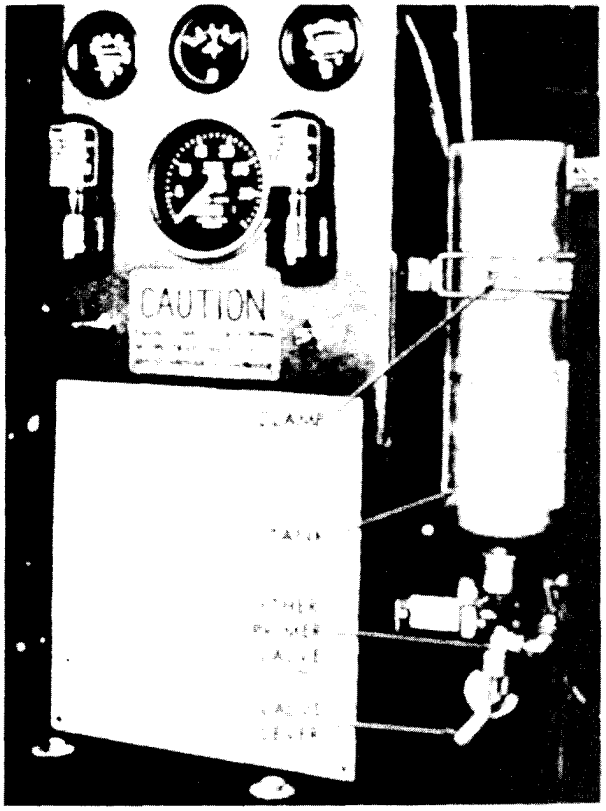


Figure 5 ① *Instruments and controls.*

Page 13. Paragraph 30*a*. In line 7 after the word "CAUTION", insert the following: **"Insure that the compressor is level before checking oil levels".**

Page 27. Figure 13 is superseded as follows:



TO REMOVE TANK:

STEP 1. UNLOCK CLAMP THAT SECURES THE TANK.

STEP 2. UNSCREW THE TANK FROM PUMP PRIMER.

TO INSTALL TANK:

STEP 1. CHECK GASKET IN VALVE. IF DAMAGED, REPLACE WITH SPARE GASKET ON TANK. DO NOT USE 2 GASKETS.

STEP 2. BE SURE VALVE LEVER IS IN "OFF" (DOWN POSITION).

STEP 3. PLACE TANK IN POSITION TO ENGAGE THREADS AND SCREW IN THE TANK.

STEP 4. SECURE TANK WITH CLAMP.

WARNING

THIS TANK CONTAINS EXTREMELY FLAMMABLE CONTENTS WHICH IS UNDER PRESSURE. CONTENTS ETHYL ETHER. KEEP AWAY FROM HEAT, SPARKS OR OPEN FLAME. DO NOT PUNCTURE OR INCINERATE CONTAINER. DO NOT STORE AT A TEMPERATURE ABOVE 200° F. AVOID CONTACT WITH SKIN. AVOID BREATHING OF VAPOR.

ME 4310-247-15/13 C2

Figure 13. Ether primer service.

Page 44. Paragraph 80*f*. In line 2 after the word "valve", add the following: "with the side marked OUTLET toward the stator".

Page 69. Paragraph 124*b*(1). Lines 1 and 2 are superseded as follows: "Clean and flush the oil cooler thoroughly with cleaning solvent, Fed. Spec. P-D-680, and dry thoroughly".

In line 8 after the word "fins", add the following: "Clean and flush all oil lines and fittings. Replace if damaged or defective".

Paragraph 124*c* (6). Step (6) is superseded as follows: "(6) Perform services specified in paragraph 78".

Add step (7) as follows: "(7) Refill system".

Add the following below paragraph 124*c*:

"*Note:* When compressor assembly is removed for disassembly and repair, clean compressor lubrication system thoroughly".

Page 71. Paragraph 128. Add the following note below paragraph title:

Note: When replacing vanes, services specified in paragraph 129 should be performed".

Paragraph 128*b* (2). Change lines 2, 3, and 4 to read as follows: "Replace vanes if end clearance is .023 in. or more (Replace all vanes as a set).

Page 73. Paragraph 128*c* (1). Step (1) is superseded as follows: "Install vanes with grooved side facing in the same direction as rotation of rotor. Make sure vanes slide freely in rotor slots".

Paragraph 129*b* (1). In line 3 after "thoroughly", add the following: "Make sure all oil passages in stator are thoroughly cleaned and free of foreign matter".

Page 82. Paragraph 132*a* (2). In line 1, delete "cylinder" and substitute "valve".

Step (3) is superseded as follows:

(3) Remove rocker arm and shaft assembly (fig. 51) by removing the screws holding it to the cylinder head.

Step (4) is added after step (3) above as follows:

(4) Remove push rods by gripping them firmly and snapping them sideways out of the tappet sockets. This breaks the hydraulic connection, and permits lifting the push rods out without disturbing the tappets. (If tappets are lifted out of the guides, they will have to be reassembled through the opening in the block when only the cylinder head is removed for servicing).

Renumber steps "(4) through "(12)" to read "(5)" through "(13)" consecutively.

Figure 51 is superseded as follows:

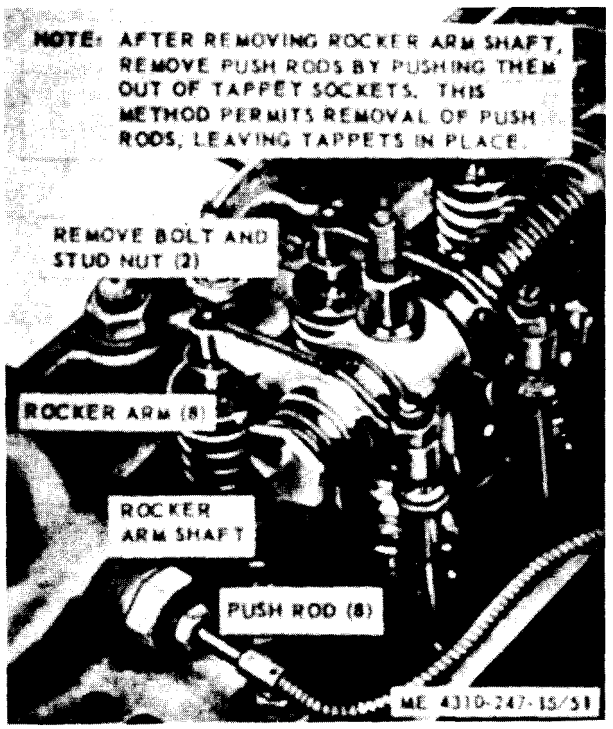


Figure 51. Rocker arm shaft removal.

Page 90. Paragraph 134*a* (1). In lines 2 and 3, change "(see figs. 51 and 52)" to read "(fig. 66 with reference to figs. 51 and 52)".

Page 93. Figure 71 is superseded as follows:

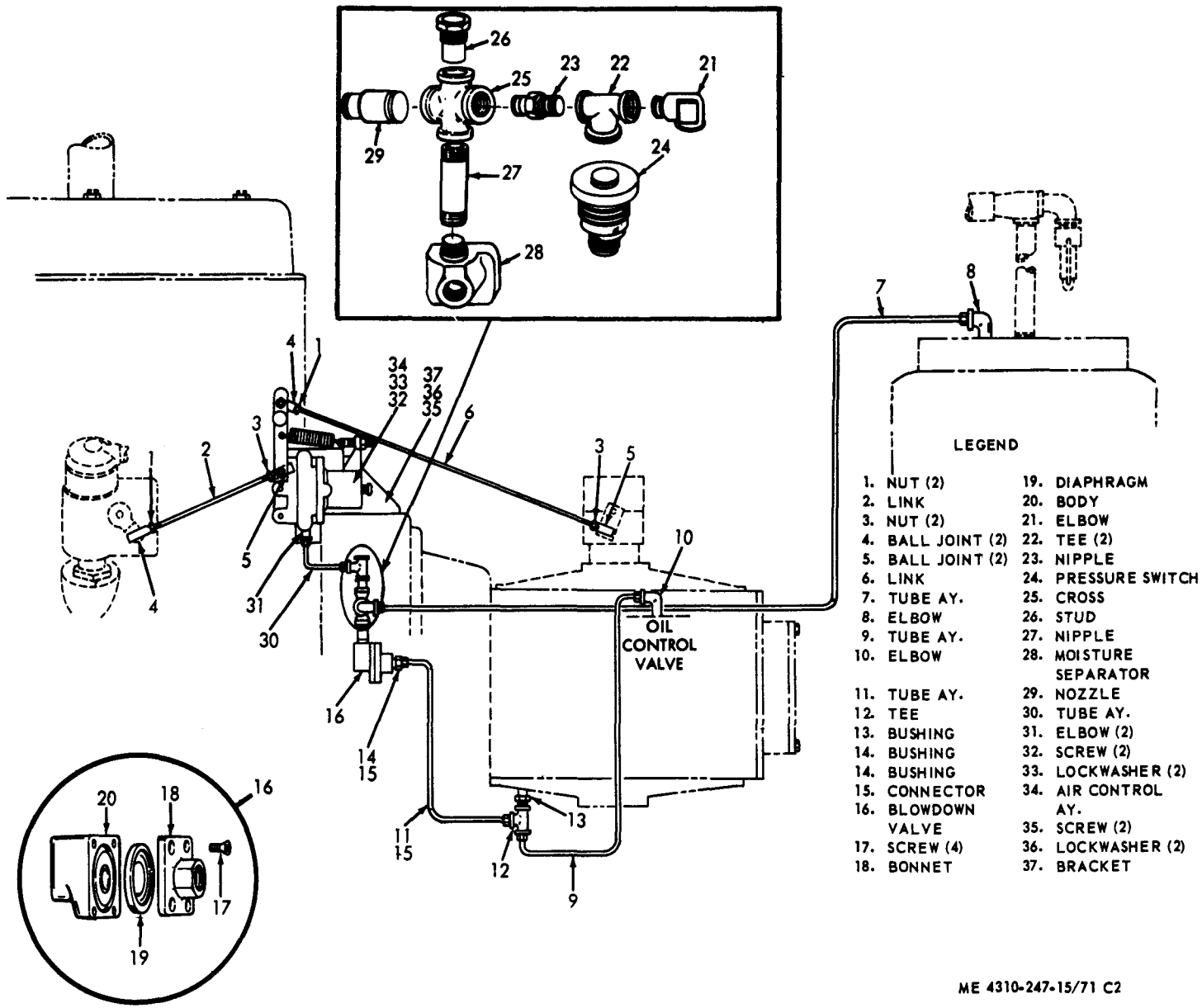


Figure 71. Control parts group.

Page 95. Appendix I is superseded as follows:

APPENDIX I

REFERENCES

1. Fire Protection	
TB 5-4200-200-10	Hand Portable Fire Extinguishers For Army Users
2. Lubrication	
C9100IL	Fuels, Lubricants, Oils and Waxes
LO 5-4310-247-15	Compressor, rotary, diesel driven, air, trailer mounted, 250cfm, 100 psi (engine Continental model JD403) (Joy model RPV250DC20MSI).
3. Painting	
TM 9-213	Painting Instruction for Field Use
4. Radio Suppression	
TM 11-483	Radio Interference Suppression
5. Maintenance	
TM 5-4310-247-20P	Organizational Maintenance Repair Parts Manual for Compressor
TM 5-4310-247-35P	DS, GS, and Depot Maintenance Repair Parts Manual for Compressor
TM 38-750	Army Equipment Record Procedures
6. Shipment and Storage	
TB 740-93-2	Preservation of USAMEC Mechanical Equipment for Shipment and Storage
TM 740-90-1	Administrative Storage of Equipment

Page 105. Appendix III is superseded as follows:

APPENDIX III

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

1. Scope

This appendix lists items which accompany the rotary compressor or are required for installation, operation, or operator's maintenance.

2. General

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

a. Basic Issue Items - Section II. A list

TM 5-4310-247-15
C 3

Change No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, *25 September 1973*

Operator, Organizational, Direct Support General Support and Depot Maintenance Manual COMPRESSOR, ROTARY, DIESEL ENGINE DRIVEN, AIR, TRAILER MOUNTED, 250 CFM, 100 PSI (JOY MODEL RPV 250 DC20MSI) FSN 4310-952-7142

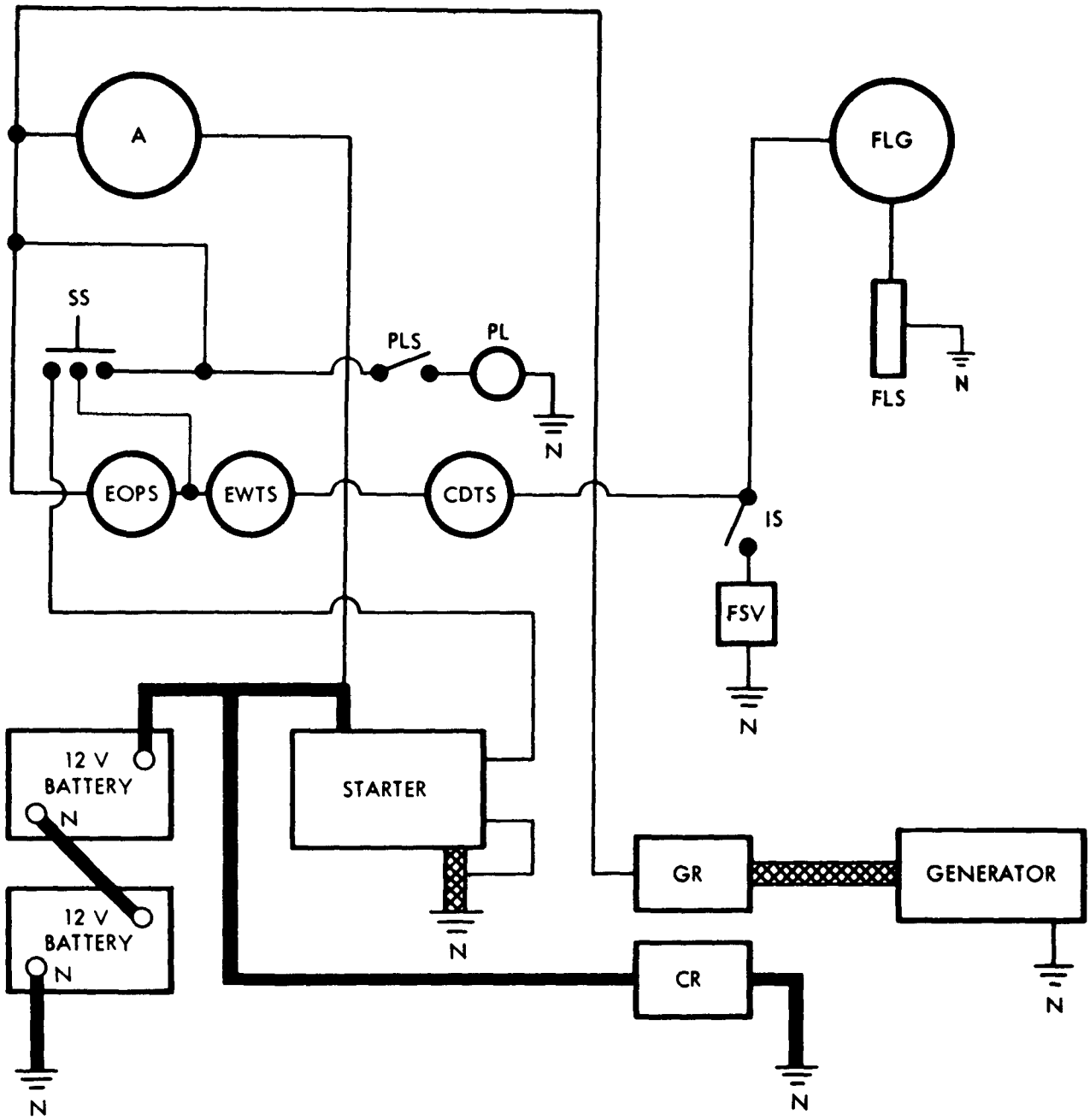
TM 5-4310-247-15, 5 April 1965, is changed as follows:

Page 6. Figure 3 is superseded as follows:

Page 8. Paragraph 7.1 is added after paragraph 7.

7.1. Maintenance and Operating Supplies

The maintenance and operating supplies required for the initial 8 hours of operation of the compressor are contained in table 0.I.



A	AMMETER	FLS	FUEL LEVEL SENDER
CDTS	COMPRESSOR DISCHARGE TEMPERATURE SWITCH	FSV	FUEL SOLENOID VALVE
		GR	GENERATOR REGULATOR
CR	CHARGING RECEPTACLE	IS	IGNITION SWITCH
EOPS	ENGINE OIL PRESSURE SWITCH	PL	PANEL LIGHT
EWTS	ENGINE WATER TEMPERATURE SWITCH	PLS	PANEL LIGHT SWITCH
FLG	FUEL LEVEL GAGE	SS	STARTER SWITCH

Figure 3. Practical Wiring Diagram

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Table 0.I. Maintenance and Operating Supplies

(1) Component application	(2) Federal stock number	(3) Description	(4) Quantity required f/initial operation	(5) Quantity required f/8 hrs operation	(6) Notes
COMPRESSOR, OIL SUMP	9150-582-5480 (5)	OIL, LUBRICATING 55 gal drum 2110T-H	8-1/2 gal (4)	3-1/8 oz (5) (6)	(1) Includes quantity of oil to fill engine–oil system as follows: 10-1/2 qt crankcase and oil filter
	9150-242-7605 (5)	OES	8-1/2 gal	3-1/8 oz (5) (6)	
CRANKCASE (1)	9150-265-9433 (5)	OIL, LUBRICATING, 1 QT CAN OE30	10-1/2 qt	1 pt (6)	(2) Tank Capacity (3) See TM 5-4310-247-15 for quantites, ambient temperatures, specific gravities
	9150-265-9425 (5)	OE-10	10-1/2 qt	1 pt (6)	
	9150-242-7602 (5)	OES	10-1/2 qt	1 pt (6)	(4) Compressor lubricating system capacity
ENGINE STARTING AIDS	2910-575-6365	CARTRIDGE, ALUMINUM, FLUID, MULT-START, 16CC	1 (8)		(5) See FSC C9100-IL for additional data and requisitioning procedures
GREASE POINTS	9150-190-0904 (5)	GREASE, AUTOMOTIVE AND ARTILLERY: 1 lb can			(6) See current LO for grade application and replenishment and intervals
RADIATOR	6850-224-8730	WATER ANTIFREEZE: Ethylene Glycol, 5 gal can	9 gal (3)		(7) Average fuel consumption is 6.25 gal per hour of continuous operation
	6850-174-1806	Compound Arctic, 55 gal drum	(3) (3)		(8) Quantity indicated is the minimum required for one each start when temperature is below 40°F.
TANK	9140-286-5294 (5)	FUEL OIL, DIESEL BULK DF-2 Regular grade	45 gal (2)	45 gal (7)	
	9150-286-5286 (5)	DF-1 Winter grade	45 gal (2)	45 gal (7)	
	9140-286-5283 (5)	DF-A Arctic grade	45 gal (2)	45 gal (7)	

Page 105. Appendix III is superseded as follows:

APPENDIX III
BASIC ISSUE ITEM LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED

Section I. INTRODUCTION

1. Scope

This appendix lists basic issue items, items troop installed or authorized which accompany the tractor and are required by the crew/operator for operation, installation, or operator's maintenance.

2. General

This basic issue items, items troop installed or authorized list is divided into the following sections:

a. Basic Issue Items List—Section II. Not applicable.

b. Items Troop Installed or Authorized List—Section III. A list in alphabetical sequence of items which, at the discretion of the unit commander, may accompany the end item, but are NOT subject to be turned in with the end item.

3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items List, Section II, and Items Troop Installed or Authorized, Section III.

a. Source, Maintenance and Recoverability Code(s) (SMR): Not applicable.

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

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

d. Unit of Measure (U/M). A 2-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Authorized (Items Troop Installed or Authorized Only). This column indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR code	(2) Federal stock No.	(3) Description Ref. No. & Mfr code	Usable on code	(4) Unit of meas	(5) Qty auth
	4210-555-8837	EXTINGUISHER, FIRE		EA	1
	4720-202-6948	HOSE ASSEMBLY, W/COUPLINGS		EA	1

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25A, (qty rqr block No. 38) organizational maintenance requirements for Air Compressors: 250 CFM.

United States Government Printing Office:1981--341-662/9393

903-862

of items which accompany the compressor and are required by the operator/crew for installation, operation or maintenance.

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

3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items, Section II.

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

(1) Source code, indicates the selection status and source for the listed item. Source code is:

Code	*Explanation*
P	Repair parts which are stocked in or supplied from the GSA/DSA, or Army supply system and authorized for use.

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

Code	*Explanation*
C	Operator/crew

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

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

c. Description. This column indicates the Federal item name and any additional description of the item required. The abbreviation "w/e", when used as a part of the nomenclature, indicates the Federal stock number includes all armament, equipment, accessories, and repair parts issued with the item. A part number or other reference number is followed by the applicable five-digit Federal supply code for manufacturers in parenthesis. Repair parts quantities included kits, sets, and assemblies are shown in front of the repair name.

d. Unit of Measure (U/M). A 2-character alphabetic abbreviation indicating the amount of quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

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

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

g. Illustration. This column is divided as follows:

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

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

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

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

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

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

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

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

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

6. Abbreviations

ea.....each
gal.....gallon
lb.....pound
oz.....ounce
pt.....pint
qt.....quart

Section II. BASIC ISSUE ITEMS

(1) SMR Code	(2) Federal stock number	(3) Description Ref No. & mfr code / Usable on code	(4) Unit of meas	(5) Qty inc in unit	(6) Qty furn with equip	(7) Illustration (a) Fig No.	(7) Illustration (b) Item No.
		Group 31 — BASIC ISSUE ITEMS, MANUFACTURER INSTALLED					
		3100 — BASIC ISSUE ITEMS MANUFACTURER OR DEPOT INSTALLED					
PC	7520-559-9618	CASE: Operational and Maintenance Publications	EA		1		
		DA Technical Manual TM 5-4310-247-15	EA		1		
PC	4210-555-8837	Extinguisher, Fire	EA		1		
		Group 32 — BASIC ISSUE ITEMS, TROOP INSTALLED					
		3200 — BASIC ISSUE ITEMS, TROOP INSTALLED OR AUTHORIZED					
PC	4720-202-6948	Hose Assembly	EA				

Section III. MAINTENANCE AND OPERATING SUPPLIES

(1) Component Application	(2) Federal Stock Number	(3) DESCRIPTION	(4) Quantity Required F/Initial Operation	(5) Quantity Required F/8 Hrs Operation	(6) NOTES
COMPRESSOR, OIL SUMP	9150-582-5480 (5)	OIL, LUBRICATING 55 gal drum 2110T-H	8 1/2 gal (4)	3 1/8 oz (5) (6)	(1) Includes quantity of oil to fill engine - oil system as follows: 10 1/2 qt crankcase and oil filter.
	9150-242-7605 (5)	OES	8 1/2 gal	3 1/8 oz (5) (6)	(2) Tank capacity.

Section III. MAINTENANCE AND OPERATING SUPPLIES — Continued

(1)	(2)	(3)	(4)	(5)	(6)
Component Application	Federal Stock Number	DESCRIPTION	Quantity Required F/Initial Operation	Quantity Required F/8 Hrs Operation	NOTES
CRANKCASE (1)	9150-265-9433 (5)	OIL, LUBRICATING, 1 QT CAN OE30	10 1/2 qt	1 pt (6)	(3) See TM 5-4310-247-15 for quantities, ambient temperatures, specific gravities.
	9150-265-9425 (5)	OE10	10 1/2 qt	1 pt (6)	
	9150-242-7602 (5)	OES	10 1/2 qt	1 pt (6)	(4) Compressor lubricating system capacity.
ENGINE STARTING AIDS	2910-575-6364	CARTRIDGE, ALUMINUM, FLUID, MULT-START, 16CC	1 (8)		
GREASE POINTS		GREASE, AUTOMOTIVE AND ARTILLERY:			(5) See FSC C9100-1L for additional data and requisitioning procedures.
	9150-190-0904 (5)	1 lb. can			
RADIATOR		WATER ANTIFREEZE:	9 gal		(6) See current LO for grade application and replenishment intervals.
	6850-224-8730	Ethylene Glycol, 5 gal can	(3) (3)		
	6850-174-1806	Compound Arctic, 55 gal drum	(3)		
TANK		FUEL OIL, DIESEL BULK			(7) Average fuel consumption is 6.25 gal per hour of continous operation
	9140-286-5294 (5)	DF-2 Regular grade	45 gal (2)	45 gal (7)	
	9140-286-5286 (5)	DF-1 Winter grade	45 gal (2)	45 gal (7)	(8) Quantity indicated is the minimum required for one each start when temperature is below 40° F.
	9140-286-5283 (5)	DF-A Arctic grade	45 gal (2)	45 gal (7)	

By Order of the Secretary of the Army:

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

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-25, Sec I (qty rqr Block No. 38), Organizational maintenance requirements for Air Compressors, 250 CFM.

TECHNICAL MANUAL
No. 5-4310-247-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *5 April 1965*

ORGANIZATIONAL, DS, GS, AND DEPOT MAINTENANCE MANUAL

COMPRESSOR, ROTARY, DIESEL ENGINE DRIVEN, AIR, TRAILER MOUNTED, 250 CFM, 100 PS1 (JOY MODEL RPV 250 DC20MSI FSN 4310-952-7142

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. Scope

a. These instructions are published for the use of the personnel to whom the Joy Air Compressor, Model RPV 250 DC20MS1 is issued. Chapters 1 through 4 provide information on the operation, preventive maintenance services, and organizational maintenance of the equipment, accessories, components, and attachments. Chapters 5 through 7 provide information for direct and general support and depot maintenance. Also included are descriptions of main units and their functions in relationship to other components.

b. Appendix I contains a list of publications applicable to this manual. Appendix II contains the maintenance allocation chart. Appendix III contains the list of basic issue items authorized the operator of this equipment and the list of maintenance and operating supplies required for initial operation.

c. The direct reporting by the individual user, of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 (Recommended Changes to DA Publications) will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen, or typewriter. The original and one copy will be forwarded direct to Commanding General, U.S. Army Mobility Equipment Center, Attn: SMOME-MMP, P.O. Drawer 58, St. Louis, Mo. 63166. One information copy will be provided to the individual's immediate supervisor (e.g., officer, noncommissioned officer, supervisor, etc.).

d. Report all equipment improvement recommendations as prescribed by TM 38-750.

2. Record and Report Forms

a. DA Form 2258 (Depreservation Guide of Engineer Equipment).

b. For other record and report forms applicable to the operator, crew, and organizational maintenance, refer to TM 38-750.

Note. Applicable forms, excluding standard Form 46 which is carried by the operator, will be kept in a canvas bag mounted on the equipment.

Section II. DESCRIPTION AND DATA

3. Description

a. General. The portable air compressor, model RPV260DC20MS1 (figs. 1 and 2), is a skid-mounted, self-contained, canopy-covered unit. The unit, driven by a diesel engine, is complete with controls, switches and gages necessary for operation. It has a standard operating pressure of 100 psi (pounds per square inch) which delivers a rated output of 250 cfm (cubic feet per minute) of air, at rated maximum speed of 1,800 rpm (revolutions per minute).

b. Compressor. The air compressor is a single-stage, flood lubricated, sliding-vane type, rotary unit. Compression is accomplished by rotating a slotted rotor, equipped with sliding vanes, within a stator having radial inlet and discharge ports. The rotor is off center with the stator bore so that the air trapped by the vanes diminishes in volume while moving from inlet port to outlet port.

c. Engine. The compressor is directly connected to and powered by a Continental engine, Model JD403. It is a 4-cylinder, 4-cycle, water cooled, diesel engine rated at 72 hp (horsepower) at 1,800 rpm.

d. Housing. The housing is designed to protect the unit under all climatic conditions. Access to the operating components of the unit is provided by hinged doors that have piano-type hinges and latches.

e. Skid Base. The skid base, which includes five covered toolboxes, is designed for mounting on an M-353 two-wheel trailer. Refer to TM 9-2330-247-14 for maintenance instructions on the trailer.

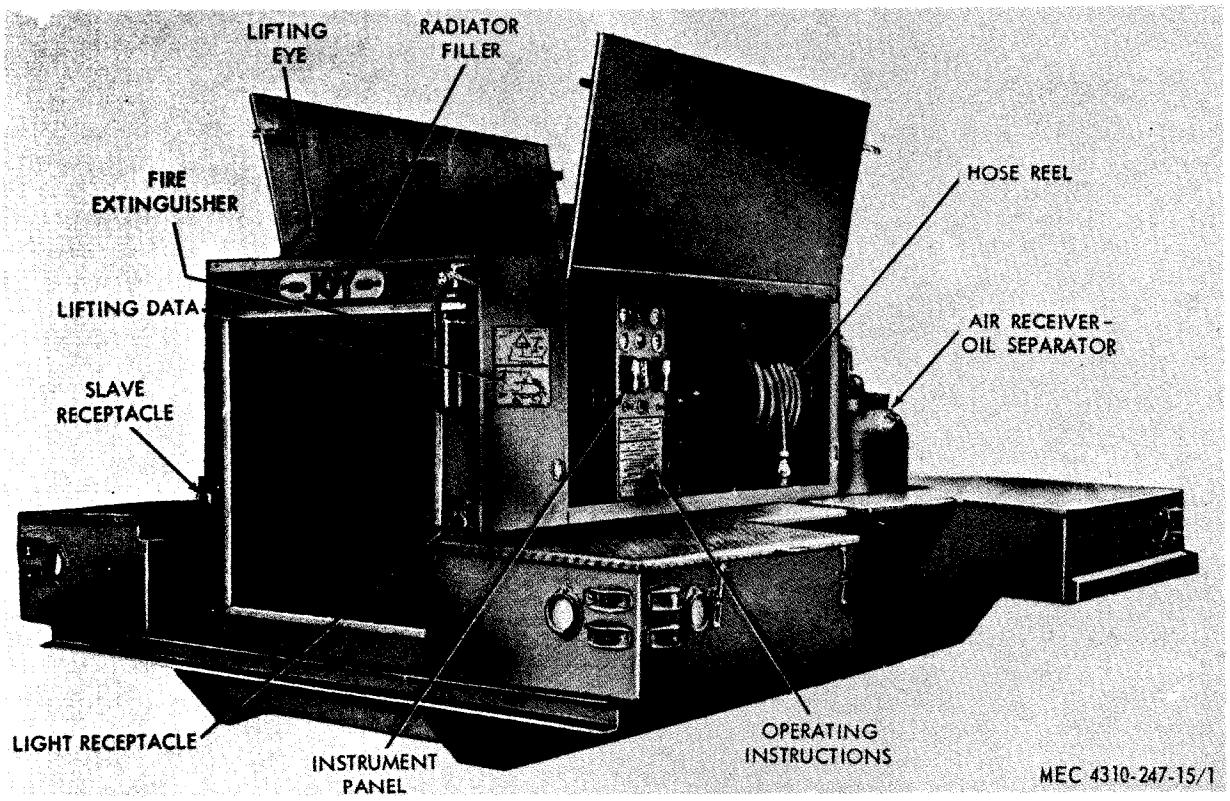


Figure 1. Left-front view.

4. Identification

The air compressor has the following major identification plates.

a. Corp of Engineers identification plate specifies official nomenclature, model and serial numbers of the equipment.

b. Joy Manufacturing Company identification plate specifies class, model number, shop number, operating pressure, operating speed, and manufacturer's name and address.

c. Engine identification plate specifies model number, serial number, specification number, tappet clearance and lubrication data.

5. Tabulated Data

a. Air Compressor Unit.

Manufacturer ---------- Joy Manufacturing Co.
Model ---------- RPV250DC20MS1
Type ---------- Rotary
Serial Nos. ---------- 81315 through 81722

b. Engine.

Manufacturer ---------- Continental Motors Corp.
Model ---------- JD 403
Type----------Diesel
Cycle ---------- 4 stroke
Cylinder----------4
Cooling----------Water
Cylinder bore ----------4⅜ in.
Stroke ----------6 in.
Piston displacement -----403403 cu. in.
Horsepower ----------72 at 1,800 rpm.
Firing order ----------1-3-4-2
Specification number ------- 6001

c. Generator.

Manufacturer ---------- Electric Autolite Co.
Type ---------- DC
Model ---------- MS13823-1
Voltage ---------- 24 volts, 18 amps
Speed range ---------- 1750-4000 rpm
Specification ---------- MIL-G-12604

d. Engine Accessories.

(1) *Starter.*

Manufacturer ---------- Prestolite Division of ELTRA Corp.
Model ---------- MFY8001AT001AT

(2) *Oil filter.*

Manufacturer ---------- Fram Corp.
Model ---------- FHB93PLMIL
Type --------- Replaceable element

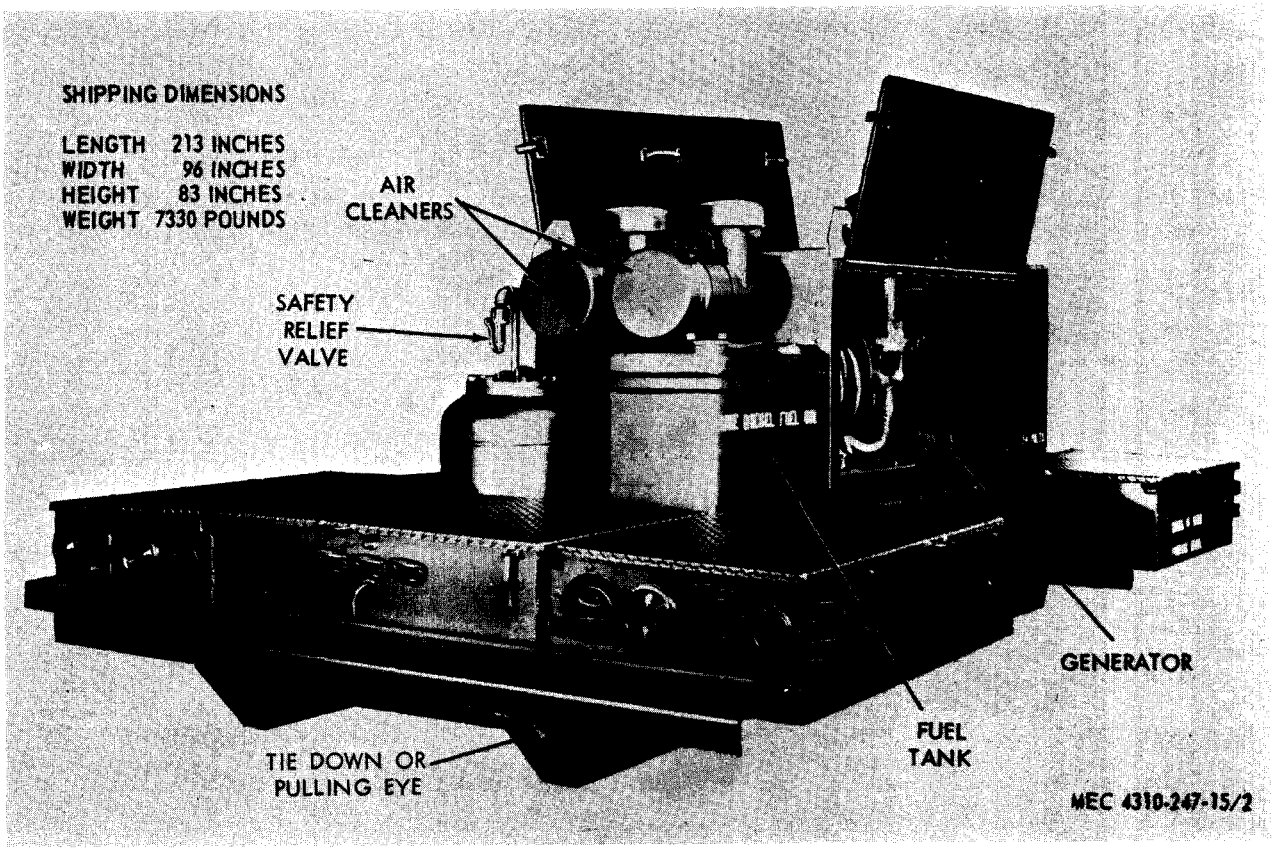


Figure 2. Right-rear view, with shipping dimensions.

(3) *Generator regulator.*
Manufacturer ---------- Prestilite Division of ELTRA Corp.
Model ---------- VBU-4002UT
Voltage ---------- 24 volt, 18 amp

(4) *Engine and compressor air filters.*
Manufacturer ---------- Air Maze Corp.
Modal ---------- D200668
Type ---------- Inertial dry

(5) *Air filter service indicator.*
Manufacturer ---------- Donaldson Co.

(6) *Fuel injection pump.*
Manufacturer ---------- Hartford Machine Screw Co.
Model ---------- DBGVC437-2AL

(7) *Primary fuel filter.*
Manufacturer ---------- Fram Corp.
Part No. ---------- 16594

(8) *Secondary fuel filter.*
Manufacturer ----------Fram Corp.
Part No. ---------- 16527

(9) *Ether primer valve.*
Manufacturer --------- Turner Corp.
Model ---------- LP1214-3

e. Compressor.
Manufacturer -------- Joy Manufacturing CO.
Model ---------- RPV250
Speed ---------- 1800 rpm
Working pressure --------- 100 psi
Cooling----------Oil

f. Compressor Oil Filter.
Manufacturer ---------- Purolator Products Inc.
Model ---------- 62822
Type ---------- Replaceable element

g. Battery.
Manufacturer ---------- Willard Storage Battery Co.
Part No. ---------- MS35000-3
Number of batteries ------- 2
Voltage ---------- 12
Type ---------- Dry charge
Polarity ---------- Negative ground system

h. Capacities.
Fuel tank ---------- 45 gal
Engine crankcase and oil filter ---------- 10½ qt
Engine cooling system ---------- 9 gal
Compress oil sump --------- 8½ gal

i. Engine Torque Data in Foot-Pounds.

Part	Thread diameter						
	¼ in.	5/16 in.	3/8 in.	7/16 in.	½ in.	9/16 in.	5/8 in.
Cyl. head (cast iron)			35–40	70–75	100–110	130–140	145–155
Main bearing caps			35–40	70–75	85–96	110–120	140–150
Connecting rods		20–25	40–45	55–60	90–100	110–120	
Flywheel		20–25	35–40	70–75	85–95	100–110	145–155
Flywheel housing		15–20	25–30	50–55	80–90	115–125	
Manifolds		15–20	25–30	40–50	50–60	50–60	60–70
Manifold end nuts				35			35
Gear covers, water pumps, front and rear end plates	8–10	15–20	25–30	50–55	80–90		
Oil Pans		12–16	12–16				
Rocker supports and die castings	6–8	10–15	20–25	35–40	50–55		
Misc. accessories and brackets	8–10	15–20	25–30	50–55	80–90	115–125	
Balancer mounting							130–140
Camshaft nut, steel camshaft: ⅝ in., 120–125 ft/lb; 1 in., 175–180 ft/lbs.							
Camshaft nut, elastic stop nut: ⅝ in., 65–70 ft/lb.							

j. Adjustment Data.

Valve tappet clearance (idling) ---------- 0.014 (hot)

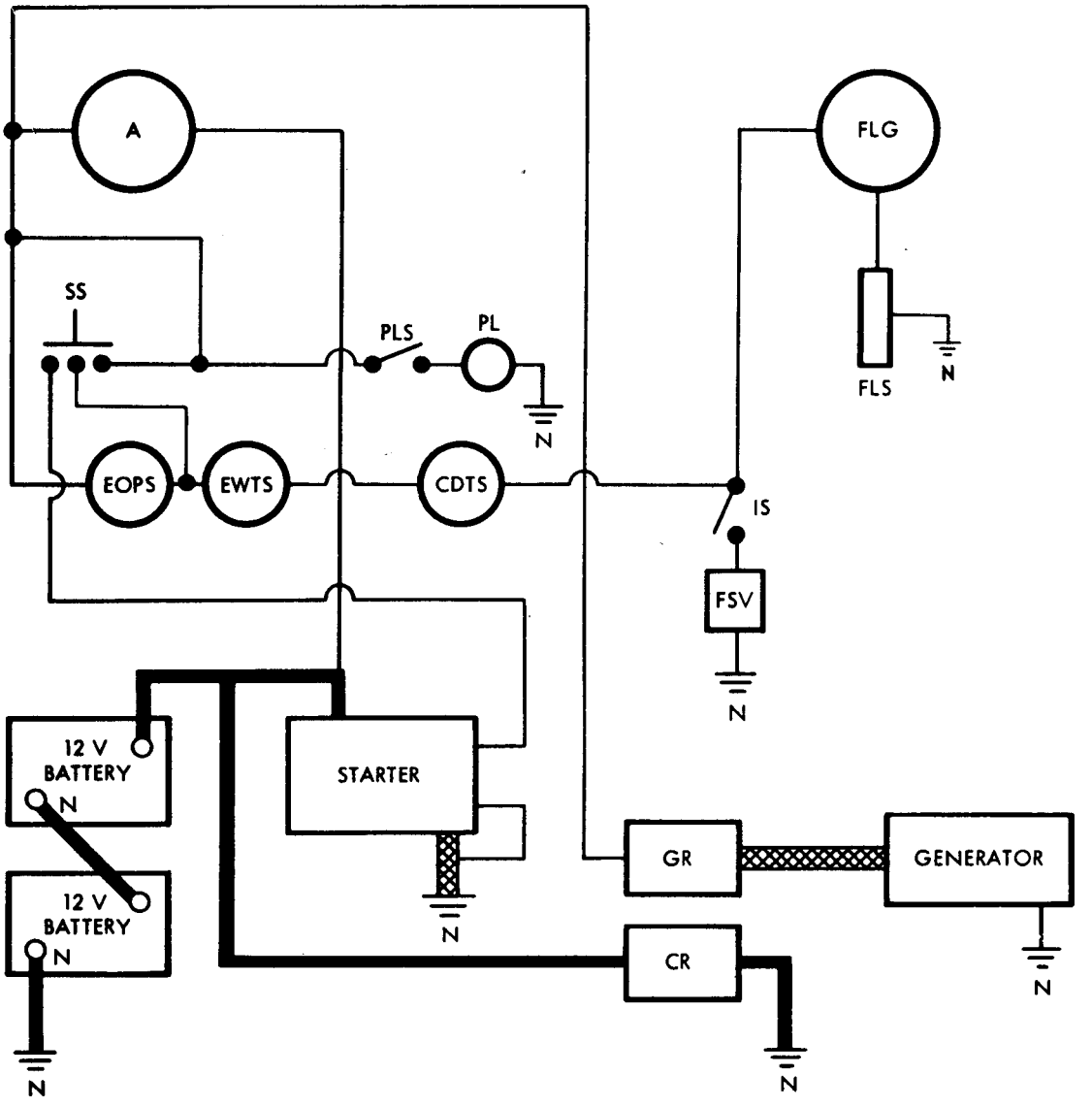
Oil pressure at 1,800 rpm_ _ 30-40 psi

Oil pressure at idle ---------- 7 psi minimum

k. Dimensions and Weight.

Compressor and skid only:
- Height, overall ---------- 63 in.
- Length, overall ---------- 137 in.
- Width, overall ---------- 95 in.
- Gross weight --------- 4,700 lb.

Compressor and skid, trailer mounted:
- Height, overall ---------- 83 in.
- Length, overall ---------- 213 in.



A	AMMETER
CDTS	COMPRESSOR DISCHARGE TEMPERATURE SWITCH
CR	CHARGING RECEPTACLE
EOPS	ENGINE OIL PRESSURE SWITCH
EWTS	ENGINE WATER TEMPERATURE SWITCH
FLG	FUEL LEVEL GAGE
FLS	FUEL LEVEL SENDER
FSV	FUEL SOLENOID VALVE
GR	GENERATOR REGULATOR
IS	IGNITION SWITCH
PL	PANEL LIGHT
PLS	PANEL LIGHT SWITCH
SS	STARTER SWITCH

MEC 4310-247-15/3

Figure 3. Practical wiring diagram.

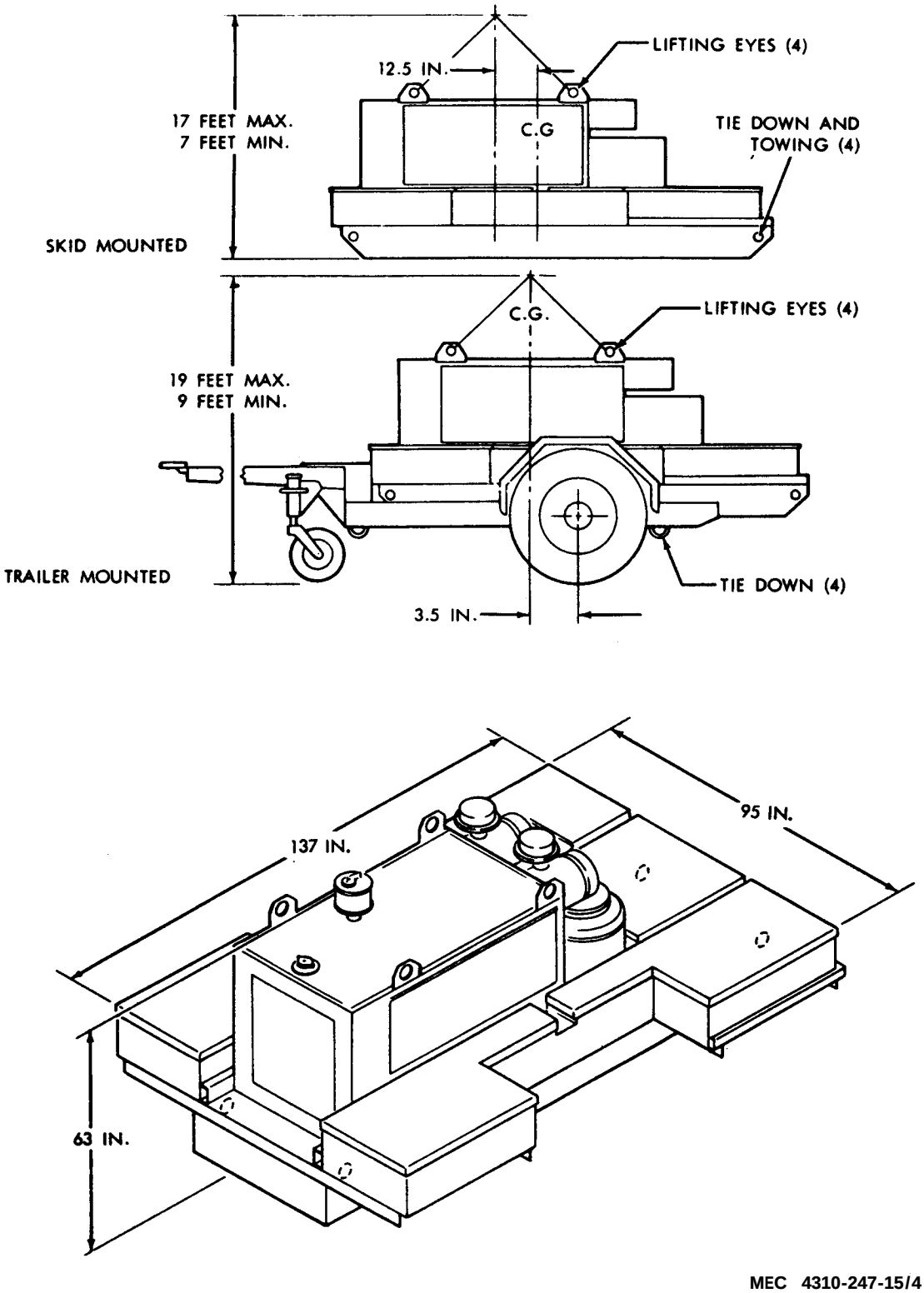


Figure 4. Overall and lifting dimensions.

