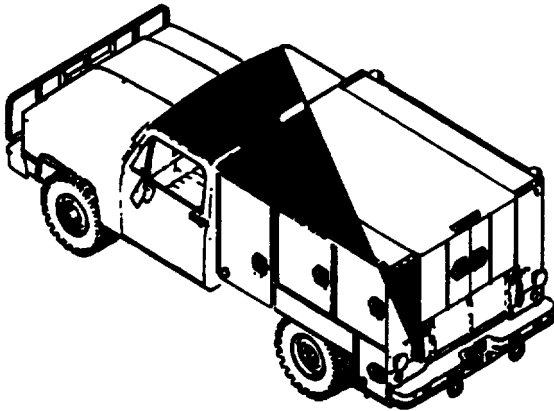


**TECHNICAL MANUAL**

**OPERATOR'S, UNIT, AND  
DIRECT SUPPORT  
MAINTENANCE  
MANUAL FOR  
SHOP EQUIPMENT, CONTACT  
MAINTENANCE,  
TRUCK MOUNTED  
TYPE I (NSN 2320-01-209-8823)  
(EIC: 2MA)  
TYPE II (NSN 4940-01-209-8824)  
(EIC: 2MB)  
TYPE III (NSN 4940-01-209-8825)  
(EIC: 2MC)  
EOD (NSN 4940-01-359-5085)**

**INTRODUCTION****PAGE 1-1****EQUIPMENT  
DESCRIPTION  
PAGE 1-7****OPERATING  
INSTRUCTIONS  
PAGE 2-1****OPERATOR'S PREVENTIVE  
MAINTENANCE CHECKS  
AND SERVICES  
PAGE 2-5****OPERATOR TROUBLESHOOTING  
PROCEDURES  
PAGE 3-3****OPERATOR MAINTENANCE  
PROCEDURES  
PAGE 3-6****UNIT MAINTENANCE  
INSTRUCTIONS  
PAGE 4-1****DIRECT SUPPORT  
MAINTENANCE INSTRUCTIONS  
PAGE 5-1**

**DISTRIBUTION STATEMENT C** - Distribution authorized to U.S. Government agencies and their contractors. This publication is required for administration and operational purposes. This determination was made on 9 November 1999. Other requests for this document will be referred to Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-LC-CIP-WT, 1 Rock Island Arsenal, Rock Island, IL 61299-7630.

**DESTRUCTION NOTICE** - For classified documents follow procedures in DoD 5200.22-M, Industrial Security Program Manual, Section II. For unclassified, limited documents, destroy by any method that will prevent disclosure of contents or reconstruction of the documents.

**HEADQUARTERS, DEPARTMENT OF THE ARMY**



## **WARNINGS**

The Contact Maintenance Vehicle (CMV) must be grounded. Failure to properly ground the equipment could result in electrical shock injuries or death to personnel.

Diesel fuel for the engine is combustible. Extinguish all smoking materials and do not allow spark or open flames near fuel tank or fuel system.

Ear protection is required within 100 feet when equipment is operating.

Use extreme caution when operating CMV in rain or wet areas. Electrical shock may occur and could cause injury or death. Use of hand power tools is not recommended in rain or wet areas.

Air compressor must be turned off and air tank bled before performing compressor maintenance. Rotating pulleys, moving belts, or compressed air could cause serious injury to personnel.

Do not breathe cleaning solvent vapors for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas, away from open flames.

Air compressor must be turned off. The air tank can contain air at dangerous pressures. Bleed down before servicing.

Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable, and, if ignited, can cause injury to personnel and damage to equipment.

Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if solvents contact the skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.

Do not disassemble air filter until air reservoir has been bled of all compressed air. Failure to do so will result in serious personnel injury.

Two persons are required for lifting the air compressor assembly. The weight of the compressor could cause injury to personnel.

Remove any electrical power before removing any of the cables. Electrical shock can cause injury or death to personnel.

## **WARNINGS**

High voltage is present in the control panel assembly and can cause serious injury or death. Disengage Power Take-Off (PTO) and turn off vehicle engine prior to performing any maintenance on the control panel assembly.

When removing/installing alternator, do not attempt to lift alternator by hand. Use a forklift or hoist to remove/install alternator. Unsecured alternator could cause serious injury to personnel or damage to equipment.

Support tailgate while removing or installing.

Ensure bumper is supported when removing and installing. Bumper could fall and cause injury to personnel.

Wear protective clothing - leather gauntlet gloves, hat, and high safety-toe shoes. Button shirt collar and pocket flaps, and wear cuffless trousers to avoid entry of sparks and slag.

Wear helmet with safety goggles or glasses with side shields underneath, appropriate filter lenses, or plates (protected by clear cover glass). This is a MUST for welding or cutting, (and shipping) to protect the eyes from radiant energy and flying metal. Replace cover glass when broken, pitted, or spattered.

Avoid oily or greasy clothing. A spark may ignite them. Hot metal such as electrode stubs and workplaces should never be handled without gloves.

Drilling operations are hazardous to the eyes. Eye protection is required.

Welding and brazing operations produce heat, toxic fumes, radiation, metal slag, and carbon particles. Welding and brazing goggles with properly tinted lenses, gloves, and apron or jacket, and welders boots are required.

Avoid breathing fumes generated by unsoldering or soldering. Eye protection is required. Good general ventilation is normally adequate.

For information on First Aid refer to FM 21-11.

CHANGE  
NO. 1

HEADQUARTERS, DEPARTMENT OF THE ARMY  
U.S. MARINE CORPS  
WASHINGTON, DC, 12 SEPTEMBER 2002

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

**Shop Equipment, Contact Maintenance, Truck Mounted**  
**TYPE I (NSN 2320-01-209-8823) (EIC: 2MA)**  
**TYPE II (NSN 4940-01-209-8824) (EIC: 2MB)**  
**TYPE III (NSN 4940-01-209-8825) (EIC: 2MC)**  
**EOD (NSN 4940-01-359-5085)**

**DISTRIBUTION STATEMENT C.** Distribution authorized to U.S. Government agencies and their contractors. This publication is required for administration and operational purposes. This determination was made on 9 November 1999. Other requests for this document shall be referred to Commander, US Army Tank-automotive and Armaments Command, ATTN: AMSTA-LC-CIP-WT, TACOM-Rock Island, 1 Rock Island Arsenal, Rock Island, IL 61299-7630.

**DESTRUCTION NOTICE.** For classified documents, follow procedures in DoD 5200.22-M, Industrial Security Program Manual, Section II. For unclassified, limited documents, destroy by any method that will prevent disclosure of contents or reconstruction of the documents.

TM 9-4940-562-13, dated 14 December 1994, 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. Illustration changes are indicated by a pointing hand adjacent to the illustrations.

Remove Pages

None  
i and ii  
FO-1/FO-2 Blank  
None  
FO-3/FO-4 Blank  
None  
DA Form 2028-2  
Cover

Insert Pages

A/B Blank  
i and ii  
FO-1  
FO-2  
FO-3  
FO-4  
DA Form 2028  
Cover

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

By Order of the Secretary of the Army:

Official:



JOEL B. HUDSON

*Administrative Assistant to the  
Secretary of the Army*

0216208

ERIC K. SHINSEKI  
*General, United States Army  
Chief of Staff*

DISTRIBUTION: To be distributed in accordance with the initial distribution requirements for IDN: 255404, requirements for TM 9-4940-562-13.

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED DATA

## LIST OF EFFECTIVE PAGES

NOTE: The portion of text affected by the changes is indicated by a vertical line in the outer margins of the page.

Dates of issue for original and changed pages are:

Original .....0.....Dec 94

Change .....1.....12 Sep 02

**TOTAL NUMBER OF PAGES IN THIS PUBLICATION ARE 344, CONSISTING OF THE FOLLOWING:**

[illegible]

\*Zero in this column indicates an original page.

### Change 1

**A/(B blank)**





Technical Manual  
No. 9-4940-562-13

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
U.S. MARINE CORPS  
WASHINGTON, D.C., 14 December 1994

**OPERATOR'S, UNIT, AND DIRECT SUPPORT  
MAINTENANCE MANUAL  
FOR  
SHOP EQUIPMENT, CONTACT MAINTENANCE, TRUCK MOUNTED  
TYPE I (NSN 2320-01-209-8823) (EIC: 2MA)  
TYPE II (NSN 4940-01-209-8824) (EIC: 2MB)  
TYPE III (NSN 4940-01-209-8825) (EIC: 2MC)  
EOD (NSN 4940-01-359-5085)**

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (Recommended Changes to Publications and Blank Forms), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is <http://aeprs.ria.army.mil>. If you need a password, scroll down and click on "ACCESS REQUEST FORM". The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or E-mail your letter or DA Form 2028 direct to: AMSTA-LC-CI Tech Pubs, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The email address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

**DISTRIBUTION STATEMENT C.** Distribution authorized to U.S. Government agencies and their contractors. This publication is required for administration and operational purposes. This determination was made on 9 November 1999. Other requests for this document shall be referred to Commander, US Army Tank-automotive and Armaments Command, ATTN: AMSTA-LC-CIP-WT, TACOM-Rock Island, 1 Rock Island Arsenal, Rock Island, IL 61299-7630.

**DESTRUCTION NOTICE.** For classified documents, follow procedures in DoD 5200.22-M, Industrial Security Program Manual, Section II. For unclassified, limited documents, destroy by any method that will prevent disclosure of contents or reconstruction of the documents.

**TABLE OF CONTENTS**

	<b>Page</b>
<b>CHAPTER 1</b>	
<b>INTRODUCTION</b> .....	<b>1-1</b>
Section I      General Information .....	1.1
Section II     Equipment Description .....	1.7
Section III    Principles of Operation .....	1-16

## TABLE OF CONTENTS - Continued

	<b>Page</b>
<b>CHAPTER 2 OPERATING INSTRUCTIONS</b> .....	<b>2-1</b>
Section I Description and Use of Operator's Controls and Indicators .....	2-1
Section II Operator's Preventive Maintenance Checks and Services (PMCS) .....	2-5
Section III Operation Under Usual Conditions .....	2-14
Section IV Operation Under Unusual Conditions .....	2-23
<b>CHAPTER 3 OPERATOR MAINTENANCE INSTRUCTIONS</b> .....	<b>3-1</b>
Section I Lubrication Instructions .....	3-1
Section II Operator Troubleshooting Procedures .....	3-4
Section III Operator Maintenance Procedures .....	3-6
<b>CHAPTER 4 UNIT MAINTENANCE INSTRUCTIONS</b> .....	<b>4-1</b>
Section I Repair Parts, Special Tools, Test, Measurement, and Diagnostic Equipment (TMDE); and Support Equipment .....	4-1
Section II Service Upon Receipt .....	4-1
Section III Unit Preventive Maintenance Checks and Services (PMCS) .....	4-2
Section IV Unit Troubleshooting Procedures .....	4-6
Section V Unit Maintenance Procedures .....	4-8
Section VI Preparation for Storage or Shipment .....	4-50
<b>CHAPTER 5 DIRECT SUPPORT MAINTENANCE INSTRUCTIONS</b> .....	<b>5-1</b>
Section I Direct Support Maintenance Procedures .....	5-1
<b>APPENDIX A REFERENCES</b> .....	<b>A-1</b>
<b>APPENDIX B MAINTENANCE ALLOCATION CHART</b> .....	<b>B-1</b>
<b>APPENDIX C COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST</b> .....	<b>C-1</b>
<b>APPENDIX D EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST</b> .....	<b>D-1</b>
<b>APPENDIX E ILLUSTRATED LIST OF MANUFACTURED ITEMS</b> .....	<b>E-1</b>
<b>APPENDIX F ON-VEHICLE EQUIPMENT LOADING PLAN</b> .....	<b>F-1</b>
<b>ALPHABETICAL INDEX</b> .....	<b>Index.1</b>

## HOW TO USE THIS MANUAL

**a. General.** This manual contains operation instructions and maintenance procedures for the Shop Equipment, Contact Maintenance, Truck Mounted and its auxiliary equipment. At the beginning of each chapter, you will find an index of the topics covered in the chapter.

Procedures for the maintenance of the unit are arranged in this manual in the following chapters:

Chapter 3 Operator Maintenance

Chapter 4 Unit Maintenance

Chapter 5 Direct Support Maintenance

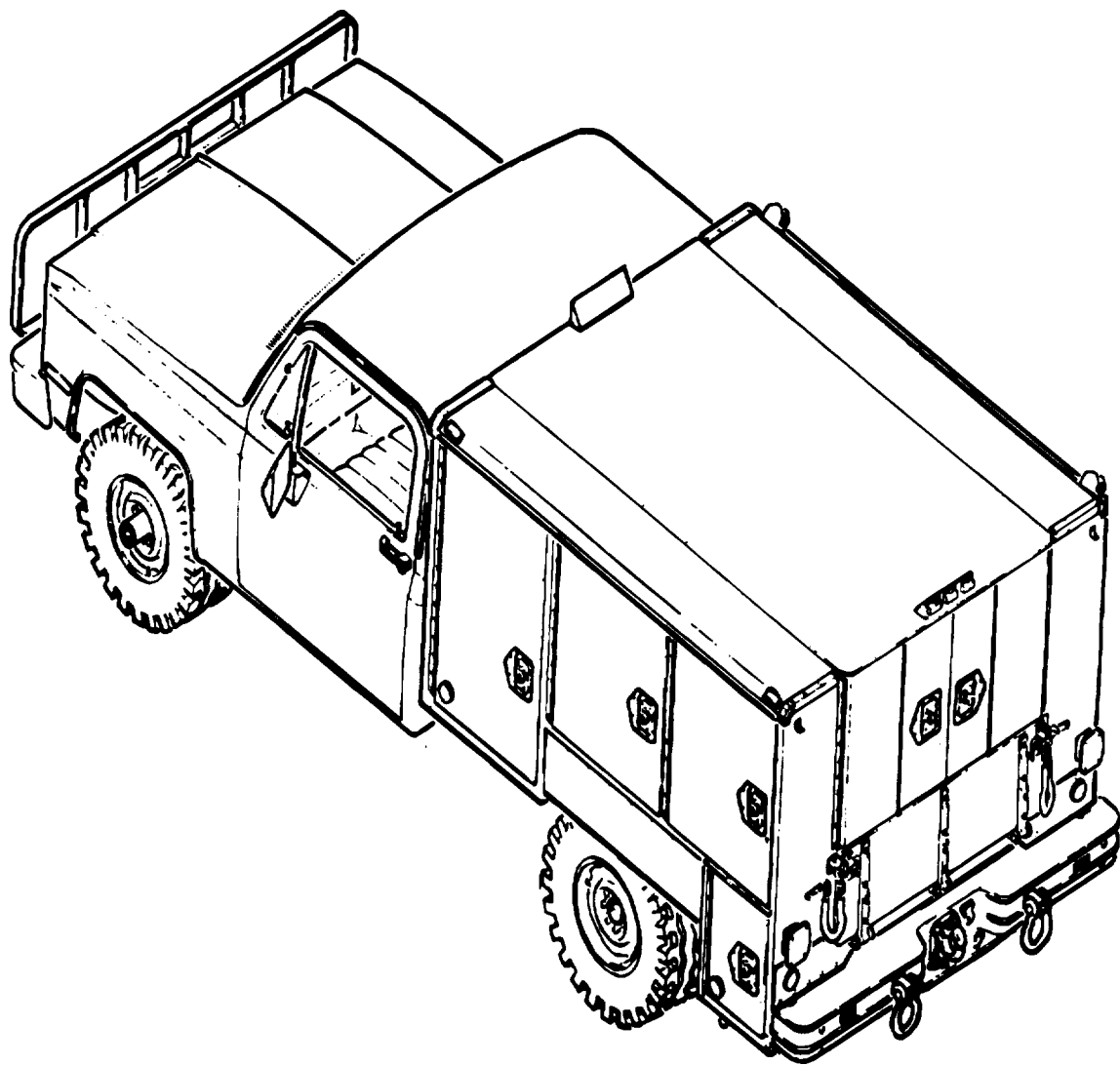
In using these procedures, you must familiarize yourself with an entire maintenance procedure before beginning a specific maintenance task.

Read all the WARNINGS before you begin operating your equipment. Read each procedure completely before beginning a task. In locating specific items in this manual, the following sections are included in this manual. References in the manual are to pages, paragraphs, and appendixes or other publications.

**b. Front Cover Index** - Tabbed index of major functions and appendixes are keyed to tabbed pages in the manual. These major items are also enclosed in boxed areas in the Table of Contents.

**c. Table of Contents** - List of chapters, sections and appendixes.

**d. Alphabetical Index** - Extensive index for each subject, located at the end of this manual.



*Figure 1-1. Shop Equipment, Contact Maintenance, Truck Mounted.*

CHAPTER 1  
INTRODUCTION

Section I.	General Information
Section II.	Equipment Description
Section III.	Principles of Operation

---

Section 1. GENERAL INFORMATION

Para.	Para.
Scope.....1-1	Destruction of Army Materiel
Maintenance Forms and Records . ...1-2	to Prevent Enemy Use .....1-5
Reporting Equipment Improvement	Administrative Storage .....1-6
Recommendations (EIR's) .....1-3	Corrosion Prevention and Control 1-7
Nomenclature Cross Reference List 1-4	

1-1. SCOPE.

a. **Type of Manual.** This manual is an operator's, unit, and direct support maintenance manual. For information on the M1031 truck, refer to the TM 9-2320-289 series.

b. **Model Number and Equipment Name.** The official equipment nomenclature is the Shop Equipment, Contact Maintenance, Truck Mounted (refer to fig. 1-1).

c. **Purpose of Equipment.** The Type I, NSN 2320-01-209-8823, is a self-contained maintenance shop set composed of a basic shop set, power take-off, and alternator that will be used by units which will identify and provide their peculiar tool loads to the shop set. The Type II, NSN 4940-01-209-8824, is a Type I shop set plus a tool load peculiar to the Engineer unit that will enable the operator to perform on-site maintenance and repair of engineer equipment in the field. The Type III, NSN 4940-01-209-8825, is a Type I shop set plus a tool load peculiar to the Ordnance unit that will enable the operator to perform on-site maintenance and repair of ordnance equipment in the field. The EOD model, NSN 4940-01-359-5085, is a Type I shop set which will be used by Explosive Ordnance Disposed (EOD) units who will identify and provide their own peculiar tool load to the shop set.

1-2. MAINTENANCE FORMS AND RECORDS.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

**1-3. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs).**

If your Contact Maintenance Vehicle needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at Commander, U.S. Army Armament Research, Development and Engineering Center, ATTN: AMSTA-ARA-QAW (R), Rock Island, IL 61299-7300. We'll send you a reply.

**1-4. NOMENCLATURE CROSS REFERENCE LIST.**

**Common Name**

**Official Nomenclature**

Contact Maintenance Vehicle (CMV)	Shop Equipment, Contact Maintenance, Truck Mounted
-----------------------------------	---

**1-5. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.**

For procedures and materials to destroy the contact maintenance vehicle, refer to TM 750-244-3, Procedures for Destruction of Equipment to Prevent Enemy Use.

**1-6. ADMINISTRATIVE STORAGE.**

**a. Definition.**

- (1) For the placement of equipment in limited storage (less than 2 weeks) and reshipment see paragraph 4-29. The placement of equipment in administrative storage can be for short periods of time (6 months or less) when:
  - (a) An organization lacks operating funds, personnel, other resources, or does not experience normal usage of its organic material.
  - b) Materiel which exceeds the capability of the owning organization to operate or maintain and must be maintained by that organization for contingency or other cogent reasons.
- (2) Installation or organization commanders may authorize the administrative storage of their materiel within guidance furnished MACOM commanders and AR 750-1.
- (3) During the storage period appropriate maintenance records will be kept.
- (4) SB 740-95-1, Storage Serviceability Standards for AMCCOM material, will be followed to determine the required inspections for determining the serviceability of the CMVS in administrative storage.

**b. Scope.** The requirements specified herein are necessary to maintain the Contact Maintenance Vehicle (CMV) in administrative storage in such a way as to achieve the maximum readiness section.

**c. General.**

- (1) Equipment that is placed in administrative storage should be capable of being readied to perform the intended mission within a 24-hour period or as otherwise prescribed by the approving authority. Before equipment is placed in administrative storage, current maintenance service, shortcomings, and deficiencies should be corrected and all Modification Work Orders (MWOs) should be applied.
- (2) Report equipment in administrative storage in Materiel Readiness and Unit Readiness reports as prescribed for all reportable equipment. See AR 220-1.
- (3) Perform inspections, maintenance services, and lubrications for the vehicle chassis in accordance with TM 9-2320-289-10, TM 9-2320-289-20, TM 9-2320-289-34, and LO 9-2320-289-12. In case of conflict in lubrication instructions, the LO will apply.

**NOTE**

**Touch-up painting will be in accordance with local SOP and TM 43-0139.**

- (4) Records and reports to be maintained for equipment in administrative storage are those prescribed by DA PAM 738-750 for equipment in use.
- (5) Ten percent variance is acceptable on time running hours or mileage used to determine maintenance actions required.

**d. Security.** Instructions contained herein do not modify security procedures and requirements for classified or pilferable items. See AR 190-13 and AR 190-51.

**e. Storage Site**

- (1) Select the best available site for administrative storage. Separate stored equipment from equipment in use. Conspicuously, mark the area "Administrative Storage".
- (2) Covered space is preferred. When covered space for all equipment to be stored is not available, select an open site and ensure that equipment is covered.
- (3) Open sites should be improved hardstand, if available. Unimproved sites should be firm, well drained, and kept free of excessive vegetation.

**1-6. ADMINISTRATIVE STORAGE (CONT).**

**f. Storage Plan.**

- (1) Store equipment so as to provide maximum protection from the elements and to provide access for inspection, maintenance, and exercising. Anticipate removal or deployment problems and take suitable precautions.
- (2) Take into account environmental conditions such as extreme heat or cold, high humidity, blowing sand/dust/loose debris, soft ground, mud, heavy snows, or combinations thereof and take adequate precautions.
- (3) Establish a fire plan and provide for adequate firefighting equipment and personnel.

**g. Maintenance Services and Inspection** Prior to storage, perform the next scheduled major preventive maintenance service (monthly, quarterly, or semiannually).

**h. Corrections of Shortcomings and Deficiencies.** Correct all shortcomings and deficiencies prior to storage or obtain a waiver from the approving authority.

**i. Lubrication.** Lubricate equipment in accordance with the applicable lubrication order or technical manual.

**j. General Cleaning, Painting, and Preservation.**

- (1) Clean the equipment of dirt, grease, and other contaminants in accordance with this manual.



**Do not direct water or steam under pressure against air cleaners, exhaust outlets, unsealed electrical systems, upholstery, or any exterior opening which will damage a component.**

- (2) Remove all rust and damaged paint by scraping, wire brushing, sanding, or buffing and spot paint as required.
- (3) After cleaning and drying, immediately coat unpainted metal surfaces with an oil or grease as appropriate.
- (4) Sunlight, heat, moisture (humidity), and dirt tend to accelerate deterioration. Close and secure all openings except those required for venting and draining.



Seal openings to prevent the entry of rain, snow, or dust. Place equipment and provide blocking or framing to allow for ventilation and water drainage,

**k. Tools and Mouted Equipment.** Clean and coat unplated metal surfaces of hand tools and accessories with lubricating oil, MIL-L-21260C (item 9, appx D).

**l. Maintenance Services.** After equipment has been placed in administrative storage, suspend all regularly scheduled maintenance services and inspect/exercise as specified herein. Do not reduce Prescribed Load List. See AR 735-5.

**m. Inspection.**

- (1) Vehicle to be prepared for administrative storage must be given a limited technical inspection and processed as prescribed on DD Form 1397. The results of the inspection and classification will be entered on DA Form 2404.
- (2) Inspection will usually be visual and must consist of at least a walk-around examination of all equipment to observe any deficiencies that may have occurred. Inspect equipment in open storage weekly and that in covered storage monthly. Immediately after any severe storm or environmental change inspect all equipment. The following are examples of things to look for during visual inspection.
  - (a) Leaks: coolant, fuel, oil, or hydraulic fluid.
  - (b) Condition of preservatives and seals. Seams may develop leaks during storage, during exercise, or shortly thereafter. If leaking continues, refer to the repair procedures in this manual or notify support maintenance.
  - (c) Corrosion or other deterioration.
  - (d) Missing or damaged parts.
  - (e) Water in components.
  - (f) Any other readily recognizable shortcomings or deficiencies.
- (3) Inspect shelf life items per AMDF.

**n. Receipt for Storage.**

- (1) When received for storage and already processed for domestic shipment by the manufacturer, indicated on DD Form 1397, the vehicle will not be reprocessed unless inspection performed on receipt of materiel reveals corrosion, deterioration, etc.

## 1-6. ADMINISTRATIVE STORAGE (CONT).

- (2) Upon receipt from manufacturing facilities, if the processing data on the tag indicates that preservation has been rendered ineffective by operation or by freight shipping damage, completely process the CMV.
- (3) Prepare SF 364 for all shipments received in a damaged or otherwise unsatisfactory condition due to deficiencies in preservation, packaging, marking, handling, loading, or storage, and for apparent excessive preservation.

**o. Exercise of Equipment.** Exercise equipment before administrative storage if schedule calls for exercising during administrative storage. Limit depreservation to removal of materials that will restrict exercising. Perform the before, during, and after operational checks in accordance with TM 9-2320-289-10. Immediately take action to correct shortcomings and deficiencies noted. Exercising will include minimum one mile operation (every 180 days) to assure vehicle systems are warmed up and normal operating temperatures are reached. Transmission shall be operated through all ranges to assure lubricant coverage and proper functioning. Both the 2-wheel and 4-wheel drives shall be engaged to assure proper functioning. After exercising, add fuel/oil as required. Start and run engine until completely warm to cover internal components with lubricating oil. Note inspection and exercise results on DA Form 2404. Record and report maintenance action on DA Form 2407. After exercising, restore the preservation to the original condition. Replenish fuel and oil used during exercising and note the amount on DA Form 2408.

**p. Rotation..** To assure utilization of all assigned materiel, rotate items in accordance with any rotational plan that will keep equipment in an operational condition and reduce maintenance effort.

**q. Removal From Administrative Storage.** Remove preservative materials. Perform the next scheduled preventive maintenance service and prepare the equipment for service as outlined in TM 9-2320-289-10 and in accordance with instructions on DD Form 1397.

**r. Servicing.** Resume the maintenance service schedule in effect at the commencement of storage as per DD Form 314. See DA PAM 738-750.

## 1-7. CORROSION PREVENTION AND CONTROL.

a. Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.

b. While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be indicative of a corrosion problem.

c. If a corrosion problem is identified, it can be reported using Standard Form 368, Product Quality Deficiency Report. Use of key words such as “corrosion”, “rust”, “deterioration”, or “cracking” will assure that the information is identified as a CPC problem.

d. The form should be submitted to:

Commander  
U.S. Army Armament Research, Development and Engineering Center  
ATTN: AMSTA-ARA-QAW (R)  
Rock Island, Illinois 61299-7300

Section II. EQUIPMENT DESCRIPTION

Para.	Para.
E Equipment Characteristics, Capabilities, and Features . . . . .	Differences Between Models . . . . .1-10
Location and Description of Major Components . . . . .	Equipment Data . . . . .1-11

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

a. Physical Description. The contact maintenance vehicle (CMV) consists of an aluminum and steel structure mounted on a M1031 Model, 1-1/4 ton, 4 x 4 tactical truck chassis. The mounted structure consists of nine compartments (fig. 1-2) used for storage of the power unit, power and hand tools, materials, and accessories. Access to the nine storage compartments is provided by latched access doors.

(1) Dimension. The dimensions and weight of the (CMV including the M1031 truck chassis are as follows:

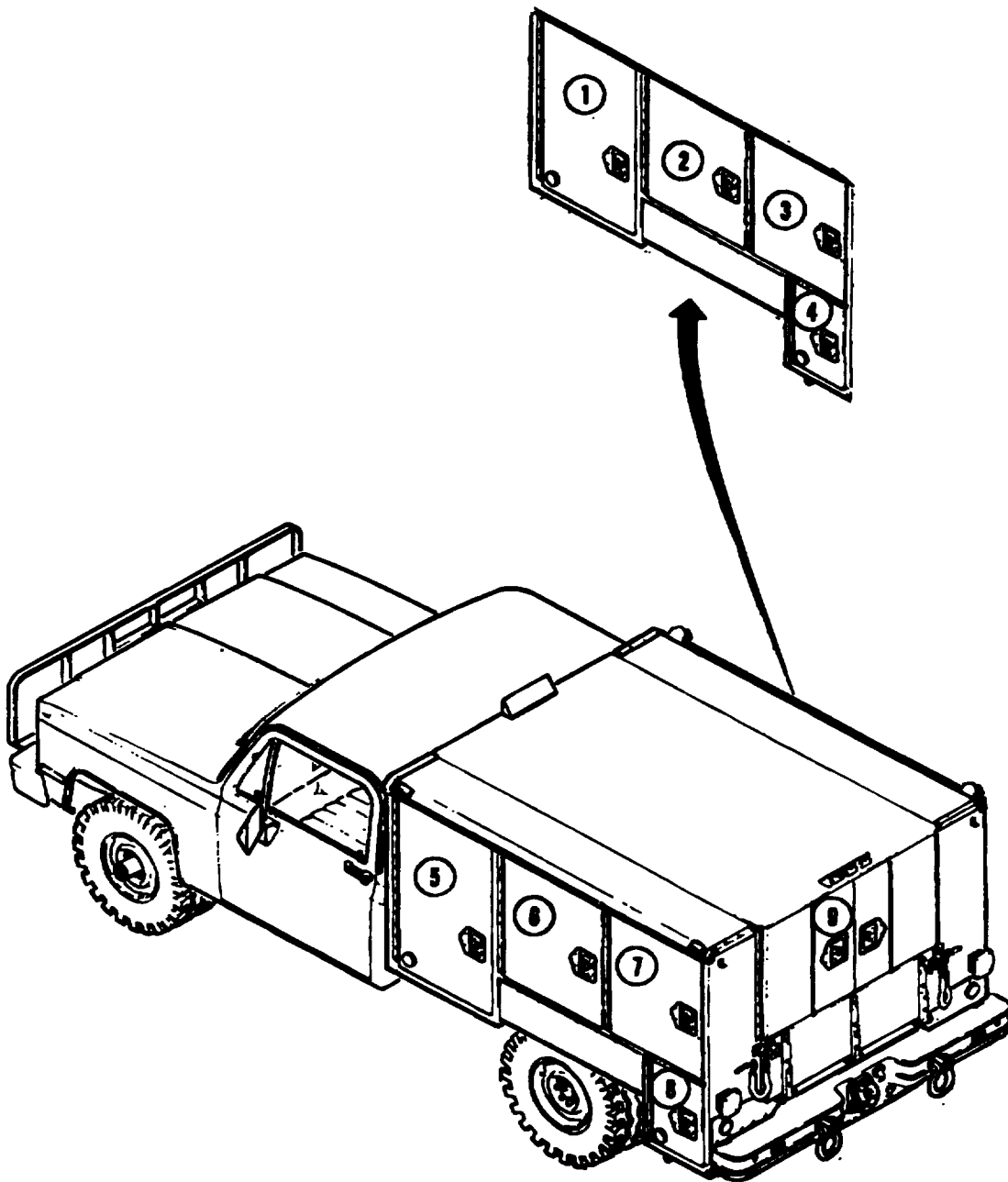
- Overall length . . .219.00 inches (556.26 cm)
- Height.....85.00 inches (215.90 cm)
- Width..... 84.00 inches (213.36 cm)
- Weight . . . . .9000 pounds (4090.98 kg)

## 1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES (CONT).

- (2) **Weatherproofing.** The CMV structure is made of aluminum and steel and treated for exterior rust prevention. The interior of the structure is protected by tight fitting compartment doors.
- (3) **Shock and Vibration.** The components of the CMV and the various compartments are protected from shock and vibration damage during travel by the use of tiedown straps and brackets. The CMV structure is securely mounted to the truck chassis to prevent shock or vibration damage.

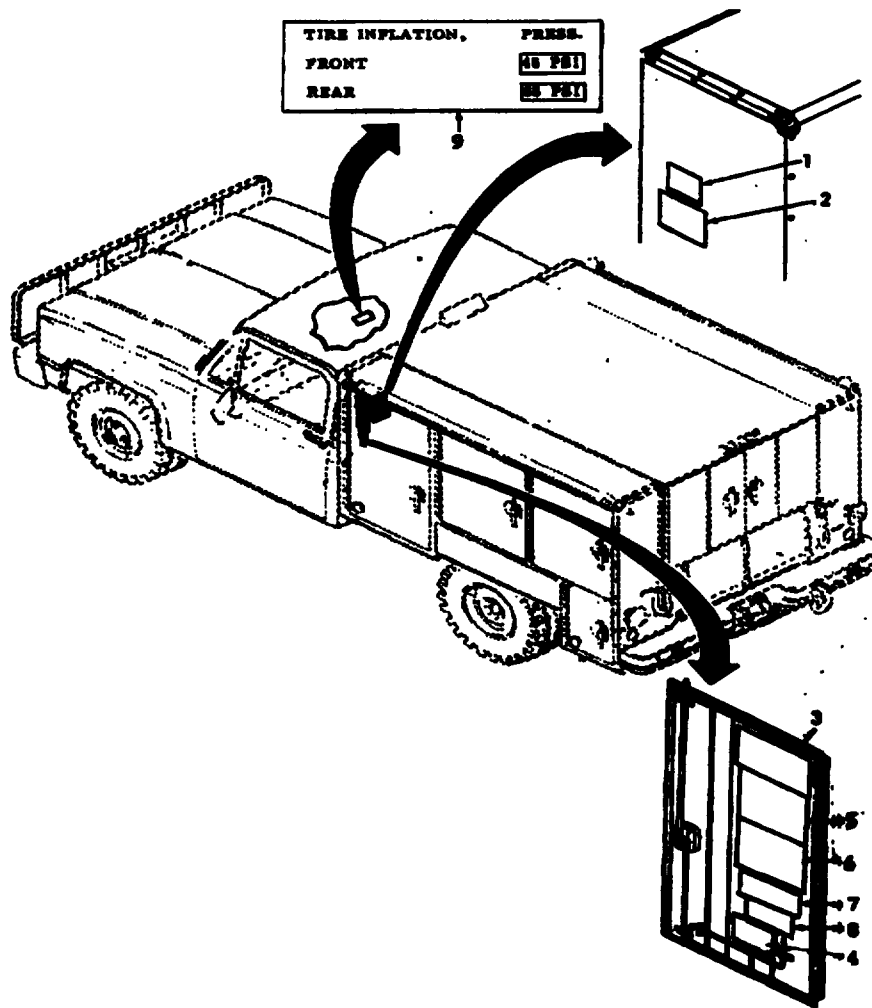
**b. Functional Description** The following paragraphs describe the intended use, capabilities, and limitations of the CMV.

- (1) **Intended Use.** The CMV is designed to provide on-site maintenance and repair of military equipment in the field. Typical maintenance and repair which can be accomplished using the CMV are lubrication, tire repair, minor engine repair, minor electrical repair, and minor body damage.
- (2) **Capabilities.** The CMV has the capability of traveling on primary or secondary roads to equipment in need of repair or maintenance. It also has off-road capability over selected terrain. In addition to the off-road capability, the CMV has hard bottom fording capability up to a depth of 20 inches (50.8 cm). A self-contained power takeoff (PTO) driven alternator provides 208-volt, three-phase and 110-volt single-phase alternating current for the air compressor and power tools.
- (3) **Limitations.** The CMV is limited in capability from performing depot level maintenance tasks on equipment in need of repair. Off-road travel is limited over excessively rough terrain and fording capability is limited to hard bottom surfaces not deeper than 20 inches (50.8 cm).
- (4) **Labels, Decals, Information, and Identification Plates** The CMV utilizes many labels, decals, and plates for instruction, information, identification, warnings, and cautions. Refer to figure 1-3 for location and identification of the various labels, decals, and plates.



*Figure 1-2. Shop Equipment, Contact Maintenance, Truck Mounted, Storage Compartments.*

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES (CONT).



**LEGEND**

1. NAMEPLATE
2. INFORMATION PLATE - VEHICLE DIMENSIONS AND DATA
3. INFORMATION PLATE - CONTROL PANEL WIRING DIAGRAM (See FO-1 )
4. WARNING PLATE - EAR PROTECTION
5. INFORMATION PLATE -DC ELECTRICAL SCHEMATIC (See para. 5-11)
6. INFORMATION PLATE -AC ELECTRICAL SCHEMATIC
7. INFORMATION PLATE - GOVERNOR SYSTEM WIRING DIAGRAM (See para. 5-7)
8. CAUTION PLATE - ELECTRICAL SUPPRESSION
9. INFORMATION PLATE - TIRE INFLATION

*Figure 1-3. Decals, Labels, Information, and Identification Plates (Sheet 1 of 3).*

**U.S. ARMY**

**SHOP EQUIPMENT, CONTACT MAINTENANCE  
TRUCK MOUNTED**

MODEL	CONT. NO. <b>DAAA 09-87-C-1364</b>		
SER. <b>ABC-</b>	CAPACITY		
REG. NO.	GVW <b>9000 LB</b>	LG <b>219 IN</b>	
NSN <b>-01-209-882</b>	DATE MFG	HGT <b>85 IN</b>	
ENG. SER.	SHIP WT <b>4.17 MT</b>	W <b>84 IN</b>	
WARRANTY	MO OR	MT	CUBE <b>878</b>
DATE SHIPPED	DATE INSP	INSP STAMP	
MFD. BY	ABLE BODY CORP.		

**TRANSPORTATION DATA FOR  
SHOP EQUIPMENT, CONTACT  
MAINTENANCE, TRUCK MOUNTED**

MAXIMUM  
AXLE  
RATING

**4500 LB**

**32 IN**

**7500 LB**

MAXIMUM AXLE  
RATING

**55 IN**

TIRE INFLATION PRESS.	OVERALL LENGTH	<b>219 IN.</b>
FRONT	OVERALL HEIGHT	<b>85 IN.</b>
REAR	OVERALL WIDTH	<b>84 IN.</b>
	G.V.W.	<b>9000 LB</b>
	SHIP. TONNAGE	<b>4.17 MT</b>
	SHIP. CUBAGE	<b>878 FT</b>

Figure 1-3. Decals, Lables, Information, and Identification Plates (Sheet 2 of 3)

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES (CONT)

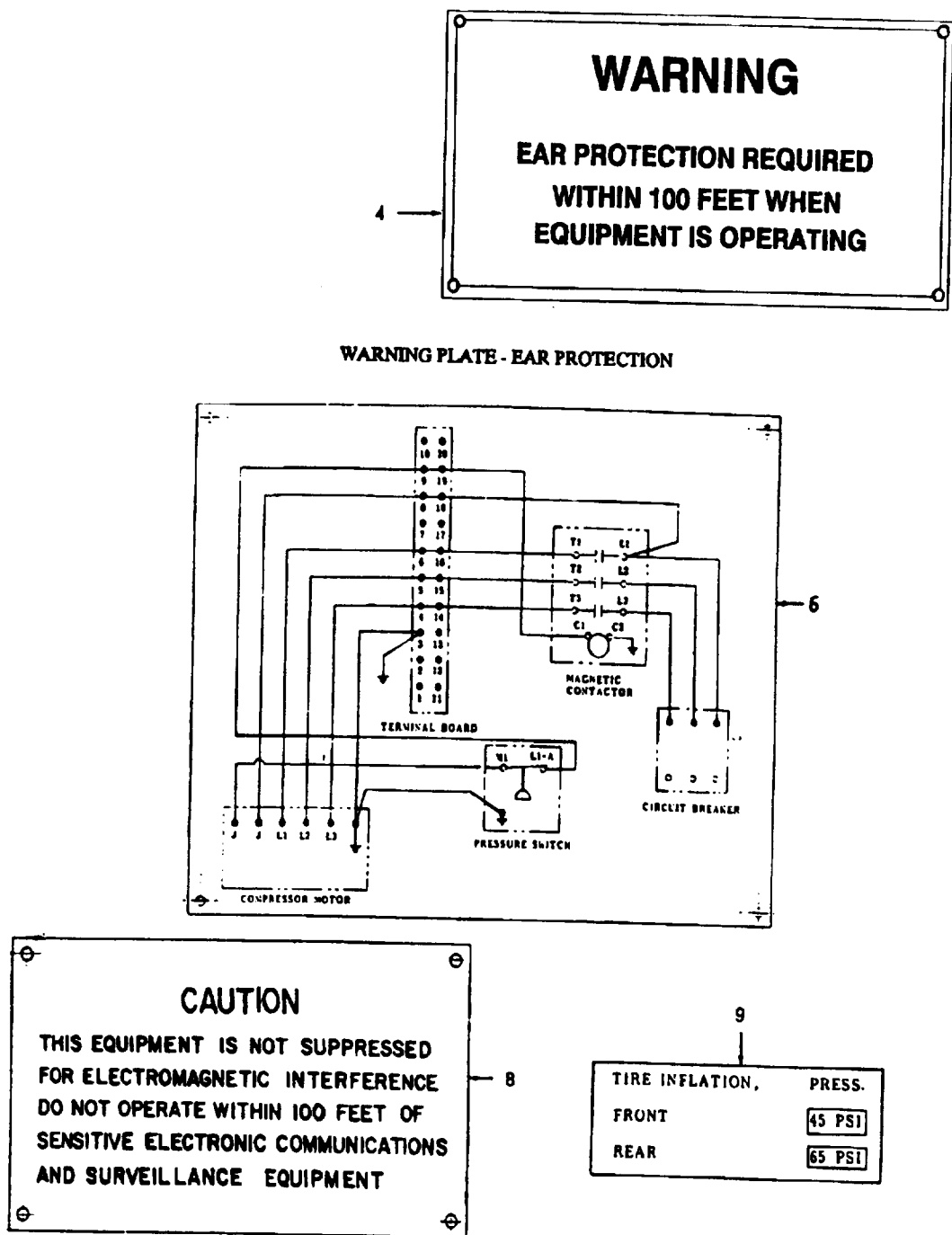


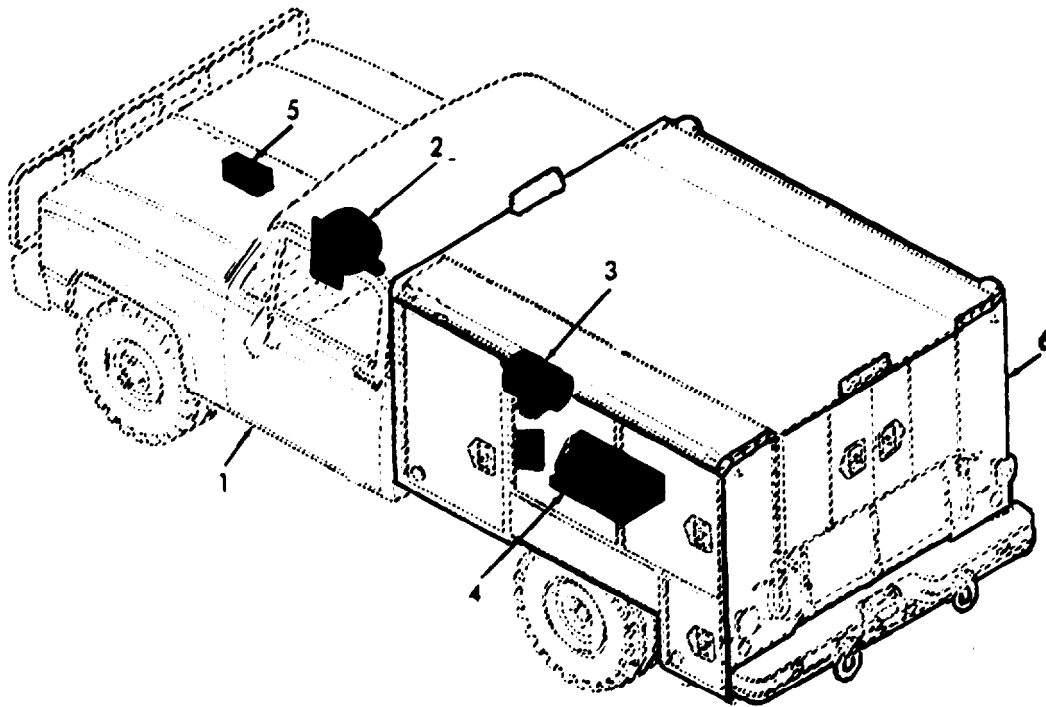
Figure 1-3. Decals, Labels, Information, and Identification Plates (Sheet 3 of 3).



### 1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS.

Refer to figure 1-4. The following is the location and description of the major components of the contact maintenance vehicle.

- a. **Truck Chassis: M1031.** The truck chassis (1) provides the ability to transport the shop equipment and to provide power for operating the power take-off systems and electrical systems.
- b. **Power Take-Off (PTO).** The PTO (2) is the device used to transfer the power generated by the engine of the truck chassis to the alternator.
- c. **Alternator.** The alternator (3) provides 120-VAC single-phase, 208-VAC, single-phase, and 208-VAC, three-phase electrical power to operate the electrical tools on board the CMV.
- d. **Air Compressor.** The air compressor (4) is operated by an electric motor run by power from the alternator. The air compressor is used to provide compressed air.
- e. **Governor.** The governor (5) provides control of the engine rpm to control the electrical output of the alternator.
- f. **Body Assembly.** The body assembly (6) consists of nine compartments that provide storage space for all tools and equipment.



*Figure 1-4. Location of Major Components.*

## **1-10. DIFFERENCES BETWEEN MODELS.**

Some Shop Equipment models use different brackets, fixtures, and retainers for holding the various types of equipment. Differences in repair or adjustment are covered in the applicable maintenance paragraphs.

## **1-11. EQUIPMENT DATA.**

**Table 1-1. Equipment Data**

---

### **CONTACT MAINTENANCE VEHICLE**

Overall length .....	219 inches (556.26 cm)
Overall width .....	84 inches (213.36 cm)
Overall height .....	85 inches (215.90 cm)
Gross vehicle weight .....	9000 pounds (4090.98 kg)
Shipping tonnage .....	9200 pounds (4177 kg)
Shipping cubage .....	878 cubic feet (24.89 cubic meters)

### **AIR COMPRESSOR ASSEMBLY - LEADING PARTICULARS**

#### **Air compressor**

Model .....	ES10
Manufacturer .....	Curtis-Toledo
Stage .....	Single
Cylinder .....	2
Bore .....	2.56
Stroke .....	1.75
Weight .....	50 pounds (22.72 kg)

#### **Motor**

Spec .....	35S69-1342-MOO
Manufacturer .....	Baldor Electric Co.
Horsepower .....	2
RPM .....	1735
Volts .....	208 Vac
Frame .....	145T
Hertz .....	60
Phase .....	3
Amps .....	7.4

#### **Reservoir**

Capacity .....	1,200 cubic inches (19,668 cubic cm)
----------------	--------------------------------------

Table 1-1. Equipment Data - Continued

ALTERNATOR - LEADING PARTICULARS

Model .....	NBR3157.0080
Manufacturer .....	Lima Electric Co.
Outputs	
Volts .....	208 Vac, 3 phase
.....	208 Vac, 1 phase
.....	120 Vac, 1 phase
NA .....	.15
Kw .....	.12
Length .....	25.5 inches (64.77 cm)
Width .....	16.25 inches (41.28 cm)
Height .....	16.5 inches (41.91 cm)
Weight .....	270 pounds (122.73 kg)

M1031 VEHICLE CAPACITIES

Tire Pressure

Front .....	45 psi (400 kpa)
Rear .....	65 psi (552 kpa)

Section III. PRINCIPLES OF OPERATION

	Para.	Para.
General .....	1-12	Mechanical Theory ..... 1-14
Electrical Theory .....	1-13	

1-12. GENERAL.

Operation of the CMV is accomplished by mechanical and electrical interaction. Refer to figure 1-5 for the CMV block diagram. The basic operation of the CMV is accomplished through the operation of the vehicle engine which drives the power takeoff (PTO) unit, which in turn drives the alternator providing electrical power for operation of CMV components.

1-13. ELECTRICAL THEORY.

The electrical power needed to operate the CMV components is supplied by the alternator. The alternator is mechanically driven by the PTO unit. The electrical output from the alternator is connected to the control panel assembly and routed through circuit breakers to various receptacles and the air compressor.

## 1-13 ELECTRICAL THEORY (CONT).

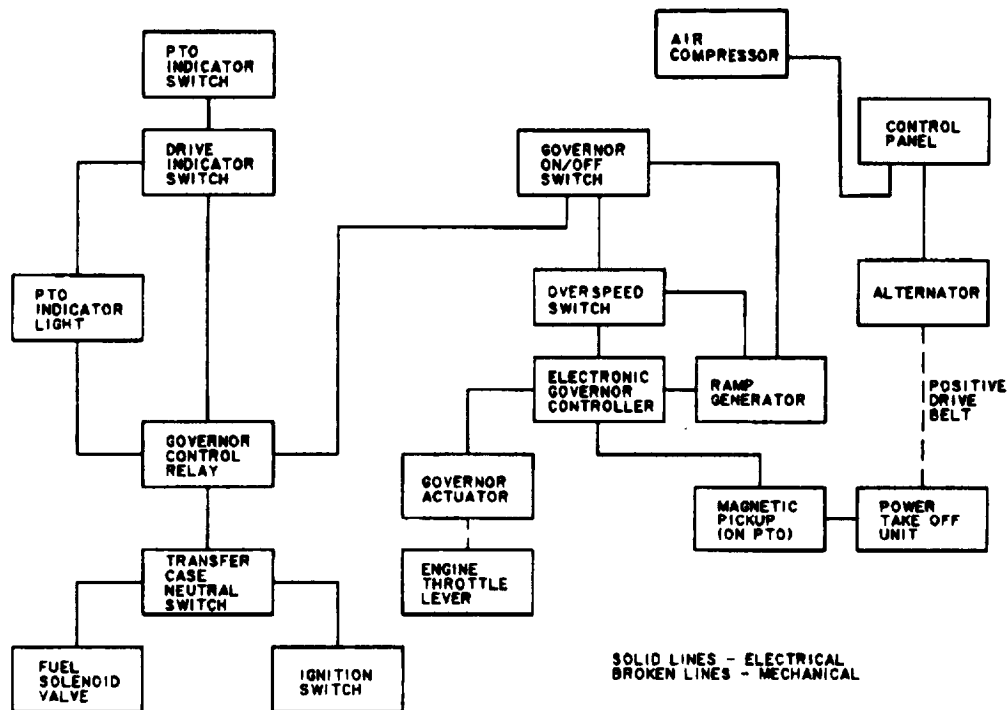


Figure 1-5. CMV Electro-Mechanical Block Diagram.

## 1-14. MECHANICAL THEORY.

**a. General.** The mechanical portion of the CMV consists of both mechanical and electronic components. These components interact for the purpose of driving the alternator. The mechanical components are the vehicle transfer case, PTO, positive drive belt, and an actuator which is part of the electronic governor system. The components which make up the electronic governor system and control the actuator are a controller, ramp generator, overspeed switch, and governor control relay. The interaction of all components provides a steady PTO output speed to drive the alternator for a 60-Hz electrical output under all load conditions. The actuator is mechanically fastened to the engine throttle lever and electrically controlled by the electric governor system. This interaction varies engine speed to compensate for automatic transmission slippage as load conditions vary.

**b. Air Compressor Operation.** The air compressor and reservoir are located inside the CMV. The air compressor is mounted on the floor section and the reservoir is mounted on the street side wall. An electric motor is activated when circuit breaker CB2 on the control panel is placed in the ON position. The electric motor drives the air compressor unit by a drive belt and pulley arrangement. The actual air pressure within the air compressor reservoir is controlled by an electrical pressure switch mounted on the reservoir. This switch turns on the electric motor when air pressure is 80 psig  $\pm 5\%$  and turns off the motor when air pressure is 100 psig  $\pm 5\%$ .

**c. Power Take Off (PTO) Unit.** The PTO is mounted to the transfer case of the vehicle and is engaged by cable linkage from the vehicle cab. With the vehicle engine running, transfer case in neutral, PTO engaged, and vehicle transmission in drive, the PTO provides rotation necessary to operate the alternator. This is accomplished using a mechanical linkage consisting of yokes, universal joints, a shaft, flange bearings, a PTO sprocket, a positive drive belt, and an alternator sprocket. The speed at which the PTO turns is sensed by a magnetic pick-up which sends a signal of PTO speed to the electronic governor. This signal provides information to the governor necessary to maintain constant output gear speed regardless of the load of the alternator.

**d. Electronic Governor System.** The electronic governor system consists of five components. The components are an actuator, a controller, a ramp generator, an overspeed switch, and a governor control relay. The actuator is mounted in the engine compartment of the M1031 vehicle, and the other four components are mounted in compartment 5 of the CMV body assembly.

- (1) Actuator.** The actuator is a proportional electric solenoid having an internal sliding armature. The sliding action of the armature causes a bell crank to rotate an output shaft. The output shaft is mated with an actuator lever assembly attached to the vehicle engine throttle lever. The basic operation of this unit is controlled by input coil current, which, when increased, slides the armature away from its balance point and rotates the output shaft counterclockwise, to push the actuator lever assembly. As the actuator lever is pushed against the throttle lever, engine speed is increased. As input coil current is reduced or not present, the armature slides back toward its balance point, reducing pressure on the engine throttle lever, which in turn reduces engine speed. Engine speed will be reduced until the actuator lever assembly makes contact with the high idle solenoid. When contact is made with the solenoid, engine speed will be stabilized at idle.

# **1-14. MECHANICAL THEORY (CONT).**

- (2) **Control.** Operation of the actuator is determined by the controller. The controller performs the functions of a receiver and a transmitter. A signal is received from either the governor switch on the dashboard of the vehicle or from the magnetic pickup on the PTO. When a signal is received, the controller interprets it and transmits a signal to the actuator. The signal received from the governor switch is turning the electronic governor system either on or off. The signal received from the magnetic pickup indicates the PTO output gear speed. The controller compares this signal to a preset value to determine if there is a need to increase or decrease engine speed, and varies input coil current to the actuator accordingly.
- (3) **Ramp- Generator.** The ramp generator functions as a time delay voltage runup circuit. This circuit is used to input the voltage to the actuator armature at a steady increasing rate, to prevent engine overspeed. Engine overspeed will occur if the total voltage necessary to attain proper output is applied instantly. Engine overspeed will result in either the turnoff of the governor system by the overspeed switch, or the engine not stabilizing at the proper speed which causes frequency oscillations. The ramp generator allows the governor system to bring the engine smoothly up to the required speed. The only overshoot is a slight increase when the transmission shifts from second to third gear. This slight increase is not enough to cause the overspeed switch to be activated nor to cause engine oscillation.
- (4) **Overspeed Switch.** The function of the overspeed switch is to reduce the possibility of engine overspeed. In the event that the governor system should malfunction, the overspeed switch will prevent the governor system from advancing the engine speed to a dangerous output speed. The overspeed switch does this by receiving a signal from the magnetic pickup and comparing it to a preset value. If the signal received is in excess of the preset value, the overspeed switch will interrupt power to the governor and the fuel solenoid, causing the engine to shut down. The governor cannot be reengaged until the overspeed switch is manually reset.
- (5) **Governor Control Relay.** This relay is in the PTO/governor circuit to prevent the vehicle from being driven while the PTO is engaged. Another function of this relay is to remove power from the governor if the transmission gear lever is not in the drive position. The relay operates based upon an interaction among the transfer case neutral switch, the drive indicator switch, and the PTO indicator switch. Together, the switches and the relay form an electrical circuit which provides an alternate path of power to the fuel solenoid

valve. This alternate path exists only when the transfer case gear shift lever is in neutral, the PTO is engaged, and the transmission gear shift lever is in drive. When these conditions exist, the governor control relay is energized and completes the electrical circuit to the fuel solenoid valve and establishes the potential so the governor system can be activated. The governor system can now be activated by placing the governor circuit switch to the ON position. This circuit now is able to remove power from the governor circuit if the transmission gear shift lever is moved out of the drive position, or remove power from the fuel solenoid valve if the, transfer case gear lever is moved from the neutral position.





CHAPTER 2

OPERATING INSTRUCTIONS

Section I.	Description and Use of Operator's Controls and Indicators
Section II.	Operator's Preventive Maintenance Checks and Services
Section III.	Operation Under Usual Conditions
Section IV.	Operation Under Unusual Conditions

Section 1. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

Para.	Para.
Introduction.....2-1	Functions of Controls and Indicators 2-2

2-1. INTRODUCTION.

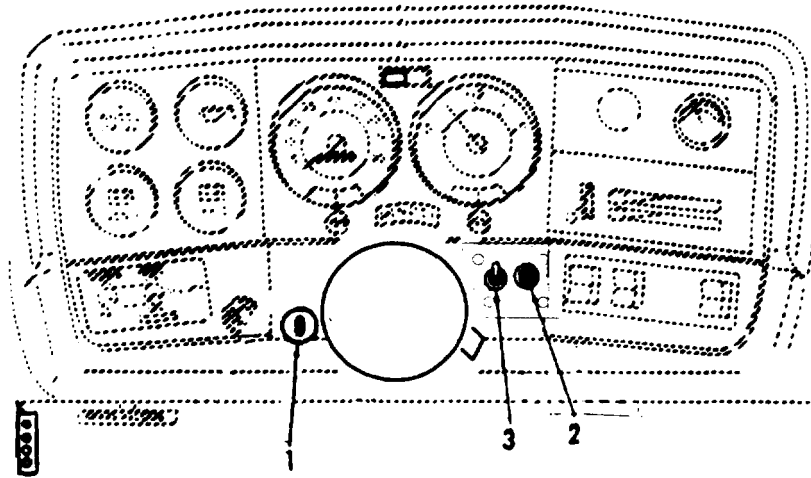
This section describes, locates, and illustrates the controls and indicators used to operate and monitor the CMV and CAN components.

2-2. FUNCTIONS OF CONTROLS AND INDICATORS.

a. PTO and Governor. (Refer to Figure 2-1). The PTO, governor controls, and indicator are located on the M1031 vehicle dashboard lower portion.

- (1) PTO Control. The PTO control (1) is a push-pull mechanical cable linkage used to engage and disengage the PTO unit.
- (2) PTO Indicator Light. This red light (2) indicates that the PTO unit is engaged or disengaged. When the PTO is engaged, the lamp illuminates; when PTO unit is disengaged, the lamp is off.
- (3) Governor Circuit ON/OFF Switch. This is a two-position switch (3) used to activate the governor. The ON position activates the electronic governor system and the OFF position deactivates the electronic governor system.

## 2.2 FUNCTIONS OF CONTROLS AND INDICATORS - Continued.



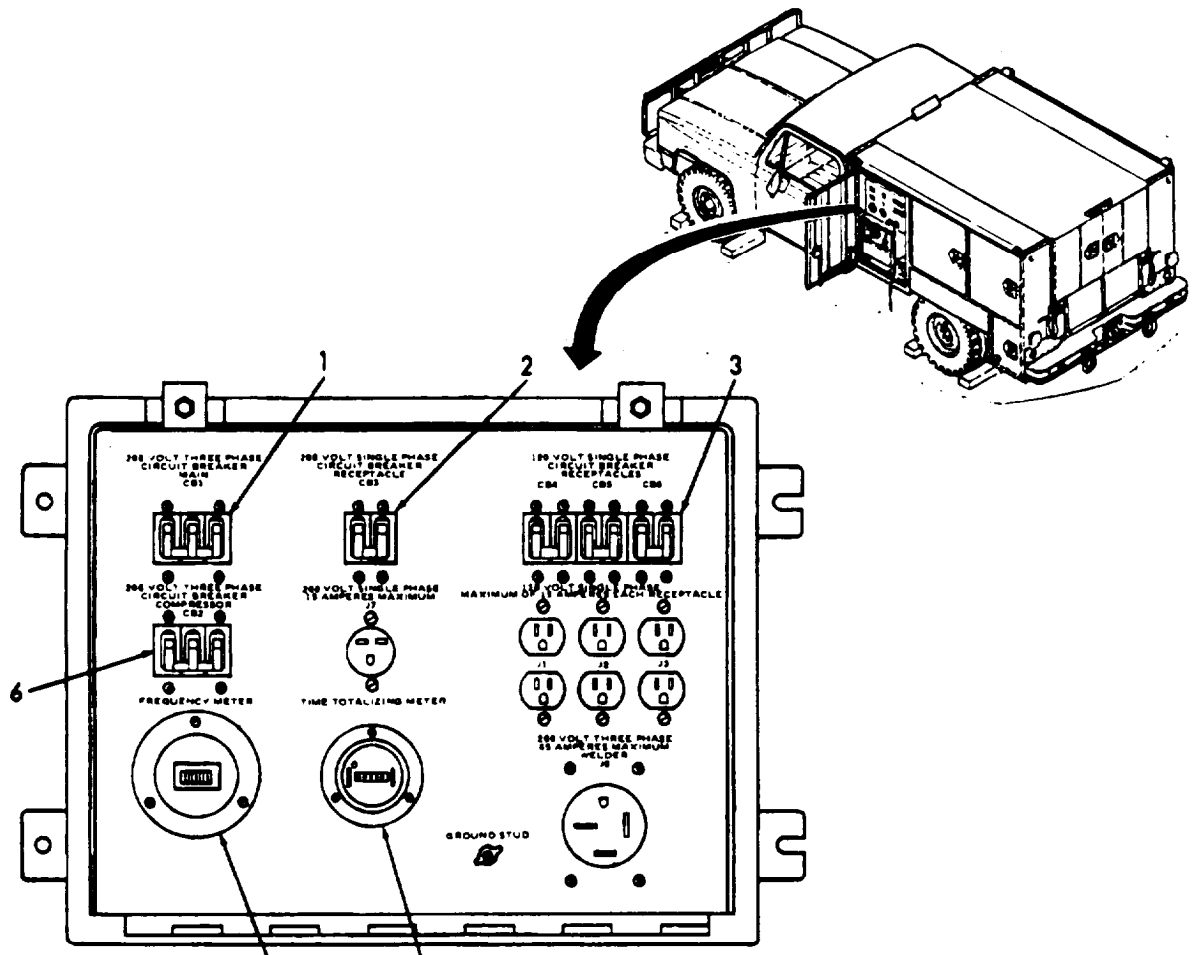
*Figure 2-1. PTO, Governor Controls, and Indicators.*

**b. Control Panel Assembly.** (Refer to figure 2-2.) The control panel assembly is located in the top portion of compartment 5 of the shop equipment. The control panel is the ac electrical power distributor for the shop equipment. In addition to the controls and indicators located on the front panel, this assembly contains a contactor which is used to start and stop the air compressor and various receptacles for plugging in the shop equipment power tools. The functions of the components of the control panel are as follows:

- (1) **208-VOLT, THREE-PHASE CIRCUIT BREAKER MAIN CB1.** This circuit breaker (1) is the main circuit breaker for the ac electrical distribution. In the ON position, electrical current is distributed to the other circuit breakers in the control panel assembly. In the OFF position, no current from the alternator is distributed. Normally, the circuit breaker is manually controlled, but its protective circuitry will open the contacts if there is an oversurge of power from the alternator.
- (2) **208-VOLT, SINGLE-PHASE CIRCUIT BREAKER RECEPTACLE CB3.** This circuit breaker (2) provides the J7 receptacle power when in the ON position. It is also the protective circuit for the J7 receptacle and will trip to the OFF position if there is an oversurge of power from the alternator.
- (3) **120-VOLT SINGLE-PHASE CIRCUIT BREAKER RECEPTACLES CB4, CB5, CB6.** These circuit breakers (3) provide electrical power to the receptacles J1, J2, and J3 respectively. In the ON position, power is supplied to the receptacle; and in the OFF position, there is no power at the receptacle. If there is a power oversurge through the circuit breaker it will trip to the OFF position to protect any component plugged in to the receptacle.

**LEGEND**

1. 208-VOLT, THREE-PHASE CIRCUIT BREAKER MAIN CB1
2. 208-VOLT, SINGLE-PHASE CIRCUIT BREAKER RECEPTACLE CB3
3. 120-VOLT, SINGLE-PHASE CIRCUIT BREAKER RECEPTACLES CB4, CB5, CB6
4. TIME TOTALIZING METER
5. FREQUENCY METER
6. 208-VOLT, THREE-PHASE CIRCUIT BREAKER COMPRESSOR CB2



*Figure 2-2. Control Panel Assembly Controls and Indicators.*

- (4) **TIME TOTALIZING METER.** This meter (4) records the total time that the alternator has been in use. Total hours are reflected in hours and tenths of hours.
- (5) **FREQUENCY METER.** This meter (5) monitors the output frequency of the alternator in cycles per second. To determine the frequency, observe the vibrating reed on the meter.

## 2-2. FUNCTIONS OF CONTROLS AND INDICATORS - Continued.

- (6) **208-VOLT, THREE-PHASE CIRCUIT BREAKER COMPRESSOR CB2.** This circuit breaker (6) is the controlling switch for the compressor. In the ON position, power is applied to the compressor. If a power oversurge occurs, the circuit breaker will trip to the OFF position and protect the compressor unit from the power oversurge.

c. **Air Compressor.** The air compressor and reservoir are located inside the body of the CMV. The air compressor is mounted on the floor section of the body and the reservoir is mounted on the street side wall. Refer to figure 2-3 for air compressor controls and indicators.

- (1) **Pressure Gage.** This gage (1) provides an indication of air pressure within the reservoir. It is expressed in psig.
- (2) **Oil Level Sight Gage.** This gage (2) is a sight gage which indicates the oil level of the air compressor.
- (3) **Pressure Control.** The pressure control (3) is an adjustable switch which turns the air compressor on when air pressure in the reservoir is below 80 psig  $\pm 5\%$  and shuts the air compressor off when reservoir pressure reaches 100 psig  $\pm 5\%$ .

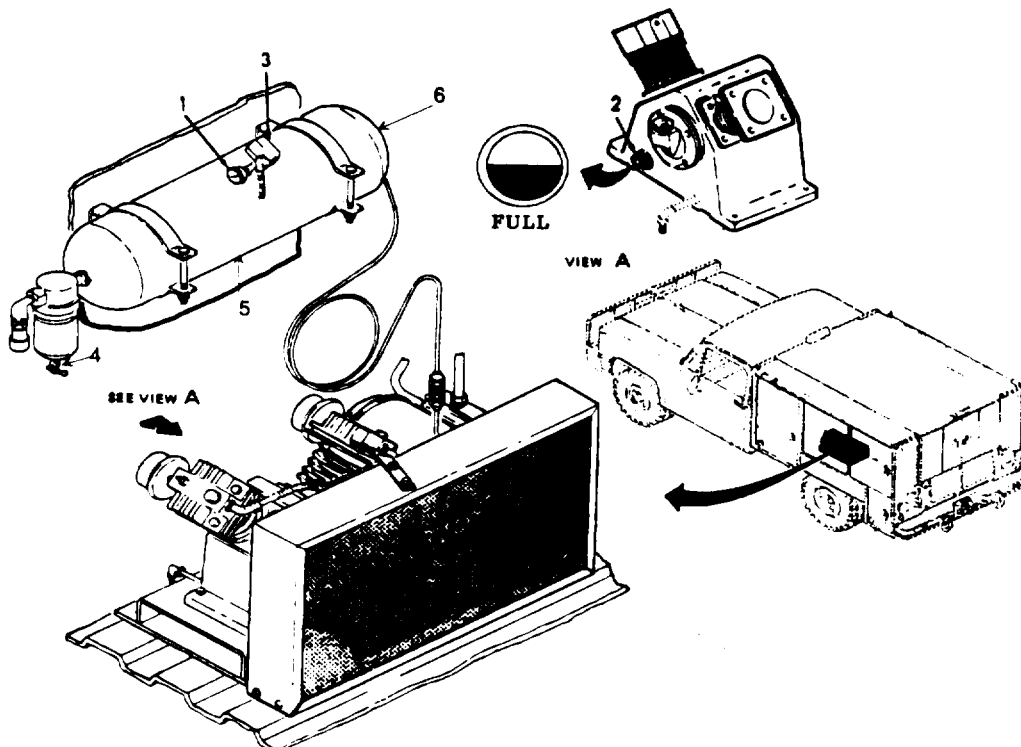


Figure 2-3. Air Compressor Controls and Indicators.

- (4) **Drain Cock.** The drain cock (4) is located at the bottom of the air filter/water separator. It allows any water accumulation to be drained from the air filter/water separator.
- (5) **Drain Cock.** An additional drain cock (5) is located at the bottom of the reservoir. It allows any water accumulation to be drained from the reservoir and can be used to bleed (remove air pressure from) the air system before maintenance work.
- (6) **On/Off Valve.** The on/off valve (6) controls compressed air delivery to the compressed air lines.

---



---

## Section II. OPERATOR'S PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

<b>Para.</b>	<b>Para.</b>
Introduction.....2-3	Operator's Preventive Maintenance
Leakage Definitions for Operators PMCS.....2-4	Checks and Services.....2-5

### 2-3. INTRODUCTION.

**a. General.** Preventive Maintenance Checks and Services (PMCS) means systematic caring, inspecting, and servicing of the contact maintenance vehicle to keep it in good condition and to prevent breakdowns.

b. Do your BEFORE PMCS just before you operate the contact maintenance vehicle. Pay attention to WARNINGS, CAUTIONS, and NOTES.

Do your DURING PMCS while you operate the contact maintenance vehicle. Pay attention to WARNINGS, CAUTIONS, and NOTES.

d. Do your AFTER PMCS right after operating the contact maintenance vehicle. Pay attention to WARNINGS, CAUTIONS, and NOTES.

e. Do your WEEKLY PMCS once a week.

f. Do your MONTHLY PMCS once a month.

## 2-3. OPERATOR'S PREVENTIVE MAINTENANCE CHECKS AND SERVICES (CONT)

**g. Item No. Column.** Checks and services are numbered in chronological order regardless of interval. This column is used as an item number source for the TM Item Number column on DA Form 2404 when recording PMCS results.

**h. Interval Column.** This column tells you when you must do the checks and services; either before, during, or after.

**i. Location, Item To Check/Service Column.** This column contains the name of the item(s) to be checked or serviced.

**j. Procedure Column.** This column tells you how to do the required checks or services.

### NOTE

The terms ready/available and mission capable refer to the same status: equipment is on hand and is able to perform its combat missions.

**k. Not Fully Mission Capable If: Column.** This column identifies the faults of the equipment that will prevent the contact maintenance vehicle from being fully mission capable.

## 2-4 LEAKAGE DEFINITIONS FOR OPERATOR PMCS

It is necessary for you to know how fluid leakage affects the status of the contact maintenance vehicle. Following are types/classes of leakage an operator needs to know to be able to determine the status of the contact maintenance vehicle. Learn these leakage definitions and remember--when in doubt, notify your supervisor.



- **Equipment operation is allowable with minor leakage (Class I or II). Of course, consideration must be given to fluid capacity in the item/system being checked/inspected. When in doubt, notify your supervisor**
- **When operating with Class I or II leaks, continue to check fluid levels as required in your PMCS.**
- **Class III leaks should be reported immediately to your supervisor.**

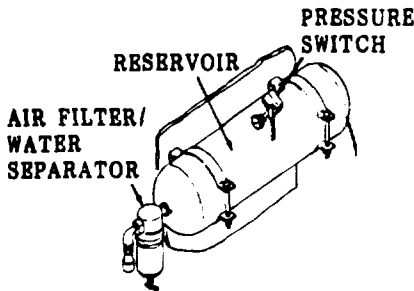
a. CLASS I - Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops

b. CLASS II - Leakage of fluid great enough to form drops but not enough to cause to drops to drip from item being checked/inspected.

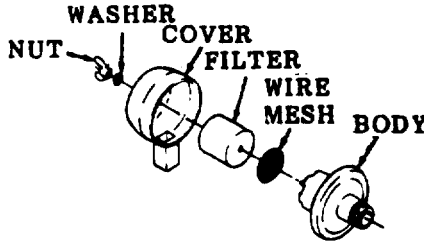
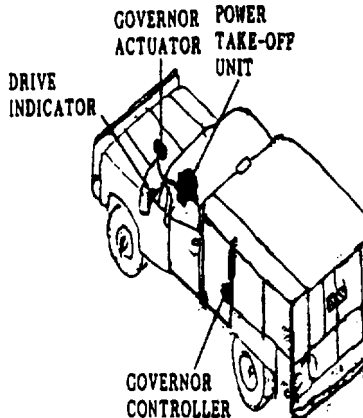
c. CLASS III- Leakage of fluid great enough to form drops that fall from item being checked/inspected.

## 2-5. OPERATOR'S PREVENTIVE MAINTENANCE CHECKS AND SERVICES.

**Table 2-1. Operator's Preventive Maintenance Checks and Services**

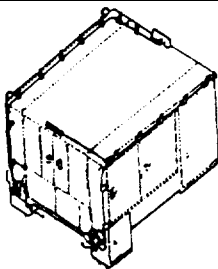

Item No.	Interval	Item To Be Checked Or Serviced	Procedure	Not Fully Mission Capable If:
1	Before	Air Filter/Water Separator	Inspect bowl for dirt or water accumulation by opening drain cock at bottom of reservoir to drain out any water. Clean air filter (see para. 3-8). Listen for air leaks	Dirt or water is in filter bowl, or if bowl or O-ring seal is damaged or missing.
				
2	Before	Belt	Check for frayed or missing belt. Examine belt for looseness and adjust as required see para. 3-7).	Belt is frayed, missing, or out of adjustment.
3.	Before	Compressor Air Inlet Filter	Inspect filter element for accumulation of dirt or oil. Remove wing nut and remove strained, filter, and wire mesh. Unscrew air strainer body from compressor. Clean filter if required. (see para. 3-8).	Inlet air filter is clogged or missing.

**2-5. OPERATOR'S PREVENTIVE MAINTENANCE CHECKS AND SERVICES (cont)****Table 2-1. Operator's Preventive Maintenance Checks and Services (cont)**

				
4	Before	Air Compressor	<p>Inspect air compressor for cracked surfaces, clogged cooling fins, and proper oil level. Clean clogged air fins. Replenish oil as required (see para. 3-2). Check air vent for clogged vent. Check oil level before operation. Check for oil leaks.</p>	Compressor assembly is cracked, if cooling fins are clogged, if oil level is too low, or if there are Class III leaks.
5	Before	Governor Wiring	<p>Check wiring for frayed or nicked wiring. Check for loose connections. Tighten as required.</p>	Wiring is frayed or nicked or if connections are loose.
				
6	Before	Electronic Governor System	<p>Inspect housing for dents. Check that engine operates at proper rpm when starting, stopping, and loading of alternator..</p>	Engine overspeeds or underspeeds during alternator operation..

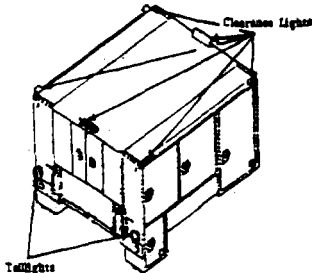
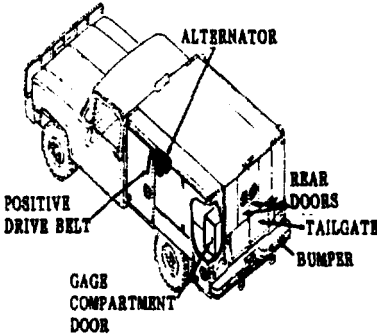


**Table 2-1. Operator's Preventive Maintenance Checks and Services (cont)**

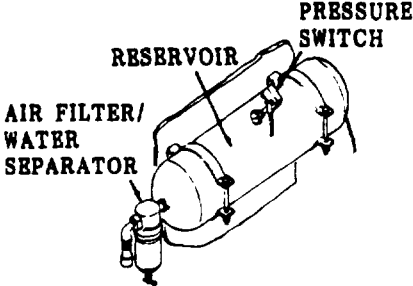
7	Before	Power Take Off Unit	Check that PTO engages when PTO control cable is activated. Check that PTO does not make excessive noises or vibrates during operation.	PTO does not engage/disengage properly, vibrates excessively, or makes unusual noises.
8	Before	Power Take Off Controls/ Indicators	Check that governor on/off toggle switch, PTO knob, and PTO indicator lights function properly.	If controls/ indicators do not function properly
9	Before	Cable Assembly (D.C.).	Check for frayed, nicked, or broken wiring. Inspect cable for loose connections.	Wiring is frayed, nicked, or broken, or if cable connections are loose.
				
10	Before	Cable Assembly (A. C.)	Check for mashed or broken conduit. Check for exposed, frayed, nicked, or broken wiring. Inspect cable for loose connections.	Conduit is mashed or broken, if wiring is exposed, frayed, nicked, or broken, or if cable connections are loose.
				
11	Before	Taillights	Inspect taillights for cracked or broken lenses. Check that all bulbs function properly.	Lenses are cracked or broken or if bulbs are burned out.

## 2-5. OPERATOR'S PREVENTIVE MAINTENANCE CHECKS AND SERVICES (cont)

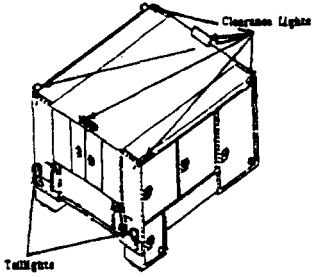
Table 2-1. Operator's Preventive Maintenance Checks and Services (cont)

				
12	Before	Clearance Lights	Inspect clearance lights for cracked or broken lenses. Check that all bulbs function properly	Lenses are cracked or broken or if bulbs are burned out.
13	Before	Control Panel	Check control panel for missing, damaged, or inoperative switches or controls	Control switches are missing, damaged, or inoperative.
14	Before	Cable Assembly (Control Panel)	Check cable assembly for loose or broken connections. Check for frayed, nicked, or broken wiring.	Cable connections are loose or broken, or if wiring is frayed, nicked, or broken.
15	Before	Positive Drive Belt	Check for missing or frayed drive belt.	Drive belt is missing or frayed
				

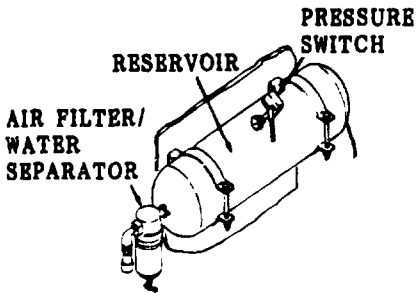
**Table 2-1. Operator's Preventive Maintenance Checks and Services (cont)**

16	Before	Alternator	Check for missing hardware. Check for unusually hot alternator housing after use. Proper voltage output	Hardware is missing, if alternator housing is unusually hot after operation, or if alternator voltage output incorrect.
17	Before	Tailgate	Check for dents or cracks. Check for cracked or warped hinges. Inspect for missing or stretched chains.	Tailgate is broken, loose, or cannot be secured to body assembly.
18	Before	Brackets and Hardware	Check for cracked/broken brackets and missing hardware.	
19	Before	Body Assembly	Check body assembly for damage, rust, corrosion, or cracks near mounting holes of frame members.	Frame members have cracks near mounting holes.
20	During	Air Filter/Water Separator	Inspect bowl for dirt or water accumulation by opening drain cock at bottom of reservoir to drain out any water. Clean air filter (see para. 3-8). Listen for air leaks.	Dirt or water is in filter bowl, or if bowl or O-ring seal is damaged or missing.
				
21	During	Pressure Switch	Inspect switch for dents. Check function of switch during air compressor operation for proper air pressure setting (para. 4-10).	Switch is damaged or if switch is set at improper air pressure setting.

**2-5. OPERATOR'S Preventive MAINTENANCE CHECKS AND SERVICES (cont)****Table 2-1. Operator's Preventive Maintenance Checks and Services (cont)**

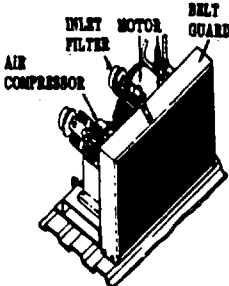
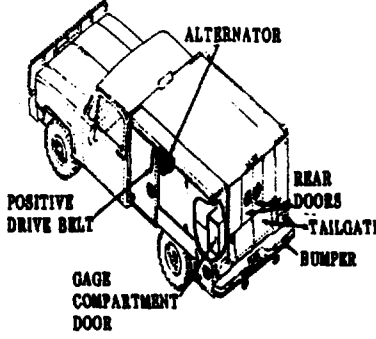
22	During	Reservoir	Inspect for missing hardware. Examine for cracks and dents. Check for leaking air pressure during operation. Drain reservoir after use.	Hardware is missing, or if reservoir leaks air pressure
23	During	Motor	Examine motor and pulley for smooth and quiet operation	Motor vibrates or makes squealing or grinding noise during operation.
24	During	Electronic Governor System	Inspect housing for dents. Check that engine operates at proper rpm when starting, stopping, and loading of alternator..	Engine overspeeds or underspeeds during alternator operation.
25	During	Governor Actuator	Check governor actuator for smooth movement of output shaft	Output shaft does not move or moves unevenly.
26	During	Power Take Off Unit	Check that PTO engages when PTO control cable is activated. Check that PTO does not make excessive noises or vibrates during operation.	PTO does not engage/disengage properly, vibrates excessively, or makes unusual noises.
27	During	Taillights	Inspect taillights for cracked or broken lenses. Check that all bulbs function properly.	Lenses are cracked or broken, or if bulbs are burned out.
				

**Table 2-1. Operator's Preventive Maintenance Checks and Services (cont)**

28	During	Clearance Lights	Inspect clearance lights for cracked or broken lenses. Check that all bulbs function properly	Lenses are cracked or broken, or if bulbs are burned out.
29	During	Control Panel	Check control panel for missing, damaged, or inoperative switches or controls	Control switches are missing, damaged, or inoperative.
30	During	Alternator	Check for missing hardware. Check for unusually hot alternator housing after use. Proper voltage output.	Hardware is missing, if alternator housing is unusually hot after operation, or alternator voltage output incorrect.
31	After	Air Filter/Water Separator	Inspect bowl for dirt or water accumulation by opening drain cock at bottom of reservoir to drain out any water. Clean air filter (see para. 3-8). Listen for air leaks.	Dirt or water is in filter bowl, or if bowl or O-ring seal is damaged or missing.
				
32	After	Pressure Switch	Inspect switch for dents. Check function of switch during air compressor operation for proper air pressure setting (para. 4-10).	Switch is damaged, or if switch is set at improper air pressure setting.
33	After	Reservoir	Inspect for missing hardware. Examine for cracks and dents. Check for leaking air pressure during operation. Drain reservoir after use.	Hardware is missing, or if reservoir leaks air pressure.

## 2-5. OPERATOR'S PREVENTIVE MAINTENANCE CHECKS AND SERVICES (cont)

Table 2-1. Operator's Preventive Maintenance Checks and Services (cont)

34	After	Belt Guard	Inspect for missing hardware and damaged or missing belt guard	Belt guard is missing or damaged to the point of interfering with operation or is not securely fastened.
				
35	After	Air Compressor	Inspect air compressor for cracked surfaces, clogged cooling fins, and proper oil level. Clean clogged air fins. Replenish oil as required (see para. 3-2). Check air vent for clogged vent. Check oil level before operation. Check for oil leaks.	Compressor assembly is cracked, if cooling fins are clogged, if oil level is too low, or if there are Class III leaks.
36	After	Positive Drive Belt	Check for missing or frayed drive belt.	Drive belt is missing or frayed.
				

**Table 2-1. Operator's Preventive Maintenance Checks and Services (cont)**

17	After	Alternator	Check for missing hardware. Check for unusually hot alternator housing after use. Proper voltage output	Hardware is missing, if alternator housing is unusually hot after operation or if alternator voltage output incorrect.
18	After	Rear Door Assembly (Left and Right Hand)	Check doors for dents or cracks. Check for proper hinge and latch operation.	Doors do not function properly to be secured or allow access to tools and components.
39	After	Door Assemblies	Check for dents or cracks in doors	Doors do not latch properly. Check for proper hinge and latch operation.
40	After	Bumper Assembly	Check that bumper assembly is not warped or damaged. Check pintle hook for looseness, damaged lock mechanism and cotter pin. Check trailer electrical coupling for damage.	
41	After	Body Assembly	Check body assembly for damage, rust, corrosion, or cracks near mounting holes of frame members.	Frame members have cracks near mounting holes.
42	Weekly	Electronic Governor System	Inspect housing for dents. Check that engine operates at proper rpm when starting, stopping, and loading of alternator..	Engine overspeeds or underspeeds during alternator operation..
43	Weekly	Power Take Off Unit	Check that PTO engages when PTO control cable is activated. Check that PTO does not make excessive noises or vibrates during operation.	PTO does not engage/disen-gage properly, vibrates excessively, or makes unusual noises.
44	Monthly	Air Compressor	Inspect air compressor for cracked surfaces, clogged cooling fins, and proper oil level. Clean clogged air fins. Replenish oil as required (see para. 3-2). Check air vent for clogged vent. Check oil level before operation. Check for oil leaks.	Compressor assembly is cracked, if cooling fins are clogged, if oil level is too low, or if there are Class III leaks.

2-5. OPERATOR’S PREVENTIVE MAINTENANCE CHECKS AND SERVICES (cont)

Table 2-1. Operator’s Preventive Maintenance Checks and Services (cont)

45	Monthly	Alternator	Check for missing hardware. Check for unusually hot alternator housing after use. Proper voltage output	Hardware is missing, if alternator housing is unusually hot after operation or if alternator voltage output incorrect.
46	Monthly	Body Assembly	Check body assembly for damage, rust, corrosion, or cracks near mounting holes of frame members.	Frame members have cracks near mounting holes.

Section III. OPERATION UNDER USUAL CONDITIONS

	Para.		Para.
General .....	2-6	Welder .....	2-8
Operation Under		Emergency Shutdown .....	2-9
Usual Conditions .....	2-7		

2-6. GENERAL.

The instructions in this section are published for the information and guidance of the personnel responsible for the operation of the CMV. It is essential that the operator know how to perform every operation of which the CMV is capable. This section gives instructions on starting and stopping the CMV, CMV components, and coordinating the basic motions to perform the specific tasks for which the equipment is designed. Since nearly every job presents a different operating situation, the operator may have to vary the given procedure to fit the individual job.

2-7. OPERATION UNDER USUAL CONDITIONS.

The following paragraphs describe the operation of the CMV and the interactions necessary to make full use of the CMV capabilities. Operation of the CMV and CMV components is broken down into the following groups:

- M1031 Vehicle
- Power Unit (Alternator, Control Panel, Electronic Governor System, and PTO)
- Air Compressor

- a. **M1031 Vehicle.** Refer to TM 9-2320-289-10 for operation of the M1031 vehicle.
- b. **Power Unit.** (Refer to figure 2-4). To engage the power unit and the governor perform the following procedures:



- (1) Locate CMV on clear, flat terrain. Chock wheels with wooden blocks as shown.
- (2) Set parking brake of CMV ((1), fig 2-5).

**WARNING**

**The CMV must be grounded whenever PTO alternator is in operation. Failure to do so could result in injury or death from electrical shock.**



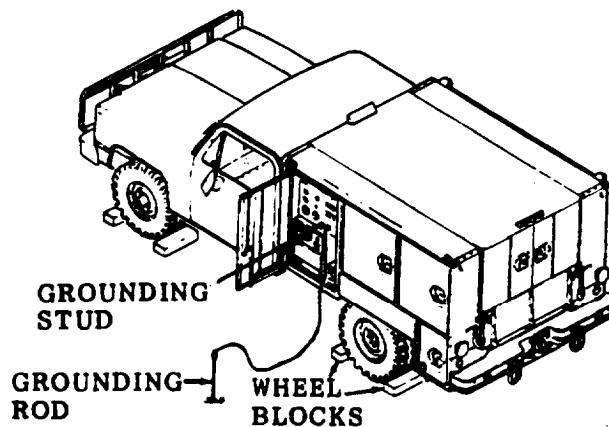
**The ground connection wire is a potential tripping hazard and should be kept as short as possible.**

- (3) Ground CMV as follows:

**NOTE**

**If soil is too hard for ground rod to be driven in vertically, it can be buried horizontally in a shallow trench.**

- (a) Drive ground rod with wire attached into the ground adjacent to the CMV. Rod should be driven in as far as possible (preferably to a maximum depth of 8 feet).



*Figure 2-4. Locating and Grounding CMV.*

- (b) Attach terminal end of the ground wire to the ground stud mounted on the control panel and secure with wingnut.

## 2-7. OPERATION UNDER USUAL CONDITIONS (CONT).

- (4) Ensure all circuit breakers on control panel assembly are in OFF position. This ensures that there is no electrical load during startup.

### **WARNING**

**Diesel fuel for the engine is combustibile. Extinguish all smoking materials and do not allow sparks or open flames near the fuel tank or fuel system.**

### **NOTE**

**M1031 vehicle will not start unless the transmission gear-shift lever is in park (P) or neutral (N).**

- (6) Refer to TM 9-2320-289-10 and fuel and start the M1031 vehicle.

### **NOTE**

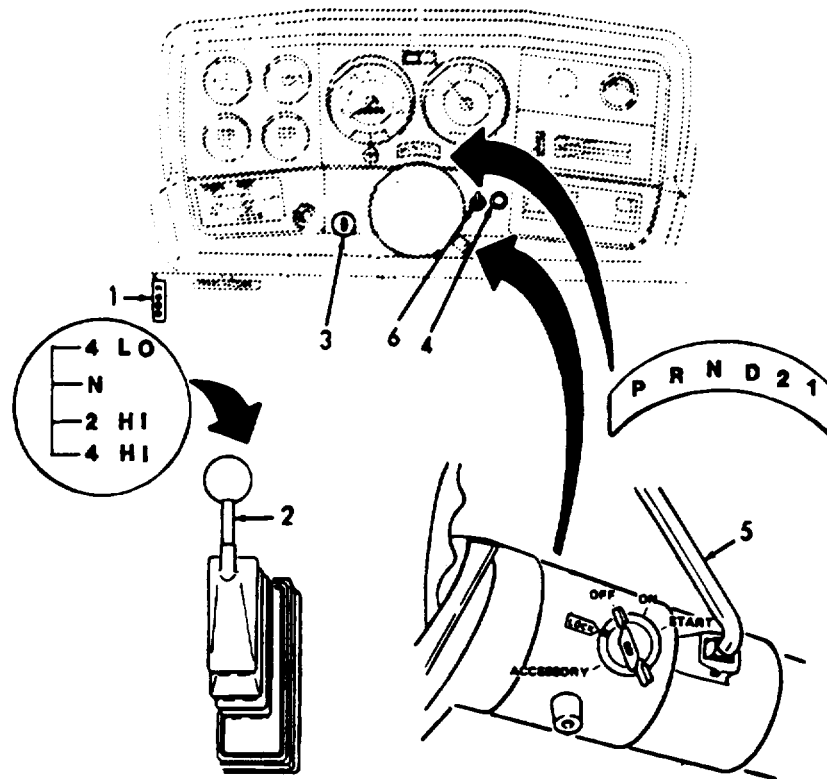
- . Allow vehicle engine approximately 5 minutes warmup time.**
- . Steps (6) through (10), following, refer to figure 2-5.**

- (6) Put transfer case control lever (2) to N (neutral).
- (7) Pull PTO knob (3) out completely and observe that PTO INDICATOR light (4) is on.



**Do not turn governor switch ON until gear shift lever has been placed in drive (D) position.**

- (8) Place transmission gearshift lever (5) to D (drive).
- (9) Place GOVERNOR CIRCUIT ON/OFF switch (6) to ON position. Motor of vehicle will speed up, and then when regulated by governor, will settle at a constant speed.
- (10) Turn main circuit breaker CB1 (fig. 2-2) on. Observe that frequency meter (5, fig. 2-2) reads 60 Hz  $\pm$ 2 Hz.



**Figure 2-5. PTO and Governor Operation**

**c. Put Unit Shutdown.** To shut down power, refer to figure 2-5 and perform the following procedures:

- (1) Remove any electrical load in use by switching all equipment to OFF and de-energizing applicable circuit breakers.
- (2) Disconnect equipment from receptacle on control panel assembly.
- (3) Place main circuit breaker CB 1 (1, fig. 2-2) to OFF position.
- (4) Place GOVERNOR CIRCUIT ON/OFF switch (6, fig. 2-5) to OFF position.
- (5) Turn ignition switch to OFF.

**NOTE**

**Gearshift lever (5) is in the drive (D) position.**

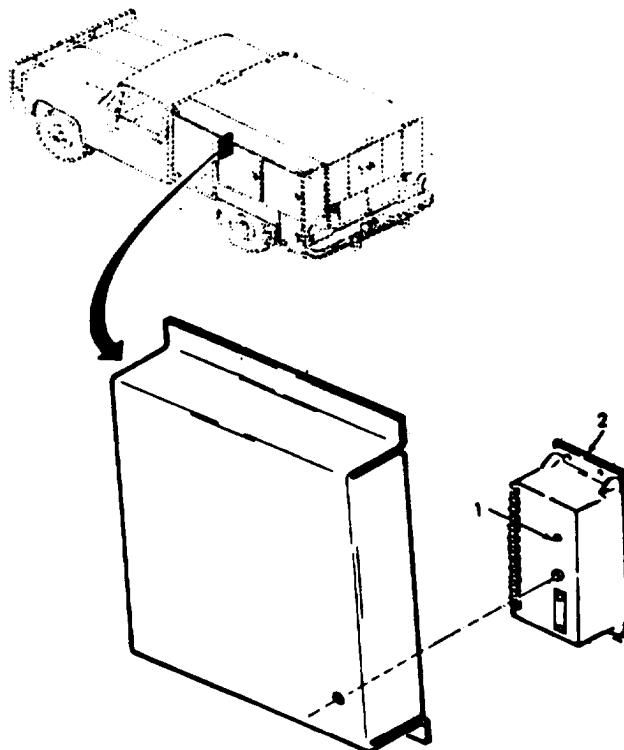
- (6) Push PTO knob (3) completely in.

## 2-7. OPERATION UNDER USUAL CONDITIONS (CONT).

- (7) Place gearshift lever (5) to park (P) and restart engine. Observe that the PTO INDICATOR light (4) is out. Shut off engine.
- (8) If moving to a new location, remove and store grounding rod/cable and remove wheel chocks.
- (9) Shift transfer case control level to 2H (two-wheel, high-gear) position and release parking brake. Vehicle can now be driven.

**d. Overspeed Switch Shutdown and Reset.** Refer to figures 2-5 and 2-6. The overspeed switch functions as a safety switch and will turn off the electronic governor system when output gear speed of the PTO reaches a set speed. This output gear speed is equal to an alternator output of about 72 Hz. When the overspeed switch shuts down the electronic government system, perform the following procedures to restart the system.

- (1) Set the GOVERNOR ON/OFF SWITCH (6, fig. 2-5) to OFF.
- (2) Manually reset the overspeed switch by pressing the RESET button (1, fig. 2-6) on the overspeed switch (2, fig. 2-6).
- (3) Set the GOVERNOR ON/OFF SWITCH (6, fig. 2-5) to ON.



**Figure 2-6. Overspeed Switch Reset.**

- e. **Air Compressor.** The air compressor is internally wired within the control panel assembly and is started by placing the 208-VOLT, THREE-PHASE CIRCUIT BREAKER COMPRESSOR CB2 (6, fig. 2-2) to the ON position.

## **2-8. WELDER.**

a. **General.** The welder used in the shop set is a portable unit which can be used as either a gas metal arc welder (GMAW) or a shielded metal arc welder (SMAW). The complete welding system consists of a power supply, gun/feeder, gas cylinders, and assorted cables, hoses, clamps, torches, contact tips, and electrode holders. The gas cylinder and power supply may be moved up to 10 feet during welding operations, and the gun/feeder may be moved up to a distance of 10 feet from the shop set electrical control panel. Figure 2-7 illustrates how the welder is to be configured for SMAW and figure 2-8 illustrates how the welder is to be configured for the GMAW operation. Refer to paragraph 2-9 for SMAW and GMAW set up and refer to manufacturer's manuals (OM-2205 and OM-1212B) for specific operating instructions for the power supply and gun/feeder.

b. **Instructions for Set Up of the Welding Equipment for Shielded Metal Arc Welding (SMAW) (Electrode Positive/Reverse Polarity).** Refer to figure 2-7 and proceed as follows:

**WARNING**

**Ensure welder is not plugged into electrical control panel prior to performing setup procedure. Injury to personnel or death could result from electrical shock.**

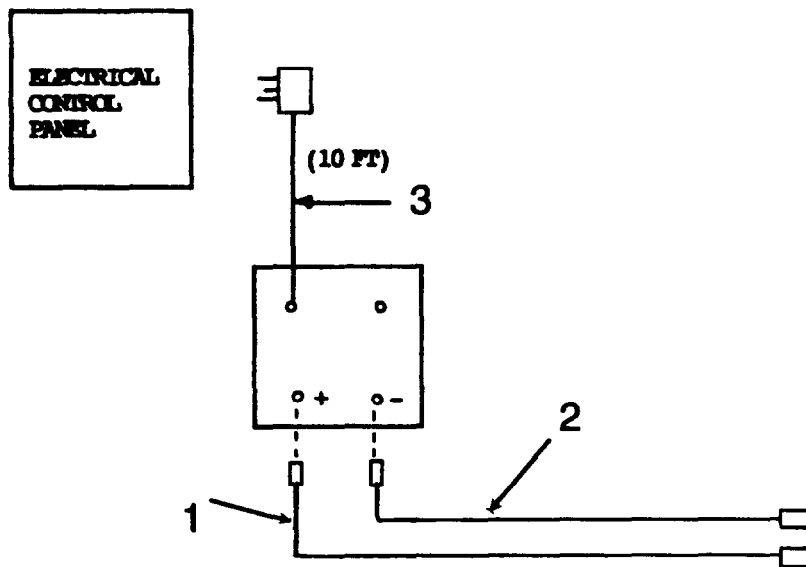
- (1) Connect end of electrode holder cable (1) to POSITIVE (+) weld output receptacle as follows: align keyway, insert plug, and rotate plug clockwise until it is securely seated in receptacle.
- (2) Connect work cable connector (2) to NEGATIVE (-) weld output receptacle as follows: align keyway, insert plug, and rotate plug clockwise until it is securely seated in receptacle.

### **NOTE**

**For Electrode Negative/Straight Polarity connections, reverse cable connections to weld output receptacles; electrode becomes negative.**

- (3) Plug welder power cable (3) into electrical control panel.

## 2-8 Welder (CONT)



*Figure 2-7. Welder Setup SMAW Configuration.*

c. **Instructions for set up of the welding equipment for gas metal arc welding (GMAW) (Electrode Positive/Reverse Polarity).** Refer to figure 2-8 and proceed as follows:

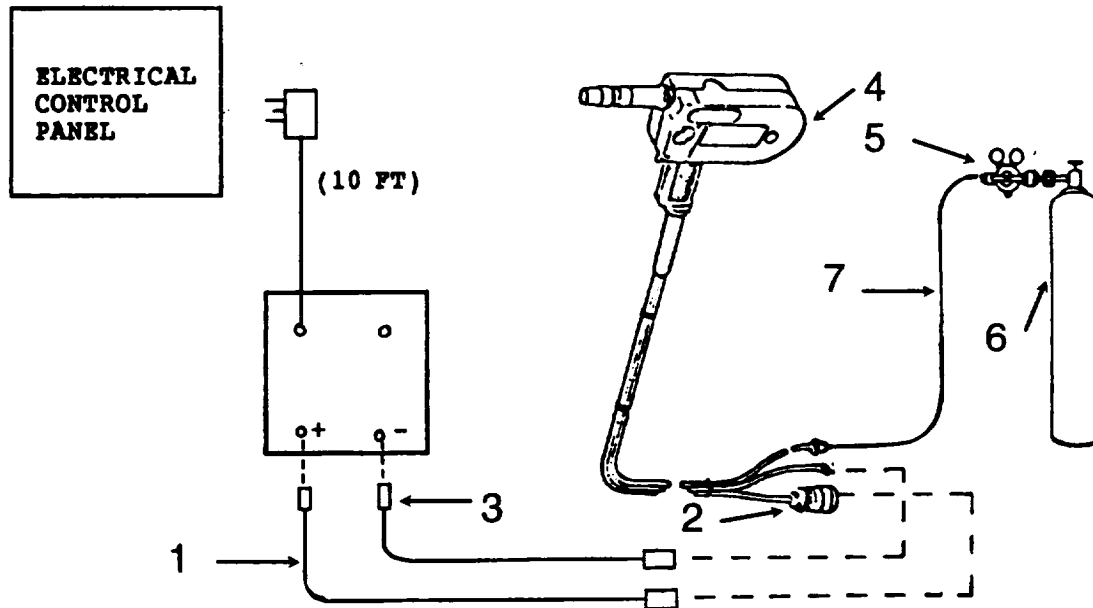
### WARNING

**Ensure welder is not plugged into electrical control panel prior to performing setup procedure. Injury to personnel or death could result from electrical shock.**

- (1) Connect one weld cable (1) to POSITIVE (+) weld output receptacle as follows: align keyway, insert plug, and rotate plug clockwise until it is securely seated in receptacle. Connect remaining end to terminal (2) on drive housing of wire feeder (see wire feeder Owner's Manual for location).
- (2) Connect work cable (3) connector to NEGATIVE (-) weld output receptacle as follows: align keyway, insert plug, and rotate plug clockwise until it is securely seated in receptacle.
- (3) Connect hose assembly to the gun/feeder (4).
- (4) Connect the pressure regulator (5) to the compressed gas cylinder (6).
- (5) Connect the hose assembly (7) to the pressure regulator (5).

## NOTE

For Electrode Negative/Straight Polarity connections, reverse cable connection to weld output receptacles; electrode becomes negative.



*Figure 2-8. Welder Setup GMAW Configuration.*

## NOTE

For operation, service, and maintenance of the welder and gun/feeder, refer to the manufacturer's commercial literature, Appendix A.

## 2-9. EMERGENCY SHUTDOWN.

In any case of emergency such as an injury to personnel, damage to shop equipment, or the chance that any of the previously mentioned situations may be happening, shut down the CMV immediately. For emergency shutdown, perform one or both of the following steps.

- a. Place 208-VOLT, THREE-PHASE CIRCUIT BREAKER MAIN CB 1 (figure 2-2, item 1) to OFF position.
- b. Refer to TM 9-2320-289-10 and shut off M1031 vehicle engine.

---

---

## Section IV. OPERATION UNDER UNUSUAL CONDITIONS

### 2-10. OPERATION UNDER UNUSUAL CONDITIONS.

**a. General.** Operation of the CMV under unusual conditions pertains to weather and environmental conditions. Unusual conditions are defined as extreme heat or cold, sandy areas, dusty areas, salt water areas, high altitudes, or similar conditions not normally encountered. Refer to TM 9-2320-289-10 for operation of M1031 vehicle under unusual conditions. Refer to LO 9-2320-28912 for lubrication of the M1031 vehicle.

**WARNING**

**Use extreme caution when operating CMV in rain or wet areas. Electrical shock may occur and could cause injury or death. Use of hand power tools is not recommended in rain or wet areas.**

**b. Operation.** Operation of the CMV under unusual conditions is the same as under normal conditions. The differences are in the types of lubrication, preventive maintenance, and cleaning. The same preventive maintenance concepts apply to operation of the CMV under unusual conditions and normal conditions. The difference is the frequency of performance. Under unusual conditions the various checks and procedures must be performed once a week to ensure optimum operation of equipment.

**c. Operation in Extreme Cold.**



**In extreme cold weather, the use of water for cleaning could result in the formation of ice. Ensure all areas cleaned with water are dry, and that no ice has formed.**



- (1) **Lubrication Oil.** Refer to table 3-1 for the proper grade of oil to use in the air compressor in extreme cold conditions.
- (2) **Wiring and Cables.** Do not attempt to service or move wiring or cables during extremely cold temperatures. Bending wires or cables under these conditions will cause cracks and breaks in the cable's insulation and/or wire.

**d. Operation in Extreme Heat and Different Altitudes.**

- (1) **Rubber Components.** Inspect rubber components once a week for signs of wear or damage. Rubber deteriorates rapidly in extreme temperatures.
- (2) **Air Compressor.** Refer to table 3-1 for proper grade of oil to use above 32°F.

**e. Operation in Sandy or Dusty Areas.**

- (1) **General.** Dust and dirt can cause premature mechanical failure of the CMV components. Locate the CMV in a well protected area, whenever possible. Brush off any sand, dirt, or dust from the CMV and its components.
- (2) **Lubrication.** Filters will have to be replaced more often than usual. Take care to clean dust and dirt from the lubrication points (Table 3-1) before applying lubricant. Clean the area around the oil filler cap and oil level gage before checking oil level or adding oil.
- (3) **Fuel System.** Clean the area around the fuel filler cap before filling fuel.
- (4) **Air Filters.** Air filters must be cleaned weekly on air compressor.

**f. Operation in Salt Water Areas.**

- (1) **General.** Hose down the exposed surfaces on the CMV exterior with clean, fresh water. Be careful not to contaminate the fuel system or damage the electrical system with water. Wipe off all component surfaces with a wiping rag (item 14, appx D) dampened with clean, fresh water.
- (2) **Protection.** Remove all rust and corrosion immediately, coat exposed metal surfaces with rust proofing material and apply primer (item 13, appx D), paint (items 12, 13, 14, appx D), or preservation oil (item 10, appx D) as required.



**CHAPTER 3****OPERATOR MAINTENANCE**

Section I.	Lubrication Instructions
Section II.	Operator Troubleshooting Procedures
Section III.	Operator Maintenance Procedures

---

---

**Section I. LUBRICATION INSTRUCTIONS****3-1. GENERAL.**

No separate Lubrication Order (LO) is available for the CMV unit; therefore, lubrication instructions contained in this section are mandatory.

**3-2. LUBRICATION INSTRUCTIONS.**

**a. General.** Keep all lubricants in closed containers and store in a clean dry place away from external heat. Allow no dust, dirt, or other foreign lubricants to mix with the lubricants. Keep all lubrication equipment clean.

**b. Cleaning.** Wipe lubrication points and surrounding areas free of dirt. Clean lubrication points and surrounding areas before and after lubrication of all spilled lubricants to prevent accumulation of dirt and foreign matter.

**c. Lubrication.** Lubricate the CMV at intervals indicated with the recommended lubricants, or their equivalent, as shown in table 3-1.

**d. Unusual Conditions.** When the air compressor is being operated or stored in extreme heat, extreme cold, salt spray, high humidity, sandy, or dusty conditions, reduce all intervals by 30% to provide greater lubrication under these severe conditions.

## 3-2 LUBRICATION INSTRUCTIONS (CONT).

Table 3-1. Lubrication Data

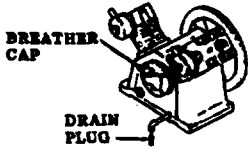

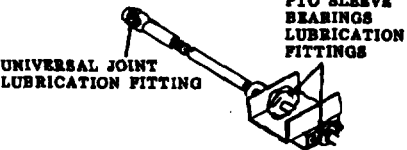
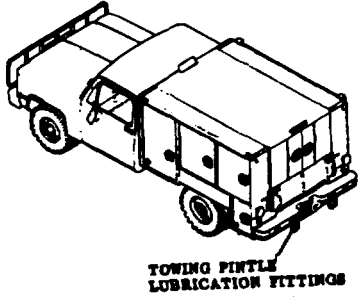
	Lubrication Task	Interval	Lubricant
1.	<b>AIR COMPRESSOR.</b> Drain only when oil is hot. Remove drain plug, drain oil, and replace drain plug. Remove breather cap and fill with oil to center of oil sight level gage. Replace breather cap and run air compressor for a few minutes, and check oil level. Add oil as necessary. Check oil level before operation and add oil as necessary.	1,000 hours	<u>Above +32°F</u> SAE 20W (item 9, appx D) <u>Below -32°F</u> SAE 10W (item 8, appx D)
	 <p>BREATH- ER CAP</p> <p>DRAIN PLUG</p>		
2.	<b>AIR COMPRESSOR MOTOR.</b> Use hand operated grease gun. Clean lubrication fittings and lubricate using no more than one or two strokes with grease gun. Remove plugs from bottom of motor and run motor for 20 minutes. Clean grease expelled from motor and replace plugs.	5,000 hours	Grease: Automotive and Artillery MIL-G-10924 (item 5, appx D)
	 <p>LUBRICATION FITTINGS</p> <p>PLUGS</p>		
3.	<b>PTO SLEEVE BEARINGS.</b> Use hand operated grease gun. Attach grease gun to lubrication fitting on each bearing and lubricate until clean grease flows out of bearing. Wipe off excess grease.	75 hours	Grease: Automotive and Artillery MIL-G-10924 (item 5, appx D).
	 <p>UNIVERSAL JOINT LUBRICATION FITTING</p> <p>PTO SLEEVE BEARINGS LUBRICATION FITTINGS</p>		

Table 3-1. Lubrication Data (Cont).

	Lubrication Task	Interval	Lubricant
4.	<b>UNIVERSAL JOINTS.</b> Use hand operated grease gun. Attach grease gun to lubrication fitting on each universal joint and lubricate until clean grease flows out of universal joint. Wipe off excess grease.	75 hours	Grease: Automotive and Artillery MIL-G-10924 (item 5, appx D)
5.	<b>M1031 VEHICLE</b> Refer to LO 9-2320-289-12 for lubrication instructions.	75 hours	Grease: Automotive and Artillery MIL-G-10924 (item 5, appx D)
	 <p>TOWING PINTLE LUBRICATION FITTINGS</p>		

## Section II. OPERATOR TROUBLESHOOTING PROCEDURES

	Para.	Para.
Introductory Information .....	3-3 Troubleshooting Table	3-5
Symptom Index .....	3-4	

### 3-3. INTRODUCTORY INFORMATION.

a. The table lists the common malfunctions which you may find during the operation or maintenance of the CMV or its components. You should perform the tests/inspections and corrective actions in the order listed.

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

### 3-4. SYMPTOM INDEX.

	Page
Excessive noise or vibration	3-5
Lights do not come on	3-5
Low or no air pressure	3-4
No electrical output at control panel assembly	3-4

### 3-5. TROUBLESHOOTING TABLE.

Table 3-2. Operator Troubleshooting

#### WARNINGS

**Be sure to read all WARNINGS in front of the manual before troubleshooting.**

---

#### MALFUNCTION

##### TEST OR INSPECTION

##### CORRECTIVE ACTION

---

#### ELECTRICAL

#### 1. NO ELECTRICAL OUTPUT AT CONTROL PANEL ASSEMBLY.

Step 1. MAIN CIRCUIT BREAKER CB1 not in ON position.

Position CB1 to "ON" and check meter for operation to indicate electrical power in control panel (para 2-6).

If CB1 is ON, and no electrical output condition exists, refer to direct support maintenance.

Step 2. PTO is not engaged.

Engage PTO (para. 2-6).

Step 3. Positive drive belt is loose or broken.

Notify unit maintenance to tighten or replace positive drive belt (para. 4-20).

#### AIR COMPRESSOR

#### 2. LOW OR NO AIR PRESSURE.

Step 1. Air compressor CIRCUIT BREAKER CB2 not in ON position.

Position CB2 to "ON" (figure 2-2).

Step 2. Petcocks on air filter/water separator or reservoir not fully closed.

Close petcocks (para. 5-4).

Step 3. Compressor to reservoir air line leaking.

**Table 3-2. Operator Troubleshooting (Cont)****MALFUNCTION****TEST OR INSPECTION****CORRECTIVE ACTION**

Tighten air line (para. 5-6).

Step 4. Check for clogged air filter/water separator or inlet filter.

Clean air filter/water separator or inlet filter (para. 3-7 or 3-9).

Step 5. Air compressor belt is loose.

Adjust belt (para. 3-8).

Step 6. Air compressor oil level is improper.

Check oil level in air compressor.

Fill as required (para. 3-2).

Step 7. Air pressure switch is defective.

Notify unit maintenance to check air pressure switch.

**3. EXCESSIVE NOISE OR VIBRATION.**

Step 1. Loose or missing hardware

Tighten or replace hardware.

Step 2. Belt pulleys loose or out of alignment.

Tighten or align belt pulleys.

**CMV EXTERIOR LIGHTING**

**4. LIGHTS DO NOT COME ON.**

Step 1. Inspect exterior lighting for damage.

If exterior lights are damaged, repair or replace them (paras. 3-9 and 3-10).

Step 2. Lamp is burned out.

### 3-5. TROUBLESHOOTING TABLE (CONT).

**Table 3-2. Operator Troubleshooting (Cont)**

#### **MALFUNCTION**

#### **TEST OR INSPECTION**

#### **CORRECTIVE ACTION**

If lamp is burned out, replace it (para. 3-9.).

Step 3. Check for blown fuse on vehicle wiring system.

Refer to TM 9-2320-289-20. Check vehicle fuses and replace if required.

Step 4. Inspect direct current wiring harness for loose connections, corroded terminals, or damage to insulation.

If insulation is damaged, notify direct support maintenance to replace wire.

### **Section III. OPERATOR MAINTENANCE PROCEDURES**

	<b>Para.</b>		<b>Para.</b>
General .....	3-6	Taillights .....	3-9
Air Compressor Belt Adjustment....	3-7	Clearance Lights .....	3-10
Inlet Filter Servicing .....	3-8		

#### **3-6. GENERAL.**

This section contains the procedures to be used by the operator for authorized operator maintenance of the CMV.

#### **3-7. AIR COMPRESSOR BELT ADJUSTMENT.**

To adjust air compressor belt perform the following steps.



<b>WARNINGS</b>
-----------------

**Air compressor electric power must be turned off, and air compressor must be bled before performing maintenance. Rotating pulleys, moving belts, or compressed air could cause serious injury to personnel.**

- a. Turn off air compressor.
- b. Bleed compressed air system by opening drain cock (4, fig. 2-3) and allowing air to escape.
- c. Remove four screws (1, fig. 3-1), bolt (2), and belt guard (3).
- d. Loosen four nuts (4) to allow motor (5) to be adjusted.

**NOTE**

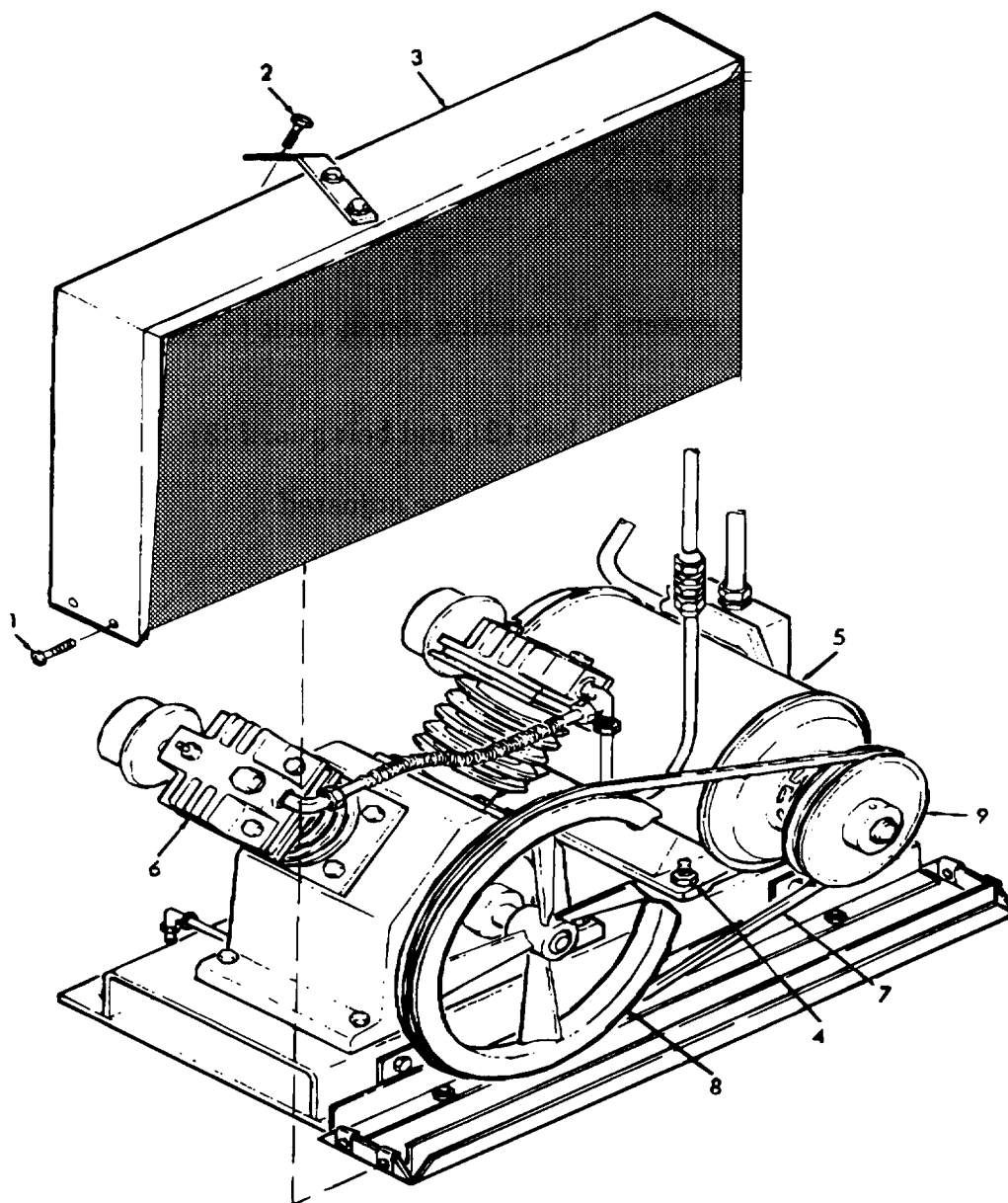
**Check belt for fraying and cracks. If belt is frayed or cracked, notify unit maintenance for belt replacement.**

- e. Slide motor (5) away from air compressor (6) until belt (7) is taut.
- f. Check belt tension. At center point of belt (7) between compressor pulley (8) and motor pulley (9), belt should deflect 3/8 inch to 1/2 inch when moderate pressure is applied.
- g. When belt deflection is correct, tighten four nuts (4).
- h. Install belt guard (3), bolt (2), and four screws (1).
- i. Close drain cock (4, fig. 2-3) and turn on circuit breaker CB2 (6, fig. 2-2).

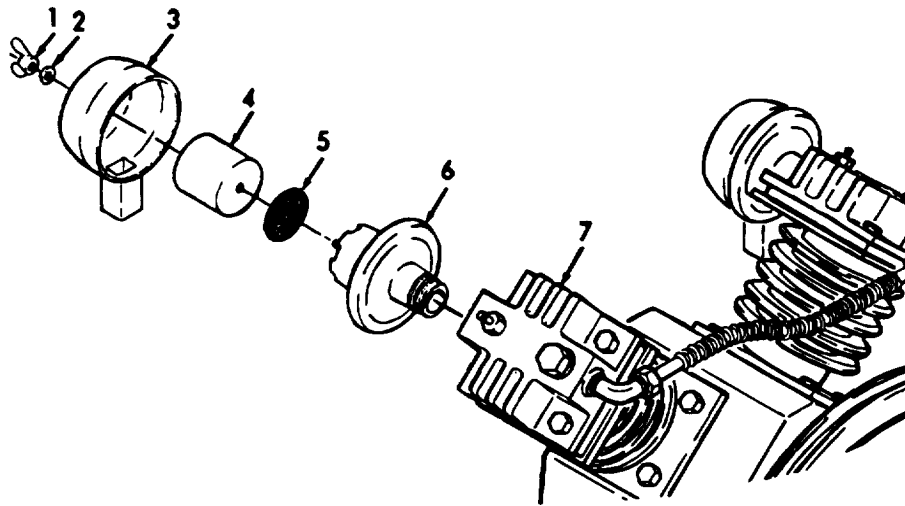
**3-8. INLET FILTER SERVICING.**

- a. **Removal.** (Refer to figure 3-2).
  - (1) Remove wing nut (1) and washer (2).
  - (2) Remove air strainer cover (3), air strainer filter (4), and air strainer mesh wire (5).
  - (3) Unscrew air strainer body (6) from air compressor (7).

3-7. AIR COMPRESSOR BELT ADJUSTMENT.



*Figure 3-1. Air Compressor Belt, Adjustment.*



*Figure 3-2. Inlet Filter Servicing, Removal.*

**b. Cleaning.**

- (1) Remove all build up of dirt or oil on all parts with a lint-free cloth (item 4, appx D).

**WARNINGS**

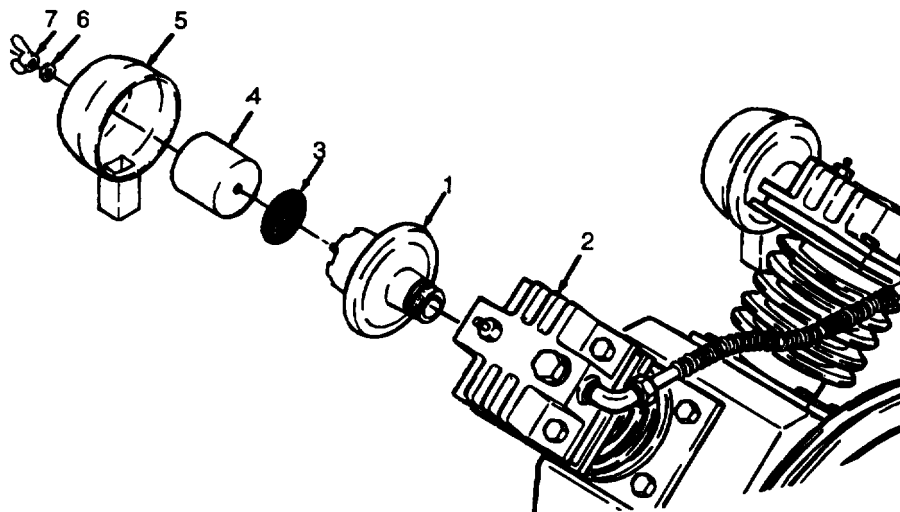
**Do not breathe cleaning solvent vapors for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas, away from open flames.**

- (2) Clean all metal parts using a lint-free cloth (item 4, appx D) or a medium bristle brush (item 2, appx D) and cleaning solvent (item 18, appx D).
- (3) Allow all parts to dry.
- (4) Clean air strainer filter with soap (item 17, Appx D) and water. Rinse with clean water and allow to dry.

### 3-8. INLET FILTER SERVICING (CONT).

c. **Installation.** (Refer to figure 3-3.)

- (1) Screw air strainer body (1) onto air compressor (2).
- (2) Install air strainer mesh wire (3), air strainer filter (4), and air strainer cover (5) as shown.
- (3) Slide washer (6) over stud and secure with wingnut (7).