CHAPTER 2

INSTALLATION AND OPERATION INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

6. Unloading the Equipment

a. If shipped by carrier remove all tiedowns and blocks securing the air compressor to bed of carrier.

b. Use a hoist or crane of suitable capacity. Attach hooks of lifting device to lifting eyes and remove the unit from bed of carrier.

7. Unpacking the Equipment

a. If the air compressor is received packaged in a crate, remove all crating, protective coverings, protective tape and oil resistant paper from the unit. Use care in removal to avoid damage to instruments, controls, tubing, and painted surfaces.

b. Prepare the air compressor for inspection and operation as outlined on DA Form 2258, attached on or near the operator's controls.

8. Inspecting and Servicing the Equipment

a. Check all equipment received with the packing list.

b. Inspect the entire unit carefully for missing or damaged parts, insecure mounting or loose objects. Make sure all components are securely mounted.

c. Perform the daily preventive maintenance services described in paragraph 32.

d. Lubricate the air compressor in accordance with the current lubrication order.

e. Fill the cooling system with the proper coolant. Tighten any leaking hose connections.

f. Be sure the fuel tank drain cock (2, fig. 22) is closed. Fill the fuel tank with the proper grade of fuel. Check all fuel line connections for leaks.

9. Installation of Separately Packed Components

a. The two 12-volt batteries are shipped in dry-charge condition. Remove the electrolyte from the packing crates and install as follows:

(1) Remove and discard the sealing tape used to close battery vent openings.

(2) Remove vent caps from the battery cells.

(3) Fill each cell with electrolyte to the bottom of filler opening. Check specific gravity of electrolyte with a hydrometer. The electrolyte should have a specific gravity of 1.275 at a temperature of 80° Fahrenheit (F.).

Warning: **Electrolyte contains sulfuric acid and can cause severe skin burns. If the electrolyte comes in contact with the body or clothing, rinse immediately with clean water. Avoid spilling electrolyte on painted surfaces.**

(4) Replace vent caps on battery cells.

Table I. Freezing Points, Composition and Specific Gravities of Military Antifreeze Materials

Lowest expected ambient temperature, °F.	Pints of inhibited glycol per gallon of coolant[1]	Compound, antifreeze, arctic[2]	Ethylene glycol coolant solution specific gravity at 68°F.[3]
+20	1½	Issued full-strength and ready mixed for 0° to −65°F. temperatures for both initial installation and replenishment of losses. DO NOT DILUTE WITH WATER OR ANY OTHER SUBSTANCE.	1.022
+10	2		1.036
0	2¾		1.047
−10	3¼		1.055
−20	3½		1.062
−30	4		1.067
−40	4¼		1.073
−50	Arctic antifreeze preferred.		
−60			
−75			

[1] Maximum protection is obtained at 60 percent by volume (4.8 pt of ethylene glycol per gal of solution).

[2] Military Specification MIL–C–1 1755 Arctic type, nonvolatile antifreeze compound is intended for use in the cooling system of liquid-cooled internal combustion engines. It is used for protection against freezing primarily in Arctic regions where the ambient temperature remains for extended periods close to −40°F. or drops below, to as low as −90°F.

[3] Use an accurate hydrometer. To test hydrometer, use 1 part ethylene glycol antifreeze to 2 parts water. This should produce a hydrometer reading of 0°F.

Note. Fasten a tag near the radiator filler cap indicating the type antifreeze.

10. Installation or Setting up Instructions

a. Outdoor Installation.

(1) For outdoor installation select a solid, clean and level area that will support the air compressor.

(2) For installation in soft ground, mud, or snow, place the air compressor on lumber of suitable size.

Caution: **The air compressor should never be operated more than 15° off level.**

b. Indoor Installation.

(1) Provide for at least 4 feet of access space on all sides of the unit.

(2) Make sure that the enclosure is well ventilated, with a maximum supply of fresh air available for compression and cooling.

(3) Install gastight exhaust pipe extensions to carry exhaust fumes to the outside. Use as few bends as possible in the extensions and install metal shields where the extensions pass through flammable walls. Wrap the exhaust lines with asbestos if there is any danger of anyone touching them.

Warning: **If the air compressor is to be operated in an enclosed area, exhaust gas must be piped to the outside. Exhaust fumes contain carbon monoxide, which is a colorless, odorless and poisonous gas.**

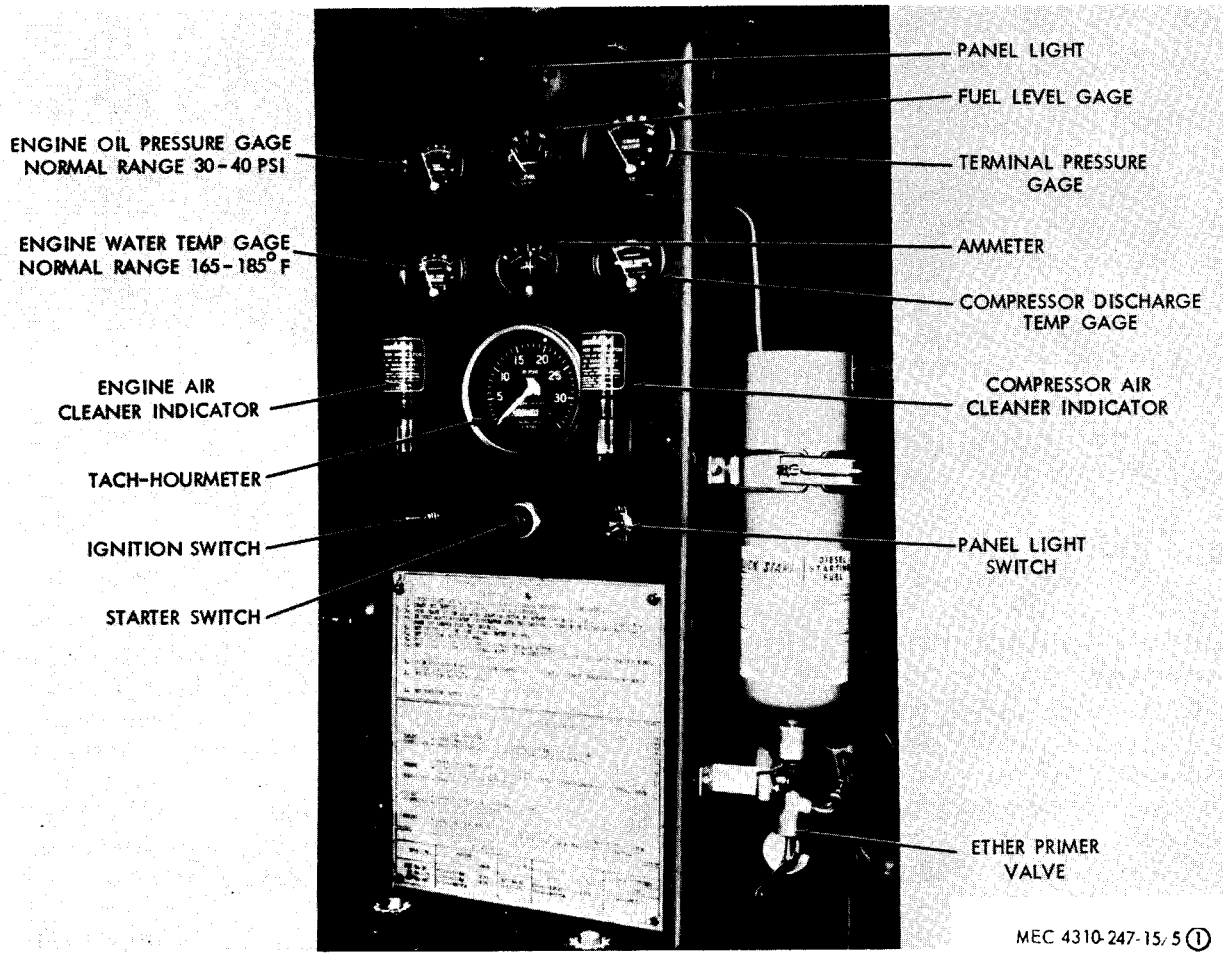


Figure 5. Instruments and Controls.

Section II. MOVEMENT TO A NEW WORKSITE

11. Dismantling for Movement

a. Shut down and disconnect the air compressor from the system being serviced (para 17). Coil the service hoses on the hose reels. Close and latch the doors.

b. Remove the flexible exhaust pipe extensions from the muffler if the unit was being operated indoors.

c. Attach the lunette and safety chains to a prime mover, and tow the air compressor to the new worksite.

Caution: **Maximum permissible towing speed is 40 mph (miles per hour) over a smooth, paved surface.**

12. Reinstallation After Movement

Set up the air compressor for operation in accordance with instructions in paragraph 10.

Section III. CONTROLS AND INSTRUMENTS

13. General

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

14. Controls and Instruments

The purpose of the controls and instruments and the normal readings of the instruments is illustrated in figure 5.

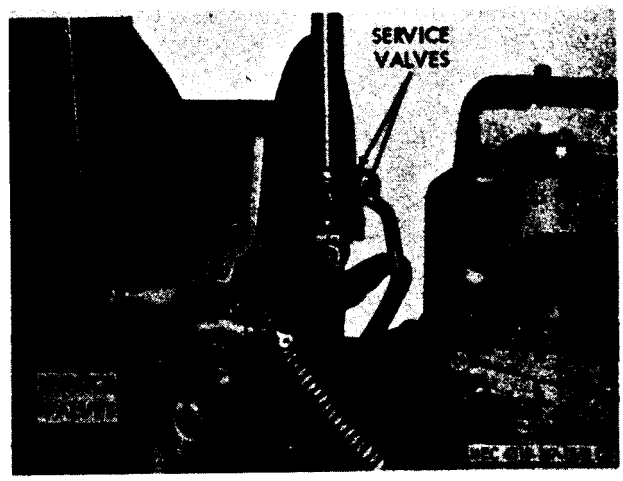


Figure 5-Continued.

Section IV. OPERATION OF EQUIPMENT AND AUXILIARY MATERIAL USED IN CONJUNCTION WITH THE EQUIPMENT

15. General

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

b. This section gives instructions on starting and stopping the air compressor, on the basic motions of the air compressor, and on coordinating the basic motions to perform the specific tasks for which the equipment is designed.

16. Starting

a. Preparation for Starting.

(1) Perform the daily preventive maintenance services (para 82).

(2) Lubricate the air compressor in accordance with the current lubrication order.

b. Starting.

(1) If the engine is new or rebuilt or if fuel filters have been serviced or any fuel lines disconnected, the fuel system must be bled to remove any air that may have become trapped in the system (para 36).

(2) Make sure shutoff valve in bottom of fuel tank is in open position.

(3) Crack one service line valve. Close all others.

(4) Push start button, allowing starter to rotate the compressor a few revolutions.

(6) Move ignition switch to run position.

(6) Push the start button and hold until engine oil pressure reaches 15 psi.
(7) Adjust the service line valve to maintain 1,200-1,400 rpm until the engine warms up.

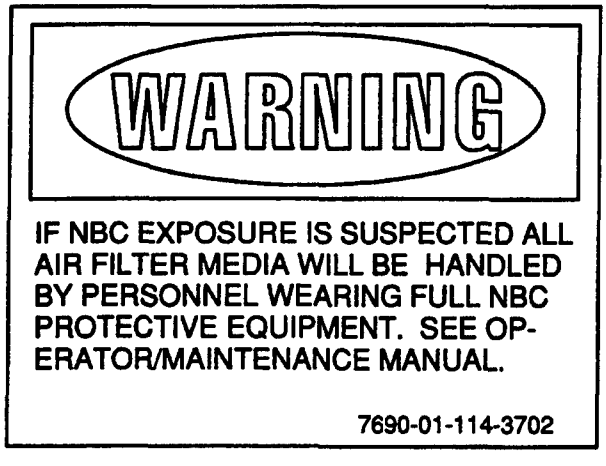
17. Stopping

a. Normal Stop.
(1) Close all service valves allowing compressor to unload. Operate unloaded for approximately 5 minutes.
(2) Increase speed to 1,500 rpm by opening service valve and set ignition switch to stop.

b. Emergency Stop. Move the ignition switch to the "stop" position.

18. Operation Under Usual Conditions

After the engine has been started, operation of the compressor is automatic. The only function of the operator is to check the controls and instruments for irregularities of operation. If trouble is encountered while the compressor is in operation, stop the unit immediately.



AIR CLEANER/AIR FILTER NBC WARNING DECAL

A decal has been developed that warns of NBC exposure. It is to be positioned in a noticeable place on or near the air filter housing or air cleaner. You may order the decal using part number 12296626, CAGEC 19207. Refer to TB 43-0219 for further information.

19. Operation in Extreme Cold (below O°F.)

a. See that the antifreeze solution is correct for the lowest possible temperature expected.

b. Inspect the cooling system for leaks.

c. Keep the batteries fully charged. If possible, add water to the batteries just prior to operation. The engine must be in operation an hour to thoroughly mix the water and electrolyte to prevent freezing.

d. Keep the fuel tank as full as possible and refill after operation to prevent condensation from forming within the tank.

e. Lubricate in accordance with the current lubrication order.

f. Refer to paragraph 37 for service of the ether primer. The primer injects an ether-base fluid into the intake manifold, where it readily ignites to start the engine.

g. Squeeze the valve lever once to inject only one shot of ether prior to cold weather start (below +32°F.).

h. It may be necessary to inject additional shots until the engine runs smoothly.

Note. Cease ether injection if loud engine combustion knock or detonation is heard. Resume ether injection when knocking has stopped if engine tends to stall.

i. Fuel filters must be checked and cleaned frequently.

j. Warm up the engine thoroughly before applying load, and maintain operating temperature between 165° and 185°F.

20. Operation in Extreme Heat

a. Keep the cooling system filled with clean coolant and check the system frequently for leaks.

b. Be sure the fan belt is properly adjusted (fig. 14).

c. Check the water temperature gage frequently.

d. Keep the radiator and oil cooler free from obstructions.

e. Locate the unit in a well ventilated area, facing upwind with the doors open.

f. Lubricate the air compressor in accordance with the current lubrication order.

21. Operation in Dusty or Sandy Areas

a. Lubricate the unit in accordance with the current lubrication order. Keep lubricants, grease gun, and fittings clean.

b. Protect the unit from dust and sand as much as possible. Keep the unit clean and free from foreign matter.

c. Cover the unit when not in use.

d. If possible, wet down the area surrounding the operating site to keep down dust and blowing sand.

e. Service the engine and compressor air cleaners frequently.

22. Operation Under Rainy or Humid Conditions

a. Lubricate the unit in accordance with the current lubrication order.

b. Frequently wipe dry all exposed areas.

c. Keep the fuel tank full, to prevent condensation.

d. Keep electrical components clean and dry.

e. Coat all exposed machine surfaces with a light film of oil.

f. Keep the servicing hoses clean and dry. Inspect frequently for cracks and deterioration.

g. Drain the air receiver frequently, to remove moisture.

h. Cover the unit when not in operation.

***23.* Operation in Salt Water Areas**

a. Wash unit frequently with clean, fresh water. Be careful not to contaminate fuel system.

b. Coat exposed metal surfaces with rustproofing material. Remove any rust immediately and apply paint and/or oil as applicable.

c. Watch closely for evidence of fungus growth on electrical components, and remove promptly.

d. Clean brass and copper surfaces, and oil lightly.

24. Operation at High Altitudes

Keep the air cleaners clean and unobstructed.

Note. The compressor will deliver rated performance at altitudes up to 5,000 ft. A slight loss of efficiency, proportionate to altitude, is a normal condition.

***25.* Fire Extinguisher (dry chemical type)**

a. Description. The dry, chemical type fire extinguisher is suitable for use on all types of fire and is effective in areas where ambient temperature is -25°F. and above. If winterized (pressurized with nitrogen), the fire extinguisher may be used in temperatures below -25°F. The fire extinguisher is a 2½ pound, stored pressure, lever-operated extinguisher.

b. Operation. Remove the fire extinguisher from its location, lift the handle, press lever, and direct the powder at the base of the flame, using a side-to-side sweeping motion.

c. Maintenance. Weigh the extinguisher every 6 months and replace the extinguisher if weight is less than 4½ pounds, or if pressure is below 125 pounds. Refer to SB 5-111. The dry chemical fire extinguishers will be serviced at installation level through repair and utilities facilities, with the filling agent supplied by local procurement through troop supply channels.

CHAPTER 3

OPERATOR AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. OPERATOR AND ORGANIZATIONAL MAINTENANCE TOOLS AND EQUIPMENT

26. Special Tools and Equipment

No special tools or equipment are required by the operator or organizational maintenance personnel for the maintenance of the air compressor.

27. Basic Issue Tools and Equipment

Tools and repair parts issued with or authorized for the air compressor are listed in the basic issue items list, appendix III of this manual.

28. Organizational Maintenance Repair Parts

Organizational maintenance repair parts are listed and illustrated in TM 5-4310-247-20P.

Section II. LUBRICATION

29. General Lubrication Information

a. This section contains a reproduction of the lubrication order and lubrication instructions which are supplemental to, and not specifically covered in the lubrication order.

b. The lubrication order shown in figure 6 is an exact reproduction of the approved lubrication order for the air compressor. For the current lubrication order, refer to DA PAM 310-4.

30. Detailed Lubrication Information

a. General. Keep all lubricants in clean, closed containers and stored in a dry place away from external heat. Allow no dust, dirt, or other foreign material to become mixed with the lubricants. Keep all lubrication equipment clean and ready for use.

Caution: **Be sure to check the engine oil level with the operating scale during operation. Check the engine oil level with the standard scale before or after operation. Use of the wrong scale can cause extensive damage to the engine.**

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

c. Points of Lubrication. Service the lubrication points at proper intervals, as illustrated in figure 6.

d. OES Oil.

(1) The engine crankcase oil level must be checked frequently, as oil consumption may increase.

(2) The oil may require changing more frequently than usual because of contamination by dilution and sludge formation, which increases under cold-weather operation conditions.

e. Compressor Oil Filter Service.

(1) Service the oil filter only during compressor oil change.

(2) Remove plug (24, fig. 9) and drain oil into a suitable container.

(3) Remove screw (26) and ring assembly (25). Lift off cover and valve assembly (27). Remove cover gasket (28).

(4) Remove element assembly (29). Discard the element and gasket.

(5) Clean cover and valve assembly and interior of filter with an approved cleaning solvent. Dry thoroughly.

(6) Install plug. Position a new element assembly, a new cover gasket and the cover and valve assembly on the filter case. Secure with ring assembly and screw.

f. Engine Oil Filter Service. Service the engine oil filter as illustrated in figure 10.

LUBRICATION ORDER

LO 5-4310-247-15

2 APRIL 1965

COMPRESSOR, ROTARY, DIESEL DRIVEN, AIR, TRAILER MOUNTED, 250CFM, 100PSI (ENGINE, CONTINENTAL MODEL JD403) (JOY MODEL RPV250DC20MS1)

Reference: C9100-IL

Intervals are based on normal hours of operation. Reduce to compensate for abnormal operation and severe conditions. During inactive periods sufficient lubrication must be performed for adequate preservation.

Relubricate after washing or fording.

Clean fittings before lubricating.

Clean parts with SOLVENT, dry-cleaning, or with OIL, fuel, Diesel. Dry before lubricating.

Drain crankcase when hot. Fill and check level.

A dotted circle indicates a drain below.

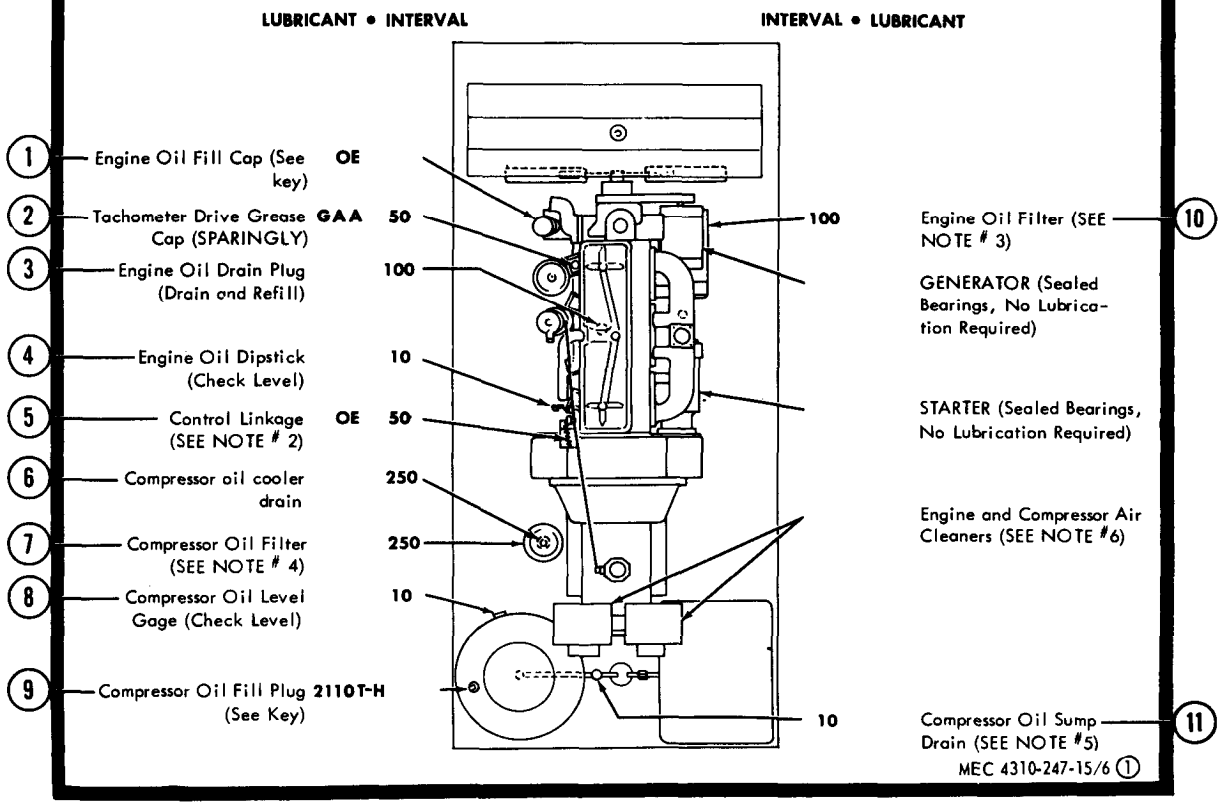


Figure 6. Lubrication order.

— KEY —

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			INTERVALS
		Above +32°F	+40°F to −10°F	0°F to −65°F	
OE OIL, Engine, Heavy Duty		**OE** 30 or **9250**	**OE** 10 or **9110**	**OES**	Intervals given are in hours of normal operation.
Engine Crankcase	10 1/2 qt				
Oil Can Points					
OES OIL, Engine, Sub-zero					
2110T-H LUBRICATING OIL, General Purpose		**2110T-H**	**2110T-H**	**OES**	
Compressor Oil Sump	34 qt				
GAA GREASE, Automotive and Artillery		All Temperatures.			

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW - 10°F. Remove lubricants prescribed in the key for temperatures above - 10°F. Clean parts with SOLVENT, dry-cleaning. Relubricate with lubricant specified in the key for temperatures below -10°F.

2. OIL CAN POINTS. Every 50 hours clean and lightly coat control linkages, exposed threads and pins with OE.

3. ENGINE OIL FILTER. Every 100 hours remove filter element, clean housing and install new element, fill crankcase, operate engine for five minutes, check for leaks, check crankcase oil level, and bring to full mark.

4. COMPRESSOR OIL FILTER. Every 250 hours remove filter element, clean housing and install new element. This shall be done only during compressor oil change.

5. COMPRESSOR OIL SUMP. Daily, before operation open the Oil Sump Drain Valve slowly, drain the condensation from the oil sump. When oil appears close the valve. Every 250 hours drain and refill compressor oil sump, operate engine for five minutes, check for leaks, check compressor oil level, and bring to full mark.

6. AIR CLEANERS. The engine and compressor air cleaners are dry type air cleaners.

Copy of this Lubrication Order will remain with the equipment at all times; instructions contained herein are mandatory.

BY ORDER OF THE SECRETARY OF THE ARMY:

OFFICIAL: HAROLD K. JOHNSON
General, United States Army.

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

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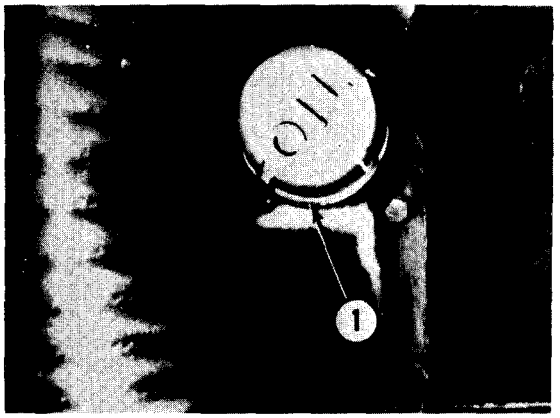
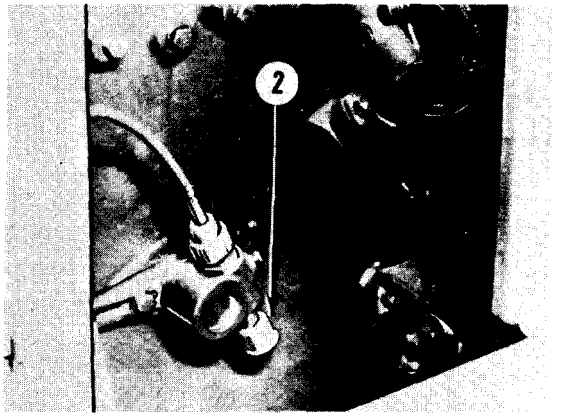
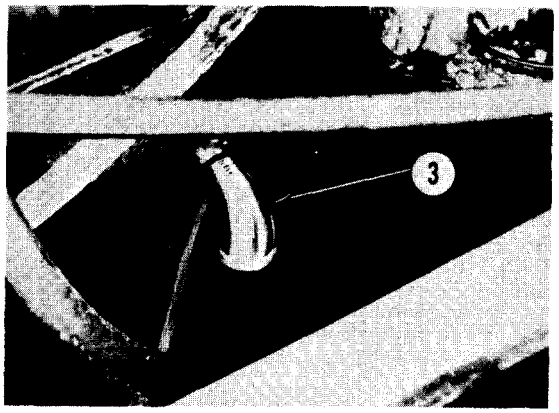
***Figure 6*—Continued.**



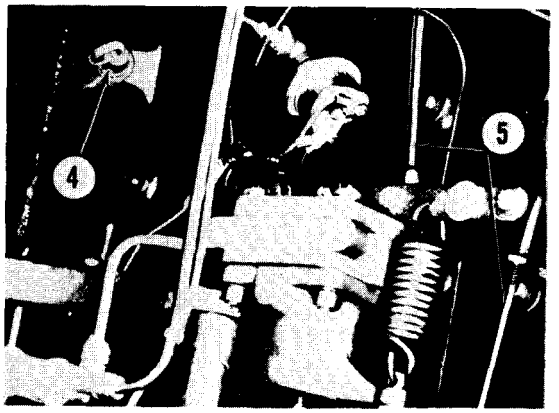
REF. 1 ENGINE OIL FILL CAP



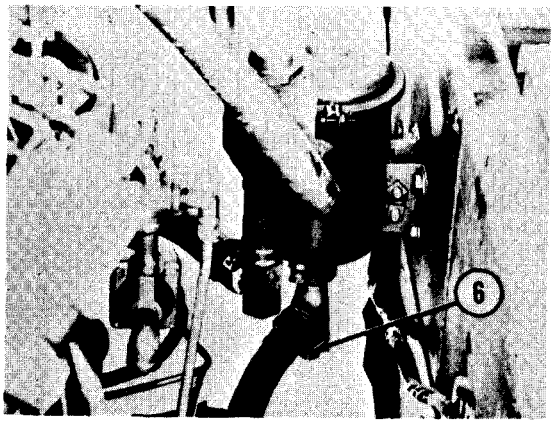
REF. 2 TACHOMETER DRIVE GREASE CAP



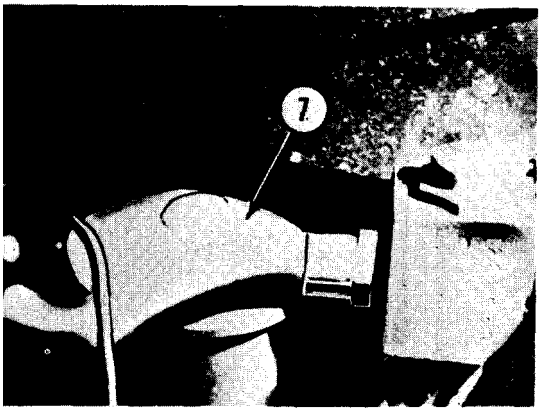
REF. 3 ENGINE OIL DRAIN PLUG



REF. 4 ENGINE OIL DIPSTICK
REF. 5 CONTROL LINKAGE



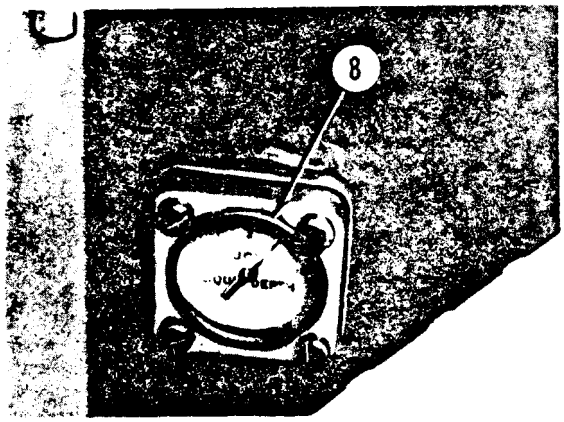
REF. 6. COMPRESSOR OIL COOLER DRAIN



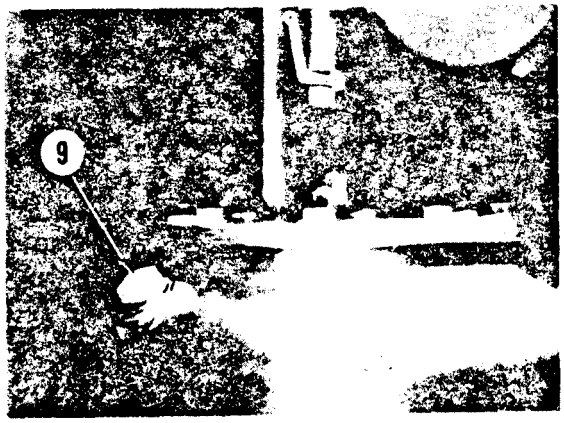
REF. 7 COMPRESSOR OIL FILTER

MEC 4310-247-15/6 (3)

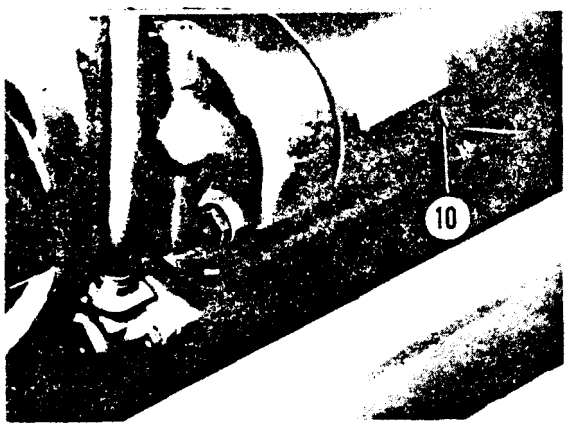
Figure 6-Continued.



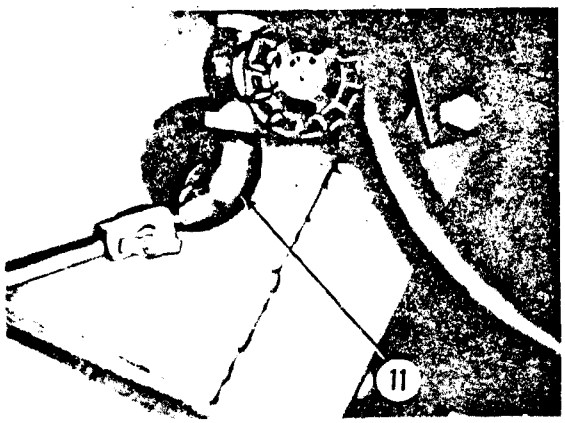
REF. 8 COMPRESSOR OIL LEVEL GAGE



REF. 9 COMPRESSOR OIL FILL PLUG



REF. 10 ENGINE OIL FILTER



REF. 11 COMPRESSOR OIL SUMP DRAIN

MEC 4310-247-15/6 (4)

Figure 6-Continued.

Section III. PREVENTIVE MAINTENANCE SERVICES

31. General

To insure that the air compressor is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance services to be performed are listed and described in paragraphs 32 and 33. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded, together with the corrective action taken, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

32. Daily Preventive Maintenance Services

This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 7 for the daily preventive maintenance services.

33. Quarterly Preventive Maintenance Services

a. This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by organizational maintenance personnel at quarterly intervals. A quarterly interval is equal to 3 calendar months, or 250 hours of operation, whichever occurs first.

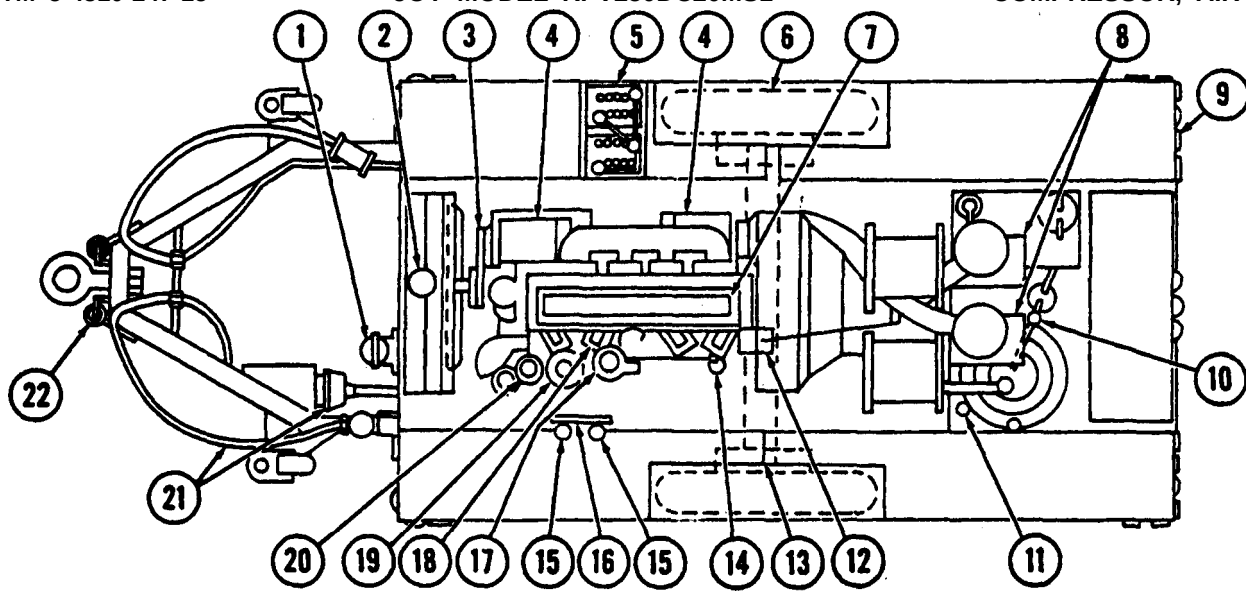
b. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to figure 8 for the quarterly preventive maintenance services

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

PREVENTIVE MAINTENANCE SERVICES
DAILY

TM 5-4310-247-15 JOY MODEL RPV250DC20MS1 COMPRESSOR, AIR



ITEM	LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER PAR REF	
1.	FIRE EXTINGUISHER. Inspect for broken seal. Inspect for full charge by pressure or weight.	62
2.	RADIATOR. Proper coolant level is 2 inches below filler neck. Replace cracked or frayed hose. Replace defective radiator. Remove obstructions in the air passages. Tighten all mounting and leaking connections.	121
3.	V-BELTS. Proper adjustment is a deflection of 3/4 inch midway between pulleys. Replace a worn, frayed or cracked belt.	38
4.	BATTERIES. Tighten loose cables and mountings. Remove corrosion. Fill to 3/8 inch above the plates. Clean venthole in filler cap before installing. In freezing weather run engine minimum of 1 hour after adding water. Repair or replace a cracked or leaking battery.	39
5.	TIRES. Check tire pressure. (Maximum air pressure 70 lbs)	

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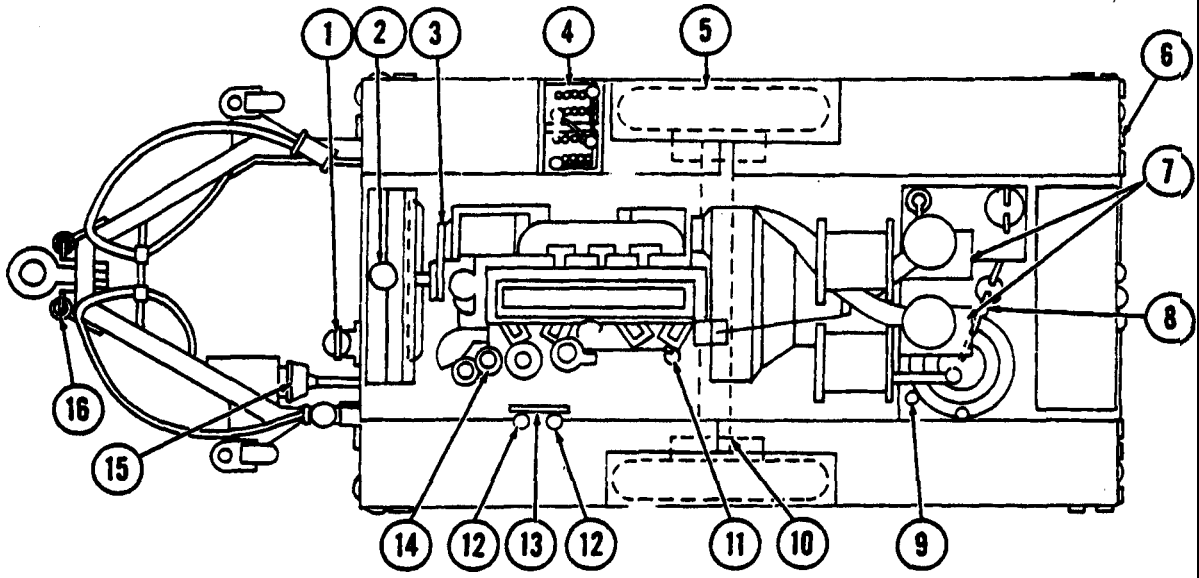
Figure 7. Daily preventive maintenance services.

ITEM		PAR REF
6.	AIR CLEANERS. Empty dust compartments. (Weekly) **WARNING** **If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.**	40a.
7.	RECEIVER CONDENSATE DRAIN. Drain condensate.	
8.	COMPRESSOR OIL LEVEL GAGE. Add oil as indicated by level gage. Reference current L.O.	30e
9.	ENGINE OIL DIPSTICK. Add oil as required. Reference current L.O.	30
10.	AIR CLEANER INDICATORS. Check for red warning signal.	40c
11.	FUEL LEVEL GAGE. Check fuel level and add fuel as required.	
12.	PRIMARY FUEL FILTER. Service every 50 hours.	35
13.	CONTROLS AND INSTRUMENTS. Inspect for damage and loose mounting. With unit operating, check for proper operation. Normal operating readings for instruments are as follows:	
	Engine Water Temperature Gore---------- 165° to 185° Engine Oil Pressure Gage----------30 to 40 psi Terminal Pressure Gage----------100 psi Ammeter ----------Charge Tachometer---------- 1800 rpm Compressor Discharge Temperature Gage 170° to 210°F	14
	NOTE 1. OPERATIONAL TEST. During operation observe for any unusual noise or vibration.	

Figure 7-Continued.

PREVENTIVE MAINTENANCE SERVICES QUARTERLY

TM 5-4310-247-15 JOY MODEL RPV250DC20MS1 COMPRESSOR, AIR



ITEM	LUBRICATE IN ACCORDANCE WITH CURRENT LUBRICATION ORDER	PAR REF
1.	FIRE EXTINGUISHER. Inspect for broken seal.	57
2.	RADIATOR. Proper coolant level is 2 inches below filler neck.	
3.	V-BELTS. Proper adjustment is a deflection of 3/4 inch midway between pulleys. (weekly)	38
4.	BATTERIES. Tighten loose cables and mountings. Remove corrosion. Inspect for cracks and leaks. Fill to 3/8 inch above the plates. Clean vent hole in filler cap before installing. In freezing weather run engine a minimum of 1 hour after adding water. (weekly)	39
5.	STARTER AND GENERATOR. Replace brushes if excessively worn or dirty. Check commutator for pitting and wear. (Check every 500 hours)	64 65
6.	LIGHTS AND REFLECTORS. Check operation of lights. Inspect for loose connections and defective lights.	

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Figure 8. Quarterly preventive maintenance services.

ITEM		PAR REF
7.	VALVE TAPPETS. Check clearance, adjust to .014 inch (hot).	81.2
8.	AIR CLEANERS. Empty dust compartments. **WARNING** If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.	40
9.	LIGHTS AND REFLECTORS. Inspect for secure mounting and broken wires. Check operation of the lights.	
10.	RECEIVER CONDENSATE DRAIN. Drain condensate.	
11.	COMPRESSOR OIL LEVEL GAGE. Add oil as indicated by level gage. Reference current L.O.	30e
12.	AIR CONTROL. Check and adjust settings.	79
13.	ENGINE OIL DIPSTICK. Add oil as required. Reference current L.O.	30
14.	AIR CLEANER INDICATORS. Check for red warning signal.	40c
15.	FUEL LEVEL GAGE. Check fuel level and add fuel as required.	
16.	INJECTION PUMP. Check timing to engine.	72
17.	INJECTOR NOZZLES. Clean and check.	118
18.	SECONDARY FUEL FILTER. Replace element. (Every 500 hours)	73
19.	PRIMARY FUEL FILTER. Service every 50 hours.	35

Figure 8-Continued.

ITEM		PAR REF
23.	CONTROLS AND INSTRUMENTS. Replace damaged instruments. Tighten lose mounting. With unit operating, check for proper operation. Normal operating readings for instruments are as follows:	
	Engine Water Temperature Gage---------- 165° to 185° Engine Oil Pressure Gage---------- 30 to 40 psi Terminal Pressure Gage ---------- 100 psi Ammeter ---------- Charge Tachometer ---------- 1800 rpm Compressor Discharge Temperature Gage 170° to 210°F	14
	NOTE 1. OPERATIONAL TEST. During operation observe for any unusual noise or vibration.	
	NOTE 2. ADJUSTMENTS. Make all necessary adjustments during operational test.	

MEC 4310-247-15/8 (3)

Figure 8—Continued.

34. General

The instructions in this section are published for the information and guidance of the operator to maintain the air compressor.

35. Primary Fuel Filter Service

Service the primary fuel filter, as illustrated in figure 11, every 50 hours.

36. Bleeding the Fuel System

a. Bleed and prime the fuel system before starting the engine for the first time, after the engine has run out of fuel, or after servicing any part of the fuel system. Refer to figure 12.

b. Loosen the bleed screw located above the secondary fuel filter.

c. Operate the hand pump until a solid stream of fuel, without air bubbles, flows from around the bleed plug.

d. Retighten the bleed plug.

37. Ether Primer Valve

Service the ether primer valve as illustrated in figure 13.

38. Servicing Fan Belt and Storage Battery

a. Fan Belt Service. Adjust fan belts as illustrated in figure 14.

b. Storage Batteries Service. Service the storage batteries as illustrated in figure 15.

39. Engine and Compressor Air Cleaners

a. Duet Removal.

(1) Release latches to remove bowl assembly (1, fig. 16).

(2) Unscrew wingnut (2) and remove louver plate (3). Empty the bowl of dirt and wipe or blow clean.

(3) Install the louver plate and the wingnut on the bowl, making sure that the louver plate is squarely seated on the bead in the bowl.

(4) If it is not necessary to clean the filter element at this time, install the bowl assembly on the body.

b. Element Servicing.

(1) Perform a(1) and (2) above.

(2) Unscrew wing bolt and remove retainer assembly (5) and element (6).

(3) Wash the element in hot or cold water, using a mild detergent. If desired, element may be cleaned in a nonflammable cleaning solution. Allow element to dry thoroughly.

***Caution:* Do not oil the element.**

(4) Install the element and the retainer assembly securely.

(5) Perform *a(3)* above.

c. Element Replacement. Discard the filter element and replace with a new one if-

(1) Visual inspection indicates a rupture or thin area in the filter media.

(2) The indicator warning signal for that filter continuously shows red after cleaning the filter element.

40. Draining and Filling the Cooling System

a. Draining.

(1) Remove radiator drain cap from drain pipe, lower, right front of radiator.

(2) Open drain cock on right rear side of block above starter.

(3) Open drain cock at bottom of engine oil cooler.

Note. Drain outlets should be left open until cooling system is to be tilled.

b. Filling.

(1) Install radiator drain cap and close drain cocks on engine oil cooler and block.

(2) Fill cooling system with proper coolant, refer to table 1.

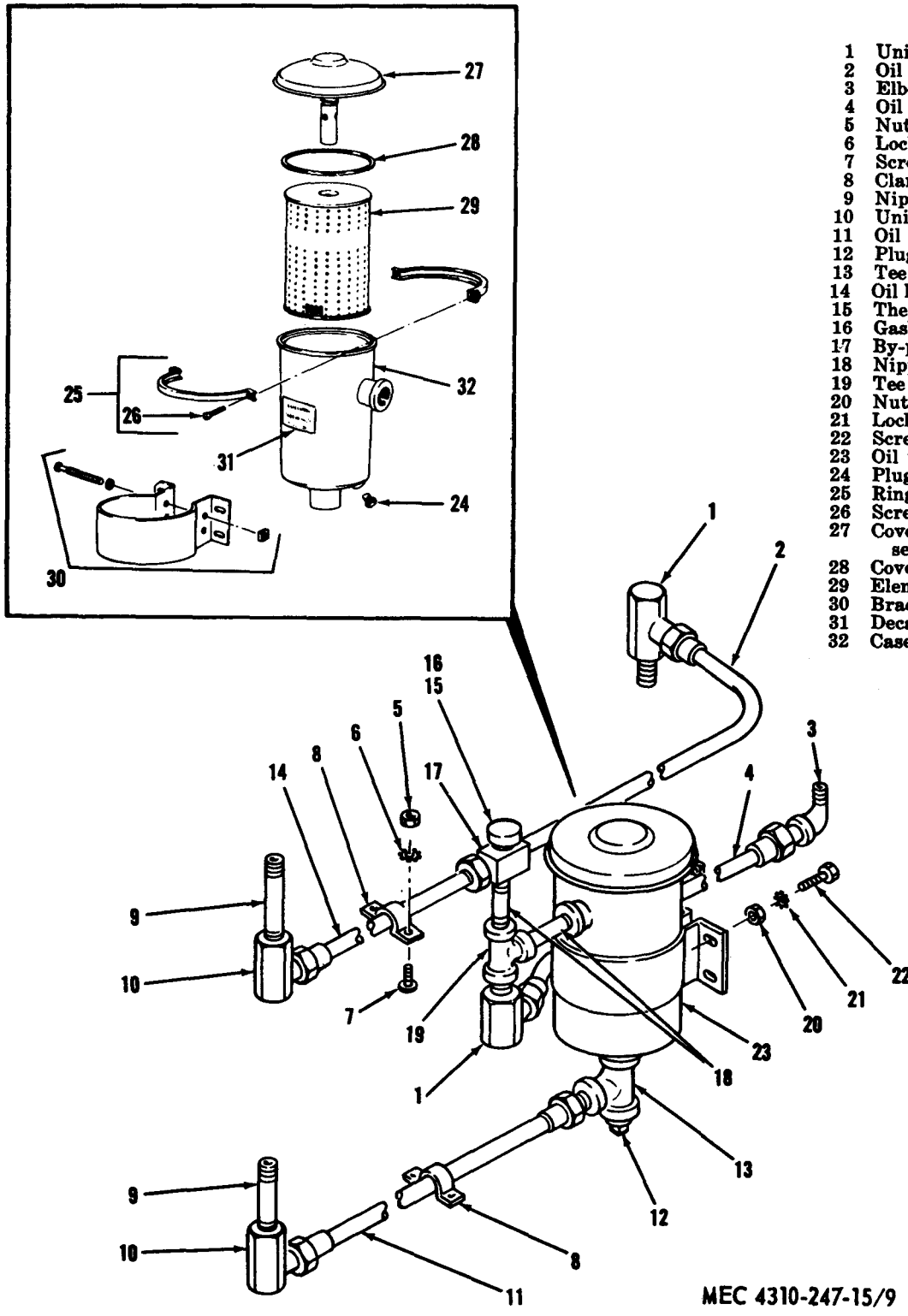
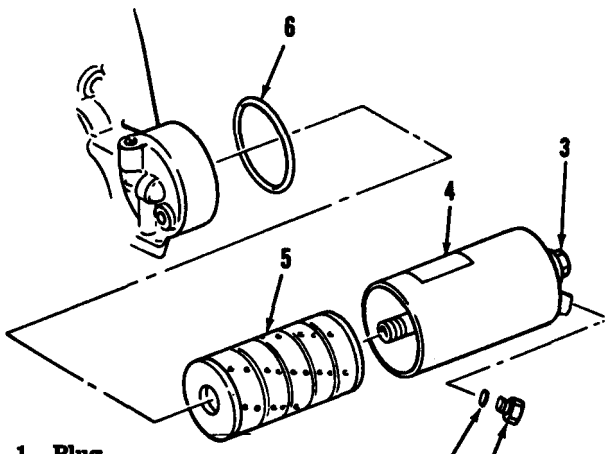


Figure 9. Compressor oil filter installation.



1 Plug
2 Seal
3 Center bolt
4 Body
5 Element
6 Gasket

Figure 10. Engine oil filter.

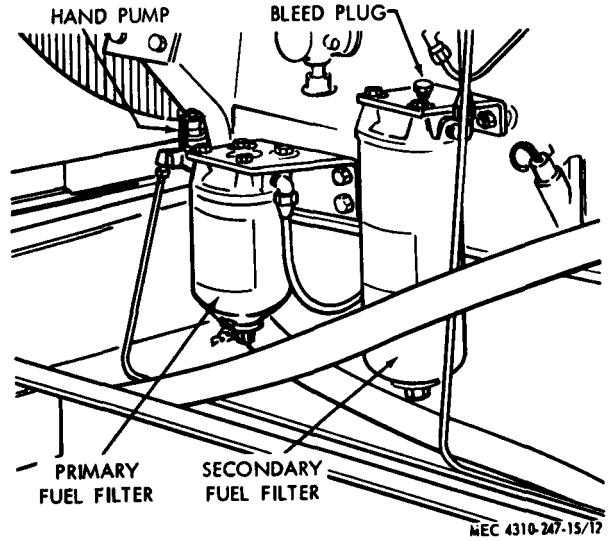
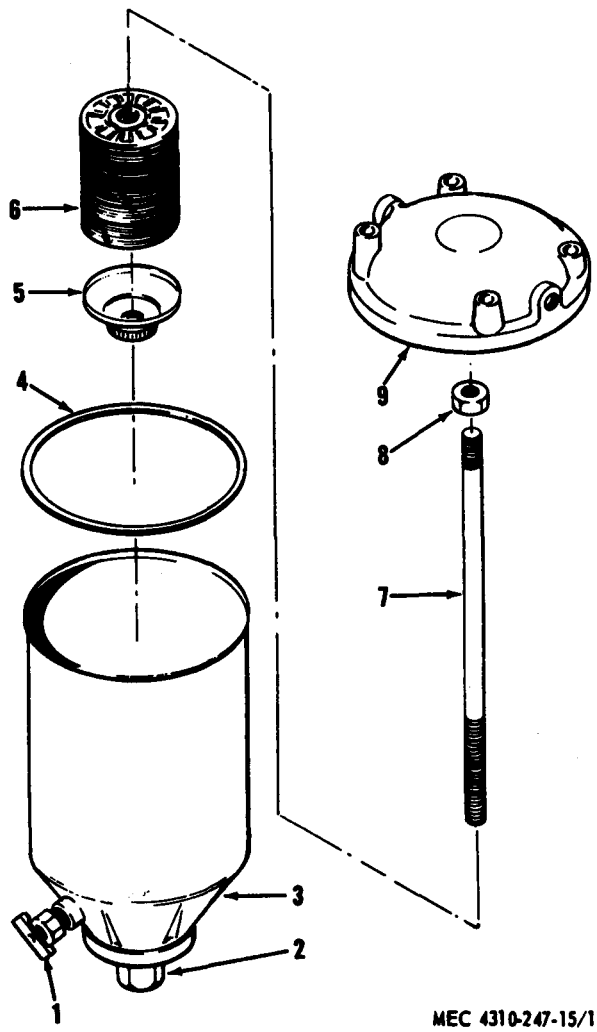


Figure 12. Bleeding the fuel system.



1 Drain cock
2 Nut
3 Body assembly
4 Gasket
5 Retainer
6 Cartridge
7 Stud
8 Nut
9 Head

Figure 11. Primary filter service.

TO REMOVE TANK:

STEP 1. UNLOCK CLAMP THAT SECURES THE TANK.

STEP 2. UNSCREW THE TANK FROM PUMP PRIMER.

TO INSTALL TANK:

STEP 1. CHECK GASKET IN VALVE. IF DAMAGED, REPLACE WITH SPARE GASKET ON TANK. DO NOT USE 2 GASKETS.

STEP 2. BE SURE VALVE LEVER IS IN "OFF" (DOWN POSITION).

STEP 3. PLACE TANK IN POSITION TO ENGAGE THREADS AND SCREW IN THE TANK.

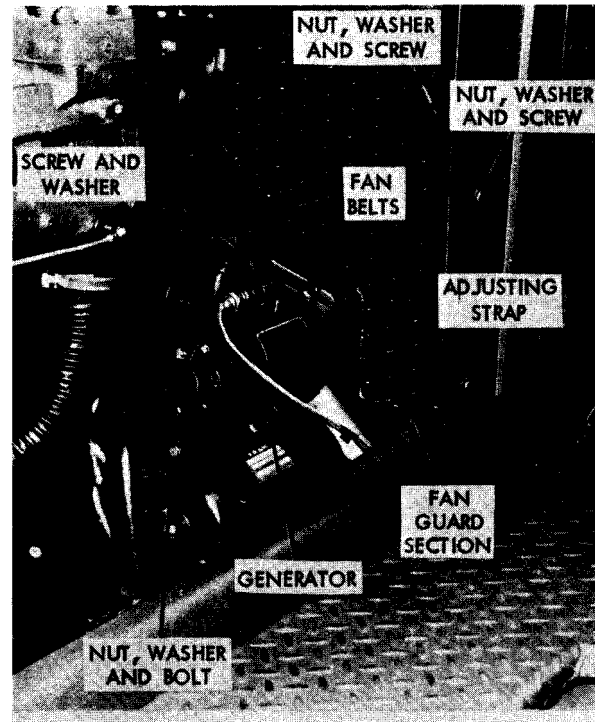
STEP 4. SECURE TANK WITH CLAMP.

WARNING

THE TANK CONTAINS EXTREMELY FLAMMABLE CONTENTS WHICH IS UNDER PRESSURE. CONTENTS ETHYL ETHER. KEEP AWAY FROM HEAT, SPARKS OR OPEN FLAME. DO NOT PUNCTURE OR INCINERATE CONTAINER. DO NOT STORE AT A TEMPERATURE ABOVE 200° F. AVOID CONTACT WITH SKIN. AVOID BREATHING OF VAPOR.

MEC 4310-247-15/13

Figure 13. Ether primer service.



TO ADJUST BELT TENSION:

STEP 1. LOOSEN SCREWS AND NUTS SECURING GENERATOR AND ADJUSTING STRAP.

STEP 2. MOVE GENERATOR UNTIL BELTS CAN BE DEFLECTED 3/4 INCH MIDWAY BETWEEN THE PULLEYS. TIGHTEN NUTS AND SCREWS.

TO REPLACE BELTS:

STEP 1. LOOSEN SCREWS AND NUTS SECURING GENERATOR AND ADJUSTING STRAP.

STEP 2. REMOVE NUTS, WASHERS, AND SCREWS SECURING THE FAN GUARD. REMOVE FAN GUARD SECTION AND THE OLD FAN BELTS.

STEP 3. POSITION NEW SET OF FAN BELTS ON THE PULLEYS. INSTALL THE FAN GUARD SECTION.

STEP 4. ADJUST BELT TENSION. TIGHTEN NUTS AND SCREWS.

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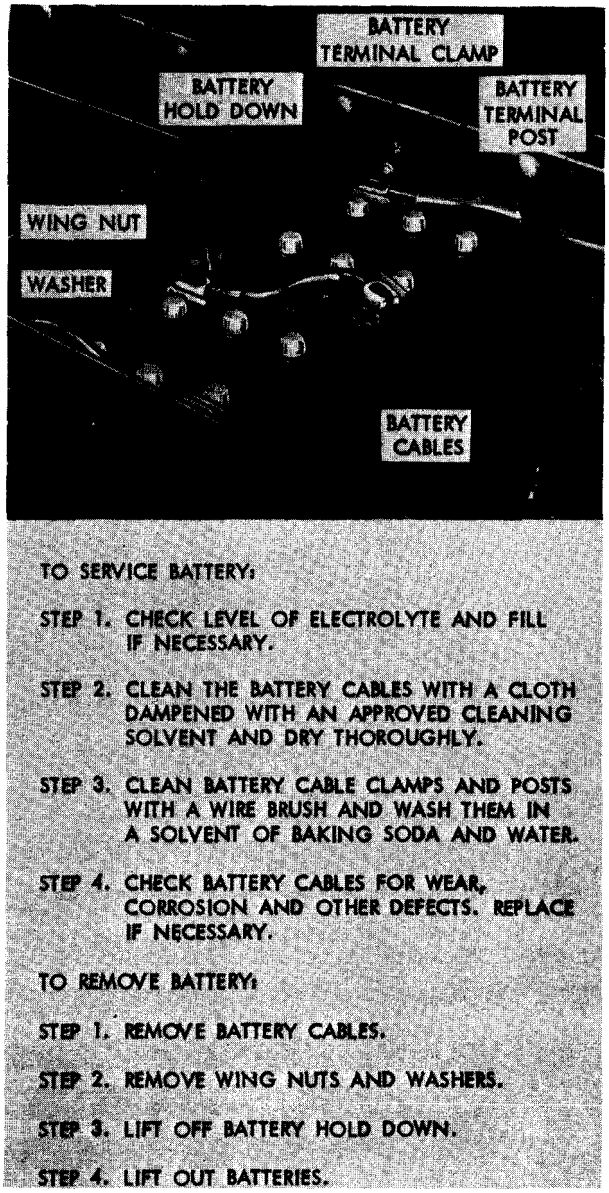
Figure 14. Fan belts service.



MEC 4310-247-15/15

Figure 15. Storage battery service and removal.

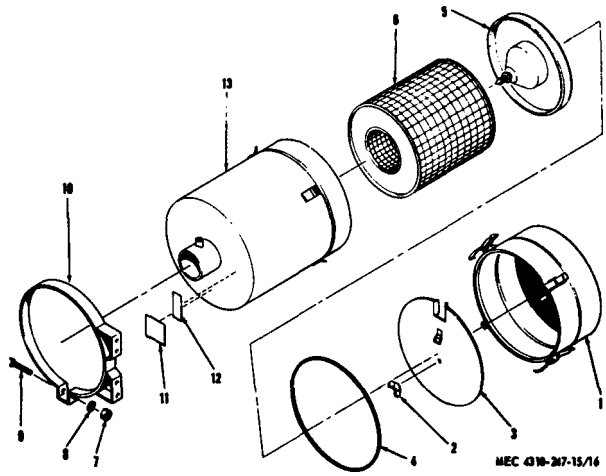


Figure 16. Air cleaner service.

1 Bowl assembly
2 Wingnut
3 Louver plate
4 Preformed packing
5 Retainer assembly
6 Element
7 Nut (2)
8 Lockwasher (2)
9 Bolt (2)
10 Bracket (2)
11 Nameplate
12 Plate
13 Body assembly

41. General

This section provides information useful in diagnosing and correcting operation or failure of the air compressor and its components. Each trouble symptom stated is followed by a list of probable causes of the trouble. The possible remedy recommended is described opposite the probable cause. Any trouble beyond the scope of organization maintenance shall be reported to direct support maintenance.

42. Starter Fails To Crank Engine

Probable cause	*Possible remedy*
Battery discharged	Test battery (para 69). Replace battery (fig. 15).
Faulty starter or switch	Replace starter (para 65) or switch (para 68).
Faulty electrical connection	Clean and tighten battery cables and other connections.
Internal engine seizure	Report to direct support maintenance.

43. Engine Hard To Start or Fails To Start

Probable cause	*Possible remedy*
Fuel tank valve closed	Open fuel tank valve (para 71).
Fuel flow restricted	Clean or replace fuel lines (para 71).
Clogged or dirty fuel filter	Service fuel lines (paras 35 and 36).
Fuel injection pump faulty	Report to direct support maintenance.
Fuel injectors dirty	Report to direct support maintenance.
Valve tappets clearance incorrect.	Adjust valve clearance (para 81.2).
Cranking speed under 115	Recharge or replace batteries (para *38b).*
Starter faulty	Replace starter (para 65).
Clogged or dirty engine air cleaner.	Service air cleaner or replace air cleaner element (para 39).

44. Engine Misses or Runs Erratically

Probable cause	*Possible remedy*
Missing cylinder or cylinders	Check cylinders for firing.
Air or water in fuel lines	Check connections, bleed fuel lines (para 36).
Clogged air cleaner	Service air cleaner (para 39).
Engine idles too slowly	Increase to recommended speed.
Clogged or dirty fuel filters	Service filters (paras 35 and 36).
Valve tappet clearance incorrect.	Adjust valve clearance (para 81.2).

45. Engine lacks Power

Probable cause	*Possible remedy*
Restricted fuel supply or air in fuel system.	Clean lines, service filters, and bleed system (para 36).
Restriction in air intake	Service air cleaner (para 39).
Faulty fuel injector	Report to direct support maintenance.
Faulty injector pump	Report to direct support maintenance.

46. Engine Overheats

Probable cause	*Possible remedy*
Low coolant level	Add coolant.
Fan belts slipping	Adjust fan belt tension (para *38a)* or apply graphite belt dressing.
Thermostat inoperative	Replace thermostat (para 132).
Inoperative water pump	Replace water pump (para 122).
Cooling system clogged	Flush out radiator and engine.
Back pressure in exhaust system.	inspect for and remedy restriations in exhaust system.
Fuel injection pump timing incorrect.	Time fuel injection pump (para 72).

47. Engine Oil Pressure Gage Indicates low or No Oil Pressure

Probable cause	*Possible remedy*
Low oil level	Add oil. Refer to current lubrication order.
Oil pressure gage or line faulty.	Check, repair or replace (para 68).
Oil too light or diluted	Change oil. Refer to current lubrication order.
Oil pump failure	Report to direct support maintenance.
Oil line clogged or broken	Clean or replace oil line.
Clogged oil filter	Replace filter element (para *30f).*

48. Oil Consumption Excessive

Probable cause	*Possible remedy*
Oil leaks	Locate and repair.
Oil level too high	Maintain proper oil level. Refer to current lubrication order.
Incorrect grade of oil used	Refer to current lubrication order.
Worn, broken or stuck piston rings or worn valve guides.	Report to direct support maintenance.
Clogged crankcase breather	Clean breather end pipe.

49. Fuel Consumption and Exhaust Smoke Excessive

Probable cause	*Possible remedy*
Restricted air supply	Service air cleaner (para 39).
Engine temperature low	Replace thermostat (para 132).
Fuel injectors faulty	Report to direct support maintenance.
Improper grade of fuel	Drain fuel system and refill with proper grade of fuel.

50. Engine Stops Suddenly

Probable cause	*Possible remedy*
No fuel	Refill fuel tank and bleed system.
Restriction in fuel flow	Service fuel filters (paras 35 and 36).
Air in fuel lines	Bleed fuel system.
Water in fuel	Drain and refill, bleed system.
Safety circuit shutdown	Check out the circuit.
Safety switch failure	Check all safety switches.

51. Combustion Knock

Probable cause	*Possible remedy*
Lugging	Increase speed.
Wrong grade of fuel	Use correct grade of fuel.
Excessive ether injection	Reduce frequency of injections.

52. Compressor Overheats

Probable cause	*Possible remedy*
Fan belt slipping	Adjust belt tension (para 38).
Oil supply low	Add oil to the proper level. Refer to current lubrication order.
Oil filter clogged	Service the oil filter (para 78).
Oil cooler fins clogged	Blow out with air hose.
Thermal valve inoperative	Clean or replace valve.

53. Discharge Pressure Does Not Build Up

Probable cause	*Possible remedy*
Service line valve open	Close valve, or replace if defective.
Air cleaner blocked	Service the air cleaner (para 39).
Safety relief valve open	Replace the safety relief valve.
Air control faulty	Service the air control (para 79).

54. Compressor Oil Consumption Excessive

Probable cause	*Possible remedy*
Broken or leaking oil line	Tighten connections or repair.
Oil sump level too high	Drain off excess.

55. Safety Relief Valve Pops

Probable cause	*Possible remedy*
Air control improperly set	Reset control.
Safety relief valve faulty	Replace.
Control line broken or leaking.	Tighten connections or repair.

Section VI. RADIO INTERFERENCE SUPPRESSION

56. Definitions

a. Interference. The term "interference" as used herein, applies to electrical disturbances in the radio frequency which are generated by the air compressor and which may interfere with the proper operation of radio receivers or other electronic equipment.

b. Interference Suppression. The term "Interference Suppression" as used herein, applies to the methods used to eliminate or effectively reduce radio interference generated by the air compressor.

57. General Methods Used To Attain Proper Suppression

Essentially, suppression is attained by providing a low-resistance path to ground for the stray currents. The methods used include shielding high frequency wires, grounding the frame with bonding straps, and using capacitators and resistors.

58. Interference Suppression Components

The primary suppression components are those whose primary function is to suppress radio interference. These components are described in figure 16.1.

59. Replacement of Suppression Components

Refer to figure 16.1 and replace the radio interference suppression components.

60. Testing of Radio Interference Suppression Components

Test the capacitors for leaks and shorts on a capacitor tester; replace defective capacitors. If test equipment is not available and interfer-

ence is indicated, isolate the cause of interference by the trial-and-error method of replacing each capacitor in turn until the cause of interference is located and eliminated.

Figure 16.1. Interference suppression capacitor, removal and installation.

Section VII. BODY

61. Doors and Panels

a. Removal

(1) Remove the screws (26, fig. 17), washers (19) and nuts (23) that secure the doors (27) to the housing (32). Remove the dears.

(2) Remove the screws (26), washers (19), and nuts (23) that secure the front lower panel (28). Remove the panel.

(3) Remove the screws (14), washers (3), and nuts (1). Remove door holders (15).

b. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect for dents, breaks, cracks, rust, damaged hinges, or other damage. Replace parts if damaged.

(3) Paint all surfaces where the paint has been removed or damaged. Refer to TB 740-93-2 for detailed instruction.

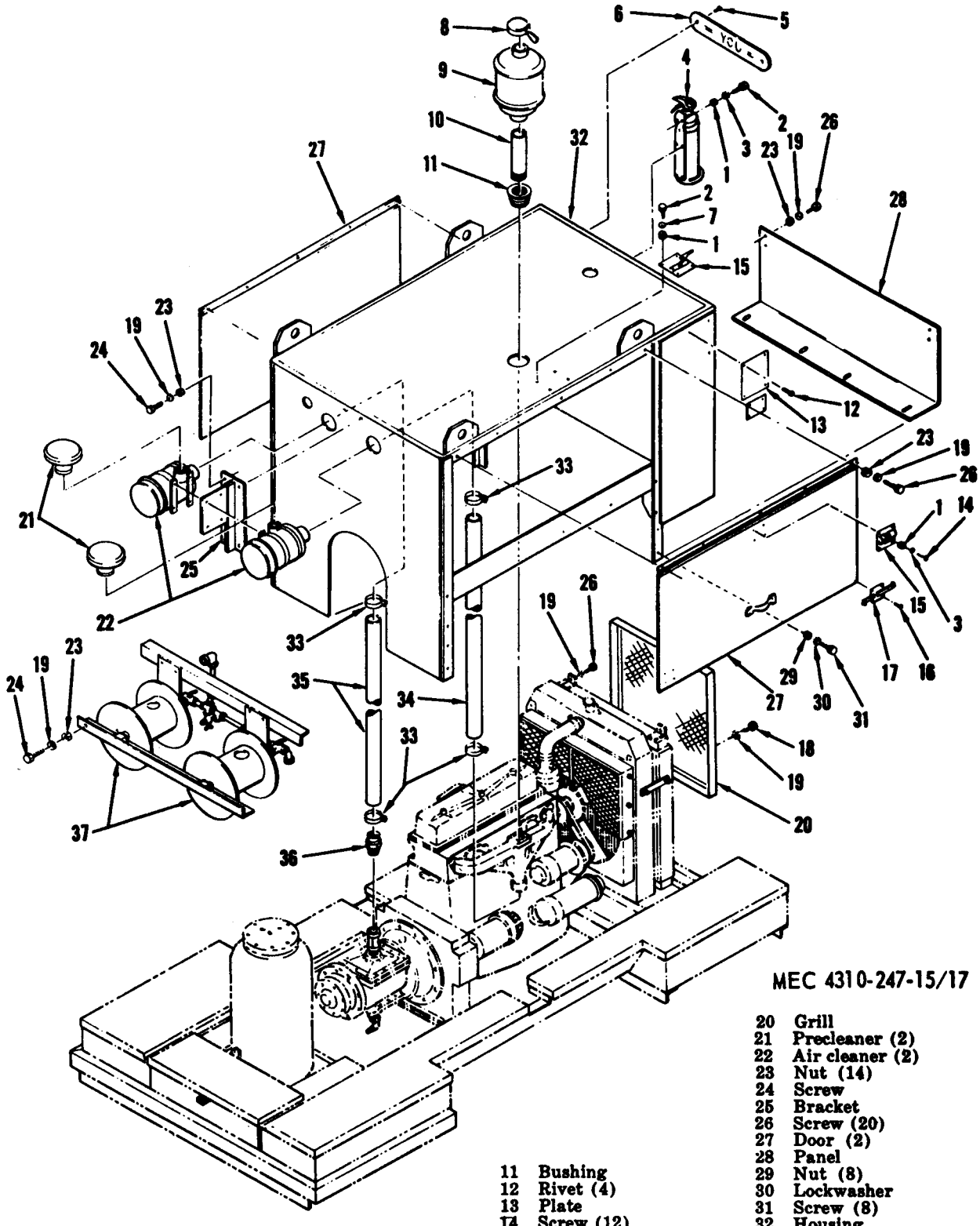
(4) Inspect the door holders, door catches, and hardware for damage or wear and replace is damaged.

c. Installation.

(1) Position the door holders (15) on the doors (27) and secure with screws (14), washers (3) and nuts (1).

(2) Position the front lower panel (28) on the housing (32) and secure with screws (26), washers (19), and nuts (23).

(3) Position the doors (27) on the housing (32) and secure with screws (26), washers (19) and nuts (23).



1 Nut (20)
2 Screw (8)
3 Lockwasher (20)
4 Fire extinguisher
5 Rivet (2)
6 Plate
7 Washer (16)
8 Rain cap
9 Muffler
10 Exhaust pipe
11 Bushing
12 Rivet (4)
13 Plate
14 Screw (12)
15 Door holder (2)
16 Rivet (16)
17 Clamp assembly (4)
18 Screw (6)
19 Lockwasher (32)
20 Grill
21 Precleaner (2)
22 Air cleaner (2)
23 Nut (14)
24 Screw
25 Bracket
26 Screw (20)
27 Door (2)
28 Panel
29 Nut (8)
30 Lockwasher
31 Screw (8)
32 Housing
33 Clamp (4)
34 Hose
35 Hose
36 Adapter
37 Hose reel assembly

Figure 17. Body group.

62. Fire Extinguisher

a. Removal.

(1) Remove fire extinguisher (4, fig. 17) from its bracket by opening clamp.

(2) Remove the attaching screws and the bracket.

b. Cleaning and Inspection.

(1) Clean bracket with an approved cleaning solvent and dry thoroughly.

(2) Inspect fire extinguisher. Refer to paragraph 25.

(3) Inspect all parts for damage or wear and replace if damaged.

c. Installation.

(1) Position bracket and secure with screws.

(2) Position fire extinguisher in bracket and lock in place with clamp.

63. Housing Assembly

a. Removal.

(1) Remove the engine and compressor air cleaner hoses (34 and 35, fig. 17).

(2) Disconnect the receiver-to-reel hose at the receiver.

(3) Remove the muffler and fittings (para 77).

(4) Remove screws at top of instrument panel. Disconnect tube clamps.

(5) Remove attaching screws, washers and nuts from the housing (32, fig. 17). Attach lifting device and remove housing assembly.

b. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect for dents, breaks, cracks, rust, or other damage. Replace parts if damaged.

(3) Paint all surfaces where the paint has been removed or damaged. Refer to TB-740-93-2 for detailed instructions.

(4) Inspect for damage or wear and replace.

c. *Installation.*

(1) Position housing assembly and secure with screws, washers and nuts.

(2) Fasten instrument panel screws. Connect tube clamps.

(3) Install muffler and fittings (para 77).

(4) Install air cleaner hoses (fig. 17).

(5) Connect receiver-to-reel hose at the receiver.

Section VIII. ELECTRICAL SYSTEM

64. Generator

a. Removal. Refer to figure 18 and remove the generator.

b. Cleaning and Inspection.

(1) Clean the outside of the generator and all other parts except electrical wiring with an approved cleaning solvent and dry thoroughly. Make sure that solvent does not enter the generator.

(2) Inspect the terminals for corrosion. Clean with a wire brush if necessary, and apply a small amount of light grease.

(3) Remove the inspection cover band from the generator housing. Clean the commutator, if necessary, by inserting a piece of No. 00 sandpaper between the brushes with the rough side against the commutator. Work the sandpaper back and forth and around the commutator until it has a polished appearance. Blow out all dust and grit with compressed air.

Caution: **Do not use emery or carborundum cloth. The particles from these cloths can short out segments of the commutator.**

(4) If the commutator is pitted, or if the mica between the segments is high, replace the generator.

(5) Inspect the brushes and replace them if they are oil-soaked, or if they are worn to less than half their original length. The length of a new brush is seven-eighths inch, *c* below.

c. *Brush Replacement.*

(1) Use a hook to lift up the brush arm. Remove the screw and washers that secure the brush lead to the brushholder; lift out the brush.

(2) Position the new brush. Be sure the spring is properly seated against the brush arm. Connect the brush lead

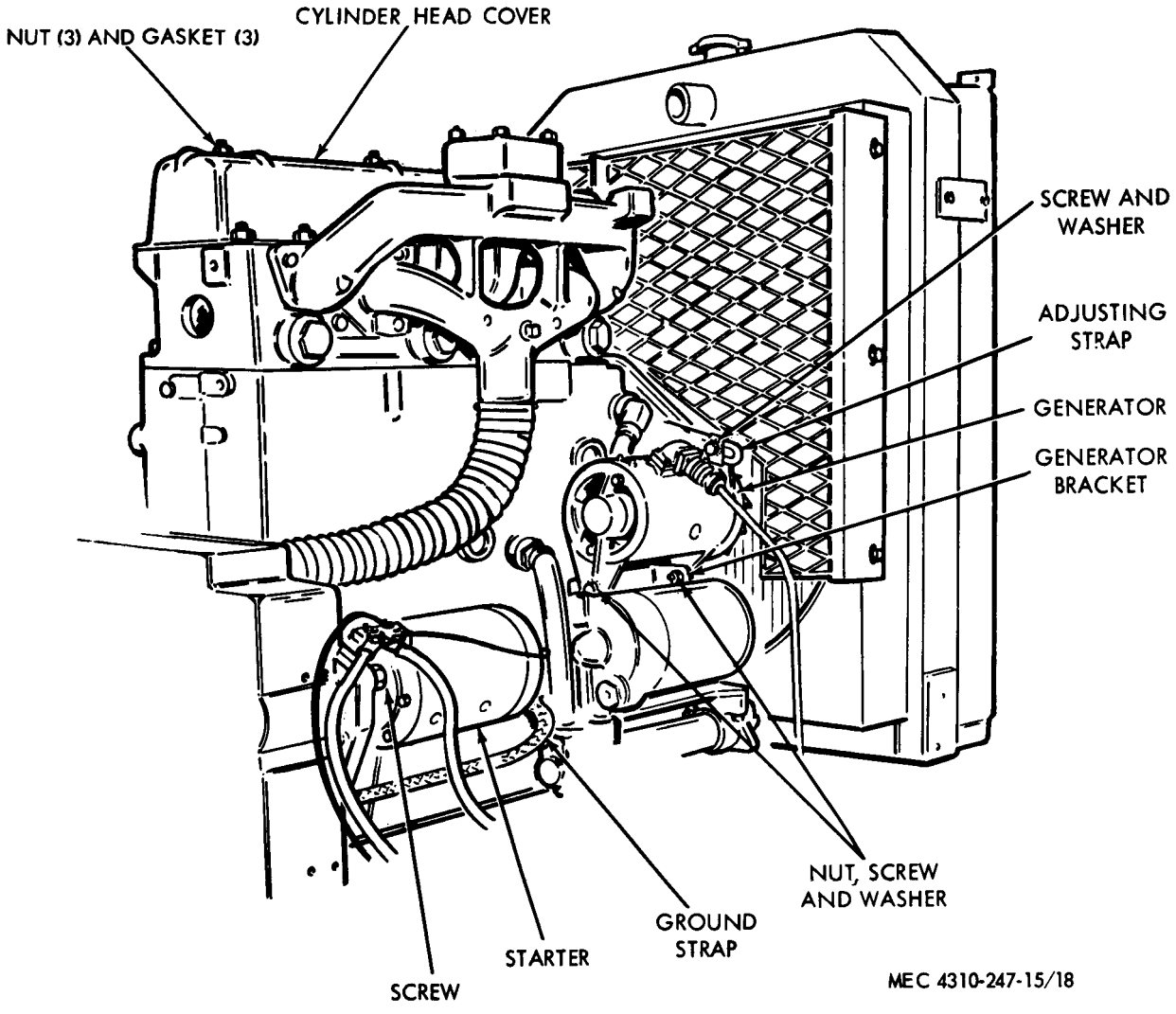


Figure 18. Generator, starter and cylinder head cover removal.

to the brushholder with the screw and washers.

(3) Seat the brushes by inserting a piece of No. 00 sandpaper between the brush and the commutator with the rough side toward the brush; pull the sandpaper back and forth against the contour of the commutator, making the last stroke in the direction of rotation. Blow out dust and grit with compressed air.

d. Generator Pulley Replacement.

(1) Protect the pulley with wood blocks and clamp it in a vise.

(2) Remove the nut and washer.

(3) Use a puller to remove the pulley and the key from the armature shaft.

(4) Install the key; align keyway of pulley, then tap pulley onto the armature shaft.

(5) Secure the pulley in a vise, using wood blocks, and install the washer and screw.

e. Engine Generator Bench Test.

(1) *Field current draw.* Connect a voltmeter between the field pin socket of the electrical receptacle connector and the engine accessory generator. Connect an ammeter, a field rheostat, a battery switch, and a fully charged

24-volt battery in series with each other and connect the group between the field pin socket of the electrical receptacle connector and the engine accessory generator. Close the battery switch and adjust the field rheostat for a reading of 24 volts on the voltmeter. The ammeter reading should be between 0.91 and 0.98 ampere. If the current does not fall within this range, inspect the engine accessory generator for defective terminals, internal connections, or field windings.

(2) *Motoring test.* Connect a jumper between the field pin socket and the brush pin socket of the electrical receptacle connector. Connect a fully-charged, 24-volt battery and a battery switch in series with each other and between the brush pin socket of the electrical receptacle connector and the engine accessory generator. Close the battery switch. The armature should revolve in a clockwise direction as viewed from the drive end. If the armature does not turn freely in the correct direction, inspect the generator for incorrect assembly, defective bearings, poor brush contact, or a defective armature.

(3) *Output test.* Mount the engine accessory generator on a test bench and couple it to a drive motor. Connect a field rheostat between the field pin socket and the brush pin socket of the electrical receptacle connector. Connect the negative terminal of a fully-charged battery to the engine accessory generator and connect the positive terminal to one terminal of a reverse current relay. Connect the other terminal of the relay to the brush pin socket of the electrical receptacle connector. Connect a carbon pile rheostat across the battery. Momentarily connect a jumper across the terminals of the reverse current relay to polarize the engine accessory generator. Start the drive motor and adjust its speed to 1,775 rpm. Adjust the field rheostat for a reading of 28.5 volts on the voltmeter and adjust the carbon pile rheostat until the ammeter shows a load of 18 amperes. Readjust the field rheostat as necessary to maintain the voltage. Operate the engine accessory generator for 15 minutes to attain operating temperature. Readjust the voltage and amperage to the aforementioned values. If the rated voltage and amperage cannot be maintained, report the condition to direct support maintenance.

f. Installation.

(1) Install the cover band and tighten the screw.

(2) Refer to figure 18 and install the generator.

(3) Momentarily connect a jumper lead between the battery terminal and the generator terminal to polarize the generator.

65. Starter

a. Removal. Refer to figure 18 and remove the starter.

b. Cleaning and Inspection.

(1) Clean the exterior of the starter with a cloth dampened with an approved cleaning solvent and dry thoroughly.

(2) Inspect the starter for breaks, cracks or other damage. Replace a damaged starter.

(3) Inspect brushes for excessive wear and dirt. Replace brushes that are worn to less than one-half their original length. Clean dirt from brushes.

(4) Check brushes for freedom in holders so that they make good contact with the commutator. Inspect wire connections.

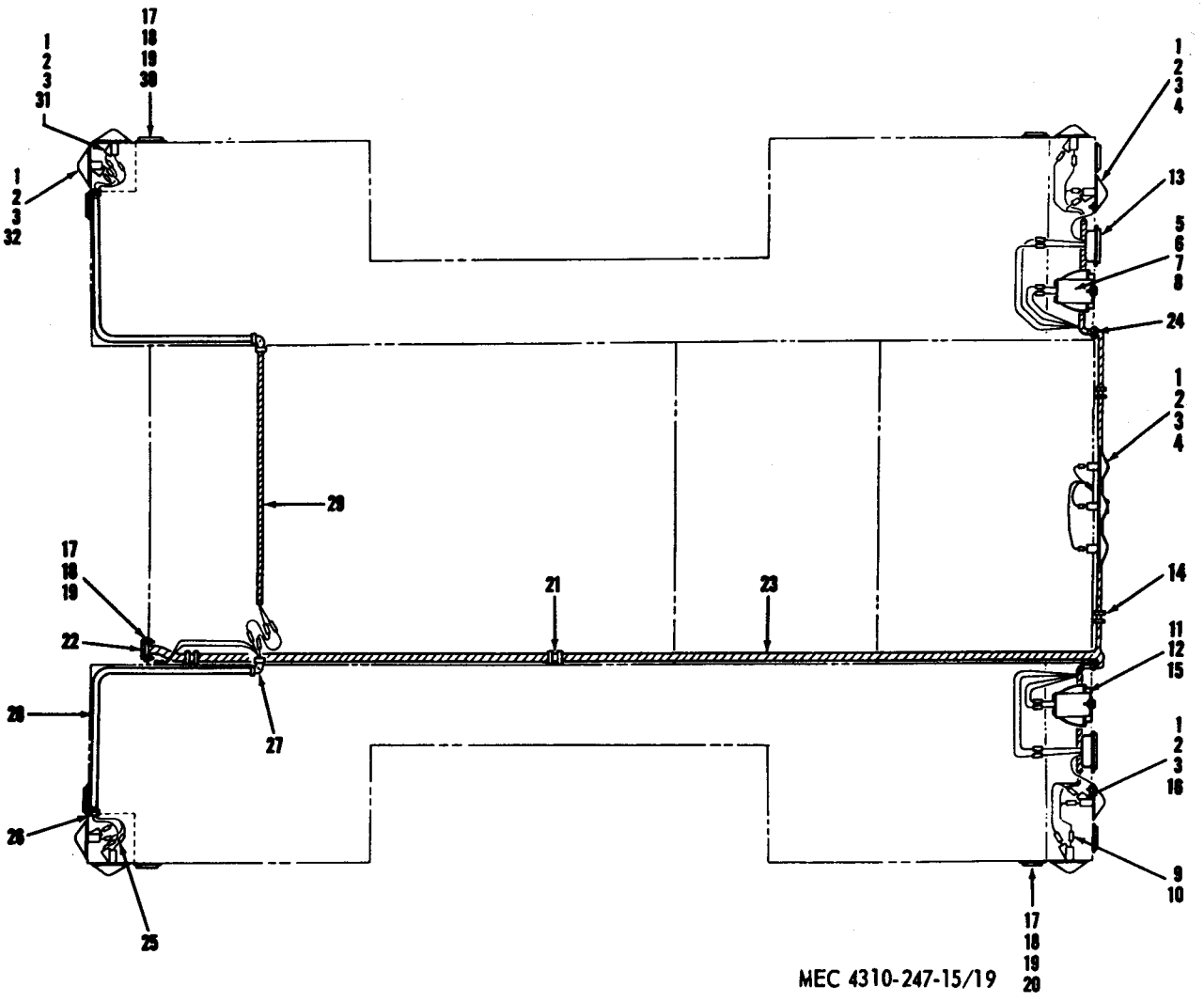
(5) Inspect gear teeth on starting mechanism for wear or damage. Replace starter if necessary.

c. Testing.

(1) Use a test lamp circuit and test between the insulated brush holder and brush end cover. If the lamp lights on this test, the brush holder is grounded. Replace starter if necessary.

(2) Test between the grounded brush holder and brush end cover. If the lamp fails to light, replace starter if necessary.

d. Installation. Install the starter.



1	Nut (76)	8	Bracket (2)	14	Clip (3)	20	Reflector, red (4)	26	Connector (20)
2	Washer (76)	9	Shell (20)	15	Lamp (2)	21	Clip (2)	27	Elbow (2)
3	Screw (76)	10	Washer (20)	16	Lamp (4)	22	Receptacle	28	Conduit (2)
4	Lamp (7)	11	Screw (8)	17	Nut (20)	23	Wiring harness	29	Wiring harness
5	Nut (8)	12	Washer (8)	18	Washer (24)	24	Grommet (2)	30	Reflector, amber (4)
6	Washer (8)	13	Lamp (2)	19	Screw (20)	25	Wiring harness	31	Lamp (4)
7	Screw (8)							32	Lamp (4)

Figure 19. Lights and mounting parts.

66. Lights and Mounting Parts

Refer to figure 19 for removal and installation of the lights and mounting parts.

67. Generator Regulator

a. On-Engine Testing. Defects in the generator or the regulator are indicated on the ammeter by a continuous high-charging rate when the battery is fully charged, or by a low-or-no-charging rate when the battery is low.

(1) When a high-charging rate is indicated, run the engine at operating speed and disconnect the field terminal lead from the regulator. If the output remains high, the trouble is in the generator. Replace a defective generator (para 64). If the output drops off, the trouble is in the regulator. Adjust the regulator or replace a defective unit.

(2) When a low-or-no-charging rate is indicated, inspect for loose connections, frayed or damaged wires, or a defective battery. If none of these conditions exists, operate the engine at a medium speed and momentarily ground the field terminal of the regulator. No increase in the output indicates a defect in the generator. Replace a defective generator (para 64). An increase indicates the regulator is faulty. Replace a defective regulator.

(3) Momentarily connect a jumper lead between the battery terminal and the generator terminal, to polarize the generator.

b. Removal and Installation. Refer to figure 20 and remove or install the generator regulator.

69. Instrument Panel

a. General. All controls and instruments necessary for operation of the air compressor are mounted on the instrument panel located within the enclosure. Controls and instruments must be replaced when they become inoperative or show signs of incorrect readings during normal operation. Care should be taken in handling controls and instruments, since they are sensitive and are adjusted accurately. Replace controls accurately, because their adjust-merits are necessary to insure proper operation of the air compressor.

(1) Disconnect batteries before doing any work on instrument panel.

(2) Disconnect air and oil lines and electrical leads from any portion of instrument panel to be worked on.

Warning: **Release all air pressure from the air compressor prior to performing any maintenance on the unit.**

b. Disassembly and Removal.

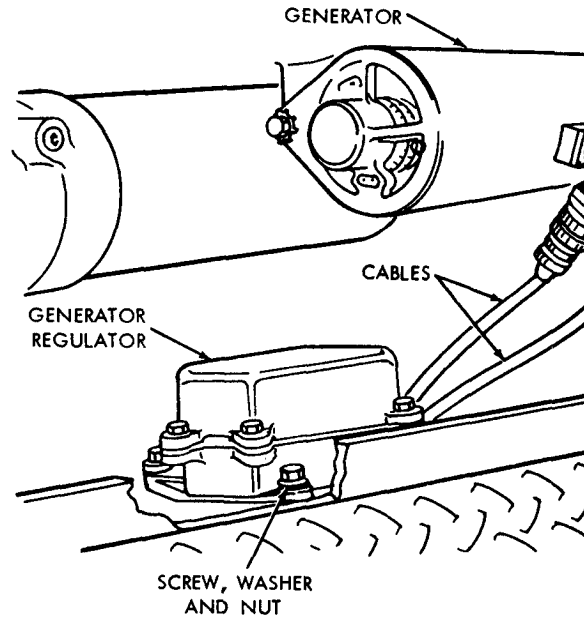
(1) Refer to figure 21 and remove items 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 28.

(2) Remove nuts (30), washers (31), and screws (32). Remove panel (33) from enclosure.

c. *Cleaning and Inspection.*

(1) Clean all parts, except electrical components, in an approved cleaning solvent; dry thoroughly.

(2) Clean electrical leads and terminals with a cloth dampened with an ap-



TO REMOVE GENERATOR REGULATOR:

STEP 1. DISCONNECT THE TWO CABLES FROM GENERATOR REGULATOR.

STEP 2. REMOVE NUTS, LOCKWASHERS AND SCREWS.

STEP 3. REMOVE GENERATOR REGULATOR.