*Figure 3-3. Inlet Filter Servicing, Installation.*

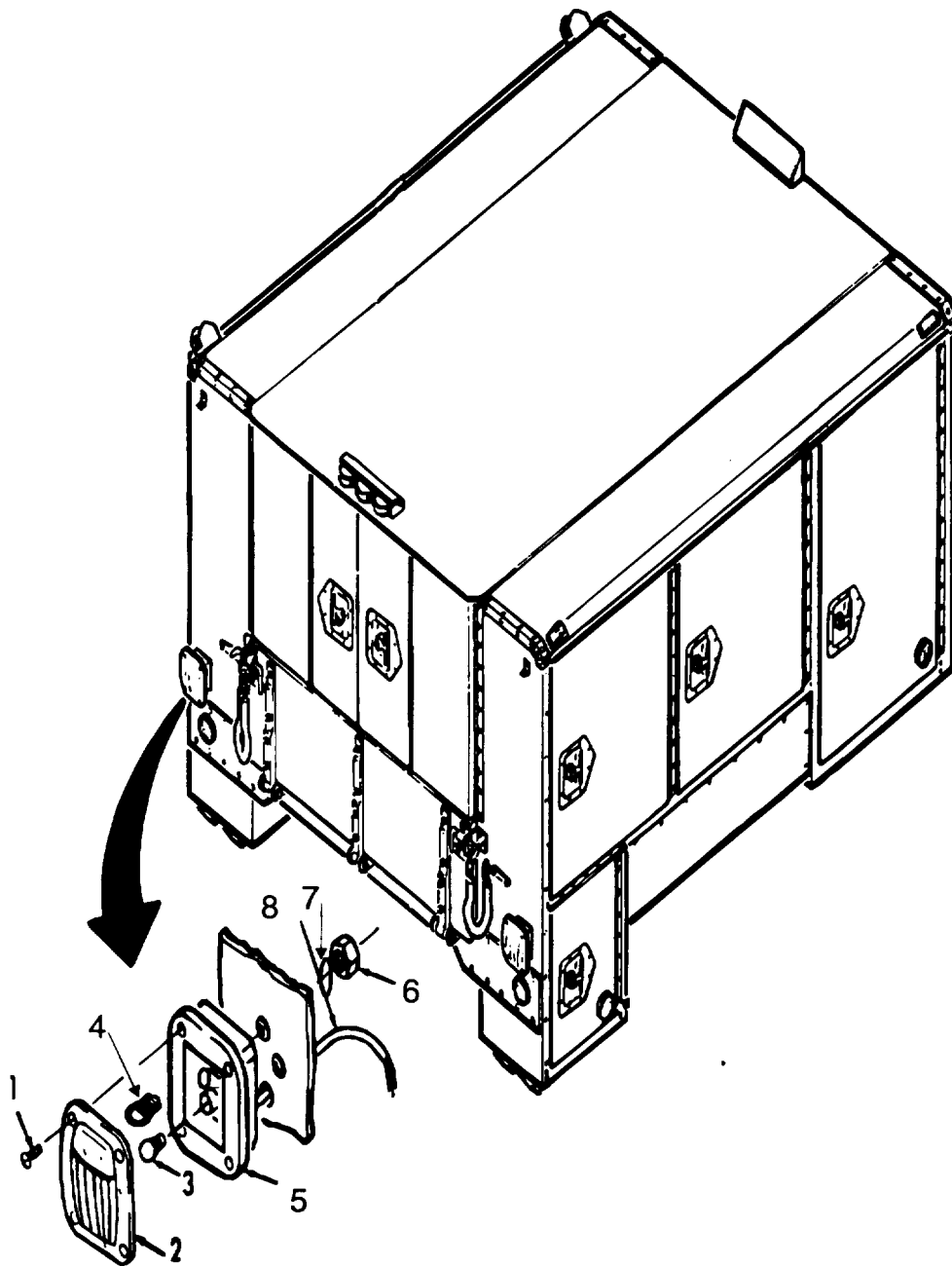
### 3-9. TAILLIGHTS.

a. **Removal.** (Refer to figure 3-4.)

- (1) Remove four screws (1), taillight lens (2), lamp (3), and lamp (4) from taillight (5).
- (2) Remove four hexagon nuts (6) and four lockwashers (7) from taillight (5).
- (3) Tag and disconnect taillight wiring (8), and remove taillight (5).

b. **Cleaning**

- (1) Remove all build up of dirt or oil on all parts with a lint-free cloth (item 3, appx E).



**Figure 3-4. Taillights, Removal.**

- (2) Clean screws, hexagon nuts, and taillight lenses with a lint-free cloth (item 3, appx E) or medium bristle brush (item 2, appx E) and soap (item 15, appx E) and water.
- (3) Allow parts to dry.
- (4) Clean lamps, taillight wiring, and taillight with a lint-free cloth (item 3, appx E) or medium bristle brush (item 2, appx D).

### 3-9. TAILLIGHTS (CONT).

#### c. Inspection

(1) **Taillight.** Replace taillight if it is cracked or bent.

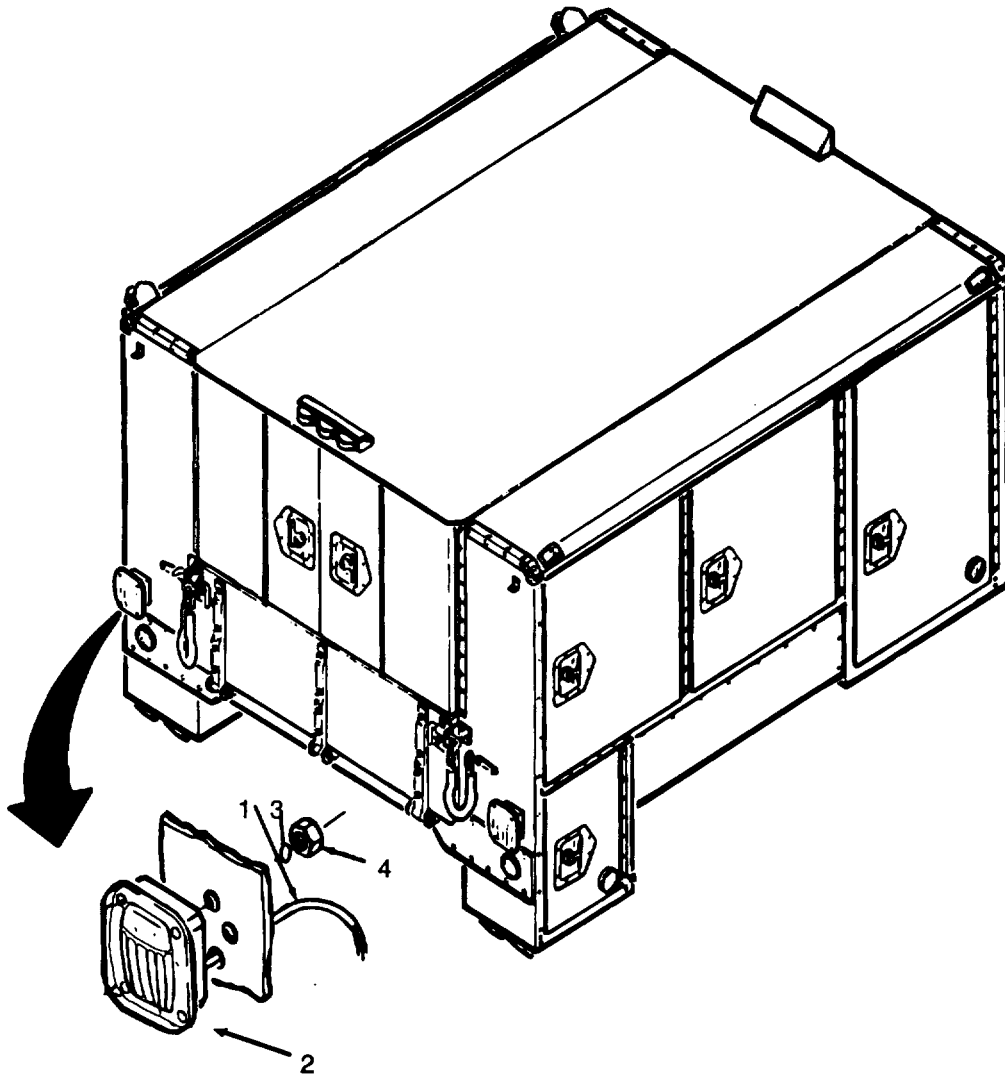
(2) **Lens.** Replace lens if it is cracked or broken.

(3) **Lamps.** Replace lamps if they are burned out.

#### d. Installation. (Refer to figure 3-5.)

(1) Remove tag and insert wiring (1) into truck body.

(2) Attach taillight (2), four lockwashers (3), and four hexagon nuts (4).



*Figure 3-5. Taillights, Installation.*

### 3-10. CLEARANCE LIGHTS.

#### a. Inspection. (Refer to figure 3-6).

- (1) Turn on clearance lights in accordance with TM 9-2320-289-10.
- (2) Inspect clearance light's incandescent lamp for proper operation. Note the location of defective lamps.
- (3) Turnoff clearance lights accordance with TM9-2320-289-10.

#### b. Removal.

##### NOTE

- Tag all required wiring before disconnecting.
- Remove components only to the extent required to repair.
- Removal of the red and amber side clearance lights is identical so the following procedure should be used for removal of red or amber side clearance lights.

- (1) Remove four machine screws (1), four hexagon nuts (2), four lockwashers (3), and lens from side clearance lights.
- (2) Disconnect one lamp base terminal (10) from either curb or street side DC wiring harness. Remove one terminal (11) from body. Remove incandescent lamp (1) from lamp base
- (3) Remove lamp base from body.

##### NOTE

- Removal of the red and amber marker lights in the front and rear cluster mounts is identical so the following procedure should be used in the removal of the red or amber marker lights.

- (4) Remove five machine screws (6) and lift access cover (5) from lighting fixture (9).
- (5) Remove four machine screw (3), four hexagon nuts (7), four lockwashers (8), and lens from marker light (2 or 4).

3-10. CLEARANCE LIGHTS (CONT).

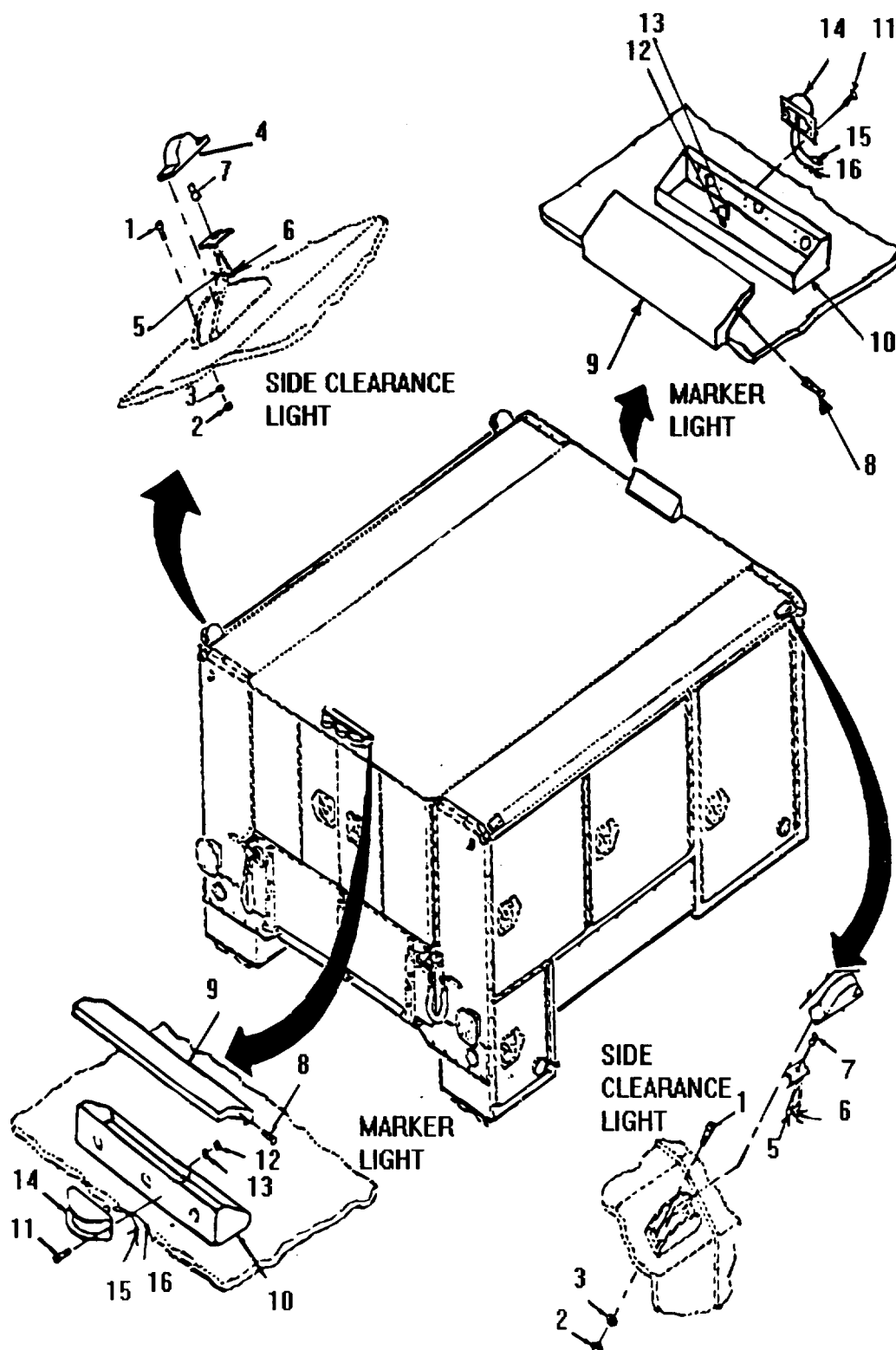


Figure 3-6. Clearance Lights, Removal.



- (6) Remove one lamp base terminal (10) from either curb or street side DC wiring harness. Remove one terminal (11) from lighting fixture (9). Remove incandescent lamp (1) from lamp.

- (7) Remove lamp base from lighting fixture (9).

**c. Repair.** Repair consists of replacement of authorized parts (TM 9-4940-562-23P).

**d. Installation. (Refer to Figure 3-7)**

#### NOTE

- **Installation of the red and amber marker lights in the front and rear cluster mounts is identical so the following procedure should be used in the installation of the red or amber marker lights.**

- (1) Install lamp base onto lighting fixture (9). Ensure that the lamp base wire leads with two terminals (10 and 11) are pushed through the center hole of the mounting surface of the lighting fixture (9).

- (2) Install one lamp base terminal (11) into either curb or streetside DC wiring harness terminal.

- (3) Install one marker light (2 or 4) and one terminal (10). Secure with four machine screws (3), four lockwashers (8), and four hexagon nuts (7).

- (4) Install access cover (5) onto lighting fixture (9) and secure with five machine screws (6)

#### NOTE

- . **Installation of the red and amber aside clearance lights is identical so the following procedure should be used in the installation of red and amber side clearance lights**

- (5) Install lamp base onto body. Ensure that the lamp base wire leads with two terminals (10 and 11) are pushed through the center hole of the mounting surface of the body.

- (6) Install one lamp base terminal (11) into either curb or streetside DC wiring harness terminal.

3-10. CLEARANCE LIGHTS (CONT).

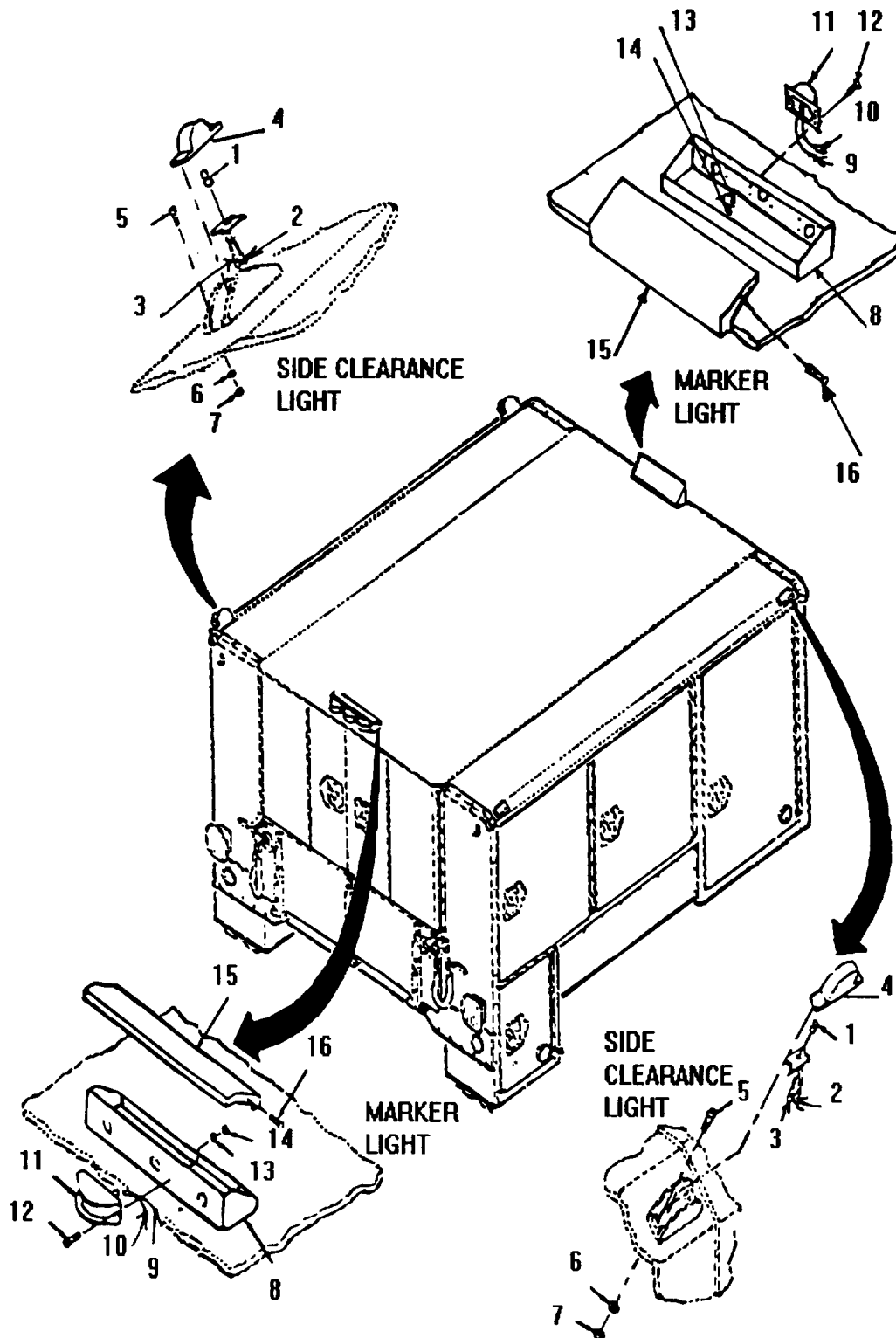


Figure 3-7. Clearance Lights, Installation.

(7) Install one marker light (2 or 4) and one terminal (10). Secure with four machine screws (3), four lockwashers (8), and four hexagon nuts (7).



## CHAPTER 4

### UNIT MAINTENANCE INSTRUCTIONS

Section I.	Repair Parts, Special Tools; Test, Measurement, and Diagnostic Equipment (TMDE); and Support Equipment
Section II.	Service Upon Receipt
Section III.	Unit Preventive Maintenance Checks and Services (PMCS)
Section IV.	Unit Troubleshooting Procedures
Section V.	Unit Maintenance Procedures
Section VI.	Preparation for Storage or Shipment

---

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

	Para.	Para.
Common Tools and Equipment .....	4-1	Repair Parts .....4-3
Special Tools, TMDE, and Support Equipment .....	4-2	

#### 4-1. COMMON TOOLS AND EQUIPMENT.

For authorized common tools and equipment, refer to the Tables of Organization and Equipment (TOE) applicable to your unit.

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

Refer to TM 9-2320-289-20 for M1031 vehicle maintenance. No special tools or equipment are required to repair the CMV.

#### 4-3. REPAIR PARTS.

Refer to TM 9-4940-562-23P for repair parts used in unit maintenance of CMV.

## Section II. SERVICE UPON RECEIPT

### 4-4. SERVICE UPON RECEIPT OF EQUIPMENT.

a. **Inspection.** Visually inspect the CMV for any interior or exterior damage that may have occurred during transit. Report any damage on SF 364.

- (1) Check for any loose or missing hardware and tighten or replace as necessary.
- (2) Check that components are securely tied down and tighten, securing straps as necessary.
- (3) Check all electrical connections, connectors, and wiring to ensure that all wires are connected, that there are no bent pins, and that wiring is not frayed or broken.

b. **Lubrication** Perform initial lubrication on the CMV and shop equipment component.

- (1) **M1031 Vehicle** Refer to LO 9-2320-289-12 for service and lubrication of the-vehicle.
- (2) **Alternator.** Ball bearings on the alternator are prelubricated and require no further lubrication for the life of the bearings.
- (3) **AirCompressor** Refer to para. 3-2 for the proper oil to use and fill air compressor until the oil level is at the centerline of the sight glass.
- (4) **Air Compressor.** Motor. Refer to para. 3-2 for the proper type of grease to insert into the motor. Use manual grease gun and attach to lubrication fittings. Fittings are designed to prevent over-lubrication.
- (5) **PTO Unit.** The PTO unit requires no special lubrication. Lubrication of the vehicle per LO 9-2320-289-12 also provides the lubrication of the PTO unit; however, the PTO output shaft has two universal joints which are lubricated in accordance with para. 3-2.

c. **Completeness of Equipment.** Ensure that all components, power and hand tools, materials, and accessories are present upon receipt of the CMV. Refer to Supply Catalog SC 4940-95-621 or SC4940-95-B22 when conducting inventory.

### Section III. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

#### 4-5. INTRODUCTION.

a. **Purpose of PMCS Table.** The purpose of this table is to list all the scheduled maintenance required to keep the CMV in good working order. Doing the scheduled maintenance will reduce the chances of equipment breakdown.

b. Do your MONTHLY PMCS once a month.

c. Do your QUARTERLY PMCS every three months.

d. Do your YEARLY PMCS once a year.

e. **Item Number Column.** This column numbers the PMCS procedures in the order they should be done. These numbers will be used as a source of item numbers for the "TM Number" column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording the results of PMCS.

f. **Interval Column.** The interval columns tell you when and how often to do a certain check or service: during, after, or weekly, for example.

g. **Location- Item to Check/Service Column.** This column lists the specific item to be worked-on such as "water pump".

h. **Procedure Column.** This column tells you how to perform the required checks and services.

i. **Not Fully Mission Capable If: Column.** This column tells you when and why your equipment cannot be used.

## 4-5. INTRODUCTION (CONT).

Table 4-1. Unit Preventive Maintenance Checks and Services

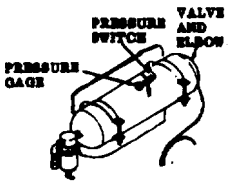
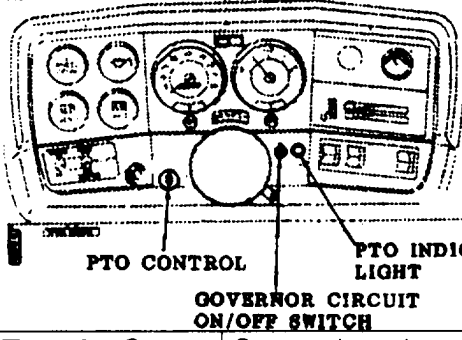
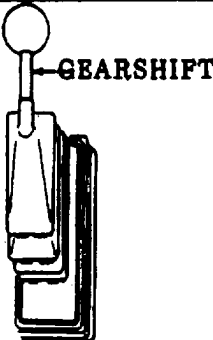
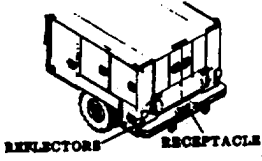
ITEM NO.	INTERVAL	ITEM TO BE CHECKED/ SERVICED	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
1	Monthly	Air Compressor System	Check air lines for leaks or cracks. Manually check valve to see that it is not stuck. Check elbow for cracks, stripped threads, rust, or corrosion. Check for frayed or damaged belt.	Compressor is not available if there are air leaks, damaged valve, broken belt, or malfunctioning pressure switch
				
2	Monthly	Pressure Gage	Check glass for cracks, chips, or scratches. Check for indication of 75-105 psig and/or damaged indicator needle.	Not available if pressure gage is damaged or does not function properly.
3	Monthly	Safety Valve	Check valve for cracks, corrosion, and failure to seal properly.	Not available if safety valve is damaged or does not seal properly.
4	Monthly	Electronic Governor System	Check operation of electronic governor system. Operate unit and engage PTO and alternator. Frequency should not fluctuate during use of electrical tools. Check for loose or disconnected wires.	Not available if the governor system is inoperative, presents a safety hazard, or fails to maintain proper frequency.

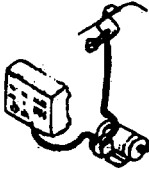
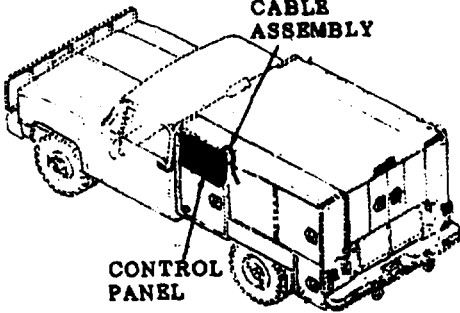
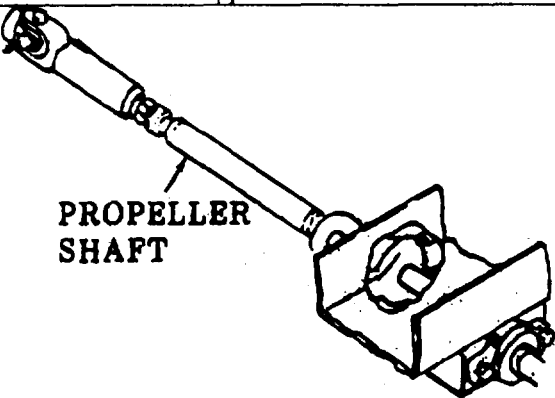


Table 4-1. Unit Preventive Maintenance Checks and Services

		 <p>PTO CONTROL</p> <p>GOVERNOR CIRCUIT ON/OFF SWITCH</p> <p>PTO INDICATOR LIGHT</p>			
5	Monthly	Transfer Case Neutral Switch	Start unit and attempt to engage power take off unit while truck gearshift is in all positions. Power take off unit should <u>only</u> engage when truck gearshift is in neutral position.	Power take off unit does not engage when truck gearshift is in neutral position. PTO engages when gearshift is in any position other than neutral.	
		 <p>GEARSHIFT</p>			
6	Monthly	Power Take Off Unit	Start engine and engage power take off unit. Listen for unusual gear noise and for smooth gear engagement. Check for oil leaks.	PTO fails to engage or develops unusual noises.	
7	Quarterly	Trailer Receptacle	Check receptacle for bent connectors, clogging, and for damaged wiring. Check for proper operation with trailer electrical hook up.	Receptacle is not ready if it is inoperative.	
		 <p>REFLECTORS</p> <p>RECEPTACLE</p>			

4-5. INTRODUCTION (CONT).

Table 4-1. Unit Preventive Maintenance Checks and Services (Cont)

8	Quarterly	Reflectors	Check reflectors for cracked or scratched lenses, broken mounting holes, or missing rivets.	
9	Quarterly	Wiring Harness (Alternating Current)	Check cable for loose or broken connectors, damaged wiring, or improper voltage output.	Wiring harness is not ready if inoperative or if presents a safety hazard.
				
10	Quarterly	Wiring Harness (Control Panel)	Check for damaged wiring, loose or broken connections, shorts, or burned wiring.	Wiring harness is not ready if inoperative or if presents a safety hazard.
				
11	Monthly	Propeller Shaft	Check for loose, bent, or broken propeller shaft. Check for worn or broken universal joints.	Propeller shaft is loose bent or broken. Universal joints are worn or damaged..
				

## Section IV. UNIT TROUBLESHOOTING PROCEDURES

	Para.		Para.
Introductory Information .....	4-6	Troubleshooting Table .....	4-8
Symptom Index .....	4-7		

### 4-6. INTRODUCTORY INFORMATION.

a. The table lists the common malfunctions which you may find during the maintenance of the CMV or its components. You should perform the tests/inspections and corrective actions in the order listed.

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

### 4-7. SYMPTOM INDEX.

	Page
No Electrical Output at Control Panel Assembly .....	4-7
Frequency Output from Alternator is Too Low or Too High .....	4-8
Low or No Air Pressure .....	4-8
Excessive Noise or Vibration of Air Compressor .....	4-9
Electronic Governor System Does Not Function Properly .....	4-9

### 4-8. TROUBLESHOOTING TABLE.

**Table 4-2. Unit Troubleshooting Table**

<b>MALFUNCTION</b>
<b>TEST OR INSPECTION</b>
<b>CORRECTIVE ACTION</b>

#### ELECTRICAL

#### 1.. NO ELECTRICAL OUTPUT AT CONTROL PANEL ASSEMBLY.

Step 1. Check for loose or broken positive drive belt.

If positive drive belt is loose, adjust it (para. 4-19). If broken, replace it (para. 4-19).

#### 4-8. TROUBLESHOOTING TABLE (CONT).

**Table 4-2. Unit Troubleshooting Table**

---

**MALFUNCTION**

**TEST OR INSPECTION**

**CORRECTIVE ACTION**

---

2. FREQUENCY OUTPUT FROM ALTERNATOR IS TOO LOW OR TOO HIGH.

Notify direct support maintenance if this malfunction occurs.

**AIR COMPRESSOR ASSEMBLY**

3. LOW OR NO AIR PRESSURE.

Step 1. Check for broken air compressor drive belt.

If air compressor drive belt is broken, replace and adjust it (para 4-14).

Step 2. Check for out of adjustment or defective pressure switch.

If pressure switch is out of adjustment or defective, adjust (para. 4-10) or notify direct support maintenance to repair/replace pressure switch.

Step 3. Check for defective air compressor circuit breaker CB2 on control panel.

Inspect circuit breaker CB2 (para.4-24).

Step 4. Check for defective air compressor contractor in control panel.

Inspect magnetic contractor S1 (para. 4-25).

Step 5. Check for defective alternating current wiring harness and loose electrical connections.

If electrical connections are loose, tighten them.

If alternating current wiring harness is damaged, notify direct support maintenance.

4. EXCESSIVE NOISE OR VIBRATION OF AIR COMPRESSOR.

Step 1. Check for loose or missing hardware on air compressor mounting (para. 5-6).

If hardware is loose, tighten hardware.

If hardware is missing, notify direct support maintenance.

Step 2. Check for loose or out of alignment air compressor pulleys.

If pulleys are loose or out of alignment, notify direct support maintenance.

### GOVERNOR SYSTEM

5. ELECTRONIC GOVERNOR SYSTEM DOES NOT FUNCTION PROPERLY.

If this malfunction occurs, notify direct support maintenance.

---

## Section V. UNIT MAINTENANCE PROCEDURES

### 4-9. GENERAL.

This section contains the maintenance procedures authorized for the unit support group. The information is organized into the following paragraphs:

Para.		Page No.
4-10	Air Compressor Pressure Switch .....	4-10
4-11	Air Pressure Gage .....	4-12
4-12	Safety Valve .....	4-13
4-13	Belt Guard .....	4-15
4-14	Air Compressor Belt .....	4-18
4-15	Motor Servicing .....	4-20
4-16	Governor Wiring Harness .....	4-21
4-17	PTO Controls and Indicators .....	4-24
4-18	Trailer Receptacle .....	4-25
4-19	Positive Drive Belt .....	4-27
4-20	Tailgate Assembly .....	4-30
4-21	Body Assembly .....	4-32
4-22	Reflectors .....	4-33
4-23	Information Plates .....	4-34
4-24	Control Panel Assembly CB2 .....	4-37
4-25	Control Panel Assembly S1 .....	4-39
4-26	Air Filter .....	4-43
4-27	Storage Straps/Tiedowns .....	4-48
4-28	Air Strainer Assembly .....	4-50

### 4-10. AIR COMPRESSOR PRESSURE SWITCH.

---

This task consists of Adjustment

---

#### 4-10. AIR COMPRESSOR PRESSURE SWITCH (CONT)

##### INITIAL SETUP:

##### Tools Required:

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
or

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-822)

##### Equipment Conditions:

Air compressor shut off and bled

---

### WARNING

Air compressor must be turned off before doing work on compressed air system. The air reservoir can contain air at dangerous pressures. Open drain cock on bottom of reservoir and bleed down before servicing.

---

Adjustment. (Refer to figure 4-1).

- a. Remove screw (1) and top cover (2) from pressure switch (3).

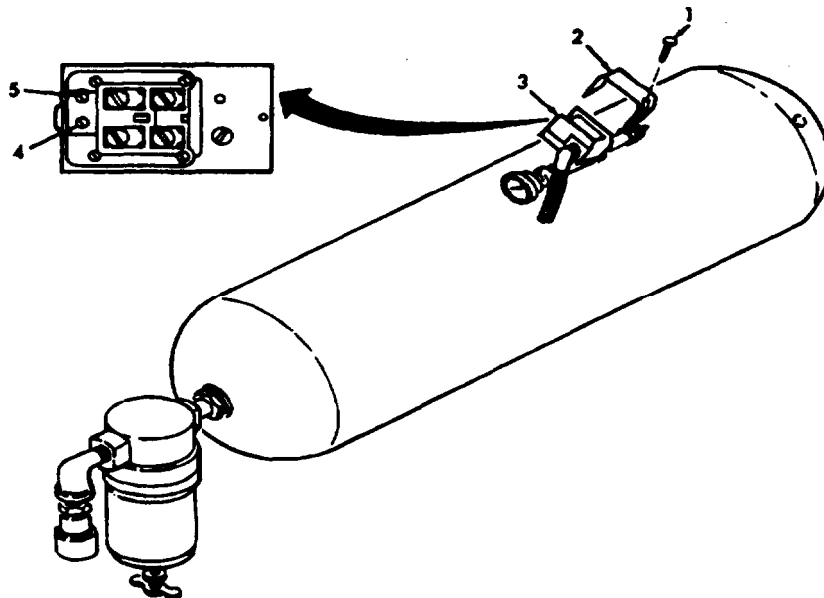


Figure 4-1. Pressure Switch, Adjustment.

- b. Turn air compressor ON and observe reading on pressure gage when air compressor stops charging. Pressure should be 100 psig  $\pm 5\%$ .
- c. Slowly bleed air compressor until air compressor activates and starts to charge air reservoir. Observe reading on pressure gage when air compressor cuts in. Pressure should be 80 psig  $\pm 5\%$ . Observe reading on pressure gage when air compressor cuts out. Pressure reading should be 100 psig  $\pm 5\%$ .
- d. If the pressure readings are not within the parameters of 80 psig  $\pm 5\%$  cut-in and 100 psig  $\pm 5\%$  cutout go to step (e.). If cut-in pressure is 80 psig  $\pm 5\%$  and cutout pressure is not 100 psig  $\pm 5\%$  go to step (f.).
- e. Turn differential screw (5) clockwise to increase cut-in pressure or counterclockwise to decrease cut-in pressure. When the differential screw (5) is turned, the cut out pressure is changed proportionately with the cut-in pressure. Perform step (f.) to adjust cutout pressure.
- f. Turn the pressure range screw (4) clockwise to increase pressure cutout or counterclockwise to decrease pressure cutout. Adjusting pressure range screw (4) does not affect cut-in pressure.
- g. Repeat steps (c.) and (d.) until cut-in pressure is 80 psig  $\pm 5\%$  and cutout pressure is 100 psig  $\pm 5\%$ .
- h. Install top cover (2) on pressure switch (3) and secure with screw (1).

#### 4-11. AIR PRESSURE GAGE.

---

This task consists of:

a. Inspection

b. Removal

c. Installation

---

#### INITIAL SETUP:

#### Tools Required:

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

#### Materials Required:

Tape, Anti-Seize (Item 19, Appx D)

#### Equipment Conditions:

CMV shut down.

Air compressor shut OFF

---

#### 4-11. AIR PRESSURE GAGE (CONT)

a. **Inspection.** (Refer to Fig 4-2) Inspect the gage glass for breaks or cracks, dented body, or if needle is bent or broken, or if gage is inoperable. Replace the gage if the glass is broke or cracked, the needle is bent or broken, or if the gage is inoperable. Turn air compressor ON and observe gage operation.

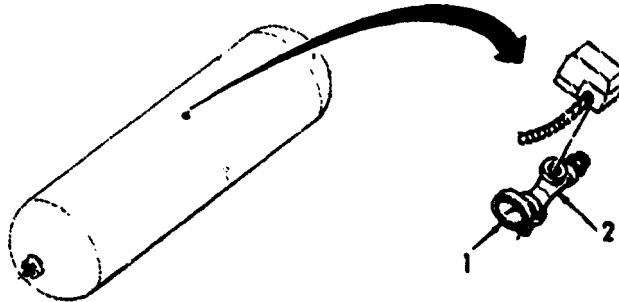


Figure 4-2. Air Pressure Gage, inspection/Removal/installation.

#### WARNING

**Air compressor must be turned OFF. The air tank can contain air at dangerous pressures. Open drain cock on bottom of tank and bleed down before servicing.**

b. **Removal.** (Refer to figure 4-2.). Unscrew pressure gage (1) counterclockwise from cross (2).

c. **Installation.** (Refer to figure 4-2.)

(1) Wrap anti-seize tape (item 19, appx D) around male thread of pressure gage (1).

(2) Screw pressure gage (1) clockwise into cross (2) until tight. Energize air compressor and check for leaks. Repeat installation if leakage is indicated.

#### 4-12. SAFETY VALVE.

This task consists of:

a. Inspection

b. Removal

c. Installation

#### INITIAL SETUP:

#### **Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

#### **Materials Required:**

Tape, Anti-Seize (Item 19, Appx D)



**Equipment Conditions:**

CMV shut down.  
Air compressor shut OFF.

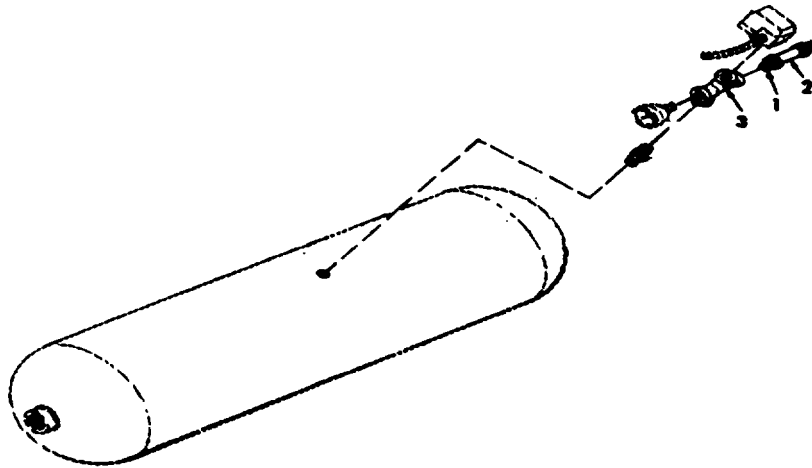
---

- a. **Inspection.** (Refer to figure 4-3).

<b>WARNING</b>
----------------

**Air compressor must be turned OFF The air tank can contain air at dangerous pressures. Open drain cock on bottom of tank and bleed before servicing.**

- (1) Using pliers or vise grips, pull out on plunger (1) and check for smooth operation of safety valve (2).
  - (2) Replace safety valve (2) if it does not operate smoothly.
- b. **Removal.** Unscrew safety valve (2) counterclockwise from cross (3).
- c. **Installation.**
- (1) Apply anti-seize tape (item 19, appx D) to male threads of safety valve (2) before installation.
  - (2) Screw safety valve (2) into cross (3).



**Figure 4-3. Safety Valve, Inspection/Removal/Installation.**

#### 4-13. BELT GUARD.

---

This task consists of:

- |             |                 |
|-------------|-----------------|
| a. Removal  | c. Inspection   |
| b. Cleaning | d. Installation |
- 

#### INITIAL SETUP:

##### **Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
or  
Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

##### **Materials Required-**

Brush, Medium Bristle (Item 2, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)  
Paint (Items 12, 13, and 14, Appx D)  
Paper, Abrasive (Item 9, Appx D)  
Primer (Item 15, Appx D)  
Solvent, Dry Cleaning (Item 18, Appx D)

##### **Equipment Conditions:**

CMV shut down.

---

- a. Removal.** (Refer to figure 4-4).

**WARNING**

**Air compressor must be turned off. The air tank can contain air at dangerous pressures. Open drain cock on bottom of tank and bleed down before servicing.**

- (1) Remove four screws (1) from belt guard (2).
- (2) Remove bolt (3) from belt guard (2) and air compressor (4).
- (3) Remove belt guard (2) from air compressor (4).

**b. Cleaning.**

- (1) Remove all build up of dirt or oil on all parts with a lint-free cloth (item 4, appx D), medium bristle brush (item 2, appx D), and cleaning solvent (item 18, appx D).

<b>WARNING</b>
----------------

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable, and, if ignited, cause injury to personnel and damage to equipment.**
- **Do not breathe cleaning solvents for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flames.**
- **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if solvents contact the skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.**

- (2) Clean all parts with a lint-free cloth (item 4, appx D) or a medium bristle brush (item 2, appx D) and cleaning solvent (item 18, appx D).

- (3) Allow all parts to dry.

c. **Inspection.** Inspect belt guard for dents, torn screen, deformed frame, or corrosion.

d. **Installation.** Refer to paragraph a. preceding and install in reverse order of removal.

4-13. BELT GUARD (CONT).

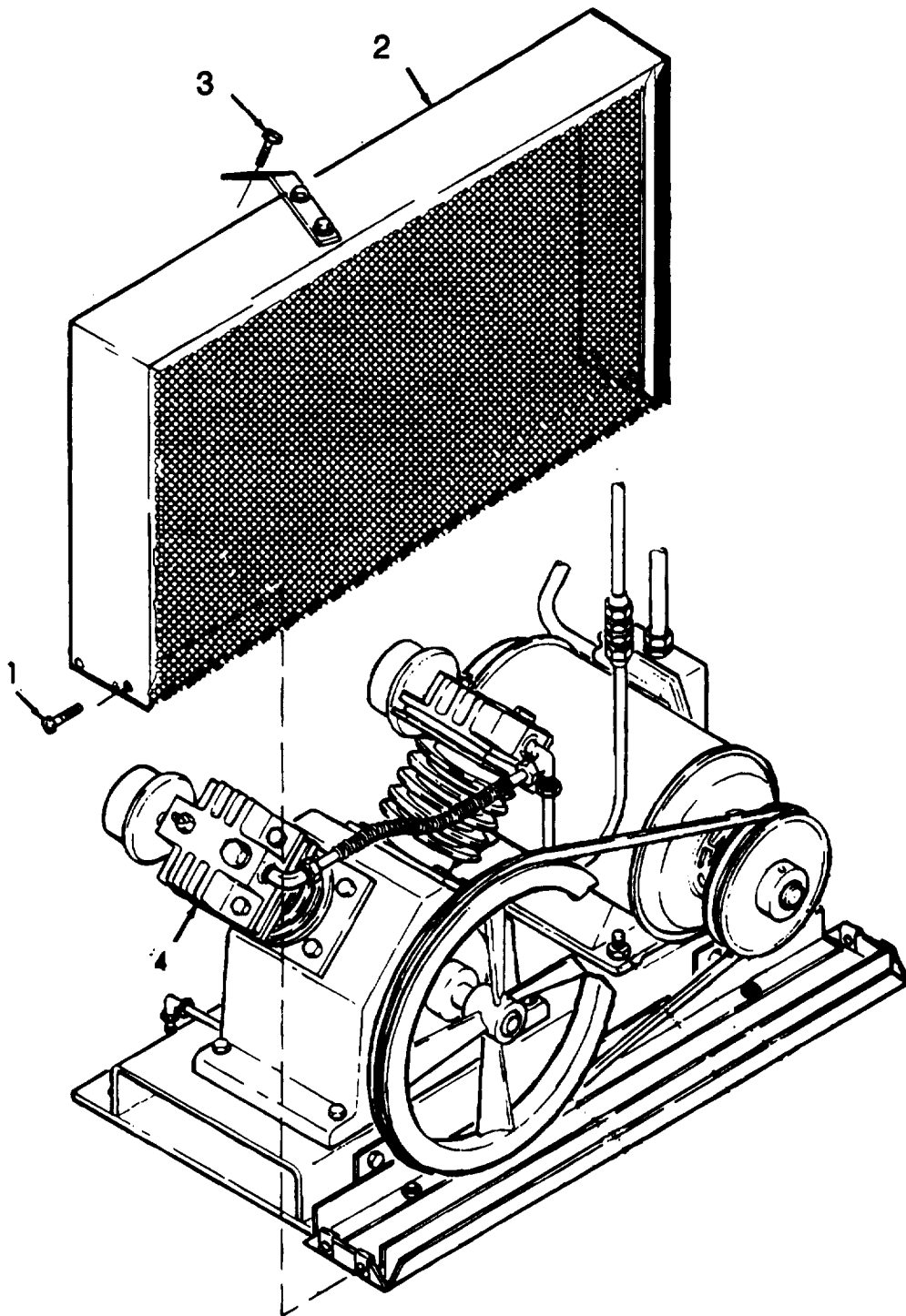


Figure 4-4. Belt Guard, Removal/Installation.

**4-14. AIR COMPRESSOR BELT.**


---

This task consists of:

a. Removal

b. Cleaning

c. Installation

---

**INITIAL SETUP:****Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
or

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

**Materials Required:**

Brush Medium Bristle (Item 2, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)

CMV shut down.

Belt guard removed in accordance with paragraph 4-13.

a. **Removal.** (Refer to figure 4-5.)

**WARNING**

**Air compressor must be turned off and bled before performing maintenance. Rotating pulleys, moving belts, or compressed air could cause serious injury to personnel.**

- (1) Loosen four nuts (1) and slide motor (2) toward air compressor (3) until air compressor belt (4) can be removed.
- (2) Remove air compressor belt (4) from compressor pulley (5) and motor pulley (6).

b. **Cleaning.**

- (1) Clean all buildup of oil and debris from all associated parts.
- (2) Clean all parts with a lint-free cloth (item 3, appx D) or a medium bristle brush (item 2, appx D).

#### 4-14. AIR COMPRESSOR BELT (CONT)

c. **Installation.** Refer to paragraph a. preceding and install in reverse order of removal. Adjust belt tension (para 3-7).

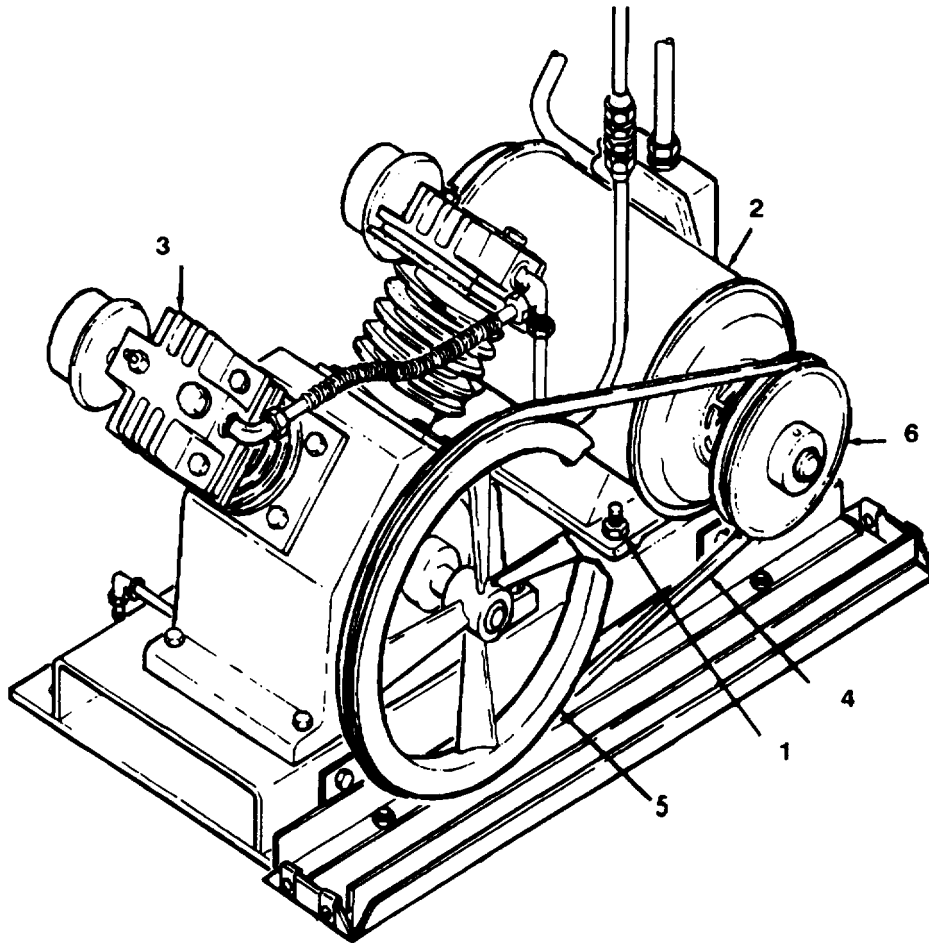


Figure 4-5. Air Compressor Belt, Removal/Installation.

**4-15. MOTOR SERVICING.**

---

This task consists of:

a. Cleaning

b. Lubrication

---

**INITIAL SETUP:****Tools Required:**

None

**Materials Required:**

Brush Medium Bristle (Item 2, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)  
Solvent, Dry Cleaning (Item 18, Appx D)

**Equipment Conditions:**

CMV shut down and cool.  
Air compressor shut off.  
Air compressor motor cool.

---

**a. Cleaning.**

- (1) Remove all build up of dirt or oil on all parts with a lint-free cloth (item 4, appx D), medium bristle brush (item 2, appx D), and cleaning solvent (item 18, appx D).

<b>WARNING</b>
----------------

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable, and, if ignited, cause injury to personnel and damage to equipment.**
  - **Do not breathe cleaning solvents for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flames.**
  - **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin. If solvents contact the skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.**
- (2) Clean motor with a lint-free cloth (item 4, appx D) or medium bristle brush (item 2, appx D) and cleaning solvent (item 18, appx D).
- (3) Allow motor to dry.

**b. Lubrication.** Lubricate per paragraph 3-2.

#### 4-16. GOVERNOR WIRING HARNESS.

---

This task consists of

a. Inspection

b. Cleaning

c. Repair

---

##### INITIAL SETUP:

##### Tools Required:

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-621)  
or

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-622)

##### Material Required:

Brush Medium Bristle (Item 2, Appx D)

Cloth, Lint-Free (Item 4, Appx D)

Tape, Electrical (Item 20, Appx D)

Multimeter

##### Equipment Conditions:

CMV shut down and cool.

---

a. **Inspection.** (Refer to figures 4-6 and 4-7).

(1) Inspect all wires (1) of wiring harness for fraying or cut insulation.

(2) Inspect all terminals (2) and connectors (3) for breaks or deformation.

(3) Perform continuity checks for shorts/opens in wiring harness with multimeter. If tests indicate a short/open, notify direct support maintenance for repair of wiring harness.

b. **Cleaning.**

(1) Clean all build up of dirt or oil on all parts with a lint-free cloth (item 4, appx D).



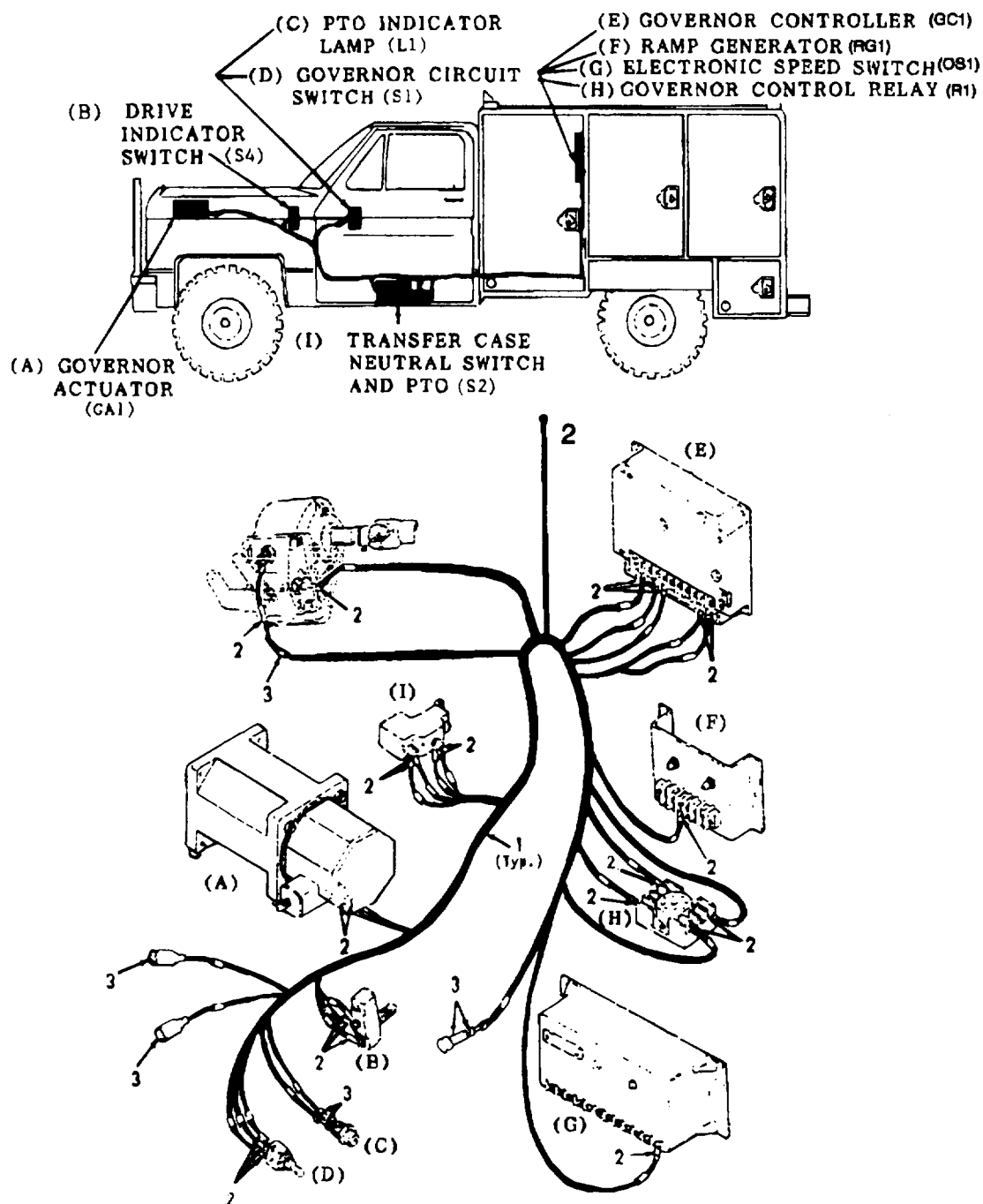


Figure 4-6. Governor Wiring Harness Repair.

4-16. GOVERNOR WIRING HARNESS (CONT).

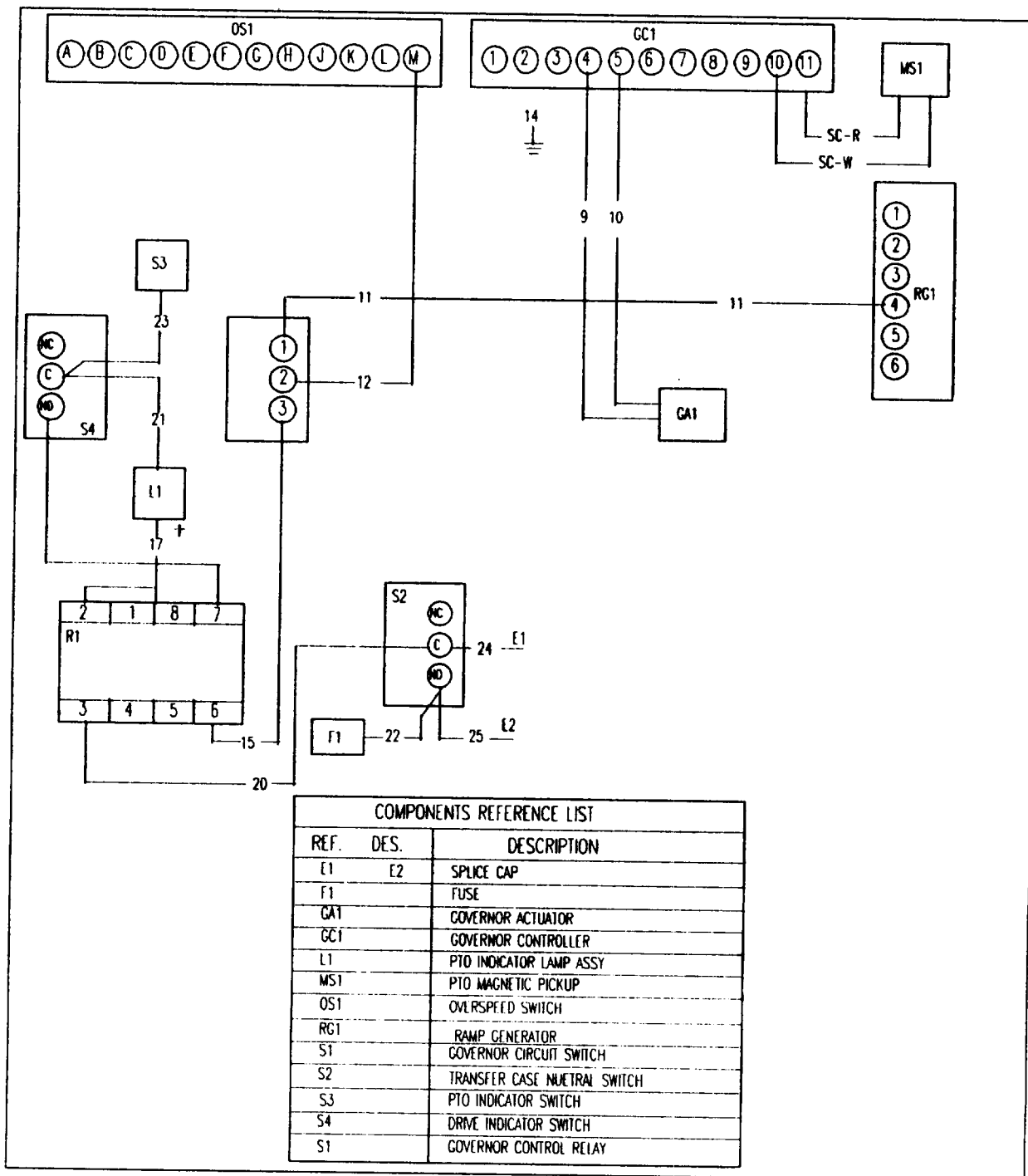


Figure 4-7. Governor System Wiring Diagram

- (2) Clean all parts with a lint-free cloth (item 4, appx D) or medium bristle brush (item 2, appx D).

c. **Repair.** of the governor wiring harness by unit maintenance is limited to taping damaged insulation on wires with electrical tape (item 20, appx D).

#### 4-17. PTO INDICATORS.

---

This task consists of:

a. Removal

b. Cleaning

c. Installation

---

#### INITIAL SETUP:

##### **Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

or

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

##### **Material Required:**

Brush Medium Bristle (Item 2, Appx D)

Cloth, Lint-Free (Item 4, Appx D)

##### **Equipment Conditions:**

CMV shut down and cool.

---

#### a. **Removal.** (Refer to figure 4-8.)

(1) Remove lens light (1), incandescent lamp (2), and two rubber washers (3) from lampholder (4). Slide lampholder (4) out from the rear of the dashboard.

(2) Tag and disconnect wiring from back of lampholder (4).

(3) Remove hexagon nut (5) and internal tooth lockwasher (6) from lampholder (4).

b. **Cleaning.** Clean metal parts using a clean, lint-free cloth (item 4, appx D) or a medium bristle brush (item 2, appx D). Clean plastic parts using a clean, lint-free cloth (item 4, appx D).

#### c. **Installation.**

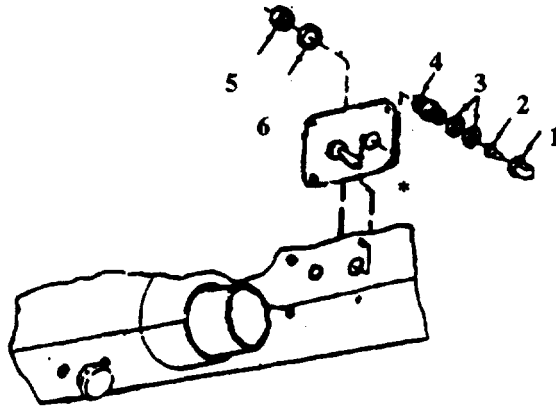
(1) Install internal-tooth lockwasher (6) and hexagon nut (5) on back of lampholder (4).

(2) Screw hexagon nut (5) onto lampholder (4) until back of hexagon nut (5) is flush with lampholder (4) base.

(3) Untag wiring and connect to back of lampholder (4).

#### 4-17. PTO INDICATORS (CONT).

- (4). Slide lampholder (4) through mounting hole in rear of dashboard. install two rubber washers (3), incandescent lamp (2), and lens light (1).



\*PLATE REMOVED FOR CLARITY

Figure 4-8. PTO Controls and Indicators, Removal/Installation.

#### 4-18. TRAILER RECEPTACLE.

This task consists of:

- |            |                 |
|------------|-----------------|
| a. Removal | b. Installation |
|------------|-----------------|

##### INITIAL SETUP:

##### Tools Required:

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
 or  
 Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

##### Equipment Conditions:

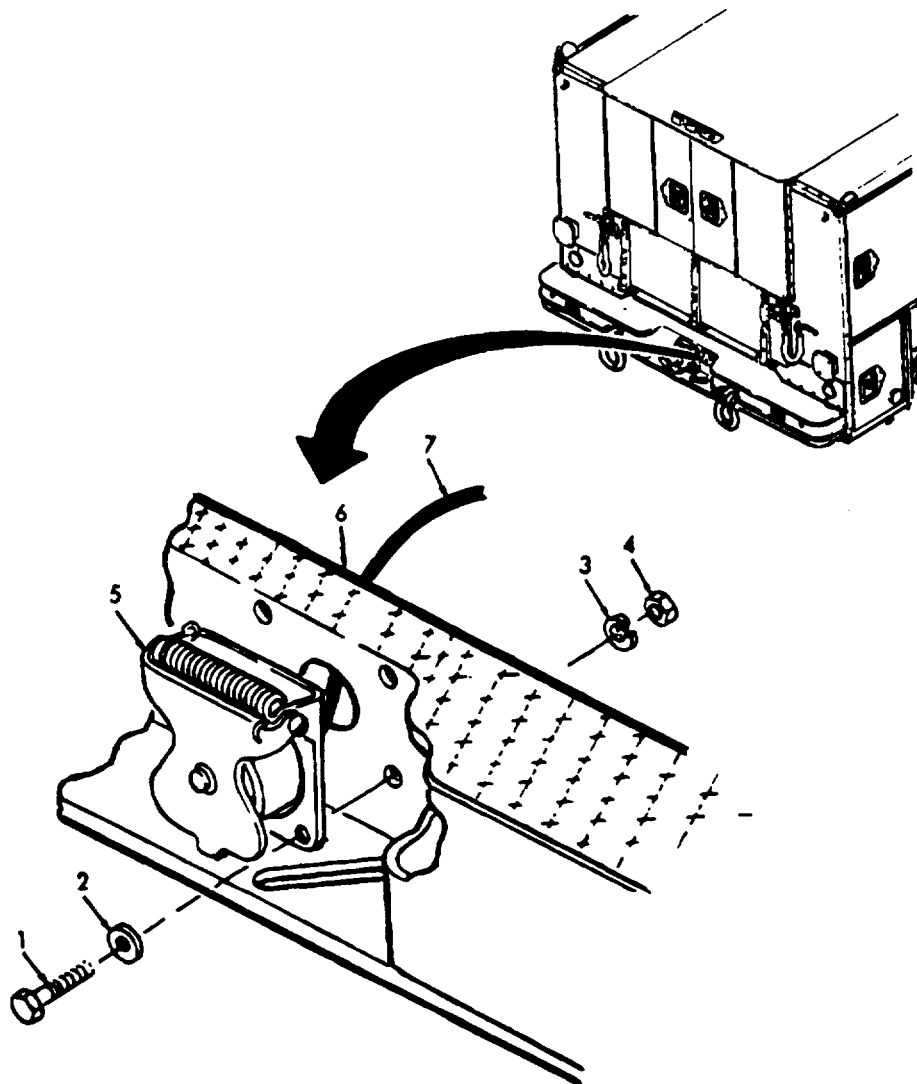
CMV shut down and cool.

##### a. Removal. (Refer to figure 4-9.)

- (1) Remove four screws (1), four washers (2), four lockwashers (3), and four nuts (4) and ease receptacle (5) away from bumper (6).
- (2) Tag and disconnect cable assembly (7) and remove receptacle (5).

**4-18. TRAILER RECEPTACLE (cont).**

b. **Installation.** Refer to paragraph a. preceding and install in reverse order of removal.



**Figure 4-9. Trailer Receptacle, Removal/Installation.**

#### 4-19. POSITIVE DRIVE BELT.

---

This task consists of:

a. Removal

b. Inspection

c. Installation/Adjustment

---

##### INITIAL SETUP:

##### Tools Required:

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
or

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

##### Equipment Conditions:

CMV shut down and cool.

---

**WARNING**

**Engagement of the PTO during maintenance can cause serious injury or death. Disengage PTO and turn OFF vehicle engine before performing any maintenance on the positive drive belt and associated components.**

a. **Removal.** (Refer to figure 4-10).

- (1) Remove four screws (1) which attach belt cover rear panel (2) to belt cover panel (3).
- (2) Remove seven machine screws (4) and belt cover panel (3).
- (3) Remove belt cover rear panel (2).
- (4) Loosen two plain hexagon nuts (5) on alternator mount (6).
- (5) Relieve tension on belt (7) by turning belt adjustment hexagon nuts (8) down. Turn belt adjustment nuts (8) until belt (7) can easily slip off top sprocket wheel (9) and bottom sprocket wheel (10).
- (6) Remove belt (7) from top sprocket wheel (9) and bottom sprocket wheel (10).

b. **Inspection.** Inspect belt in accordance with the following criteria:

- (1) **Cracks** - Small cracks are allowed. If the crack creates a hinge point with excessive flexing movement or if the cords of the belt are visible, replace the belt.
- (2) **Grease** - Replace belt if sidewalls are slick and the undercore is grease softened. Greasy belts deteriorate rapidly.

**4-19 POSITIVE DRIVE BELT (CONT).**

- (3) **Glaze** - Replace belt if sidewalls are slick, hard, or board-like.
- (4) **Undercore Wear** - Replace belt if sections of the undercore underside of the belt below the cord section are broken off, peeling, or cracked and exposing the belt's cord.
- (5) **Split Belt/Sidewall Wear** - Replace belt if sidewall is frayed or badly worn. Also replace belt if undercore is split open.

**c. Installation/Adjustment (Refer to Figure 4-10).**

- (1) Place belt cover rear panel (2) in installation position.
- (2) Install belt (7) over bottom sprocket wheel (10).
- (3) Install belt (7) over top sprocket wheel (9).
- (4) Check that belt undercore sections mesh correctly with sprockets.
- (5) Measure belt deflection at center approximately 14 inches below centerline of top sprocket wheel with 15 pounds pressure: Deflection should be 0.44 inch.
- (6) Turn belt adjustment hexagon nuts (8) up six flats at a time for coarse adjustment until approximately 0.44 inch deflection of the belt (7) is obtained. Make adjustments one flat at a time.
- (7) Tighten two plain hexagon nuts (5) on alternator mount (6).
- (8) Install belt cover panel (3) and secure with seven machine screws (4).
- (9) Install belt cover rear panel (2) to belt cover panel (3) and secure with four capscrows (1).

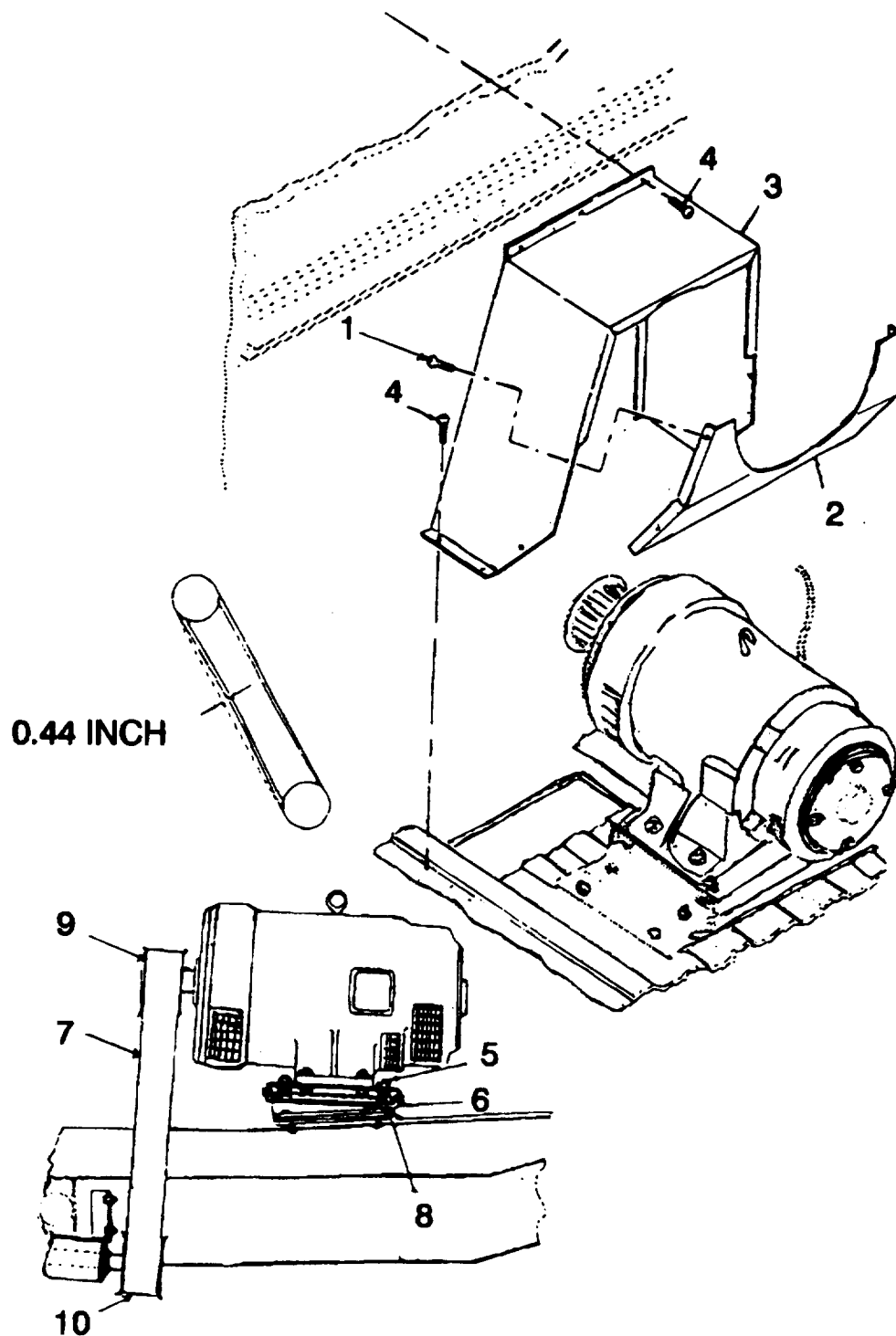


Figure 4-10. Positive Drive Belt, Removal/Installation/Adjustment.



## 4-20. TAILGATE ASSEMBLY.

---

This task consists of:

- |            |                 |
|------------|-----------------|
| a. Removal | b. Installation |
|------------|-----------------|
- 

### INITIAL SETUP:

#### **Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
or

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

#### **Equipment Conditions:**

CMV shut down and cool.

---

- a. **Removal.** (Refer to figure 4-11).

#### NOTE

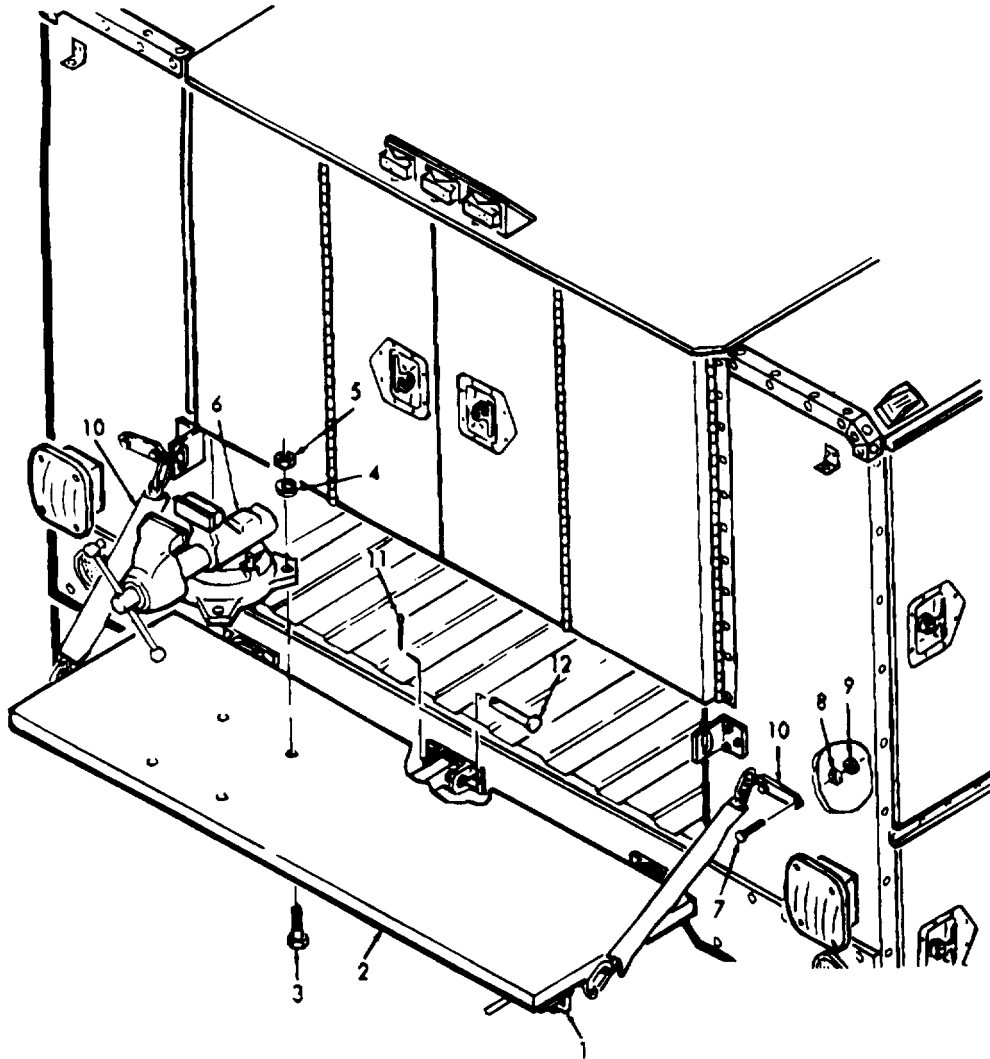
**Shop set rear doors must be open in order to remove tailgate assembly.**

- (1) Unlock two tailgate latches (1) and lower tailgate assembly (2).
- (2) Remove four bolts (3), four lockwashers (4), four nuts (5), and vise (6).

**WARNING**

#### **Support tailgate while removing.**

- (3) Remove four bolts (7) , four washers (8) , and four nuts (9) and disconnect two bracket and chain assemblies (10) from truck body.
- (4) Remove three cotter pins (11), three pins (12), and tailgate assembly (2).



**Figure 4-11. Tailgate Assembly, Removal/Installation.**

**b. Installation.**

**WARNING**

**Support tailgate while installing.**

Refer to paragraph a. preceding and install in reverse order of removal.

**4-21. BODY ASSEMBLY.**

---

This task consists of Cleaning

---

**INITIAL SETUP:****Tools Required:**

None

**Material Required:**

Brush Medium Bristle (Item 2, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)  
Soap (Item 17, Appx D)

**Equipment Conditions:**

CMV shut down and cool.

---

**Cleaning.** Servicing of the CMV Body Assembly consists of thorough cleaning of the body, The following steps define the cleaning method to be used.

- a. Remove all loose accumulation of dirt from the body by squirting the unit with water from a low pressure water hose.
- b. Remove all build up of dirt, grease, and other types of residue with a soft, lint-free cloth (item 4, appx D) .
- c. Use a medium bristle brush (item 2, appx D) to remove build up of dirt, grease, and other residue from corners and hard to reach areas.



**Do not spray body assembly with high pressure water spray.**

- d. Wash the body with a mild solution of water and soap (item 17, appx D) using a lint-free cloth (item 4, appx D) and rinse with water.
- e. Allow body to dry.

## 4-22. REFLECTORS.

---

This task consists of:

- |               |                 |
|---------------|-----------------|
| a. Inspection | c. Removal      |
| b. Cleaning   | d. Installation |
- 

### INITIAL SETUP:

#### Tools Required:

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
or  
Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

#### Material Required:

Cloth, Lint-Free (Item 4, Appx D)  
Soap (Item 17, Appx D)

#### Equipment Conditions:

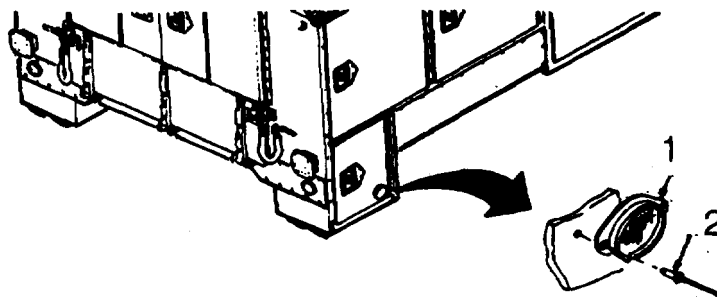
CMV shut down.

---

### NOTE

**Inspection, cleaning, removal, and installation for all reflectors is the same.**

- a. **Inspection.** (Refer to figure 4-12.) Replace reflector (1) if lens is cracked or scratched.



**Figure 4-12. Reflector, Removal/Installation.**

- b. **Cleaning.**

- (1) Clean reflectors with mild soap (item 17, appx D) and water.
- (2) Wipe dry with a lint-free cloth (item 4, appx D).

- c. **Removal.** Remove two rivets (2) and reflector (1).

- d. **Installation.** Install reflector (1) and secure with two rivets (2).

**4-23. INFORMATION PLATES.**

---

This task consists of:

a. Removal

b. Installation

---

**INITIAL SETUP:****Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
or

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

**Material Required:**

Cloth, Lint-Free (Item 4, Appx D)  
Soap (item 17, Appx D)

**Equipment Conditions:**

CMV shut down and cool.

---

a. **Removal.** (Refer to figure 4-13).

- (1) Remove eight rivets (1) by drilling out. Remove data plate (2) and information plate (3) from body (4).
- (2) Remove twenty rivets (5) by drilling out. Remove information plate (6), instruction plate (7), instruction plate (8), instruction plate (9), and caution plate (10) from door (11).
- (3) Carefully peel decal (12) and decal (13) from vehicle dashboard,

b. **Installation.**

- (1) Clean surface of vehicle dashboard with a clean lint-free cloth (item 4, appx D), mild soap (item 17, appx D), and water. Allow vehicle dash to dry before applying decals.
- (2) Remove backing from decal(s) and place decals (12) and (13) into position on the vehicle's dashboard. Press firmly on the decals to assure decal adhesive bonds to dashboard.
- (3) Install data plate (2) and information plate (3) onto body (4) by placing plate over mounting holes and securing with rivets (1).
- (4) Install information plate (6), instruction plate (7), instruction plate (8), instruction plate (9), and caution plate (10) by placing respective plate over appropriate mounting holes and securing with four rivets (5).

4-23. INFORMATION PLATES.

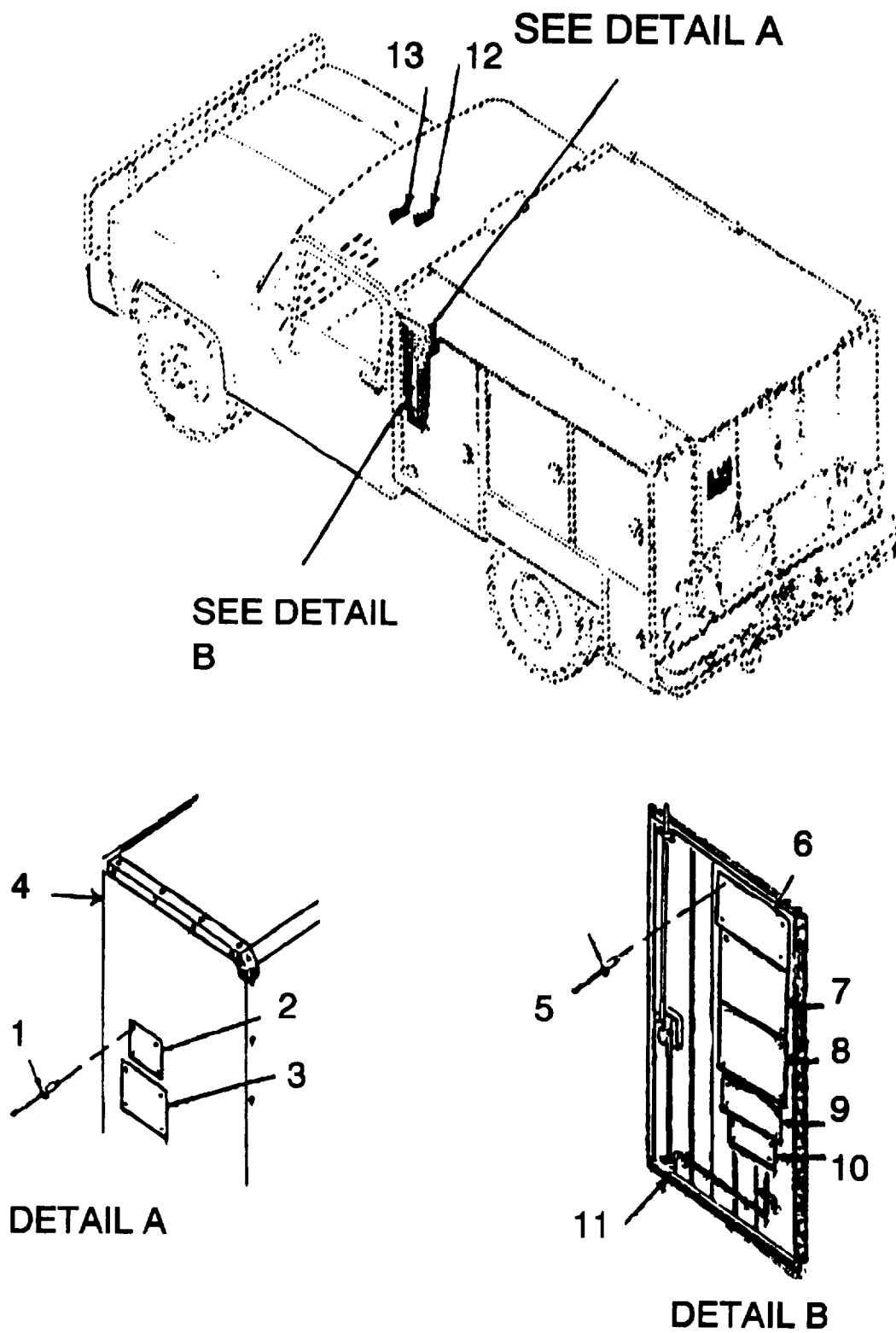


Figure 4-13. Information Plates, Removal/Installation.

**4-24. CONTROL PANEL ASSEMBLY CB2.**

---

This task consists of:

- |             |               |
|-------------|---------------|
| a. Removal  | c. Inspection |
| b. Cleaning | d. Assembly   |
- 

**INITIAL SETUP:****Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)  
Multimeter

**Material Required:**

Brush, Medium Bristle (Item 2, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)

**Equipment Conditions:**

Disengage power takeoff.  
CMV shut down and cool.  
Electrical power turned off.

---

- a. **Removal.** (Refer to figure 4-14.)

<b>WARNING</b>
----------------

**High voltage is present in the control panel assembly and can cause serious injury or death. Disengage PTO and turn off vehicle engine prior to performing any maintenance on the control panel assembly.**

- (1) Remove two latch bolts (1), two washers (2), and two latches (3) on top edge of control panel assembly and open front panel.
- (2) Tag and disconnect wiring from back of CB2 (4).

- b. **Cleaning.**

- (1) Ensure all electrical power is off.
- (2) Remove all build up of dirt or oil on all parts with a lint-free cloth (item 4, appx D) or small medium-bristle brush (item 2, appx D).

#### 4-24. CONTROL PANEL ASSEMBLY CB2 (CONT).

**c. Inspection.**

- (1) Inspect circuit breaker for cracks in the case and smooth operation of the switch mechanism.
- (2) With circuit breaker unlatched, perform continuity checks between LINE (1) and LOAD (A), LINE (2) and LOAD (B), LINE (3) and LOAD (C) terminals. If continuity is present, notify direct support maintenance for replacement of the circuit breaker. If continuity is not present, proceed to step 3.
- (3) With circuit breaker latched, perform continuity checks between LINE (1) and LOAD (A), LINE (2) and LOAD (B), LINE (3) and LOAD (C) terminals. If continuity is present, proceed to assembly of the circuit breaker. If continuity is not present, notify direct support maintenance for replacement of circuit breaker.

**d. Assembly.**

- (1) Remove tags from wiring and connect to appropriate terminals on back of CB2 (4).
- (2) Install two latchingbolts (1), two washers (2), and two latches (3) onto top edge of control panel assembly and close front panel.

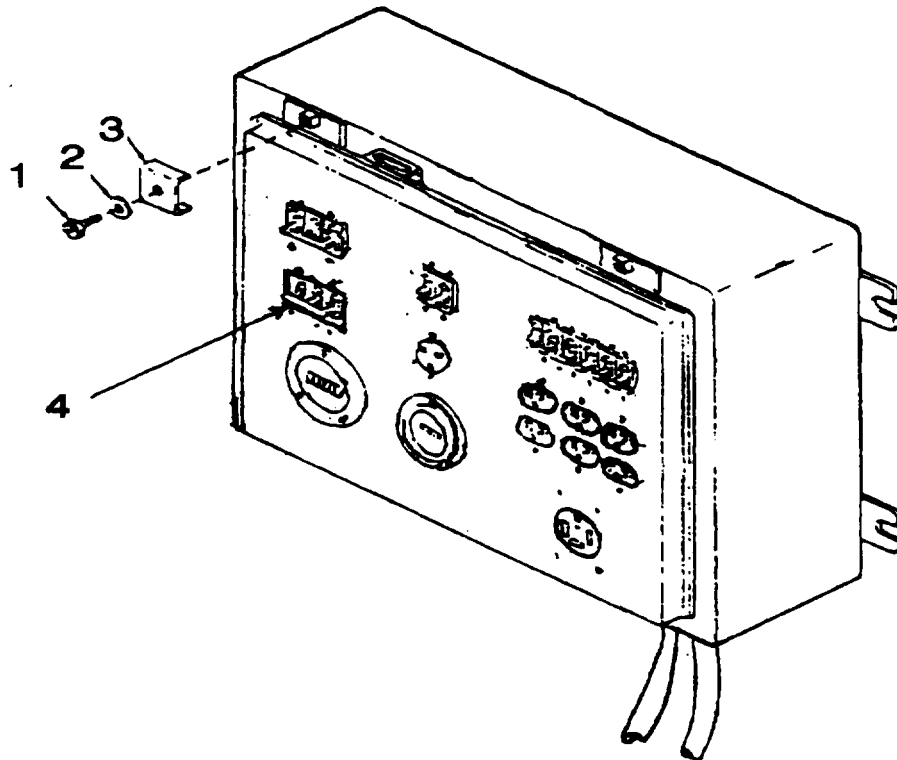


Figure 4-14. Control Panel Assembly.



#### 4-25. CONTROL PANEL ASSEMBLY S1.

---

This task consists of:

- |             |               |
|-------------|---------------|
| a. Removal  | c. Inspection |
| b. Cleaning | d. Assembly   |
- 

##### INITIAL SETUP:

##### **Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
or  
Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)  
Multimeter

##### **Material Required:**

Brush, Medium Bristle (Item 2, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)

##### **Equipment Conditions:**

Disengage power takeoff.  
CMV shut down and cool.  
Electrical power turned off.

---

- a. **Removal.** (Refer to figures 4-15 and 4-16.)

**WARNING**

**High voltage is present in the control panel assembly and can cause serious injury or death. Disengage PTO and turn off vehicle engine prior to performing any maintenance on the control panel assembly.**

- (1) Remove two latch bolts (1, fig. 4-15), two washers (2), and two latches (3) on top edge of control panel assembly. Open front panel (4) and pivot panel downward.
- (2) Tag and disconnect wiring from S1 (1, fig. 4-16).

b. **Cleaning.**

- (1) Ensure all electrical power is off.
- (2) Remove all buildup of dirt or oil on all parts with a lint-free cloth (item 4, appx D) or small medium-bristle brush (item 2, appx D).

#### 4-25. CONTROL PANEL ASSEMBLY S1 (CONT).

##### c. Inspection.

- (1) Inspect magnetic contactor's terminals for looseness and for free movement of the magnetic contactor if terminals are loose or magnetic bar does not move freely.
- (2) Depress the magnetic bar and check of continuity between L1 (1) to T1 (A), L2 (2) to T2 (B), L3 (3) to T3 (C). If continuity is not present, notify direct support maintenance for replacement of the magnetic contactor. If continuity is present, proceed to step (3).
- (3) Depress the magnetic bar and check for continuity from wiring connection 17 (coil) to wiring connection 14 (N) on the contactor. If continuity is not present, notify direct support maintenance for replacement of the contactor. If continuity is present, proceed to assembly of the magnetic contactor.

##### d. Assembly. (Refer to figures 4-15 and 4-16.)

- (1) Remove tags from wiring and connect to appropriate terminals on S1 (1, fig. 4-16).
- (2) Pivot front panel (4, fig. 4-15) upward and secure with two latches (3), two washers (2), and two latch bolts (1) on top edge of control panel assembly.

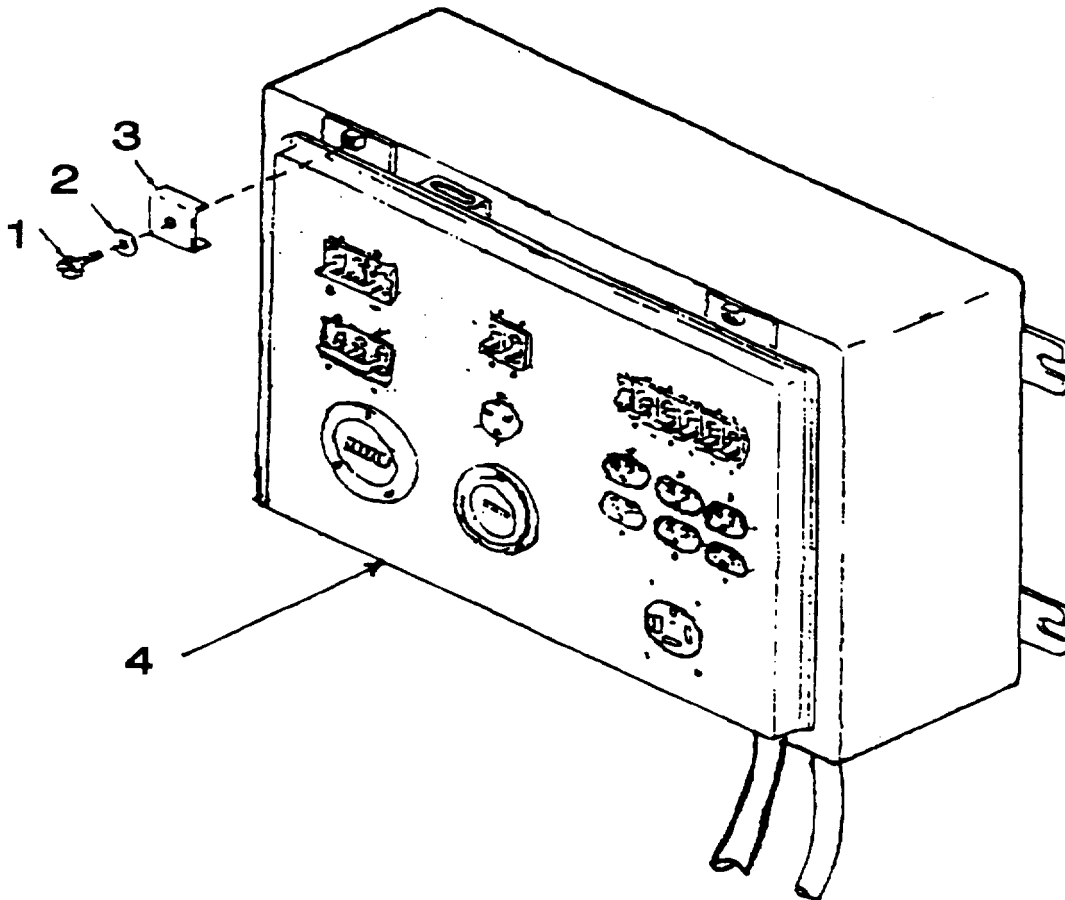


Figure 4-15. Control Panel Assembly.

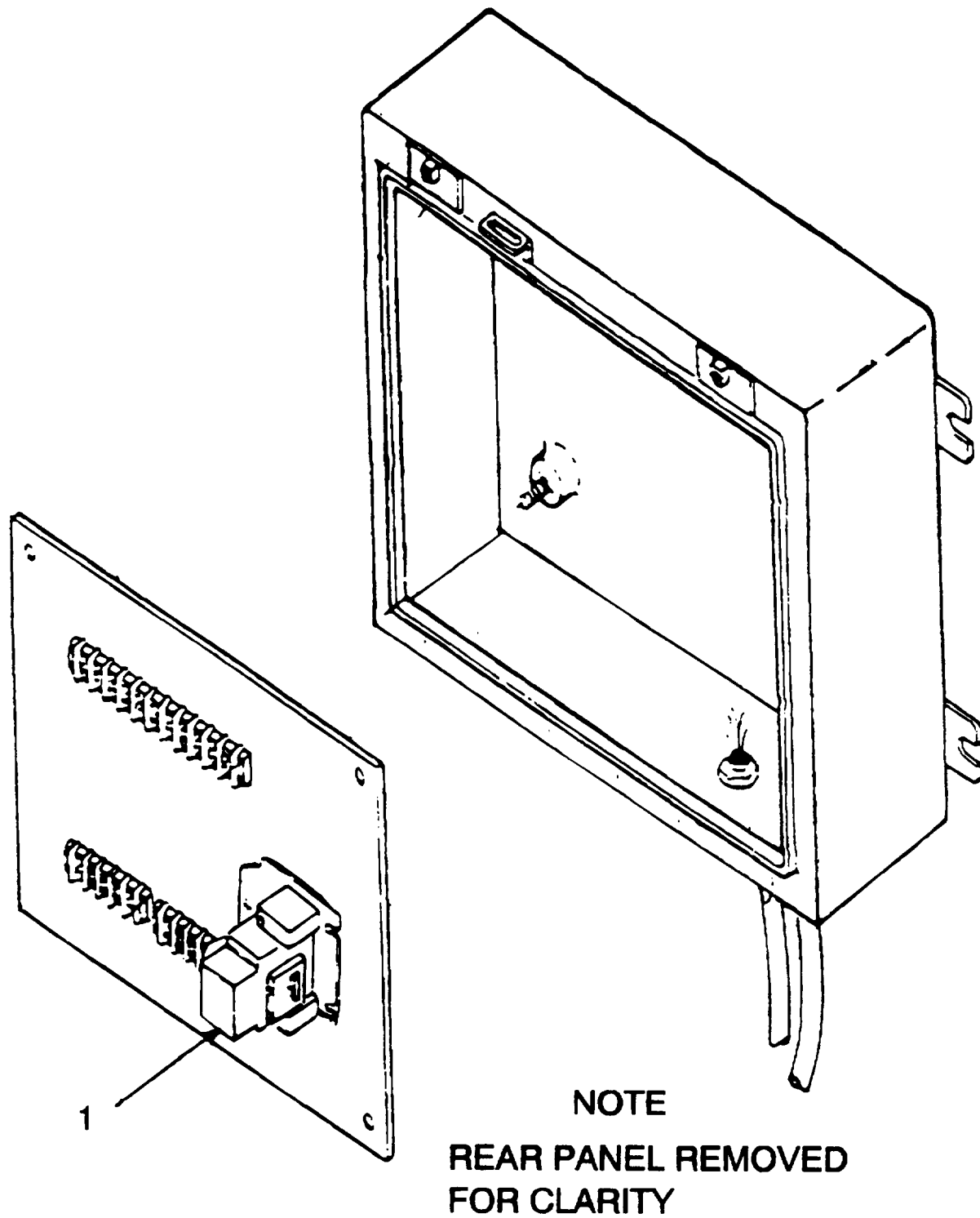


Figure 4-16. Control Panel Assembly.

#### 4-26. AIR FILTER.

---

This task consists of:

- |                |                 |
|----------------|-----------------|
| a. Removal     | e. Assembly     |
| b. Disassembly | f. Installation |
| c. Cleaning    | g. Testing      |
| d. Repair      |                 |
- 

#### INITIAL SETUP:

##### Tools Required:

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
or  
Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

##### Material Required:

Cloth, Lint-Free (Item 4, Appx D)  
Soap (Item 17, Appx D)  
Brush, Medium Bristle (Item 2, Appx D)  
Grease, GAA (Item 5, Appx D)  
Tape, Anti-Seize (Item 19, Appx D)

##### Equipment Conditions:

CMV shut down and cool.  
Air compressor shut down and cool.

---

- a. **Removal.** (Refer to figure 4-17.)

**WARNING**

**Air compressor must be turned OFF. The air tank can contain air at dangerous pressures. Open drain cock on bottom of tank and bleed down before servicing air filter. Open drain cock on bottom of air filter and bleed pressure in air filter to zero.**

- (1) Unscrew and remove half coupling (1) and street elbow (2) from air filter (3).
- (2) Unscrew and remove air filter (3) and pipe nipple (4) from reservoir (5).

- b. **Disassembly.** (Refer to figure 4-18.)

- (1) Unscrew and remove filter bowl (1) and preformed packing (2) from filter body (3).  
Loosen hexagon nut (4) and remove insert (5), gasket (6), and drain cock (7).

**4-26. AIR FILTER (CONT).**

- (2) Unscrew and remove air filter baffle (8) from filter body (3). Remove filter element (9).
- (3) Unscrew and remove lower air filter (10) and preformed packing (11) from filter body (3).



**Do not remove center post from filter body as damage to threads could result.**

**c. Cleaning.**

- (1) Remove all build up of dirt or grease on all parts with a lint-free cloth (item 4, appx D).
- (2) Clean all metal parts, except hardware, with warm water and soap (item 17, appx D), and a medium bristle brush (item 2, appx D). Allow parts to air dry.
- (3) Clean internal passages in filter body by blowing out the internal passages in filter body using clean, dry compressed air. Clean filter element by clean, dry compressed air through the filter element from inside to outside to dislodge surface contaminants.

**d. Repair.**

- (1) Inspect and replace preformed packings/gaskets that have nicks, cuts, abrasions, or deformations.
- (2) Replace filter element when the filter element cannot be cleaned.
- (3) Repair of all metal parts is by replacement of authorized parts (TM 9-4940-562-23P) which are determined to be defective.

**e. Assembly.** (Refer to figure 4-18.)

- (1) Prior to assembly of the air filter, generously coat preformed packing (11) and preformed packing (2) with grease (item 5, appx D).
- (2) Install preformed packing (11) on filter body (3) and secure with lower air filter (10). Screw lower air filter (10) onto filter body center post until contact is made with the filter body, then tighten 1/4 turn.
- (3) Install filter element (9) on filter body (3) and secure with air filter baffle (8). Screw air filter baffle (8) onto filter body center post until initial contact is made with the filter element (9). Tighten baffle 1/4 to 1/2 turn.

- (4) Run hexagon nut (4) down drain cock (7). install drain cock (7) through filter bowl (1) and secure with gasket (6) and insert (5). Tighten hexagon nut (4) 20 to 25 inch-pounds torque.
- (5) Install preformed packing (2) and filter bowl (1) onto filter body (3). Turn filter bowl (1) into filter body (3) until it stops (approximately 5 turns of the filter bowl).

**f. Installation.** (Refer to figure 4-17.)

**NOTE**

**Apply anti-seize tape (item 19, appx D) to all male threads before installation.**

- (1) Screw pipe nipple (4) and air filter on reservoir (5)
- (2) Screw street elbow (2) and half coupling (1) on air filter (3)

**g. Testing.**

**NOTE**

**Prior to energizing the air compressor, verify that the air filter drain petcock and reservoir drain cock are closed.**

4-26. AIR FILTER(CONT).

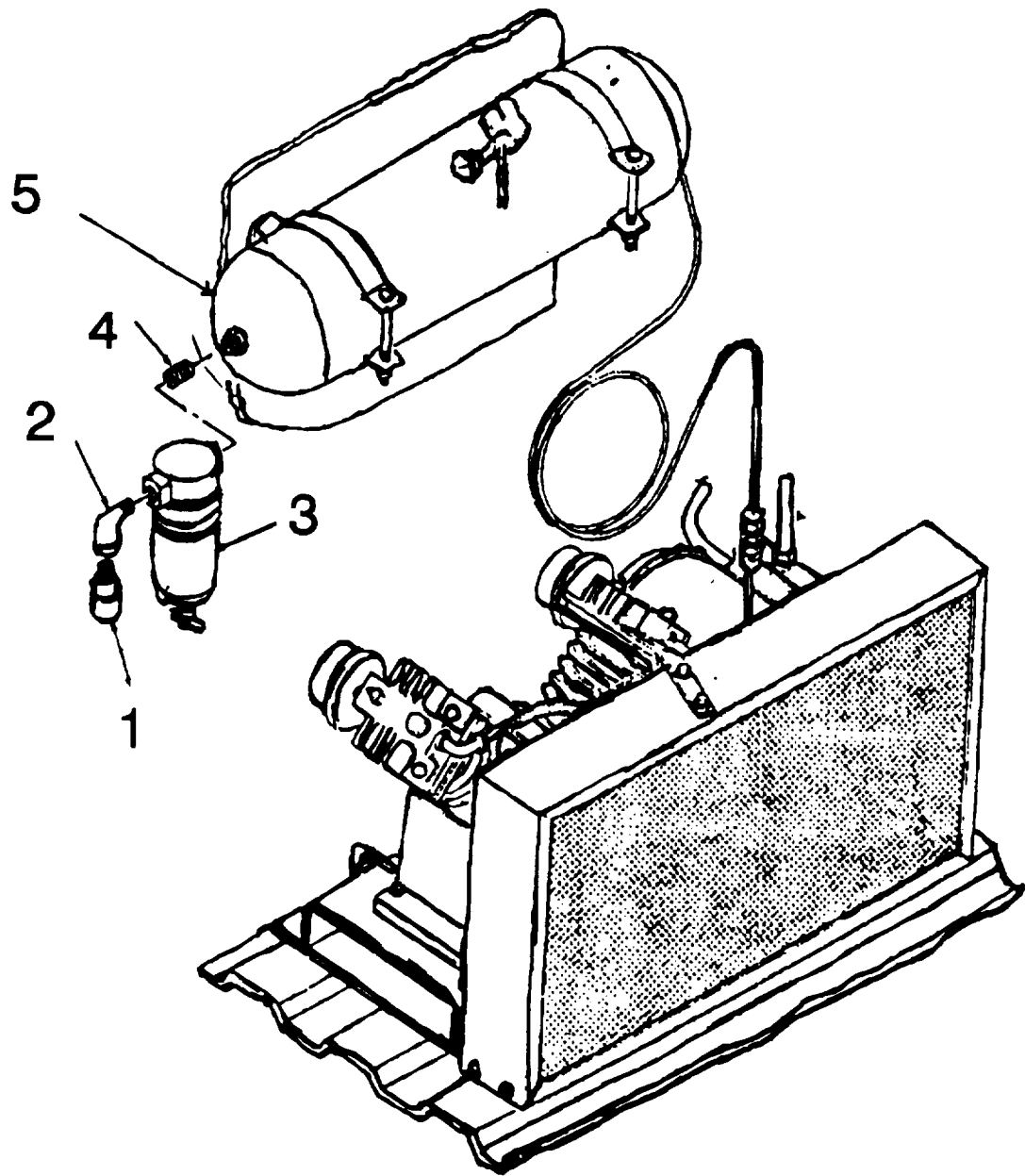


Figure 4-17. Air Filter Removal/Installation.

Turn ON the air compressor and operate to pressurize the reservoir. The allowable compressed air leakage rate shall be such that the low pressure cut in shall not restart the air compressor within one half hour after compressor has cut out. If the air leakage rate is not within the prescribed rate, prepare a mixture of 50% water and 50% soap (item 17, appx D). Pressurize the reservoir and pour drops of the soap/water mixture onto the street elbow, half coupling, pipe nipple, and air filter. The component that bubbles when the soap/water mixture is present must be either replaced or tightened. Retest to assure that corrective action was applied properly.

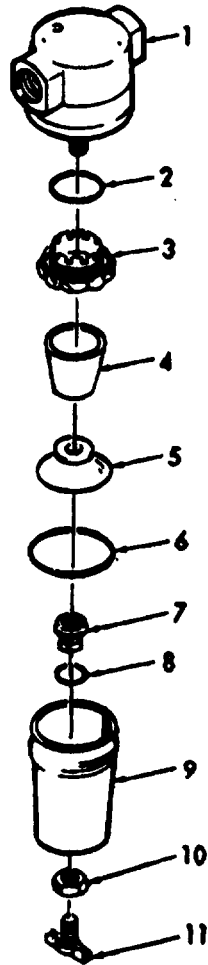


Figure 4-18. Air Filter Disassembly/Assembly.



**4-27. STORAGE STRAPS/TIEDOWNS.**

---

This task consists of:

- |               |                 |
|---------------|-----------------|
| a. Removal    | c. Cleaning     |
| b. Inspection | d. Installation |
- 

**INITIAL SETUP:****Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

**Material Required:**

Cloth, Lint-Free (Item 4, Appx D)

Soap (Item 17, Appx D)

Solvent, Dry Cleaning (Item 18, Appx D)

Oil, Lubricating (Item 8, Appx D)

**Equipment Conditions:**

CMV shut down and cool.

---

**a. Removal.** This procedure is applicable to all tiedown straps in the shop set. Refer to figure 4-19 and proceed as follows:

- (1) Remove four machine screws (1), four lockwashers (2), four hexagon nuts (3), two loops (4), and two storage straps (5 and 6).
- (2) Remove two loops (4) from two storage straps (5 and 6).

**b. Inspection.**

- (1) Inspect tiedown straps for fraying, tears, and damage to buckles. Replace tiedown straps if they are frayed, torn, or buckles do not latch properly.
- (2) Inspect attaching hardware for stripped threads, rust or corrosion. Replace any hardware that is defective.

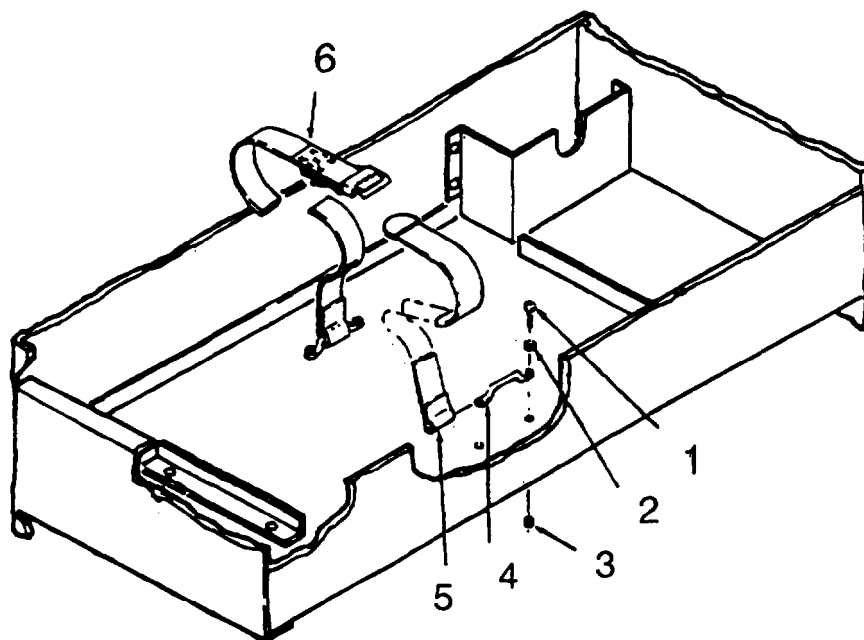
c. **Cleaning.**

**WARNING**

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable, and, if ignited, could cause injury to personnel and damage to equipment.**
  - **Do not breathe cleaning solvent for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flames.**
  - **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if solvents contact the skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.**
- (1) Remove all build-up of dirt, grease, and other types of residues with a lint-free cloth (item 4, appx D).
  - (2) Remove all build-up of dirt and grease from buckles, loops, and attaching hardware with a lint-free cloth (item 4, appx D) and dry cleaning solvent (item 18, appx D).
  - (3) Clean storage straps with water and soap (item 17, appx D). Rinse with clean water and let air dry.
  - (4) Apply a thin coat of lubricating oil (item 8, appx D) to metal parts.

**d. Installation.** To install storage straps and tiedowns, refer to figure 4-19 and proceed as follows;

- (1) Push two loops (4) through two storage straps (5 and 6).
- (2) Secure two storage straps (5 and 6) with four machine screws (1), four lockwashers (2), and four hexagon nuts (3).

**4-27. STORAGE STRAPS/TIEDOWNS (CONT).****Figure 4-19. Storage Straps/Tiedowns****4-28. AIR STRAINER ASSEMBLY**


---

This task consists of:

- |               |                 |
|---------------|-----------------|
| a. Removal    | c. Cleaning     |
| b. Inspection | d. Installation |
- 

**INITIAL SETUP:****Tools Required:**

Tool Kit, Contact Maintenance (Engineer) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

**Material Required:**

Cloth, Lint-Free (Item 5, Appx E)  
 Brush, Medium Bristle (Item 6, Appx E)  
 Soap (Item 20 Appx E)  
 Solvent, Dry Cleaning (Item 7, Appx E)

**Equipment Conditions:**

CMV Shut Down and Cool  
 Air Compressor Shut Down and Cool

---

#### 4-28. AIR STRAINER ASSEMBLY (CONT).

a. **Removal.** To remove the air strainer assembly components, refer to figure 4-6 and proceed as follows.

- (1) Remove plain wing nut (1) and flat washer (2).
- (2) Remove air filter cover (3), intake filter element (4), and mesh strainer element (5) from air strainer body.

b. **Inspection.** Inspect parts for obvious damage. Replace intake filter element if damaged. Replace mesh strainer element if damaged.

c. **Cleaning.**

**WARNING**

- Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable, and, if ignited, could cause injury to personnel and damage to equipment.
- Do not breathe cleaning solvents for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flames.
- Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if solvents contact the skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.

(1) Remove all build up of dirt or oil from metal parts with a lint-free cloth (Item 5, Appx E), medium brush (Item 6 Appx E), and dry cleaning solvent (Item 7, Appx E).

(2) Clean intake filter element (4) with water and soap (Item 10, Appx E). Rinse with clean water and let air dry.

d. **Installation.** To install the air strainer assembly components, refer to figure 4-6 and proceed as follows:

(1) Install mesh strainer element (5), intake filter element (4), and air filter cover (3) on air strainer body (6).

(2) Secure air filter cover (3) on air strainer body (6) with flat washer (2) and plain wing nut (1).

---

**Section VI. PREPARATION FOR STORAGE OR SHIPMENT****4-29. PREPARATION FOR LIMITED STORAGE OR RESHIPMENT.****NOTE**

**Limited storage is applicable to a time period not to exceed two weeks.**

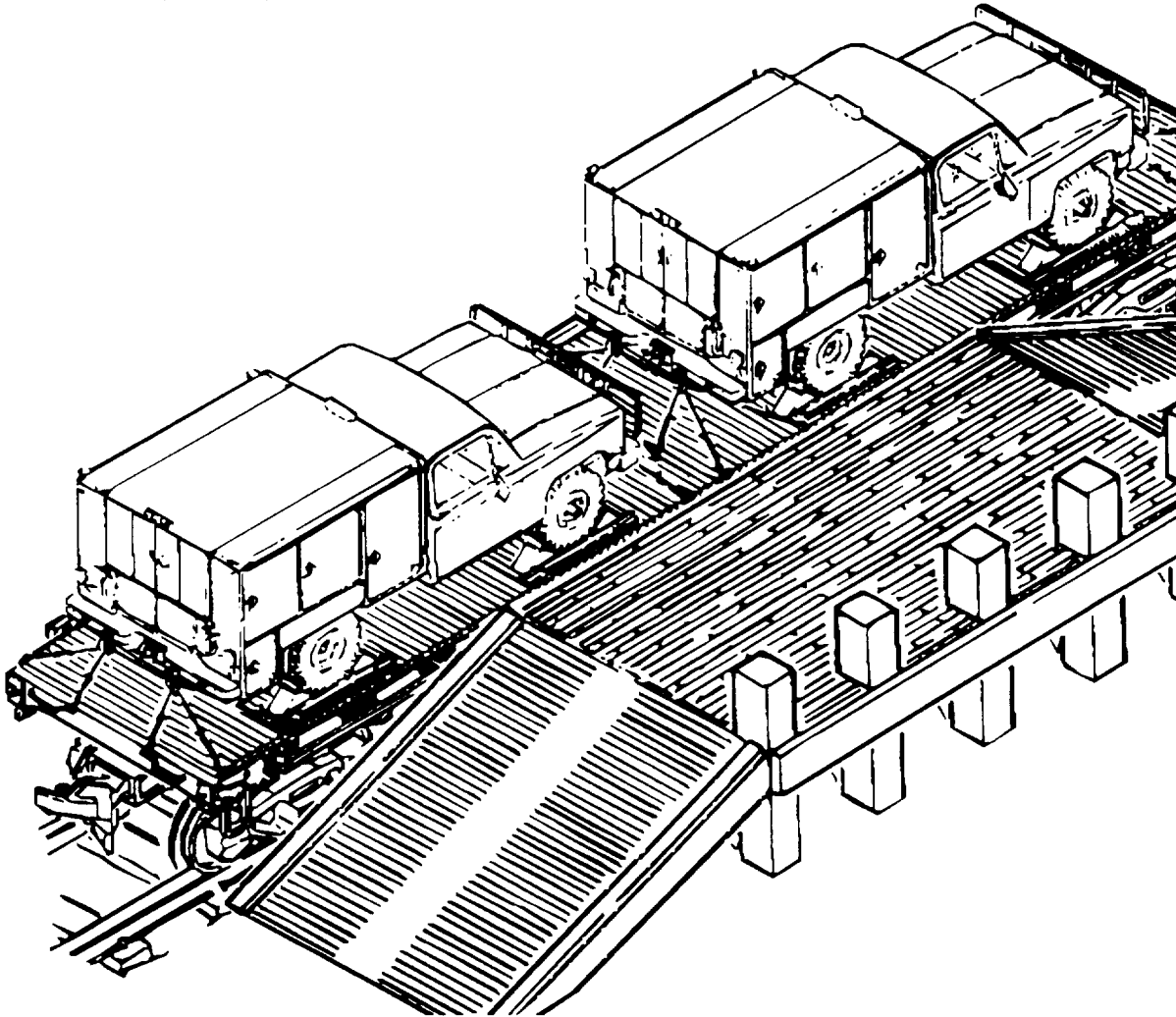
**a. Limited Storage.**

- (1) Place MAIN CIRCUIT BREAKER CB1 on control panel to OFF position.
- (2) Disengage PTO in accordance with paragraph 2-6c.
- (3) Remove CMV ground by disconnecting copper wire terminal from safety ground terminal on control panel and pull ground rod out of ground.
- (4) Replace all CMV components into their respective storage compartments; ensure all are tightened and secure.
- (5) Release all air pressure from air compressor system before moving CMV, by opening petcock on bottom of air reservoir assembly,
- (6) Ensure that the valves on the oxygen and acetylene cylinders of the welding unit are closed.
- (7) Close and lock all storage compartment doors.

**b. Reshipment.** The CMV may be shipped by any of the following modes of transportation: self-propelled over the road, rail, or flatbed trailer.

- (1) **Preparation for Reshipment.** This requires no special preparation other than performing steps (1) through (7) of paragraph a. preceding.
- (2) **Shipping by Rail.** Refer to figure 4-20 and load CMV (under its own power), onto railway car and secure using wheel blocks. Refer to TM 55-2200-001-12 for blocking and bracing of the CMV for rail car shipment.
- (3) **Shipping by Flatbed Trailer.** Refer to figure 4-21 and load CMV (under its own power), onto flatbed trailer and secure using wheel blocks.
- (4) **Wheel Blocking Procedures.** Refer to figures 4-21 and 4-20 and perform the following procedures for wheel blocking of CMV.
  - (a) Block front and rear wheels of CMV.

**4-29. PREPARATION FOR LIMITED STORAGE OR RESHIPMENT  
(CONT).**



**Figure 4-20. Shipping CMV by Rail Car.**

#### 4-29. PREPARATION FOR LIMITED STORAGE OR RESHIPMENT (CONT).

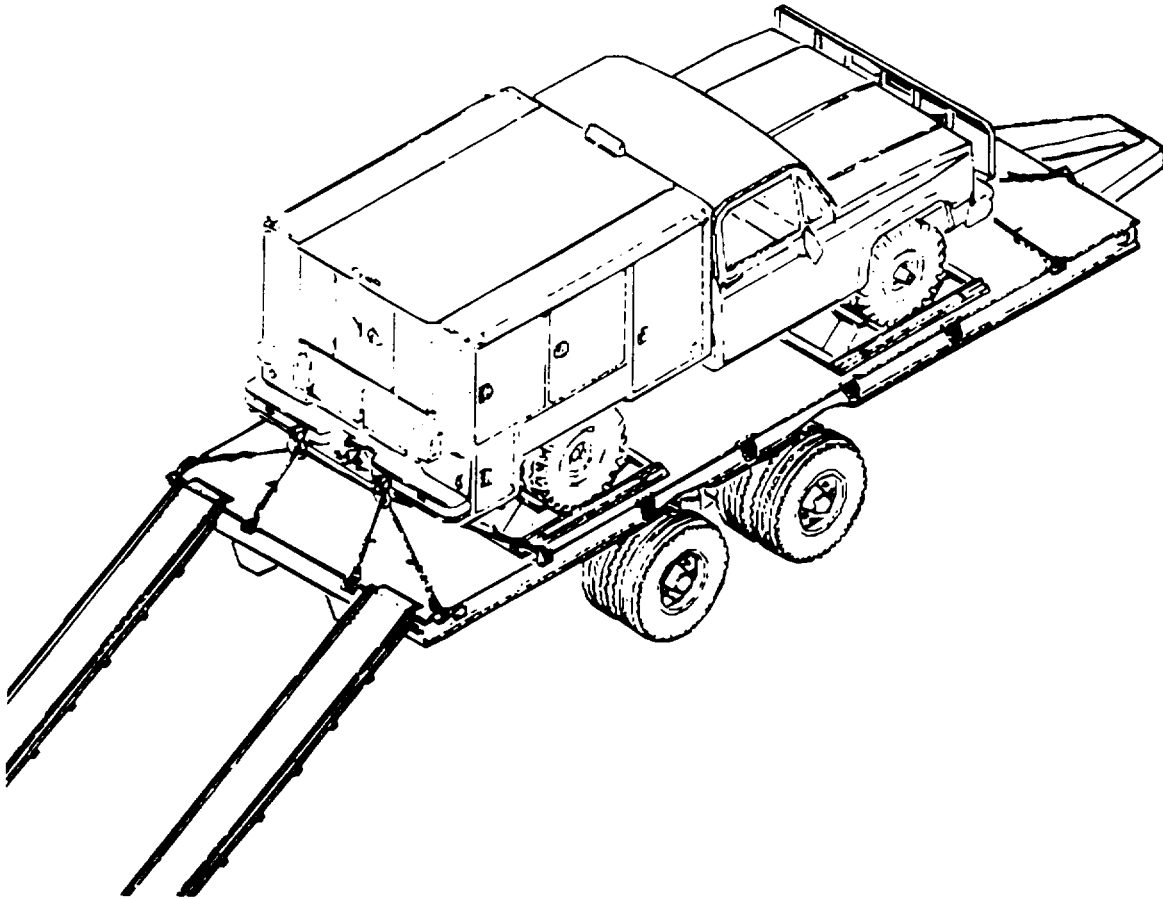


Figure 4-21. Shipping CMV by Flatbed Trailer.

#### b. Reshipment. (Cont).

##### (4) Wheel Blocking Procedures (Cont).

- (b) Insert blocking material, preferably 4 x 4 inch block of wood between axles and chassis of vehicle.
- (c) Secure vehicle.

#### 4-30. GENERAL CARE AND PREPARATION FOR STORAGE.

- a. M1031 Vehicle. Refer to TM 9-2320-289-10 for M1031 vehicle storage.
- b. CMV. To prepare CMV for storage, proceed as follows:

- (1) Bleed air compressor to ensure all air in reservoir has been removed and no pressure exists.
- (2) Drain any condensate from air filter/water separator and reservoir.
- (3) Perform all lubrication tasks on CMV components.
- (4) Ensure all CMV components are stored in proper location and none are missing.
- (5) Secure all components,
- (6) Latch and lock CMV doors and move to a secure storage area.

**4-31. LONG-TERM STORAGE.**

- a. **M1031 Vehicle.** Refer to TM 9-2320-289-10 for vehicle storage.
- b. **CMV.** To prepare the CMV for long-term storage, proceed as follows:
  - (1) Perform administrative storage as stated in paragraph 1-6.
  - (2) Package component items and preserve in accordance with level A, MIL-V-62038.



## CHAPTER 5

## DIRECT SUPPORT MAINTENANCE INSTRUCTIONS

## Section I. DIRECT SUPPORT MAINTENANCE PROCEDURES

## 5-1. GENERAL.

This section contains the maintenance procedures authorized for the direct support maintenance group. The information is organized into the following paragraphs:

Para.		Page
5-2	Air Line .....	5-2
5-3	Pressure Stitch .....	5-5
5-4	Air Tank Reservoir .....	5-8
5-5	Air Compressor Motor .....	5-12
5-6	Air Compressor .....	5-17
5-7	Governor Wiring Harness .....	5-27
5-8	Electronic Governor System .....	5-35
5-9	Transfer Case Neutral Switch .....	5-52
5-10	Power Take Off Unit .....	5-55
5-11	Cable Assemblies (Direct Current) .....	5-66
5-12	Cable Assemblies (Alternating Current) .....	5-73
5-13	Alternator .....	5-81
5-14	Alternator Mount .....	5-90
5-15	Control Panel Assembly .....	5-92
5-16	Cable Assemblies (Control Panel) .....	5-99
5-17	Propeller Shaft .....	5-105
5-18	Sprockets .....	5-110
5-19	Gage Compartment Door .....	5-115
5-20	Rear Door Assemblies (Left Hand and Right Hand) .....	5-117
5-21	Side Door Assemblies .....	5-120
5-22	PTO Controls .....	5-123
5-23	Bumper Assembly .....	5-127
5-24	Explosive Ordnance Disposal (EOD) Hardware .....	5-132

## 5-2. AIR LINE.

---

This task consists of:

- |               |                 |
|---------------|-----------------|
| a. Removal    | c. Cleaning     |
| b. Inspection | d. Installation |
- 

### INITIAL SETUP:

#### **Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)  
Fitting Repair Kit (P/O SC 4940-95-B21))

#### **Material Required:**

Brush, Medium Bristle (Item 2, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)  
Tape, Anti-Seize (Item 19, Appx D)  
Solvent, Dry-Cleaning (Item 18, Appx D)

#### **Equipment Conditions:**

CMV shut down and cool.  
Air compressor shut down and cool.

---

- a. **Removal.** (Refer to figure 5-1.)

**WARNING**

**Air compressor must be turned off and bled before performing maintenance. Rotating pulleys, moving belts, or compressed air could cause serious injury to personnel.**

- (1) Disconnect union (1) on air line (2) from tube assembly (3) adapter.
- (2) Loosen coupling nut (4) and sleeve (5). Remove air line (2).
- (3) Remove check valve (6) and elbow (7) from air reservoir (8).
- (4) Disconnect adapter (9) on tube assembly (3) and remove tube assembly (3) from air compressor (10).