MEC 4310-247-15/20

Figure 20. Generator regulator removal.

proved cleaning advent, removing all grease and dirt accumulations. Remove any corrosion from the terminals.

(3) Replace all worn, cracked, broken, or otherwise defective parts.

d. Installation.

(1) Position panel (33) in enclosure and secure with nuts (30), washers (31), and screws (32).

(2) Refer to figure 21 and reassemble items 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 28.

(3) Connect the air and oil lines and the electrical leads.

(4) Reconnect the battery cables.

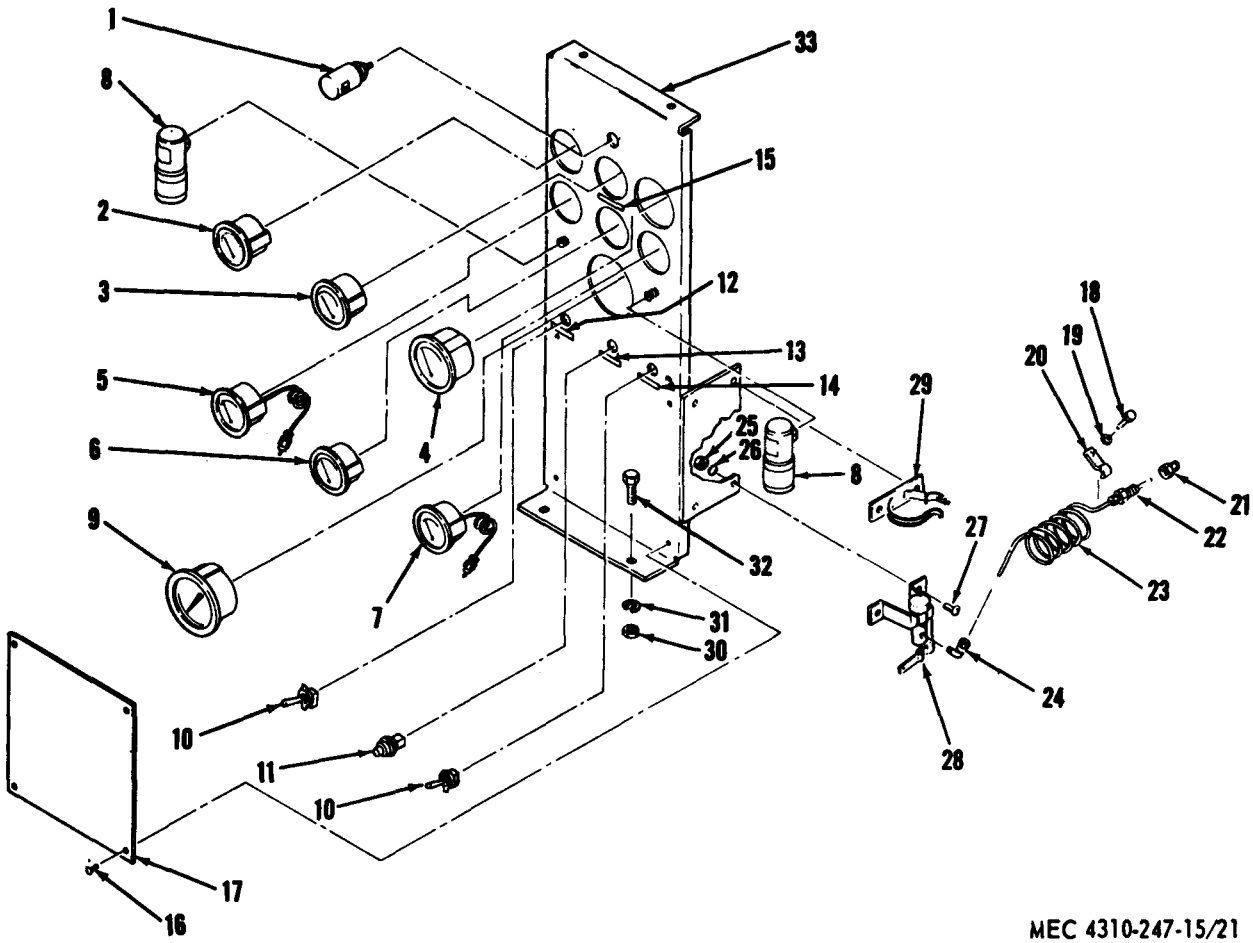
69. Storage Battery Testing

a. Cleaning and Inspection.

(1) Remove any corrosion from the battery posts and cable clamps with a solution of ordinary baking soda and water. Clean corroded parts with a stiff brush; flush with clear water.

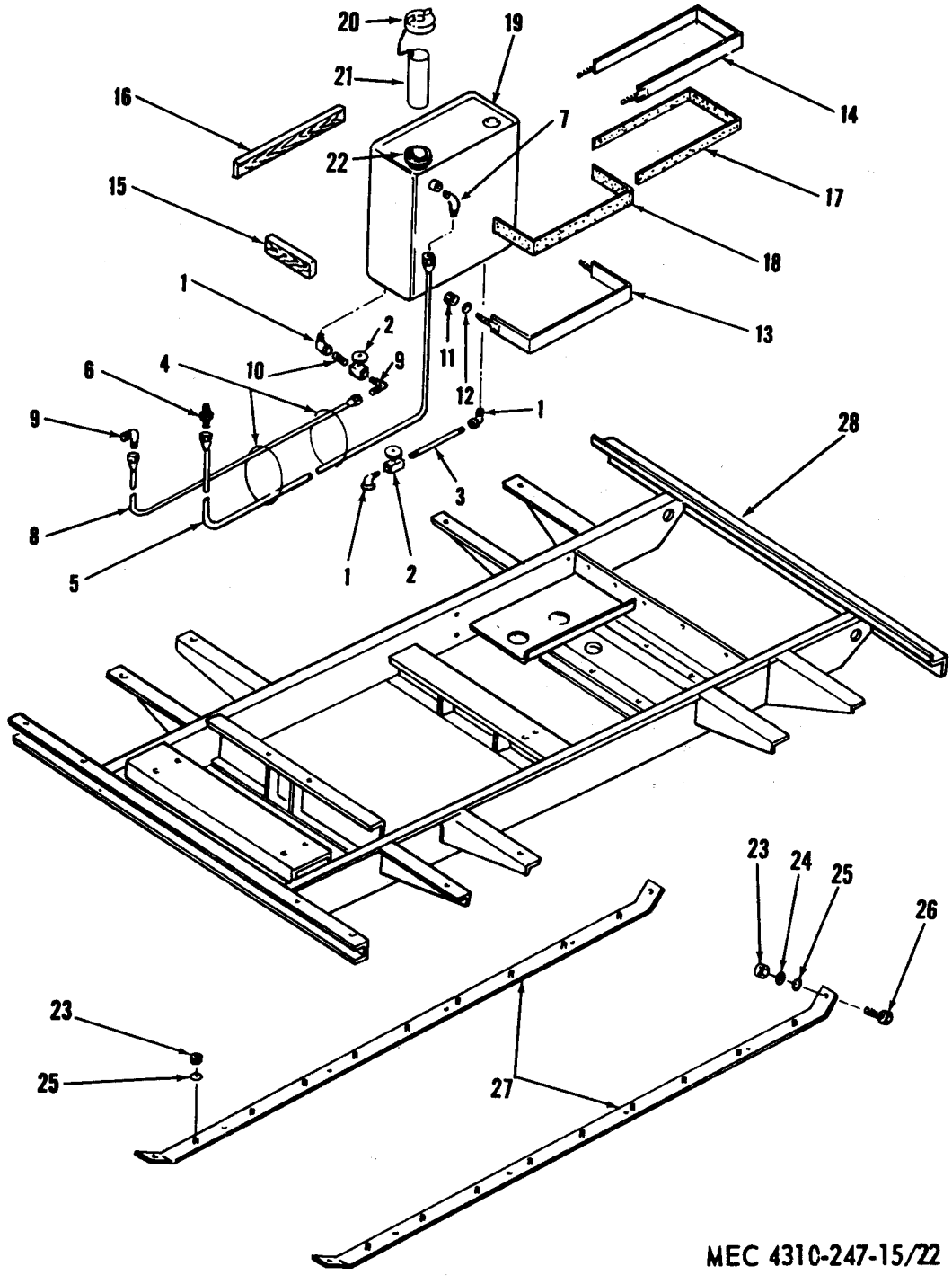
Caution: **Make sure that none of the solution enters the batteries. Baking soda will react with the acid to neutralize it.**

(2) Coat the posts and clamps lightly with grease to prevent corrosion.



1 Panel light
2 Oil pressure gage
3 Ammeter
4 Pressure gage
5 Temperature gage
6 Fuel level gage
7 Temperature gage
8 Indicator (2)
9 Tachometer—hourmeter
10 Toggle switch (2)
11 Starter switch
12 Label
13 Label
14 Label
15 Label
16 Rivet (4)
17 Instruction plate
18 Screw
19 Lockwasher
20 Spring clip
21 Bushing
22 Fitting
23 Tube
24 Elbow
25 Nut (4)
26 Lockwasher (4)
27 Screw (4)
28 Ether primer valve
29 Clamp assembly
30 Nut (4)
31 Washer (4)
32 Screw (4)
33 Panel

Figure 21. *Instrument ,panel.*



1 Elbow (4)	8 Tube assembly	15 Lower spacer	22 Filler neck
2 Shut-off cock (2)	9 Elbow	16 Upper spacer	23 Nut (26)
3 Nipple	10 Nipple	17 Upper anti-squeak	24 Washer (4)
4 Strap	11 Nut (4)	18 Lower anti-squeak	25 Lockwasher (26)
5 Tube assembly	12 Washer (4)	19 Fuel tank	26 Screw (8)
6 Union half	13 Lower mounting strap	20 Cap	27 Runner (2)
7 Elbow (3)	14 Upper mounting strap	21 Filler tube	28 Skid

Figure 22. Chassis group.

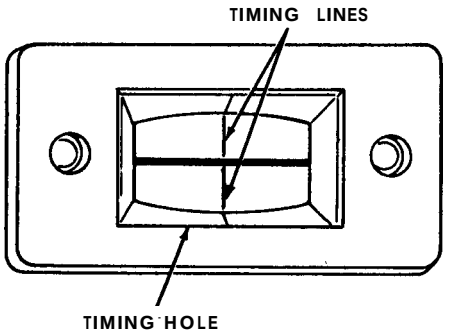


Figure 23. Fuel pump timing marks.

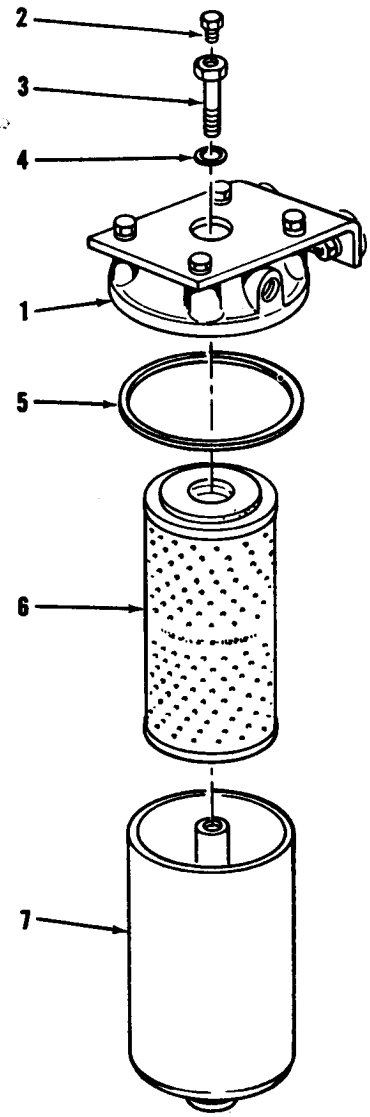
(3) Clean ventholes in the battery caps.

(4) Check battery for leakage. Replace a leaking battery.

b. Testing.

(1) Test the specific gravity of the battery electrolyte with a hydrometer, drawing the electrolyte from each cell. Correct the specific gravity reading of the hydrometer for the temperature of the electrolyte. The temperature corrected reading should be 1.280.

(2) Specific gravity temperature correction:



1 Head
2 Bleed plug
3 Screw
4 Gasket
5 Head gasket
6 Cartridge
7 Body assembly

Figure 24. Secondary fuel filter.

Specific Gravity Chart

% Charge	−65°F.	−40°F.	−20°F.	−10°F.	0°F.	+20°F.	+40°F.	+80°F.	+100°F.	+120°F.
50%	1.277	1.267	1.259	1.255	1.251	1.243	1.236	1.220	1.213	1.205
75%	1.307	1.297	1.289	1.281	1.281	1.273	1.266	1.250	1.243	1.235
100%	1.338	1.328	1.320	1.316	1.312	1.304	1.296	1.280	1.272	1.265

Section IX. FUEL SYSTEM

70. Air Cleaner Repair and Replacement

WARNING

If NBC exposure is suspected, all air filter media should be handled by personnel wearing protective equipment. Consult your unit NBC Officer or NBC NCO for appropriate handling or disposal instructions.

a. Removal. Refer to figure 16 for removal and disassembly of the air cleaners.

b. Cleaning and Inspection.

(1) Clean parts except element with an approved cleaning solvent and dry thoroughly.

(2) Service the filter element (para 40).

(3) Inspect for dents, tears, worn threads or other damage. Replace any damaged parts.

c. Reassembly and Installation. Refer to figure 16 for reassembly and installation of the air cleaners.

71. Fuel Tank, Lines, and Fittings

a Removal and Disassembly.

(1) Open shutoff cock (2, fig. 22) and drain the fuel into a suitable container.

(2) Disconnect tube assemblies (5 and 8) at the fuel tank.

(3) Remove nuts (11), washers (12), straps (13 and 14), antisqueak (17 and 18), and spacers (15 and 16).

(4) Lift out fuel tank assembly and remove elbow (1), shutoff cock (2), nipple (3), elbows (9 and 7), and nipple (10).

(5) Remove cap (20) and filler tube (21) from filler neck (22). Disconnect and remove fuel level gauge sender from fuel tank (19).

b. Cleaning and Inspection.

(1) Clean the fuel tank, straps, and fuel line assembly with a cloth dampened with an approved cleaning solvent.

(2) Inspect the fuel tank, straps, and fuel lines for dents, cracks, breaks, rust spots, damaged threads, wear, or other damage.

(3) Inspect the cap, filler tube, and gage sender for breaks, cracks, tears, or other damage.

(4) Paint all surfaces where the paint has been removed or damaged. Refer to TB 740-93-2 for detailed cleaning and painting instructions.

(5) Replace all damaged or unserviceable parts

c. Installation.

(1) Install nipple (10), elbows (9 and 7), nipple (3), shutoff cock (2) and elbow (1).

(2) Install tank using spacers (15 and 16), antisqueak (17 and 18), straps (13 and 14), washers (12), and nuts (11).

(3) Connect tube assemblies (5 and 8) to the tank.

(4) Install fuel level gage sender, filler tube, and cap on the fuel tank.

72. Fuel Pump Timing

a. Turn engine over until the number 1 piston is on the compression stroke and the pointer seen through the flywheel housing hole is reading 25° (for 1,800 rpm governed speed).

Note. Make certain number 1 piston is on compression stroke by turning both push rods by hand indicating that valves are closed.

b. Remove timing hole cover from pump housing and check if the timing mark on the drive plate lines up with the mark on the cam ring (fig. 23).

c. If adjustment is required, loosen mounting nuts and turn pump housing by hand so that timing marks line up.

d. Turn engine over two revolutions and recheck to make sure all backlash is eliminated in gear train.

Caution: **Do not attempt to time or move pump while engine is running.**

73. Secondary Fuel Filter

a. Removal.

(1) Remove screw (3, fig. 24), and gasket (4) from head (1).

(2) Remove head gasket (5) and cartridge (6) from body assembly (7). Discard the cartridge.

b. Cleaning and Inspection.
(1) Clean all parts with an approved cleaning solvent and dry thoroughly. Wipe inside of body with a suitable cloth.
(2) Inspect all parts for cracks, breaks, bends or worn threads. Replace if unserviceable.

c. Installation.
(1) Place new cartridge (6) in body assembly (7). Install head gasket (5), gasket (4), and secure body assembly (7) to head (1) with screw (3).

Note. Service the fuel filter every 500 hours.

(2) Bleed the fuel system (para 36).

74. Nozzle Holder Removal

a. Remove the nozzle holders (para 130).

b. Inspect for cracks, breaks, obstructions, or damaged or worn threads. Replace all defective parts. Replace the nozzle holder for any cylinder that has been misfiring.

c. Install the nozzle holders (para 130).

Section X. COOLING AND EXHAUST

75. Fan Guard and Fan

a. Removal.
(1) Refer to paragraph 38 and remove the fan guard and belt.
(2) Remove screws (35, fig. 25) and washers (30) and lift off the fan (36).

b. Cleaning and Inspection.
(1) Clean all parts with an approved cleaning solvent and dry thoroughly.
(2) Inspect for breaks, cracks, bends, loose blades, or other damage.
(3) Straighten bends, tighten loose blades. Replace fan if blades are broken or damaged.

c. Installation.
(1) Position fan (36) on engine (46) and secure with washers (30) and screws (35) .
(2) Refer to paragraph 38 and install the belt and the fan guard.

76. Hoses and Fittings

a. Removal.
(1) Drain the engine cooling system.
(2) Loosen hose clamps (16 and 18, fig. 25) and remove hoses (17 and 19).

b. Cleaning and Inspection.
(1) Clean the clamps with an approved cleaning solvent; dry thoroughly.
(2) Clean the hoses in soap and water; dry thoroughly.
(3) Inspect clamps for damage: replace if damaged.
(4) Inspect the hoses for cracks, breaks, wear, or deterioration and replace if damaged.

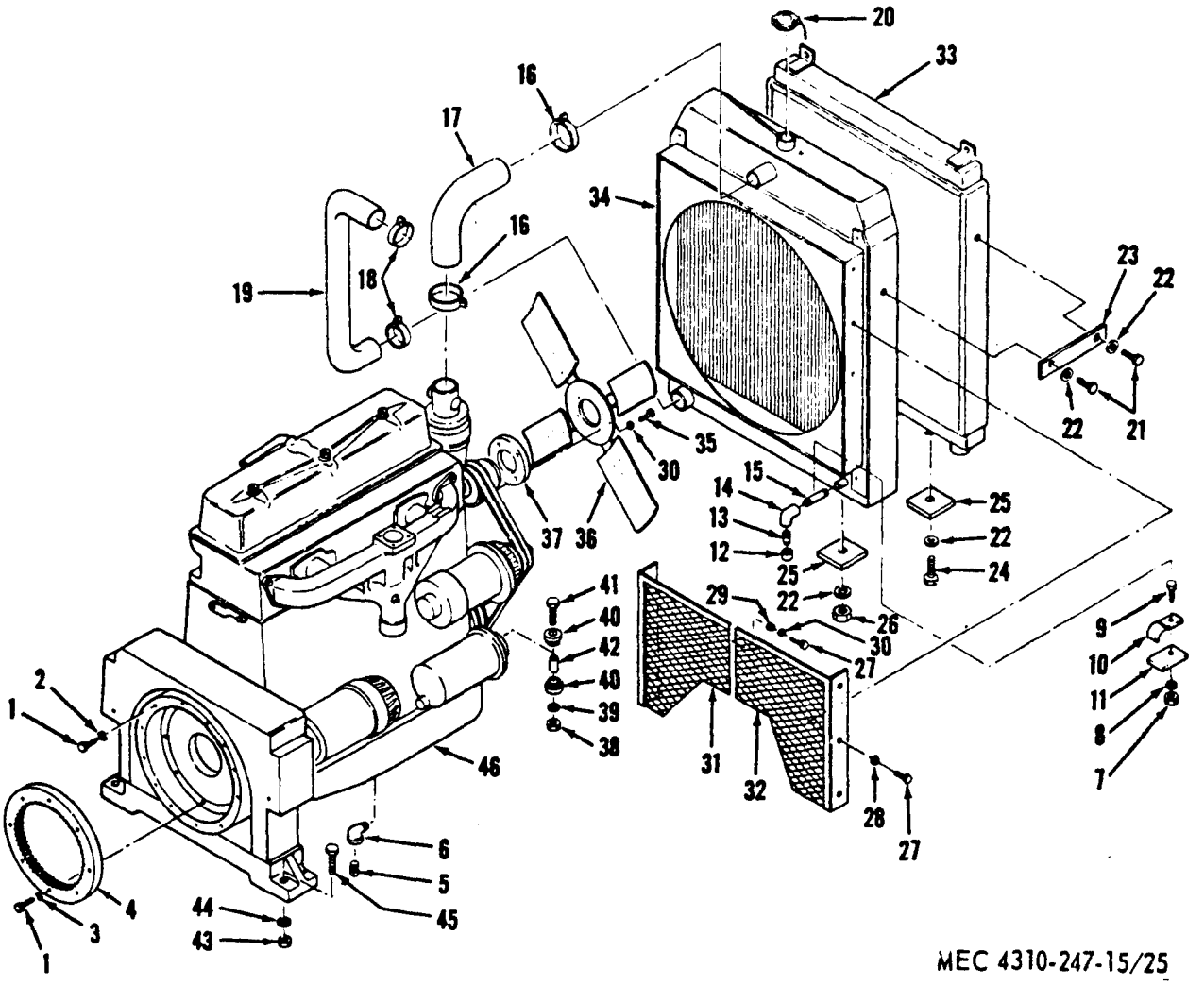
c. Installation.
(1) Position hoses (17 and 19) and clamps (16 and 18) on engine and radiator. Tighten the clamps.
(2) Fill engine cooling system with proper coolant. Check hose connections for leaks.

77. Muffler and Fittings

a. Removal.
(1) Remove rain cap (8, fig. 17) from muffler.
(2) Remove muffler (9) and exhaust pipe (10) from the exhaust manifold.

b. Cleaning and Inspection.
(1) Clean all parts with an approved cleaning solvent and dry thoroughly.
(2) Inspect the muffler for burned or rusted spots, holes, cracks, or other damage. Replace a defective muffler.

c. Installation. Install exhaust pipe (10), muffler (9), and rain cap (8).



1 Screw (20)	13 Nipple	24 Screw (4)	35 Screw (10)
2 Lockwasher (12)	14 Elbow	25 Pad (4)	36 Fan
3 Lockwasher (8)	15 Nipple	26 Nut (2)	37 Spacer
4 Gear	16 Clamp (2)	27 Screw (2)	38 Nut (2)
5 Plug	17 Hose (2)	28 Washer	39 Washer (2)
6 Elbow	18 Clamp	29 Nut (2)	40 Mounting (4)
7 Nut	19 Hose	30 Lockwasher (18)	41 Screw (2)
8 Washer	20 Radiator cap	31 Fan Guard	42 Bushing (2)
9 Screw	21 Screw	32 Fan Guard	43 Nut (4)
10 Clamp	22 Lockwasher (8)	33 Oil Cooler	44 Washer (4)
11 Spacer	23 Bracket (2)	34 Radiator	45 Screw (4)
12 Cap			46 Engine

Figure 25. Engine group.

Section XI. COMPRESSOR

78. Compressor Oil Filter

a. Removal. Refer to figure 9 for removal and disassembly of the oil filter.

b. Cleaning and Inspection.

(1) Clean all parts except the element and the cover gasket with an approved solvent; dry thoroughly.

(2) Inspect the spring for distortion or lack of tension. Inspect other parts for breaks, cracks, bends, damage or evidence of leaking. Replace any defective parts.

c. Installation. Refer to figure 9 for reassembly and installation of the oil filter.

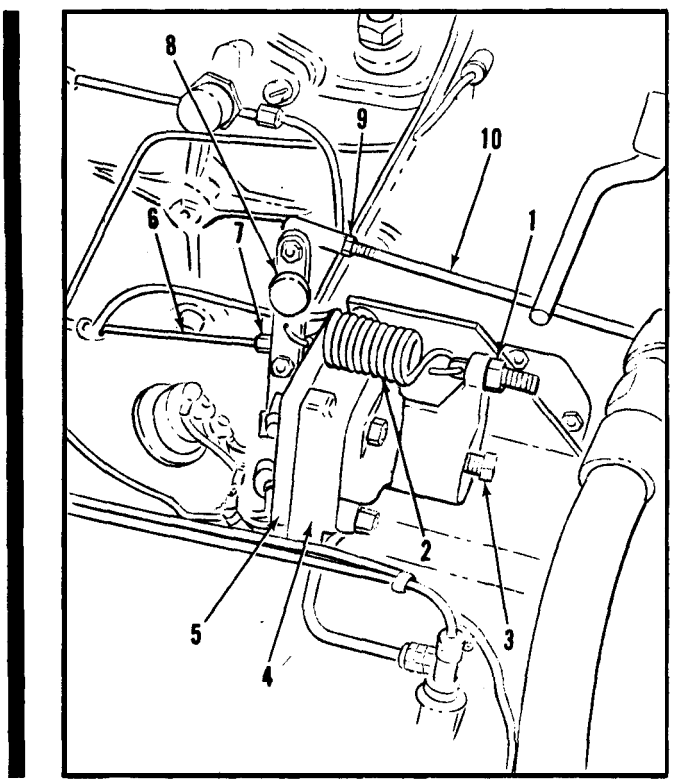
79. Air Control Assembly

a. Pressure Adjustment.

(1) Before starting the engine, turn nut (1, fig. 26) clockwise, finger tight, to obtain a small amount of tension in spring (2) and to hold lever (8) against control diaphragm retainer (5).

(2) With engine running and thoroughly warmed up, slowly close all service air valves and allow compressor to unload. It may be necessary to loosen ball joint locknuts (9) and shorten rod (10) to prevent engine from stalling.

(3) Turn screw (3) clockwise to raise receiver pressure to approximately 110 psi.



1 Nut
2 Spring
3 Screw
4 Air control assembly
5 Diaphram retainer
6 Linkage rod
7 Locknut
8 Lever
9 Locknut
10 Linkage rod

Figure 26. Air control service.

b. Speed Adjustment.

(1) Lower receiver pressure to 100 psi by bleeding air with a service valve. Engine will speed up.

(2) Loosen locknuts (7) on linkage rod (6) and turn rod to obtain 1,800 rpm. It may be necessary to change setting of service air valves to maintain 100 psi during speed adjustment. Tighten locknuts. If lever (8) moves away from contact with control diaphragm retainer (5) tighten nut (1) several turns or turn screw (3) clockwise slightly. If this condition persists after lowering the receiver pressure to 90 psi, report the condition to direct support maintenance. Practically no air should leak from the bleed hole in the body (4) when operating at full speed and pressures of 100 psi or below.

(3) Close service valves to unload compressor. Loosen locknuts on rod (10) and turn rod to obtain an idle speed of approximately 1,050 rpm at 110 psi receiver pressure. Retighten locknuts.

Note. The engine must be properly tuned, thoroughly warmed up, with proper grade of fuel and oil, relatively clean fuel filters end air filter prior to air control adjustment.

80. Oil Control Valve

a. General. This valve is placed in the system to prevent oil from draining back into the compressor during shut-down. Discharge air pressure holds the valve open during operation, permitting oil to circulate through the system. Upon shutdown, the loss of air pressure allows the spring-loaded valve to close.

b. Removal.

(1) Refer to figure 28 and remove the oil control valve.

(2) Remove nipple (2, fig. 27).

c. Disassembly. Refer to figure 29 for disassembly of the oil control valve.

d. Cleaning and *Inspection.*

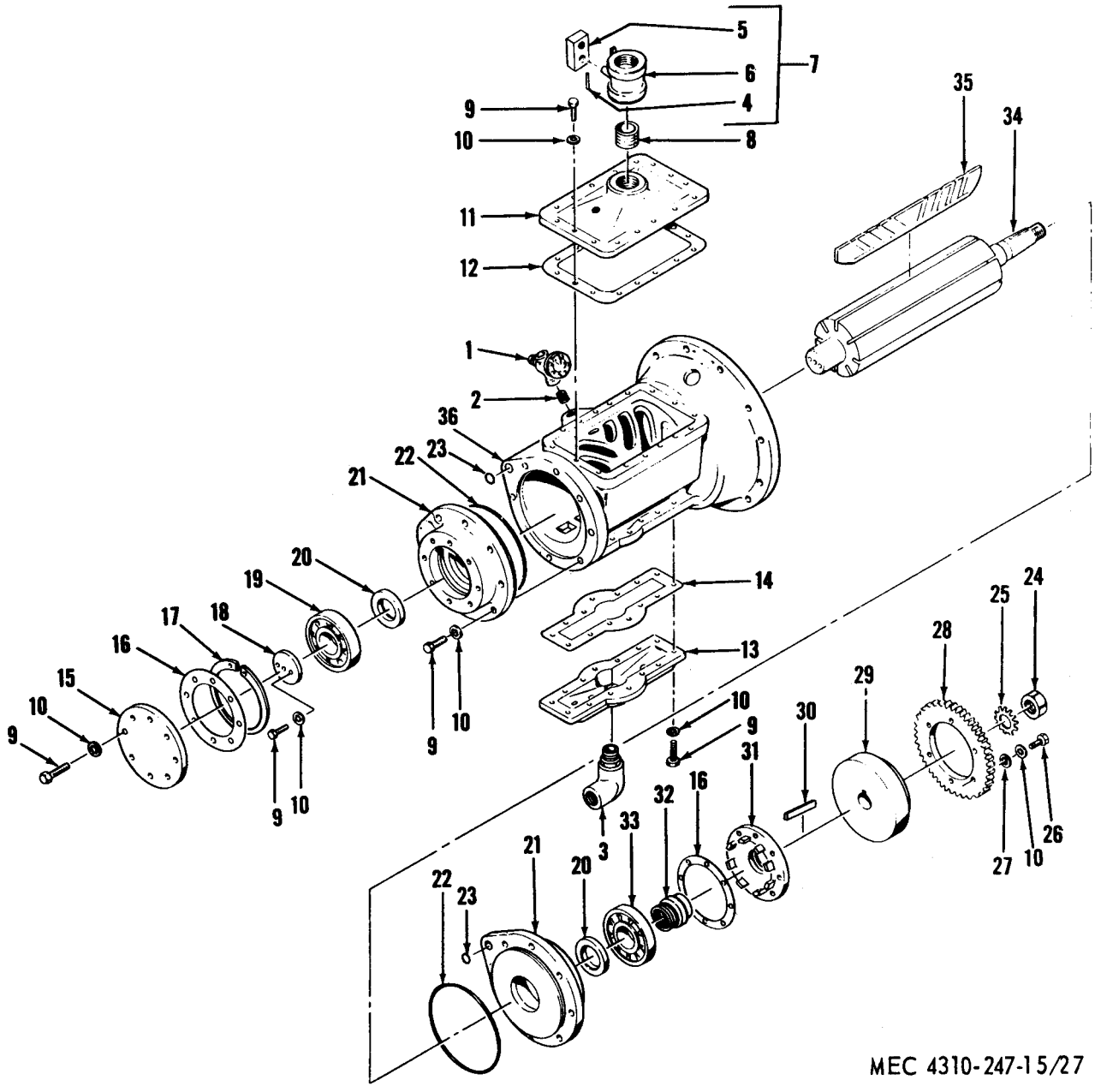
(1) Clean all parts with an approved cleaning solvent; dry thoroughly.

(2) Inspect all parts for wear or damage, repair or replace if unserviceable.

e. Reassembly. Refer to figure 29 and reassemble the valve.

f. Installation. Refer to figure 28 and install the valve.

* U.S. GOVERNMENT PRINTING OFFICE: 1992 643-016/60023



1 Oil control valve
2 Nipple
3 Discharge valve assembly
4 Pin
5 Lever
6 Inlet valve subassembly
7 Inlet valve assembly
8 Nipple
9 Screw (64)
10 Washer (52)
11 Inlet flange
12 Gasket
13 Discharge flange
14 Gasket
15 Bearing cap, outboard
16 Gasket
17 Retaining ring
18 Bearing retainer
19 Bearing
20 Bearing spacer
21 Bearing housing (2)
22 Preformed packing
23 Preformed packing
24 Nut
25 Lockwasher
26 Screw (6)
27 Washer (6)
28 Gear
29 Drive hub
30 Key
31 Bearing cap, inboard
32 Shaft seal
33 Bearing
34 Rotor
35 Vane (8)
36 Stator

Figure 27. Compresser unit.

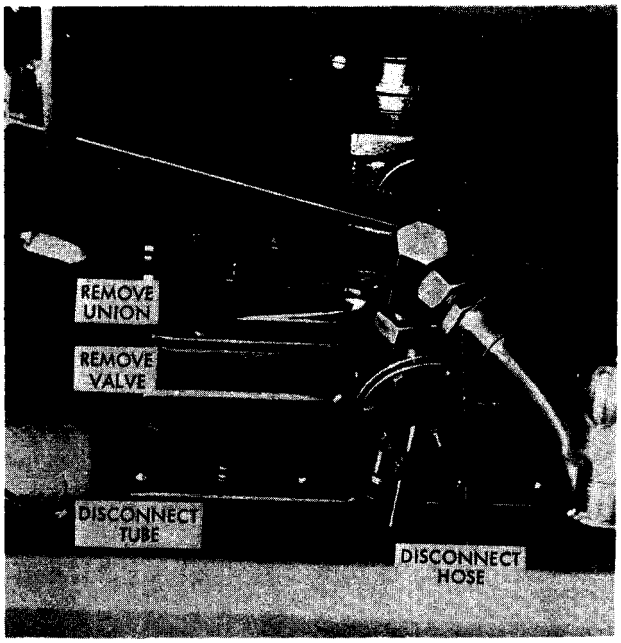


Figure 28. Oil control valve removal.

81. Hose Reels and Fittings

a. Removal. Remove nuts (29, fig. 17), washers (19), and screws (24); lift out the hose reel assembly (37).

b. Disassembly. Disassemble the hose reel assembly as illustrated in figure 30.

c. Cleaning, Inspection, and Repair.

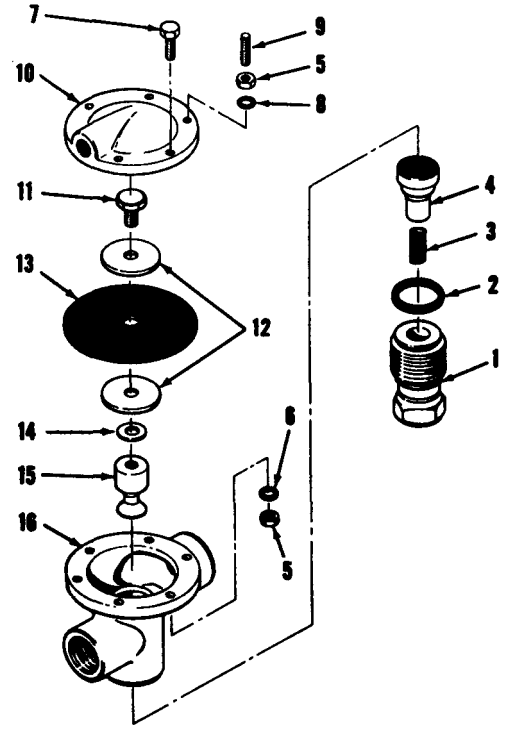
(1) Clean all parts except service hoses in an approved solvent.

(2) Inspect coil springs for distortion or lack of tension. Inspect other parts for breaks, cracks, bends or other damage. Straighten bent parts; weld breaks or cracks. Replace any defective or unserviceable parts.

d. Reassembly. Reassemble the hose reel assembly as illustrated in figure 30.

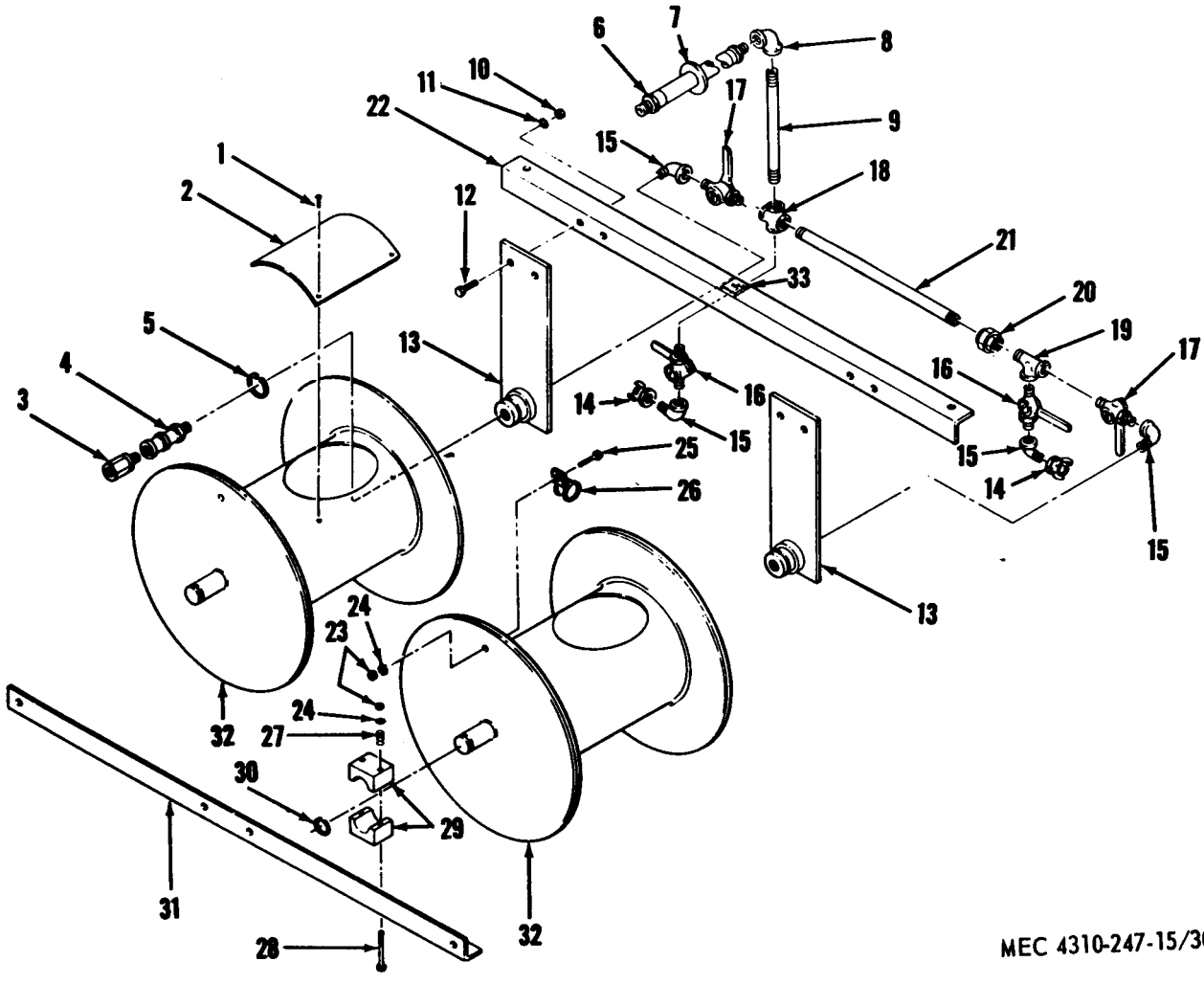
e. Installation. Install the hose reel assembly (37, fig. 17) using screw (24), washers (19), and nuts (23).

f. Adjustment. Adjust screws (28, fig. 30) for correct tension on brake halves (29).



1 Body	9 Stud (2)
2 Gasket	10 Body
3 Spring	11 Screw
4 Seat	12 Plate (2)
5 Nut (6)	13 Diaphragm
6 Lockwasher (4)	14 Gasket (2)
7 Screw (4)	15 Actuator
8 Lockwasher (2)	16 Housing

Figure 29. Oil control valve, exploded view.



1 Screw (8)
2 Hub cover (2)
3 Plug coupling (2)
4 Socket (2)
5 Snap ring (2)
6 Air hose assembly
7 Grommet
8 Elbow
9 Nipple
10 Nut
11 Lockwasher
12 Screw (6)
13 Hose reel mounting hanger (2)
14 End coupling (2)
15 Elbow (4)
16 Valve (2)
17 Valve (2)
18 Cross
19 Tee
20 Union
21 Nipple (2)
22 Hose reel mounting angle (top)
23 Nut (4)
24 Lockwasher (4)
25 Screw
26 Clamp (2)
27 Spring (4)
28 Screw (4)
29 Brake (4)
30 Snap ring (2)
31 Hose reel angle (rear)
32 Hose reel (2)
33 Pad

Figure 30. *Hose reel assembly.*

Section XII. VALVE ADJUSTMENT

81.1. General

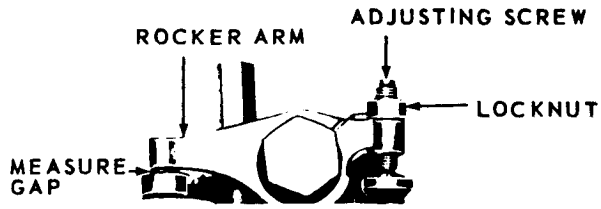
This section contains valve adjustment and valve tappet clearance data.

81.2. Valve Adjustment

a. Disconnect rod (10, fig. 26) and spring (2) from lever (8) to decrease idling speed.

b. Refer to figure 30.1 and adjust the valves.

c. After valve adjustment has been completed connect rod (10, fig. 26) and spring (2) to lever (8).



STEP 1. OPERATE ENGINE UNTIL OPERATING TEMPERATURE IS REACHED. REFER TO PAR. 14.

STEP 2. REMOVE CYLINDER HEAD COVER. REFER TO FIGURE 18.

STEP 3. WITH A FEELER GAGE MEASURE CAP FOR CLEARANCE. PROPER VALVE TAPPET CLEARANCE IS 0.014 IN. (HOT).

STEP 4. ADJUST ROCKER ARMS AS NECESSARY BY LOOSENING LOCKNUT AND TURNING ADJUSTING SCREW CLOCKWISE TO DECREASE CLEARANCE, AND COUNTER CLOCKWISE TO INCREASE CLEARANCE.

STEP 5. TIGHTEN LOCKNUT AFTER ADJUSTING AND CHECK CLEARANCE.

STEP 6. READJUST AS NECESSARY.

STEP 7. INSTALL CYLINDER HEAD COVER. REFER TO PAR. 14.

MEC 4310-247-15/30.1

Figure 30.1. Valve adjustment.

Section XIII. ENGINE LUBRICATION SYSTEM

81.3. Oil Cooler

a. Removal. Refer to figure 30.2 and remove engine oil cooler.

b. Cleaning and Inspection.

(1) Clean the oil cooler with an approved cleaning solvent; dry thoroughly.

(2) Inspect for dents, cracks, breaks, corrosion, or other damage.

(3) Replace gaskets and damaged mount. ing hardware.

c. Installation. Refer to figure 30.2 and install engine oil cooler.

Note. After reinstallation of engine oil cooler bring cooling system to proper level (para 40).

81.4. Oil Filter

a. Removal.

(1) Remove oil cooler (para 81.3).

(2) Refer to figure 30.2 and remove engine oil filter.

b. Cleaning and Inspection.

(1) Clean the engine oil filter assembly, except element and gasket, with an approved cleaning solvent; dry thoroughly.

(2) Inspect all parts for cracks, breaks, dents, or other damage.

(3) Replace gaskets.

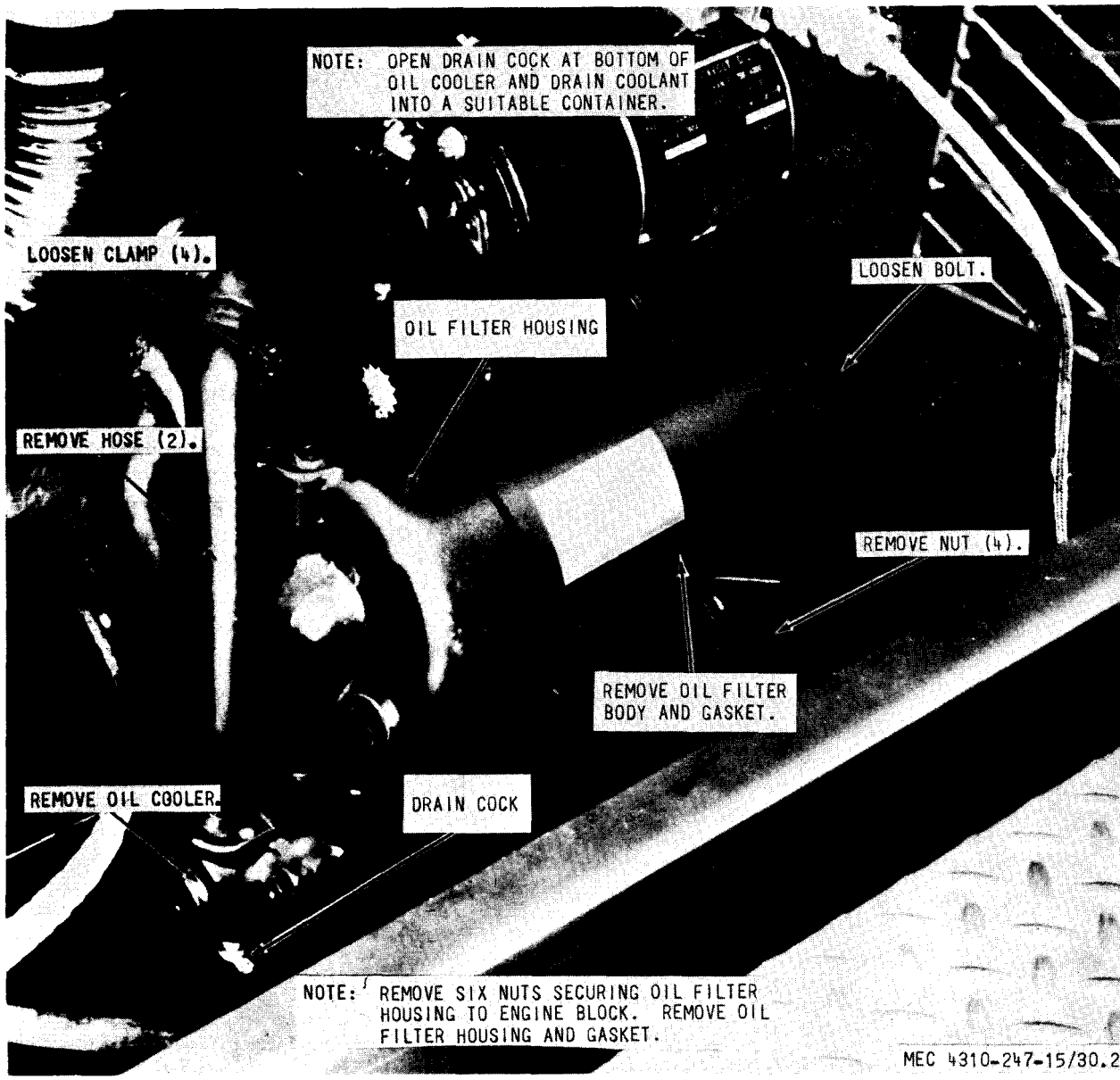


Figure 30.2. Engine oil cooler and oil filter removal and installation.