- (5) Disconnect two flare nuts (11) on tube assembly (12). Remove tube assembly (12) from air compressor (10).

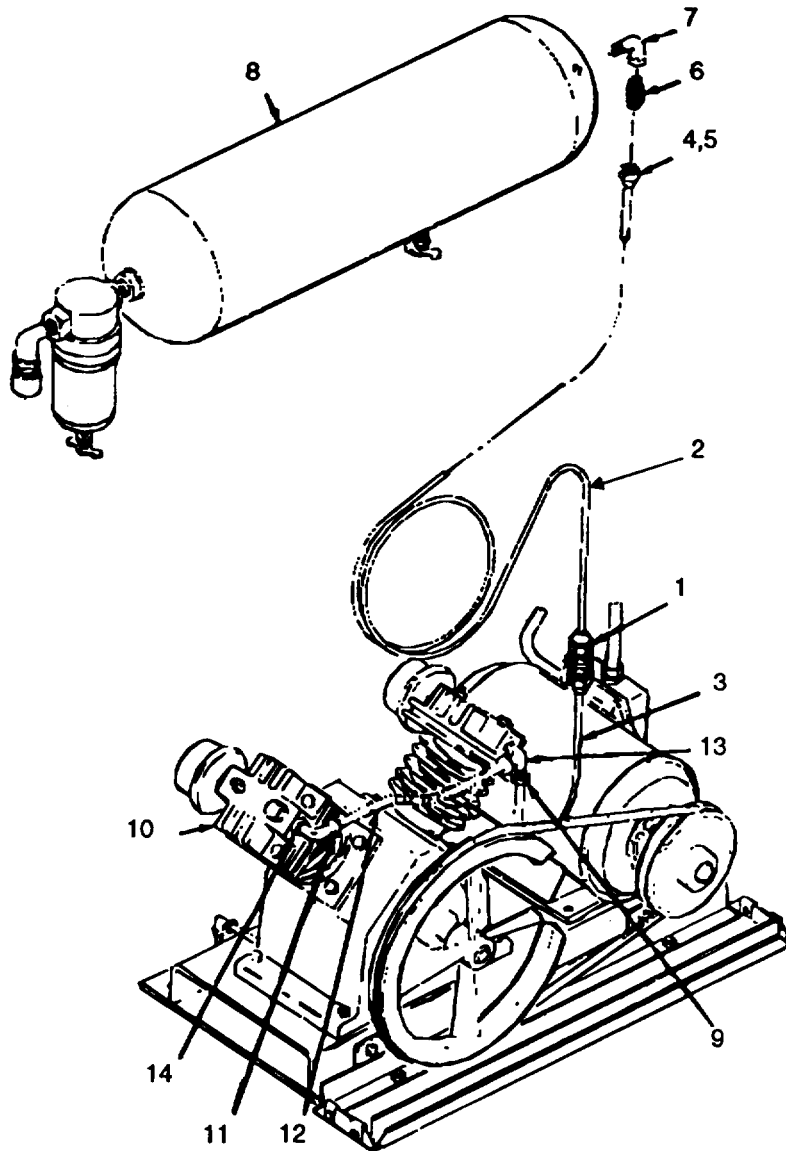


Figure 5-1. Air Line, Removal/Installation.

**5-2. AIR LINE (CONT).**

(6) Remove pipe tee (13) and pipe elbow (14) from air compressor (10).

**b. Inspection.**

- (1) Inspect air lines cracks, collapsed lines, and corrosion. Replace air line if it cannot be repaired with fitting kit components.
- (2) Inspect union, coupling nut, sleeve, elbows, adapter, flare nuts, and pipe tee for cracks, corrosion, or damaged threads. Replace any component that is unusable.
- (3) Inspect check valve for smooth operation of internal piston. Replace check valve is piston binds or does not move.

**c. Cleaning.**

**WARNING**

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable, and, if ignited, cause injury to personnel and damage to equipment.**
  - **Do not breathe cleaning solvents for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flames.**
  - **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if solvents contact the skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.**
- (1) Clean all parts with a lint-free cloth (item 4, appx D) or a medium bristle brush (item 2, appx D) and dry-cleaning solvent (item 18, appx D).

(2) Allow all parts to air dry.

**d. Installation.** (Refer to figure 5-1.)

**NOTE**

**Apply anti-seize tape (item 19, appx D) to all male threads before installation.**

- (1) Install and tighten pipe tee (13) and pipe elbow on air compressor (10).
- (2) Install tube assembly (12) by attaching two flare nuts (11) of tube assembly (12) onto pipe tee (13) and pipe elbow (14). Tighten the two flare nuts (11).
- (3) Install elbow (7) and check valve (6) on air reservoir (8).
- (4) Connect adapter (9) of tube assembly (3) to pipe tee (13).
- (5) Install air line (2) by attaching coupling nut (4) and sleeve (5) to check valve (6) and by attaching union (1) to tube assembly (3) adapter.

**5-3. PRESSURE SWITCH.**

---

This task consists of:

- |             |                 |
|-------------|-----------------|
| a. Removal  | c. Installation |
| b. Cleaning | d. Adjustment   |
- 

**INITIAL SETUP:**

**Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

**Material Required:**

Brush, Medium Bristle (Item 2, Appx D)  
 Cloth, Lint-Free (Item 4, Appx D)  
 Solvent, Dry-Cleaning (Item 18, Appx D)  
 Tape, Anti-Seize (Item 19, Appx D)

**Equipment Conditions:**

CMV shut down and cool.  
 Air compressor shut off and bled.

---

### 5-3. PRESSURE SWITCH (CONT).

---

#### **WARNING**

Air compressor must be turned OFF. The air tank can contain air at dangerous pressures. Open drain cock on bottom of tank and bleed down before servicing.

**a. Removal.** (Refer to figure 5-2.)

- (1) Tag and disconnect all wiring and cable attached to pressure switch (1).
- (2) Unscrew pressure switch (1) from pipe cross (2).

**b. Cleaning.**

- (1) Remove all build up of dirt or oil on all parts with a lint-free cloth (item 4, appx D) or medium bristle brush (item 2, appx D).

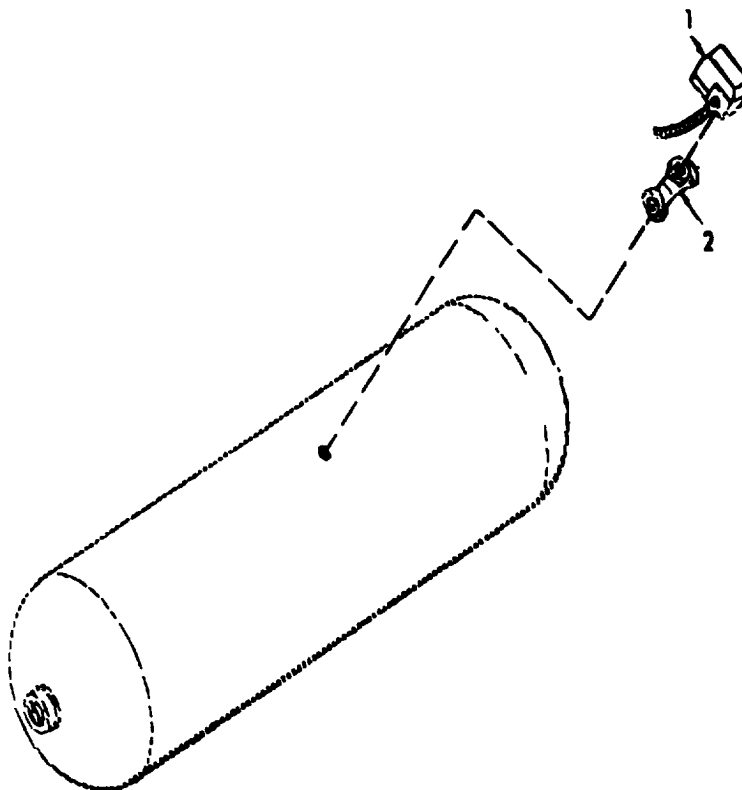


Figure 5-2. Pressure Switch, Removal/Installation.

**WARNING**

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable, and, if ignited, cause injury to personnel and damage to equipment.**
- **Do not breathe cleaning solvents for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flames.**
- **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.**

**CAUTION**

**In the following step, do not allow cleaning solvent to contact the pressure switch.**

- (2) Clean all metal parts with a lint-free cloth (item 4, appx D) or medium bristle brush (item 2, appx D) and cleaning solvent (item 18, appx D) .
- (3) Allow all parts to dry.

**c. Installation.** Apply anti-seize tape (item 19, appx D) to brass fittings before installation. Refer to paragraph a. preceding and install in reverse order of removal.

**d. Adjustment.** Refer to paragraph 4-10 for adjustment procedures.

#### 5-4. AIR TANK RESERVOIR.

---

This task consists of:

- |             |                 |
|-------------|-----------------|
| a. Removal  | d. Installation |
| b. Cleaning | e. Test         |
| c. Repair   |                 |
- 

#### INITIAL SETUP:

##### **Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
or  
Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

##### **Material Required**

Brush, Medium Bristle (Item 2, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)  
Solvent, Dry-Cleaning (Item 18, Appx D)  
Tape, Anti-Seize (Item 19, Appx D)  
Soap, (Item 17, Appx D)

##### **Equipment Conditions:**

CMV shut down and cool.  
Air compressor shut off and bled.

---

<b>WARNING</b>
----------------

**Air compressor must be turned OFF. The air tank can contain air at dangerous pressures. Open drain cock on bottom of tank and bleed down before servicing.**

##### **a. Removal** (Refer to figure 5-3.)

- (1) Disconnect air line (1) from check valve (2). Unscrew and remove check valve (2) and elbow (3) from reservoir (4).
- (2) Tag and disconnect wiring of cable assembly (5) to pressure switch (6). Remove box connector of cable assembly (5) from pressure switch (6) and remove cable assembly (5) from pressure switch (6).



- (3) Unscrew and remove pressure switch (6), air pressure gage (7), and safety relief valve (8) from pipe cross (9).
- (4) Unscrew and remove pipe cross (9) and reducer (10) from reservoir (4).
- (5) Unscrew and remove half coupling (11) and street elbow (12) from air filter (13).

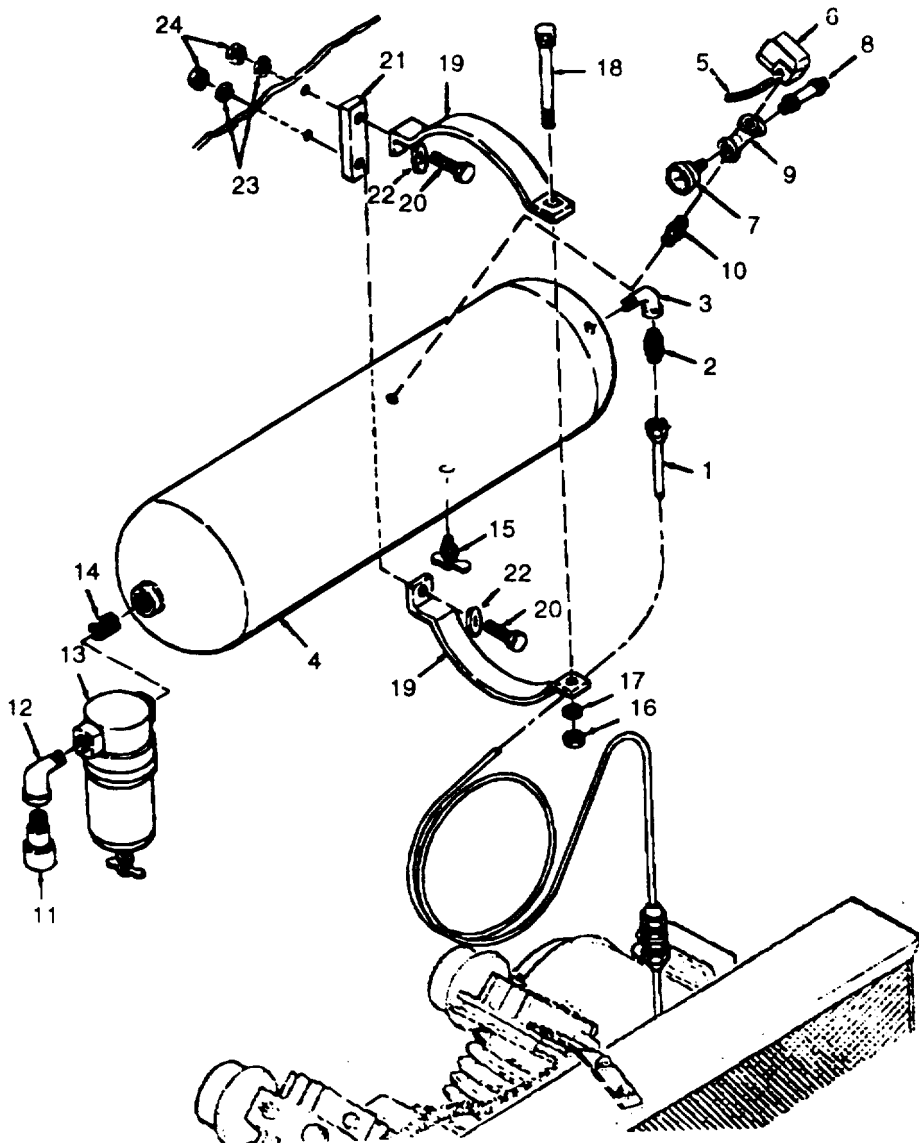


Figure 5-3. Air Tank Reservoir, Removal/Installation.

#### 5-4. AIR TANK RESERVOIR (CONT).

- (6) Unscrew and remove air filter (13) and pipe nipple (14) from reservoir (4).
- (7) Unscrew and remove drain cock (15) from reservoir (4).
- (8) Unscrew and remove two hexagon nuts (16), two lockwashers (17), and two bolts (18) from two bracket assemblies (19).
- (9) Remove reservoir (4) from bracket assembly (19).
- (10) Unscrew and remove four cap screws (20) holding bracket assembly (19) to spacer plate (21). Remove four lockwashers (22), two bracket assemblies (19), two spacer plates (21), four lockwashers (23), and four hexagon nuts (24).

#### b. Cleaning.

- (1) Remove all build up of dirt or oil on all parts with a lint-free cloth (item 3, appx D).

<b>WARNING</b>
----------------

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning for these items are highly flammable, and if ignited, cause injury to personnel and damage to equipment.**
- **Do not breathe cleaning solvents for long periods of time or use solvent near open flame. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flames.**
- **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with the exposed skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.**

- (2) Clean metal parts, ex., elbow, bolts, lockwashers, etc., with a lint-free cloth (item 4, appx D), or medium bristle brush (item 2, appx D), and dry cleaning solvent (item 18, appx D). Allow parts to air dry.

c. **Repair.** Repair is limited to replacement of damaged or defective components.

d. **Installation.** (Refer to figure 5-3).

#### NOTE

**Wrap anti-seize tape (item 19, appx D) on all male pipe threads before installation of pipe threaded parts.**

- (1) Install four cap screws (20), four lockwashers (22), two bracket assemblies (19), two spacer plates (21), four lockwashers (23), and four hexagon nuts (24).
- (2) Install reservoir (4) in bracket assembly (19) so that ends of reservoir are approximately equidistant from bracket assembly (19) brackets.
- (3) Install and tighten two bolts (18), two lockwashers (17), and two hexagon nuts (16) on two bracket assemblies (19).
- (4) Install and tighten drain cock (15) onto reservoir (4).
- (5) Install pipe nipple (14) and air filter (13) onto reservoir (4).
- (6) Install street elbow (12) and half coupling (11) onto air filter (13).
- (7) Install and tighten reducer (10) and pipe cross (9) onto reservoir (4).
- (8) Install and tighten pressure switch (6), air pressure gage (7), and safety relief valve (8) onto pipe cross (9).
- (9) Pull tagged wiring of cable assembly (5) through mounting hole of pressure switch (6). Install box connector of cable assembly (5) onto pressure switch (6). Connect tagged wiring of cable assembly (5) onto pressure switch (6).
- (10) Install and tighten elbow (3) and check valve (2) onto reservoir (4). Connect and tighten air line (1) onto check valve (2).
- (11) Adjust air compressor switch per paragraph 4-10.

#### 5-4. AIR TANK RESERVOIR (CONT).

##### e. Test.

#### NOTE

**Prior to energizing the air compressor, verify that air filter drain petcock and reservoir drain cock are closed.**

Turn ON the air compressor and operate to pressurize the reservoir. The allowable compressed air leakage rate shall be such that the low pressure cut in shall not restart the air compressor within one half hour after compressor has cut out. If the air leakage rate is not within the prescribed rate, prepare a mixture of 50% water and 50% soap (item 17, appx D). Pressure the reservoir and pour drops of the water/soap mixture onto all air line connections. The air line connection that bubbles when the water/soap mixture is present must be either replaced or reconnected. Retest to assure all air line connections are within prescribed test parameters.

#### 5-5. AIR COMPRESSOR MOTOR.

---

This task consists of:

- |                |                 |
|----------------|-----------------|
| a. Removal     | d. Repair       |
| b. Disassembly | e. Assembly     |
| c. Cleaning    | f. Installation |
- 

#### INITIAL SETUP:

##### Tools Required:

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

##### Material Required:

Cloth, Lint-Free (Item 4, Appx D)  
Brush, Medium Bristle (Item 2, Appx D)  
Solvent, Dry-Cleaning (Item 18, Appx D)

##### Equipment Conditions:

CMV shut down and cool.  
Air compressor shut down and cool.  
Air compressor belt guard removed.

---

**WARNING**

**Air compressor must be turned OFF and bled before performing maintenance. Rotating pulleys, moving belts, or compressed air can cause serious injury to personnel.**

**a. Removal.** (Refer to figures 5-4 and 5-5.)

- (1) Remove four screws (1, fig. 5-5), cover plate of outlet conduit (2), and gasket (3) of motor.
- (2) Tag and disconnect wiring of cable assembly (1 and 2, fig 5-4) to motor (3). Remove box connectors of cable assemblies (1 and 2) from motor and remove the cable assemblies.
- (3) Remove four hexagon nuts (4), four lockwashers (5), four flat washers (6), and four shoulder bolts (7).
- (4) Slide motor toward air compressor (8) until V-belt (9) can be removed from pulley (10).
- (5) Remove V-belt (9) and motor (3). Remove pin from pulley (10) and remove pulley from motor.

**b. Disassembly.** (Refer to figure 5-5.)

- (1) Remove four machine bolts (4) and four hexagon nuts (5).
- (2) Remove front end plate (6), two bearing covers (7), rear end plate (8), and wave washer (9) from motor stator (10). Remove shaft assembly (11) and impeller fan (12) as an assembly from motor stator (10).

5-5. AIR COMPRESSOR MOTOR (CONT).

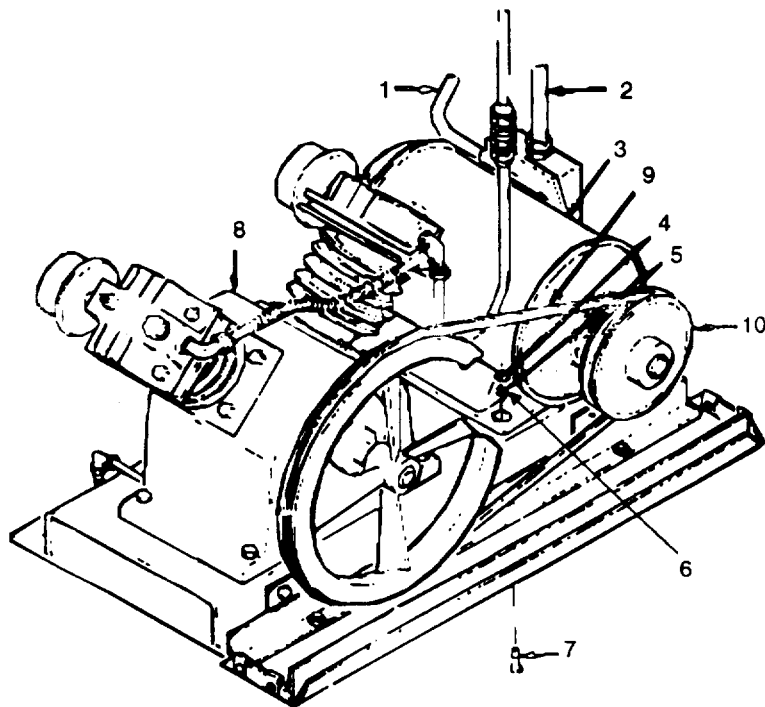


Figure 5-4. Air Compressor Motor - Removal/Installation.

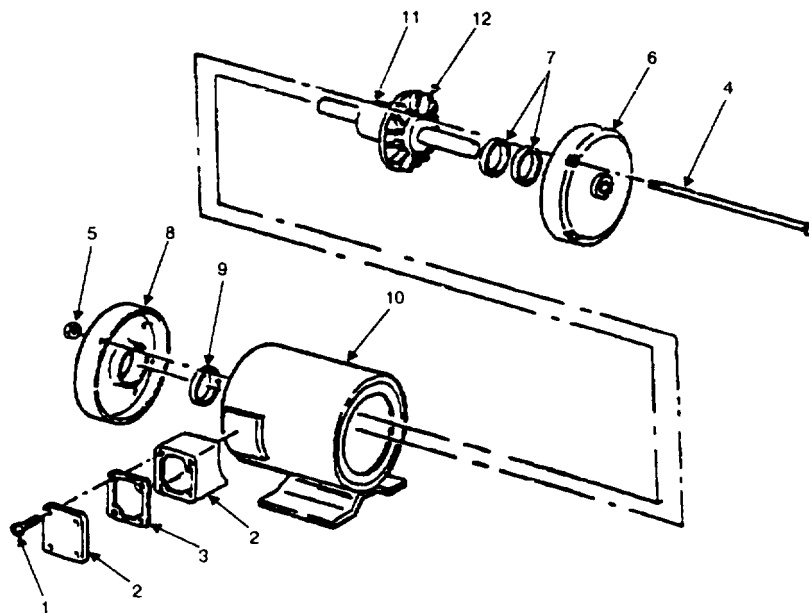


Figure 5-5. Air Compressor Motor - Disassembly and Assembly.

**c. Cleaning.**

- (1) Remove all buildup of dirt or grease on all parts with a lint-free cloth (item 4, appx D).

<b>WARNING</b>
----------------

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning for these items are highly flammable, and if ignited, cause injury to personnel and damage to equipment.**
  - **Do not breathe cleaning solvents for long periods of time or use solvent near open flame. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flames.**
  - **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with the exposed skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.**
- (2) Clean screws, hexagon nuts, washers, and bolts with a medium bristle brush (item 2, appx D) and dry cleaning solvent (item 18, appx D). Allow parts to air dry.
  - (3) Clean motor components, (except front end plate, bearing covers and stator) with a lint-free cloth (item 4, appx D).

**d. Repair.**

- (1) Inspect for worn or damaged parts.
- (2) Repair is by replacement of authorized parts (TM 9-4940-562-23P) which are determined to be defective.

## 5-5. AIR COMPRESSOR MOTOR (CONT).

### e. Assembly. (Refer to figure 5-5.)

- (1) Place shaft assembly (11) and impeller fan (12) in motor stator (10). Install wave washer (9) onto shaft assembly (11).
- (2) Place two bearing covers (7) on front of shaft assembly (11). Install front end plate (6) and rear end plate (8) and secure with four machine bolts (4) and four hexagon nuts (5).
- (3) Use hand operated grease gun. Clean lubrication fittings and lubricate using no more than one or two strokes with grease gun.

### f. Installation. (Refer to figure 5-4).

- (1) Place pulley (10) on motor (3) and align pin holes in pulley and motor shaft assembly. install pin in pin holes.
- (2) Place motor (3) close to air compressor (8) and slip V-belt (9) over the motor pulley (10) and air compressor pulley.
- (3) Install but not tighten four shoulder bolts(7), four flat washers (6), four lockwashers (5), and four hexagon nuts (4). Pull motor (3) away from air compressor (8) so that belt tension deflection at midpoint is 3/8 to 1/2 inch. Tighten hexagon nuts (4) once correct belt tension is obtained.
- (4) Pull tagged wiring of cable assembly (1 and 2) through mounting hole of outlet conduit. Install box connectors of cable assemblies (1 and 2) to outlet conduit of motor (3). Connect tagged wiring of cable assemblies (1 and 2) to motor (3).
- (5) Install gasket (3, fig. 5-5) cover plate of outlet conduit (2), and four screws (1).
- (6) Run air compressor 20 minutes. Clean grease expelled from motor.



**5-6. AIR COMPRESSOR.**

---

This task consists of:

- |                |                 |
|----------------|-----------------|
| a. Removal     | e. Repair       |
| b. Disassembly | f. Assembly     |
| c. Cleaning    | g. Installation |
| d. Inspection  |                 |
- 

**INITIAL SETUP:****Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

**Material Required:**

Oil, Lubricating (Item 8, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)  
Brush, Medium Bristle (Item 2, Appx D)  
Solvent, Dry-Cleaning (Item 18, Appx D)  
Soap (Item 17, Appx D)  
Cloth, Abrasive (Item 3, Appx D)

**Equipment Conditions:**

CMV shut down and cool.  
Air compressor shut down and cool.  
Air compressor belt guard removed.  
Air compressor belt removed.

---

<b>WARNING</b>
----------------

- **Air compressor must be turned OFF. The air tank can contain air at dangerous pressures. Open drain cock at bottom of tank and bleed down before servicing.**
- **Two persons are required for lifting the air compressor. The weight of the compressor (50 pounds) could cause injury to personnel.**

## 5-6. AIR COMPRESSOR (CONT).

### a. **Removal.** (Refer to figure 5-6.)

- (1) Remove air line (1) from tube coupling (2).
- (2) Remove four cap screws (3) and four lock washers (4) and air compressor (5) from base assembly (6).

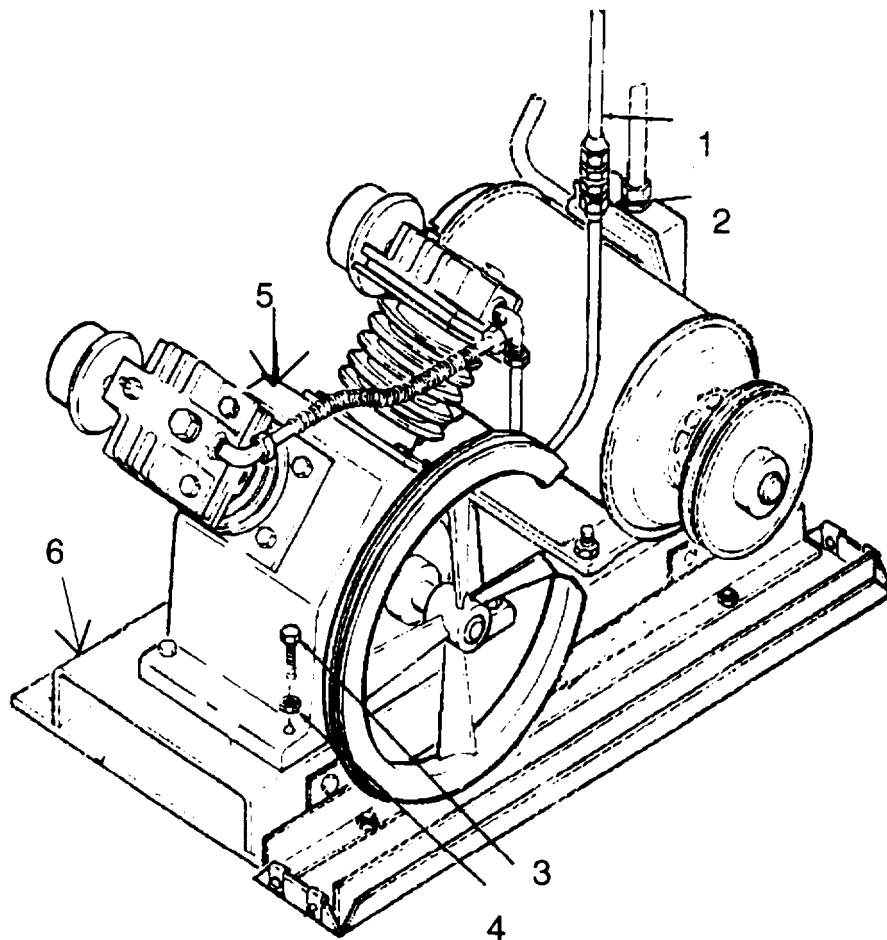
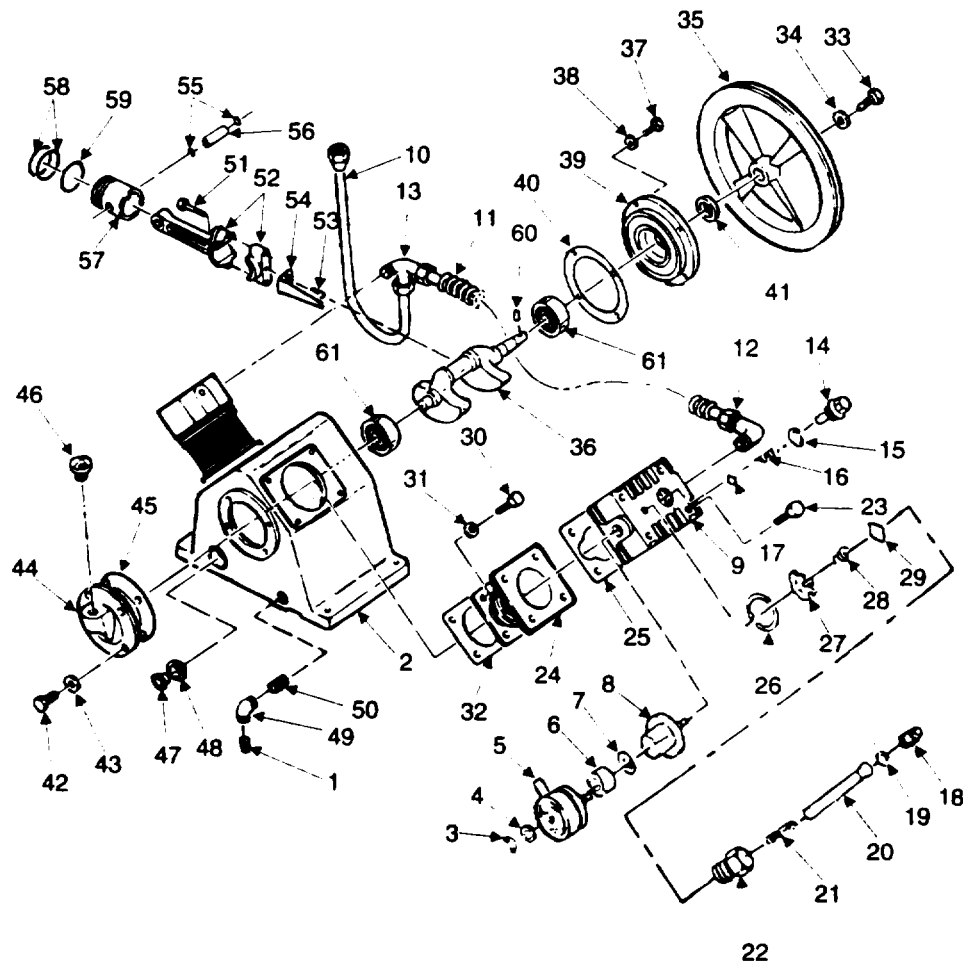


Figure 5-6. Air Compressor, Removal/Installation.

### b. **Disassembly.** (Refer to figure 5-7.)

- (1) Remove pipe plug (1) on rear of air compressor crankcase (2) and drain oil into a suitable container.

- (2) Remove wing nut (3), flat washer (4), air filter cover (5), air filter element (6), and strainer element (7). Remove air filter housing (8) from cylinder head (10) by turning the housing counterclockwise.
- (3) Remove discharge tube (10), tube assembly (11), pipe elbow (12), and pipe tee (13) from cylinder heads (9).



**Figure 5-7. Air Compressor, Disassembly/Assembly.**

**5-6. AIR COMPRESSOR (CONT).**

**NOTE**

**Both cylinders are identical so the following procedure should be used for disassembly of either cylinder.**

- (4) Unbolt outlet valve push cover (14) and remove packing (15), helical spring (16), valve plate (17) from cylinder head (9).
- (5) Unbolt pipe plug (18) and remove O-ring (19), piston (20), and unloader spring (21) from unloader cylinder (22).
- (6) Remove four machine bolts (23) and carefully remove cylinder head (9) from cylinder (24). Scrape gasket (25) from cylinder head (9) and cylinder (24).
- (7) Remove retaining ring (26), valve receiver (27), helical spring (28), and valve plate (29) from cylinder head (9). Unbolt unloader cylinder (22) from cylinder head (9).
- (8) Remove four machine bolts (30), four flat washers (31), and cylinder (24) from crankcase (2). Scrape gasket (32) from cylinder (24) and crankcase (2).
- (9) Remove machine bolt (33), flat washer (34), and pulley (35) from crankshaft (36).
- (10) Remove four machine bolts (37), four flat washers (38), front bearing cover (39), gasket (40), and oil seal (41) from crankcase (2).
- (11) Remove four machine bolts (42), four flat washers (43), rear bearing cover (44), and gasket (45) from crankcase (2).
- (12) Unscrew breather cap (46) from rear bearing cover (44).
- (13) Remove sight gage (47) and seal (48) from crankcase (2).
- (14) Remove pipe elbow (49) and pipe nipple (50) from crankcase (2).

- (15) Remove two bolts (51) from connecting rod (52) and connecting rod (52) from crankshaft (36). Remove machine screw (53) and oil splasher (54) from connecting rod (52).
- (16) Remove two snap rings (55), piston pin (56), and piston (57) from connecting rod (52).
- (17) Remove two compression rings (58) and oil ring (59) from piston (57).
- (18) Remove straight pin (60) and two bearings (61) from crankshaft (36).

**c. Cleaning.**

- (1) Thoroughly clean the cylinder heads by brushing or scraping lightly to remove accumulations of carbon deposits, being careful not to damage gasket surfaces. Be sure the gasket surface is free of all gasket particles.

**WARNING**

**Dry cleaning solvent, used to clean parts, is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact or breathing of fumes. Do not use near open flame or excessive heat. Flash point of solvent is 100 degrees F to 138 degrees F (38 degrees C to 59 degrees C). Use only in well ventilated area.**

- (2) Use dry cleaning solvent (item 18, appx D) and medium bristle brush (item 2, appx D) to wash away all accumulated oil. Be sure bore of cylinder is clean, and that all gasket particles are removed from surfaces.
- (3) Wash pistons in dry cleaning solvent (item 18, appx D) and scrub using medium bristle brush (item 2, appx D) to remove all accumulated oil and carbon. Pay particular attention to the piston ring grooves. Be sure that oil return holes in the oil control ring grooves are open, and that the groove themselves are absolutely clean.

## 5-6. AIR COMPRESSOR (CONT).

- (4) Wash the oil reservoir portion of the crankcase, being sure that accumulations of oil and sludge are removed. Clean gasket surfaces for cylinders and end covers. Be sure no particles of old gaskets remain on the surfaces.
- (5) Clean the valves in dry cleaning solvent (item 18, appx D). Clean both valve and seat with medium bristle brush (item 2, appx D). Should it be necessary to scrape carbon or sludge, do so lightly, with something soft, like a square piece of hardwood. This will prevent marring of valve or seating surface.

### d. Inspection.

- (1) Inspect the cylinder bore for any signs of scoring or scuffing. if the cylinder bore shows signs of wear or scoring, as indicated by visible ridging at the end of ring travel it must be replaced. Inspect the cylinder bore for wear: nominal dimensions is 65.002 MM (2.5611 in.) diameter; maximum allowable wear is 65.010 MM (2.5614 in.) diameter. Replace cylinder if the diameter exceeds the maximum allowable wear limit.
- (2) Inspect the piston for signs of scoring, or for any indication of cracked or broken lands. If these signs are found, replace the piston. If piston shows no signs of scoring or cracked or broken lands, check the condition of ring grooves for signs of excessive wear. A tapered ring groove would result in excessive clearance, and indicates that piston should be replaced.

### NOTE

**If new ring sets are to be on the pistons, and the old cylinder is going to be reused, the cylinder walls must be deglazed or slightly roughened to provide a proper seating-in surface for the new piston rings.**

- (3) Cylinders that passed inspection in paragraph d.(2), preceding, and that are to be reused with new piston rings must be deglazed as follows:

**WARNING**

**Dry cleaning solvent, used to clean parts, is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact or breathing of fumes. Do not use near open flame or excessive heat. Flash point of solvent is 100 degrees F to 138 degrees F (38 degrees C to 59 degrees C). Use only in well ventilated area.**

- (a) Use a No. 80 grit abrasive paper (item 3, appx D) dampened in dry cleaning solvent (item 18, appx D) and move it over the surface of the bore in a rotating and reciprocating motion with a very light pressure.
- (b) After deglazing, the cylinder wall should be thoroughly cleaned with a hot 20 percent soap (item 17, appx D) and 80 percent water solution, using a medium bristle brush (item 2, appx D). Rinse thoroughly with hot water then check cleanliness of the bore by wiping with a soft white paper or lint-free cloth (item 4, appx D). If the paper or cloth shows more than slight discoloring, the cylinder has not been properly cleaned and paragraph d.(3)(1), preceding, must be repeated until the paper or cloth only shows slight discoloration.
- (4) Inspect the bearings for roughness of bearing movement, corrosion, and wear. If bearings are worn, rough, or have other damage, replace the bearing. Inspect the crankshaft bearing surfaces for wear, pitting, or discoloration. If any crankshaft bearing surface is worn, pitted, or discolored, replace the crankshaft.
- (5) Inspect intercooler tube assembly for cracks in the tube or deterioration to the tube and fittings. If the tube is cracked or the fittings exhibit deterioration, replace the tube assembly.
- (6) Inspect air filter components for cracks, element damage, and for stripped threads. Replace any component not meeting inspection criteria.

## 5-6. AIR COMPRESSOR (CONT).

- (7) Inspect connecting rods for wear: piston pin bushing end nominal dimension is 16.001 MM (0.6305 in.) diameter; maximum allowable wear is 16.020 MM (0.6312 in.) diameter; crankshaft bushing end nominal dimension is 25.502 MM (1.0048 in.) diameter; maximum allowable wear is 25.507 MM (1.0049 in.) diameter. Replace connecting rod if maximum allowable wear dimensions are exceeded.

**e. Repair.** Repair is by replacement of authorized parts (TM 9-4940-562-23P) which are determined to be defective.

**f. Assembly.** (Refer to figure 5-7.)

### NOTE

**Position the compressor crankcase on workbench.  
Fasten it down so it will not tip over when weight is  
added by assembly.**

- (1) Install pipe nipple (50), pipe elbow (49), and pipe plug (1) into crankcase (2).
- (2) Install seal (48) and sight gage (47) into crankcase (2).
- (3) Install breather cap (46) onto rear bearing cover (44); install gasket (45) and rear bearing cover (44) onto crankcase (2), and secure with four flat washers (43) and four machine bolts (42).
- (4) Press two bearings (61) onto crankshaft (36) and install straight pin (60).
- (5) Install crankshaft (36) into crankcase (2), seating bearing (61) into rear bearing cover (44) by gently tapping on the crankshaft end with a soft hammer.



**If a vise is used to press the seal in the following step, be sure serrated jaws, if any, are covered to protect the seal from distortion.**



- (6) Install the shaft end oil seal (41) in front bearing cover (39) with the sealing lip facing the inside of shaft end cover, then press into position.
- (7) Place gasket (40) in position around shaft, then install front bearing cover (39). Secure front bearing cover to crankcase (2) with four flat washers (38) and four machine bolts (37).
- (8) Install oil splasher (54) onto connecting rod (52) with machine screw (53). Bolt connecting rod (52) onto crankshaft (36) with two bolts (51).
- (9) Install piston pin (56) through connecting rod (52) and piston (57), and secure with two snap rings (55).

**NOTE**

**Before installing rings, see that all ring grooves are lubricated with compressor lubricating oil (item 8, appx D).**

- (10) Install oil ring (59) in bottom groove of piston (57). Install a compression ring (58) in the second groove from bottom of piston (57). Install second compression ring (58) in the top groove of the piston (57). Turn end gaps of the rings until they are staggered at 90 degrees to each other.
- (11) Lubricate bore of cylinder (24) with lubricating oil (item 8, appx D).



**It is recommended that a ring compressor be used in the following step to avoid distorting or breaking the rings.**

Position gasket (32) on crankcase (2), then position cylinder (24) over piston (57) and press in on rings until they slip into the tapered bottom of the cylinder. Seat cylinder (24) on gasket (32), then install four flat washers (31) and four machine bolts (30).

## 5-6. AIR COMPRESSOR (CONT).

- (12) Place valve plate (17) into position on cylinder head (9). Install helical spring (28), valve receiver (27), and retaining ring (26). Check for free movement of assembly.
- (13) Turn over cylinder and install unloader cylinder (22), unloader spring (21), piston, and O-ring (19). Check for free movement of assembly. Install pipe plug (18) on unloader cylinder (22).
- (14) Place valve plate (17), into position on cylinder head (9). Install helical spring (16) and packing (15). Check for free movement of assembly. Install outlet valve push cover (14) on cylinder head (9).
- (15) Position gasket (25) on cylinder (24) and install cylinder head (9), secure with four machine bolts (23).
- (16) Install pipe tee (13), pipe elbow (12), and tube assembly (11), to cylinder heads (9). Install discharge tube (10) to pipe tee (13).
- (17) Install air filter housing (8), strainer element (7), air filter element (6), air filter cover (5), flat washer (4), and wing nut (3) to each cylinder head (9).
- (18) Install pulley (35), flat washer (34), and machine bolt (33) onto crankshaft (36). Ensure machine bolt (33) is torqued to 12 ft/lbs.

### **g. Installation.** (Refer to figure 5-6.)

**WARNING**

**Use two people to lift the compressor. The weight (50 pounds) of assembled compressor could cause injury to personnel.**

- (1) Position air compressor (5) on base assembly (6) and secure with four lockwashers (4) and four cap screws (3).
- (2) Attach air line (1) to tube coupling (2).

- (3) Install air compressor belt (refer to paragraph 4-14).
- (4) Install belt guard (refer to paragraph 4-13).
- (5) Unscrew breather cap (46, fig. 5-7) from rear bearing cover (44). Fill crankcase (2) with lubricating oil (item 6, appx D) until oil level is at centerline of sight gage (47). Replace breather cap (46).

#### 5-7. GOVERNOR WIRING HARNESS.

---

This task consists of:

- |               |                 |
|---------------|-----------------|
| a. Removal    | d. Repair       |
| b. Cleaning   | e. Installation |
| c. Inspection |                 |
- 

#### INITIAL SETUP:

##### **Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

##### **Material Required:**

Brush, Medium Bristle (Item 2, Appx D)

Cloth, Lint-Free (Item 4, Appx D)

Tape, Anti-Seize (Item 19, Appx D)

##### **Equipment Conditions:**

Disengage the power takeoff.

CMV shut down and cool.

Electrical power turned off.

---

**WARNING**

**High voltage is present in the control panel assembly and can cause serious injury or death. Disengage PTO and turn off vehicle engine prior to performing any maintenance on the control panel assembly.**

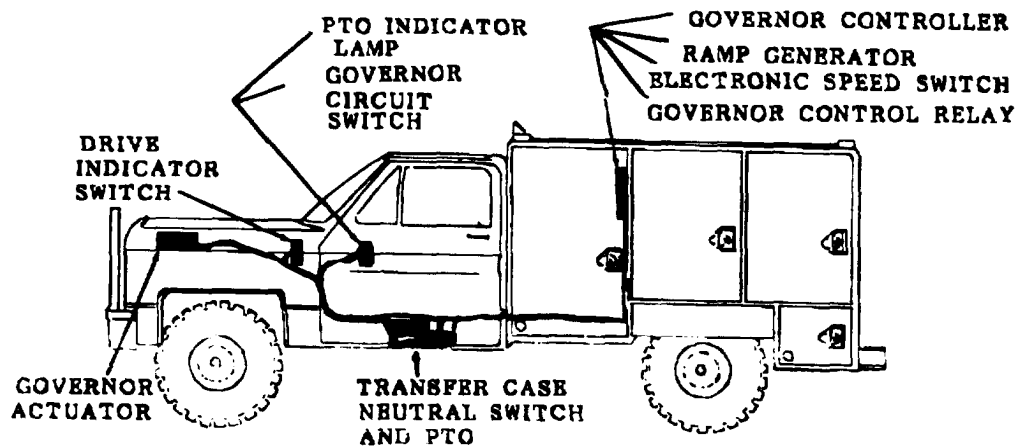
## 5-7. GOVERNOR WIRING HARNESS (CONT).

### NOTE

**Tag all wires before disconnecting. Refer to figure 5-9 for location of major components.**

#### a. **Removal.** (Refer to figures 5-8 and 5-9.)

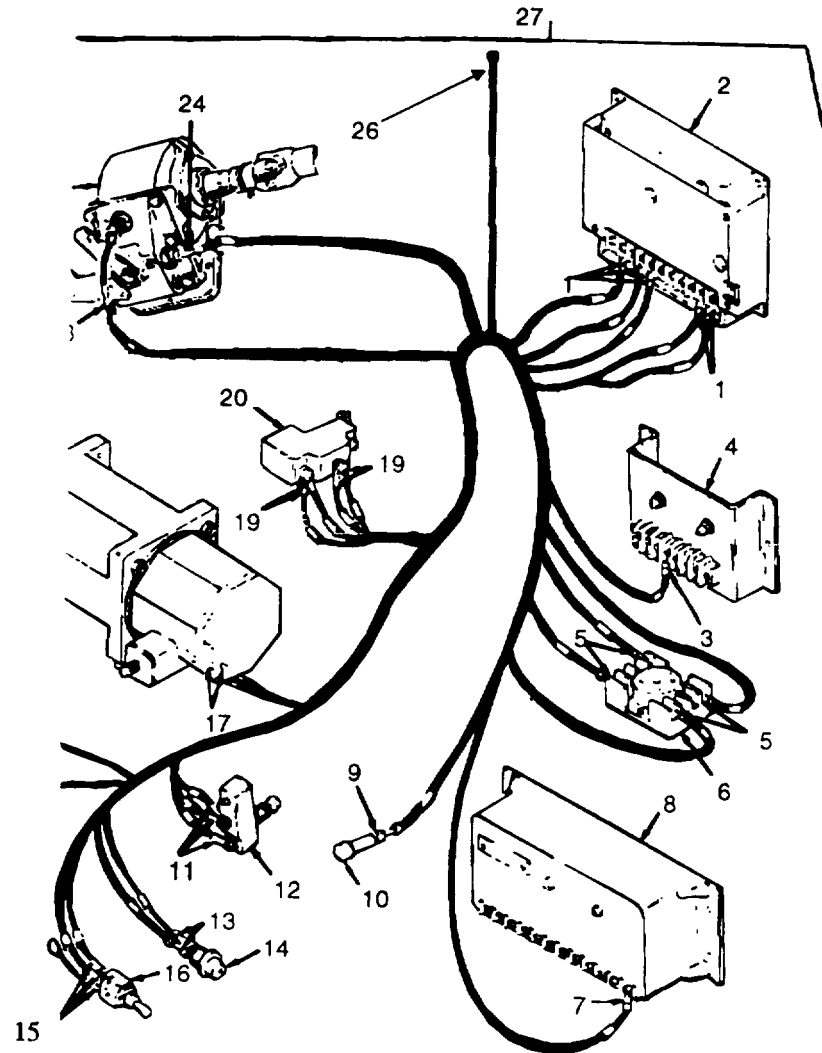
- (1) Disconnect five wire harness terminal lugs (1) from governor controller (2) terminals 2, 4, 5, 10, and 11.
- (2) Disconnect wire harness terminal lug (3) from ramp generator (4) terminal 4.



**Figure 5-8. Governor Wiring Harness, Location.**

- (3) Disconnect four wire harness terminal lugs (5) from governor control relay (6) terminals 2, 3, 6, and 7.
- (4) Disconnect wire harness terminal lug (7) from overspeed switch (8) terminal M.
- (5) Disconnect wire harness terminal (9) from fuse holder assembly (10).
- (6) Disconnect three wire harness terminals (11) from drive indicator switch (12).
- (7) Disconnect two wire harness terminals (13) from PTO indicator lamp assembly (14).

- (8) Disconnect three wire harness terminals (15) from governor circuit switch (16).
- (9) Disconnect two wire harness terminals (17) from governor actuator (18).
- (10) Disconnect four wire harness terminals (19) from transfer case neutral switch (20).
- (11) Disconnect wire harness terminal (21) from splice cap (E2) connecting to vehicle fuse block. Disconnect wire harness terminal (22) from splice cap (E1) connecting to fuel solenoid valve.



**Figure 5-9. Governor Wiring Harness, Removal/Installation.**

## 5-7. GOVERNOR WIRING HARNESS (CONT).

- (12) Disconnect two wire harness terminals (23) from PTO magnetic pickup and one wire harness terminal (24) from PTO indicator switch on the power take off (25).
- (13) Disconnect wire harness terminal (26) from elevated ground.
- (14) Carefully remove tiewraps and governor wiring harness (27) from CMV.

### **b. Cleaning.**

- (1) Clean all buildup or oil on all parts with a lint-free cloth (item 4, appx D).
- (2) Clean all parts with a lint-free cloth (item 4, appx D) or medium bristle brush (item 2, appx D).

### **c. Inspection.** (Refer to figures 5-9 and 5-10 and table 5-1.)

- (1) Inspect wiring insulation for cracks or fraying. Pay particular attention to areas where wiring passes through holes in the frame, or over metal edges. Inspect wire harness terminals for tight connection to wire runs. Inspect wire run/wire harness terminal for burn spots or corrosion. Replace any wire harness terminal that has burn spots/corrosion/or is not securely attached to the wire run. Replace any wire run that is cracked/frayed/burned or cut.
- (2) Perform continuity checks of wire harness wire runs. Check for opens/shorts in wire harness with a multimeter. Repair/replace any wire run that checks as open/shorted.

### **d. Repair.** (Refer to table 5-1 for governor system wiring harness wire run list and table 5-2 for governor system wiring harness parts list). Repair consists of either replacement of a wire run or replacement of a defective wire harness terminal.

- (1) To assemble a new wire run, refer to tables 5-1 and 5-2. Identify type of wire harness terminals and type/length of electrical wire needed. Construct new wire run and test for shorts/opens. If the electrical harness tape insulation cannot be broken, run new wire run along the outside of the harness and secure to existing wire bundle by either taping or tiewraps.

- (2) To replace a defective wire harness terminal, inspect the wiring harness in accordance with paragraph c., preceding, and locate the defective wire harness terminal. Refer to table 5-1 to determine the wire harness terminal/electrical wire needed and then to table 5-2 for the part number of the wire harness terminal/electrical wire needed. Uncrimp the defective terminal and crimp the replacement terminal or construct a new wire run. If the electrical harness cannot be broken, run the new wire run along the outside of the wire harness and secure to the existing wire bundle by either taping or tiewrapping the new wire run to the existing wire bundle.

**e. Installation.** Refer to figure 5-10 for wiring diagram of governor wiring harness connections and to figure 5-9 for governor wiring harness installation.

- (1) Connect wire run 14 terminal (26) to elevated ground. Remove and discard tag.
- (2) Connect wire SC-RED terminal (23) to PTO magnetic pickup (MSI) + terminal. Connect wire run SC-WHITE terminal to PTO magnetic pickup (MSI) - terminal. Connect wire run 23 terminal (24) to PTO indicator switch (S3) on the power take off (25). Remove and discard tags.
- (3) Connect wire run 25 terminal (21) to splice cap E2. Connect wire run 24 terminal (22) to splice cap E1. Remove and discard tags.
- (4) Connect wire run 20 terminal (19) to transfer case neutral switch (20) terminal C. Connect wire run 22 terminal (19) to transfer case neutral switch (20) terminal NO. Connect wire run 24 terminal (19) to transfer case neutral switch (20) terminal C. Connect wire run 25 terminal (19) to transfer case neutral switch (20) terminal NO. Remove and discard tags.
- (5) Connect wire runs 9 and 10 terminals (17) to governor actuator (18) terminals. Remove and discard tags.

5-7. GOVERNOR WIRING HARNESS (CONT).

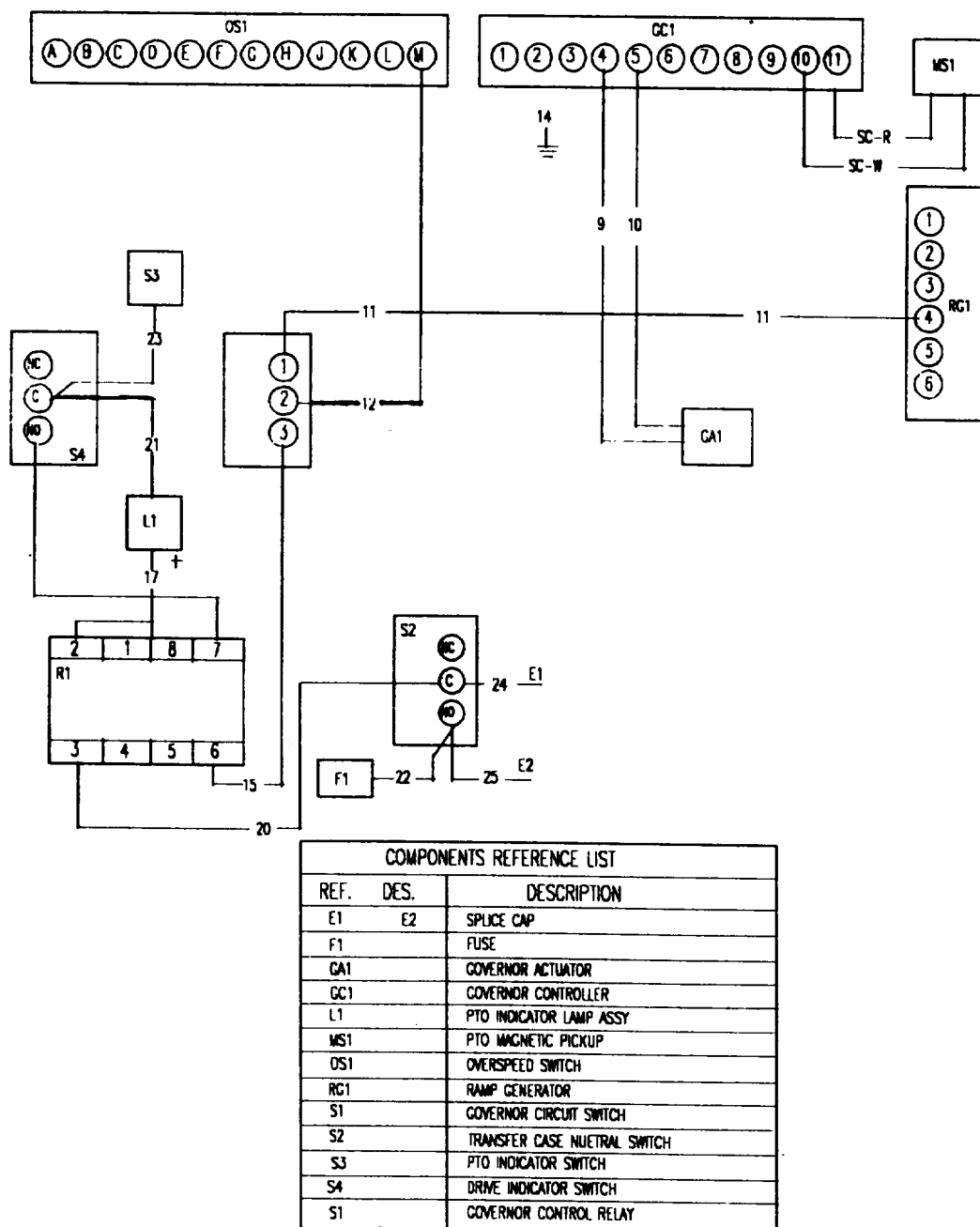


Figure 5-10. Governor Wiring Harness Wiring Diagram.



Table 5-1. Governor System Wiring Harness/Wire Run

Wire No.	From	Pin	*Item No.	To	Pin	*Item No.	Wire Length (In.)	*Wire Item No.
9	GC1	4	2	GA1		1	174.5	8
10	GC1	5	3	GA1		1	274.5	8
11	RG1	4	3	S1	1	5	177.5	8
12	OS1	M	3	S1	2	5	182.5	8
14	GC1	2	3	GRD		1	111.0	8
15	R1	6	3	S1	3	5	183.5	8
16	R1	7	3	S4	NO	1	176.0	8
17	R1	2	3	L1	+	4	177.5	8
20	R1	3	3	S2	C	1	139.0	8
21	S4	C	1	L1	-	4	39.5	8
22	F1	+	4	S2	NO	1	127.0	8
23	S4	C	1	S3		2	77.0	8
24	S2	C	1	E1		4	70.0	8
25	S2	NO	1	E2		4	70.0	8
SC-WHITE	GC1	10	3	MS1	-	6	116.0	9
SC-RED	GC1	11	3	MS1	+	7	116.0	9

\*See table 5-2.

Table 5-2. Governor System Wiring Harness Parts List

Item No.	Part Number	CAGEC	Description	NSN
1	MS25036-106	96906	Terminal, Lug	5940-00-283-5280
2	RB-257	59730	Terminal, Quick Disconnect	5940-00-926-0085
3	RB-1253	59730	Terminal, Quick Disconnect	5940-01-107-9491
4	M7928/5-4	81349	Connector, Electrical	5940-01-079-1375
5	MS25036-153	96906	Terminal, Lug	5940-00-143-4774
6	MS27142-2	96906	Connector, Plug, Electrical	5935-00-462-6603
7	MS27144-2	96906	Connector, Plug, Electrical	5935-00-115-2307
8	M5086/2-14-9	81349	Wire, Electrical	6145-00-578-6604
9	M27506-16TE2T14	81349	Wire, Electrical	6145-01-213-5495

**5-7. GOVERNOR WIRING HARNESS (CONT).**

- (6) Connect wire run 11 terminal (15) to governor circuit switch (16) terminal 1. Connect wire run 12 terminal (15) to governor circuit switch (16) terminal 2. Connect wire run 15 terminal (15) to governor circuit switch (16) terminal 3. Remove and discard tags.
- (7) Connect wire run 17 terminal (13) to PTO indicator light assembly (14) terminal +. Connect wire run 21 terminal (13) to PTO indicator light assembly (14) terminal -. Remove and discard tags.
- (8) Connect wire run 6 terminal (11) to drive indicator switch (12) terminal NO. Connect wire run 23 terminal (11) to drive indicator switch (12) terminal C. Connect wire run 21 terminal (11) to drive indicator switch (12) terminal C. Remove and discard tags.
- (9) Connect wire run 22 terminal (9) to fuseholder assembly (10). Remove and discard tag.
- (10) Connect wire run 12 terminal (7) to terminal M of the overspeed switch (8). Remove and discard tag.
- (11) Connect wire run 15 terminal (5) to governor control relay (6) terminal 6. Connect wire run 16 terminal (5) to governor control relay (6) terminal 7. Connect wire run 17 terminal (5) to governor control relay (6) terminal 2. Connect wire run 20 terminal (5) to governor control relay (6) terminal 3. Remove and discard tags.
- (12) Connect wire run 11 terminal (3) to ramp generator (4) terminal 4. Remove and discard tag.
- (13) Connect wire run SC-WHITE terminal (1) to governor controller (2) terminal 10. Connect wire run SC-RED terminal (1) to governor controller (2) terminal 11. Connect wire run 9 terminal (1) to governor controller (2) terminal 4. Connect wire run 10 terminal (1) to governor controller (2) terminal 5. Connect wire run 14 terminal (1) to governor controller (2) terminal 2. Remove and discard tags.
- (14) Secure governor wire harness (27) to CMV with tiewraps.

**5-8. ELECTRONIC GOVERNOR SYSTEM.**

---

This task consists of:

- |               |                 |
|---------------|-----------------|
| a. Removal    | d. Repair       |
| b. Cleaning   | e. Installation |
| c. Inspection | f. Adjustment   |
- 

**INITIAL SETUP:****Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
or  
Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

**Material Required:**

Brush, Medium Bristle (Item 2, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)  
Solvent, Dry Cleaning (Item 18, Appx D)

**Equipment Conditions:**

Disengage the power takeoff.  
CMV shut down and cool.  
Electrical power turned off.

---

<b>WARNING</b>
----------------

- **High voltage is present in the control panel assembly and can cause serious injury or death. Disengage PTO and turn off vehicle engine prior to performing any maintenance on the control panel assembly.**
- **CMV engine must be turned OFF prior to performing maintenance in the engine compartment. Rotating pulleys or moving belts can cause serious injury to personnel.**

**NOTE**

- **Tag all required wiring before disconnecting.**

## 5-8. ELECTRONIC GOVERNOR SYSTEM (CONT).

- Remove components only to the extent required to repair.