(4) Inspect mounting hardware for damage. Replace as necessary.

c. Installation.

(1) Refer to figure 30.2 and install engine oil filter.

(2) Install oil cooler (para 81.3).

CHAPTER 4

DEMOLITION, SHIPMENT, AND LIMITED STORAGE

Section I. DEMOLITION OF THE AIR COMPRESSOR TO PREVENT ENEMY USE

82. General

When capture or abandonment of the air compressor to an enemy is imminent, the responsible unit commander must make the decision either to destroy the equipment or to render it inoperative. Based on this decision, orders are issued which cover the desired extent of destruction. Whatever method of demolition is employed, it is essential to destroy the same vital parts of all air compressors and all corresponding repair parts.

83. Demolition To Render the Equipment Inoperative

a. Mechanical Means. Use a sledge hammer, pickaxe, or any other heavy tool to destroy the following:

(1) Engine manifolds and fuel pump.
(2) Engine cylinder block.
(3) Oil cooler, radiator, water pump.
(4) Starter, generator, and generator regulator.
(5) Service valves.

Note. The above steps are the minimum requirement for this method.

(6) Control assembly.
(7) Batteries.
(8) Fuel tank.

b. Misuse. Perform the following steps to render the air compressor inoperative:

(1) Remove or damage the oil cooler and the radiator.
(2) Drain the oil from the engine and the oil separator. Pour sand in the oil filler openings.
(3) Throw dirt or mud into the oil cooler openings and into the compressor and engine air intake opening.
(4) Start the engine and allow the unit to run at ungoverned speed until it fails.

84. Demolition by Explosives or Weapons' Fire

a. Demolition By Explosives. Place as many of the following charges (fig. 31) as the situation permits, and detonate them simultaneously with detonating cord and a suitable detonator.

(1) Four ½-pound charges on top of the engine.
(2) Four ½-pound charges on top of the air compressor.
(3) Two ½-pound charges behind the control panel.

Note. The above charges are the minimum requirement for this method.

(4) One ½-pound charge between the generator and the engine block.
(5) One ½-pound charge between the starter and the engine block.
(6) One ½-pound charge on top of the batteries.
(7) One ½-pound charge on the axles next to each tire and wheel.

b. Weapons' Fire. Fire on the air compressor with the heaviest practical weapons available.

85. Other Demolition Methods

a. Scattering and Concealment. Remove all easily accessible vital parts, such as the fuel pump, fuel and oil filters, safety valve, blowdown valve, and batteries. Scatter them through dense foliage, bury them, or throw them in a lake, stream, or other body of water.

b. Burning. Pack rags, clothing, or canvas under, around, and inside the air compressor. Saturate this packing with gasoline, oil, or diesel fuel, and ignite.

c. Demolition By Submersion. Totally submerge the air compressor in a body of water to provide water damage and concealment. Salt water will damage metal parts more than fresh water.

86. Training

All operators should receive thorough training in the destruction of the air compressor. Refer to FM 5-25. Simulated destruction, using all of the methods listed above, should be in-

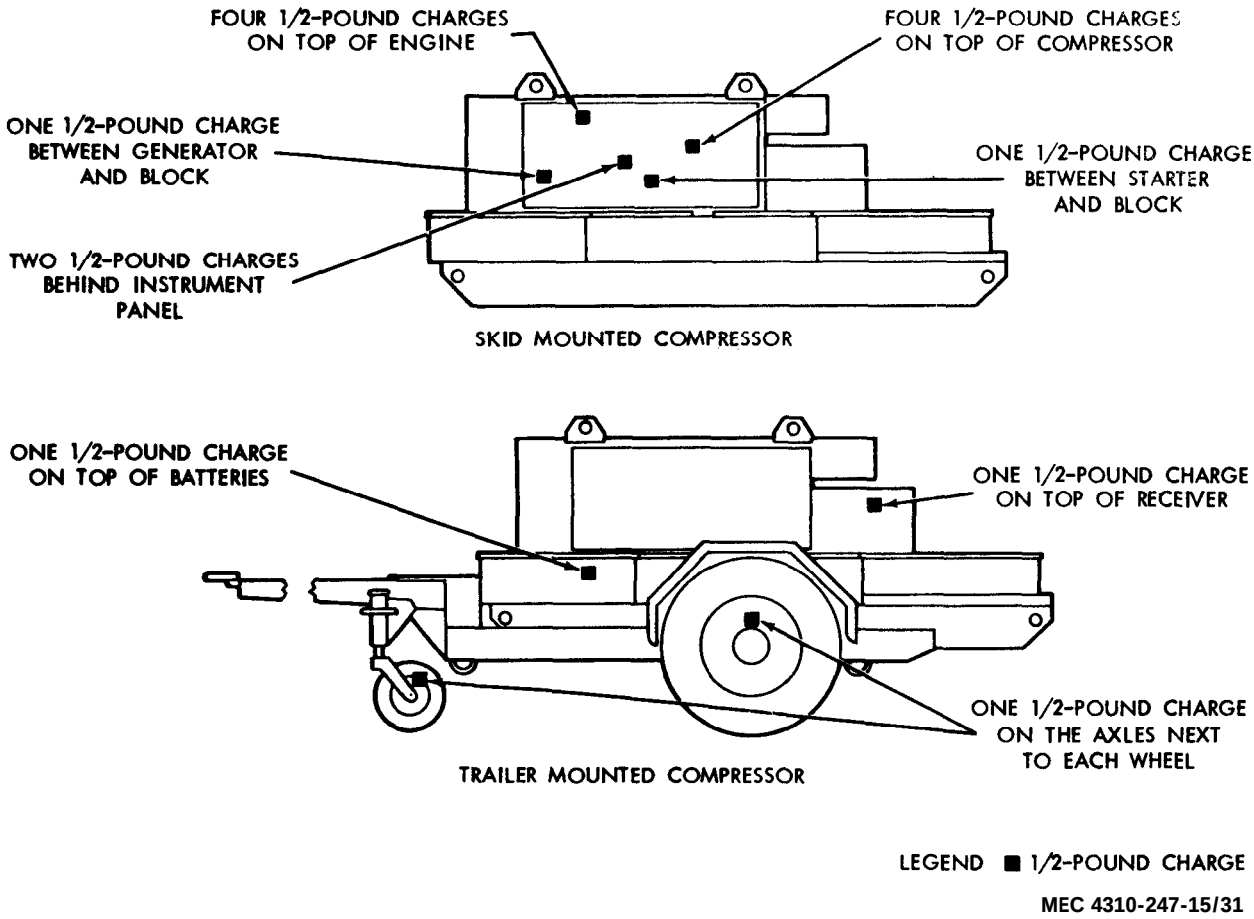


Figure 31. Placement of charges.

cluded in the operator training program. It must be emphasized in training, that demolition operations are usually necessitated by critical situations when time available for carrying out destruction is limited. For this reason, it is necessary that operators be thoroughly familiar with all methods of destruction of equipment, and be able to carry out demolition instructions without reference to this or any other manual.

Section II. SHIPMENT AND LIMITED STORAGE

87. Preparation of Equpiment for Shipment

a. General. Detailed instructions for the preparation of the air compressor for domestic shipment are outlined within this paragraph. Preservation will be accomplished in a sequence that will not require the operation of previously preserved components.

b. Inspection. The air compressor will be inspected for any unusual conditions such as damage, rusting, accumulation of water, and pilferage. Inspection of the individual components and assemblies will be as outlined on the "Preventive Maintenance Service, Quarterly" in this manual.

c. Cleaning and Drying. All contamination shall be removed from the air compressor by an approved method. Approved methods of cleaning, drying, types of preservatives, and methods of application are described in TM 38-230.

d. Painting. Paint all surfaces where the paint has been removed or damaged. Refer to TB 740-93-2 for detailed cleaning and painting instructions.

e. Depreservation Guide. DA Form 2258 (Depreservation Guide for Engineer Equipment). A properly annotated depreservation guide will be completed concurrently with preservation for each item of mechanical equipment. Any peculiar requirements will be outlined in the blank spaces 27 through 33. The completed depreservation guide will be placed with the equipment in a waterproof envelope marked "Depreservation Guide", and fastened in a conspicuous location on or near the operator's controls.

f. Lubrication System. Check level of engine and compressor lubricant. Operate the equipment at fast idle until lubricants have been circulated throughout the system. The engine crankcase, the oil coolers, and the oil separator will then be drained and the drain plugs reinstalled.

g. Cooling System. Completely drain the cooling system including radiator and block, oil cooler, or other accessories through which the coolant has circulated. Flush with clean water. Leave drain cocks open.

h. Combustion Chambers. Remove the intake or exhaust manifold or both. Rotate the crankshaft until one valve is open and spray 2 ounces of type PE-2, grade 2 preservative oil conforming to MIL-L-21260 into the cylinder through the open port. After preserving each cylinder, rotate the crankshaft at least 5 revolutions and reinstall manifolds.

Caution: **Engine temperature must be less than 125° F. when preservation is applied to the combustion chambers.**

i. Air Receiver. Remove the pipe plugs from tanks and spray the tank interior with type PE-2, grade 2, engine preservative oil conforming to MIL-L-21260 and reinstall. Open drain cock to allow excess preservative oil to drain. Leave drain cock open to allow condensation to drain.

j. Hose and Coupling. Recoil on hose reel or coil the hose to a minimum safe diameter and tie or strap the coil to the equipment to prevent movement. Shroud exposed hose but not protected by storage facilities with waterproof kraft wrapping paper (UU-P-271).

k. Sealing of Openings. Openings that will permit the direct entry of water into the interior of diesel engine-driven equipment, starting motor, generator, electrical enclosures and so on, will be sealed with pressure-sensitive tape conforming to Specification PPP-T-60, type III, class I.

l. Fuel Tank, Boxed or Crated. If the fuel tank is empty, spray or fog interior with preservative oil, type PE-2, grade 2, conforming to Specification MIL-L-21260. Otherwise it is not necessary to drain or preserve the fuel tank.

m. Air Cleaners. Clean the air cleaners and seal all openings that permit the direct entry of water. Use type III, class I, pressure-sensitive tape conforming to Specification PPP-T-60.

n. Exterior Surfaces. Coat exposed machined ferrous metal surfaces with type CL preservative conforming to Specification MIL-C-11796, class 3. If preservative is not available, GAA-GREASE may be used.

o. Marking. Will conform to MIL-STD-129.

p. Batteries and Cables. Batteries will be filled, fully charged, and secured in the battery compartment. Cables shall be disconnected and secured in a manner that will prevent contact with terminals.

q. Disassembly. Disassembled partsandbasic issue items.

(1) Disassemblywillbe limited to the removal of parts and projecting components that tend to increase the overall profile of the air compressor and parts that are subject to pilferage.

(2) Disassembled items will be packed with the publications in the toolbox, if possible. Otherwise, items will be packed in a suitable container and secured to the air compressor to prevent loss or pilferage.

Note. If packing is required to provide adequate protection against damage during shipment, refer to TM 38-230 for guidance in crate fabrication.

88. Loading Equipment for Shipment

Use appropriate materials handling equipment of sufficient capacity to lift the air compressor onto the carrier. Block and tie the unit to assure that it will not move during transit.

89. Preparation of Equipment for Storage

a. General. Detailed instructions for preparation of the air compressor for limited storage are provided in paragraph 87. Limited storage is defined as storage not to exceed 6 months. Refer to AR 743-505.

b. Air Cleaners. Service air cleaners and seal all openings that will permit direct entry of water with pressure-sensitive tape conforming to type III, class 1 of Specification PPP-T-60.

c. *Fuel Tank.* Drain fuel tank and fog or spray interior with type PE-2, grade 2, engine preservative oil conforming to Specification MIL-L-21260.

d. Pneumatic Tires. Inflate tires to normal operating pressure.

e. Storage. Every effort should be made to provide covered storage for the air compressor. If this is impossible, select a firm, level, well-drained storage location, protected from prevailing winds. Position the air compressor on heavy planking. Cover the air compressor with a tarpaulin or other suitable waterproof covering and secure in a manner that will provide maximum protection from the the elements.

90. Inspection and Maintenance of Equipment in Storage

Every 90 days, the air compressor will be inspected as outlined on the "Preventive Maintenance Services, Quarterly" and operated long enough to assure complete lubrication of bearings. After each inspection period, the air compressor will be represerved as outlined in paragraph 89.

CHAPTER 5

DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

91. Scope

a. The following instructions are for direct and general support and depot maintenance personnel. They Contain information on equipment maintenance that is beyond the scope of the tools, equipment, personnel, or supplies normally available to organizational maintenance.

b. Appendix I includes the publications applicable to direct and general support and depot maintenance. Appendix II contains the maintenance allocation chart. The direct and general support and depot maintenance repair parts and special tool lists are listed in TM 5-4310-247-35P.

92. Record and Report Forms

For record and report forms applicable to direct and general supply and depot maintenance, refer to TM 38-750.

Note. Applicable forms, excluding standard form 46 which is carried by the operator, will be kept in a canvas bag mounted on the equipment.

Section II. DESCRIPTION AND DATA

93. Description

A general description of the RPV250DC20-MSI air compressor together with the location and description of the identification and instruction plates are contained in chapter 1 of this manual. The repair and maintenance instructions are described in appropriate sections.

94. Tabulated Data

a. General. This paragraph contains overhaul data pertinent to direct and general support and depot maintenance personnel. A wiring diagram (fig. 3) is also included.

Table 2 Engine Repair and Replacement Standards

	Manufacturer's dimensions and tolerances in inches		Desired clearance		Maximum allowable wear in inches	Maximum allowable clearance in inches
	Minimum	*Maximum*	*Minimum*	*Maximum*		
Intake Valve Guide Wear limits max dia		0.438				
Exhaust Valve Guide Length Outside dia Stem hole dia Wear limits max dia Distance cylinder head		0.438				
Valve Intake Overall length Stem dia Wear limits (minimum) dia Head die Angle of valve face Desired stem Clearance	0.4324 44°	44°	.0008	.0015		0.0041 .0021

Table 2. Engine Repair and Replacement—Standards-Continued

	Manufacturer's dimensions and tolerances in inches		Desired clearance		Maximum allowable wear in inches	Maximum allowable clearance in inches
	Minimum	*Maximum*	*Minimum*	*Maximum*		
Valve, Exhaust						
Overall length						
Stem dia						
Wear limits min dia	0.4295					.007
Head dia						
Angle of valve face	44°	44°				
Desired stem clearance			.0035	.004		.005
Valve Spring						
Length-valve closed	1.875 (w/52 lb load)					
Length-valve open	1.521 (w/103 lb load)					
Camshaft						
No. 1 bearing journal dia	2.1215	2.1225				
No. 2 bearing journal dia	1.7455	1.7465				
No. 3 bearing journal dia	1.6830	1.6840				
Cam lift-intake		0.336				
Cam lift-exhaust		0.336				
Wear limits, max clearance in bearings.						.006
End play			.005	.009		
Valve Tappet						
Tappet dia	0.9975	0.9985				
Wear limit					0.9965	
Crankshaft						
Crankpin dia	2.7475	2.7485				
Wear limit, min dia	2.7465					
Main Bearing						
Journal dia	3.250	3.251				
Wear limits, min dia	3.249					
End play			.005	.008		
Connecting Rod						
Length center-to-center	10.498	10.502				
Bushing hole dia	1.6239	1.6249				
Bearing hole dia	2.8740	2.8745				
Bearing thickness	.0616	.0621				
Wear limits, min thickness	.0611					
Clearance limits	.0013	0038	.0025			.0048
Side play			.0065	0.0105		
Main Bearings						
Dia of bore in block	3.4992	3.5000				
Bearing shell thickness	0.12365	0.12390				
Wear limits min thickness	0.12290					
Clearance limits	.0027	.004	.002	.0037		
Piston Pin						
Length	3.703	3.718				
Diameter	1.4998	1.5000				

Table 2. Engine Repair and Replacement Stadards—Continued

	Manufacturer's dimensions and tolerances in inches		Desired clearance		Maximum allowable wear in inches	Maximum allowable clearance in inches
	Minimum	*Maxi*	*Minimum*	*Maximum*		
Piston Pin—Continued						
Wear limits min dia	1.4995					
Bushing hole dia finished	1.5003	1.5005				
Wear limits max dia		1.5015				
Pin clearances in bushing			.0003	.0007		
Wear limits	.0017				.0017	
Pin fit			.0005	.0005		
Cylinders						
Actual inside dia of bore	4.6250	4.6255				
Ring Groove Dia						
No. 1	4.105	4.115				
No. 2	4.181	4.191				
No. 3	4.181	4.191				
No. 4	4.141	4.151				
No. 5	4.141	4.151				
Ring Groove Width						
No. 1 groove	0.128	0.129				
No. 2 groove	0.127	0.128				
No. 3 groove	0.127	0.128				
No. 4 groove	0.252	0.253				
No. 5 groove	0.1895	0.1905				
Ring Land Dia						
No. 1	4.590	4.595				
No. 2	4.590	4.595				
No. 3	4.590	4.595				
No. 4	4.576	4.581				
Piston fit		.006				
Ring Width						
No. 1	0.1235	0.1240			.002	
No. 2	0.1235	0.1240			.002	
No. 3	0.1235	0.1240			.002	
No. 4	0.2485	0.2490			.002	
No. 5	0.1860	0.1865			.002	
Ring Thickness						
No. 1	0.221	0.231				
No. 2	0.176	0.186				
No. 3	0.176	0.186				
No. 4	0.176	0.186				
No. 5	0.176	0.186				
Ring Gap Clearance						
No. 1	.013	.023				
No. 2	.013	.023				
No. 3	.013	.023				
No. 4	.013	.023				
No. 5	.013	.023				

Table 2. Engine Repair and Replacement Standards-Continued

	Manufacturer's dimensions and tolerances in inches		Desired clearance		Maximum allowable wear in inches	Maximum allowable clearance in inches
	Minimum	*Maximum*	*Minimum*	*Maximum*		
Ring Side Clearance						
No. 1	.004	.0055			.0025	
No. 2	.003	.0045			.0025	
No. 3	.003	.0045			.0025	
No. 4	.003	.0045			.0025	
No. 5	.003	.0045			.0025	

Table 3. Compressor Wear Limits

	Desired clearance		Maximum allowable wear in inches	Maximum allowable clearance in inches
	Minimum	*Minimum*		
Vane shorter than stator	.016		.007	.023
Rotor shorter than stator	.014		.005	.019
Rotor to bearing housing, held end	.003		.0055	.0085
Rotor to bearing housing, float end	.006		.009	.015
Rotor end play				.0035

CHAPTER 6

GENERAL MAINTENANCE INSTRUCTIONS

Section I. SPECIAL TOOLS AND EQUIPMENT

95. Special Tools and Equipment

No special tools or equipment are required by direct and general support and depot maintenance personnel for performing maintenance on the air compressor.

96. Direct and General Support and Depot Maintenance Repair Parts

Direct and general support and depot maintenance repair parts are listed and illustrated in TM 5-4310-247-35P.

97. Specially Designed Tools and Equipment

No specially designed tools or equipment are required by direct and general support and depot maintenance for performing maintenance on the air compressor.

Section II. TROUBLESHOOTING

98. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the air compressor or any of its components. Each trouble symptom stated is followed by a list of probable causes of trouble. The possible remedy recommended is described opposite the probable cause.

99. Starter Fails To Crank Engine

Probable cause	*Possible remedy*
Starting motor defective	Check brushes, commutator, drive springs and mounting bolts.
Internal engine seizure	Check for foreign object in gears, on top of piston or for piston seizure.

100. Engine Hard To Start or Fails To Start

Probable cause	*Possible remedy*
Wrong injection pump timing.	Retime pump to engine (para 72).
Low compression-below 325 psi.	Refer to paragraph 105.
Fuel injection pump faulty	Replace or repair fuel injection pump (para 119).
Fuel injectors dirty	Replace or repair injectors (para 118).
Starter faulty	Replace or repair starter (para 117).

101. Engine Misses or Runs Erratically

Probable cause	*Possible remedy*
Too low operating temperature-below 166° F.	Check thermostat, replace if necessary.
Fuel pump governor surge	Check for broken or weak governor springs, replace if necessary.
Missing cylinder or cylinders.	Check and clean fuel nozzles (para 118).

102. Engine Lacks Power

Probable cause	*Possible remedy*
Air in fuel lines	Check connections and bleed fuel system.
Low compression	Refer to paragraph 105.
Injection nozzles faulty	Clean, repair or replace (para 118).
Energy cell faulty	Clean or replace (para 132).
Fuel pump faulty	Repair or replace (para 119).
Fuel injection timing wrong-	Retime pump to engine (para 72).

103. Engine Overheats

Probable cause	*Possible remedy*
Thermostats sticking or inoperative.	Clean or replace.
Fuel injection timing wrong-	retime pump (para 72).
Water pump inoperative	Repair or replace pump (para 122).

104. Engine Smokes Excessively

a. White Smoke --Indicates misfiring.

Probable cause	*Possible remedy*
Low engine temperature	Check thermostat replace if necessary.
Faulty nozzle	Clean and test (para 118).
Low compression	Refer to paragraph 105.

b. Blue Smoke --Indicates high oil consumption.

Probable cause	*Possible remedy*
Worn or stuck rings	Replace rings (para 133).
Low engine water temperature.	Check thermostat, replace if necessary.

c. Black Smoke.

Excessive fuel consumption	Retime pump (para 72).
Low engine water temperature.	Check thermostat, replace if necessary.

105. Compression Low

Probable cause	*Possible remedy*
Valves holding open—no tappet clearance.	Adjust tappets (para 81.2, fig. 30.1).
Leaky cylinder head gasket	Clean head and block surfaces, replace gasket (para 132).
Leaky energy cell	Clean or replace (para 132).
Wrong valve timing	Check and repair.
Burned or sticking valves	Clean and grind, or replace (para 134).
Broken or weak valve springs.	Check and replace (para 134).
Piston rings worn or broken	Replace (para 133).
Worn pistons and sleeves	Replace (para 133).

106. Oil Pressure Low

Probable cause	*Possible remedy*
Dirt in relief valve or broken spring.	Clean or replace (para 131).
Suction screen plugged	Clean (para 131).
Worn oil pump	Repair or replace (para 131).

107. Oil Consumption Excessive

Probable cause	*Possible remedy*
Oil pressure too high, relief valve stuck.	Clean and check.
Worn, broken, or stuck piston rings and clogged oil control rings.	Replace rings (paras 133 and 134).
Worn pistons and liners	Replace (paras 133 and 134).
Worn bearings and valve guides.	Check and replace (paras 133 and 134).

108. Fuel Consumption Excessive

Probable cause	*Possible remedy*
Operating with low water temperature.	Maintain 165°–185° F. for maximum economy and performance.
Loss of power	Refer to paragraph 102.
Incorrect fuel pump timing	Retime pump to engine (para 72).
Nozzles faulty	Clean, test, repair or replace (para 118).
Energy cell	Clean or replace (para 132).
Incorrect tappet clearance	Adjust when engine is warm (para 81.2, fig. 30.1).

109. Engine Stops Suddenly

Probable cause	*Possible remedy*
Fuel pump faulty	Replace (para 119).
Internal engine seizure	Check for foreign object in combustion chamber or for piston or bearing seizure.

110. Combustion Knock

Probable cause	*Possible remedy*
Injection timed too early	Retime pump to engine (para 72).
Injection nozzle sticking	Clean and adjust (para 118).

111. Discharge Pressure Does Not Build Up

Probable cause	*Possible remedy*
Inlet valve inoperative	Repair or replace the valve.
Broken or worn vanes	Replace (para 128).

112. Compressor Oil Consumption Excessive

Probable cause	*Possible remedy*
Defective agglomerator element.	Replace (para 123).

113. Safety Relief Valve Pops

Probable cause	*Possible remedy*
Inlet valve defective or leaking.	Repair or replace the valve.

Section III. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS

114. compressor

a. Removal

(1) Remove doors, panel and housing assembly (paras 61 and 63).

(2) Disconnect all controls and linkages from the compressor.

(3) Disconnect all air and oil lines from the compressor.

(4) Attach a sling around the compressor unit and take up the slack with a suitable hoist or other lifting device.

(5) Remove screws (1, fig. 25) and washers (2).

(6) Remove compressor.

b. Installation.

(1) Position compressor on the chassis with a suitable hoist or lifting device.

(2) Secure with washers (2) and screws (1).

(3) Connect all oil lines leading to the compressor.

(4) Connect all controls and linkages for operation of the compressor.

(6) Install doors, panel, and housing assembly (paras 61 and 63).

115. Engine

a. Removal.

(1) Remove doors and panels (para 61) and housing assembly (para 63).

(2) Disconnect all controls and linkages from the compressor and the engine.

(3) Disconnect all air, oil, and water lines from the compressor and the engine.

(4) Place a sling under the compressor and engine. Take up the slack with a suitable hoist or other lifting device.

(5) Remove nuts (38, fig. 25), washers (39), mountings (40), screws (41), and bushings (42). Remove nuts (43), washers (44), and screws (45).

(6) Remove screws (27), washers (28), fan guards (31 and 32).

(7) Remove the compressor and engine.

(8) Support the compressor. Remove screws (1) washers (2), and the compressor.

b. Installation.

(1) Install washers (2, fig. 25), screws (1) and the compressor on the engine.

(2) Sling the engine and compressor. Use a hoist or other suitable device to position them on the skid frame.

(3) Install washers (28), screws (27), and fan guards (31 and 32).

(4) Install screws (45), washers (44), and nuts (43). Install bushings (42), screws (41), mountings (40), washers (39), and nuts (38).

(5) Connect all air, oil, and water lines to the compressor and the engine.

(6) Connect all linkages and controls to the compressor and the engine.

(7) Install housing assembly (para 63) and doors and panels (para 61).

CHAPTER 7

REPAIR INSTRUCTIONS

Section I. ELECTRICAL SYSTEM

116. Generator

a. Removal and Disassembly.

(1) Refer to paragraph *64* and remove the generator.

(2) Refer to figure *32* and disassemble the generator.

b. Cleaning, Inspection, Testing, and Repair.

(1) Clean all metal parts, with the exception of bearings, coils and armature, with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for cracks, breaks, wear, and other damage or defects. Replace all defective parts.

(3) Inspect the bearings for roughness or excessive play when rotated. Replace defective bearings.

(4) Inspect the brushes for wear, cracks, chips, or breaks. Replace if necessary.

(5) Inspect the brush springs for proper tension and distortion. Replace a brush spring that is distorted or has a spring tension of less than 28 ounces.

(6) Clean the armature with a clean, lint-free cloth dampened with an approved cleaning solvent and dry thoroughly. Inspect the armature for roughness, high mica, or burning of the commutator. Turn the commutator down in a lathe to remove roughness or high mica. Use a hacksaw blade or undercutting tool to undercut the mica to a depth of one thirty-second inch between the commutator bars.

(7) Inspect the armature shaft for burrs, pita, or excessive wear. Inspect the armature core for loose windings. Replace the armature if windings are loose or the armature is unserviceable.

(8) Use a suitable growler to test the armature for shorts. Position the armature on the growler and energize the growler. Hold a thin steel strip parallel to the core slots and explore the exposed surf ace of the armature core. A short circuited coil in one of the slots bridged by the jaws of the growler will cause the steel strip to vibrate when brought close to the other slot occupied by the defective coil; however, inspect the commutator slots carefully for copper or electrical contact brush dust which may collect in the slots and cause shorts. Turn the armature in the growler one slot at a time until all coils have been tested. Replace a defective armature.

Caution: **During the following outlined open and ground tests, do not touch the test probes to the armature shaft bearing surfaces or the commutator, for arcing may mar the surfaces.**

(9) Test the armature for open circuits with a growler. Position the armature on the growler and energize the growler circuit. With the test probes connected to an AC voltmeter, select a pair of commutator bars which give a readable indication on the voltmeter. Maintaining this relation between the test probe position and the growler, turn the armature one slot a time until all coils are tested. The voltmeter readings should be clearly uniform. If the armature has proven free of shorts a low or zero reading indicates an open circuit. Replace a defective armature.

(10) Test the armature for grounds with a test lamp circuit. Test between the armature shaft or core and one of the commutator bars. Repeat the test at two or more locations around the commutator to preclude the possibility of testing from an isolated bar. If the test lamp lights, the armature is grounded. Replace a defective armature.

(11) Clean the coils with a clean, dry cloth.

Caution: **Coils should not be cleaned by any degreasing method or with any solvent, as this would damage the insulation and ruin the windings. Care should also be exercised in handling windings to avoid breaking the connecting lead.**

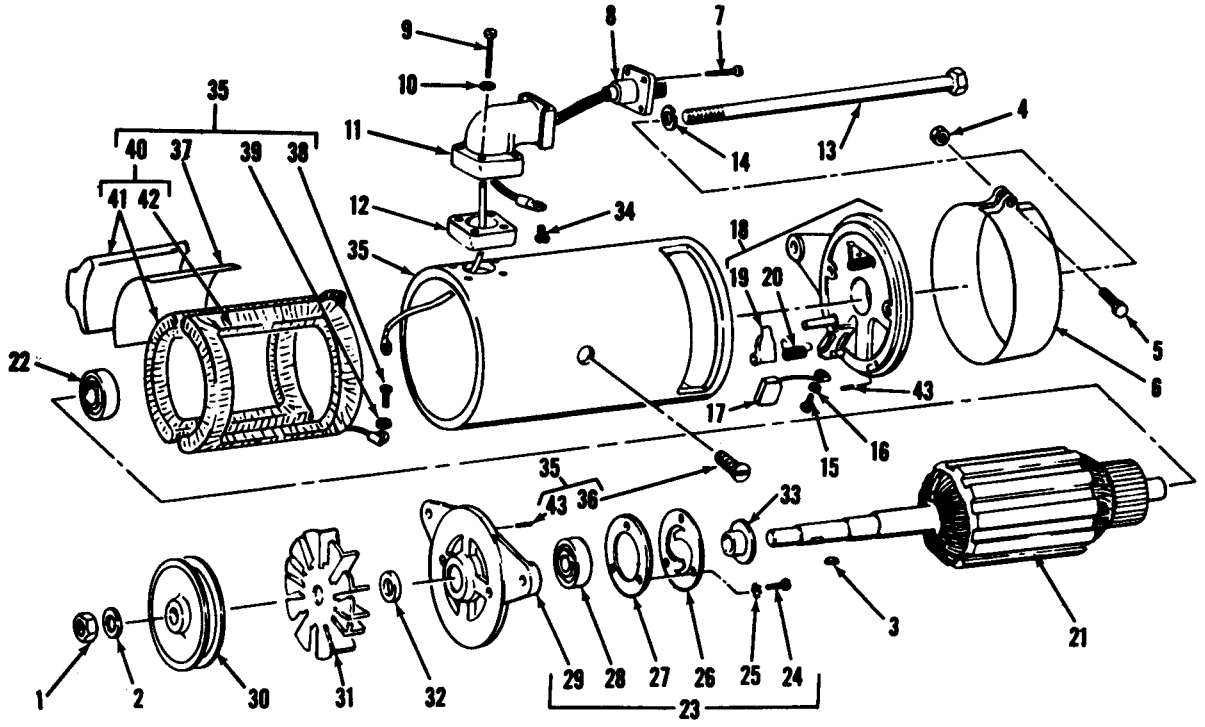
(12) Inspect the coils for worn or frayed insulation or defective connections and repair as necessary.

(13) Test the coils for an open circuit with a test lamp circuit. Test across the interconriections between coils. If the lamp fails to light, resolder the interconnections, then test between the two leads of the coils. Failure of the lamp to light indicates an open circuit and the defective windings must be replaced.

(14) Insulation on the coils that has worn away may be repaired by wrapping; however, care must be exercised to avoid excessive bulkiness. All soldered connections should be made with resin flux solder.

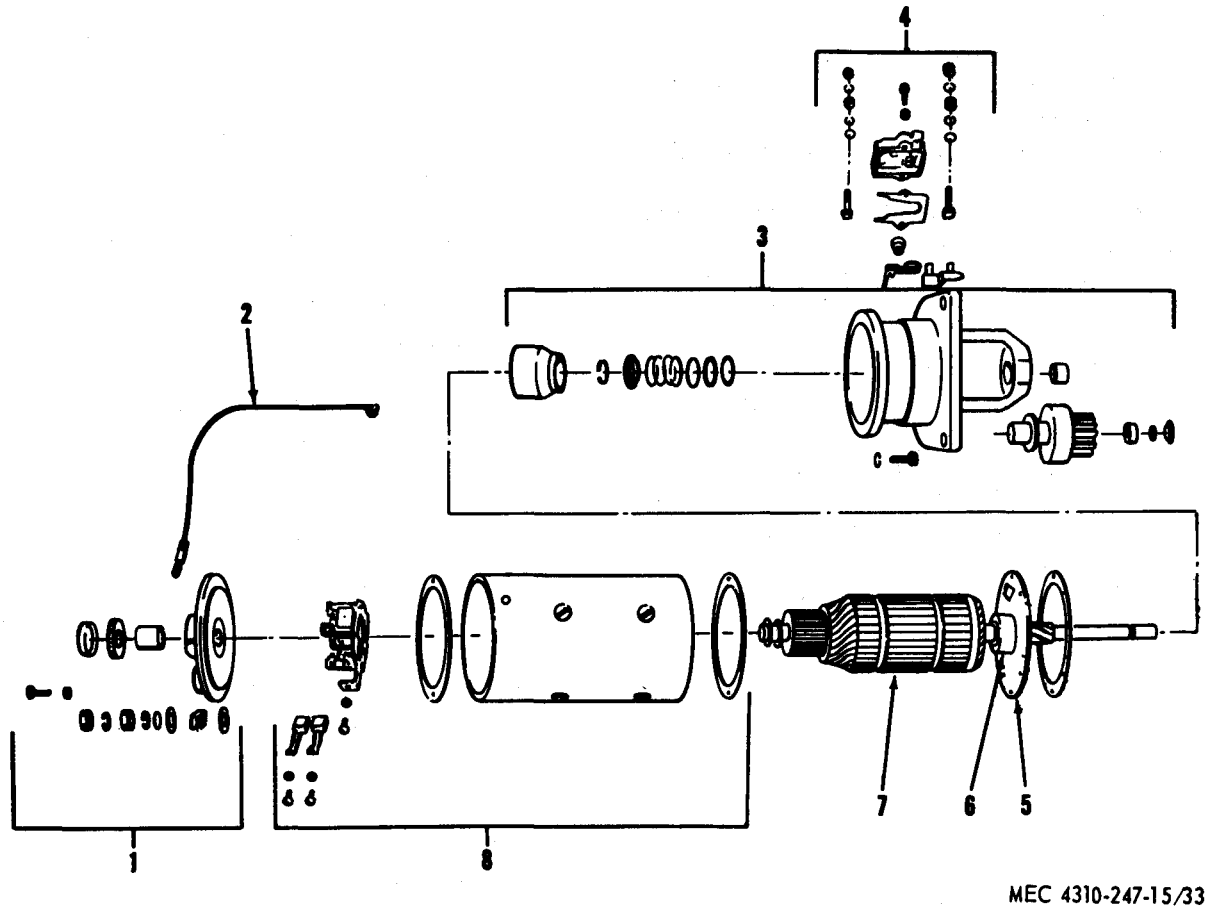
(15) Test the coils for a grounded circuit with the windings installed. Test between a lead of the coils and the frame assembly. If the lamp lights, a grounded condition exists and the defective windings must be repaired or replaced.

(16) Test the electrical receptacle connector for shorts, open circuit, or a grounded condition with a test lamp circuit. Test



1 Nut	12 Spacer	23 Head assembly	34 Screw
2 Washer	13 Bolt (2)	24 Screw (3)	35 Frame assembly
3 Key	14 Washer (2)	25 Washer (3)	36 Screw (2)
4 Nut	15 Screw (2)	26 Plate	37 Insulation
5 Screw	16 Washer (4)	27 Retainer	38 Screw
6 Band	17 Brush (2)	28 Bearing	39 Washer
7 Screw (4)	18 Head assembly (2)	29 End bell	40 Coil assembly
8 Receptacle assembly	19 Arm (2)	30 Pulley	41 Coil
9 Screw (4)	20 Spring (2)	31 Fan	42 Coil
10 Washer (6)	21 Armature assembly	32 Spacer	43 Pin (2)
11 Elbow	22 Bearing	33 Spacer	

Figure 32. Generator repair.



1 Head
2 Lead
3 Solenoid, clutch and housing assembly
4 Switch cover and contact assembly
5 Gasket
6 Intermediate bearing assembly
7
8

Figure 33. Starter repair.

between the leads of the connector and their respective pin sockets. Failure of the lamp to light indicates an open circuit and the defective electrical receptacle connector must be replaced. Test between the leads of the electrical receptacle connector. If the test lamp lights, a short exists and the connector must be replaced. Test between each lead and the body of the electrical receptacle connector. If the lamp lights, a grounded condition exists and the connector must be replaced.

(17) Test the commutator end frame assembly with a test lamp circuit. Test between the insulated brush holder and the commutator end frame assembly. If the lamp lights, the brush holder is grounded and the commutator end frame assembly must be replaced. Test between the grounded brush holder and commutator end frame. If the lamp fails to light, the brush holder is defective and the commutator end frame assembly must be replaced.

c. Reassembly and Installation.

(1) Refer in figure 32 and reassemble the generator.

(2) Refer to paragraph 64 and install the generator.

117. Starter

a. Removal and Disassembly.

(1) Refer to paragraph 65 for removal of starter.

(2) Refer to figure 33 for disassembly of starter.

b. Cleaning, Inspection, Repair, and Testing.

(1) Clean all parts, except electrical wiring, armature, and field coils with an approved cleaning solvent and dry thoroughly.

(2) Clean the armature and field coils by blowing them out with dry, compressd air.

(3) Inspect the armature shaft and commutator for wear. Turn down a worn commutator on a lathe and undercut the mica between the commutator bars. Replace the armature if the armature shaft is defective or damaged in any way.

(4) Inspect the field coil insulators, terminals and pole pieces for cracks or breaks. Replace if necessary.

(5) Inspect all parts for wear, breaks, cracks, damaged threads or other damage. Replace if necessary.

(6) Inspect all electrical wiring for wear, breaks, or corrosion. Repair or replace if unserviceable.

(7) Use a multimeter and test between brush holder and the commutator end head. If continuity is indicated replace or repair the end head assembly (1, fig. 33).

(8) Use a growler and test the armature for shorts, grounds, and open circuit. Replace if necessary.

(9) Use a multimeter and test the field coils for continuity and grounds. Replace if necessary.

c. Reassembly and Installation.

(1) Refer to figure 33 for reassembly of starter.

(2) Refer to paragraph 65 for installation of starter.

Section II. FUEL SYSTEM

118. Nozzle Holder Testing

a. Removal. Remove the nozzle holders (para 130).

b. Testing.

(1) Connect the nozzle holder to a special hydraulic nozzle tester and include a small fuel oil supply tank with a filter.

(2) Close gage valve and work pump handle several sharp strokes to dislodge any carbon or dirt particles from the nozzle.

(3) Open gage valve and work pump slowly. Observe nozzle opening pressure. This should be between 1,750-1,850 psi except with new springs the setting should be 1,950-2,000 psi.

(4) To adjust opening pressure remove holder cap, loosen locknut, and turn adjusting screw clockwise to raise the setting.

Note. It is recommended that all nozzles from the same engine be set at approximately the same opening pressure.

(5) Maintain a pressure of 1450-1500 psi. Check the nozzle for dribble at the orifice, indicating a bad seat; or for drops forming around the cap nut, indicating a leak between the holder and valve body lapped surfaces.

Caution: **Keep hands away from nozzle spray. The high velocity can puncture the skin and cause blood poisoning.**

(6) Close gage valve and observe spray characteristics while working the pump about 100 strokes per minute. An unsymmetrical spray pattern, or one showing a flag, heavy end, or deflected core are undesirable and indicate need for repair or replacement of faulty parts.

119. Fuel Pump

a. Removal.

(1) Remove all fuel lines from fuel pump (22, fig. 39).

(2) Remove nuts (19) and washers (20).

(3) Remove fuel pump (22).

b. Disassembly.

(1) Refer to figure 34 for disassembly.

(2) Care must be exercised to avoid scoring or scratching the metering valve (59, fig. 34) when withdrawing it from the pump housing (125).

(3) The transfer pump blades (69) are made of a special molded carbon-graphite compound which will chip easily if not handled with extreme care.

(4) Extreme care must be exercised to prevent any scoring or scratching of the plungers (93) or their bore.

(5) Note the position of the etched arrow on the cam ring (97). The position of the arrow must be maintained during reassembly.

c. *Cleaning, Inspection, and Repair.*

(1) It is essential to have a small tank of filtered fuel oil (or approved cleaning solvent) available in which component parts must be thoroughly washed. Do not use abrasive materials in cleaning pump parts. Flush out all oil passages and ports with clean fuel oil under compressed air pressure.

(2) Inspect all parts for wear, scores, nicks, or burrs. Replace if necessary.

(3) Inspect parts for gum deposits. If gum deposits are apparent, the part must be washed thoroughly with a brush and solvent.

(4) Inspect the transfer pump blades for wear or chipping; if they are shorter than 1.0930 inches, they must be replaced.

(5) Inspect all springs for fatigue. Replace if necessary.

(6) Inspect the solenoid assembly for shorts, grounds, and open circuits.

(7) Inspect parts for cracks, breaks, distortion, corrosion, and damaged threads. Replace defective parts. Replace all seals.

d. Bench Timing.

(1) Apply 30 to 100 psi of air pressure to the No. 1 outlet. Turn the rotor in the direction of rotation until the discharge port comes into partial registry with No. 1 port in the hydraulic head. Air pressure then will force the plungers in their extreme outward limit.

(2) Continue to turn the rotor until the cam rollers contact the oppositely spaced cam lobes. This will be evidenced by an increase in effort to turn the rotor. At this time injection begins and the timing marks should be aligned. Refer to figure 23. If the timing marks do not align, the cam ring (97) must be reinstalled in clockwise rotation.

e. Reassembly and Installation.

(1) Refer to figure 34 and reassemble the fuel pump.

(2) Position the cam ring (97) with etched arrow as noted in disassembly.

(3) Time the fuel pump to engine (para 72).

120. Fuel Tank Repair

a. Removal (para 71).

b. Cleaning and Inspection.

(1) Refer to paragraph 71.

(2) Check fuel tank for leaks. Repair if necessary.

(3) Replace tank if necessary.

c. Installation (para 71).

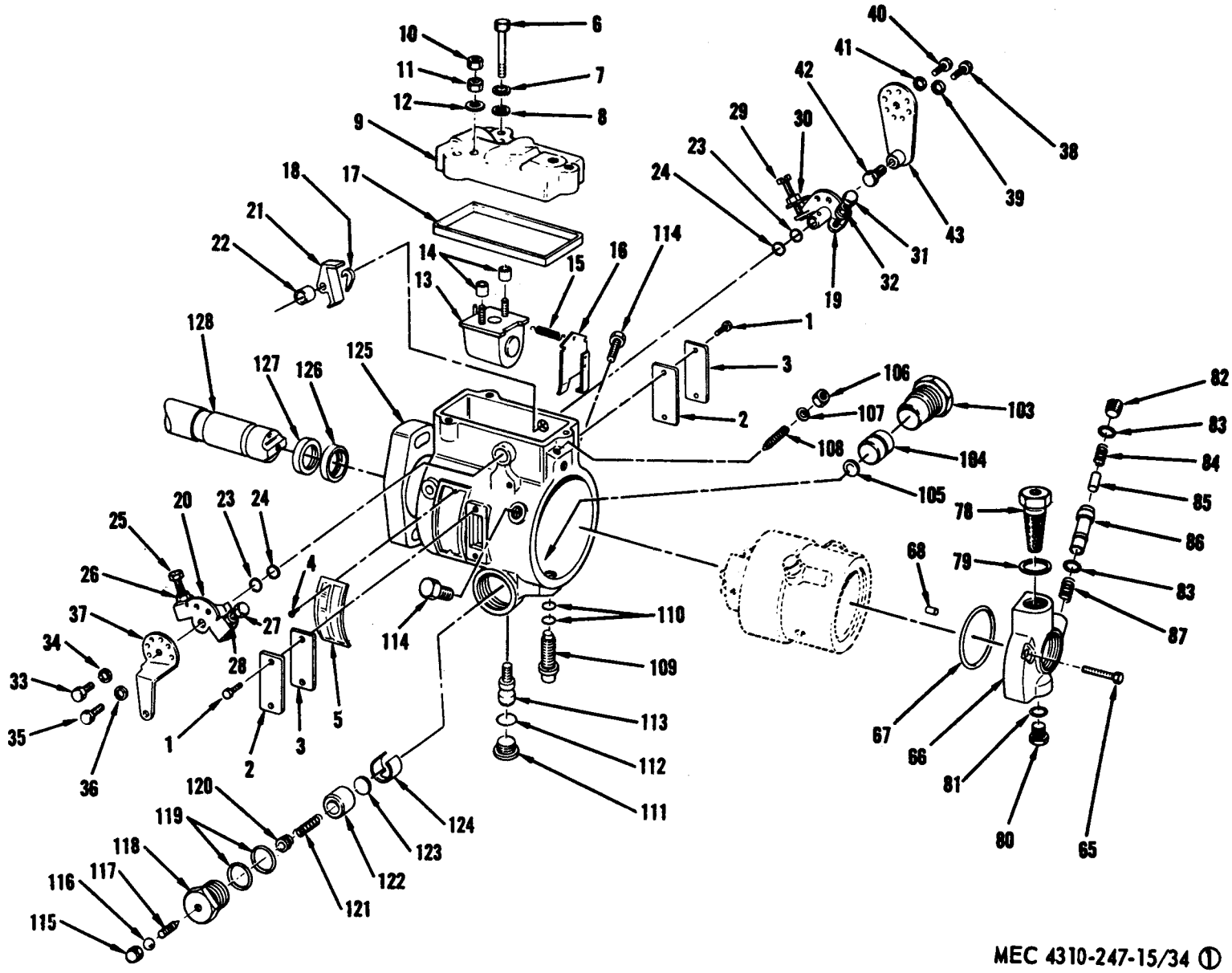


Figure 34. Fuel pump, disassembled view.