### a. Removal. (Refer to figure 5-11.)

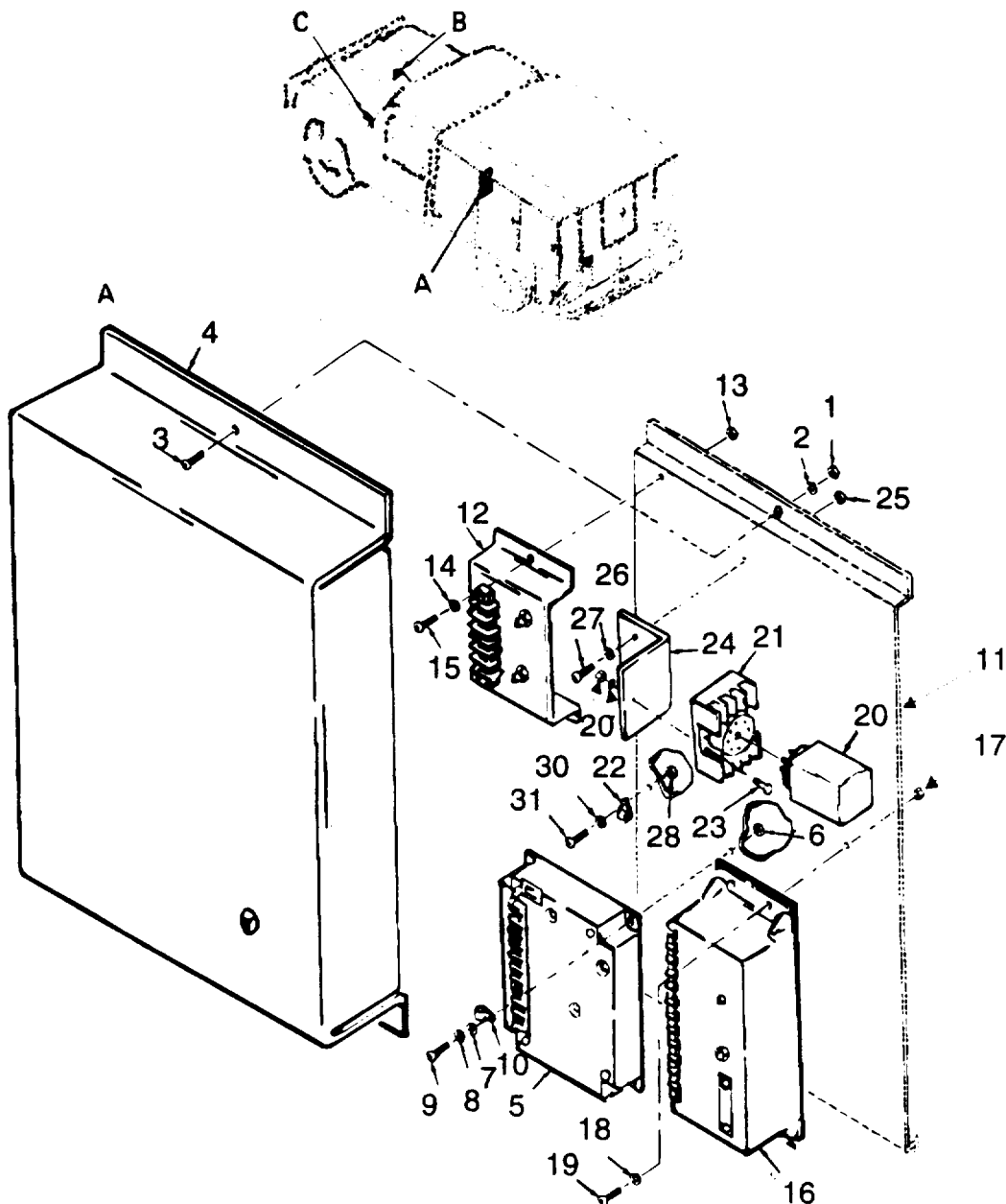


Figure 5-11. Electronic Governor System, Removal / Installation (Sheet 1 of 2).

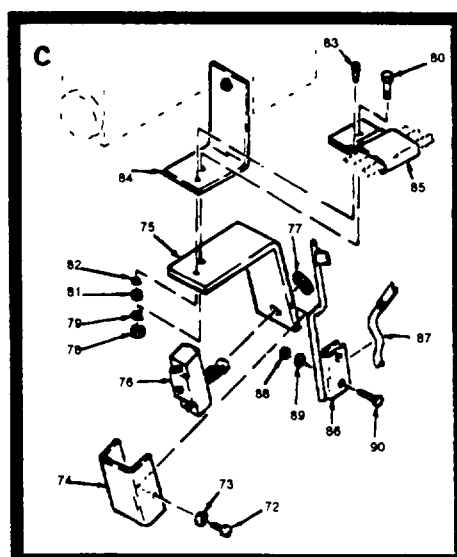
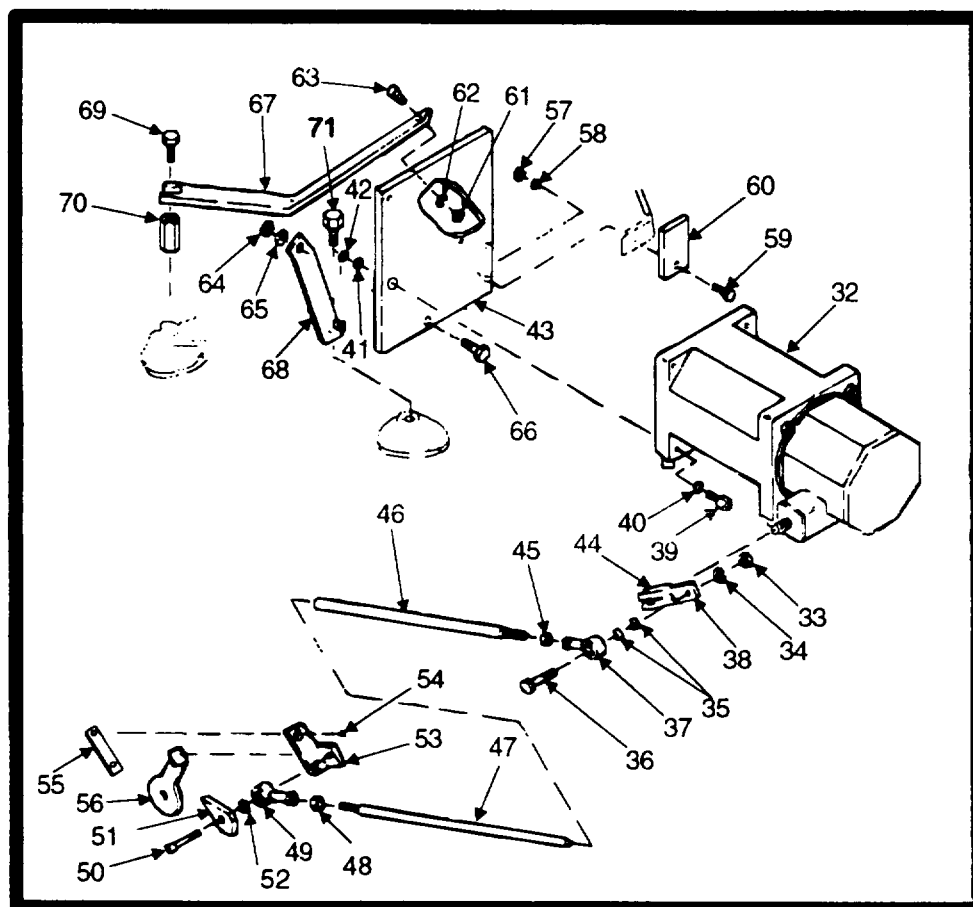


Figure 5-11. Electronic Governor System, Removal/Installation (Sheet 2 of 2).

**5-8. ELECTRONIC GOVERNOR SYSTEM (CONT).**

**a. Removal (cont).**

- (1) From compartment 5, unscrew and remove three hexagon nuts (1), three lockwashers (2) three machine screws (3), and access cover (4) to gain access to the governor system electronic components.
- (2) Disconnect five governor wiring harness terminal lugs to governor controller (5) terminals 2, 4, 5, 10, and 11. Disconnect electrical lead assemblies from governor controller terminals 1, 2, 6, 8, and 11.
- (3) Unscrew and remove four hexagon nuts (6), four flat washers (7), four lockwashers (8), four machine screws (9), clamp (10), and governor controller (5) from mounting plate (11).
- (4) Disconnect governor wiring harness terminal lug to ramp generator (12) terminal 4. Disconnect electrical lead assemblies from ramp generator terminals 1, 2, 3, 4, and 5.
- (5) Unscrew and remove two hexagon nuts (13), two lockwashers (14), two machine screws (15), and ramp generator (12) from mounting plate (11).
- (6) Disconnect governor wiring harness terminal lug to overspeed switch (16) terminal M. Disconnect electrical lead assemblies from overspeed switch (16) terminals A, H, J, K, L, and M.
- (7) Unscrew and remove three hexagon nuts (17), three flat washers (18), three machine screws (19), and overspeed switch (16) from mounting plate (11).
- (8) Remove governor control relay (20) from plug-in socket (21).
- (9) Disconnect governor wiring harness terminal lugs to governor control relay socket (21) terminals 2, 3, 6, and 7. Disconnect electrical lead assemblies from governor control relay socket terminals 1 and 2.
- (10) Unscrew and remove two hexagon nuts (22), two lockwashers (7), two machine screws (23), and governor control relay socket (21) from relay bracket (24).

- (11) Unscrew and remove two hexagon nuts (25), two flat washers (26), two machine screws (27), and relay bracket (24) from mounting plate (11).
- (12) Unscrew and remove hexagon nut (28), clamp (29), flat washer (30), and machine screw (31) from mounting plate (11).
- (13) Open and secure the vehicle hood. Disconnect two governor wiring harness terminals to governor actuator (32).
- (14) Unscrew and remove hexagon nut (33), lockwasher (34), two flat washers (35), and cap screw (36) from rod end bearing (37) and actuator lever (38).
- (15) Unscrew and remove four cap screws (39), four lockwashers (40), one lockwasher (41), one hexagon nut (42), and actuator (32) with actuator lever (38) attached from mounting bracket (43).

#### NOTE

**Prior to performing the following step, mark the position of the actuator lever on the output shaft of the actuator.**

- (16) Loosen hexagon screw (44) and remove actuator lever (38) from output shaft of the actuator (32).
- (17) Unscrew and remove rod end bearing (37) and hexagon nut (45) from linkage tube (46). Slide linkage tube (46) off linkage rod (47).
- (18) Unscrew and remove linkage rod (47) and hexagon nut (48) from rod end bearing (49).
- (19) Unscrew and remove cap screw (50), idle solenoid block (51), flat washer (52), and rod end bearing (49) from fuel lever adapter (53).
- (20) Unscrew and remove two machine screws (54), fuel lever adapter (53), and retainer (55) from engine throttle lever (56).
- (21) Unscrew and remove two hexagon nuts (57), two lockwashers (58), two cap screws (59), and mounting plate (60) from mounting bracket (43).

**5-8. ELECTRONIC GOVERNOR SYSTEM (CONT).**

- (22) Unscrew and remove hexagon nut (61), lockwasher (62), machine bolt (63), hexagon nut (64), lockwasher (65), machine bolt (66), and mounting bracket (43) from mounting brace (67) and actuator brace (68).
- (23) Unscrew and remove hexagon bolt (69), mounting brace (67), and spacer sleeve (70) from stud on engine block.
- (24) Unscrew and remove machine bolt (71) and actuator brace (68) from engine block.
- (25) Unscrew and remove two machine screws (72), two lockwashers (73), and switch cover (74) from switch bracket (75).
- (26) Disconnect governor wiring harness terminal lugs to drive indicator switch (76) terminals C and NO.
- (27) Unscrew and remove hexagon nut (77) and drive indicator switch (76) from switch bracket (75).
- (28) Unscrew and remove hexagon nut (78), lockwasher (79), cap screw (80), hexagon nut (81), lockwasher (82), machine screw (83), and switch bracket (75) from brake line bracket (84) and brake line clamp (85).
- (29) Prior to removal of the actuator switch rod (86) from the transmission shift rod (87), mark the position of the actuator switch rod (86) fastening bracket on both sides of the transmission shift rod (87). Unscrew and remove two hexagon nuts (88), two lockwashers (89), two cap screws (40), and actuator switch rod (86) from transmission shift rod (87).

**b. Cleaning.**

- (1) Remove all buildup of dirt and oil on all parts with a lint-free cloth (item 4, appx D).



- (11) Unscrew and remove two hexagon nuts (25), two flat washers (26), two machine screws (27), and relay bracket (24) from mounting plate (11).
- (12) Unscrew and remove hexagon nut (28), clamp (29), flat washer (30), and machine screw (31) from mounting plate (11).
- (13) Open and secure the vehicle hood. Disconnect two governor wiring harness terminals to governor actuator (32).
- (14) Unscrew and remove hexagon nut (33), lockwasher (34), two flat washers (35), and cap screw (36) from rod end bearing (37) and actuator lever (38).
- (15) Unscrew and remove four cap screws (39), four lockwashers (40), one lockwasher (41), one hexagon nut (42), and actuator (32) with actuator lever (38) attached from mounting bracket (43).

**NOTE**

**Prior to performing the following step, mark the position of the actuator lever on the output shaft of the actuator.**

- (16) Loosen hexagon screw (44) and remove actuator lever (38) from output shaft of the actuator (32).
- (17) Unscrew and remove rod end bearing (37) and hexagon nut (45) from linkage tube (46). Slide linkage tube (46) off linkage rod (47).
- (18) Unscrew and remove linkage rod (47) and hexagon nut (48) from rod end bearing (49).
- (19) Unscrew and remove cap screw (50), idle solenoid block (51), flat washer (52), and rod end bearing (49) from fuel lever adapter (53).
- (20) Unscrew and remove two machine screws (54), fuel lever adapter (53), and retainer (55) from engine throttle lever (56).
- (21) Unscrew and remove two hexagon nuts (57), two lockwashers (58), two cap screws (59), and mounting plate (60) from mounting bracket (43).

**5-8. ELECTRONIC GOVERNOR SYSTEM (CONT).**

- (22) Unscrew and remove hexagon nut (61), lockwasher (62), machine bolt (63), hexagon nut (64), lockwasher (65), machine bolt (66), and mounting bracket (43) from mounting brace (67) and actuator brace (68).
- (23) Unscrew and remove hexagon bolt (69), mounting brace (67), and spacer sleeve (70) from stud on engine block.
- (24) Unscrew and remove machine bolt (71) and actuator brace (68) from engine block.
- (25) Unscrew and remove two machine screws (72), two lockwashers (73), and switch cover (74) from switch bracket (75).
- (26) Disconnect governor wiring harness terminal lugs to drive indicator switch (76) terminals C and NO.
- (27) Unscrew and remove hexagon nut (77) and drive indicator switch (76) from switch bracket (75).
- (28) Unscrew and remove hexagon nut (78), lockwasher (79), cap screw (80), hexagon nut (81), lockwasher (82), machine screw (83), and switch bracket (75) from brake line bracket (84) and brake line clamp (85).
- (29) Prior to removal of the actuator switch rod (86) from the transmission shift rod (87), mark the position of the actuator switch rod (86) fastening bracket on both sides of the transmission shift rod (87). Unscrew and remove two hexagon nuts (88), two lockwashers (89), two cap screws (40), and actuator switch rod (86) from transmission shift rod (87).

**b. Cleaning.**

- (1) Remove all buildup of dirt and oil on all parts with a lint-free cloth (item 4, appx D).

- (11) Unscrew and remove two hexagon nuts (25), two flat washers (26), two machine screws (27), and relay bracket (24) from mounting plate (11).
- (12) Unscrew and remove hexagon nut (28), clamp (29), flat washer (30), and machine screw (31) from mounting plate (11).
- (13) Open and secure the vehicle hood. Disconnect two governor wiring harness terminals to governor actuator (32).
- (14) Unscrew and remove hexagon nut (33), lockwasher (34), two flat washers (35), and cap screw (36) from rod end bearing (37) and actuator lever (38).
- (15) Unscrew and remove four cap screws (39), four lockwashers (40), one lockwasher (41), one hexagon nut (42), and actuator (32) with actuator lever (38) attached from mounting bracket (43).

#### NOTE

**Prior to performing the following step, mark the position of the actuator lever on the output shaft of the actuator.**

- (16) Loosen hexagon screw (44) and remove actuator lever (38) from output shaft of the actuator (32).
- (17) Unscrew and remove rod end bearing (37) and hexagon nut (45) from linkage tube (46). Slide linkage tube (46) off linkage rod (47).
- (18) Unscrew and remove linkage rod (47) and hexagon nut (48) from rod end bearing (49).
- (19) Unscrew and remove cap screw (50), idle solenoid block (51), flat washer (52), and rod end bearing (49) from fuel lever adapter (53).
- (20) Unscrew and remove two machine screws (54), fuel lever adapter (53), and retainer (55) from engine throttle lever (56).
- (21) Unscrew and remove two hexagon nuts (57), two lockwashers (58), two cap screws (59), and mounting plate (60) from mounting bracket (43).

## 5-8. ELECTRONIC GOVERNOR SYSTEM (CONT).

- (22) Unscrew and remove hexagon nut (61), lockwasher (62), machine bolt (63), hexagon nut (64), lockwasher (65), machine bolt (66), and mounting bracket (43) from mounting brace (67) and actuator brace (68).
- (23) unscrew and remove hexagon bolt (69), mounting brace (67), and spacer sleeve (70) from stud on engine block.
- (24) Unscrew and remove machine bolt (71) and actuator brace (68) from engine block.
- (25) Unscrew and remove two machine screws (72), two lockwashers (73), and switch cover (74) from switch bracket (75).
- (26) Disconnect governor wiring harness terminal lugs to drive indicator switch (76) terminals C and NO.
- (27) Unscrew and remove hexagon nut (77) and drive indicator switch (76) from switch bracket (75).
- (28) Unscrew and remove hexagon nut (78), lockwasher (79), cap screw (80), hexagon nut (81), lockwasher (82), machine screw (83), and switch bracket (75) from brake line bracket (84) and brake line clamp (85).
- (29) Prior to removal of the actuator switch rod (86) from the transmission shift rod (87), mark the position of the actuator switch rod (86) fastening bracket on both sides of the transmission shift rod (87). Unscrew and remove two hexagon nuts (88), two lockwashers (89), two cap screws (40), and actuator switch rod (86) from transmission shift rod (87).

### **b. Cleaning.**

- (1) Remove all buildup of dirt and oil on all parts with a lint-free cloth (item 4, appx D).

- (11) Unscrew and remove two hexagon nuts (25), two flat washers (26), two machine screws (27), and relay bracket (24) from mounting plate (11).
- (12) Unscrew and remove hexagon nut (28), clamp (29), flat washer (30), and machine screw (31) from mounting plate (11).
- (13) Open and secure the vehicle hood. Disconnect two governor wiring harness terminals to governor actuator (32).
- (14) Unscrew and remove hexagon nut (33), lockwasher (34), two flat washers (35), and cap screw (36) from rod end bearing (37) and actuator lever (38).
- (15) Unscrew and remove four cap screws (39), four lockwashers (40), one lockwasher (41), one hexagon nut (42), and actuator (32) with actuator lever (38) attached from mounting bracket (43).

#### NOTE

Prior to performing the following step, mark the position of the actuator lever on the output shaft of the actuator.

- (16) Loosen hexagon screw (44) and remove actuator lever (38) from output shaft of the actuator (32).
- (17) Unscrew and remove rod end bearing (37) and hexagon nut (45) from linkage tube (46). Slide linkage tube (46) off linkage rod (47).
- (18) Unscrew and remove linkage rod (47) and hexagon nut (48) from rod end bearing (49).
- (19) Unscrew and remove cap screw (50), idle solenoid block (51), flat washer (52), and rod end bearing (49) from fuel lever adapter (53).
- (20) Unscrew and remove two machine screws (54), fuel lever adapter (53), and retainer (55) from engine throttle lever (56).
- (21) Unscrew and remove two hexagon nuts (57), two lockwashers (58), two cap screws (59), and mounting plate (60) from mounting bracket (43).

**5-8. ELECTRONIC GOVERNOR SYSTEM (CONT).**

- (22) Unscrew and remove hexagon nut (61), lockwasher (62), machine bolt (63), hexagon nut (64), lockwasher (65), machine bolt (66), and mounting bracket (43) from mounting brace (67) and actuator brace (68).
- (23) unscrew and remove hexagon bolt (69), mounting brace (67), and spacer sleeve (70) from stud on engine block.
- (24) Unscrew and remove machine bolt (71) and actuator brace (68) from engine block.
- (25) Unscrew and remove two machine screws (72), two locksvashers (73), and switch cover (74) from switch bracket (75).
- (26) Disconnect governor wiring harness terminal lugs to drive indicator switch (76) terminals C and NO.
- (27) Unscrew and remove hexagon nut (77) and drive indicator switch (76) from switch bracket (75).
- (28) Unscrew and remove hexagon nut (78), lockwasher (79), cap screw (80), hexagon nut (81), lockwasher (82), machine screw (83), and switch bracket (75) from brake line bracket (84) and brake line clamp (85).
- (29) Prior to removal of the actuator switch rod (86) from the transmission shift rod (87), mark the position of the actuator switch rod (86) fastening bracket on both sides of the transmission shift rod (87). Unscrew and remove two hexagon nuts (88), two lockwashers (89), two cap screws (40), and actuator switch rod (86) from transmission shift rod (87).

**b. Cleaning.**

- (1) Remove all buildup of dirt and oil on all parts with a lint-free cloth (item 4, appx D).

**WARNING**

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning for these items are highly flammable, and if ignited, cause injury to personnel and damage to equipment.**
  - **Do not breathe cleaning solvents for long periods of time or use solvent near open flame. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flame.**
  - **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with the exposed skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.**
- (2) Clean screws, hexagon nuts, washers, and bolts with a medium bristle brush (item 2, appx D) and dry cleaning solvent (item 18, appx D). Allow parts to air dry.
  - (3) Clean electrical components, e.g., switches, actuators and relays with a lint-free cloth (item 4, appx D) or medium bristle brush (item 2, appx D).

**c. Inspection.**

- (1) Inspect wiring insulation for cracks or fraying. Pay particular attention to areas where wiring passes through holes in the frame, or over metal edges. Inspect wire harness terminals for tight connection to wire runs. Inspect wire run/wire harness terminal for burn spots or corrosion. Replace any wire harness terminal that has burn spots/corrosion/or is not securely attached to the wire run. Replace any wire run that is cracked/frayed/burned or cut.
- (2) Perform continuity checks of wire runs. Check for opens/shorts in wire run with a multimeter. Repair/replace any wire run that checks open/shorted.

## 5-8. ELECTRONIC GOVERNOR SYSTEM (CONT).

- (3) Inspect the governor control relay plug-in socket for cracks, burn spots, or visible damage to socket terminals. Replace socket if there are cracks, burn spots, or visible damage to socket terminals.
- (4) Inspect screws and hexagon nuts for stripped threads, corrosion, or cracks. Replace any hardware that is defective.
- (5) Inspect metal parts, except mounting plates and relay brackets, for cracks, rust, corrosion, and other signs of obvious damage. Replace any metal part that is defective.
- (6) Inspect governor control relay case for cracks in the case. Perform continuity checks between pins 7 and 2 and between pins 1 and 3. Replace relay if relay case is cracked or if continuity is not indicated during check. Perform continuity check between pins 3 and 6. Replace relay if continuity is indicated between pins 3 and 6.
- (7) Inspect drive indicator switch for smooth operation of switch and ease of roller movement. Replace switch if switch does not operate smoothly.

**d. Repair.** (Refer to table 5-3 for wiring diagram of wire run list and to table 5-4 for wire run parts list.) Repair consists of either replacement of a wire run or replacement of a defective wire harness terminal. Repair governor wiring harness in accordance with paragraph 5-7.

- (1) To assemble a new wire run, refer to tables 5-3 and 5-4. Identify type of wire harness terminals and type/length of electrical wire needed. Construct new wire run and test for opens/shorts.
- (2) To replace a defective wire run harness terminal, inspect the wiring run in accordance with paragraphs c.(1) and c.(2), preceding, and locate the defective wire run terminal. Refer to table 5-3 to determine the wire run terminal needed and then to table 5-4 for the part number of the wire run terminal needed. Uncrimp the defective terminal and crimp the replacement terminal.
- (3) Repair of attaching hardware and electrical components is by replacement of authorized parts (TM 9-4940-562-23P) which are determined to be defective.



Table 5-3. Electronic Governor System Wire Run List

Wire No.	From	Pin	*Item No.	To	Pin	*Item No.	Wire Length (In.)	*Wire Item No.
1	GC1	1	1	RG1	1	1	8.3	2
2	GC1	6	1	RG1	2	1	10.0	2
3	GC1	8	1	RG1	3	1	10.3	2
4	OS1	H	1	RG1	4	1	10.5	2
5	GC1	2	1	RG1	5	1	8.5	2
6	GC1	1	1	OS1	J	1	18.5	2
7	GC1	2	1	OS1	L	1	16.5	2
8	GC1	11	1	OS1	A	1	18.0	2
13	OS1	K	1	OS1	M	1	4.0	2
18	R1	2	1	R1	1	1	4.0	2
19	R1	1	1	F11		3	3.0	2

\*See table 5-4.

Table 5-4. Electronic Governor System Wire Run Parts List

Item No.	Part Number	CAGEC	Description	NSN
1	1564	83330	Terminal, Quick Disconnect	5940-00-644-7948
2	M5086/2-14-9	81349	Wire, Electrical	6145-00-578-6604
3	M7928/5-4	81349	Splice, Conductor	5940-01-079-1375

**e. Installation.** (Refer to figure 5-11).

- (1) Position switch bracket (75) on brake line bracket (84) and brake line clamp (85). Secure with machine screw (83), lockwasher (82), hexagon nut (81), cap screw (80), lockwasher (79), and hexagon nut (78).
- (2) Place drive indicator switch (76) in switch bracket (75) and secure with hexagon nut (77).
- (3) Connect governor wiring harness wire run 21 terminal to terminal C of the drive indicator switch (76). Connect governor wiring harness wire run 23 terminal to terminal C of the drive indicator switch (76). Connect governor wiring harness wire run 16 to terminal NO of the drive indicator switch (76). Discard tags.

**5-8. ELECTRONIC GOVERNOR SYSTEM (CONT).**

- (4) Position actuator switch rod (86) on transmission shift rod (87) so that rod is positioned within previous markings (para a.(29), preceding). Install two cap screws (90), two lockwashers (89), and two hexagon nuts (88). DO NOT TIGHTEN. Place vehicle gear shift lever to D (drive). Adjust actuator switch rod (86) on transmission shift rod (87) so the drive indicator switch (76) is engaged when the transmission is in drive. Tighten two hexagon nuts (88). Place vehicle gear shift lever to P (park).
- (5) Install switch cover (74) on switch bracket (75) and secure with two machine screws (72) and two lockwashers (73).
- (6) Install actuator brace (68) on engine block and secure with machine bolt (71). DO NOT TIGHTEN MACHINE BOLT.
- (7) Install spacer sleeve (70) and mounting brace (67) on engine block stud.
- (8) Install mounting bracket (43) to mounting brace (67) and actuator brace (68) and secure with machine bolt (63), lockwasher (62), hexagon nut (61), machine bolt (66), lockwasher (65), and hexagon nut (64). Tighten machine bolt (71) and hexagon bolt (69).
- (9) Install mounting plate (60) on mounting bracket (43) and secure with two cap screws (59), two lockwashers (58), and two hexagon nuts (57).
- (10) Place fuel lever adapter (53) over engine throttle lever (56) and secure with retainer (55) and two machine screws (54).
- (11) Install cap screw (50), idle solenoid block (51), flat washer (52), and rod end bearing (49) onto fuel lever adapter (53).
- (12) Screw hexagon nut (48) on linkage rod (47). Screw linkage rod (47) into rod end bearing (49) and tighten hexagon nut (48) against rod end bearing (47).
- (13) Install hexagon nut (45) on linkage tube (46). Screw rod end bearing (37) onto linkage tube (46). Tighten hexagon nut (45) against rod end bearing (37). Slide linkage tube (46) onto linkage rod (47).

- (14) Attach actuator lever (38) to output shaft of the actuator (32). Align mark on actuator lever (38) with mark on actuator output shaft and tighten hexagon screw (44) to secure.
- (15) Install actuator (32) onto mounting bracket (43) and secure with four cap screws (39), four lockwashers (40), four lockwashers (41), and four hexagon nuts (42).
- (16) Connect rod end bearing (37) and two flat washers (35) to actuator lever (38) using cap screw (36), lockwasher (34), and hexagon nut (33).
- (17) Connect governor wiring harness wire runs 9 and 10 terminals to governor actuator (32). Discard tags. Close the vehicle hood.
- (18) In compartment 5 of the shop set, install clamp (29) to mounting plate (11) with machine screw (31), flat washer (30), and hexagon nut (28).
- (19) Install relay bracket (24) on mounting plate (11) with two machine screws (27), two flat washers (26), and two hexagon nuts (25).
- (20) Attach relay socket (21) to relay bracket (24) with two machine screws (23), two lockwashers (7), and two hexagon nuts (22).
- (21) Connect governor wiring harness wire run 15 terminal to relay socket (21) terminal 3; connect governor wiring harness wire run 17 terminal to relay socket (21) terminal 2; connect governor wiring harness wire run 16 terminal to relay socket (21) terminal 7; connect governor wiring harness wire run 15 terminal to relay socket (21) terminal 6. Connect electrical lead assembly 18 quick disconnect terminals to relay socket (21) terminals 1 and 2; connect electrical lead assembly 19 quick disconnect terminal to relay socket terminal 1. Discard tags.
- (22) Install governor control relay (20) into governor control relay socket (21).
- (23) Install overspeed switch (16) onto mounting plate (11) with three machine screws (19), three flat washers (18), and three hexagon nuts (17).

**5-8. ELECTRONIC GOVERNOR SYSTEM (CONT).**

- (24) Connect governor wiring harness wire run 12 terminal to overspeed switch (16) terminal M. Connect electrical lead assembly 13 quick disconnect terminals to overspeed switch (16) terminals K and M; connect one electrical lead assembly 8 quick disconnect terminal to overspeed switch (16) terminal A; connect one electrical lead assembly 7 quick disconnect terminal to overspeed switch (16) terminal L; connect one electrical lead assembly 6 quick disconnect terminal to overspeed switch (16) terminal J; connect one electrical lead assembly 4 quick disconnect terminal to overspeed switch (16) terminal H. Discard tags.
- (25) Install ramp generator (12) onto mounting plate (11) with two machine screws (15), two lockwashers (14), and two hexagon nuts (13).
- (26) Connect governor wiring harness wire run 11 terminal to ramp generator (12) terminal 4. Connect one electrical lead assembly 5 quick disconnect terminal to ramp generator (12) terminal 5; connect one electrical lead assembly 4 quick disconnect terminal to ramp generator (12) terminal 4; connect one electrical lead assembly 3 quick disconnect terminal to ramp generator (12) terminal 3; connect one electrical lead assembly 2 quick disconnect terminal to ramp generator (12) terminal 2; connect one electrical lead assembly 1 quick disconnect terminal to ramp generator (12) terminal 1. Discard tags.
- (27) Install governor controller (5) onto mounting plate (11) with clamp (10), four machine screws (9), four lockwashers (8), four flat washers (7), and four hexagon nuts (6).
- (28) Connect governor wiring harness wire run 14 terminal to governor controller (5) terminal 2; connect governor wiring harness wire run 10 terminal to governor controller (5) terminal 5; connect governor wiring harness wire run 9 terminal to governor controller (5) terminal 4; connect governor wiring harness wire run SC WHITE terminal to governor controller (5) terminal 10; connect governor wiring harness wire run SC RED terminal to governor controller (5) terminal 11. Connect remaining electrical lead assembly 8 quick disconnect terminal to governor controller (5) terminal 11; connect remaining electrical lead assembly 8 quick disconnect terminal to governor controller (5) terminal 2; connect

remaining electrical lead assembly 6 and 1 quick disconnect terminals to governor controller (5) terminal 1; connect remaining electrical lead assembly 5 quick disconnect terminal to governor controller (5) terminal 2; connect remaining electrical lead assembly 3 quick disconnect terminal to governor controller (5) terminal 8; connect remaining electrical lead assembly 2 quick disconnect terminal to governor controller (5) terminal 6. Discard tags.

- (29) Install access cover (4) with three machine screws (3), three lockwashers (2), and three hexagon nuts (1).

**f. Adjustment.** (Refer to figure 5-12.)

**(1) Governor Adjustment.**

- (a) Remove three hexagon nuts (1), three lockwashers (2), three machine screws (3), and access cover (4) to gain access to the governor controller (5).
- (b) Perform startup procedure in accordance with TM 9-2320-289-10 and paragraph 2-6b.

**NOTE**

**For a more accurate frequency reading, a frequency meter connected to TB1, terminals 4 and 6, on the control panel may be used (paragraph 2-2b).**

- (c) When engine stabilizes to a constant speed, observe frequency on the frequency meter on the control panel. Reading should be 60 Hertz.
- (d) If the reading is not 60 Hertz, adjust the speed control 96) on the governor controller to attain the 60 Hertz reading. Adjusting clockwise will increase frequency and adjusting counterclockwise will decrease frequency.
- (e) If you plan to adjust the overspeed switch, proceed to paragraph (2)(c) following; otherwise, shut down engine and install access cover (4) and secure with three machine screws (3), three lockwashers (2), and three hexagon nuts (1).

5-8. ELECTRONIC GOVERNOR SYSTEM (CONT).

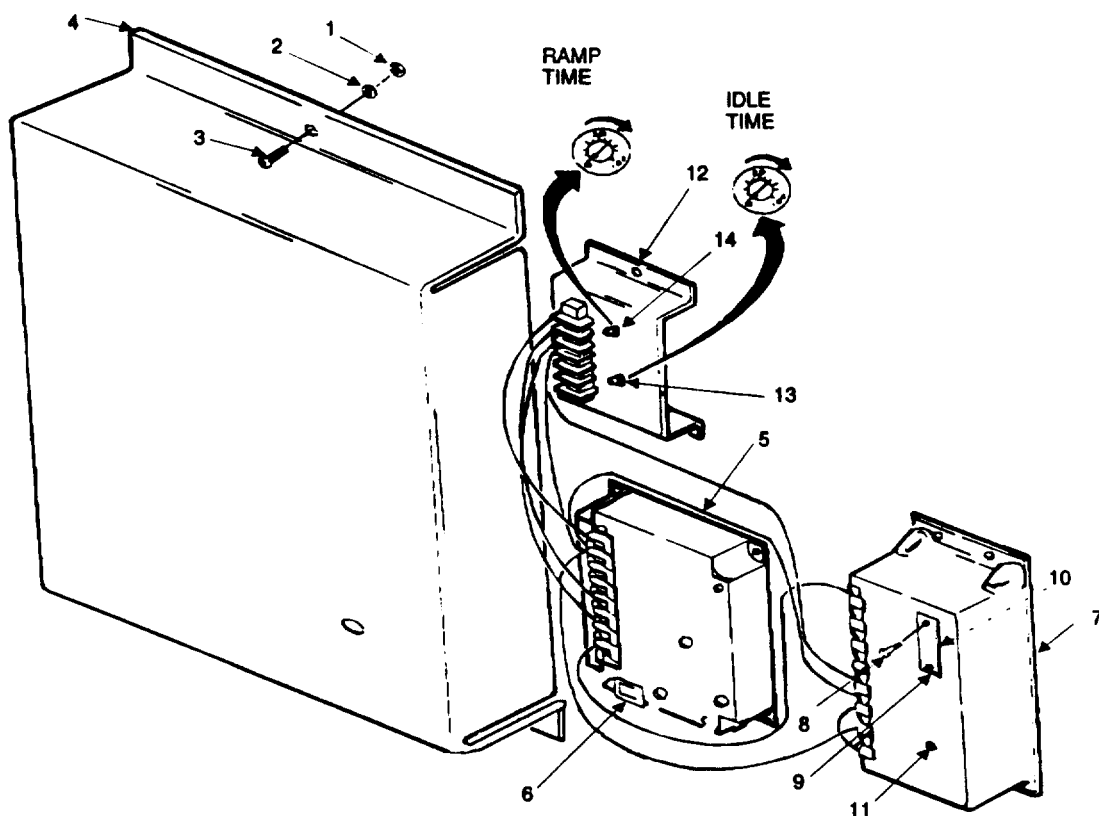


Figure 5-12. Electronic Governor System Adjustment

(2) Overspeed Switch Adjustment.

**WARNING**

**DO NOT ADJUST S1, or S2, they are preset at the factory.**

- (a) If not already removed, remove three hexagon nuts (1), three lockwashers (2), three machine screws (3), and access cover (4) to gain access to the overspeed switch (7).
- (b) Perform startup procedure in accordance with TM 9-2320-2389-10 and paragraph 2-6b.

- (c) Remove two machine screws (8) and cover plate (9) from overspeed switch (7) to gain access to overspeed switch adjustment potentiometer (10). On newer versions of the overspeed switch, the adjustment potentiometer is located at position 1.
- (d) Using a 1/16-inch screwdriver, turn the adjustment potentiometer (10) clockwise 2 or 3 full turns.
- (e) Mark position of governor controller speed control (6) on case of governor controller (5).

#### NOTE

**For a more accurate frequency reading, a frequency meter connected to TB1, terminals 4 and 6, on the control panel may be used (paragraph 2-2b).**

- (f) Adjust governor controller speed control (6) clockwise until frequency meter reads 67 Hertz.
- (g) Slowly turn overspeed switch adjustment potentiometer (10) counterwise until governor system shuts off and engine goes to idle.
- (h) Position governor circuit ON/OFF switch on M1031 vehicle dashboard to OFF.
- (i) Turn governor controller speed control (6) back to the position marked in step (a) preceding.
- (j) Press RESET button (11) on the overspeed switch (7) and position governor circuit ON/OFF switch on M1031 vehicle dashboard to ON.
- (k) Adjust governor controller speed control (6) to 60 Hertz.
- (l) Install cover plate (9) onto overspeed switch (7) and secure with two machine screws (8).

## 5-8. ELECTRONIC GOVERNOR SYSTEM (CONT).

- (d) If you plan to adjust the ramp generator, proceed to paragraph (3), following; otherwise, install access cover (4) and secure with three machine screws (3), three lockwashers (2), and three hexagon nuts (1).

### (3) Ramp Generator Adjustment.

#### NOTE

**The following adjustment procedure consists of steps which are trial and error. Refer to paragraph 2-6b. and TM 9-2320-289-10 for operation of vehicle engine, transmission, and PTO controls.**

- (a) If not already removed, remove three hexagon nuts (1), three lockwashers (2), three machine screws (3), and access cover (4) to gain access to ramp generator (12).
- (b) Attach a jumper wire between terminals 1 and 5 on the ramp generator (12).
- (c) Turn IDLE SPEED control (13) on ramp generator (12) fully counterclockwise.
- (d) Perform startup procedure in accordance with TM 9-2320-289-10 and paragraph 2-6b.
- (e) Adjust IDLE SPEED control (13) slowly clockwise until engine sound starts to change. When sound starts to change, STOP adjustment.
- (f) Disengage governor and PTO in accordance with paragraph 2-6c.
- (g) Remove jumper wire installed in step (b), preceding.
- (h) Perform startup procedure in accordance with TM 9-2320-289-10 and paragraph 2-6c.
  - (1) Set the governor circuit ON/OFF switch on M1031 dashboard to OFF.
  - (2) Press RESET button (11) on the overspeed switch (7).



- (3) Set the governor circuit ON/OFF switch on M1031 dashboard to ON.
- (i) Note the time it takes for the engine to stabilize. Time should be 10-12 seconds.
- (j) If time for the engine to stabilize is 10-12 seconds, ramp generator adjustment is complete. Proceed to step (4), following.
- (k) If time is less than 10-12 seconds, proceed to step (l), following; if greater than 10-12 seconds, proceed to step (o), following.
- (l) Position the governor circuit ON/OFF switch on M1031 dashboard to OFF, place transmission lever to N (neutral), and adjust RAMP TIME control (14) slightly clockwise.
- (m) Place transmission lever to D (drive) and position the governor circuit ON/OFF switch on M1031 dashboard to ON. Note the time it takes for the engine to stabilize.
- (n) If time is still less than 10-12 seconds, repeat steps (l) and (m), preceding. If time is 10-12 seconds, proceed to step (r), following; if time is greater than 10-12 seconds, proceed to step (o), following.
- (o) Position the governor circuit ON/OFF switch on the M1031 dashboard to OFF, place transmission lever to N (neutral), and adjust RAMP TIME control (14) slightly counterclockwise.
- (p) Place transmission lever to D (drive) and position the governor circuit ON/OFF switch on M1031 dashboard to ON. Note the time it takes for the engine to stabilize.
- (q) If time is still greater than 10-12 seconds, repeat steps (o) and (p), preceding; if time is 10-12 seconds, proceed to step (4), following; if time is less than 10-12 seconds, repeat steps (l) and (m), preceding.
- (r) Install access cover (4) and secure with three machine screws (3), three lockwashers (2), and three hexagon nuts (1).

## 5-9. TRANSFER CASE NEUTRAL SWITCH.

---

This task consists of:

- |               |                 |
|---------------|-----------------|
| a. Removal    | d. Repair       |
| b. Cleaning   | e. Installation |
| c. Inspection | f. Adjustment   |
- 

### INITIAL SETUP:

#### **Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

#### **Material Required:**

Brush, Medium Bristle (Item 2, Appx D)

Cloth, Lint-Free (Item 4, Appx D)

Solvent, Dry Cleaning (Item 18, Appx D)

#### **Equipment Conditions:**

CMV shut down and cool.

---

- a. **Removal.** (Refer to figure 5-13).

#### NOTE

**Tag all required wiring before disconnecting.**

- (1) Remove knob (1) from top of transfer case gear lever (2). Remove boot (3) which covers transfer case gearshaft and transfer case neutral switch.
- (2) Disconnect four governor wiring harness terminals to transfer case neutral switch (4).
- (3) Remove self-locking nut (5), flat washer (6), five flat washers (7), and cap screw (8).
- (4) Rotate switch lever (9) so that it can be lifted up over the transfer case gearshift and removed.
- (5) Remove two hexagon nuts (10), two washers (11), two bolts (12); and switch bracket (13) from underside of cab floor.

- (6) Remove two hexagon nuts (14), two flat washers (15), two machine screws (16), and transfer case neutral switch (4) from switch bracket (13).

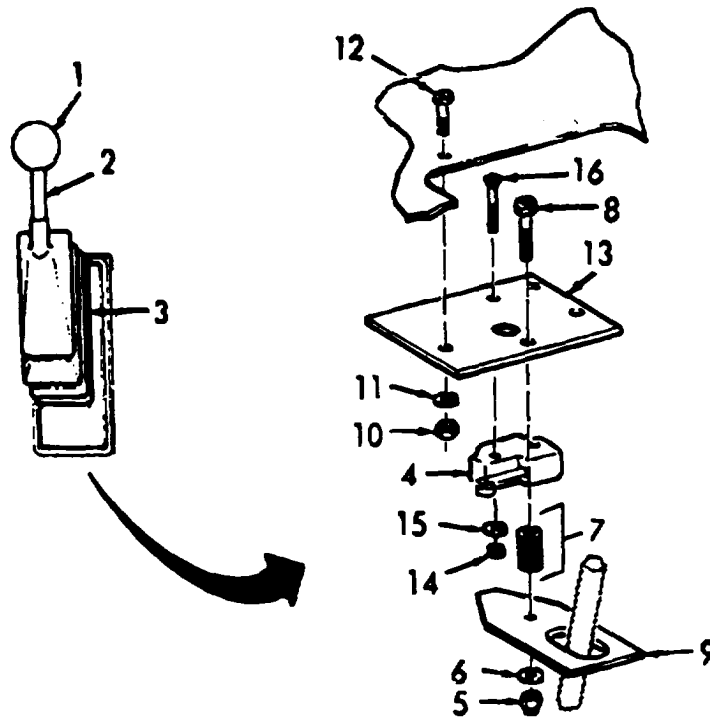


Figure 5-13. Transfer Case Neutral Switch, Removal/Installation.

**b. Cleaning.**

- (1) Remove all buildup of dirt or oil on all parts with a lint-free cloth (item 4, appx D).

**WARNING**

- Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable, and, if ignited, cause injury to personnel and damage to equipment.

**5-9. TRANSFER CASE NEUTRAL SWITCH (CONT).**

- **Do not breathe cleaning solvents for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flames.**
- **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.**

- (2) Clean all metal parts, except machine screws, nuts, and washers using a lint-free cloth (item 4, appx D) or a medium bristle brush (item 2, appx D) and cleaning solvent, (item 18, appx D).
- (3) Allow all parts to dry.
- (4) Clean transfer case neutral switch with a lint-free cloth (item 4, appx D) or a medium bristle brush (item 2, appx D).

**c. Inspection.**

- (1) Refer to paragraph 5-7c for inspection of the governor wiring harness.
- (2) Inspect attaching hardware and metal parts for cracks, rust, corrosion, stripped threads, and other obvious damage.
- (3) Inspect transfer case neutral switch for smooth lever action, broken or corroded terminals, and other obvious damage.

**d. Repair.** Repair of attaching hardware, metal parts, and transfer case neutral switch is by replacement of authorized parts (TM 9-4940-562-23P) which are determined to be defective. Replace all self-locking hexagon nuts.

**e. Installation.** (Refer to figure 5-13.)

- (1) Install transfer case neutral switch (4) onto switch bracket (13) and secure with two machine screws (16), two flat washers (15), and two hexagon nuts (14).
- (2) Install switch bracket (13) to the underside of the cab floor and secure with two machine bolts (12), two flat washers (11), and two hexagon nuts (10).
- (3) Slide switch lever (9) down over transfer case gearshift and rotate it so that it will mate with transfer case neutral switch (4).
- (4) Secure switch lever (9) to switch bracket (13) with cap screw (8), five flat washers (7), flat washer (6), and self-locking nut (5).
- (5) Connect governor wiring harness wire run 20 terminal to transfer case neutral switch (4) terminal C. Connect governor wiring harness wire run 22 terminal to transfer case neutral switch (4) terminal NO. Connect governor wiring harness wire run 24 terminal to transfer case neutral switch (4) terminal C. Connect governor wiring harness wire run 25 terminal to transfer case neutral switch (4) terminal NO. Remove and discard tags.
- (6) Install boot (3) over transfer case. Install knob (1) on top of transfer case gearshift lever (2).

**5-10. POWER TAKE OFF UNIT.**


---

This task consists of:

- |                |                 |
|----------------|-----------------|
| a. Removal     | e. Repair       |
| b. Disassembly | f. Reassembly   |
| c. Cleaning    | g. Installation |
| d. Inspection  |                 |
- 

**INITIAL SETUP:****Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
 or  
 Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

## 5-10. POWER TAKE OFF UNIT (CONT).

### **Material Required:**

Brush, Medium Bristle (Item 2, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)  
Solvent, Dry Cleaning (Item 18, Appx D)  
Hydraulic Fluid, Automatic Transmission (Item 7, Appx D)

### **Equipment Conditions:**

CMV shut down and cool.

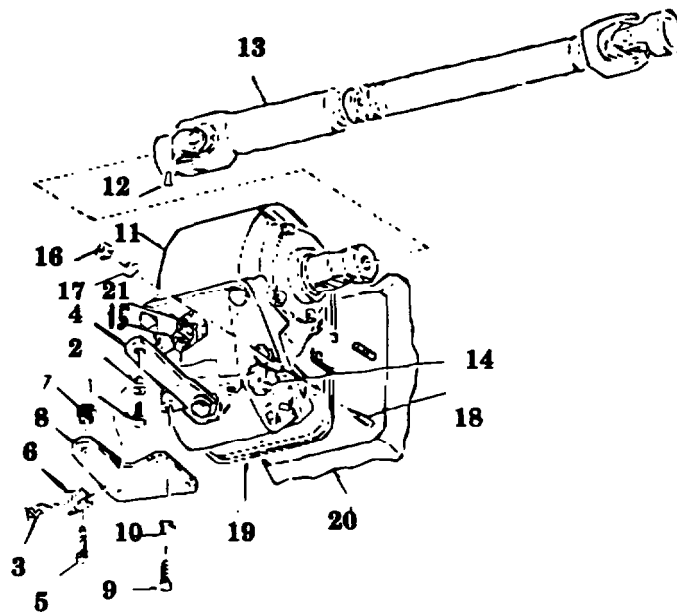
---

#### **a. Removal.** (Refer to figure 5-14.)

#### **NOTE**

**Tag all wiring before disconnecting.**

- (1) Remove setscrew (1), pivot in (2), and PTO control cable (3) from PTO shift lever (4).
- (2) Remove cap screw (5), swivel bracket (6), hexagon nut (7), and PTO control cable (3) from PTO bracket (8).
- (3) Remove machine bolt (9, lockwasher (10), and PTO bracket (8) from PTO (11).
- (4) Loosen setscrew (12) on end yoke (13); slip end yoke (13) away from PTO output shaft and support end yoke.
- (5) Disconnect three governor wiring harness terminals to the positive drive indicator switch (14) and magnetic pickup (15).
- (6) Remove six hexagon nuts (16), six lockwashers (17), PTO (11), and gasket(s) (19) from transmission case (20). Not quantity of gaskets (19) removed.



**Figure 5-14. PTO Unit, Removal/Installation.**

**b. Disassembly.** (Refer to figures 5-14 and 5-15.)

- (1) Remove magnetic pickup (15, fig. 5-14) by loosening jam nut (21) and unscrewing magnetic pickup (15) out of cable housing.
- (2) Remove positive drive indicator switch ((1), fig. 5-15) by loosening and unscrewing the switch from cable housing (2). Remove and discard preformed packing (3).
- (3) Remove and discard machine key (4).
- (4) Remove six cap screws (5) and lift cable housing (2) from housing (6). Remove and discard gasket (7).
- (5) Remove cap screw (8). Scribe a mark on shift lever (9), trigger shaft (10), and cable housing (2). Remove shift lever (9), lockwasher (10), flat washer (11), and preformed packing (12).

5-10. POWER TAKE OFF UNIT (CONT).

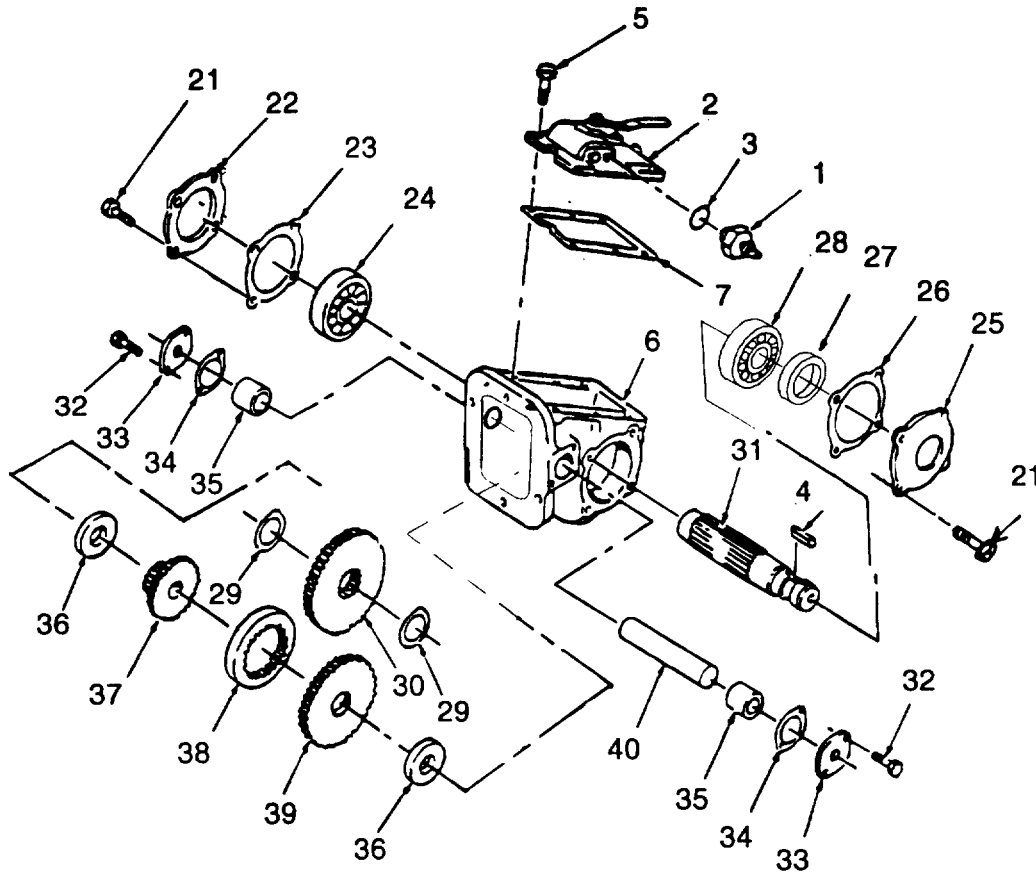


Figure 5-15. Power Take Off Unit (Sheet 1 of 2).



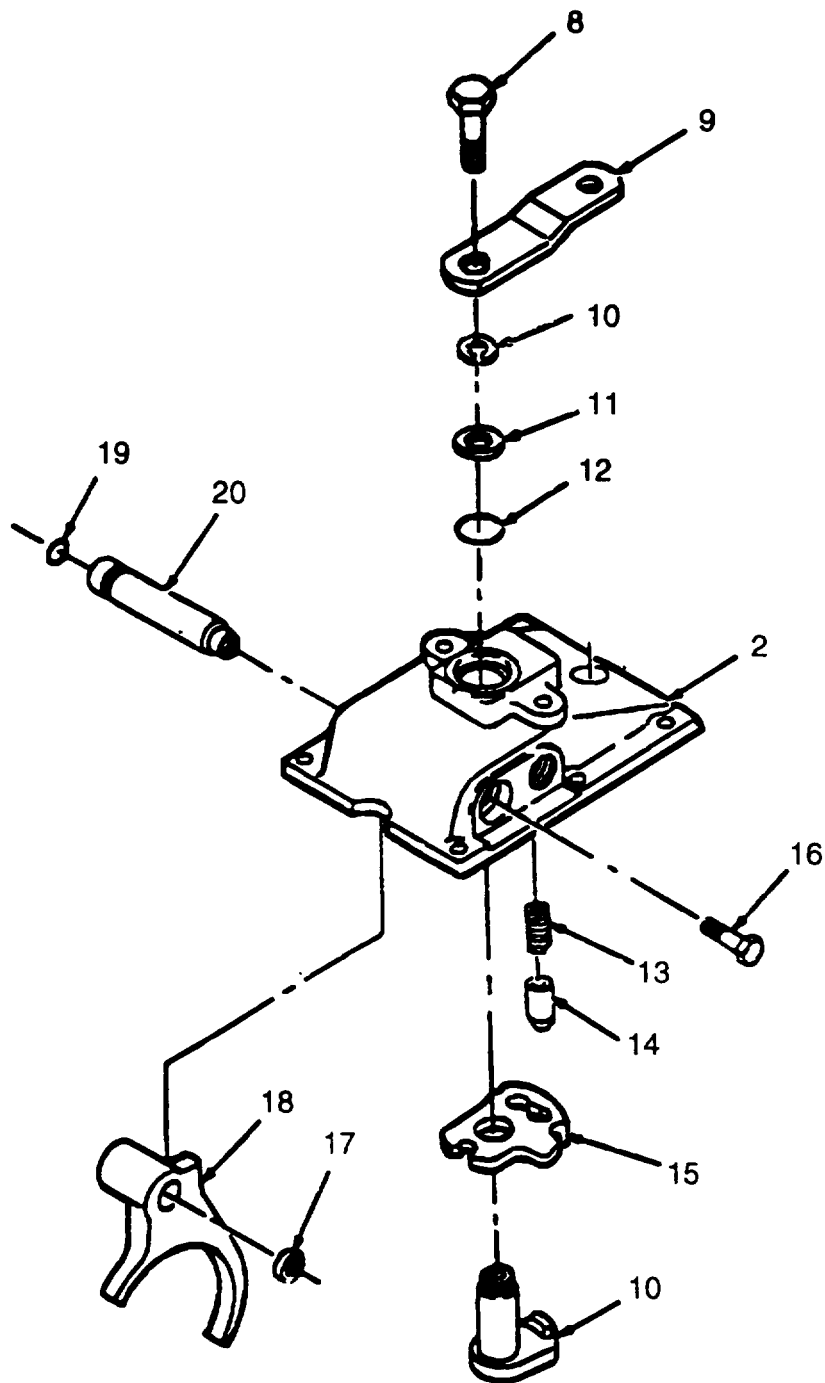


Figure 5-15. Power Take Off Unit (Sheet 2 of 2).

**5-10. POWER TAKE OFF UNIT (CONT).**

- (6) Mark hole containing helical spring (13) and poppet (14). Remove trigger (10), yoke plate (15), poppet (14), and helical spring (13).
- (7) Remove cap screw (16), seal (17), yoke (18), preformed packing (19), and rail shifter (20).
- (8) Remove eight cap screws (21), bearing cap (22), gasket (23), ball bearing (24), bearing cap (25), gasket (26), seal (27), and ball bearing (28).
- (9) Remove two retainer rings (29), spur gear (30), and gearshaft (31).
- (10) Remove four cap screws (32), idler shaft caps (33), two gaskets (34), two bearing sleeves (35), two thrust washers (36), gear cluster (37), positive clutch (38), helical gear (39), and idler shaft (40).

**c. Cleaning.** (Refer to figure 5-15.)

- (1) Remove all buildup of dirt or oil on all parts with a lint-free cloth (item 4, appx D).

<b>WARNING</b>
----------------

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable, and, if ignited, cause injury to personnel and damage to equipment.**
- **Do not breathe cleaning solvents for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flames.**
- **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.**

- (2) Clean idler shaft (40), helical gear (39), positive clutch (38), gear cluster (37), spur gear (30), two bearing sleeves (35), and gear shaft (31), with a lint-free cloth (item 4, appx D), a medium bristle brush (item 2, appx D), and dry cleaning solvent (item 18, appx D).
- (3) Clean cable housing (2) and housing (6) with a lint-free cloth (item 4, appx D), medium bristle brush (item 2, appx D), and dry cleaning solvent (item 18, appx D). Clean all gasket material from mating surfaces.
- (4) Clean bearing cap (22), bearing cap (25), and two idler shift caps (33) with a lint-free cloth (item 4, appx D), medium bristle brush (item 2, appx D), and dry cleaning solvent (item 18, appx D). Clean all gasket material from mating surfaces.
- (5) Clean two ball bearings (24 and 28) with lint-free cloth (item 4, appx D), medium bristle brush (item 2, appx D) and dry cleaning solvent (item 18, appx D). DO NOT use compressed air to dry the bearings, allow bearings to air dry.
- (6) Clean remaining metal parts, except hardware items, with a lint-free cloth (item 4, appx D), medium bristle brush (item 2, appx D), and dry cleaning solvent (item 18, appx D).

**d. Inspection.** (Refer to figure 5-15.)

- (1) Inspect idler shaft (40), helical gear (39), positive clutch (38), gear cluster (37), spur gear (30), two bearing sleeves (35), and gear shaft (31), for breaks, cracks, chips, pitting and wear.
- (2) Inspect two ball bearings (24 and 28) for pits, scores, cracks, chips, and smoothness of bearing movement.
- (3) Inspect the cable housing (2) and housing (6) for cracks and chips.
- (4) Inspect bearing cap (22), bearing cap (25), and two idler shift caps (33) for pits, breaks, cracks, chips, and wear.
- (5) Inspect remaining metal parts for pits, breaks, cracks, chips, and wear.
- (6) Inspect PTO control cable for breaks and smoothness of operation.

**5-10. POWER TAKE OFF UNIT (CONT).**

(7) Inspect PTO shift lever for looseness and ease of operation.

(8) Inspect governor wiring harness for loose terminals, breaks, or fraying.

**e. Repair.** Items found to be defective will be restored to a serviceable condition before being used. Items that cannot be restored will be replaced. General repair procedures are as follows:

**NOTE**

**Minor surface defects that affect only appearance and do not interfere with fit or function are acceptable. Surface defects that affect an item's fit or function must be either repaired or the item replaced.**

**(1) Housings and Machined Surfaces.**

(a) Remove minor nicks, scores, burrs, rust, and small irregularities on machined surfaces with crocus cloth or a soft honing stone. Replace part if cracked, fractured, deformed, or excessively scored or burred.

(b) Repair damaged threads with correct size tap or die. If threads cannot be restored in this manner, install threaded insert into body or housing.

**(2) Gears and Shafts.** Remove minor burrs and surface irregularities with crocus cloth or a soft honing stone. Replace part if broke, cracked, chipped, or excessively pitted or worn.

(3) Repair of attaching hardware, ball bearings, bearing caps, etc., is by replacement of authorized parts (TM 9-4940-562-23P) which are determined to be defective.

(4) Repair governor wiring harness in accordance with paragraph 5-7.

(5) Repair PTO controls in accordance with paragraph 5-24.

**f. Reassembly.** (Refer to figure 5-15.)

**NOTE**

**Lubricate metal power take off components with hydraulic fluid (item 7, appx D) during reassembly.**

- (1) Place housing (6) on workbench with PTO to transmission flange facing you. Flange for mounting cable housing (2) must be facing up.
- (2) Install ball bearing (28) in bearing cap (22). Install bearing cap (22) to left side of housing (6) with gasket (23) and four cap screws (21). Tighten cap screws 8-10 lb-ft.
- (3) Slide gearshaft (31) through right (output) side of housing (6) and spur gear (30). Secure spur gear (30) on gearshaft (31) with two retainer rings (29) (one on each side of the spur gear).
- (4) Install ball bearing (24) and seal (27) onto right end of gearshaft (31). Install gasket (26) and bearing cap (25) onto housing (6) and secure with four cap screws (21). Tighten cap screws 8-10 lb-ft. Gearshaft (31) should turn freely and end play should not be excessive.
- (5) Install gasket (34) and idler shift cap (33) onto left side of housing (6) and secure with two cap screws (32). Tighten cap screws to 8-10 lb-ft.
- (6) Install bearing sleeve (35) into housing (6) until bearing sleeve (35) bottoms against idler shift cap (33).
- (7) Pass idler shaft (40) through housing (6) and install thrust washer (36) (tab sits in housing slot), helical gear (39), positive clutch (38), gear cluster (37), and one thrust washer (36) (tab sits in housing slot).
- (8) Install bearing sleeve (35) onto idler shaft (40) and slide into housing (6) until flush with housing flange. Install gasket (34) and idler shift cap (33) onto right side of housing (6) and secure with two cap screws (32). Tighten screws 8-10 lb-ft. Idler shaft should turn freely with little end play. Positive clutch (38) should freely move to the left engaging gear cluster (37) with spur gear (30).
- (9) Place cable housing (2) on workbench so that cable housing flange to PTO mounting flange faces up.