1 Screw (4)
2 Cover (2)
3 Gasket (2)
4 Screw (2)
5 Plate
6 Screw (3)
7 Lockwasher (3)
8 Washer (3)
9 Cover
10 Nut (2)
11 Nut (2)
12 Washer (2)
13 Frame assembly
14 Tube (2)
15 Spring
16 Arm assembly
17 Gasket
18 Cam
19 Shaft assembly
20 Shaft assembly
21 Lever
22 Spacer
23 Seal (2)
24 Washer (6)
25 Screw
26 Nut
27 Screw
28 Nut
29 Screw
30 Nut
31 Screw
32 Nut
33 Screw
34 Washer
35 Screw
36 Washer
37 Lever
38 Screw
39 Washer
40 Screw
41 Washer
42 Screw
43 Arm assembly
44 Spring
45 Retainer
46 Spring
47 Guide
48 Stud
49 Washer
50 Screw
51 Washer
52 Hook
53 Link assembly
54 Spring
55 Screw
56 Washer
57 Arm assembly
58 Shim
59 Valve
60 Spring
61 Nut (2)
62 Seal (2)
63 Shaft
64 Arm
65 Screw (4)
66 Plate
67 Seal
68 Roll pin
69 Blade (2)
70 Liner
71 Ring
72 Ring
73 Retainer (2)
74 Screw
75 Stop
76 Spring
77 Valve
78 Cap and filter element assembly
79 Seal
80 Plug
81 Seal
82 Plug
83 Seal (4)
84 Spring
85 Piston
86 Sleeve
87 Spring
88 Screw (4)
89 Washer (8)
90 Head and Rotor assembly
91 Roller (2)
92 Shoe (2)
93 Plunger (2)
94 Screw
95 Spring
96 Seal
97 Cam ring
98 Retainer
99 Ring
100 Washer
101 Weight (6)
102 Sleeve
103 Plug
104 Piston
105 Washer
106 Nut
107 Seal
108 Screw
109 Screw assembly
110 Seal (2)
111 Plug
112 Seal
113 Screw
114 Screw (2)
115 Cap
116 Seal
117 Screw
118 Plug
119 Seal (4)
120 Guide
121 Spring
122 Piston
123 Washer
124 Retainer
125 Housing assembly
126 Washer
127 Seal (2)
128 Shaft

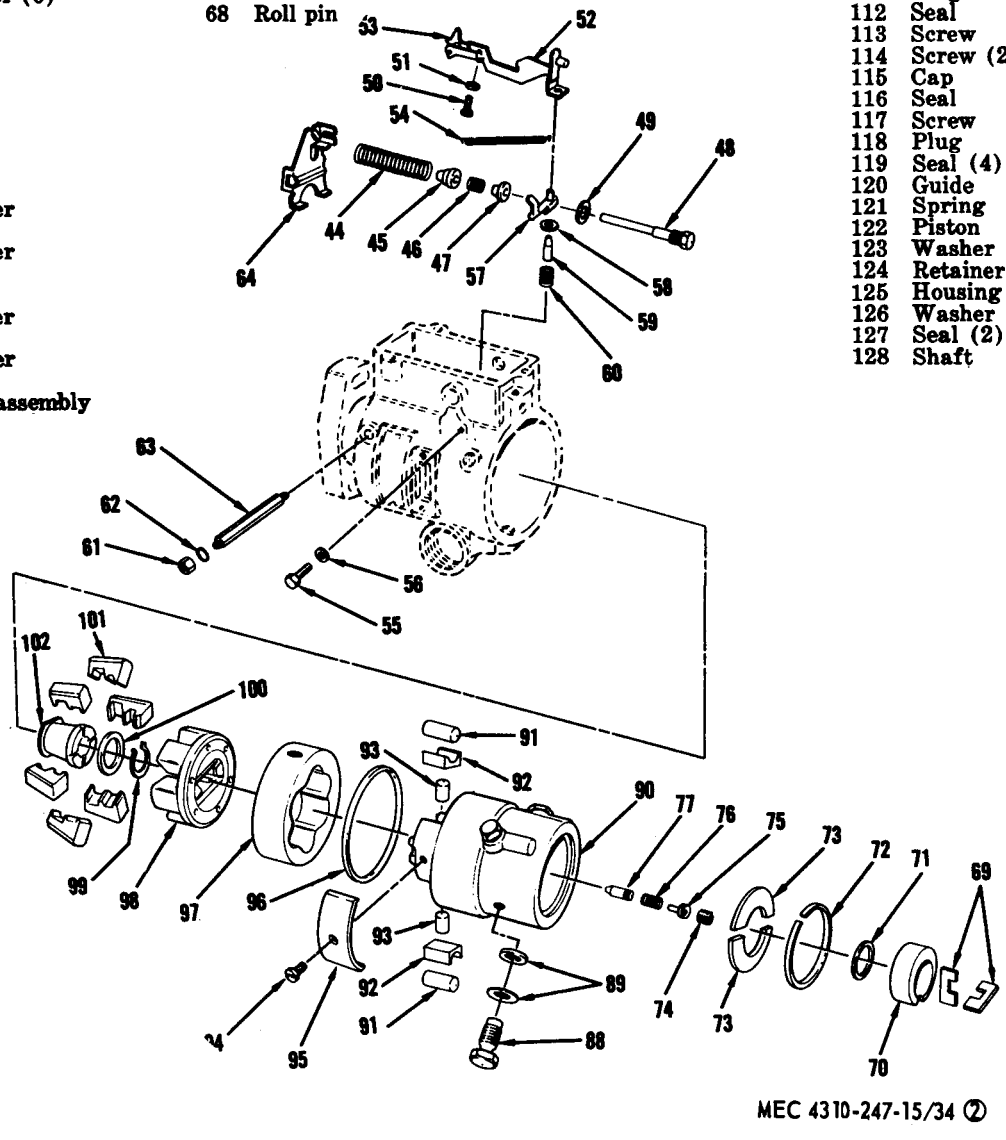


Figure 34-Continued.

121. Radiator Repair

a. Removal

(1) Remove doors and panel (para 61), and housing assembly (para 63).
(2) Remove oil cooler (para 124).
(3) Remove fan guard (para 76).
(4) Remove hoses and fittings (para 76).
(5) Remove nuts (26, fig. 25), washers (22) and mounting pads (25).
(6) Remove radiator (34).

b. Cleaning and Inspection.

(1) Clean the exterior of the radiator with an approved cleaning solvent and dry thoroughly. Use a stream of compressed air in the direction opposite to normal air flow to clean all dirt from the radiator fins. If necessary, complete the cleaning with a brush, taking care not to bend or damage the radiator fins.
(2) Inspect the radiator for bends, cracks, damaged fins, possible obstructions, evidence of leaks, or other damage. Replace or repair the radiator if it is damaged.
(3) Inspect the hardware for breaks, cracks, damaged threads, or other damage and replace if damaged.

c. Installation.

(1) Position the radiator (34) on the chassis.
(2) Secure with mounting pads (25), washers (22) and nuts (26).
(3) Install hoses and fittings (para 76).
(4) Install fan guard (para 75).
(5) Install oil cooler (para 124).
(6) Install housing assembly (para 63), and doors and panel (para 61).

122. Water Pump Repair

a. Removal and Disassembly.

(1) Refer to figure 14 and loosen fan belt enough to slide over pulley (13, fig. 35).
(2) Remove fan (para 75).
(3) Remove nuts (4, fig. 35) and lockwashers (6) holding the pump body (7) to the front of the block and remove the pump assembly.
(4) Remove the impeller (1) with a suitable puller.

Note. Do not pound or drive on the pump shaft or carbon seal on shaft will be damaged.

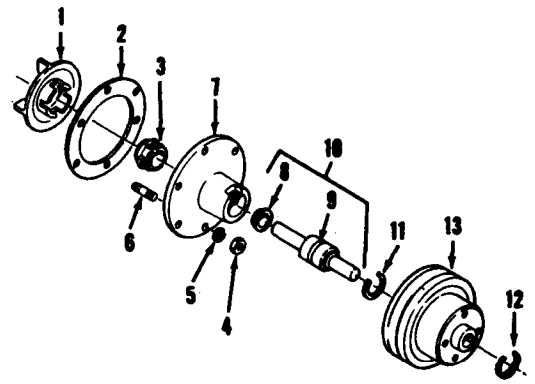
(5) The remaining parts can be lifted off the shaft

b. Cleaning and Inspection.

(1) Clean the water pump and pulley with a cloth dampened with an approved cleaning solvent and dry thoroughly.
(2) Inspect the water pump and pulley for cracks, breaks, or other damage. Inspect the water pump for evidence of coolant leakage.
(3) Inspect the shaft of the water pump for excessive play that would indicate internal wear.
(4) Be sure that the pulley seats tightly on the shaft of the water pump.
(5) Replace a defective or damaged water pump or pulley.
(6) Inspect all applicable hardware for wear or damaged threads. Replace as necessary.

c. Assembly and Installation.

(1) Refer to figure 35 for assembly of water pump.
(2) Position water pump to front of block and secure with lockwashers (5) and nuts (4).
(3) Install fan (para 75).
(4) Install fan belt and adjust for proper tension. Secure generator.



MEC 4310-247-15/35

1 Impeller and insert assembly
2 Gasket
3 Seal
4 Nut (6)
5 Washer (6)
6 Stud (6)
7 Body
8 Slinger
9 Shaft and bearing
10 Pump shaft assembly
11 Snap ring
12 Snap ring
13 Pulley

Figure 35. Water pump.

123. Air Receiver-Oil Separator

a. Removal and Disassembly.

(1) Drain the oil from the system.

(2) Refer to figure 36 for removal and disassembly of air receiver-oil separator.

b. Cleaning and Inspection.

(1) Clean all metal parts with an approved cleaning solvent. Dry thoroughly.

(2) Inspect agglomerator (21). Replace if clogged or if an excessive amount of oil was noted in the discharge air.

(3) Inspect the receiver (37) for leaks, cracks, breaks, or other damage. Replace if damaged.

(4) Inspect gage (32) for condition of float and linkage. Replace if damaged or inoperative.

(5) Inspect safety valve (7) for broken spring or other damage. Replace if damaged or inoperative.

(6) Inspect applicable parts for condition of threads. Replace if threads are stripped, damaged, or excessively worn.

c. Reassembly and Installation.

(1) Refer to figure 36 for reassembly and installation of air receiver-oil separator.

(2) Refill system with oil according to the current lubrication order.

124. Oil Cooler

a. Removal.

(1) Drain oil from system.

(2) Remove housing assembly (para 63).

(3) Disconnect the oil hose fittings from the oil cooler.

(4) Remove screws (21, fig. 25), washers (22) and brackets (23).

(5) Remove screws (26, fig. 17) and washers (19).

(6) Remove screws (24, fig. 25), washers (22) and pads (25). Lift out oil cooler.

b. Cleaning and Inspection.

(1) Clean the oil cooler in an approved cleaning solvent and dry thoroughly. Use a stream of compressed air in the direction opposite to normal air flow to clean all dirt from the oil cooler fins. If necessary, complete the cleaning with a brush, taking care not to bend or damage the oil cooler fins.

(2) Inspect the oil cooler for bends, cracks, damaged fins, possible internal obstructions, evidence of leaks, or other damage.

(3) Straighten bends, and repair damaged fins and leaks.

(4) Replace oil cooler if necessary.

c. Installation.

(1) Position the oil cooler in front of the radiator. Secure on pads (25) with washers (22) and screws (24).

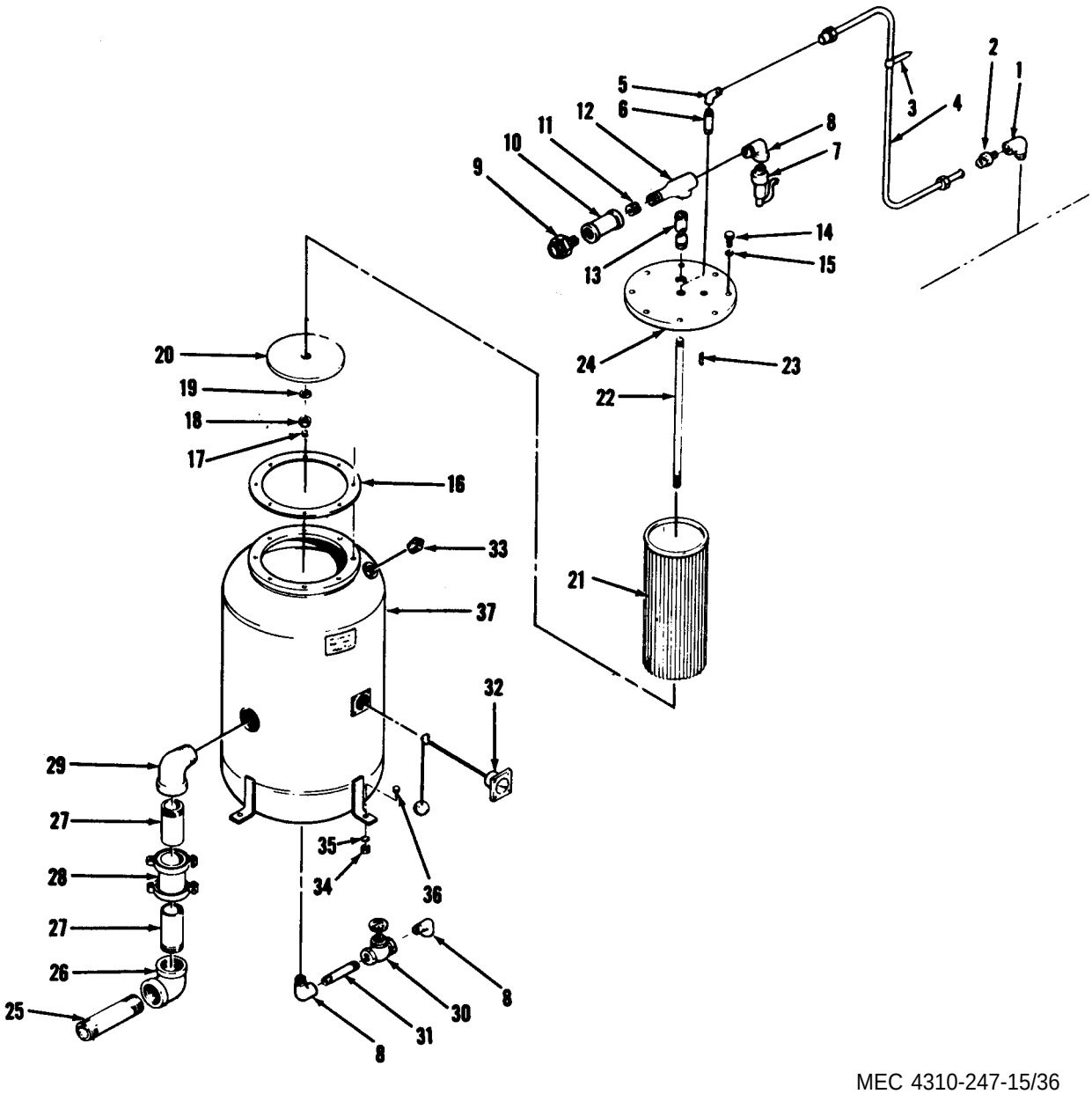
(2) Install washers (19, fig. 17) and screws (24).

(3) Secure brackets (23, fig. 25) with washers (22) and screws (21).

(4) Connect oil hoses to oil cooler.

(5) Install housing assembly (para 63).

(6) Refill system.



1 Elbow
2 Connection
3 Strap (11)
4 Tube assembly
5 Elbow
6 Nipple
7 Safety valve
8 Elbow (2)
9 Union
10 Coupling
11 Orifice
12 Tee
13 Nipple
14 Screw (8)
15 Washer (8)
16 Gasket
17 Plug (6)
18 Nut
19 Washer
20 End cover
21 Ag glomerator
22 Oil return pipe
23 Spring pin (3)
24 Mounting plate
25 Nipple
26 Elbow
27 Nipple (2)
28 Coupling
29 Elbow
30 Valve
31 Nipple
32 Gage
33 Plug (7)
34 Nut (4)
35 Washer (4)
36 Screw (4)
37 Receiver

Figure 36. Air receiver—oil separator.

Section V. COMPRESSOR

125. Air Control Assembly

a. Removal and Disassembly.

(1) Disconnect ball joints (4, fig. 71) from lever (17, fig. 37).

(2) Remove tube assembly (28, fig. 71) from the air control.

(3) Remove the screws (30) and lockwashers (31).

(4) Remove the air control.

(5) Refer to figure 37 and disassemble the air control.

b. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for breaks, cracks, bent condition, damaged or worn threads. Replace all damaged or unserviceable parts.

c. *Reassembly and Installation.*

(1) Refer to figure 37 for reassembly of air control assembly.

(2) Position the air control assembly and secure with lockwashers (31, fig. 71) and screws (30).

(3) Install tube assembly (28).

(4) Connect ball joints (4) to lever (17, fig. 37).

d. Lubrication. Lubricate the linkages according to the current lubrication order.

e. Adjustment. Refer to paragraph 79 for adjustment of the air control assembly.

126. Discharge Valve

a. Removal Disconnect hose from discharge valve (3, fig. 27) and remove the valve from the compressor.

b. Disassembly. Refer to figure 38 and disassemble the discharge valve.

c. *Cleaning and Inspection.*

(1) Clean parts with an approved cleaning solvent; dry thoroughly.

(2) Inspect for breaks, cracks, damaged or worn threads, or other damage. Replace any part found to be unserviceable.

d. Reassembly. Refer to figure 38 and reassemble the valve.

e. Installation. Install the discharge valve (9, fig. 27) on the compressor and connect the hose.

127. Compressor Drive

a. Removal.

(1) Remove the compressor (para 114).

(2) Remove screws (1, fig. 25), washers (3), and ring gear (4) from flywheel housing.

(3) Remove screws (26, fig. 27), lockwashers (10), and washers (27). Remove drive gear (28).

b. Cleaning, Inspection, and Repair.

(1) Clean the ring gear and drive gear with an approved cleaning solvent and dry thoroughly.

(2) Inspect the gears for wear, cracks, breaks, or damaged teeth. See that the teeth are not burred or worn. Remove burrs with a fine cut file.

(3) Inspect all mounting hardware for stripped or damaged threads. Replace as required.

(4) Replace the ring gear or drive gear if unserviceable.

c. Installation.

(1) Position drive gear (28) on compressor unit and secure with washers (27), lockwashers (10) and screws (26).

(2) Position ring gear (4, fig. 25) in flywheel housing and secure with washers (3) and screws (1).

(3) Install the compressor (para 114).

128. Vane Replacement

a. Removal

(1) Remove screws (9, fig. 27), washers (10), outboard bearing cap (15), and gasket (16).

(2) Remove screws (9), washers (10), and bearing retainer (18).

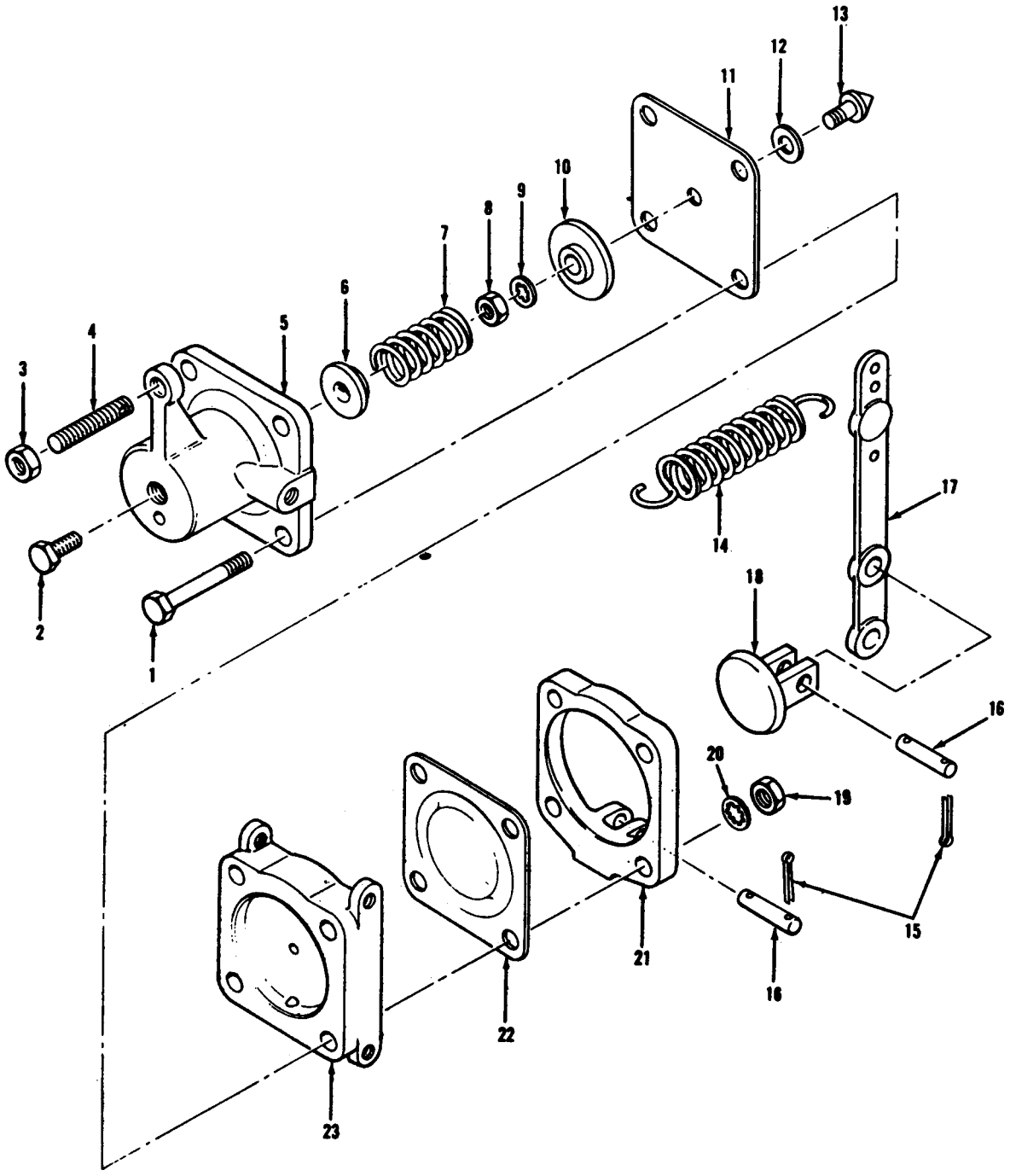
(3) Remove screws (9), washers (10), preformed packings (22 and 23), and bearing housing (21).

(4) Pull vanes (35) from rotor (34).

b. Cleaning and Inspection.

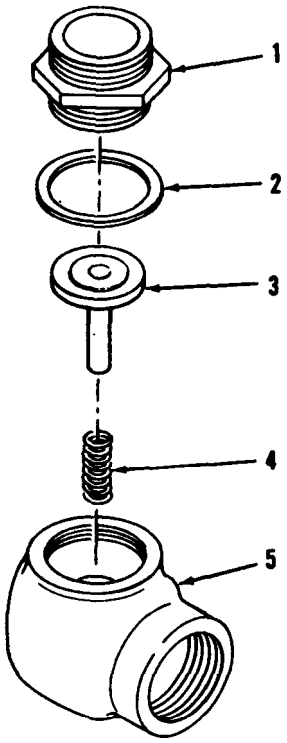
(1) Clean the vanes with an approved cleaning solvent and dry thoroughly.

(2) Inspect vanes for wear. Replace a vane worn down to the oil groove. Replace a vane that is .023 in. or more shorter than the stator.



1 Screw (4)	7 Spring	13 Needle valve	19 Nut (4)
2 Screw	8 Nut	14 Spring	20 Washer (4)
3 Nut	9 Washer	15 Cotter pin (4)	21 Retainer
4 Special stud	10 Spring rest	16 Pin (2)	22 Diaphragm, control
5 Housing	11 Diaphragm, pilot	17 Lever	23 Body
6 Spring guide	12 Washer	18 Plunger assembly	

Figure 37. Air control assembly



MEC 4310-247-15/38

1 Seat
2 O-ring
3 Valve
4 Spring
5 Body

Figure 38. Discharge valve.

(3) Inspect for chipped, cracked, or scarred ends. Replace if damaged.
(4) Inspect for burned, chipped, or cracked contact edges. Replace if damaged.

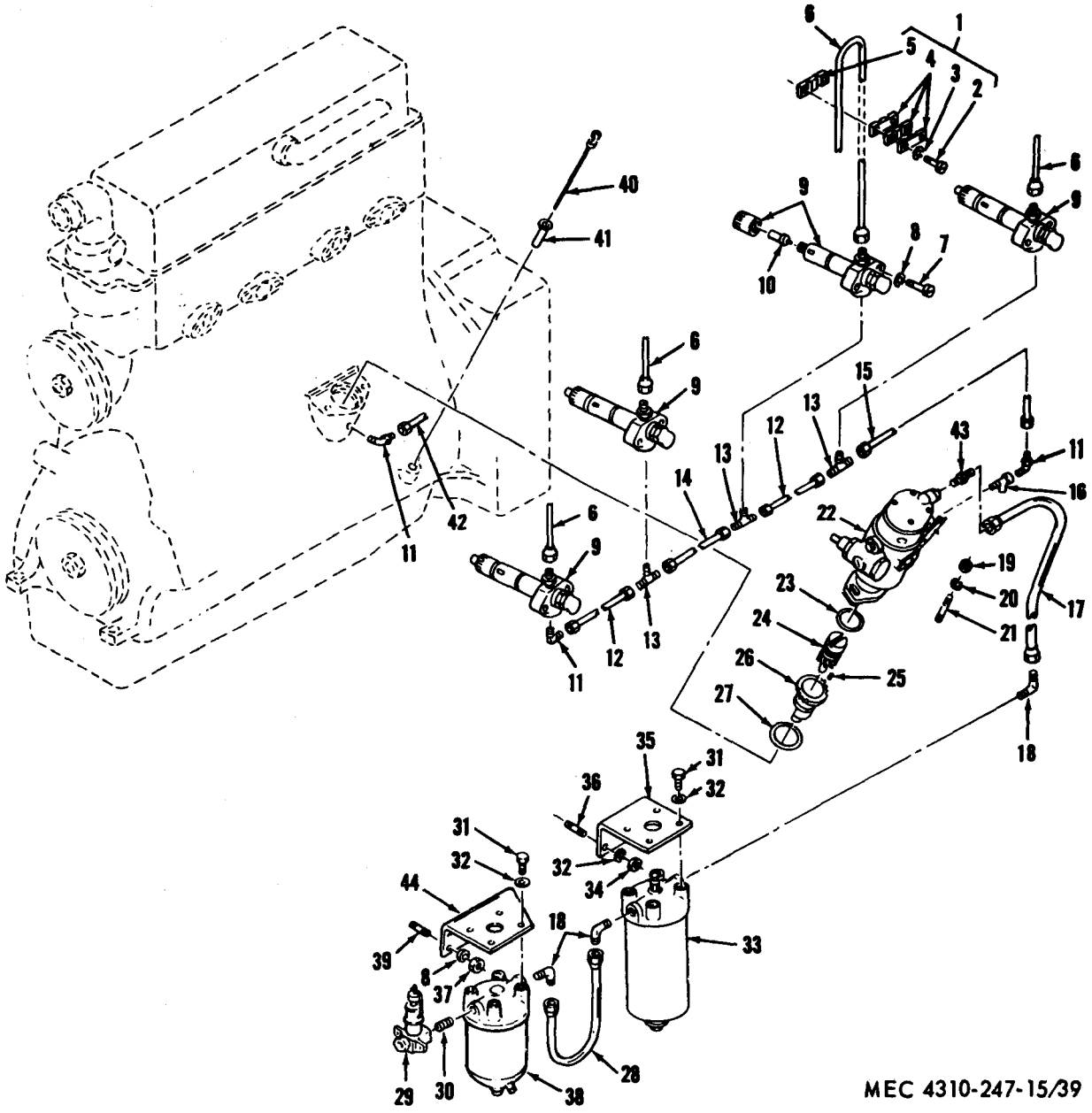
c. Installation.
(1) Push vanes into rotor.
(2) Install preformed packings (23 and 22), bearing housing (21), washers (10), and screws (9).
(3) Install bearing retainer (18), washers (10), and screws (9).
(4) Install gasket (16), bearing cap (15), washers (10), and screws (9).

129. Stator, Rotor, and Bearings

a. Removal.
(1) Remove the compressor (para 114).
(2) Refer to figure 27 for disassembly of compressor unit.
(3) Remove stator (36, fig. 27), rotor (34) and bearings (19 and 33).

b. Cleaning and Inspection.
(1) Clean stator, rotor and bearings with an approved cleaning solvent. dry thoroughly.
(2) Inspect stator for cracks or other damage. Replace if unserviceable.
(3) Inspect rotor for wear or damage. Replace if unserviceable or if rotor is .019 in. or more shorter than stator.
(4) Inspect bearings for wear or damage. Replace if unserviceable.

c. Installation.
(1) Press bearings (19 and 33) on rotor (34). Assemble rotor, stator and other parts of the compressor unit as shown on figure 27.
(2) Refer to paragraph 94 for rotor to bearing housing clearances and for rotor end play.
(3) Install the compressor (para 114).



1	Clamp section (4)	12	Tube assembly (2)	23	Seal	34	Nut (2)
2	Screw (2)	13	Tee (3)	24	Shaft	35	Bracket
3	Lockwasher (2)	14	Tube assembly (4)	25	Pin	36	Stud (2)
4	Clamp section (3)	15	Tube assembly	26	Adapter	37	Nut (4)
5	Clamp section (1)	16	Tee	27	Seal	38	Primary fuel filter
6	Line (4)	17	Tube assembly	28	Tube assembly	39	Stud (4)
7	Screw (8)	18	Elbow (2)	29	Hand pump	40	Rod
8	Washer (12)	19	Nut (2)	30	Nipple	41	Adapter
9	Nozzle holder	20	Washer (2)	31	Screw (12)	42	Tube assembly
10	Tip	21	Stud (2)	32	Washer (8)	43	Connector
11	Elbow	22	Pump	33	Secondary fuel filter	44	Bracket

Figure 39. External engine parts, fuel injection side.

130. External Engine Parts (fuel injection side)

a. Removal and Disassembly. Remove the external parts on the fuel injection side of the engine as shown in figure 39.

(1) Disconnect the fuel injection lines (6) from the injection pump (22), and nozzle holders (9).

Note. Clean the side of the engine before disconnecting the injection lines. Use clean fuel to flush the fittings, so that dirt cannot enter the injection system. As each line is removed, plug the pump openings and cap the nozzles with clean (preferably plastic) plugs and caps. Tape the ends of all lines.

(2) Remove nozzle holders (9) and leak-off tube assembly (12, 14 and 15). Begin with the No. 1 nozzle holder (fig. 40).

Caution: **Do not strike nozzle tips against hard surface or damage will result. Nozzle holders should not be disassembled unless cleaning or other service is needed.**

b. Cleaning, Inspection, and Repair.

(1) Clean all metal parts in an approved cleaning solvent and dry thoroughly. Wipe nonmetallic parts with a clean, dry cloth. Clean hose with soap and water.

(2) Check line, tube, and hose assemblies for continuity. Inspect hose for cuts, worn or weak spots, and deterioration. Replace if unserviceable.

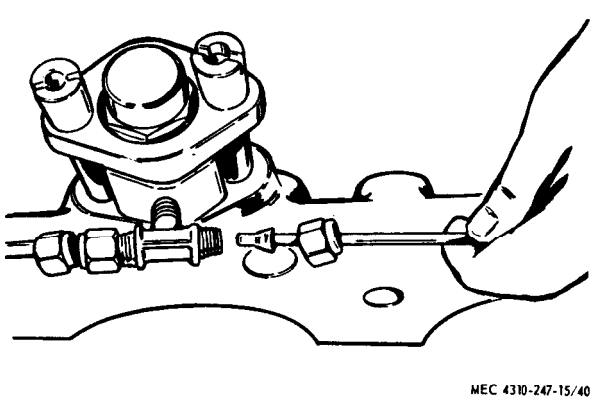


Figure 40. Disconnecting nozzle leak-off line.

(3) Inspect all metal parts for breaks, bends, nicks, groves, cracks, dents, obstructions, broken welds, damaged or worn threads, and corrosion. Use a fine stone to remove small nicks or burrs. Replace all damaged parts.

c. Reassembly and Installation. Reassemble and install external parts on the fuel injection side as shown in figure 39.

(1) Clean carbon and dirt from counterbore and gasket seat in the cylinder head before installing nozzle holder assembly, as small carbon particles on seating surfaces will clog assembly and permit blow-up. A reaming tool or round piece of wood or brass, properly shaped, may be used.

(2) Install nozzle holders and leak-off tube assembly, starting with nozzle holder No. 4. When tightening leak-off connections, always hold the fittings with a wrench to keep them from turning while tightening the nuts.

Note. Torque the nozzle holder mounting screws to 14-16 ft-lb. Pull down evenly in three stages, at 5, 10, and 16 ft-lb, respectively.

(3) Remove all caps, plugs and protective tape, and connect the fuel injection lines between the pump and nozzle holders.

131. Engine Oil Pump and Balancer

a. Removal and Disassembly.

(1) Refer to paragraph 115 and remove the engine.

(2) Remove all oil lines which connect balancer housing to crankcase at both housing and crankcase ends.

(3) Loosen screws (84 and 85, fig. 41) and pry the balancer loose from the dowels (59). Remove screws and balancer.

(4) Remove the nut (51) and washer (52) from idler gear stud (58) and press out stud.

(5) Remove oil pump wire (9), oil screen (10), frame (14), screws (25), and oil relief shield (27).

(6) Remove screws (28 and 30) and remove oil pump body (36).

(7) Check gear backlash by rocking the gears through the centerline connecting both shafts. This should be .001 to .003 inch.

(8) Check both the drive gear and the driven gear in the pump body for the correct clearance; use a dummy shaft to hold gear in place as shown in figure 42. This should not be over .003 inch.

(9) Remove cotter pin (32, fig. 41) from oil pressure relief valve (35) and disassemble.

(10) Mark end of counterweight idler shaft (76) and housing to locate proper radial positioning of counterweight idler shaft to housing at reassembly.

(11) Drive out pin (73) holding counterweight idler shaft to housing with a prick punch. Drive out counterweight idler shaft carefully.

(12) Remove staked setscrews (66) retaining counterweight drive gear (72) to the drive shaft (69).

(13) Remove nut (64) and pin (65) from drive shaft collar (71).

(14) To remove drive shaft (69) use a brass or aluminum drift and tap end of the shaft lightly to prevent damage. Remove counterweight drive gear (72).

(15) Straighten sheet metal locknut (61) and remove nut (51) and locknut. Remove drive gear (62) only if service is necessary.

(16) Remove tube assembly (18) from tee (24) to front idler boss. Disassemble nipple (23), reducing bushing (21) and elbows (20 and 22) from tee. Remove tee (24) from balancer housing (86). Remove all pipe plugs from balancer housing. Press out front bushing (70) using an arbor press with a driver. New bushings can be installed with the same driver for the front and intermediate case holes. Press out intermediate needle bearing or bushing with same driver as above.

(17) Press out remaining bushings with a proper driver.

b. Cleaning and Inspection.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly.

(2) Steam clean all oil passages in housing.

(3) Replace gasket between body and spacer.

(4) Replace bushings and gaskets if necessary.

(5) Inspect parts for cracks, breaks, wear, or other damage. Replace parts that are unserviceable.

(6) Inspect gears for burrs, breaks, or wear. Remove burrs or replace gears if unserviceable.

(7) Replace crank and cam gears which show wear or damage if balancer assembly is replaced for any reason.

c. Assembly and Installation.

(1) Press bushing (42) into rear housing using a driver and an arbor press. It is important to line up bushing hole radially with hole in housing before pressing bushing in.

***Caution:* Bushings must be pressed in with the chamfered end contacting the housing. Do not hammer against end of bushing. Make certain that end of bushings do not project past thrust face of housing.**

(2) Install bushings (70 and 78) as above.

(3) Install plugs in balancer housing and tighten securely.

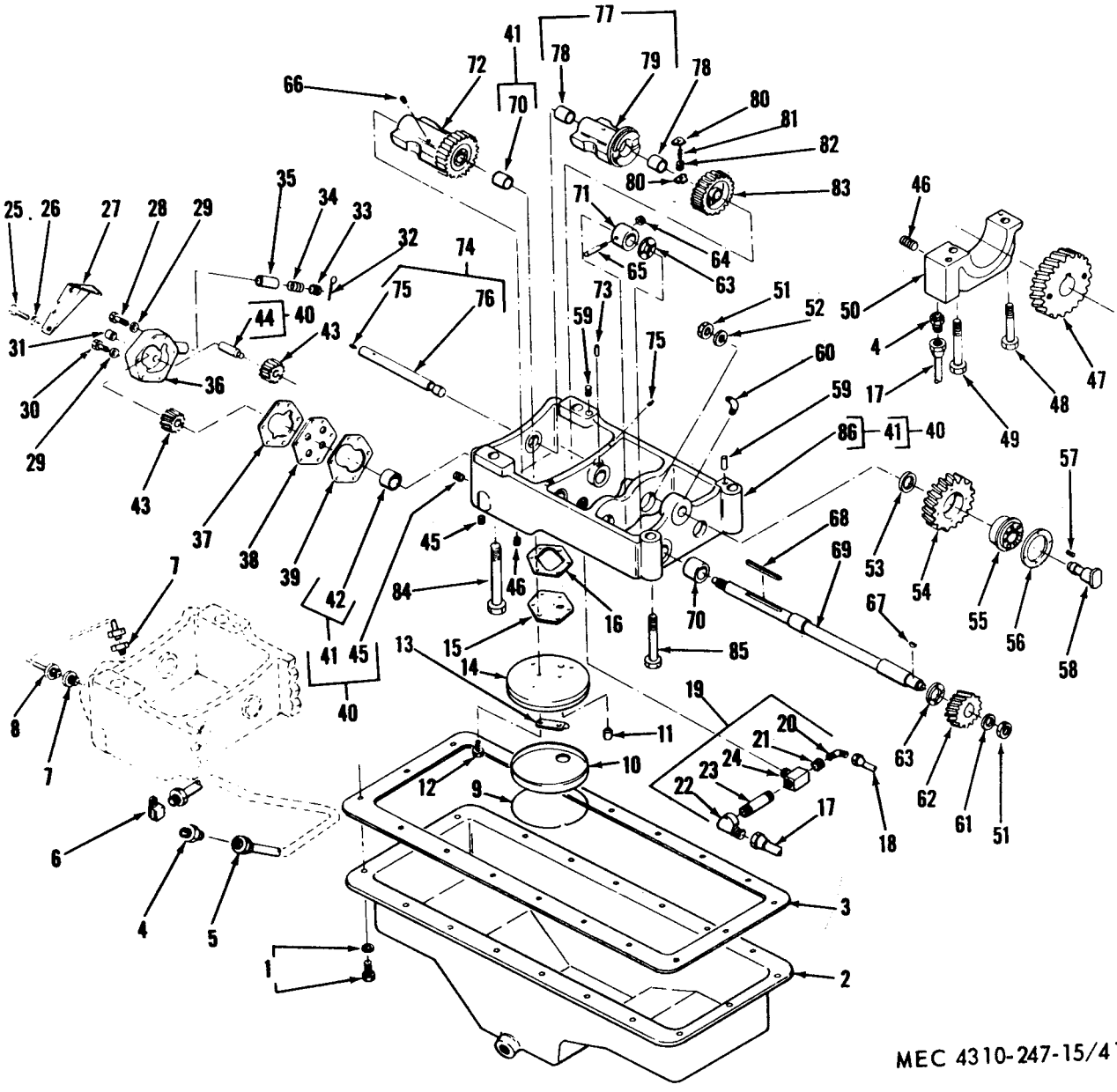
(4) Reassemble tee, nipple, and elbow assembly (19).

***Caution:* Do not try to remove and replace the drive gear from the drive shaft without removing the shaft assembly from the housing. Driving the gear on to the shaft while the shaft is installed in the housing will damage rear bearing.**

(5) Position the keys (67 and 68) on the drive shaft (69). Heat the drive gear (62) to 200°F. before pressing onto shaft. Install one of the thrust washers (63), drive gear (62), sheet metal locknut (61), hex nut (51) to the drive shaft (69). Torque hex nut (51) to 75 foot-pounds and bend locknut (61) against flat on hex nut.

Note. Use a pilot sleeve over the splined end of the shaft when assembling to prevent damage to rear bushing. Failure to use a pilot sleeve will damage the shell of the rear bushing, causing a bearing failure.

(6) Slide drive shaft (69) into first hole in housing (86). Install the other



1 Screw and washer assembly (18)
2 Pan
3 Gasket
4 Connector
5 Tube assembly
6 Elbow
7 Connector (2)
8 Tube assembly
9 Wire
10 Oil screen
11 Tube
12 Screw and washer assembly (6)
13 Spacer
14 Frame
15 Cover
16 Gasket
17 Tube assembly
18 Tube assembly
19 Tee, nipple and elbow assembly
20 Elbow
21 Bushing
22 Elbow
23 Nipple
24 Tee
25 Screw (5)
26 Lockwasher
27 Shield
28 Screw (2)
29 Washer (2)
30 Screw
31 Bushing
32 Pin
33 Retainer
34 Spring
35 Valve
36 Body
37 Gasket
38 Cover
39 Gasket
40 Housing assembly
41 Housing assembly
42 Bushing
43 Gear
44 Stud
45 Plug (2)
46 Plug
47 Gear
48 Screw
49 Screw
50 Cap
51 Nut (2)
52 Washer
53 Spacer
54 Gear
55 Bearing
56 Plate
57 Screw (4)
58 Stud
59 Dowel (2)
60 Elbow (2)
61 Nut (2)
62 Gear
63 Washer (2)
64 Nut
65 Pin
66 Screw (2)
67 Key
68 Key
69 Shaft
70 Bushing (2)
71 Collar
72 Gear
73 Pin
74 Gear shaft assembly
75 Plug
76 Shaft
77 Idler assembly
78 Bushing (2)
79 Counterweight
80 Spring seat (4)
81 Bumper (2)
82 Spring idler (2)
83 Gear
84 Screw (2)
85 Screw (2)
86 Housing

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Figure 41. Balancer and oil pump.

thrust washer (63) and thrust collar (71) onto the shaft. Position the thrust washers (63) on the shaft so the tangs are in the slots in the housing (86) before installation of shaft. If tangs in thrust washers are not in place, the washers will turn against housing causing excessive wear.

(7) When replacing bushings in the forged steel counterweight idler (77), press in with driver with chamfered end of bushing toward gear. In order to keep the oil slots open on the hub, install bushing 1/32 inch below hub of gear.

Caution: **Split bushing must be pressed in with the split in position as shown in figure 43.**

(8) Position counterweight drive gear (72, fig. 41) as shown in figure 44. A .006-.007 shim and a pilot should be in place when drive shaft (69) is being pressed through bushing (78) and gear (79).

(9) Check thrust collar (71, fig. 41) with shim stock for .003 to .005 end play (fig. 45).

(10) If pin hole in thrust collar (71, fig. 41) does not line up when assembled to .003 to .005 end play, due to wear on thrust washer (63) or collar, redrill pin hole through collar and shaft at right angles to original hole.

(11) Apply a wedge between bottom of counterweight drive gear (72) and housing (86). Tighten the two Nylock setscrews (66) securely. Stake each screw in four places and remove wedge as shown in figure 46.

(12) Press counterweight idler shaft (76, fig. 41) with gear (72) into housing (86). For reassembly of original shaft, align mark on end of shaft with mark on housing (fig. 47). Position counterweight idler gear (72, fig. 41) on shaft so edges of both counterweights are in the same plane. To prevent a mismatch of hole in shaft with groove in the bushing, press in counterweight idler shaft with end of shaft 11/32 inch from finished face of oil pump mounting pad. If, when mounting, the 11/32 -inch dimension from the end of the shaft does not bring the front shaft in line with housing hole for inserting the pin, replace the shaft. Drill ¼-inch hole through the present 3/16 -inch hole and drive in a ¼ x 1¾-inch tempered steel roll pin (fig.48).

(13) Position two aligning studs in balancer oil pump mounting pad. Position paper gasket (39, fig. 41), oil pump cover (38), lead gasket (37), gears (43) and oil pump body (36).

Caution: **Check oil pump idler stud (44) so it extends 1 1/32 inch above pad face. Also make certain that the oil hole in the oil pump idler gear indexes with the oil groove in the idler stud. If these do not index gear will freeze on stud causing oil pump failure.**

Note. When replacing oil pump body, balancer must be removed from engine in order to properly position the new body. To check position rotate the drive shaft (69).

(14) Assemble hex head capscrews (28 and 31, fig. 41) lockwashers (29) through oil pump body to balancer housing. Torque to 12 foot-pounds and check for freeness of pump gears by rotating drive shaft (69). Remove aligning studs, assemble oil relief shield (27) and remaining capscrews and lockwashers and torque to 12 foot-pounds.