**5-10. POWER TAKE OFF UNIT (CONT).**

- (10) Slide rail shifter (20) through left side of cable housing (2). Install seal (17), yoke (18), and preformed packing (19) on rail shifter (20). Secure rail shifter (20) to cable housing (2) with cap screw (16). Yoke (18) should move freely on rail shifter (20).
- (11) Install in hole previously marked for installation on cable housing (2) helical spring (13) and poppet (14).
- (12) Slide trigger shaft (10) through big hole in yoke plate (15). Position yoke (18) so that leading edge of yoke (18) is in slot of yoke plate (15).
- (13) Push trigger (10) up through cable housing (2). Ensure that poppet (14) engages dimple in yoke plate (15).
- (14) Install preformed packing (12), flat washer (11), lockwasher (10), and shift lever (9). Align shift lever (9), trigger shaft (10), and cable housing (2) with marks. Once alignment is established, secure with cap screw (16).
- (15) Install gasket (7) and cable housing (2) onto housing (6). Ensure that yoke (18) engages positive clutch (38). Secure cable housing (2) to housing (6) with six cap screws (5). Finger tighten cap screws.
- (16) Install new machine key (4).
- (17) Install new preformed packing (3) and positive drive indicator switch (1) in cable housing (2).
- (18) Rotate shift lever (9) so that positive clutch (38) is engaged. Rotate helical gear (39), by hand, until one tooth of the gear is centered in the magnetic pickup hole.
- (19) Screw jam nut (21, fig. 5-14) on the magnetic pickup (15) towards the wiring end. Screw in the magnetic pickup (15) until it bottoms against the helical gear tooth; back off 1/2 turn counterclockwise and tighten jam nut (21).

**g. Installation.** (Refer to figure 5-14).

**NOTE**

**Actual installation experience will indicate whether 1, 2, or 3 gaskets are appropriate for PTO installation. However, at least one gasket must be used.**

- (1) Install the number of gaskets (19) removed in step a.(6), preceding, over mounting studs (18) on transmission case (20). Install PTO (11), six lockwashers (17), and six hexagon nuts (16). Tighten hexagon nuts to 30-35 lb-ft.
- (2) Remove six cap screws (5, fig. 5-15) and remove cable housing (2) and gasket (7) from housing (6).
- (3) Working through the opening with the cable housing (2) removed, check the backlash on the input gear (gear that meshes with the transmission gear). The amount of rotational movement of the PTO gear should be .005" to .012". If the measured movement is out of this range, the PTO will have to be removed and the quantity of gaskets changed. Additional gasket if the movement is less than .005" and remove one gasket if the movement is more than .012". No more than four gaskets should be stacked together.

**NOTE**

**One thin gasket (.010" thick) will change the backlash movement by approximately .006".**

**It may be necessary to use a screwdriver inserted through the shifter opening to hold the transmission gear still to achieve proper backlash readings. The screwdriver must be long enough to avoid contact with the PTO input gear.**

- (4) Install gasket (7) and cable housing (2) onto housing (6). Ensure that yoke (18) engages positive clutch (38). Secure cable housing (2) to housing (6) with six cap screws (5). Tighten screws to 8-10 lb-ft.

## 5-10. POWER TAKE OFF UNIT (CONT).

- (5) Connect governor wiring harness wire run 23 quick disconnect terminal to positive drive indicator switch (1). Connect governor wiring harness wire run SC WHITE terminal to magnetic pickup terminal -. Connect governor wiring harness wire run SC RED terminal to magnetic pickup terminal +. Discard tags.
- (6) Slip end yoke (13, fig. 5-14) onto PTO output shaft and tighten setscrew (12).
- (7) Install PTO bracket (8) onto PTO (11) and secure with lockwasher (10) and machine bolt (9).
- (8) Install PTO control cable (3) to PTO bracket (8) using hexagon nut (7), swivel bracket (6), and cap screw (5).
- (9) Attach PTO control cable (3) to PTO shift lever (4) and secure with pivot pin (2) and setscrew (1). Pull dash-mounted knob out for PTO engagement. Adjust PTO control cable for proper operation.
- (10) Check transmission fluid level (TM 9-2320-289-10). Run engine and check PTO mounting for visible leaks.

## 5-11. CABLE ASSEMBLIES (DIRECT CURRENT)

---

This task consists of:

- |               |                 |
|---------------|-----------------|
| a. Removal    | d. Repair       |
| b. Cleaning   | e. Installation |
| c. Inspection |                 |
- 

### INITIAL SETUP:

#### **Tools Required.**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
or  
Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

#### **Material Required:**

Brush, Medium Bristle (Item 2, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)  
Solvent, Dry Cleaning (Item 18, Appx D)  
Multimeter



**Equipment Conditions:**

Disengage the power takeoff.  
CMV shut down and cool.  
Electrical power turned off.  
Air compressor shut down.

---

**WARNING**

- **Air compressor must be turned OFF before performing maintenance. Rotating pulleys and moving belts could cause serious injury to personnel.**
- **Electrical power must be turned off prior to any maintenance on the DC cable assemblies. Electrical shock can cause serious injury or death to personnel.**

**NOTE**

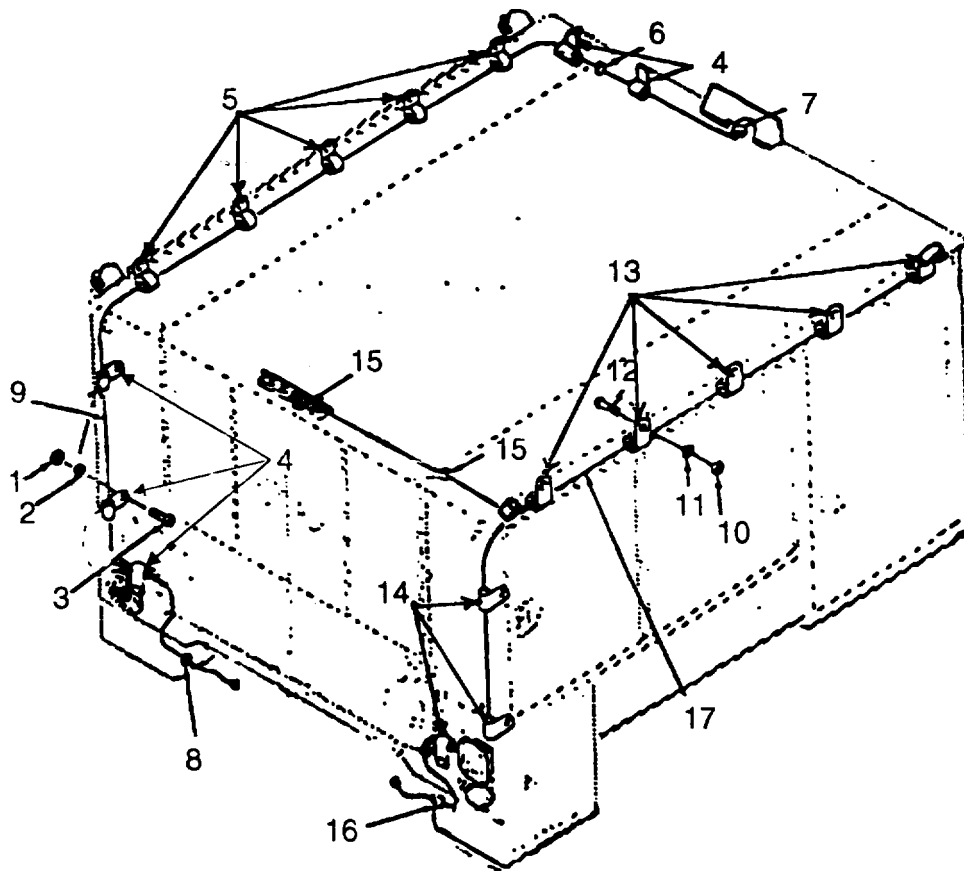
- **Tag all required wiring before disconnecting. Refer to figure 5-17 for electrical schematic. (FOLDOUT FO1)**
- **Remove components only to the extent required to repair.**

**a. Removal.** (Refer to figure 5-16.)

- (1) Tag and disconnect red and amber side clearance lights from either curb or streetside DC cable assembly.
- (2) Tag and disconnect red and amber marker light terminals from front and rear cluster mounts.
- (3) Remove ten hexagon nuts (1), ten lockwashers (2), ten machine screws (3), five clamp loops (4), five clamp loops (5), one nonmetallic grommet (1), one nonmetallic grommet (7), and one nonmetallic grommet (8) from body.

**5-11. CABLE ASSEMBLIES (DIRECT CURRENT) (CONT).**

- (4) Carefully remove streetside DC cable assembly (9).
- (5) Remove eight hexagon nuts (10), eight lockwashers (11), eight machine screws (12), five clamp loops (13), three clamp loops (14), two nonmetallic grommets (15), and one nonmetallic grommet (16) from body.
- (6) Carefully remove curbside DC cable assembly (17).



**Figure 5-16. Cable Assembly (Direct Current), Removal/Installation.**

**THIS PAGE LEFT BLANK INTENTIONALLY**

## 5-11. CABLE ASSEMBLIES (DIRECT CURRENT) (CONT).

### b. Cleaning.

- (1) Remove all buildup of dirt and oil on all parts with a lint-free cloth (item 4, appx D).

<b>WARNING</b>
----------------

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning for these items are highly flammable, and if ignited, cause injury to personnel and damage to equipment.**
  - **Do not breathe cleaning solvents for long periods of time or use solvent near open flame. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flame.**
  - **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with the exposed skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.**
- (2) Clean hardware with a medium bristle brush (item 2, appx D) and dry cleaning solvent (item 18, appx D). Allow parts to air dry.
  - (3) Clean electrical components, such as connectors, band marks, and tubing with a lint-free cloth (item 4, appx D) or medium bristle brush (item 2, appx D).

### c. Inspection.

- (1) Inspect wiring insulation for cracks or fraying. Pay particular attention to areas where wiring passes through holes in the frame, or over metal edges. Inspect wire harness terminals for tight connection to the wire runs. Inspect wire run/wire harness terminal for burn spots or corrosion. Replace any wire harness terminal that has burn spots/corrosion or is not securely attached to the wire run. Replace any wire run that is cracked/frayed/burned or cut.

- (2) Perform continuity checks of wire runs. Check for opens/shorts in wire run with a multimeter. Repair/replace any wire run that checks open/shorted.
- (3) Inspect machine screws, lockwashers, and hexagon nuts for stripped threads, corrosion, or cracks. Replace any hardware that is defective.

**d. Repair.** (Refer to table 5-5 for curbside DC cable assembly wire run list, table 5-6 for streetside DC cable assembly wire run list, and table 5-7 curbside/streetside DC cable assembly wire run parts list.) Repair consist of either replacement of a wire run or replacement of a defective wire harness terminal.

- (1) To assemble a new wire run, refer to either tables 5-5, 5-6, or 5-7. Identify type of wire harness terminals and type/length of electrical wire needed. Construct a new wire run and test for opens/shorts.
- (2) To replace a defective wire run harness terminal, inspect the wiring run per paragraph c., preceding, and locate the defective wire run terminal. Refer to tables 5-5 and 5-6 to determine the wire run terminal needed and to table 5-7 for the part number of the wire run terminal needed. Uncrimp the defective terminal and crimp the replacement terminal.
- (3) Repair of attaching hardware and electrical components is by replacement of authorized parts (TM 9-4940-562-23P) which are determined to be defective.

**e. Installation.** (Refer to figure 5-16.)

- (1) Carefully install curbside DC cable assembly (17) in body.
- (2) Install one nonmetallic grommet (16) and two nonmetallic grommets (15) in bulkhead holes of body around curbside DC cable assembly (17). Secure curbside DC cable assembly to body with eight machine screws (12), five clamp loops (13), three clamp loops (14), eight lockwashers (11), and eight hexagon nuts (10).
- (3) carefully install streetside DC cable assembly (9) in body.
- (4) Install one nonmetallic grommet (8), one nonmetallic grommet (7), and one nonmetallic grommet (6) in bulkhead holes of body around streetside DC cable assembly. Secure streetside DC cable assembly to body with ten machine screws (3), five clamp loops (4), five clamp loops (5), ten lockwashers (2), and ten hexagon nuts (1).

**5-11. CABLE ASSEMBLIES (DIRECT CURRENT) (CONT).**

(5) Connect red and amber marker light terminals from front and rear cluster mounts. Remove and discard tags.

(6) Connect red and amber side clearance lights. Remove and discard tags.

**Table 5-5. Curbside DC Cable Assembly, P/N 13217E8313, Wire Run List**

<b>Wire No.</b>	<b>Item No. *</b>	<b>Item No. *</b>	<b>Wire Length</b>	<b>Item No. *</b>	<b>Item No.*</b>	<b>Conduit Length (In.)</b>
13217E8313-3	4	<b>3</b>	3.00"	1	7	35.00
13217E8313-4	4	<b>3</b>	5.00"	1		
13217E8313-4	4	<b>3</b>	5.00"	1		
13217E8313-4	4	<b>3</b>	5.00"	1		
13217E8313-4	4	<b>5</b>	5.00"	1		
13217E8313-5	3	<b>5</b>	35.00"	1		
13217E8313-6	5	6	48.00"	1		
13217E8313-7	3	3	51.00"	1		
13217E8313-8	3	4	87.00"	1		

\*See table 5-7.

**Table 5-6. Streetside DC Cable Assembly, P/N 13217E8314, Wire Run List**

<b>Wire No.</b>	<b>Item No. *</b>	<b>Item No. *</b>	<b>Wire Length</b>	<b>Item No. *</b>	<b>Item No.*</b>	<b>Conduit Length (In.)</b>
13217E8314-1	<b>6</b>	<b>5</b>	48.00"		7	35.00
13217E8314-3	<b>4</b>	<b>3</b>	5.00"			
13217E8314-3	<b>4</b>	<b>3</b>	5.00"			
13217E8314-3	<b>4</b>	<b>3</b>	5.00"			
13217E8314-3	<b>4</b>	<b>5</b>	5.00"			
13217E8314-3	<b>4</b>	<b>5</b>	5.00"			
13217E8314-3	<b>4</b>	<b>5</b>	5.00"			
13217E8314-4	<b>5</b>	<b>5</b>	85.00"			
13217E8314-5	<b>5</b>	<b>5</b>	38.00"			
13217E8314-6	<b>5</b>	<b>3</b>	55.00"			

\*See table 5-7.

**Table 5-7. Curbside/Streetside DC Cable Assembly Wire Run Parts List**

<b>Item No.</b>	<b>Part Number</b>	<b>CAGEC</b>	<b>Description</b>	<b>NSN</b>
1	M13486-1-5	81349	Wire, Electrical	6145-00-152-6499
2	M43436/1-10	81349	Band, Marker	9905-00-818-8373
3	401A212-3	06090	Insulation Sleeving	5970-01-003-7640
4	MS27144-1	96906	Connector, Plug, Electrical	5935-00-167-7775
5	301A212-3	06090	Insulation Sleeving	5970-00-113-5840
6	MS27142-2	96906	Connector, Plug, Electrical	5926-00-462-6603
7	LOOM3/8ID	97030	Conduit, Nonmetallic	5075-00-285-0907

\*From tables 5-5 and 5-6.

#### **5-12. CABLE ASSEMBLY (ALTERNATING CURRENT).**

This task consists of:

- |               |                 |
|---------------|-----------------|
| a. Removal    | d. Repair       |
| b. Cleaning   | e. Installation |
| c. Inspection |                 |

#### **INITIAL SETUP:**

##### **Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

##### **Material Required:**

Brush, Medium Bristle (Item 2, Appx D)  
 Cloth, Lint-Free (Item 4, Appx D)  
 Solvent, Dry Cleaning (Item 18, Appx D)

##### **Equipment Conditions:**

Disengage the power takeoff.  
 CMV shut down and cool.  
 Electrical power turned off.  
 Air compressor shut down.

5-12. CABLE ASSEMBLY (ALTERNATING CURRENT).

**WARNING**

- **Air compressor must be turned OFF before performing maintenance. Rotating pulleys and moving belts could cause serious injury to personnel.**
- **Electrical power must be turned off prior to any maintenance on the DC cable assemblies. Electrical shock can cause serious injury or death to personnel.**

**NOTE**

- **Tag all required wiring before disconnecting. Refer to electrical schematic (fig. 5-19).**
- **Remove components only to the extent required to repair.**

a. **Removal.** (Refer to figure 5-18.)

- (1) Remove two machine screws (1) and electrical connector box cover (2) from alternator (3).
- (2) Open control panel assembly and gain access to rear of the control panel assembly (4).
- (3) Tag and disconnect alternator to control panel AC electrical cable assembly (5) leads (6) from alternator (3) and control panel assembly (4).
- (4) Remove two fittings (7) and alternator to control panel AC electrical cable assembly (5).
- (5) Remove four screws (8), cover (9), and gasket (10) from air compressor motor (11).
- (6) Remove screw (12), lockwasher (13), and cover (14) from air pressure switch.
- (7) Tag and disconnect air pressure switch to air compressor motor AC electrical cable assembly (15) terminal lugs (16) from air pressure switch and air compressor motor (11).
- (8) Remove two machine screws (17), two hexagon nuts (18), two flat washers (19), and two retaining straps (20).
- (9) Remove two electrical box connectors (21), two electrical bushings (22), and air pressure switch to air compressor motor AC electrical cable assembly (15).
- (10) Tag and disconnect air compressor motor to control panel AC electrical cable assembly (23) leads (24 and 25) and terminal lugs (26).



- (11) Remove two machine screws (27), two hexagon nuts (28), two flat washers (29), and two retaining straps (30).
- (12) Remove two electrical box connectors (31), two electrical bushings (32), and air compressor motor to control panel AC electrical cable assembly (23).

b. **Cleaning.**

**WARNING**

- Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning for these items are highly flammable, and if ignited, cause injury to personnel and damage to equipment.
- Do not breathe cleaning solvents for long periods of time or use solvent near open flame. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flame.
- Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with the exposed skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.

5-12. CABLE ASSEMBLIES (ALTERNATING CURRENT)(CONT).

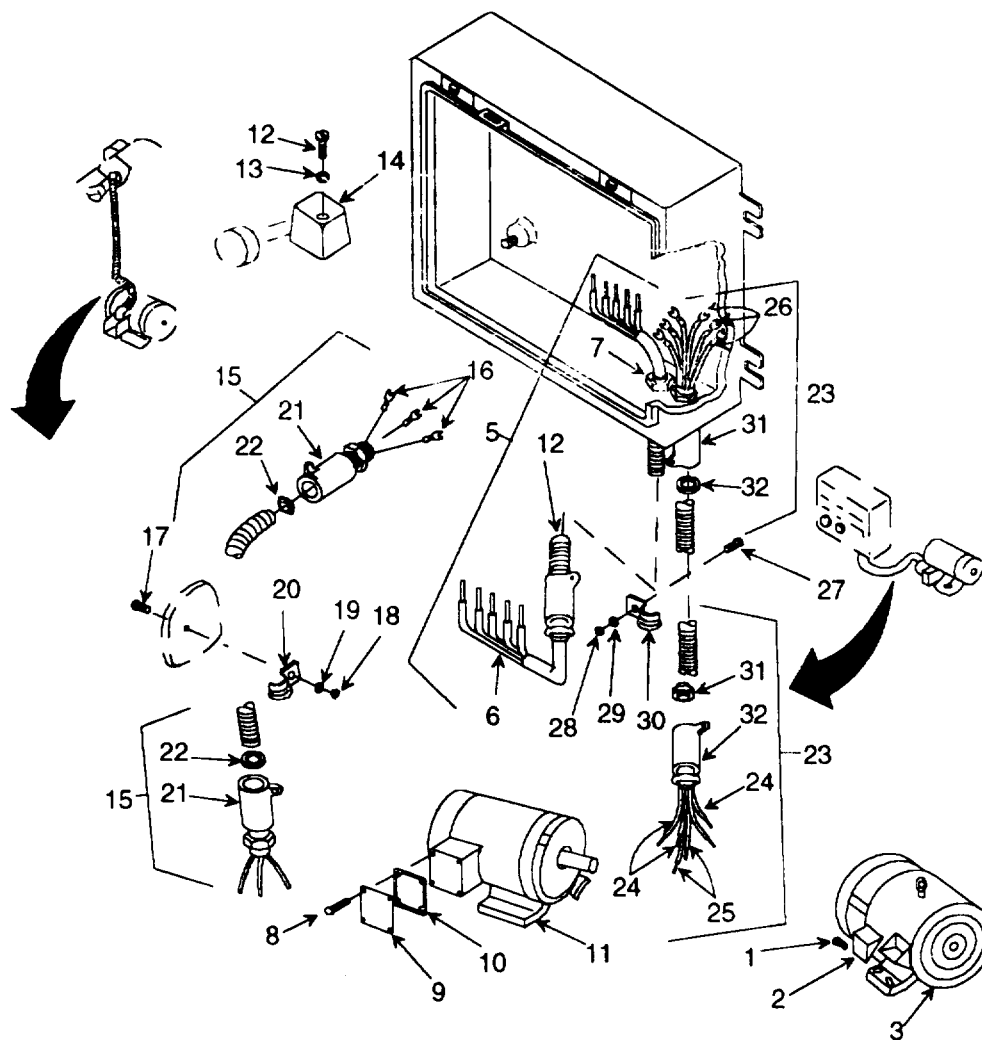


Figure 5-18 Cable Assembly (Alternating Current), Removal / Installation.

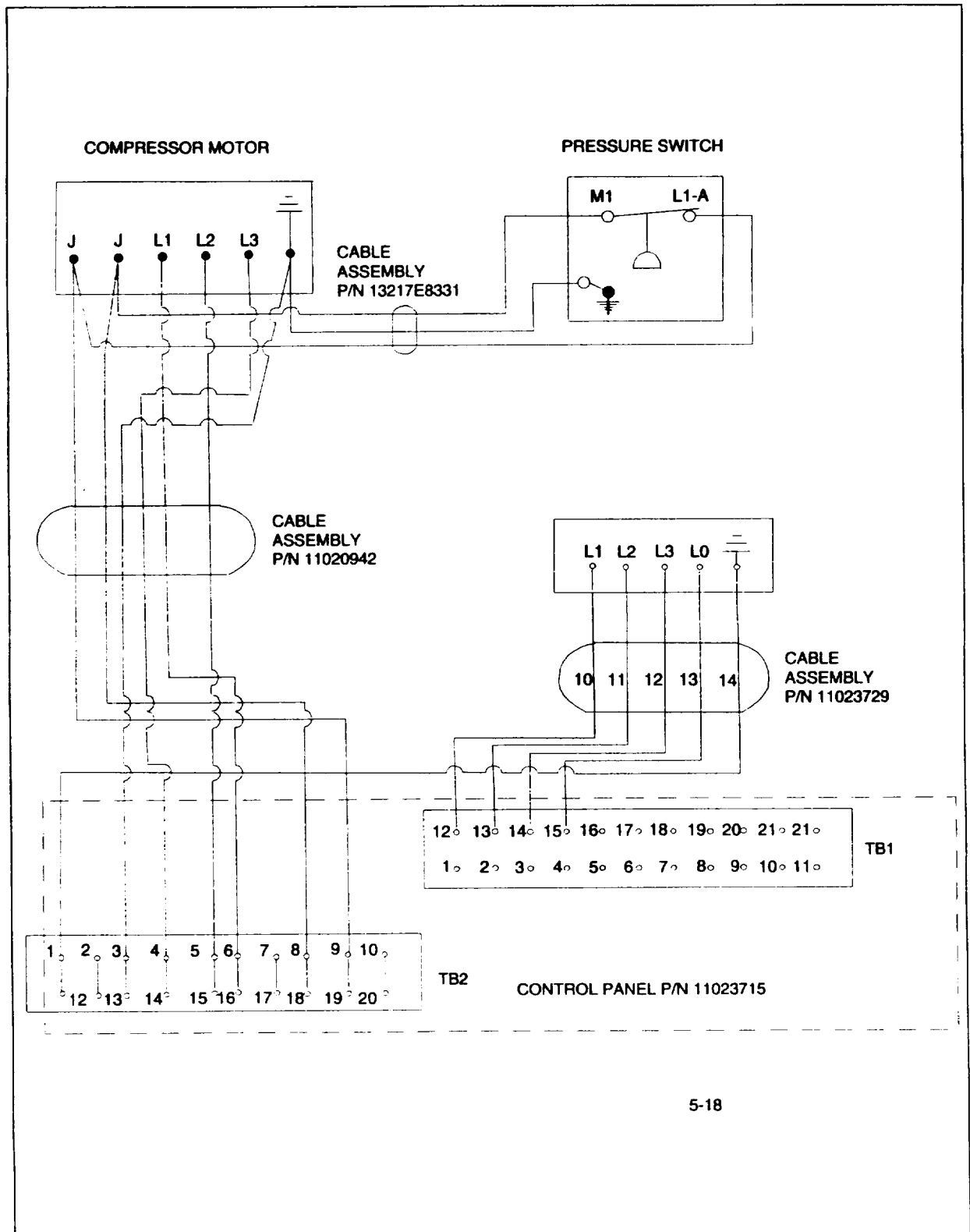


Figure 5-19. Cable Assembly (alternating Current) Electrical Schematic.

**5-12. CABLE ASSEMBLY (ALTERNATING CURRENT) (CONT).**

- (1) Remove all buildup of dirt and oil on all parts with a lint-free cloth (item 4, appx D).
- (2) Clean hardware and other metal parts with a medium bristle brush (item 2, appx D) and dry cleaning solvent (item 18, appx D). Allow parts to air dry.
- (3) Clean electrical components, such as wire runs and electrical bushings with a lint-free cloth (item 4, appx D) or medium bristle brush (item 2, appx D).

**c. Inspection.**

- (1) Inspect wiring insulation for cracks or fraying. Pay particular attention to areas where wiring passes through holes or over metal edges. Inspect wire harness terminals for tight connection to the wire runs. Inspect wire run/wire harness terminal for burn spots or corrosion. Replace any wire harness terminal that has burn spots/corrosion or is not securely attached to the wire run. Replace any wire run that is cracked/frayed/burned or cut.
- (2) Perform continuity checks of wire runs. Check for opens/shorts in wire run with a multimeter. Repair/replace any wire run that checks open/shorted.
- (3) Inspect machine screws, lockwashers, and hexagon nuts for stripped threads, corrosion, or cracks. Replace any hardware that is defective.

**d. Repair.** (Refer to table 5-8 for air pressure switch to air compressor AC cable assembly wire run list, table 5-9 for air compressor motor to control panel AC cable assembly wire run list, table 5-10 for alternator to control panel AC cable assembly wire run list, and table 5-11 for AC cable assemblies wire run parts list.) Repair consists of either replacement of a wire run or replacement of a defective wire harness terminal.

**5-12. CABLE ASSEMBLY (ALTERNATING CURRENT) (CONT).**

- (1) To assemble a new wire run, refer to either tables 5-8, 5-9, 5-10, or 5-11. Identify type of wire harness terminals and type/length of electrical wire needed. Construct a new wire run and test for opens/shorts.
- (2) To replace a defective wire run harness terminal, inspect the wire run per paragraph c., preceding, and locate the defective wire run terminal. Refer to tables 5-8, 5-9, and 5-10 to determine the wire run terminal needed and to table 5-11 for the part number of the wire run terminal needed. Uncrimp the defective terminal and crimp the replacement terminal.
- (3) Repair of attaching hardware and electrical components is by replacement of authorized parts (TM 9-4940-562-23P) which are determined to be defective.

**Table 5-8. AC Cable Assembly, Part Number 13217E8331, Wire Run List**

<b>Item No.*</b>	<b>Item No. *</b>	<b>Wire Length**</b>	<b>Nonmetallic Conduit Item No.***</b>	<b>Conduit Length (In.)</b>
2	5	58.75"	3 +	51.00
2	5	58.75"	3 +	51.00
2	5	58.75"	3 +	51.00

\*See table 5-11

\*\*End of wire to be stripped 3/4" and tined to prevent wire strands from fraying

\*\*\*Three wire runs are in conduit

**Table 5-9. AC Cable Assembly, Part Number 11020942, Wire Run List**

<b>Item No.*</b>	<b>Item No.*</b>	<b>Wire Length** (In.)</b>	<b>Nonmetallic Conduit Item No.*</b>	<b>Conduit Length*** (In.)</b>
1	4	77.00	7	53.00
1	4	77.00	7	53.00
1	4	76.50	7	53.00
2	4	76.00	7	53.00
2	4	75.50	7	53.00
2	4	75.00	7	53.00

\*See table 5-11

\*\*End of wire to be stripped 3/4" and tined to prevent wire strands from fraying

\*\*\*Six wire runs are in conduit

**Table 5-10. AC Cable Assembly, Part Number 11023729, Wire Run List**

Wire No.	Wire Length* (In.)	Item No. **	Nonmetallic Conduit Item No.**	Conduit Length*** (In.)
10 thru 14	70.00	8	6	40.00

\*End of wire to be stripped 3/4"

\*\*See table 5-11

\*\*\*Five wire runs are in conduit

**Table 5-11. AC Cable Assemblies Wire Run Parts List**

Item No.	Part Number	CAGEC	Description	NSN
1	M5086/1-12-0	<b>81349</b>	Wire, Electrical	6145-00-044-3579
2	M5086/1-10-0	<b>81349</b>	Wire, Electrical	6145-01-323-1541
3	WWC566	<b>81348</b>	Conduit, metal, Flexible	5975-00-878-5153
4	MS25036-112	<b>96906</b>	Terminal Lug	5940-00-143-4794
5	RC1123	<b>59730</b>	Terminal Lug	5940-00-118-2239
6	UASEALTITE 1 IN	<b>70510</b>	Conduit, Metal, Flexible	5975-00-956-6105
7	3-4SEALTITE	<b>01881</b>	Conduit, Metal, Flexible	5975-00-878-5154
8	M5086/2-8-9	<b>81349</b>	Wire, Electrical	6145-00-284-0657

**e. Installation.** (Refer to figure 5-18.)

- (1) Carefully install air compressor motor to control panel AC electrical cable assembly (23). Secure with cable assembly with two electrical bushings (32) and two electrical box connectors (31).
- (2) Secure AC electrical cable assembly (23) to body with two machine screws (27), two retaining straps (30), two flat washers (29), and two hexagon nuts (28).
- (3) Connect AC electrical cable assembly (23) leads (24 and 25) and terminal lugs (26) to control panel (4) and air compressor motor (11). Remove and discard tags.
- (4) Carefully install air pressure switch to air compressor motor AC electrical cable assembly (15). Secure with two electrical bushings (22) and two electrical box connectors (21).
- (5) Secure AC electrical cable assembly (15) to body with two machine screws (17), two retaining straps (20), two flat washers (19), and two hexagon nuts (18).

- (6) Connect AC electrical cable assembly (15), leads and terminal lugs (16) to air pressure switch and air compressor motor (11). Remove and discard tags.
- (7) Install cover (14) onto air pressure switch and secure with lockwasher (13) and screw (12).
- (8) Install cover (9) and gasket (10) onto air compressor motor (11) and secure with four screws (8).
- (9) carefully install alternator to control panel AC electrical cable assembly (5) and secure with two fittings (7).
- (10) Connect AC electrical cable assembly (5) leads (6) to alternator (3) and control panel assembly (4). Remove and discard tags.
- (11) Close control panel assembly.
- (12) Install electrical connector box cover (2) onto alternator (3) and secure with two machine screws (1).

### 5-13. ALTERNATOR.

---

This task consists of:

- |                |                 |
|----------------|-----------------|
| a. Removal     | e. Testing      |
| b. Disassembly | f. Repair       |
| c. Cleaning    | g. Assembly     |
| d. Inspection  | h. Installation |
- 

### INITIAL SETUP:

#### **Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

#### **Material Required:**

Brush, Medium Bristle (Item 2, Appx D)  
 Cloth, Lint-Free (Item 4, Appx D)  
 Solvent, Dry Cleaning (Item 18, Appx D)

CMV shut down and cool.  
 Air compressor shut off and bled.  
 Positive drive belt removed.  
 Sprockets removed.

---

### 5-13. ALTERNATOR (CONT).

a. **Removal.** (Refer to figure 5-20.)

**NOTE**

- **Alternator is to be removed attached to alternator mount.**
- **Tag all required wiring before disconnecting.**

- (1) Remove two machine screws (1) and box cover (2) to gain access to alternator AC cable assembly (3) connections.
- (2) Disconnect alternator AC cable assembly (3) from alternator (4).
- (3) Remove fitting (5) and pull alternator AC cable assembly (3) out of alternator electrical connection box (6).

**WARNING**

**Do not attempt to lift and move alternator by hand. Use a forklift or hoist to remove alternator from shop set.**

- (4) Remove four hexagon nuts (7), four lockwashers (8), four flat washers (9), and four hexagon cap screws (10) which attach the alternator mount (11) to the shop set floor.
- (5) Carefully slide alternator mount (11) with alternator (4) attached toward the rear of the shop set where it can be attached to a suitable lifting device and removed.

b. **Disassemble.** (Refer to figures 5-21 and 5-22.)

**NOTE**

- **Maintenance of the alternator is limited to cleaning and limited replacement of parts.**
- **This procedure can be accomplished with the alternator attached to alternator mount.**
- **Remove components only to the extent required to repair.**

- (1) Remove four cap screws (1, fig. 5-21), four lockwashers (2), four hexagon nuts (3), and end bell (4) from alternator housing (5).
- (2) Remove spring washer (6) from shoulder shaft (7).



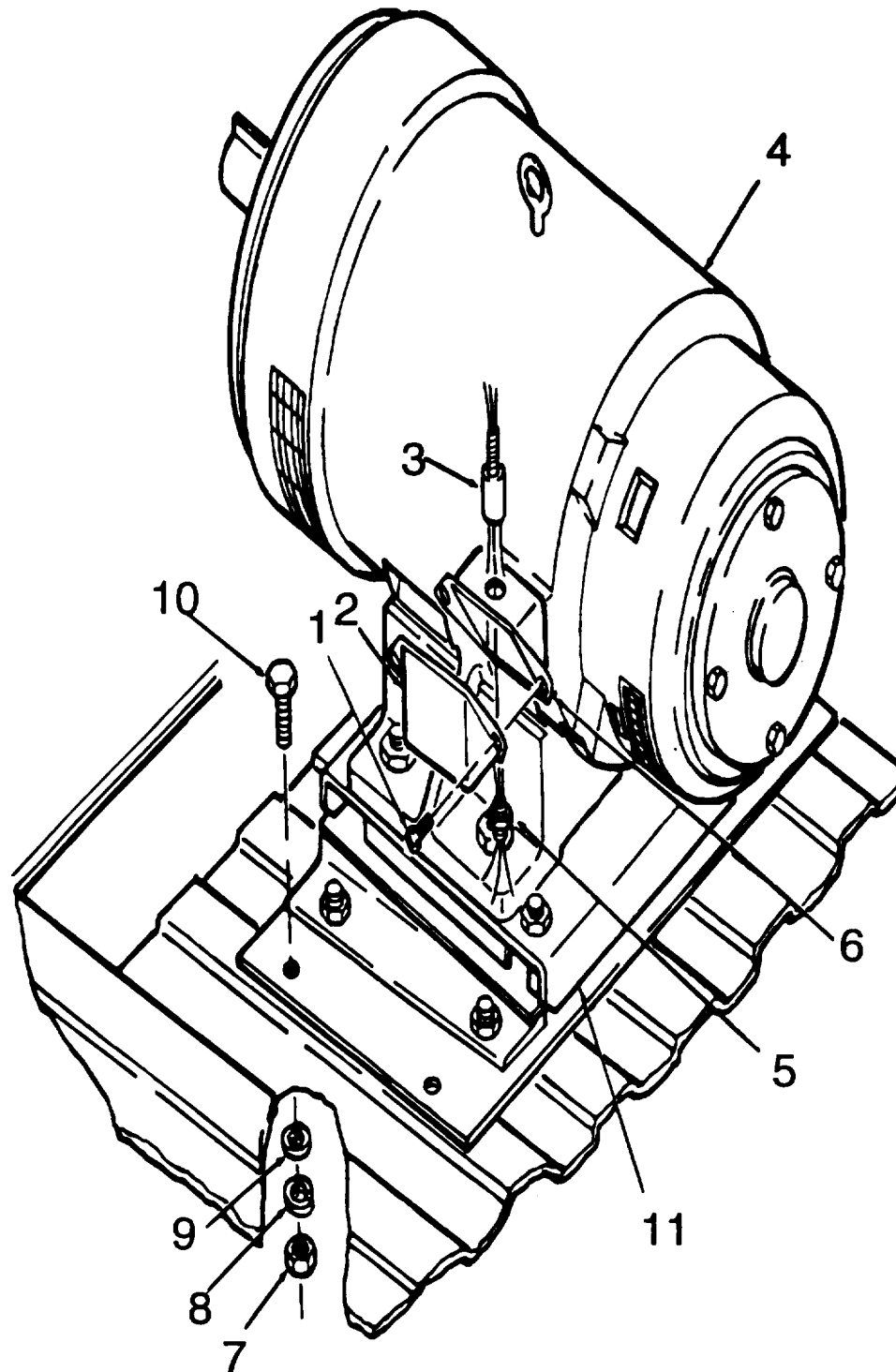


Figure 5-20. Alternator, Removal/Installation

5-13. ALTERNATOR(CONT)

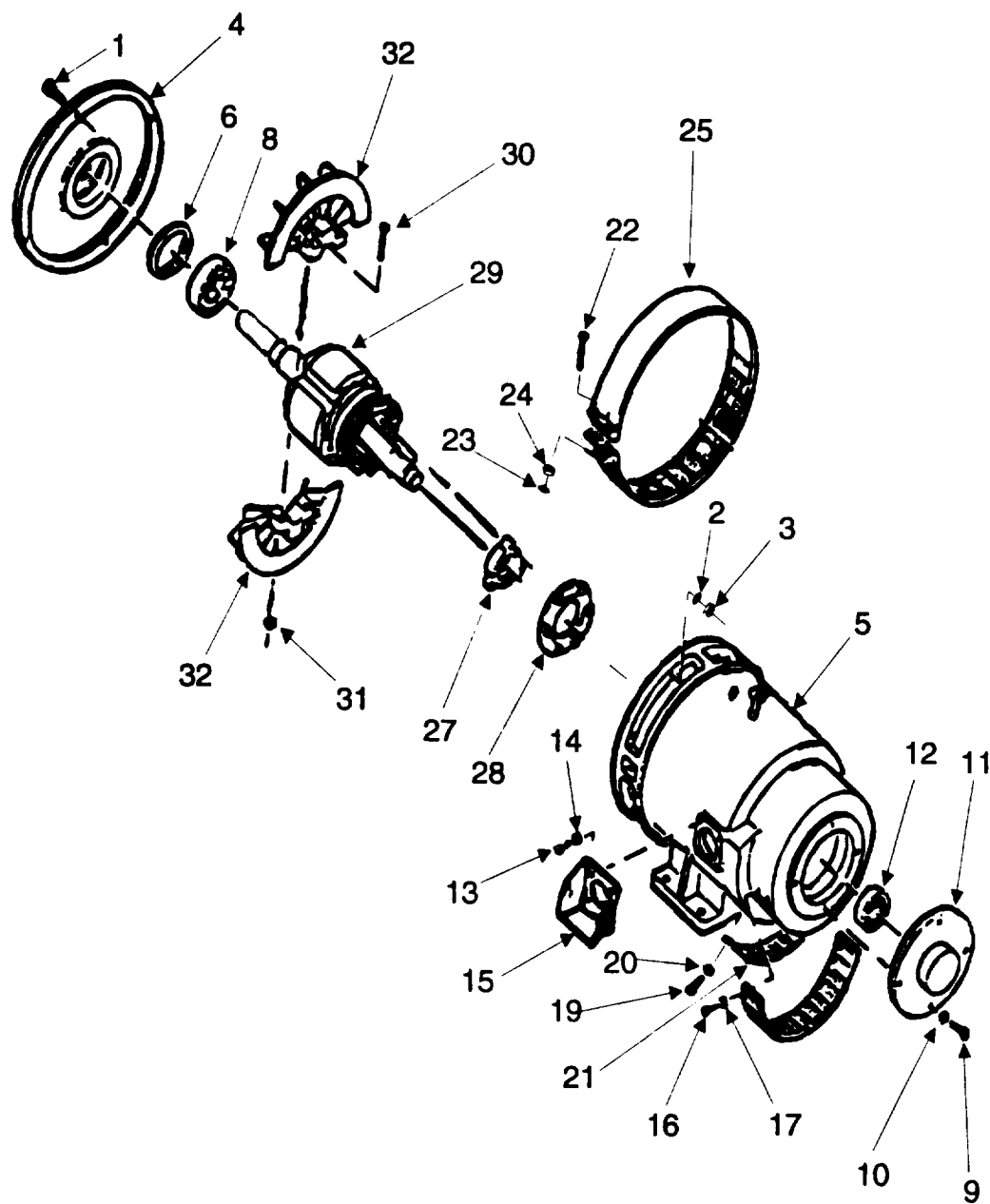
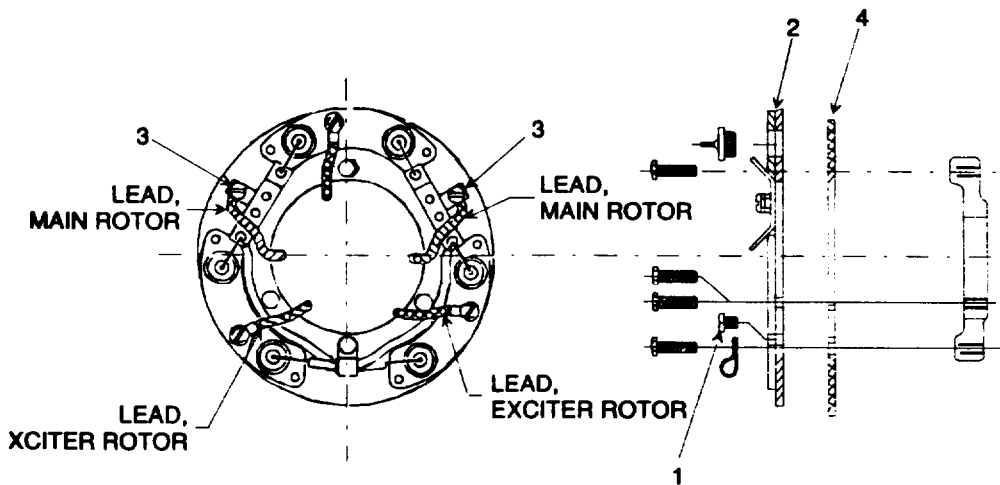


Figure 5-21 Alternator, Disassembly/Assembly



**Locate bearing puller on inner race of bearing to avoid damage to bearing.**

- (3) Using a bearing puller, remove ball bearing (8) from shouldered shaft (7).
- (4) Remove four cap screws (9), four lockwashers (10), and bearing retainer (11) from alternator housing (5).
- (5) Using a bearing puller, remove ball bearing (12) from shouldered shaft (7).
- (6) Remove four hexagon cap screws (13), four lockwashers (14), and connector box (15) from alternator housing (5).
- (7) Remove four hexagon cap screws (16), four flat washers (17), and metal grille (18) from alternator housing (5).
- (8) Remove four hexagon cap screws (19), four flat washers (20), and metal grille (21) from alternator housing (5).
- (9) Remove two cap screws (22), two plain nuts (23), two lockwashers (24), and metal grille (25) from alternator housing (5).



**Figure 22 Rectifier Assembly**

- (10) Remove three flat screws (1, fig. 5-22) that fasten three exciter motor leads to rectifier mounting plate assembly (2). Retain flat screws for later used.
- (11) Remove two flat screws (3) that fasten two main rotor leads to rectifier mounting plate assembly (2). Retain flat screws for later use.
- (12) Remove four cap screws (26, fig. 5-21) from rectifier hub (27).
- (13) Remove rectifier assembly (28) from main rotor (29).

### 5-13. ALTERNATOR (CONT).

- (14) Separate rectifier mounting plate assembly (2, fig. 5-22) from insulation plate (4).
- (15) Remove two cap screws (30, fig. 5-21), two self-locking nuts (31) and two fan halves (32) from shouldered shaft (7).

#### NOTE

**The main rotor, exciter rotor, and rectifier hub are all heat shrunk onto the shouldered shaft and cannot be separated in the field.**

- (16) Pull main rotor (29), with exciter rotor and rectifier hub (27) still attached, out of alternator housing (5).

#### c. Cleaning.

- (1) Remove all buildup of dirt and oil on all parts with a lint-free cloth (item 4, appx D).

#### WARNING

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable and, if ignited, could cause injury to personnel and damage to equipment.**
  - **Do not breathe cleaning solvents for long periods of time or use solvent near open flames. To avoid illness explosion, or fire, only use solvent in well-ventilated areas away from open flame.**
  - **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with the skin. In cold weather, contact of exposed skin with cleaning solvent can cause frostbite.**
- (2) Clean two ball bearings (8 and 12) with lint-free cloth (item 4, appx D).
  - (3) Clean hardware items, end bell, bearing retainer, and connector box with a lint-free cloth (item 4, appx D), a medium bristle brush (item 2, appx D), and dry cleaning solvent (item 18, appx D). Allow parts to air dry.
  - (4) Clean metal grilles and two fan halves with a medium bristle brush (item 2, appx D) and dry cleaning solvent (item 18, appx D). Allow all parts to air dry.
  - (5) Clean rectifier assembly, main rotor, exciter rotor, rectifier hub, stator motor, stator exciter, and alternator housing with a lint-free cloth (item 4, appx D) or medium bristle brush (item 2, appx D).

**d. Inspection.**

- (1) Inspect ball bearings for cracks in the housing, sufficient lubricant, and rotation. Rotate bearing by hand and feel for binding, sticking or noise in the bearing which would indicate foreign matter/corrosion in the bearing. Replace any defective bearing.
- (2) Inspect attaching hardware for stripped threads, corrosion, or cracks. Replace any hardware that is defective.
- (3) Inspect end bell and bearing retainer for breaks, cracks, chips, pitting, and wear.
- (4) Inspect metal grilles and fan halves for pits, breaks, and cracks. Replace any defective component.
- (5) Inspect main rotor, exciter rotor main stator, and stator exciter for burn spots, broken wiring, and scoring. Notify supervisor if damage is found during inspection.
- (6) Inspect alternator housing and rectifier hub for damaged threads, burrs, and cracks.
- (7) Inspect rectifier assembly. for cracks, loose or broken connections on diodes, broken leads, and burn spots.

**d. Testing.** Testing of the rectifier assembly's diodes can be performed by using a multimeter. To test the diodes proceed as follows:

**NOTE**

**Do not remove diodes from rectifier mounting plate assembly.**

- (1) Set the multimeter to check ohms in the highest scale. Zero the multimeter.
- (2) Apply the probes of the multimeter to the anode and cathode of the diode.
- (3) Read resistance through diode. Reverse the probes and apply the probes to the anode and cathode to the diode and read resistance through diode.
- (4) A good diode will produce readings of only a few ohms when the probes are applied in one direction and a reading near infinity when the probes are reversed.
- (5) If both readings are high or low, the diode is defective and the rectifier assembly must be replaced.

**f. Repair.** Items found to be defective will be restored to a serviceable condition before being used. Items that cannot be restored will be replaced. General repair procedures are as follows:

**NOTE**

**Minor surface defects that affect only appearance and do not interfere with fit or function are acceptable. Surface defects that affect an item's fit or function must be either repaired or replaced.**

### 5-13. ALTERNATOR (CONT).

(1) Alternator housing, fan halves, bearing retainer, and end bell.

(a) Remove minor nicks, scores, burrs, rust, and small irregularities on machined surfaces with crocus cloth or a soft honing stone. Replace part if cracked, fractured, deformed, or excessively scored or burred.

(b) Repair damaged threads with correct size tap or die. If threads cannot be restored in this manner, install threaded insert into housing.

(2) **Shouldered shaft.** Remove minor burrs and surface irregularities with crocus cloth or a soft honing stone. Replace shouldered shaft if broke, cracked, chipped, or excessively pitted or worn.

(3) Repair of attaching hardware, metal grilles, and ball bearings is by replacement of authorized parts (TM 9-4940-562-23P) which are determined to be defective.

g. **Assembly.** (Refer to figures 5-21 and 5-22.)

(1) Align insulation plate (4,fig. 5-22) behind mounting plate assembly (2).

#### NOTE

**The mounting holes of the insulation plate should align with the mounting holes of the mounting plate assembly.**

(2) Install four cap screws (26, fig. 5-21) through rectifier assembly (28) and rectifier hub (27) into main rotor (29).

#### NOTE

**Bottom cap screw should go through clamp loop holding two lead assemblies.**

(3) Using two flat screws (3, fig. 5-22) fasten two main rotor leads to rectifier mounting plate assembly (2).

(4) Using three flat screws (1) fasten three exciter motor leads to rectifier mounting plate assembly (2).

#### NOTE

**Assemble fan halves with cap screw heads at opposite ends to maintain balance.**

(5) Install two cap screws (30) through fan halves (32) and secure with two self-locking nuts (31). Do not tighten cap screws.

(6) Install impeller fan (32) onto shouldered shaft (7). Tighten two cap screws (30).

- (7) Press ball bearings (8 and 12) onto shouldered shaft (7).
- (8) Carefully place shouldered shaft (7) with main rotor (29) and exciter rotor attached into alternator housing (5).
- (9) Carefully place ball bearing (12) into bearing retainer (11). Secure bearing retainer (11) to alternator housing (5) with four lockwashers (10) and four cap screws (9).
- (10) Install spring washer (6) onto shouldered shaft (7) in front of ball bearing (8).
- (11) Carefully lift shouldered shaft (7) and slide end bell (4) over shouldered shaft. Secure end bell (4) to alternator housing (5) with four cap screws (1), four lockwashers (2) and four hexagon nuts (3).
- (12) Rotate shouldered shaft. Check for binding and free movement of shaft. If shaft binds or does not rotate freely, repeat steps 5 through 11, preceding.
- (13) Place metal grille (25) around alternator housing (5) and secure with two cap screws (22), two lockwashers (24), and two plain nuts (23).
- (14) Place metal grille (21) onto alternator housing (5) and secure with four hexagon cap screws (19) and four flat washers (20).
- (15) Place metal grille (18) onto alternator housing (5) and secure with four hexagon cap screws (16) and four flat washers (17).
- (16) Place connector box (15) onto alternator housing (5) and secure with four hexagon cap screws (13) and four lockwashers (14).

**h. Installation.** (Refer to figure 5-20.)

**WARNING**

**Do not attempt to lift and move alternator by hand. Use a forklift or hoist to move alternator to shop set.**

- (1) Carefully slide alternator mount (11) and alternator (4) into the rear of the shop set. Remove lifting device and slide alternator mount (11) forward until alternator mount holes are over shop set mounting holes.
- (2) Secure alternator mount (11) to shop set floor with four hexagon cap screws (10), four flat washers (9), four lockwashers ( ? ), and four hexagon nuts (7).

### 5-13. ALTERNATOR (CONT).

- (3) Push alternator AC cable assembly (3) into alternator electrical connection box (6) and secure with fitting (5).
- (4) Connect alternator AC cable assembly (3) to wiring from alternator (4). Remove and discard tags.
- (5) Install box cover (2) on alternator electrical connection box (6) and secure with two machine screws (1).

### 5-14. ALTERNATOR MOUNT.

---

This task consists of:

- |             |                 |
|-------------|-----------------|
| a. Removal  | c. Inspection   |
| b. Cleaning | d. Installation |
- 

#### INITIAL SETUP:

#### Tools Required:

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

#### Material Required:

Brush, Medium Bristle (Item 2, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)  
Solvent, Dry Cleaning (Item 18, Appx D)

#### Equipment Conditions:

Alternator and attached mount removed (para. 5-13)

---

#### a. Removal. (Refer to figure 5-23.)

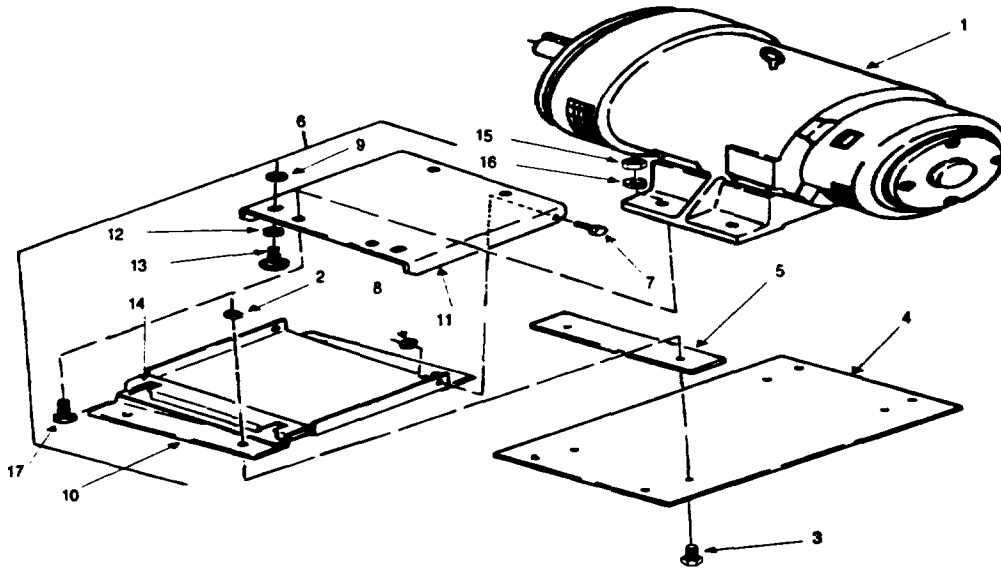
- (1) With alternator (1) raised and held by a suitable lifting device, remove four hexagon nuts (2), four cap screws (3), baseplate (4), and two mounting pads (5) from alternator mount (6).
- (2) Remove two cap screws (7), two hexagon nuts (8), two hexagon nuts (9), and alternator mounting bracket (10) from bracket (11).
- (3) Remove two hexagon nuts (12) from two captive bolts (13).
- (4) Remove two captive bolts (13) from slots (14) on alternator mounting bracket (10).



- (5) Remove four nuts (15), four lockwashers (16), four cap screws (17), and bracket (11) from alternator (1).

**b. Cleaning.**

- (1) Remove all buildup of dirt or oil on all parts with a lint-free cloth (item 4, appx D).



*Figure 5-23. Alternator Mount, Removal/Installation.*

**WARNING**

- Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable, and, if ignited, cause injury to personnel and equipment.
- Do not breathe cleaning solvent vapors for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas, away from open flames.
- Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.

#### 5-14. ALTERNATOR MOUNT (CONT).

(2) clean all metal parts using a clean, lint-free cloth (item 4, appx D) or a medium bristle brush (item 2, appx E) and cleaning solvent (item 18, appx D).

(3) Allow all part to air dry.

##### c. Inspection.

(1) Inspect alternator mount and components for cracks in metal, corrosion, and stripped threads on bolts (especially captive bolts). Replace any item that is defective.

(2) Inspect felt mounting pads for rips and tears. Replace pad if ripped or torn.

##### d. Installation.

**WARNING**

**Do not attempt to lift alternator by hand. Use a forklift or hoist to install alternator to shop set.**

Refer to paragraph a., preceding, and install in reverse order of removal.

#### 5-15. CONTROL PANEL ASSEMBLY.

---

This task consists of:

a. Disassembly  
b. Cleaning

c. Inspection  
d. Assembly

---

#### INITIAL SETUP:

##### Tools Required:

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

##### Material Required:

Brush, Medium Bristle (Item 2, Appx D)

Cloth, Lint-Free (Item 4, Appx D)

Solvent, Dry Cleaning (Item 18, Appx D)

##### Equipment Condition:

CMV shut down and cool.

Disengage the power takeoff.

Electrical power turned off.

---

- a. **Disassemble.** (Refer to figures 5-24 and 5-25/FOLDOUT FO3)

**WARNING**

**High voltage is present in the control panel assembly and can cause serious injury or death. Disengage PTO and turn off vehicle engine prior to performing any maintenance on the control panel assembly.**

**NOTE**

- **Tag all required wiring before disconnecting.**
  - **Remove components only to the extent required for repair.**
  - **Control panel assembly cable assembly tasks are addressed in paragraph 5-18.**
- (1) Remove two latch bolts (1), two flat washers (2), and two latches (3) on top edge of control panel assembly and open front panel (4).
  - (2) Remove eight machine screws (5), circuit breaker CB1 (6), and circuit breaker CB2 (7) from front panel (4).
  - (3) Remove sixteen machine screws (8) and circuit breakers CB3, CB4, CB5, and CB6 (9) from front panel (4).
  - (4) Remove two machine screws (10) and connector receptacle J7 (11) from front panel (4).
  - (5) Remove six hexagon nuts (12), six flat washers (13), six machine screws (14), and three connector receptacles J1, J2, and J3 (15) from front panel (4).
  - (6) Remove four self-locking nuts (16), four flat washers (17), four machine screws (18), and connector receptacle J8 (19) from front panel (4).
  - (7) Remove wing nut (20), hexagon nut (21), lockwasher (22), flat washer (23), hexagon nut (24), lockwasher (25), flat washer (26), and ground stud (27) from front panel (4).
  - (8) Remove three self-tapping screws (28) and time totalizing meter (29) from front panel (4).
  - (9) Remove three self-tapping (30) and electrical frequency meter (31) from front panel (4).
  - (10) Remove four hexagon nuts (32), four lockwashers (33), and mounting sheet (34) from four collar studs (35).

## 5-15. CONTROL PANEL ASSEMBLY. (CONT)

- (11) Remove four machine screws (36), four flat washers (37), four self-locking hexagon nuts (38), and terminal board TB 1 (39) from mounting sheet (34).
- (12) Remove four machine screws (40), four flat washers (41), four self-locking hexagon nuts (42), and two terminal boards TB2 (43) from mounting sheet (34).
- (13) Remove three machine screws (44), three flat washers (45), three self-locking hexagon nuts (46), and magnetic contactor S1 (47) from mounting sheet (34).

### b. Cleaning,

- (1) Ensure all electrical power is off.
- (2) Remove all buildup of dirt or oil on all parts with a lint-free cloth (item 4, appx D).

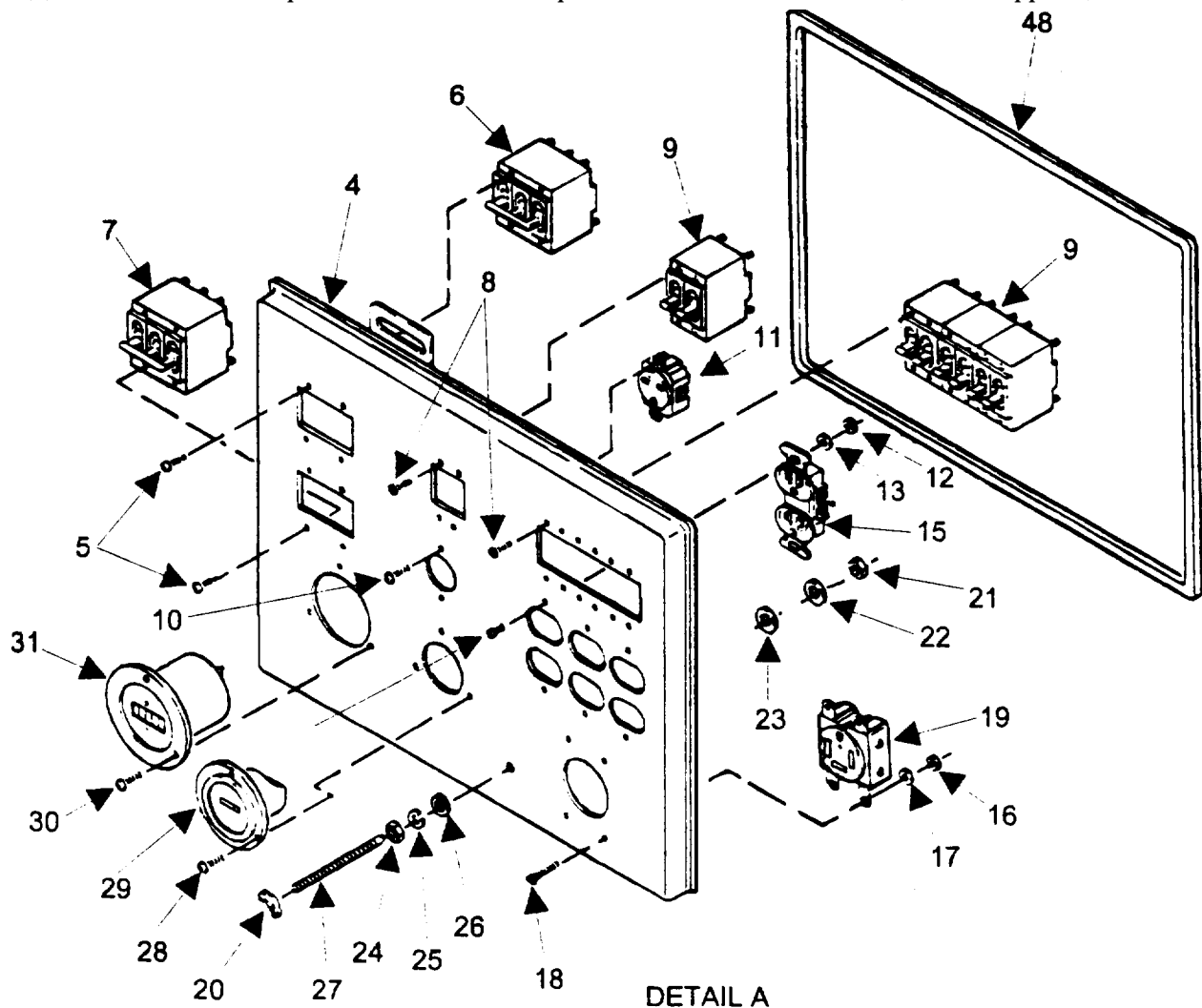


Figure 5-24. Control Panel Assembly. Disassembly/Assembly (Sheet 1 of 2).