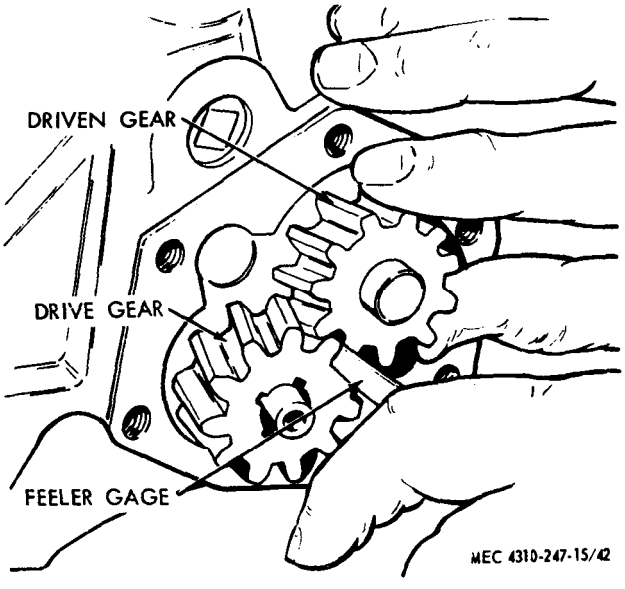


Figure 42. Gear clearance.

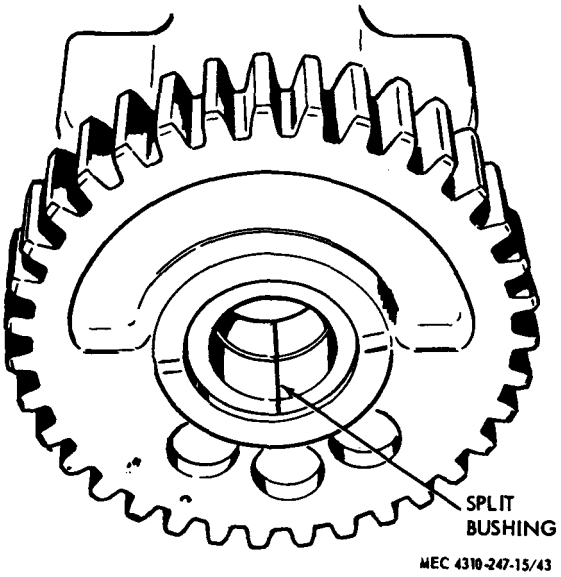


Figure 43. Bushing alignnment.

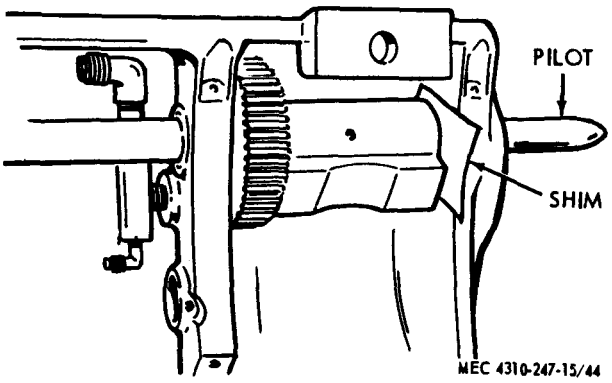


Figure 44. Drive gear installation.

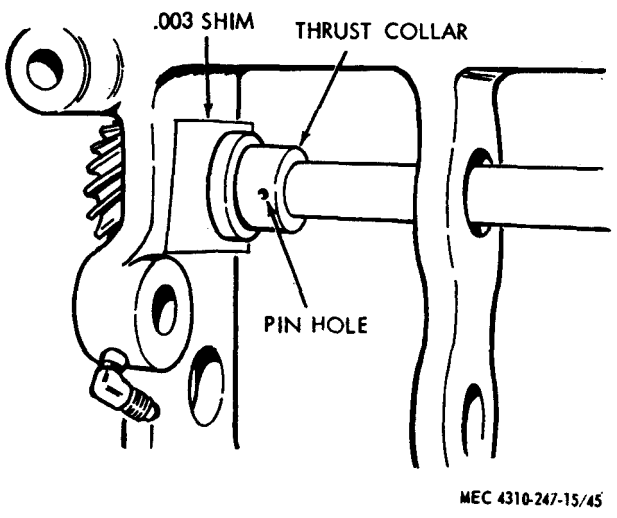


Figure 45. Pin hole drilling.

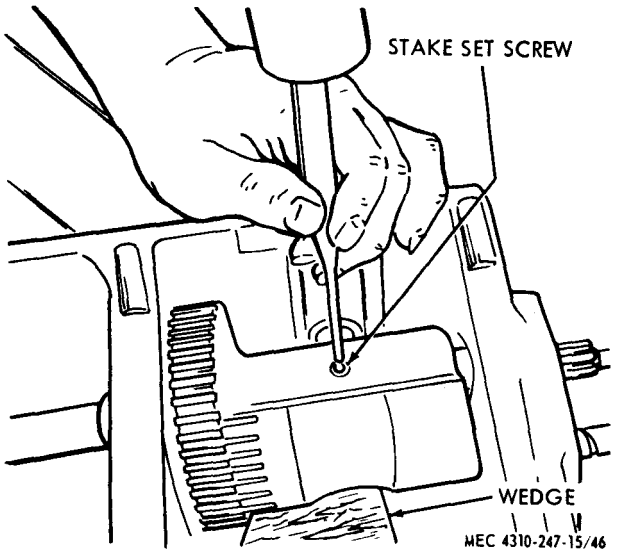


Figure 46. Setscrew staking.

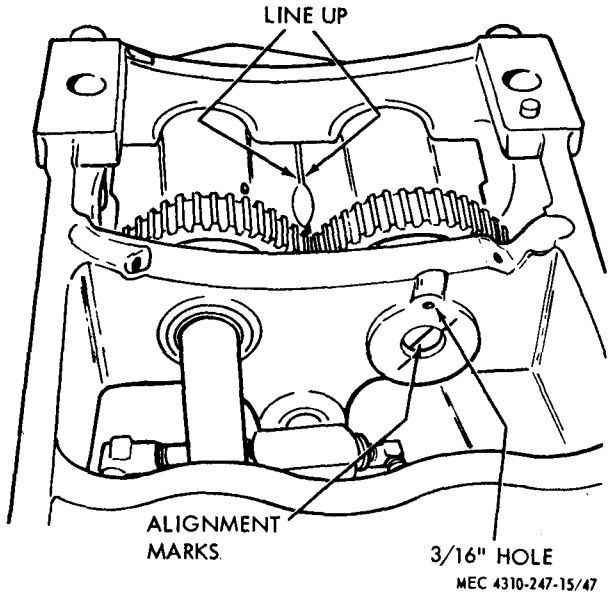


Figure 47. Gear and shaft alignment.

Recheck for freeness of pump gears. If they do not rotate freely, loosen and reposition body.

Caution: **Failure to replace oil relief shield will cause a rear main crank seal leak.**

(15) Assemble lead oil inlet cover gasket (16) to bottom of balancer housing. Assemble oil inlet cover (15), oil inlet strainer frame (14) and oil inlet strainer spacer (13) with hex head

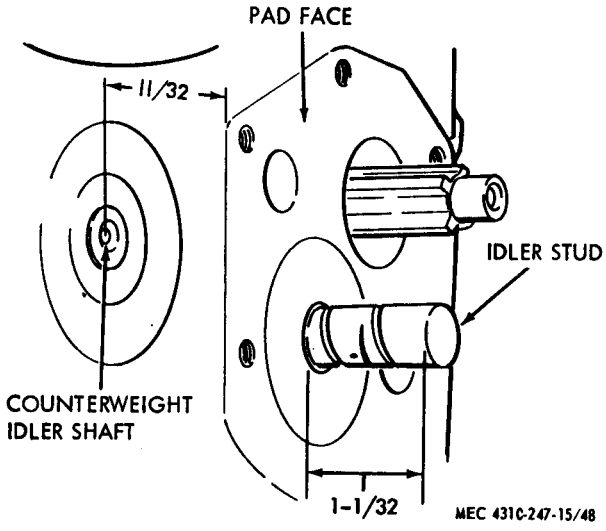


Figure 48. Shaft location dimensions.

capscrew and lockwasher assemblies (12). Torque screws to 10 foot-pounds. Assemble oil pump strainer screen (10).

(16) Assemble idler gear (64), idler gear stud (58), spacer (63), and idler gear bearing (55). Assemble retainer plate (56) to idler gear with screws (57). Tighten screws securely and stake two places in each screw so metal from gear is driven into screw slots.

(17) Assemble idler gear assembly (step 15) into housing. Secure with washer (52) and nut (61). Line up marked tooth space on idler gear (47) with marked tooth on counterweight drive gear (62). Rotate balancer idler gear to bring marked tooth space on idler gear and marked tooth on counterweight drive shaft gear in line. Due to the gear ratio of the two gears, the markings line up only once every 31 turns, so it maybe necessary to rotate the gears several revolutions. Check backlash of gears for .004 to .007 clearance in four places. Assemble lockwasher (61) and nut (61). Torque nut to 75 foot-pounds (fig. 49).

(18) Turn engine crankshaft until the marked tooth space on the crankshaft gear lines up with the marked teeth on the cam gear. The marked teeth on crankshaft gear must be in the lowest position. Mount the complete balancer assembly to the crankcase with the capscrews (84 and 85) only finger tight.

(19) Reconnect all oil lines from balancer to engine.

(20) Line up the marked teeth on the crankshaft gear with the marked tooth on top of the counterweight idler gear. Tighten screws holding balancer housing to engine crankcase to 125 to 130 foot-pounds. Check timing for lineup after balancer is tightened to be sure that you are not one tooth off. Check backlash between crankcase and idler gear all the way around by rotating one complete revolution. Crank and balancer idler gear must have .004 to .0075 inch backlash.

(21) Tighten capscrews (84 and 85) to torque as given in paragraph 5.

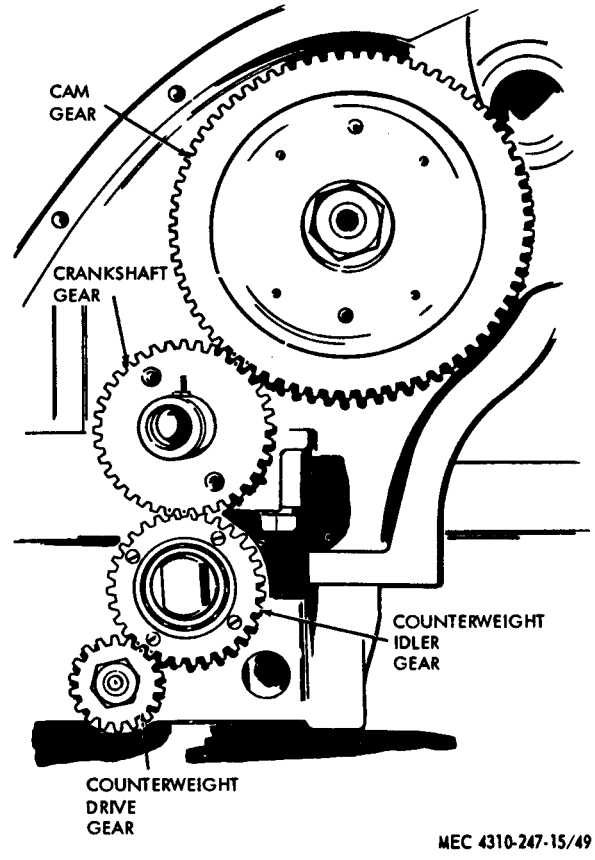
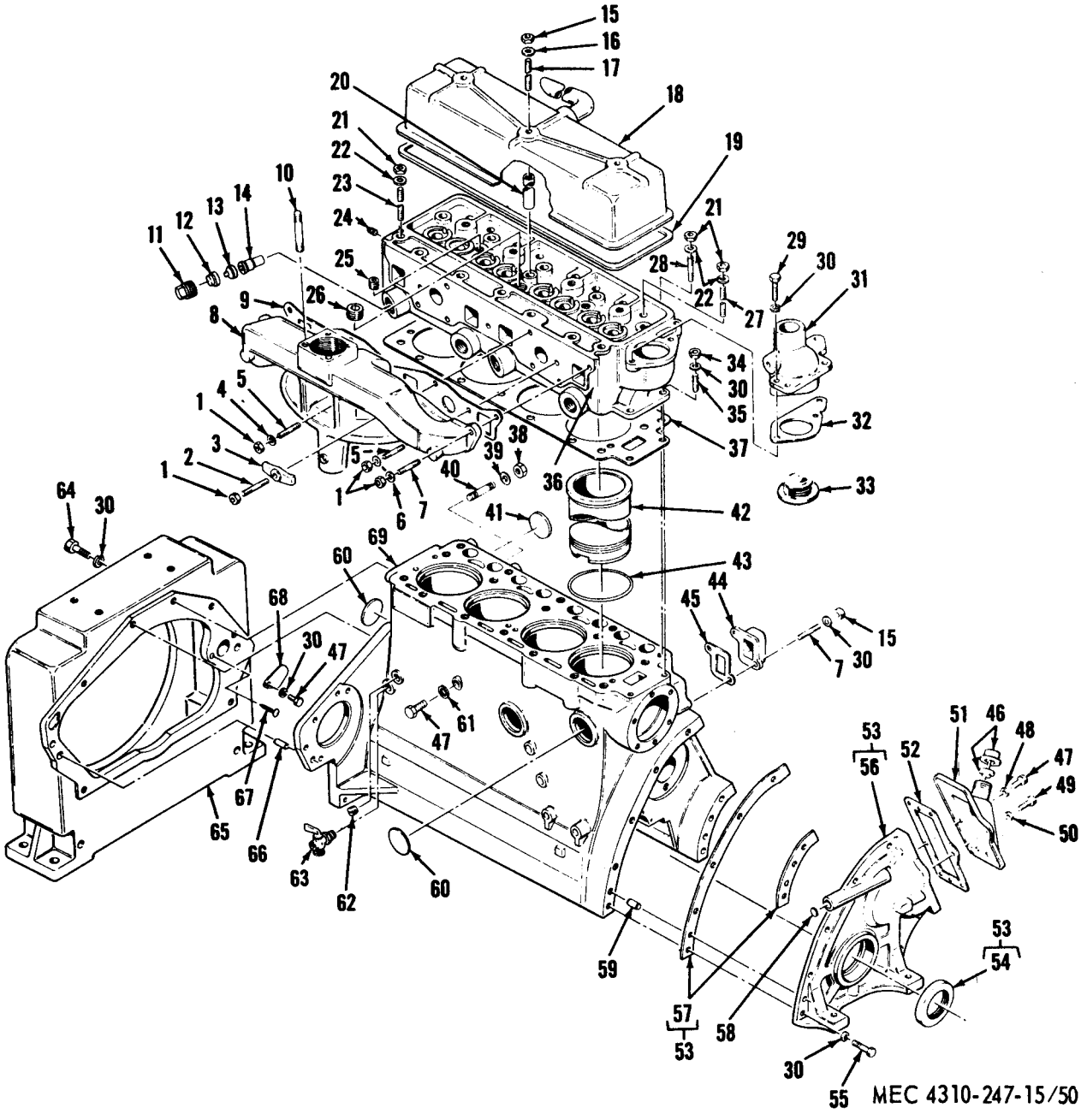


Figure 49. Gear alignment.



1 Nut (11)
2 Stud (4)
3 Crab (4)
4 Washer (2)
5 Stud (5)
6 Washer (5)
7 Stud (8)
8 Manifold
9 Gasket (2)
10 Stud (4)
11 Energy cell plug (4)
12 Energy cell retainer (4)
13 Energy cell cap (4)
14 Energy cell body (4)
15 Nut (5)
16 Gasket (3)
17 Stud (3)
Cover assembly
Gasket
Spacer
Nut
Washer (17)
Stud (6)
Plug
Plug (4)
Plug (3)
Stud (4)
Stud (2)
Screw (3)
Washer (24)
Elbow
Gasket
Themostat
Nut (2)
Stud (2)
36 Head assembly
37 Gasket
38 Nut
39 Washer
40 Stud
41 Plug
42 Sleeve (4)
43 Packing (8)
44 Elbow
45 Gasket
46 Cap assembly
47 Screw (22)
48 Washer (10)
49 Screw
50 Washer
51 Lid and oil filler assembly
52 Gasket
53 Gear cover assembly
54 Seal
55 Screw (25)
56 Cover
57 Gasket
58 Plug
59 Dowel (2)
60 Plug (2)
61 Washer
62 Plug (2)
63 Drain cock
64 Screw (2)
65 Housing
66 Dowel
67 Screw
68 Cover
69 Block

Figure 50. Engine parts, manifold side.

(22) Refer to paragraph 115 and install the engine.

(23) Lubricate the engine in accordance with the current lubrication order.

Note. After assembly and on initial run at 1,800 rpm, oil pressure should be 30 to 40 psi. If it is below this figure, install washers in cavity of oil relief plunger. Reassemble oil relief plunger spring, oil relief spring retainer and cotter pin.

132. Engine Parts (manifold side)

a. Removal and Disassembly. Remove the external parts on the manifold side of the engine as shown in figure 60.

Note. Provide a clean place to work, and clean the engine exterior before you start disassembling.

(1) Drain water from engine and disconnect radiator outlet hose.

(2) Remove cylinder cover (18) by taking out the screws holding it to the rocker arm supports. Remove gasket (19).

(3) Remove rocker arm shaft assembly and push rods (fig. 51). Grip the push rods and snap them sideways out of the tappet sockets (fig. 52). This breaks the hydraulic connection, and permits lifting the push rods out without disturbing the tappets. (If tappets are lifted out of the guides, they will have to be reassembled through the opening in the block when only the cylinder head is removed for servicing.)

(4) Disconnect the injection and leak-off lines at both the nozzle and pump connections and immediately cap the fittinge to prevent dirt from entering.

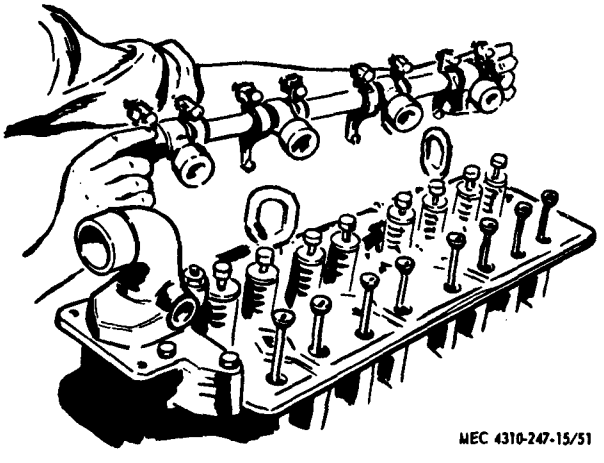


Figure 51. Rocker arm shaft removal.

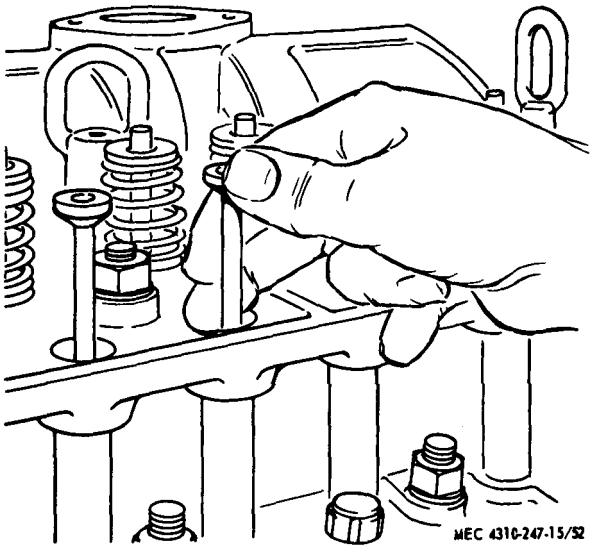


Figure 52. Push rod disassembly.

Figure 53. Energy cell body removal.

(5) Loosen and remove the nuts holding the cylinder head (36, fig. 50) to the block (69) .

(6) Lift the cylinder head off the engine and carry it to a clean bench for further disassembly. Remove and discard old gasket (37).

(7) Remove all carbon from combustion areas with a scraper and wire brush. Remove valve assemblies (para. 134).

(8) Remove the energy cell assemblies from the cylinder head (36) by first removing the energy cell retainer plugs (11) and retainers (12), and then the caps (13) from the energy cell bores in cylinder head.

Note. The energy cell cap (13) may become stuck to the energy cell body (14). In this case, the cap may be pried slightly to break the carbon crust.

(9) Pull the energy cell bodies (14) from the cylinder head (fig. 53).

Note. It maybe necessary to first remove the fuel injection nozzleholders (para 130) and then drive the energy cells out of the cylinder head from the nozzle opening. Always use a spherical-headed brass drift for this purpose. Never use a steel drift, as this would damage the conical entrance of the metered opening.

(10) Remove the manifold (8, fig. 50). Remove elbow (31) and thermostat (33).

(11) Lift sleeves (42) out of seatings in engine block (69).

(12) Detach housing (65) and oil filler assembly (51) from engine block, and remove drain cock (63). Remove gear cover assembly (53).

b. Cleaning, Inspection, and Repair.

(1) Clean all metal parts in an approved cleaning solvent and dry thoroughly. Wipe nonmetal parts with a clean, dry cloth.

(2) Clean the cylinder head thoroughly with a solvent or decreasing solution and blow it off with compressed air. Inspect carefully for cracks.

(3) Clean and inspect the valve stem guides and all exhaust valve inserts (para 134).

(4) Clean the energy cell bores in the cylinder head, to insure proper seating upon installation.

(5) Clean all carbon and other deposits from the energy cell counterbore, being careful not to damage the large diameter angular seat on which the energy cell makes contact.

(6) Clean the four energy cell assemblies with an approved cleaning solvent, inside and out, and dry with compressed air. Remove carbon from inside the cell caps and bodies (13 and 14, fig. 50) with a steel scraper.

(7) Inspect the energy cells for burned spots, especially around the mouth. Pay particular attention to the surface that touches the cap. Discard the energy cell body if it is defective.

(8) Inspect the mating surfaces of the caps and cell bodies for scratches or burrs which may affect an airtight seal. Discard defective caps and cells.

(9) Clean the cylinder bores in the head. Clean the ring of carbon from around the top of the bore, formed above the travel of the top ring.

(10) Inspect cylinder bores for wear. If wear is less than .008 inch, a set of oversize rings may be used to restore the engine to satisfactory operating condition. If wear exceeds .008 inch, however, pull out the sleeve and discard it.

c. Reassembly and Installation. Reassemble and install external parts on the manifold side of the engine as shown in figure 50.

(1) Attach housing (65) and oil filler assembly (51) to engine block (69), and install drain cock (63). Replace gear cover assembly (53).

(2) Install sleeves (42). If new sleeves are being used, new seals (43) must first be assembled in the grooves provided for them.

Caution: The seals must not be twisted during, assembly; otherwise they may leak. Slip fingers under seals, sliding them out of the sleeve grooves, and run the finger around the inside so that the seal slides into place without twisting.

(3) Drop sleeves back into their respective bores, after having first lubricated the seals thoroughly with either hydraulic brake fluid or petroleum jelly. Then press sleeve in place with the palm of the hand (fig. 54).

(4) Install manifold (8, fig. 50), elbow (31) and thermostat (33).

(5) Install energy cell assemblies, after first replacing any parts found defec-

tive during inspection. Screw the energy cell body (14) on the end of a piece of wood, then insert the cell into the cylinder head, lapping the energy cell body to the seat.

Note. The seat in the cylinder head must be gastight, since it is a point at which the cell is sealed into the head. Any leakage will cause burning of the surrounding metal in a short time.

(6) Lap the mating surfaces between the energy cell caps and the energy cells to insure an airtight seal.

(7) Position the energy cell bodies (14), caps (13), and retainers (12) in the cylinder head assembly (36), and secure with the energy cell plugs (11). Tighten plug, and torque to 100 foot-pounds.

(8) If it was necessary to remove the fuel injection nozzle holders in order to drive the energy cells out of the-cylinder head, replace the nozzle holders at this time (para 130).

(9) Replace valve assemblies (para 134) and check gasket contact surfaces on the head (36, fig. 50) and block (69), making sure they are clean, smooth, and flat.

Note. Check flatness with straight edge and feeler gage in three positions lengthwise and five crosswise (fig. 55). The maximum permissible is .004 inch low in the center lengthwise, gradually decreasing toward the ends, and .003 inch crosswise or in localized low spots. Cylinder head or block must be resurfaced if these limits are exceeded.

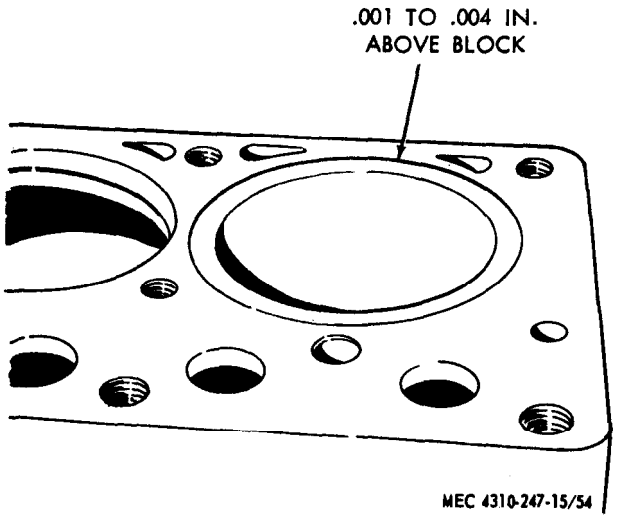


Figure 54. Cylinder sleeve reassembly.

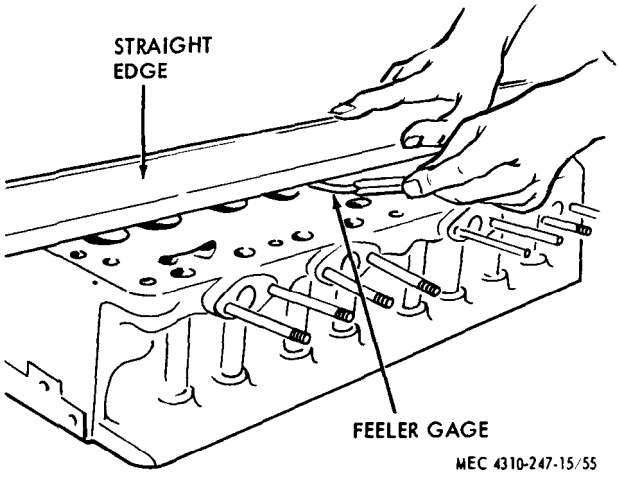


Figure 55. Cylinder head inspection.

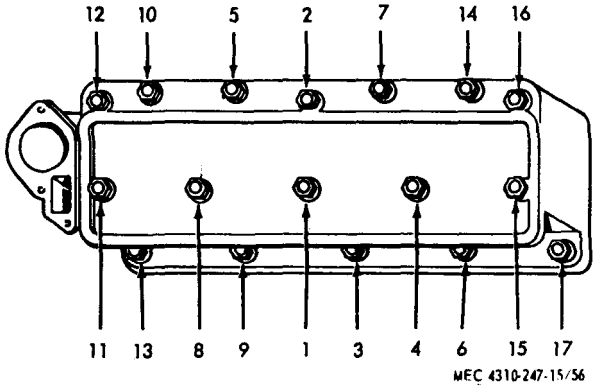


Figure 56. Cylinder head tightening sequence.

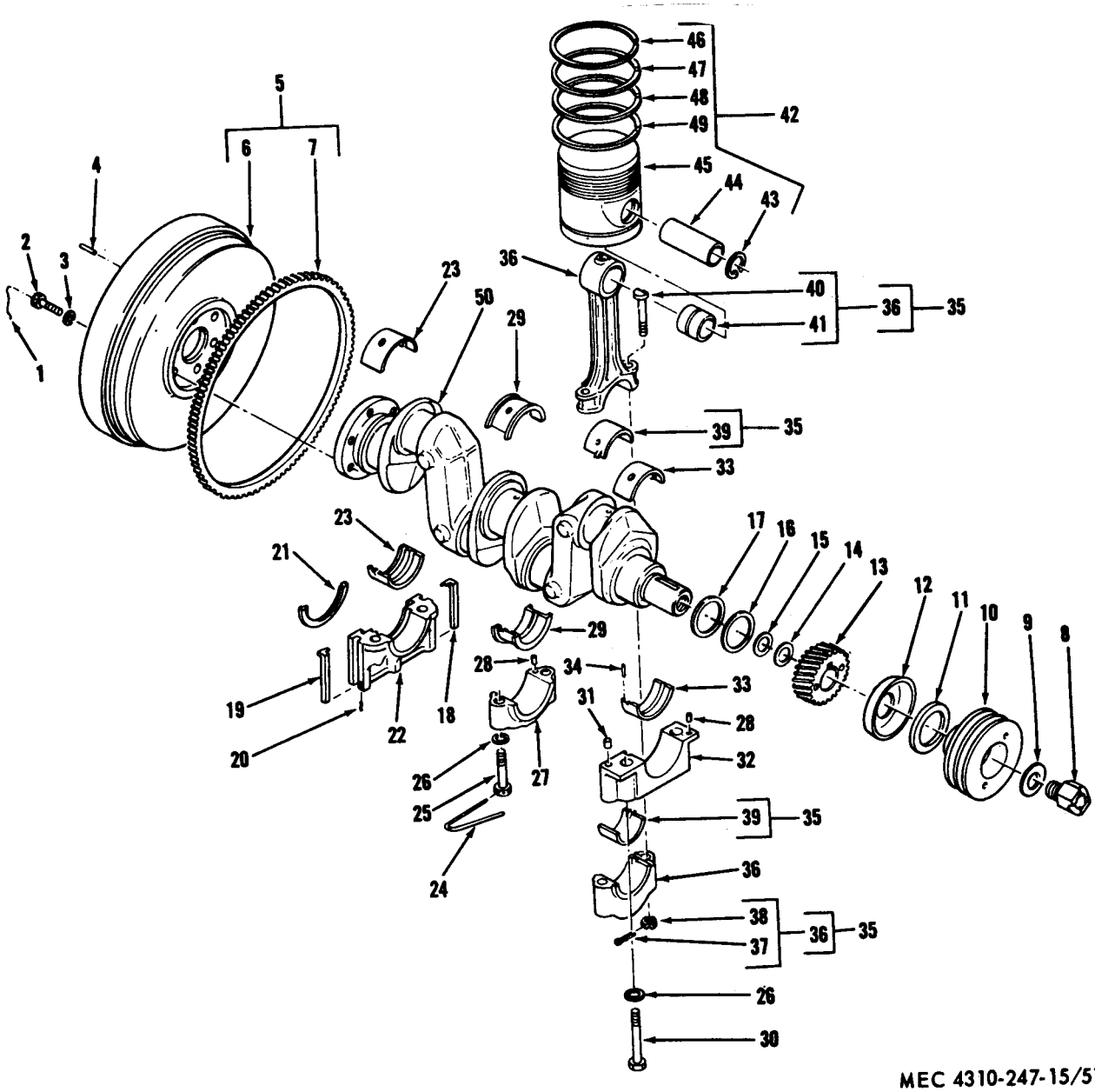
Note. Use new cylinder head gasket (37, fig. 50). If difficulties are encountered with gasket sealing, coat both sides of gasket with heat resisting aluminum paint and assemble immediately.

(10) Using a chain hoist, lower the cylinder head assembly (36) evenly over the studs, then pull all cylinder head nuts down snug with speed wrench and tighten with torque wrench.

Note. Refer to the tabulated data of paragraph 5 for torque. Pull down evenly in three stages, in the sequence shown in fig. 56.

(11) Connect injection and leak-off lines (para 130).

(12) Reassemble and install valves, push rods, and rocker arm assembly (para 134).



1 Wire
2 Screw (6)
3 Lockwasher (6)
4 Dowel (2)
5 Flywheel assembly
6 Flywheel
7 Gear
8 Jaw
9 Washer
10 Pulley
11 Seal
12 Thrower
13 Gear
14 Shim
15 Shim
16 Washer
17 Washer
18 Seal
19 Seal
20 Pin
21 Seal
22 Rear cap
23 Bearing, rear
24 Lock wire (3)
25 Screw (2)
26 Washer (4)
27 Cap
28 Pin (3)
29 Bearing, center
30 Screw (2)
31 Dowel
32 Cap
33 Bearing, front
34 Pin
35 Rod and cap assembly
36 (4)
37 Rod assembly (4)
38 Nut (10)
39 Bearing (8)
40 Screw (10)
41 Bushing (4)
42 Piston assembly (4)
43 Ring (10)
44 Pin (4)
45 Piston (4)
46 Ring (4)
47 Ring (13)
48 Ring (9)
49 Ring (4)
50 Crankshaft

Figure 57. Internal engine parts.

(13) Install cylinder head cover assembly (18, fig. 50) and gasket (19). Reconnect radiator or heat exchanger outlet hose.

133. Internal Engine Parts

a. Removal and Disassembly. Remove and disassemble the internal parts of the engine as shown in figure 57.

(1) Refer to figure 58 and remove connecting rod cap (36, fig. 57). Remove the screws (30) and washers (26) holding the cap to the rod.

Note. Keep the caps and screws in numerical order so that when the pistons and rods are removed from the engine, the cap can be reassembled and kept with its mating part.

(2) Push the piston (45, fig. 57) and connecting rod (36) up through the top of the cylinder.

(3) Remove the remaining three pistons and connecting rods in the same manner.

(4) Remove starting jaw (8) and washer (9) and remove the crankshaft pulley (10) with a puller.

(5) Remove the screws holding gear cover to the front of the block and those holding the injection pump drive housing to the gear cover.

(6) Remove the oil pump suction tube.

(7) Remove each main bearing cap (22, 27, and 32).

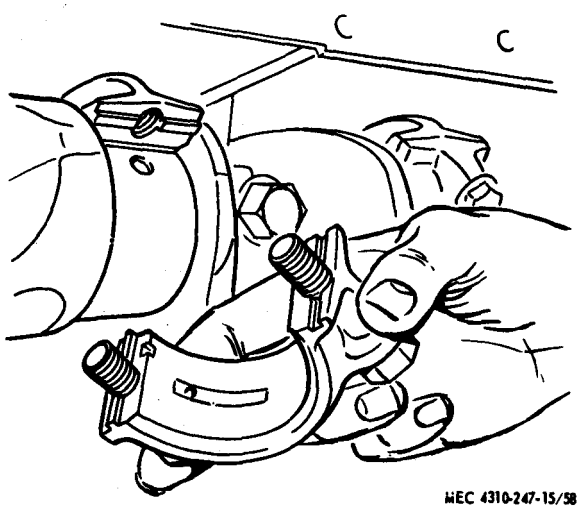


Figure 58. Connection rod cap removal.

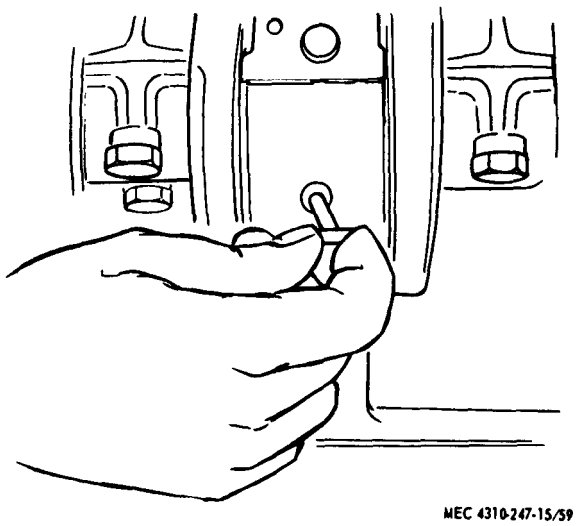


Figure 59. Crankshaft bearing removal.

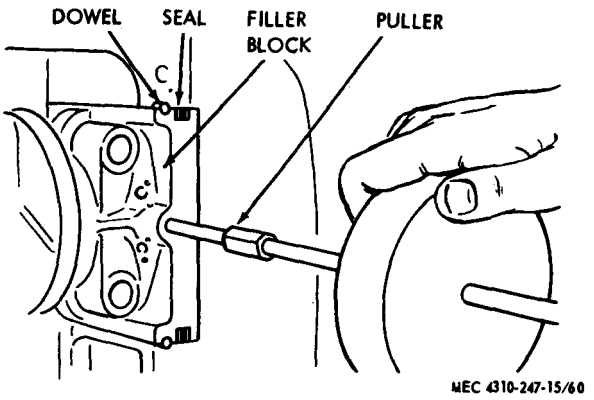


Figure 60. Filler block removal.

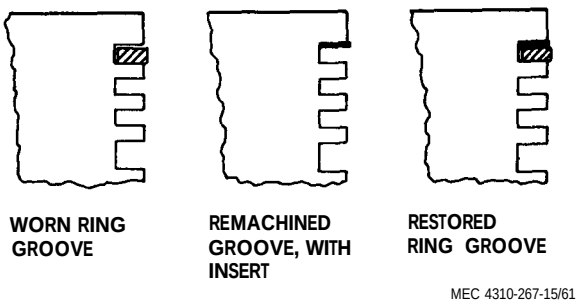


Figure 61. Ring groove insert installation.

(8) Remove crankshaft bearings (23, 29, and 33). Figure 59 shows how to remove upper half of bearings.

(9) Remove filler block assembly, then tilt forward to clear the engine housing

and remove oil seals (18, 19, and 21, fig. 57). Refer to figure 60 for removal of rear oil seal.

b. Cleaning, Inspection, and Repair. Clean all metal parts in an approved cleaning solvent and dry thoroughly. Wipe nonmetal parts with a clean, dry cloth.

(1) Check the piston fit in the bore (.006 in. with 5- to 10-lb pull). Also check the piston rings in the cylinders for gap (.012 to .023). If any ring does not have enough gap, it may be filed (fig. 62).

(2) Check the bushing (41, fig. 57) for wear. Replace a worn bushing and hone to fit pin (44).

(3) Check the connecting rod assembly for squareness, twist, and alignment.

(4) Check the crankshaft journal and main bearing clearances.

(5) Inspect main bearings (26, 29, and 33) and crankshaft. If there is any indication of flaking out, scoring, or actual wear, they must be replaced. If visual inspection is satisfactory, bearings should be checked for thickness with a ball micrometer (fig. 63).

Note. If the thickness of the bearing shells has been reduced more than .0005 inch from that given in paragraph 94, the bearing shell must be replaced.

(6) Check the front oil seal and replace if damaged.

(7) Examine the contact surface on the fan-drive pulley (10, fig. 57) for roughness or scratches. Slight damage can be repaired by brazing, turning, and polishing. Otherwise, replace the pulley.

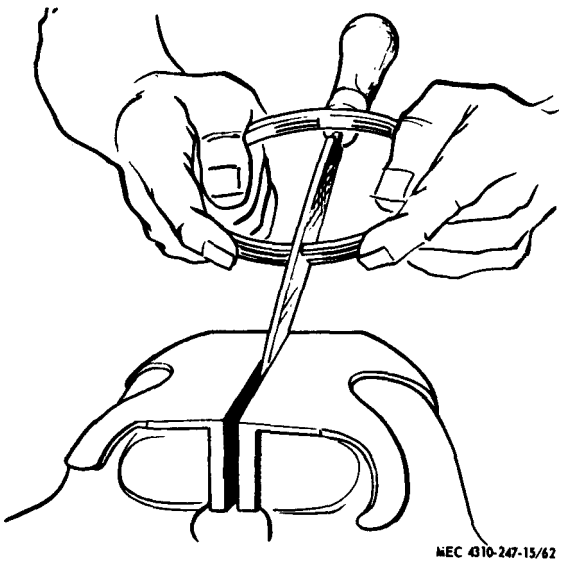


Figure 62. Piston ring gap.

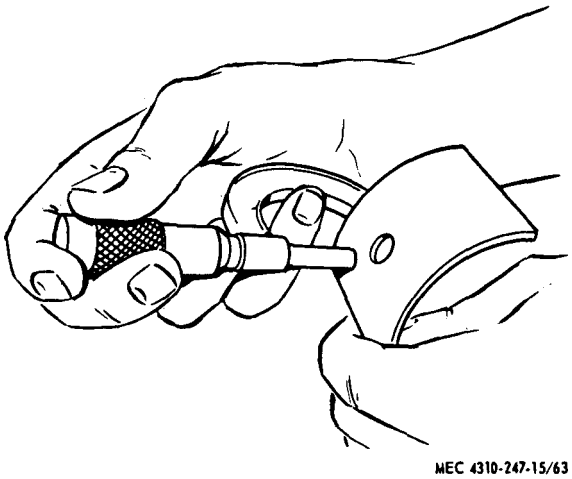


Figure 63. Bearing measurement.

(8) Clean and examine the rear oil seal. Clean all contact surfaces and make sure sealing surface on crankshaft is smooth and free from scratches.

(9) Clean the seal groove in the cylinder block and filler block. The cylinder block groove can be cleaned through the flywheel mounting hole in the crankshaft. Make sure that sealing surface on crankshaft is smooth and free from scratches.

(10) Check rear main bearing (23) for excessive clearance.

(11) Check side clearance of piston rings (46, 47, 48, and 49) at various positions with a feeler (fig. 64), in accordance with the tolerances given in paragraph 94. If any ring lacks clearance, it can be removed and lapped on a flat plate. Use crocus cloth to reduce the ring to the specified clearance.

c. Reassembly and Installation. Reassemble and install the internal parts of the engine as shown in figure 57. When reassembling pistons (46) and connecting rods (36), oil the bores thoroughly and be careful to prevent connecting rods from damaging the cylinder bore finish. Always lubricate the bearings with clean engine oil when assembling, and tighten them

to the torque specified. Use lockwires, cotter pins, or lockwashers as required, to prevent nuts and screws from becoming loose.

(1) Assemble the pistons (45) on the connecting rods (36) at room temperature (approx 75° F.). Tap the pins (44) into place through the rod bushing (41). The piston pin hole in the connecting rod must be parallel to and in plane with the large bore in the bearing end of the rod. The snap rings (43) must be firmly seated in the grooves.

(2) Install piston rings (46, 47, 48, and 49). Grip the connecting rod (36) in a vise with leadlined jaws to hold the piston (45) firmly, and roll each ring in its groove to make sure there are no burrs or other material to impede the free action of the ring in the groove. Start with the lowest ring (49).

Caution: **Do not expand rings more than necessary to fit over piston. Excessive expansion of a ring may cause distortion which can not be detected by visual inspection. Tapered piston rings must be installed with top side up.**

(3) Refer to figure 65 and install crankshaft oil seals on engine block and bearing cap (22, fig. 57). Check oil seal lip to make sure sealing surface is clean, smooth, and free from nicks. Apply a thin coating of seal lubricant to lip surface before installing, and break edge slightly on both the cap and the block, to prevent cutting the seal during installation. Coat outside seal edge (contacting the groove) with cement.

Note. This oil seal can be installed without removing the crankshaft. In this case, use only light grease in the seal groove in the cylinder block when sliding the seal in place. Apply pressure to the seal so that it will hug the crankshaft. This also helps to move it into place.

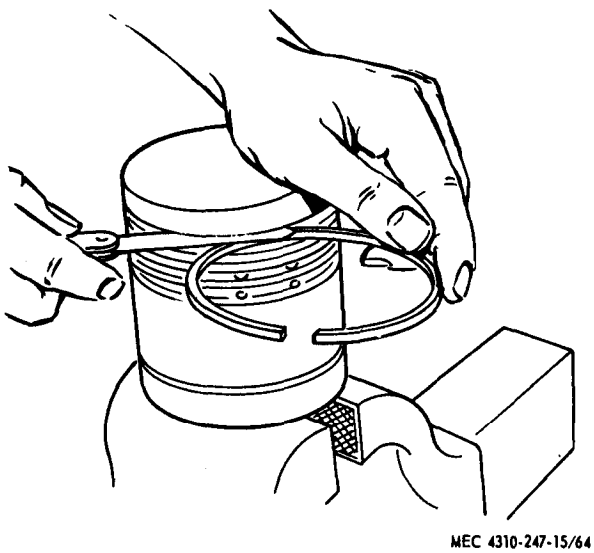


Figure 64. Ring groove clearance.

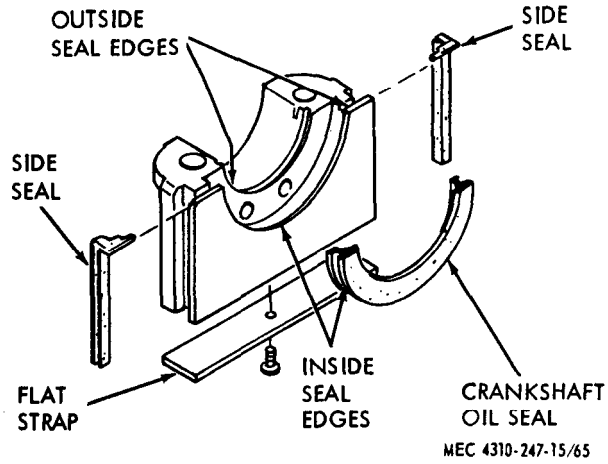


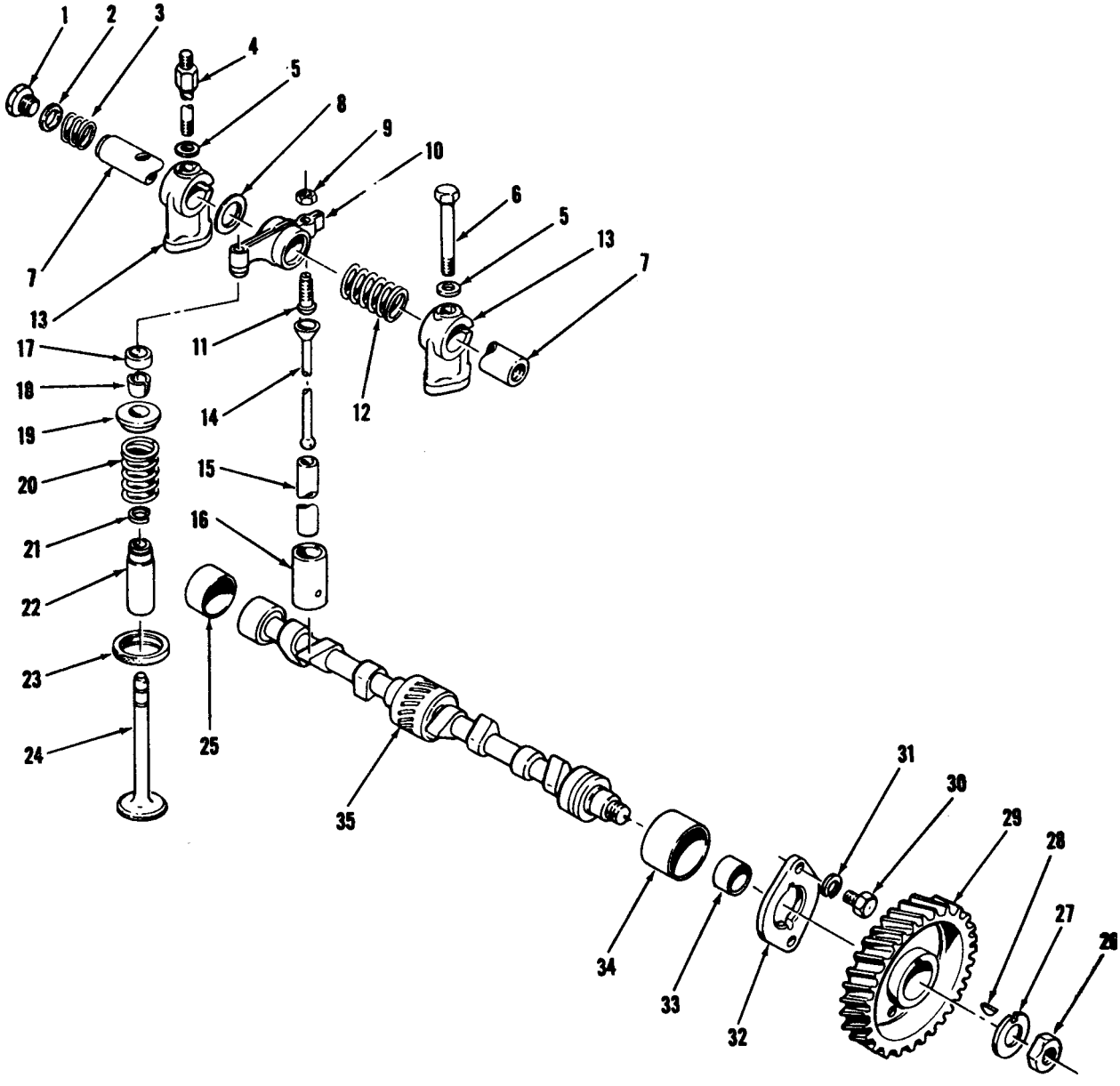
Figure 65. Filler block and seal reassembly.

(4) Slide the side seals (fig. 65) into the filler grooves without oil. Then coat the outside edge lightly with an oily finger to help slide in the block without stretching.

(5) Apply a light coat of cement to the tab end side seal surfaces that contact both the block and filler block. Allow it to become tacky before assembling.

Caution: **Do not use too much cement. Make sure no cement gets on lip of seal.**

(6) Bolt a flat strap (fig. 65) (approx 1/8 by 1 by 6 in.) to bearing cap, using the same hole that was used for puller. This strap will hold the side seals in place during assembly to block. After assembly, remove strap. The side slabs should not project more than



1 Plug (2)
2 Gasket (2)
3 Spring (2)
4 Screw (2)
5 Washer (4)
6 Screw (2)
7 Shaft
8 Spacer (8)
9 Nut (4)
10 Arm (8)
11 Screw (4)
12 Spring (3)
13 Support (4)
14 Rod (8)
15 Tube (8)
16 Tappet (8)
17 Socket (8)
18 Lock (16)
19 Retainer (8)
20 Spring (8)
21 Snapring (8)
22 Guide (8)
23 Insert (4)
24 Valve (8)
25 Bushing
26 Nut
27 Lock nut
28 Key
29 Gear
30 Screw (2)
31 Washer (2)
32 Plate
33 Bushing
34 Bushing
35 Camshaft

Figure 66. Camshaft parts.

1/16 inch above the pan surface contact. If they do, remove and reinstall.

Caution: Make sure that rear face of bearing cap is flush with rear face of cylinder block.

(7) After the filler block is in place, start the bearing capscrews, drive in the two dowel pins half way, and torque the screws to 140-150 foot-pounds. Then drive in the two dowels until they are flush.

134. Camshaft Parts

a. Removal and Disassembly. Remove the rocker arm and disassemble the camshaft parts of the engine as shown in figure 66.

(1) Remove rocker arm shaft assembly (7) and push rods (14) (see figs. 51 and 52). Remove the valve spring retainer locks (18, fig. 66), retainers (19) and springs (20).

(2) Remove the valves (24) in order and place them in a rack with holes numbered for both intake and exhaust so they will not be mixed in handling.

(3) Remove all valve guides (22) by pressing them out from the combustion chamber side.

(4) Using a puller, remove the cam and crank gears (fig. 67).

(5) Remove the screws holding the camshaft thrust plate (32, fig. 66) to the block, which will permit pulling the camshaft forward out of the bearings.

Note. Before pulling the camshaft completely, check the clearance of the camshaft journal in the bearing hole or bushing (para 94).

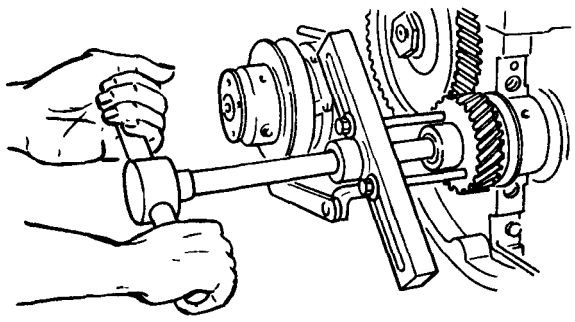


Figure 67. Crankshaft gear removal.

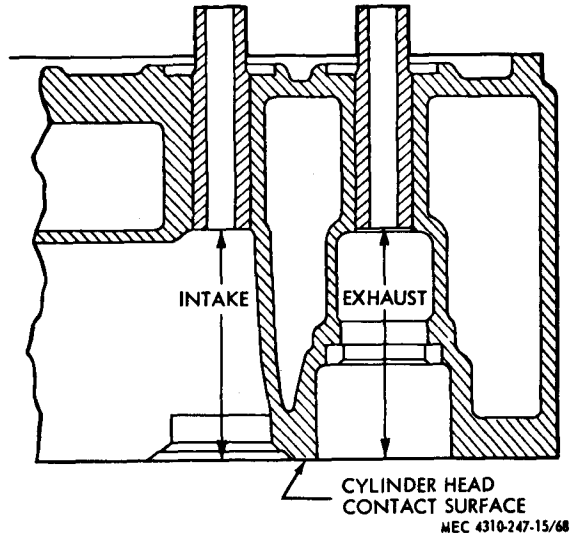


Figure 68. Valve guide location.

b. Cleaning, Inspection, and Repair. Clean all metal parts in an approved cleaning solvent and dry thoroughly. Wipe nonmetal parts with clean, dry cloth.

(1) Place valve spring retainer locks (18), retainers (19), and springs (20) in a container of solvent.

(2) Clean the valve stem guides (22), removing lacquer or other deposits by running a wire brush (or a valve guide cleaner) through the guides. Check guides for wear, replacing all guides that are bell-mouthed. Also replace any guide that has increased .0015 or more in diameter. Valve guides can be located by means of figure 68.

(3) Inspect exhaust valve seat inserts (23, fig. 66) and replace any that are loose, cracked, or otherwise damaged.

(4) Inspect valves for condition and replace any that are "necked", cracked, burned, bent, or worn beyond the limits given in paragraph 94.

(5) Check all valve springs with a spring tester. Refer to paragraph 94.

(6) Inspect the rocker arm shaft (7) for wear. If the shaft has acquired shoulders, replace it. Blow out oil holes with air. Examine rocker arms (10) for cracks, worn bushings, and condition of valve contact surface. Replace all defective arms or any

having over .005 inch clearance between shaft and arm. Inspect the rocker arm brackets for cracks or other damage.

(7) Inspect push rods for bends or twists and examine the ball and cup ends for excessive wear. Replace rods that are faulty or excessively worn.

(8) Check the clearance of the camshaft journal in the bearing hole or bushing. If the clearance equals or exceeds the wear limits given in paragraph 94, check the diameter of the camshaft journals. If the wear is excessive, the camshaft must be replaced.

(9) Check the outside diameter of all tappets (16) with micrometer and replace if excessively worn. Refer to paragraph 94. Inspect tappets for scores or damage to contact face. Two or three small pits is acceptable; replace if excessively pitted.

(10) Examine the camshaft thrust plate (32) for scoring and wear. Replace if unsatisfactory.

c. Reassembly and Installation. Reassemble and install the rocker arm and camshaft parts of the engine as shown in figure 66.

(1) Assemble the cam gear (29) to the camshaft (35) by holding the camshaft forward so that the act of driving or pressing the gear on the shaft does not cause the shaft to bump the expansion plug at the rear end, forcing it out of position and causing an oil leak.

(2) Install any tappets (16) which were removed for examination or replacement. Tappets can be removed from the top of the block without pulling the camshaft, by means of a magnetized rod.

(3) Refer to figure 69. First coat the valve stems with a light film of engine oil, then reassemble the valves (24, fig. 66) and springs (20) in the head with the retainers (19) and retainer locks (18). The close-wound coils of the valve spring should contact the cylinder head.

(4) Replace worn guides (22) by pressing in new guides from the combustion side to the correct depth below the cylinder head contact surface (2 25/32 inch for intake guides, 3 1/8 inch for exhaust guides).

(5) Ream new valve stem guides to sise if necessary. Refer to paragraph 94.

Caution: **Ferrox coated guides are now used on some models. These are pre-reamed and they do not require further reaming after installation.**

(6) When replacing valve seat inserts with new inserts, clean and counterbore for .010 inch larger insert. Limits are 1.6888/1.687 inch for inside diameter of counterbore (B), and 1.692/

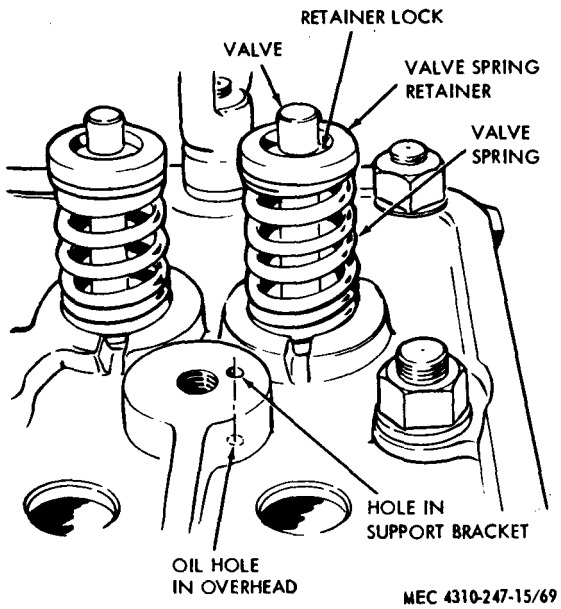


Figure 69. Valve reassembly.

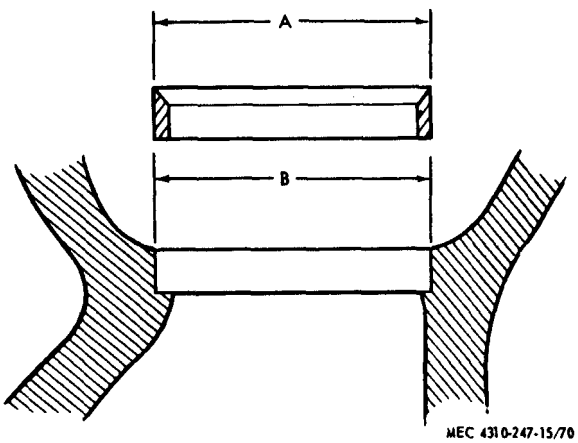


Figure 70. Valve seat insert.

1.691 inch for outside diameter of insert (A), as shown in figure 70. Chill insert in container of dry ice for 20 minutes before assembling. New inserts should have .003 to .005 inch press fit with counterbore.

Section VII. FRAME PARTS

135. Tool and Battery Boxes

a. Removal. Refer to figure 72 for removal of tool and battery boxes.

b. Cleaning and Inspection.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect for cracks, bends, breaks, or other damage. Repair or replace if unserviceable.

(3) Check all lid stays for proper operation. Replace if unserviceable.

c. Installation. Refer to figure 72 for installation of tool and battery boxes.

136. Mounting Frame

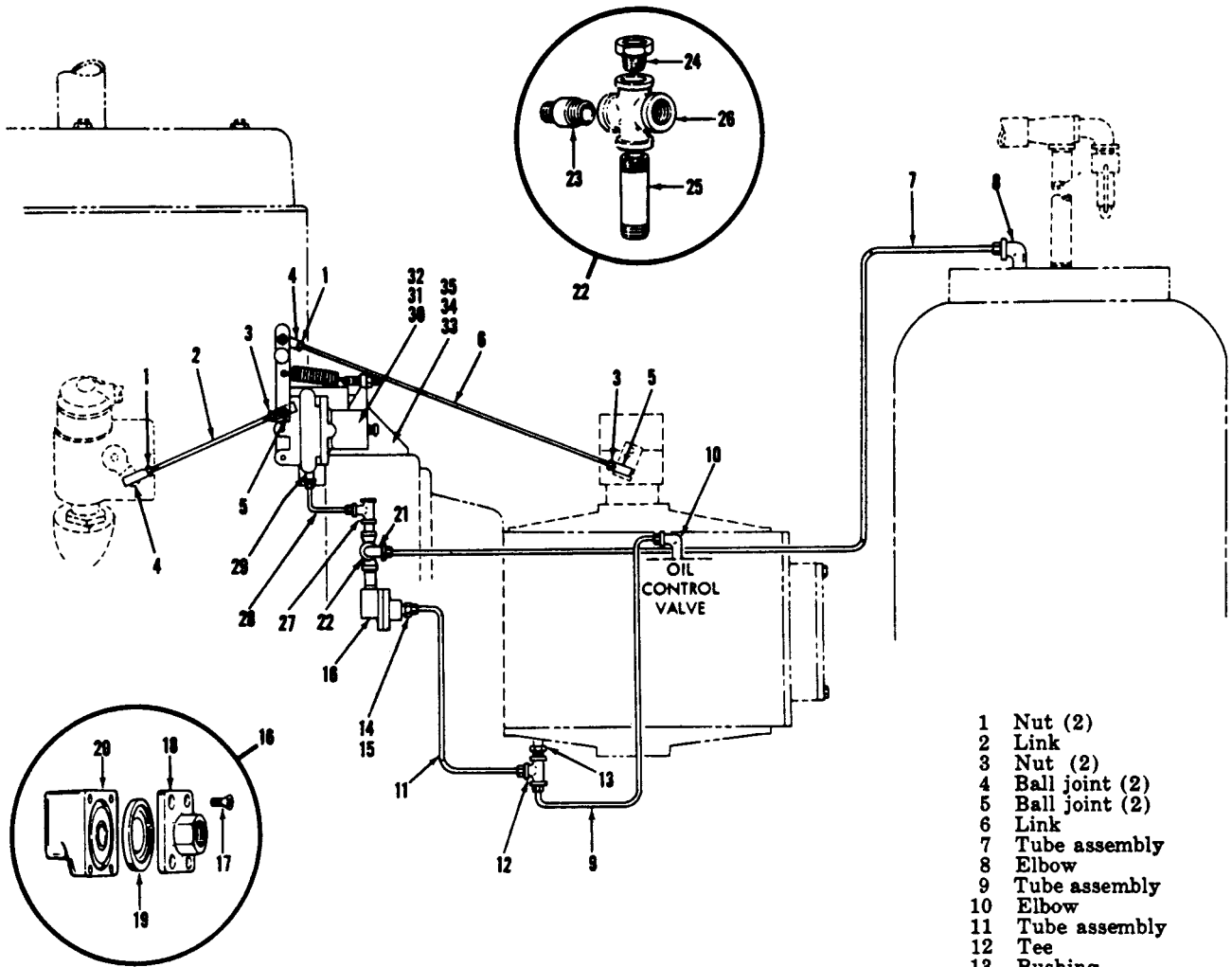
a. Disassembly. Refer to figure 22 for disassembly of mounting frame.

b. Cleaning and Inspection.

(1) Clean all metal parts with an approved cleaning solvent and dry thoroughly.

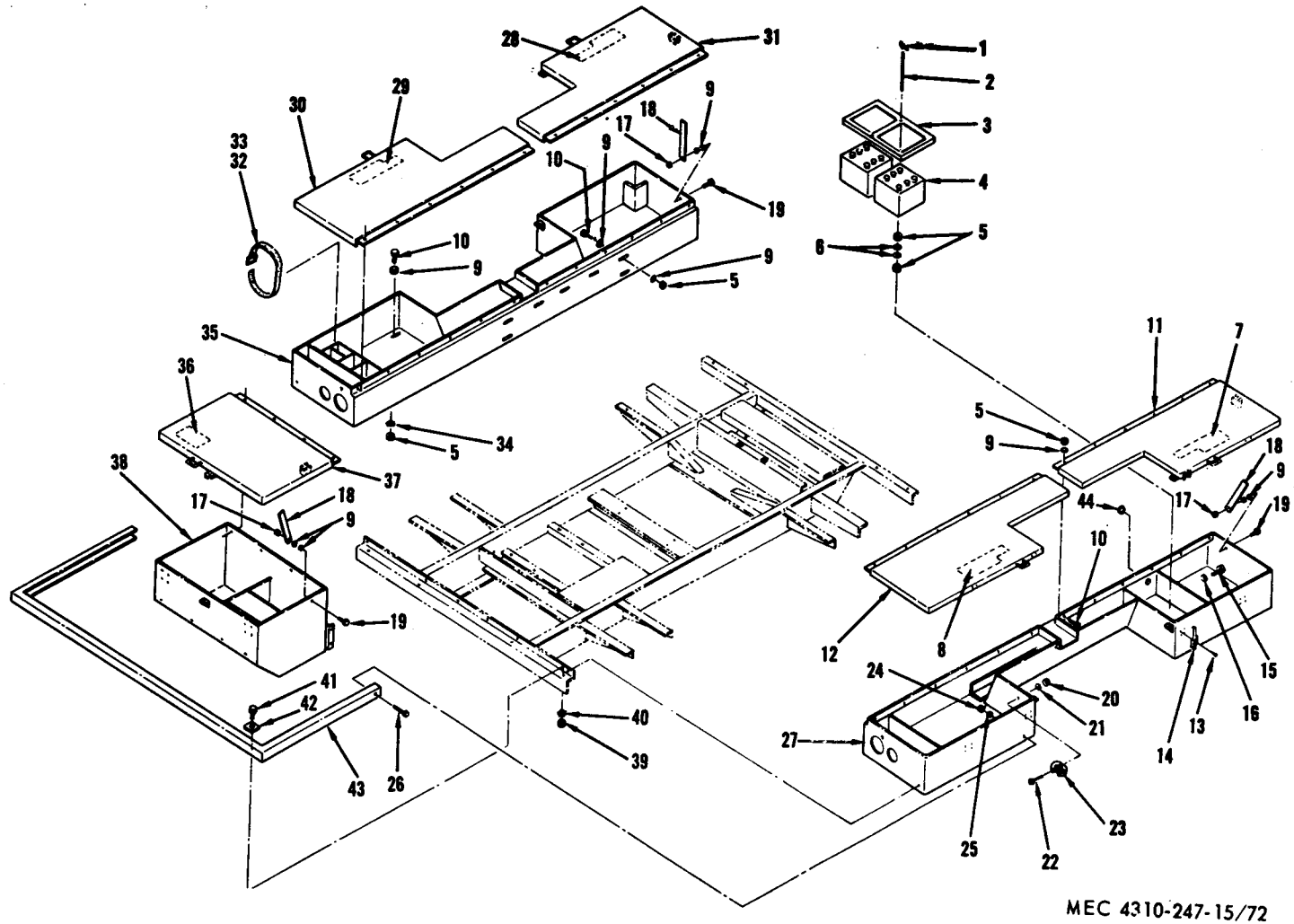
(2) Inspect all parts for cracks, bends, breaks, or other damage. Repair or replace if necessary.

c. Reassembly. Refer to figure 22 for reassembly of mounting frame.



1	Nut (2)	19	Diaphragm
2	Link	20	Body
3	Nut (2)	21	Elbow
4	Ball joint (2)	22	Moisture separator
5	Ball joint (2)	23	Mounting stud
6	Link	24	Nozzle
7	Tube assembly	25	Nipple
8	Elbow	26	Cross
9	Tube assembly	27	Tee (2)
10	Elbow	28	Tube assembly
11	Tube assembly	29	Elbow (2)
12	Tee	30	Screw (2)
13	Bushing	31	Lockwasher (2)
14	Bushing	32	Air control assembly
15	Connector	33	Screw (2)
16	Bowdown valve	34	Lockwasher (2)
17	Screw (4)	35	Bracket
18	Bonnet		

Figure 71. Control parts group.



1 Wingnut (2)
2 Stud (2)
3 Battery holdown
4 Battery (2)
5 Nut (67)
6 Lockwasher (4)
7 Label
8 Label
9 Washer (10)
10 Screw (66)
11 Lid
12 Lid
13 Rivet (40)
14 Clamp assembly
15 Screw
16 Washer (3)
17 Nut
18 Lid stay (5)
19 Screw (5)
20 Nut (24)
21 Washer (24)
22 Screw (24)
23 Clip (12)
24 Nut
25 Washer
26 Screw (2)
27 Toolbox
28 Label
29 Label
30 Lid
31 Lid
32 Strap (9)
33 Strap (9)
34 Lockwasher (67)
35 Toolbox
36 Label
37 Lid
38 Toolbox
39 Nut (8)
40 Lockwasher (8)
41 Screw (4)
42 Washer, bevel (4)
43 Bumper
44 Grommet

Figure 72. Tool and battery boxes.

APPENDIX I

REFERENCES

1. Dictionaries of Terms and Abbreviations

AR 320-5	Dictionary of United States Army Terms.
AR 320-50	Authorized Abbreviations and Brevity Codes.

2. Fire Protection

SB 5-111	Supply of DA Approved Fire Extinguishers to Army Troop Users.
TM 5-687	Repair and Utilities: Fire Protection Equipment and Appliances: Inspections, Operations, and Preventive Maintenance.

3. Lubrication

LO 5-4310-247-15	Lubrication Order.

4. Operating Instructions

TM 5-4310-247-15	Operator, Organizational, Direct and General Support and Depot Maintenance Instruction Manual. Compressor, Rotary, Diesel Driven, Air, Trailer Mounted, 250 CFM, 100 Psi (Joy Model RPV250DC20MS1), FSN 4310-952-7142.
TM 9-2330-247-14	Operator, Organizational and Field Maintenance Instruction Manual. Trailer Chassis, 3½-Ton, 2-Wheel, M353.

5. Painting

TM 9-213	Painting Instructions for Field Use.

6. Preventive Maintenance

AR 750-5	Organization, Policies and Responsibilities for Maintenance Operation.
TB ENG 347	Winterization Techniques for Engineer Equipment.
TM 5-764	Electric Motor and Generator Repair.
TM 9-207	Operation and Maintenance of Ordnance Materiel in Extreme Cold (0° to 65 °F.).
TM 9-6140-200-15	Operation and Organizational, Field and Depot Maintenance: Storage Batteries, Lead-Acid Type.
TM 38-750	Army Equipment Record Procedures.

7. Publication Indexes

DA Pam 108-1	Index of Army Motion Pictures, Film Strips, Slides, and Phono-Recordings.
DA Pam 310-1	Index of Administrative Publications.
DA Pam 310-2	Index of Blank Forms.
DA Pam 310-3	Index of Doctrinal, Training, and Organizational Publications.
DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 4, 6, 7, 8, or 9), Supply Bulletins, Lubrication Orders, and Modification Work Orders.
DA Pam 310-5	Index of Graphic Training Aids and Devices.
DA Pam 310-25	Index of Supply Manuals-Engineer Type Items.

8. Radio Interference Suppression

TM 11-483	Radio Interference Suppression.

9. Shipment and Limited Storage

AR 743-505	Limited Storage of Engineers Mechanical Equipment.
TM 9-200	General Packaging Instructions for Ordnance General Supplies.
TM 38-230	Preservation, Packaging, and Packing of Military Supplies and Equipment.

10. Supply Publications

FSC C9100-IL	FSC Group 91; Fuels, Lubricants, Oils, and Waxes.
TM 5-4310-247-20P	Organizational Maintenance Repair Parts Manual. Compressor, Rotary, Diesel Driven, Air, Trailer Mounted, 250 CFM, 100 Psi (Joy Model RPV250DC20MS1). FSN 4310-952-7142.
TM 5-4310-247-35P	Direct and General Support and Depot Maintenance Repair Parts Manual. Compressor, Rotary, Diesel Driven, Air, Trailer Mounted, 250 CFM, 100 Psi (Joy Model RPV250DC20MS1). FSN 4310-952-7142.

11. Training Aids

FM 5-25	Explosives and Demolitions.
FM 21-5	Military Training Management.
FM 21-6	Techniques of Military Instruction.
FM 21-30	Military Symbols.

APPENDIX II

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

1. General

This appendix contains the explanations of all the maintenance and repair functions authorized the various maintenance levels.

Section II, the Maintenance Allocation Chart (MAC) designates overall responsibility for the performance of maintenance operations. The implementation of maintenance tasks upon the end item or component will be consistent with the assigned maintenance operations.

Section III, Remarks contains supplemental instructions, explanatory notes, and/or illustrations required for a particular maintenance operation. This section is cross-referenced to the MAC, section II, column L.

2. Maintenance Operations

Maintenance is any action taken to keep material in a serviceable condition or to restore it to serviceability when it is unserviceable, Maintenance of material includes the following:

a. Service. Operations required periodically to keep the item in proper operating condition, i.e., to clean, preserve, drain, paint, and replenish fuel, lubricants, hydraulic, and deicing fluids or compressed air supplies.

b. Adjust. Regulate periodically to prevent malfunction. Adjustments will be made commensurate with adjustment procedures and associated equipment specifications.

c. Align. Adjust two or more components of an electrical or mechanical system so that their functions are properly synchronized or adjusted.

d. Calibrate. Determine, check, or rectify the graduation of an instrument, weapon, or weapons system or components of a weapons system.

e. Inspect. Verify serviceability and detect incipient electrical or mechanical failure by close visual examination.

f. Test. Verify serviceability and detect incipient electrical or mechanical failure by measuring the mechanical or electrical characteristics of the item and comparing those characteristics with authorized standards. Test will be made commensurate with test procedures and with calibrated tools and/or test equipment referenced on the MAC.

g. Replace. Substitute serviceable components, assemblies, and subassemblies for unserviceable counter parts or remove and install the same item when required for the performance of other maintenance operations.

h. Repair. Restore to a serviceable condition by replacing unserviceable parts or by any other action required using available tools, equipment and skills to include welding, grinding, riveting, straightening, adjusting and facing.

i. Overhaul Restore and end item to completely serviceable condition as prescribed by serviceability standards. This is accomplished through employment of the technique of "Inspection and repair only as necessary" (IROAN). Maximum use of diagnostic and test equipment is combined with minimum disassembly during overhaul "overhaul" may be assigned to any level of maintenance except organizational, provided the time, tools, equipment, repair parts authorization, and technical skills are available at that level. Normally, overhaul as applied to end items, is limited to depot maintenance level.

j. Rebuild. Restore to a condition comparable to new by disassembling to determine the condition of each component part and reassembly using serviceable, rebuilt, or new assemblies subassemblies, and parts.

3. Explanation of Columns (See II)

a. Functional Group Number. The functional group is a numerical group set up on a functional basis. The applicable functional grouping indexes (obtained from TB 750-93-1 Functional Grouping Codes) are listed on the MAC in the appropriate numerical sequence. These

indexes normally are set up in accordance with their function and proximity to each other.

b. Component Assembly Nomenclature. This column contains the functional grouping index heading, Subgroups heading, and a brief decription of the part starting with the noun name.

c. Essentiality. The essentiality column reflects whether or not an assembly, or repair part, is combat essential to the tactical use of the end item. The letter E: in this column indicates the items are combat essential.

d. Maintenance Operations and Maintenance Levels. This column contains the various maintenance operations "A" thorugh "J", service, adjust, etc.

A symbol indicating the maintenance level placed in the appropriate column in line with an indicated maintenance operation authorises that level to perform the function. The symbol indicates the lowest level of maintenance responsible for performing the function, but does not necessarily indicate repair parts stockage at that level. Higher levels of maintenance are authorized to perform the indicated functions of lower levels. The symbol designation for the various maintenance levels are as follows:

O/C-Operator or crew
O --Organizational
DS --Direct Support
GS --General Support
D --Depot

e. Reference Note. This column is subdivided in two columns. Column K references the tool and test equipment requirements (T and TE) section III of the MAC. Column L references the remarks section IV of the MAC.

4. Explanation of Columns
(See III)

a. Reference Code. This column consists of two letters separated by a dash. The first letter references column L, the second letter references a maintenance operation, column A through J on the MAC section II.

b. Remark This column lists the remarks and other information pertinent to the operation being performed as indicated on the MAC, section II.

Section II. MAINTENANCE ALLOCATION CHART

Functional group No.	Component assembly nomenclature	Essentiality	Maintenance operations						Maintenance levels				Note reference	
			A	B	C	D	E	F	G	H	I	J	K	L
			Service	Adjust	Align	Calibrate	Inspect	Test	Replace	Repair	Overhaul	Rebuild	T and TE requirements	Remarks
01	ENGINE													
0100	Engine Assembly													
	Engine assembly		O/C				O/C	DS	DS	DS	GS			A
0101	Crankcase, Block, Cylinder Head													
	Cylinder and crankcase								GS	GS				
	Head assembly, cylinder								DS	DS				
0102	Crankshaft													
	Bearing set, main								GS					
	Crankshaft, engine								GS	D				B
	Pulley, crankshaft								DS					
	Seals								GS					
0103	Flywheel Assembly													
	Flywheel assembly								GS	GS				C
	Housing, flywheel								GS					
0104	Piston, Connecting Rods													
	Bearing set, rod								GS					
	Piston and Sleeve set, cylinder								GS					
	Ring set, piston								GS					
	Rod and bearing assembly								GS	GS				
0105	Valves, Camshafts, and Timing System													
	Bushing set, camshaft								GS					
	Camshaft								GS					
	Cover and gasket, valve								O					
	Cover assembly, timing gear								GS					
	Gears, seals								GS					
	Guides, springs and rings								DS					
	Rocker arm, tappets			O					DS					
	Valves, inserts								DS	DS				D
0106	Engine Lubrication System													
	Cooler, oil		O/C						O					
	Element kit, filter								O					
	Filter, oil		O/C						O					
	Hose, fittings, oil								O					
	Lid assembly, filler								O					
	Oil gage, rod assembly								O					
	Pan, oil								GS					

Functional group No.	Component assembly nomenclature	Essentiality	Maintenance operations						Maintenance levels				Note reference	
			A	B	C	D	E	F	G	H	I	J	K	L
			Service	Adjust	Align	Calibrate	Inspect	Test	Replace	Repair	Overhaul	Rebuild	T and TE requirements	Remarks
0106	Engine Lubrication System—Continued													
	Pump and shaft assembly, oil								GS	GS				
	Screen assembly, oil								GS					
	Tube assemblies, oil								GS					
	Valve relief								GS					
0108	Manifolds													
	Manifold								O					
03	FUEL SYSTEM													
0301	Fuel Injector													
	Nozzle assembly							DS	O	DS				
0302	Fuel Pumps													
	Pump, fuel			O				DS	O	DS				
0304	Air Cleaners													
	Filter, Air		O/C						O	O				
0306	Tanks, Lines, Fittings													
	Cap, sleeve, fuel tank								O					
	Tank, fuel		O/C						O	DS				
	Tube assemblies, cock and fittings								O					
	Tube assemblies, injectors								O					
0309	Fuel Filters													
	Element, filter								O/C					
	Filters, fuel		O/C						O					
0311	Engine Starting Aids													
	Pump, fuel primer								O					
	Valve assembly								O					
	Tubes, bushings, fittings								O					
0312	THROTTLE CONTROL													
	Joint, ball								O					
	Link, connecting								O					
04	EXHAUST SYSTEM													
0401	Muffler and Pipes													
	Cap, rain								O					
	Muffler, exhaust								O					
	Pipe, flange, exhaust								O					
05	COOLING SYSTEM													
0501	Radiator													
	Cap, radiator								O	O/C				

	Grille, radiator								O					
	Radiator, engine cooling		O/C					DS	DS	DS				
0503	Thermostats and Housing Gaskets													
	Clamps, hose and fittings								O					
	Cock, drain								O					
	Elbows, inlet and outlet								O					
	Thermostat							O	O					
0504	WATER PUMP													
	Pump assembly, water		O/C						O	DS				
0505	Fan Assembly													
	Fan, engine cooling								O					
	Guard, spacer								O					
06	ELECTRICAL SYSTEM													
0601	Generator													
	Belt, drive			O/C					O					
	Brushes								O					
	Generator, engine accessory							O	O	DS				
0602	Generator, Regulator													
	Regulator, voltage			O				O	O					
0603	Starting Motor													
	Starter								O	DS				
0607	Instrument or Engine Control Panel													
	Ammeter								O					
	Gage, fuel								O					
	Harness, wiring								O					
	Lamp								O/C					
	Light, panel								O					
	Panel, instrument								O					
	Switches, push and toggle								O					
0608	Miscellaneous Items													
	Receptacle, charger								O					
0609	Lights													
	Conduits								O					
	Harness, wiring connectors, sockets								O					
	Lamps								O					
	Lens, red and amber								O					
	Lights, clearance, signal and stop								O					
0610	Sending Units													
	Sender, fuel level								O					
	Switches, pressure temperature								O					
0612	Batteries													
	Battery, storage		O/C						O					
	Cables, battery								O					
	Holddown, battery								O					
0615	Radio Interference Suppression													
	Strap, ground								O					

Functional group No.	Component assembly nomenclature	Essentiality	Maintenance operations						Maintenance levels				Note reference	
			A	B	C	D	E	F	G	H	I	J	K	L
			Service	Adjust	Align	Calibrate	Inspect	Test	Replace	Repair	Overhaul	Rebuild	T and TE requirements	Remarks
15	FRAME													
1501	Frame Assembly													
	Bumper								O					
	Runner, frame								DS					
	Skid compressor mounting								DS					
18	BODY, CAB, HOOD AND HULL													
1801	Body, Cab, Hood													
	Clamp assembly								O					
	Door, housing								O					
	Holder, door								O					
	Hood, housing								O					
	Housing assembly								O					
	Panels								O					
1808	Stowage Racks, Boxes													
	Angles, hangers								O					
	Brake, half								O					
	Lid, toolbox								O					
	Reel assembly, hose								O	O				
	Toolboxes								O	O				
22	ACCESSORY ITEMS													
2202	Accessory Items													
	Couplings, fittings								O					
	Hose assembly, air								O					
	Reflectors								O					
2210	Data Plates													
	Plates, data (C.O.E.)								DS					
	Plates, instruction								O					
47	GAGES													
4702	Gages													
	Gages, pressure, temperature								O					
	Indicator assembly								O					
4703	Hourmeter													
	Adapter, drive								O					
	Meter, tachometer-hour								O					
50	PNEUMATIC EQUIPMENT													
5000	Air Compressor Assembly													
	Compressor assembly		O/C						DS	DS	GS			

5001	Crankcase, Block														
	Stator, (housing) rotor								GS	GS					
5004	ROTORS														
	Bearing, rotor, front								GS						
	Bearing, rotor, rear								DS						
	Housing, bearing, front								GS						
	Housing, bearing, rear								DS						
	Rotor, compressor								GS						
	Seals, gaskets, packing front								GS						
	Seals, gaskets, packing rear								DS						
	Vanes, rotor								GS						
5006	Lubrication System														
	Agglonerator								O						
	Cooler, oil								DS						
	Element assembly, oil								O						
	Filter, oil		O/C						O						
	Hose, fittings								O						
	Thermostat, oil								O						
	Tube assembly								O						
	Valve, globe								O						
	Valve, safety relief								O	O					
5007	Compressor Drive														
	Hub, drive								GS						
	Plate, drive								GS						
	Ring, drive								GS						
5008	Air Intake														
	Cleaner, air		O/C						O						
	Flange, inlet								O						
	Valve assembly, inlet								O	O					
5009	Unloader System Component														
	Separator, moisturde								O	O					
	Valve, shutoff								O	O					
5012	Throttling Devices														
	Connectors, elbows, bushings								O						
	Control assembly			O					O	O					
	Joint, ball								O						
	Link, connecting								O						
	Tube assemblies								O						
5014	Air Receiver														
	Cover, plate								O						
	Receiver, air		O/C						O	O					
5015	Air Discharge System														
	Couplings, elbow, fittings								O						
	Flange, discharge								O						
	Orifice								O						
	Valves, service and discharge								O						

Reference code	Remarks
A–F	Test includes engine operation and compression.
B–H	Metalize, align, and grind.
C–H	Replace gear.
D–H	Repair of valves includes refacing.

APPENDIX III

BASIC ISSUE ITEMS LIST AND MAINTENANCE AND OPERATING SUPPLIES

Section I. INTRODUCTION

1. General

Section II lists the accessories, tools, and publications required for maintenance and operation by the operator, initially issued with, or authorized for the RPV 250 DC20MS1 Air Compressor. Section III lists the maintenance and operating supplies required for initial operation.

2. Explanation of Columns Contained in Section II

a. Source Codes. The information provided in each column is as follows:

(1) *Materiel.* This column lists the basic materiel code numbers of the supply service assigned responsibility for the part. Blank spaces denote supply responsibility of the preparing agency. General Engineer supply parts are identified by the letters GE in parentheses, following the nomenclature in the description column. Other basic materiel code numbers are-

3--Chemical Materiel
9--Ordnance Materiel
10--Quartermaster Materiel
12--Adjutant General

(2) *Source.* The selection status and source of supply for each part are indicated by one of the following code symbols:

(a) P--applied to high-mortality repair parts which are stocked in or supplied from the supply service depot system, and authorized for use at indicated maintenance levels.

(b) P1--applied to repair parts which are low-mortality parts, stocked in or supplied from supply service depots, and authorized for installation at indicated maintenance levels.

(c) M--applied to repair parts which are not procured or stocked but are to be manufactured at indicated maintenance levels.

(d) X2--applied to repair parts which are not stocked. The indicated maintenance levels requiring such repair parts will attempt to obtain them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.

(3) *Maintenance.* The lowest maintenance level authorized to use, stock, install, or manufacture the part is indicated by the following code symbol:

O-Organizational Maintenance

(4) *Recoverability.* Repair parts and/or tool and equipment items that are recoverable are indicated by one of the following code symbols:

(a) R--applied to repair parts and assemblies which are economically repairable at direct and general support maintenance activities and normally are furnished by supply on an exchange basis.

(b) T--applied to high-dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts normally are repaired or overhauled at depot maintenance facilities.

(c) U--applied to repair parts specifically selected for salvage by reclamation units because of precious metal content, critical materials, high-dollar value reusable casings, castings, and the like.

Note. When no code is shown in the recoverability column the part is considered expendable.

b. Federal Stock Number. The Federal stock number will be shown in this column, and will be used for requisitioning purposes.

c. Description.

(1) The item name and a brief description of the part are shown.

(2) A five-digit Federal supply code for manufacturers and/or other supply services is shown in parentheses followed by the manufacturer's part number. This number will be used for requisitioning purposes when no Federal stock number is indicated in the Federal stock number column.
Example: (08645) 88453.

(3) The letters GE, shown in parentheses immediately following the description, indicates General Engineer supply responsibility for the part.

d. Unit of Issue. If no abbreviation is shown in this column, the unit of issue is "each".

e. Quantity Authorized. This column lists the quantities of repair parts, accessories, tools, or publications authorized for issue to the equipment operator or crew as required.

f. Quantity Issued with Equipment. This column lists the quantities of repair parts, accessories, tools, or publications that are initially issued with each item of equipment. Those indicated by an asterisk are to be requisitioned through normal channels as required.

g. Illustrations. This column is subdivided into two columns which provide the following information:

(1) *Figure number.* Provides the identifying number of the illustration.

(2) *Item number.* Provides the referenced number for the parts shown in the illustration.

3. Explanation of Columns Contained in Section III

a. Item. This column contains numerical sequenced item numbers, assigned to each component application, to facilitate reference.

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

c. Source of Supply. This column lists the basic materiel code number of the supply service assigned responsibility for the item. Blank spaces denote supply responsibility of the preparing agency. Other basic materiel code numbers are-

9--Ordnance Materiel
10--Quartermaster Materiel

d. Federal Stock Number. The Federal stock number will be shown in this column and will be used for requisitioning purposes.

e. Description. The item and a brief description are shown.

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

g. Quantitv Required for 8 Hours Operation. Quantities listed represent the estimatad requirements for an average eight hours of operation.

h. Notes. This column contains informative notes keyed to data appearing in the preceding column.

Section II. BASIC ISSUE ITEMS LIST

Source codes				Federal stock No.	Description	Unit of issue	Quantity authorized	Quantity issued with equipment	Illustration	
Materiel	Source	Maintenance	Recoverability						Figure	Item
					GROUP 31 - 31—BASIC ISSUE ITEMS, MANUFACTURER INSTALLED					
					3100—BASIC ISSUE ITEMS, MANUFACTURER OR DEPOT INSTALLED					
9	P	O	-----	6140–057–2554	BATTERY: Storage, 12-V, 6-Cell..... (Repair Parts Manual Group 0612).	----	2	2		
10	P	O	-----	7520–559–9618	CASE: Maintenance and Operational Manuals, cotton duck, water-repellent, mildew-resistant, MIL–B–11743 B.	----	1	1		
12	-----	-----	-----	----------	DEPARTMENT OF THE ARMY LUBRICATION ORDER LO 5–4310–247–15.	----	1	1		

Source codes				Federal stock No	Description	Unit of issue	Quantity authorized	Quantity issued with equipment	Illustration	
Mater	Soure	ain-te-nance	Re-cover abilit;						Figure	
12	----	-----	----	----------	DEPARTMENT OF THE ARMY, OPERATOR, ORGANIZATIONAL, DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE MANUAL TM 5-4310 247-1.	----	2	2		
12	----	-----	----	----------	DEPARTMENT OF THE ARMY ORGANIZATIONAL MAINTENANCE REPAIR PARTS MANUAL TM 5-4310-247-20P.	----	2	2		
	P	O	----	4210-893-1092	EXTINGUISHER: Fire, dry chemical, charged, hand, pressurized w/dry air or nitrogen gas; w/pressure gauge; squeeze grip control; steel cylinder; enameled red; factory mutual or UL approved, class 4-B, C; 2½ lb; w/universal bracket (Repair Parts Manual Group 7603).	----	1	1		
3	P	O	----	3810-264-9063	SULPHURIC ACID: Electrolyte------- (Repair Parts Manual Group 0612).	Gal	4	4		
					GROUP 32- BA81C ISSUE ITEMS, TROOP INSTALLED					
					3200—BASIC ISSUE ITEMS, TROOP INSTALLED OR AUTHORIZED					
10	P	O	----	4930-360-2801	GREASE GUN, HAND: 16 oz-------	----	1	*		
10	P	O	----	4930-273-3644	OILER, HAND: 8 oz----------	----	1	*		
10	P	O	----	5120-277-9491	SCREWDRIVER, FLAT TIP: ¼ in. tip, 9 in. lg.	----	1	*		
10	P	O	----	5120-449-8083	WRENCH, OPEN END: adjustable, 10 in.	----	1	*		
10	P	O	----	5120-223-7396	PLIERS, SLIP JOINT: 6 in.----------	----	1	*		
5	P	O	----	4720-202-6948	HOSE ASSEMBLY, RUBBER: .750 in. ID, 50 ft. lg. w/2 ea. universal couplings.	----	4	4		

Section III. MAINTENANCE AND OPERATING SUPPLIES

Item	Component application	Source of supply	Federal stock No.	Description	Quantity required for initial operation	Quantity required for 8 hours operation	Notes
1	0101 CRANKCASE (1)			OIL, LUBRICATING			(1) Includes quantity of oil to fill engine-oil system as follows: 10½ qt crankcase and oil filter. (2) Tank capacity. (3) See TM 5-4310-247-15 for quantities, ambient temperatures, specific gravities. (4) Compressor lubricating system capacity. (5) See FSC C9100-IL for additional data and requisitioning procedure. (6) See current LO for grade application and replenishment intervals. (7) Average fuel consumption is 6.25 gal per hour of continuous operation. (8) Quantity indicated is the minimum required for one each start, when temperature is below 40°F.
		10	9150-265-9433 (5)	OE30 1-qt can	10½ qt	1 pt (6)	
		10	9150-265-9425 (5)	OE10	10½ qt	1 pt (6)	
		10	9150-242-7602 (5)	OES	10½ qt	1 pt (6)	
2	0306 TANK	10	9140-286-5294	FUEL OIL, DIESEL BULK.	45 gal (2)	45 gal (7)	
3	0311 ENGINE STARTING AIDS.		2910-575-6364	CARTRIDGE, ALUMINUM, FLUID, MULT-START, 16CC.	1 (8)		
4	0501 RADIATOR			WATER ANTI-FREEZE:	9 gal (3)		
		9	6850-893-8636	Ethylene Glycol	(3)		
		9	6850-174-1806	Compound Arctic 55-gal drum	(3)		
5	5014 COMPRESSOR, OIL SUMP.	10	9150-582-5480 (5)	OIL, LUBRICATING 55-gal drum			
				2110T-H	8½ gal (4)	3⅓ oz (5) (6)	
		10	9150-242-7602 (5)	OES	8½ gal (4)	3⅓ oz (5) (6)	
6	GREASE POINTS	10	9150-190-0904	GREASE, AUTOMOTIVE AND ARTILLERY: 1 lb can.			

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HAROLD K. JOHNSON,
General, United States Army
Chief of Staff.

Official:
J. C. LAMBERT,
Major GeneraL United States Army,
The Adjutant General.

Distribution:

Active Army:

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5–118	29–26
5–127	29–27
5–129	29–36
5–137	29–37
5–145	29–79
5–146	37
5–147	37–100
5–148	39–51
5–155	39–61

NG: State AG (3).

USAR: Same as active Army except allowance is one copy to each unit.

For explanation of abbreviations used, see AR 320–50.

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