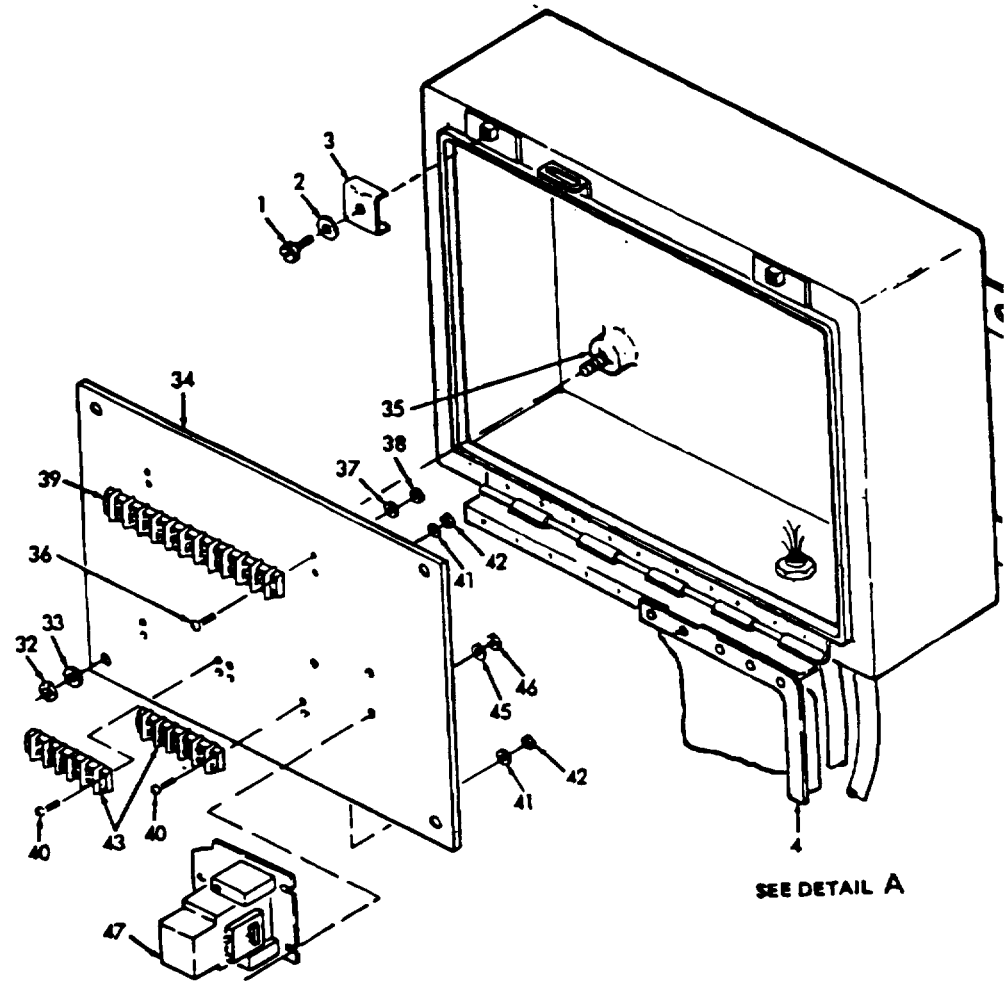


Figure 5-24. Control Panel Assembly, Disassembly/Assembly (Sheet 2 of 2).

**THIS PAGE LEFT BLANK INTENTIONALLY**

<b>WARNING</b>
----------------

- **Do not use diesel fuel, gasoline, or benzene (Benzoil) for cleaning, for these items are highly flammable, and, if ignited, could cause injury to personnel and damage to equipment.**
- **Do not breathe cleaning solvents for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flames.**
- **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.**

- (3) Clean bolts, machine screws, washers, hexagon nuts, etc., with a lint-free cloth (item 4, appx D), a medium bristle brush (item 2, appx D), and dry cleaning solvent (item 18, appx D). Allow parts to air dry.
- (4) Clean electrical components with a lint-free cloth (item 4, appx D) and medium bristle brush (item 2, appx D).

**c. Inspection.**

- (1) Inspect the control panel enclosure, front panel, and mounting sheet for obvious damage such as rust, cracks, and breaks. Replace any defective components.
- (2) Inspect attaching hardware for stripped threads, corrosion, or cracks. Replace any hardware that is defective.
- (3) Inspect time totalizing meter and electrical frequency meter for broken or cracked glass and loose or damaged indication components. Replace any meter that is defective.
- (4) Inspect terminal boards TB1 and TB2 for cracks, burn spots, and missing or damaged hardware. Replace terminal board if defective.
- (5) Inspect connector receptacles J7, J8, J1, J2, and J3 for cracks or burn spots. Replace any connector receptacle that is defective.
- (6) Inspect circuit breakers CB3, CB4, CB5, and CB6 in accordance with the following:
  - (a) Inspect circuit breaker case for cracks or burn spots. Replace the circuit breaker if the breaker case is cracked or has burn spots.

**5-15. CONTROL PANEL ASSEMBLY (CONT).**

- (b) Inspect circuit breaker actuator for smoothness of movement and position lock. Replace circuit breaker actuator movement is rough or if actuator will not lock into position.
- (c) Perform continuity check of circuit breaker. Place actuator in off position. Set the multimeter to check ohms. Zero the multimeter. Place multimeter leads on one set of LINE and LOAD studs and note no continuity. Place actuator in on position and note continuity. Check other set of LINE and LOAD studs for continuity/no continuity. Replace circuit breaker if multimeter readings are not as specified.

**(7) Inspect circuit breakers DB1 and CB2 as per the following:**

- (a) Inspect circuit breaker case for cracks or burn spots. Replace the circuit breaker if the breaker case is cracked or has burn spots
- (b) Inspect circuit breaker actuator for smoothness of movement and positive lock. Replace circuit breaker if actuator movement is rough or if actuator will not lock into position.
- (c) Perform continuity check of circuit breaker. Place actuator in off position. Set the multimeter to check ohms. Zero the multimeter. Place multimeter leads on one set of LINE and LOAD studs and note no continuity. Place actuator in on position and note continuity. Check other sets of LINE and LOAD studs for continuity/no continuity. Replace circuit breaker if multimeter readings are not as specified.

**(8) Inspect magnetic contactor S1 as per the following:**

- (a) Inspect magnetic contactor case for cracks and burn spots. Replace magnetic contactor if the contactor case is cracked or has burn spots.
- (b) Perform continuity check of magnetic contactor coil. Set the multimeter to check ohms. Zero the multimeter. Place one multimeter lead on C1 and the other multimeter lead on C2 and note that continuity is indicated. Replace magnetic contactor if continuity is not indicated.

**d. Assembly.** (Refer to figures 5-24 and 5-25.)

- (1) Mount magnetic contactor S1 (47) onto mounting sheet (34) and secure with three machine screws (44), three flat washers (45), and three self-locking hexagon nuts (46).
- (2) Mount terminal boards TB2 (43) onto mounting sheet (34) and secure with four machine screws (40), four flat washers (41), and four self-locking hexagon nuts (42).
- (3) Mount terminal board TB2 (39) onto mounting sheet (34) and secure with four machine screws (36), four flat washers (37), and four self-locking hexagon nuts (38).



- (4) Install mounting sheet (34) on four collar studs (35) and secure with four lockwashers (33) and four hexagon nuts.
- (5) Mount electrical frequency meter (31) in front panel (4) and secure with three self-tapping screws (30).
- (6) Mount time totalizing meter (29) in front panel (4) and secure with three self-tapping screws (28).
- (7) Install flat washer (26), lockwasher (25), and hexagon nut (24) onto ground stud (27). place ground stud (27) through front panel (4) and secure with flat washer (23), lockwasher (22), and hexagon nut (21). Install wing nut (20) on ground stud (27).
- (8) Mount connector receptacle J8 (19) in front panel (4) and secure with four machine screws (18), four flat washers (17), and four self-locking nuts (16).
- (9) Mount three connector receptacles J1, J2, and J3 (15) in front panel (4) and secure with six machine screws (14), six flat washers (13), and six hexagon nuts (12).
- (10) Mount connector receptacle J7 in front panel (4) and secure with two machine screws (10).
- (11) Mount circuit breakers CB3, CB4, CB5, and CB6 (9) in front panel (4) and secure with sixteen machine screws (8).
- (12) Mount circuit breaker CB1 (6) and circuit breaker CB2 (7) in front panel (4) and secure with eight machine screws (5).
- (13) Connect removed control panel assembly cable assemblies and discard tags.
- (14) Close front panel (4) and secure with two latches (3), two flat washers (2) and two latch bolts (1).

#### 5-16. CABLE ASSEMBLIES (CONTROL PANEL).

---

This task consists of:

- |               |                 |
|---------------|-----------------|
| a. Removal    | c. Repair       |
| b. Inspection | d. Installation |
- 

#### INITIAL SETUP:

##### Tools Required:

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

## 5-16. CABLE ASSEMBLIES (CONTROL PANEL).

### **Equipment Conditions:**

CMV shut down and cool.  
Disengage the power takeoff.  
Electrical power turned off.

---

### **WARNING**

**High voltage is present in the control panel assembly and can cause serious injury or death. Disengage the PTO and turn off vehicle engine prior to performing any maintenance on the control panel assembly.**

### **NOTE**

- **Tag all required wiring before disconnecting.**
- **Remove components only to the extent required for repair.**
- **There are various individual cable assemblies within the control panel. Removal of a cable assembly is the same for all cable assemblies.**

### **a. Disassemble.** (Refer to figure 5-26.)

- (1) Loosen terminal screws holding cable assembly wire terminals to electrical component. Remove tinned leads and cable assembly wire terminal from electrical component. Remove tiedown straps.
- (2) Remove cable assembly from control panel.

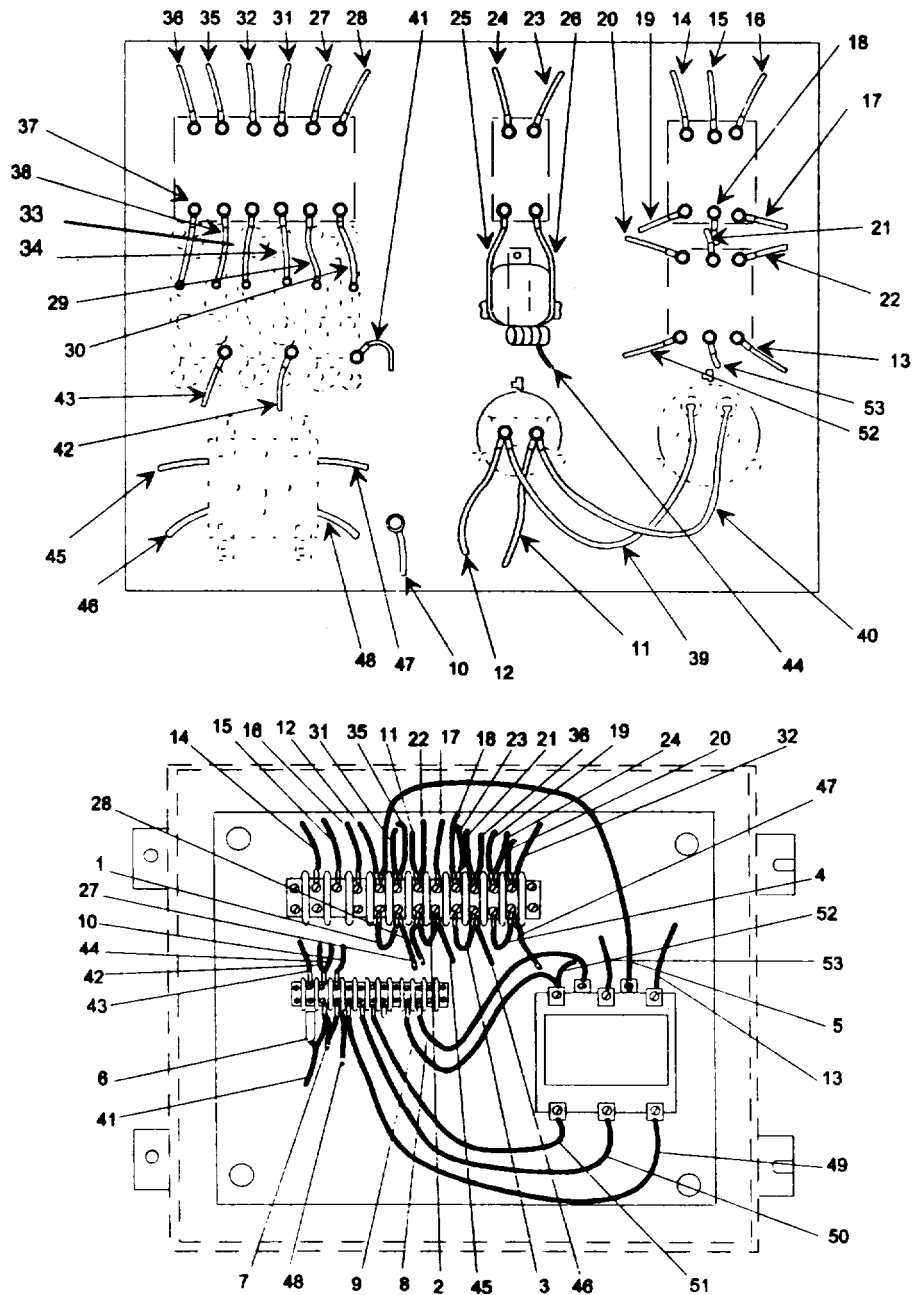


Figure 5-26. Control Panel Cable Assemblies.

**5-16. CABLE ASSEMBLIES (CONTROL PANEL) (CONT).**

**b. Inspection**

- (1) Inspect wiring insulation for cracks or fraying. Pay particular attention to areas where wiring passes near metal surfaces. Inspect wire harness terminals for tight connection to the wire runs. Inspect wire run/wire harness terminal for burn spots or corrosion. Replace any wire harness terminal that has burn spots/corrosion or is not securely attached to the wire run. Replace any wire run that has cracked/frayed/burned or cut insulation.
- (2) Perform continuity checks of wire runs. Check for opens/shorts in wire run with a multimeter. Repair/replace any wire run that checks open/shorted.
- (3) Inspect attaching hardware for stripped threads or corrosion. Replace any hardware that is defective.

**c. Repair.**

- (1) Refer to table 5-12 for control panel cable assemblies wire run list and table 5-13 for control panel cable assemblies wire run parts list. Repair consists of either replacement of a wire run or replacement of a defective wire harness terminal.
- (2) To assemble a new wire run, refer to tables 5-12 and 5-13. Identify type of wire harness terminals and type/length of electrical wire needed. Construct a new wire run and test for opens/shorts.
- (3) To replace a defective wire run harness terminal, inspect the wire run per paragraph c, preceding, and locate the defective wire run terminal. Refer to table 5-12 to determine the wire run terminal needed and to table 5-13 for the part number of the wire run terminal needed. Uncrimp the defective terminal and crimp the replacement terminal.
- (4) Repair of attaching hardware is by replacement of authorized parts (TM 9-4940-262-23P) which are determined to be defective.

**d. Installation.** (Refer to figure 5-26.)

- (1) Place cable assembly in control panel and locate wire terminals to appropriate electrical component terminal.
- (2) Loosen electrical component terminal screw and secure cable assembly wire terminal/tinned wire.
- (3) Remove and discard tags. Secure cable assembly with tiedown straps.

## 5-16. CABLE ASSEMBLIES (CONTROL PANEL) (CONT).

Table 5-12. Control Panel Cable Assemblies Wire Run List

Wire Assy No.	Fig. 5-25 Ref. No.	Wire No.	From	Pin	Terminal Item No. *	To	Pin	Terminal Item No. *	Wire Length (In.)	Item No. *
11023737-9	1	9	TB1	15	7	TB1	16	7	4.0	3
11023737-10	2	10	TB1	17	7	TB1	18	7	4.0	3
11023737-11	3	11	TB1	19	7	TB1	20	7	4.0	3
11023737-12	4	12	TB1	21	7	TB1	22	7	4.0	3
11023737-14	5	14	TB1	4	6	S1	N	**	17.0	1
11023737-15	6	15	TB2	11	6	TB2	12	6	4.0	2
11023737-16	7	16	TB2	12	6	TB2	13	6	4.0	2
11023737-17	8	17	TB2	19	6	S1	coil	**	16.0	1
11023737-20	9	20	TB2	18	6	S1	1	**	16.0	1
11023737-21	10	21	TB2	3	8	Grd Stud		8	33.0	2
11023737-22	11	22	TB1	6	6	TT1	2	6	33.5	1
11023737-23	12	23	TB1	4	6	TT1	1	6	33.5	1
11023737-24	13	24	CB2	c	6	S1	3	**	41.0	1
11023737-25	14	25	CB1	1	7	TB1	1	7	45.0	3
11023737-26	15	26	CB1	2	7	TB1	2	7	45.0	3
11023737-27	16	27	CB1	3	7	TB1	3	7	45.0	3
11023737-28	17	28	CB1	c	7	TB1	7	7	55.5	3
11023737-29	18	29	CB1	B	7	TB1	8	7	55.5	3
11023737-30	19	30	CB1	A	7	TB1	10	7	55.5	3
11023737-31	20	31	CB2	1	6	TB1	11	6	44.0	1
11023737-32	21	32	CB2	2	6	TB1	9	6	40.0	1
11023737-33	22	33	CB2	3	6	TB1	6	6	37.5	1
11023737-34	23	34	CB3	2	6	TB1	8	6	44.0	1
11023737-35	24	35	CB3	1	6	TB1	10	6	44.0	1
11023737-36	25	36	CB3	A	6	J7	1	**	4.0	1
11023737-37	26	37	CB3	B	6	J7	2	**	4.0	1
11023737-38	27	38	CB4	1	6	TB1	16	6	37.5	1
11023737-39	28	39	CB4	2	6	TB1	17	6	38.0	1
11023737-40	29	40	CB4	A	6	J1	1	**	3.0	1
11023737-41	30	41	CB4	B	6	J1	2	**	3.0	1
11023737-42	31	42	CB5	2	6	TB1	5	6	48.0	1
11023737-43	32	43	CB5	1	6	TB1	11	6	50.5	1
11023737-44	33	44	CB5	A	6	J2	1	**	3.0	1
11023737-45	34	45	CB5	B	6	J2	2	**	3.0	1
11023737-46	35	46	CB6	2	6	TB1	5	6	48.5	1
11023737-47	36	47	CB6	1	6	TB1	9	6	50.5	1
11023737-48	37	48	CB6	A	6	J3	1	**	3.0	1
11023737-49	38	49	CB6	B	6	J3	2	**	3.0	1
11023737-50	39	50	TT1	1	6	F1	1	**	10.0	1
11023737-51	40	51	TT1	2	6	F1	2	**	10.0	1
11023737-52	41	52	TB2	11	4	J1	Grd	5	28.5	1
11023737-53	42	53	TB2	2	4	J2	Grd	5	33.0	1

## 5-16. CABLE ASSEMBLIES (CONTROL PANEL) (CONT).

Table 5-12. Control Panel Cable Assemblies Wire Run List (Cont)

Wire Assy No.	Fig. 5-25 Ref. No.	Wire No.	From	Pin	Terminal Item No. *	To	Pin	Terminal Item No. *	Wire Length (In.)	Item No.*
11023737-54	43	54	TB2	1	4	J3	Grd	5	28.0	1
11023737-55	44	55	TB2	2	4	J7	Grd	6	33.0	1
11023737-56	46	56	TB1	19	7	J8	1	**	37.0	3
11023737-57	46	57	TB1	20	7	J8	2	**	37.0	3
11023737-58	47	58	TB1	22	7	J8	3	**	34.5	3
11023737-59	48	59	TB2	13	6	J8	Grd	**	23.5	2
11023737-60	49	60	TB2	14	6	S1	C	**	14.5	1
11023737-61	50	61	TB2	15	6	S1	B	**	12.5	1
11023737-62	51	62	TB2	16	6	S1	A	**	11.0	1
11023737-63	52	63	CB2	A	6	S1	1	**	41.0	1
11023737-64	53	64	CB2	B	6	S1	2	**	41.0	1

\*See table 5-13 for parts list.

\*\* End of tire to be stripped .75"/- .25" and tinned to prevent wire strands from fraying.

Table 5-13. Control Panel Cable Assemblies Wire Run Parts List

Item No.	Part Number	CAGEC	Description	NSN
1	M5086/2-12-9	81349	Wire, Electrical: 12 Ga, 600 V, 105 C	6145-00-578-7514
2	M5086/2-10-9	81349	Wire, Electrical: 10 Ga, 600 V, 105 C	6145-00-578-7513
3	M5086/2-8-9	81349	Wire, Electrical: 8 Ga, 600 V, 105 C	6145-00-284-0657
4	MS25036-156	96906	Terminal, Lug: Crimp Style, 10-12 GA, #8 Stud	5940-00-143-4775
5	T-2016	92219	Terminal, Lug: Crimp Style, Fork Tongue, 12-10 GA, # 8 Stud	5940-00-043-3110
6	MS25036-112	96906	Terminal, Lug: Crimp Style, 12-10 GA, # 10 Stud	5940-00-143-4794
7	MS25036-115	96906	Terminal, Lug: Crimp Style, 8 GA, # 10 Stud	5940-00-143-5284
8	MS25036-157	96906	Terminal, Lug: Crimp Style, 12-10 GA, # 1/4 Stud	5940-00-143-4777

**5-17. PROPELLER SHAFT.**

---

This task consists of:

- |                |                 |
|----------------|-----------------|
| a. Removal     | e. Repair       |
| b. Disassembly | f. Assembly     |
| c. Cleaning    | g. Installation |
| d. Inspection  |                 |
- 

**INITIAL SETUP:****Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

**Materials Required**

Brush, Medium Bristle (Item 2, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)  
Solvent, Dry Cleaning (Item 18, Appx D)  
Grease (Item 5, Appx D)  
Cloth, Abrasive (Item 3, Appx D)

**Equipment Conditions:**

CMV shut down and cool.  
Disengage the power takeoff,

---

**a. Removal.** (Refer to figure 5-27.)

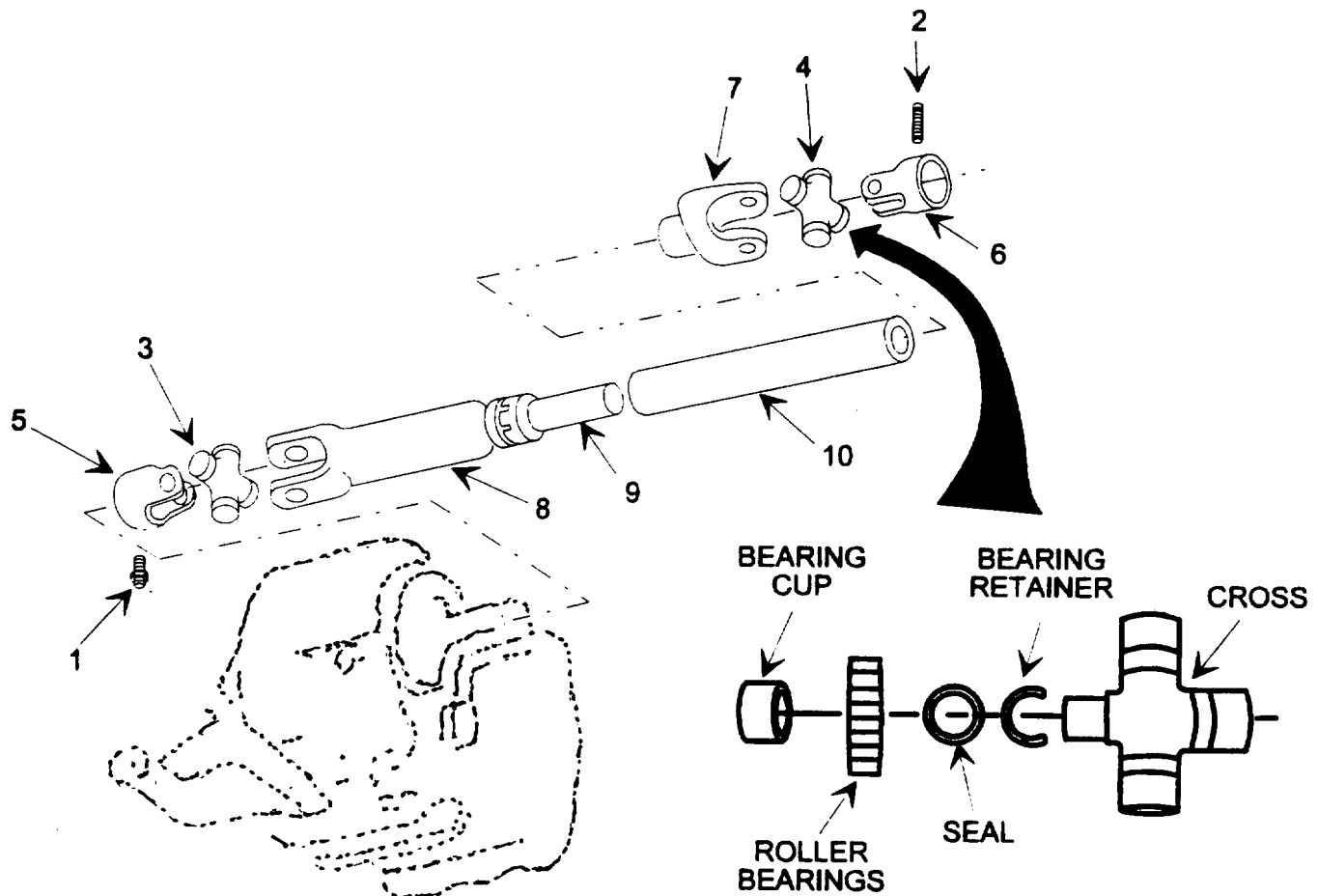
- (1) Remove and retain for installation two setscrews (1 and 2) from yoke shaft (5) and yoke shaft (6).
- (2) Slip yoke shaft (5) away from PTO output gear shaft.
- (3) Slip yoke shaft (6) away from lower sprocket straight shaft.
- (4) Remove propeller shaft from CMV.

**b. Disassembly** (Refer to figure 5-27.)**NOTE**

**Remove components only to the extent required for repair.**

- (1) Remove four bearing retainers from bearing assembly (4).

5-17. PROPELLER SHAFT (CONT).



*Figure 5-27. Propeller Shaft, Disassembly/Assembly.*

- (2) Support yoke shaft (7) in a bench vise with a socket the same size as the bearing cup on one side and a socket larger than the bearing cup on the outside of the yoke shaft (7). Press on the bearing assembly (4) until the bearing cup is almost out. Grasp bearing cup and work out of yoke shaft (7). Reverse the sockets and press out the other bearing cup. Remove yoke shaft (7) and metal tube (10) from bench vise.
- (3) Support yoke shaft (6) in a bench vise with a socket the same size as the bearing cup on one side and a socket larger than the bearing cup on the outside of the yoke shaft (6). Press on the bearing assembly (4) until the bearing cup is almost out. Grasp bearing cup and work out of yoke shaft (6). Reverse the sockets and press out the other bearing cup. Remove bearing assembly (4) from yoke shaft (6).
- (4) Remove four bearing retainers from bearing assembly (3).



- (5) Support yoke shaft (8) in bench vise with a socket the same size as the bearing cup on one side and a socket larger than the bearing cup on the outside of the yoke shaft (8). Press on the bearing assembly (3) until the bearing cup is almost out. Grasp bearing cup and work out of yoke shaft (8). Reverse the sockets and press out the other bearing cup. Remove bearing assembly (3) from yoke shaft (8).
- (6) Support yoke shaft (5) in a bench vise with a socket the same size as the bearing cup on one side and a socket larger than the bearing cup on the outside of the yoke shaft (5). Press on the bearing assembly (3) until the bearing cup is almost out. Grasp bearing cup and work out of yoke shaft (5). Reverse the sockets and press out the other bearing cup. Remove bearing assembly (3) from yoke shaft (5).
- (7) Remove yoke shaft (8) and stub shaft (9) from metal tube (10).

**c. Cleaning.**

- (1) Remove all buildup of dirt or oil on all parts with a lint-free cloth (item 4, appx D).

**WARNING**

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable, and, if ignited, could cause injury to personnel and damage to equipment.**
- **Do not breathe cleaning solvents for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well ventilated areas away from open flame.**
- **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with the skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.**

**CAUTION**

**DO NOT CLEAN the neoprene seals with dry cleaning solvent.**

- (2) Clean all metal parts with a lint-free cloth (item 4, appx D) or a medium bristle brush (item 2, appx D) and dry cleaning solvent (item 18, appx D). Allow parts to air dry.

5-17. PROPELLER SHAFT (CONT).

d. Inspection.

- (1) Inspect cross of bearing assembly for cracked, chipped, or nicked bearing surfaces. Remove minor nicks on cross with abrasive cloth (item 3,. appx D). Inspect bearing assembly for smooth bearing action. Replace bearing assembly if bearing assembly's cross is cracked, chipped, or has major nicks on the bearing surface or if bearing action is rough.
- (2) Inspect yoke shafts for cracks in or around mounting flanges or elongated holes in the mounting flange. Replace yoke shafts that have cracks in or around mounting flanges or that have elongated holes in the mounting flange.
- (3) Inspect metal tube, stub shaft, and yoke shaft for straightness, cracks, and dents. Replace metal tube, stub shaft, or yoke shaft if item is not straight, has hairline or larger cracks, or has no more than one dent covering one half inch or less in area and 1/16 inch or less in depth are allowed in metal tube, stub shaft, or yoke assembly.
- (4) Inspect bearing retainers for stripped threads or corrosion. Replace any bearing retainers that are damaged.

e. Repair is limited to replacement of those parts found to be defective during inspection.

f. Assembly (Refer to figure 5-27.)

NOTE

**Replacement bearing assemblies contain only enough grease to provide needle bearing protection during storage. It is necessary to completely lubricate each replacement bearing assembly prior to assembly to the yoke shaft. Each bearing cup should be half filled with grease (item 5, appx D) and each roller bearing should also be wiped with the same grease; filling all the cavities between the rollers and applying a liberal coating of grease on the bearing surfaces of the cross.**

- (1) Position bearing cup, roller bearings, and seal in mounting hole of yoke shaft (5) flange. place cross into bearing cup. Place a socket the same size as the bearing cup on the bearing cup. Place yoke shaft (5) and socket in a bench vise and press the bearing cup 1/2 way into mounting hole. Remove yoke shaft (5) from vise.
- (2) Position bearing cup, roller bearings, and seal in other mounting hole of yoke shaft (5) flange. Place a socket that is the same size as the bearing cup on each bearing cup. Place yoke shaft (5) and sockets in a bench vise and press bearing cups into yoke shaft, Secure bearing assembly (3) in yoke shaft (5) with two bearing retainers.

- (3) Position bearing cup, roller bearings, and seal in mounting hole of yoke shaft (5) flange. Place cross into bearing cup. Place a socket the same size as the bearing cup on the bearing cup. Place yoke shaft (5) and socket in a bench vise and press the bearing cup 1/2 way into mounting hole. Remove yoke shaft (5) from vise.
- (4) Position bearing cup, roller bearings, and seal in other mounting hole of yoke shaft (8) flange. Place a socket that is the same size as the bearing cup on each bearing cup. Place yoke shaft (8) and sockets in a bench vise and press bearing cups into yoke shaft. Secure bearing assembly (3) in yoke shaft (8) with two bearing retainers.
- (5) position bearing cup, roller bearings, and seal in mounting hole of yoke shaft (6) flange. lase cross into bearing cup. Place a socket the same size as the bearing cup on the bearing cup. Place yoke shaft (6) and socket in a bench vise and press the bearing cup 1/2 way into mounting hole. Remove yoke shaft (6) from vise.
- (6) position bearing cup, roller bearings, and seal in other mounting hole of yoke shaft (6) flange. Place a socket that is the same size as the bearing cup on each bearing cup. Place yoke shaft (6) and sockets in a bench vise and press bearing cups into yoke shaft. Secure bearing assembly (4) in yoke shaft (6) with two bearing retainers.
- (7) Position bearing cup, roller bearings, and seal in mounting hole of yoke shaft (7) flange. Place cross into bearing cup. Place a socket the same size as the bearing cup on the bearing cup. Place yoke shaft (7) and socket in a bench vise and press the bearing cup 1/2 way into mounting hole. Remove yoke shaft (7) from vise.
- (8) position bearing cup, roller bearings, and seal in other mounting hole of yoke shaft (7) flange. Place a socket that is the same size as the bearing cup on each bearing cup. Place yoke shaft (7) and sockets in a bench vise and press bearing cups into yoke shaft. Secure bearing assembly (4) in yoke shaft (7) with two bearing retainers.

#### NOTE

**After the bearing assemblies are installed into the propeller shaft and prior to installation of the propeller shaft, they should be lubricated through the zerks using grease (item 5, appx D). It is essential to add grease until it appears at all bearing assembly seals. This assures removal of dirt particles and other contaminants that may find their way into the bearings and indicates that the bearings are fully lubricated. DO NOT assume that bearing cavities have been filled with new lubricant unless flow is noticed around all four bearing seals.**

### 5-17. PROPELLER SHAFT (CONT).

- (9) Lubricate stub shaft (9) with grease (item 5, appx D) and install into metal tube (10).

**g. Installation.** (Refer to figure 5-27.)

- (1) Install two setscrews (1 and 2) on yoke shafts (5 and 6).
- (2) Slip yoke shaft (6) onto lower sprocket straight shaft.
- (3) Slip yoke shaft (5) onto PTO output gearshaft.
- (4) Tighten two setscrews (1 and 2) on yoke shafts (5 and 6).

### 5-18. SPROCKETS.

---

This task consists of:

- |                |                 |
|----------------|-----------------|
| a. Removal     | e. Repair       |
| b. Disassembly | f. Assembly     |
| c. Cleaning    | g. Installation |
| d. Inspection  |                 |
- 

#### INITIAL SETUP:

#### **Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

#### **Materials Required:**

Brush, Medium Bristle (Item 2, Appx D)  
Cloth, Lint-Free (Item 4, Appx D)  
Solvent, Dry Cleaning (Item 18, Appx D)  
Cloth, Abrasive (Item 3, Appx D)

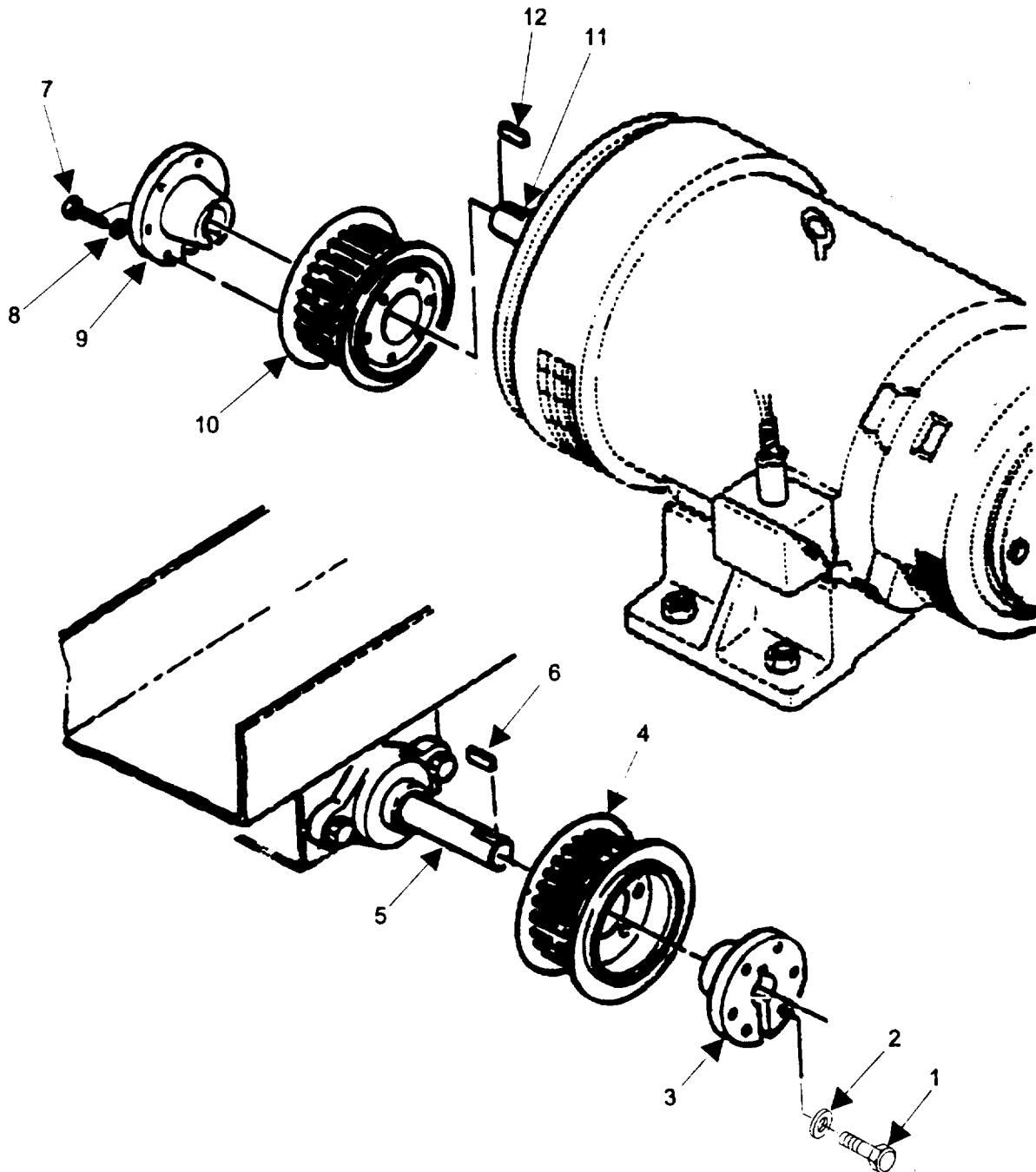
#### **Equipment Conditions:**

CMV shut down and cool.  
Disengage the power takeoff.  
Positive drive belt removed.

---

**a. Removal.** (Refer to figure 5-28.)

- (1) Loosen and remove three machine bolts (1) and three lockwashers (2) from tapered bushing (3).



**Figure 5-28. Positive Drive Belt Sprockets, Removal/Installation.**

- (2)** Insert three machine bolts (1) in the threaded holes of tapered bushing (3). Progressively tighten the machine bolts until the sprocket wheel (4) is loose on the tapered bushing (3). Remove three machine bolts (1) from tapered bushing (3).

### 5-17. PROPELLER SHAFT (CONT).

- (3) Remove the tapered bushing (3) and sprocket wheel (4) from straight shaft (5). Remove machine key (6).
- (4) Loosen and remove three machine bolts (7) and three lockwashers (8) from tapered bushing (9).
- (5) Insert three machine bolts (7) in the threaded holes of tapered bushing (9). Progressively tighten the machine bolts until the sprocket wheel (10) is loose on the tapered bushing (9). Remove three machine bolts (7) from tapered bushing (9).
- (6) Remove the tapered bushing (9) and sprocket wheel (10) from alternator shaft (11). Remove machine key (12).

#### b. Cleaning.

- (1) Remove all buildup of dirt or oil on all parts with a lint-free cloth (item 4, appx D).

<b>WARNING</b>
----------------

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable, and, if ignited, could cause injury to personnel and damage to equipment.**
  - **Do not breathe cleaning solvents for long periods of time or use solvents near open flames. To avoid illness, explosion, or fire, only use solvent in well ventilated areas away from open flame.**
  - **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with the skin. In cold weather, contact of exposed skin with cleaning solvent can cause frostbite.**
- (2) Clean the tapered surface and bore of the tapered bushing with a lint-free cloth (item 4, appx D) or a medium bristle brush item 2, appx D) and dry cleaning solvent (item 18, appx D). All paint, dirt, or grease must be removed. Allow parts to air dry.
  - (3) Clean the straight shaft and alternator output shaft with a lint-free cloth (item 4, appx D) and dry cleaning solvent (item 18, appx D). Exercise care not to allow dry cleaning solvent to penetrate straight shaft/alternator bearings. All paint, dirt, or grease must be removed. Allow parts to air dry.

- (4) Clean sprocket wheels with a lint-free cloth (item 4, appx D) or medium bristle brush (item 2, appx D) and dry cleaning solvent (item 18, appx D). Allow parts to air dry.
- (5) Clean machine bolts and lockwashers with medium bristle brush (item 2, appx D) and dry cleaning solvent (item 18, appx D). All dirt and grease must be removed. Allow parts to air dry.

**c. Inspection.**

- (1) Inspect the sprocket wheels for chipped grooves, stripped or damaged threads, cracks, nicks, and corrosion. Remove minor nicks and chips on sprocket wheel with abrasive cloth (item 3, appx D). Replace sprocket wheel if sprocket wheel has cracks, stripped or damaged threads, or corrosion that could not be removed by cleaning.
- (2) Inspect the tapered bushings for cracks, corrosion, and stripped or damaged threads. Replace tapered bushing if tapered bushing has cracks, stripped or damaged threads, or corrosion that could not be removed by cleaning.
- (3) Inspect machine bolts for cracks, stripped threads, or corrosion. Replace any machine bolt if machine bolt has cracks, stripped threads, or corrosion that could not be removed by cleaning.

**d. Installation.** (Refer to figure 5-28.)

**NOTE**

- **The sprocket wheels used on the alternator and PTO straight shaft are different sizes. The smaller sprocket wheel is attached to the alternator shaft.**
- **Wedging the tapered bushing to spread it during placement on a shaft could damage the tapered bushing. DO NOT wedge the tapered bushing.**

- (1) **Insert machine key (6) on straight shaft (5)**
- (2) Insert tapered bushing (3) into sprocket wheel (4).
- (3) Slide tapered bushing (3) and sprocket wheel (4) onto straight shaft (5). Slide tapered bushing (3) on straight shaft (5) until snug or machine key (6) is flush with tapered bushing (3).

**5-18. SPROCKETS (CONT).**

- (4) Rotate sprocket wheel (4) until three tapped holes are behind three untapped holes of tapered bushing (3). Install three lockwashers (2) and three machine bolts (1) through tapered bushing (3) and into sprocket wheel (4). Finger tighten the three machine bolts (1).
- (5) Insert machine key (12) on alternator shaft (11).
- (6) Insert tapered bushing (9) into sprocket wheel (10).
- (7) Slide tapered bushing (9) and sprocket wheel (10) onto alternator shaft (11). Slide tapered bushing (9) on alternator shaft (11) until snug or machine key (12) is flush with tapered bushing (9).
- (8) Rotate sprocket wheel (10) Until three tapped holes are behind three untapped holes of tapered bushing (9). Install three lockwashers (8) and three machine bolts (7) through tapered bushing (9) and into sprocket wheel (10). Finger tighten the three machine bolts (7).
- (9) Visually check axial alignment of the two sprocket wheels. If the axial alignment appears to be incorrect, repeat steps 1 thru 8, preceding.
- (10) With the sprocket wheels properly aligned, tighten the three machine bolts evenly and progressively in rotation to 15 ft. lbs. When the machine bolts are tightened properly, 15 ft lbs will remain on the machine bolts and there will be a slight gap between the flange of the tapered bushing and the face of the sprocket wheel. DO NOT attempt to tighten machine bolts enough to close this gap.
- (11) Install positive drive belt.



**5-19. GAGE COMPARTMENT DOOR.**

---

This task consists of:

a. Disassembly

b. Assembly

---

**INITIAL SETUP:****Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

**Equipment Conditions:**

CMV shut down and cool.

---

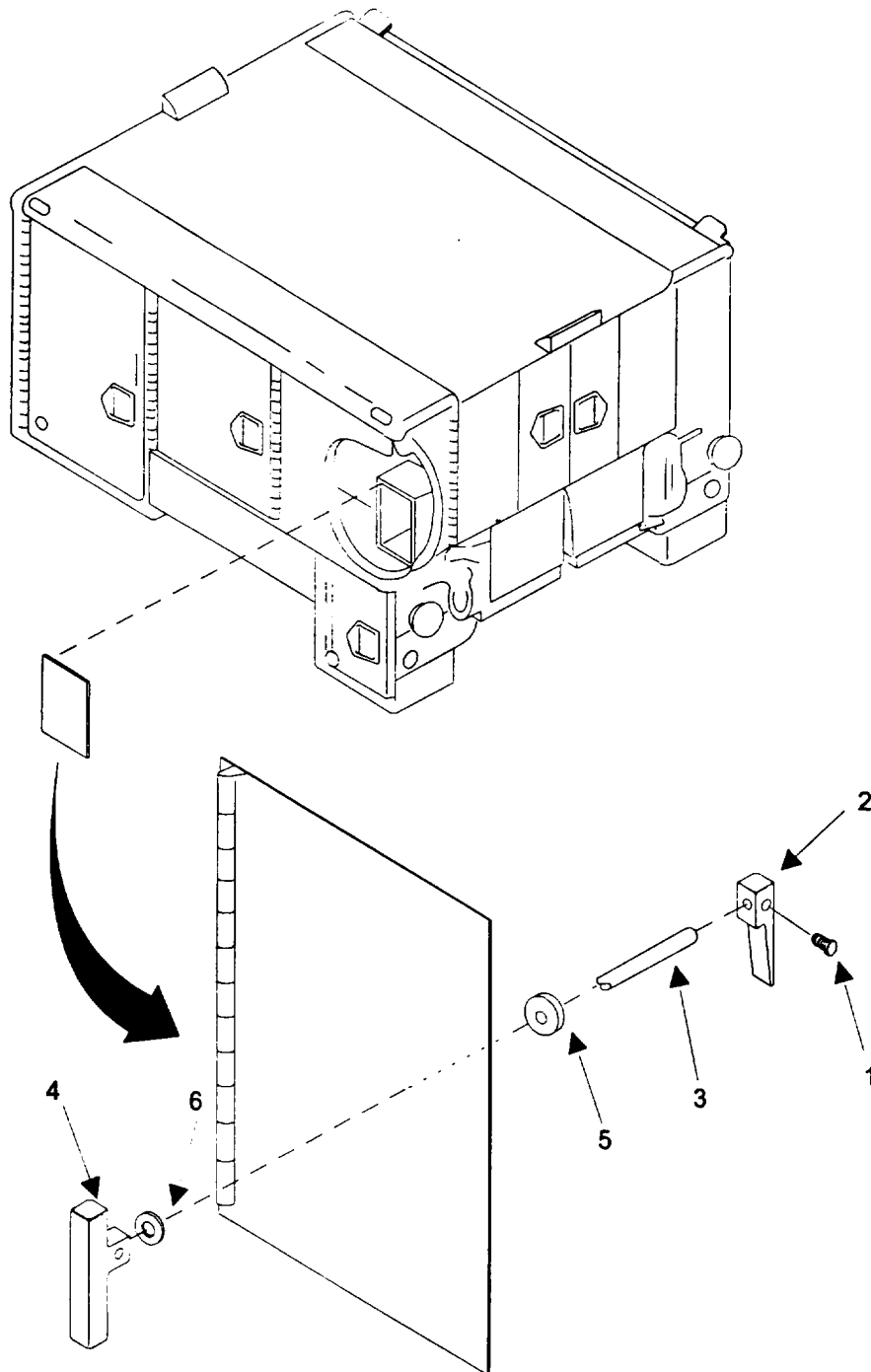
**a. Disassemble.** (Refer to figure 5-29.)

- (1) Loosen set screw (1) on pawl (2) and remove pawl (2) from shaft (3)
- (2) Remove handle assembly (4) with shaft (3) attached through retainer (5) and trim washer (6).

**b. Assembly.**

- (1) Install handle assembly (4) with shaft (3) attached through trim washer (6) and retainer (5).
- (2) Install pawl (2) on shaft (3) and secure with setscrew (1) Adjust pawl so that gage compartment door will be drawn tight against the body.

5-19. GAGE COMPARTMENT DOOR (CONT).



*Figure 5-29. Gage Compartment Door, Removal / Installation.*

**5-20. REAR DOOR ASSEMBLIES (LEFT HAND AND RIGHT HAND).**

---

This task consists of:

- |                |             |
|----------------|-------------|
| a. Disassembly | b. Assembly |
|----------------|-------------|
- 

**INITIAL SETUP:****Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

**Equipment Conditions:**

CMV shut down and cool.

---

- a. **Disassembly.** (Refer to figure 5-30.)

**NOTE**

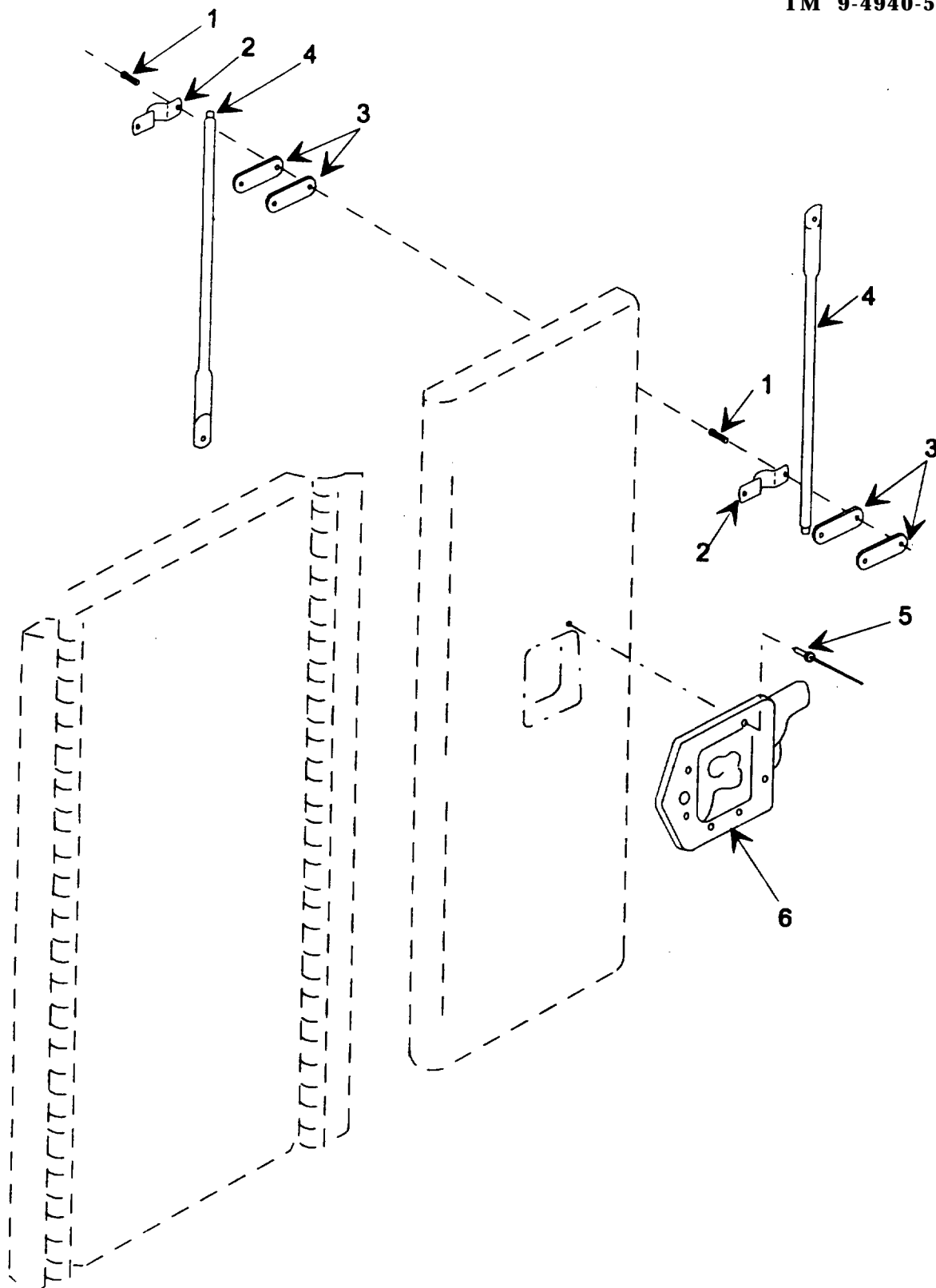
- **Disassemble only to the extent required for repair of rear door assembly.**
- **There are two rear doors mounted on the rear of the CMV. Maintenance of both doors is identical and can be performed without removing the doors.**

- (1) Remove four blind rivets (1), two retaining straps (2), and four spacer plates (3) which secure each of the two locking rods (4) to the rear door assembly.
- (2) Remove two locking rods (4) from luggage lock (5).
- (3) Remove eight blind rivets (6) from rear door assembly and remove luggage lock (5).

- b. **Assembly.** (refer to figure 5-30)

- (1) Install luggage lock (5) and secure with eight blind rivets.
- (2) Turn luggage lock (5) to unlocked position.
- (3) Install two locking rods (4) onto formed studs on the back of the luggage lock and rotate the locking rods 90° degrees, one to the upward position and one to the downward position.

- (4) Position retaining strap (2) onto locking rod (4) and line up two spacer plates (3) with mounting holes on rear door assembly. Secure retaining strap (2) and two spacer plates (3) with two blind rivets (1).
- (5) Repeat step 4, preceding, for the remaining locking rod.



**Figure 5-30. Rear Door Assemblies, Removal / Installation.**

## 5-21. SIDE DOOR ASSEMBLIES.

---

This task consists of:

- |                |             |
|----------------|-------------|
| a. Disassembly | b. Assembly |
|----------------|-------------|
- 

### INITIAL SETUP:

#### **Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

#### **Equipment Conditions:**

CMV shut down and cool.

---

- a. **Disassembly.** (Refer to figure 5-31.)

#### NOTE

- **Disassemble only to the extent required for repair of side door assembly.**
- **There are four door assemblies on each side of the shop set. Assembly/disassembly of all doors is the same even though door size is different.**

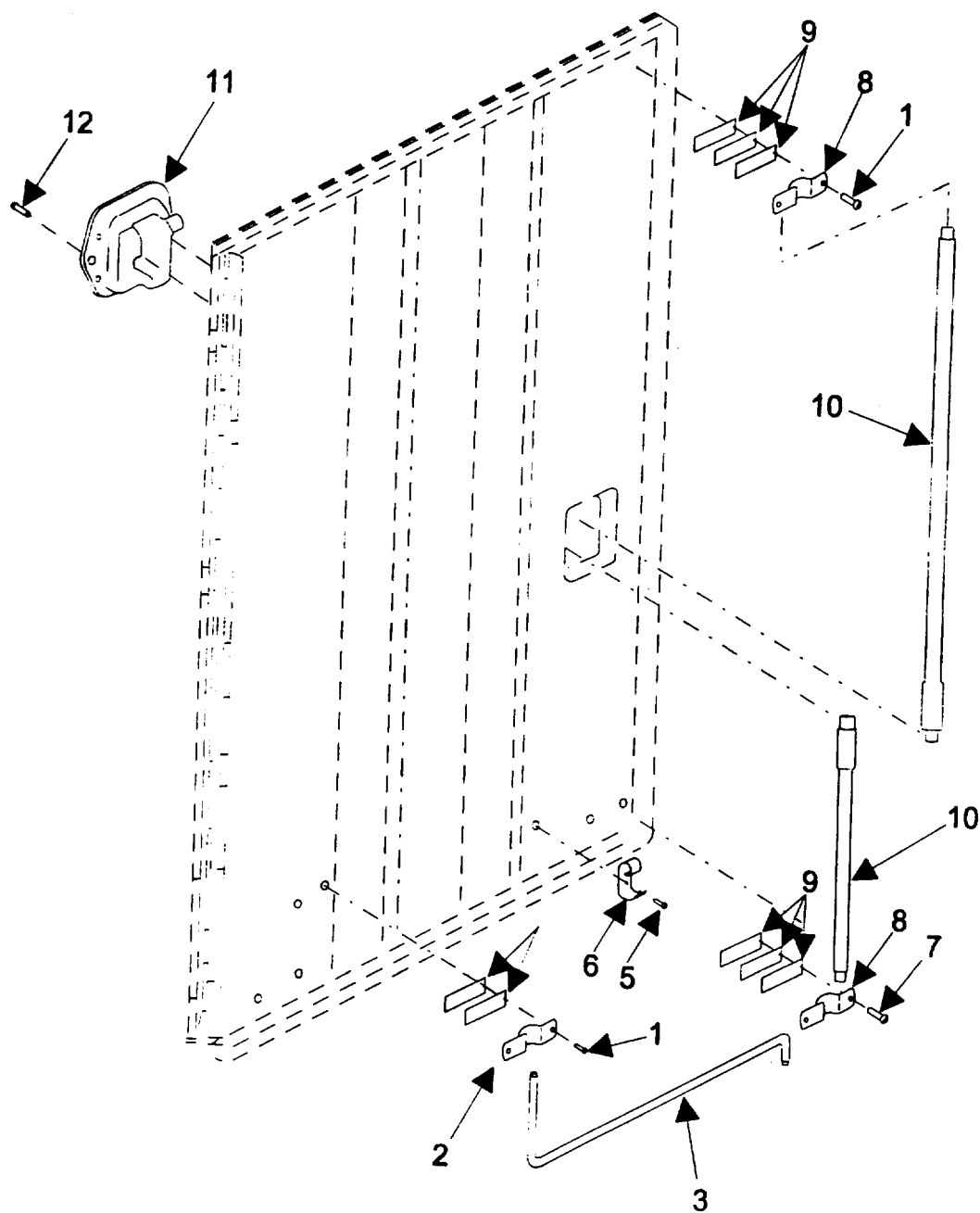
- (1) Remove two blind rivets (1), retaining strap (2), doorstop (3), and two spacer plates (4) from door assembly.
- (2) Remove machine screw (5) and retaining clip (6) from side door assembly.
- (3) Remove four blind rivets (7), two retaining straps (8), six spacer plates (9) which secure each of the two locking rods (10) to the side door assembly,
- (4) Remove two locking rods (10) from luggage lock (11).
- (5) Remove eight blind rivets (12) and luggage lock (11) from side door assembly.

- b. **Assembly.** (Refer to figure 5-31.)

- (1) Install luggage lock (11) into side door assembly and secure with eight blind rivets (12).
- (2) Turn luggage lock (11) to unlocked position.

- (3) Install two locking rods (10) onto formed studs on the back of the luggage lock. Rotate the locking rods 90° degrees one to the upward position and one to the downward position.
- (4) Position retaining strap (8) onto locking rod (4) and line up three spacer plates (9) with mounting holes on rear door assembly. Secure retaining strap (8) and three spacer plates (9) with two blind rivets (7). Repeat for the remaining locking rod.
- (5) Position retaining strap (2) onto doorstop (3) and line up two spacer plates (4) with mounting holes on rear door assembly. Secure retaining strap (2) and two spacer plates (4) with two blind rivets (1).
- (6) Position retaining clip (6) on mounting hole of rear door assembly and secure with machine screw (5).

5-21. SIDE DOOR ASSEMBLIES. (CONT).



*Figure 5-31. Side Door Assemblies, Removal Installation.*



**5-22. PTO CONTROLS.**


---

This task consists of

a. Removal	b. Cleaning	c. Installation
------------	-------------	-----------------

---

**INITIAL SETUP:****Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

**Materials Required:**

Brush, Medium Bristle (Item 2, Appx D)

Cloth, Lint-Free (Item 4, Appx D)

Solvent, Dry Cleaning (Item 18, Appx D)

**Equipment Conditions:**

CMV shut down and cool.

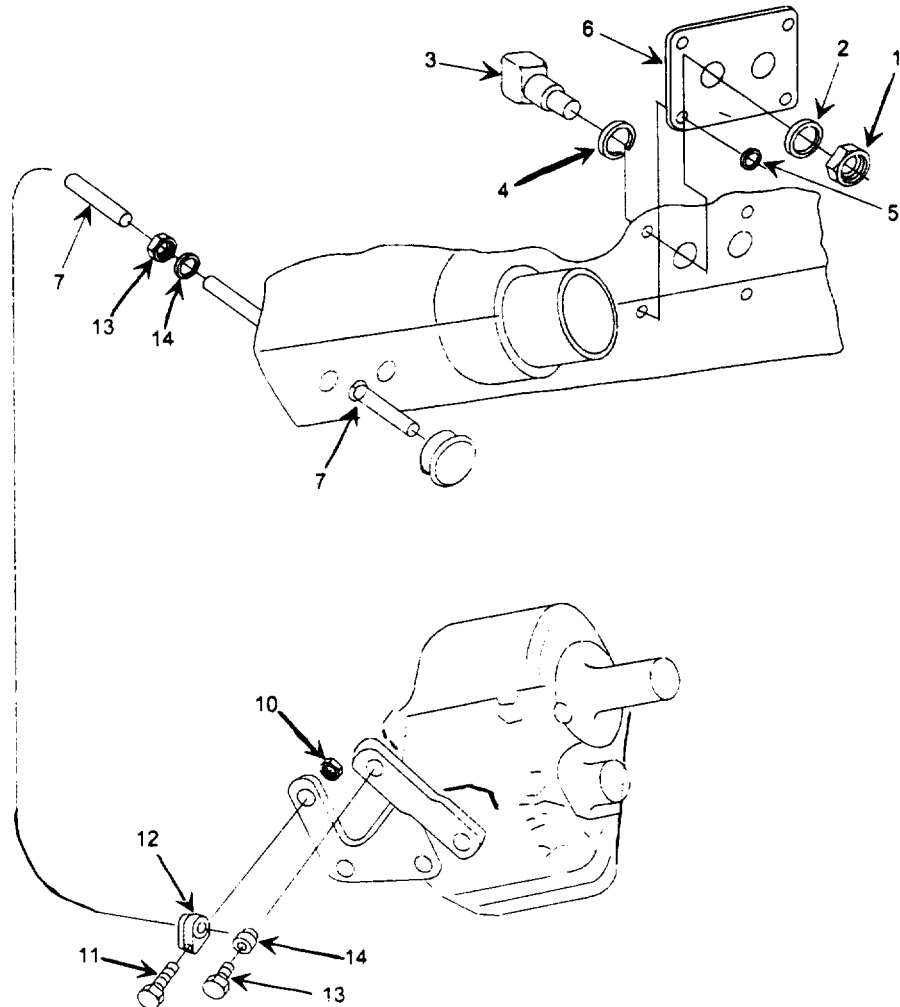
PTO indicator removed.

---

**a. Removal.** (Refer to figure 5-32.)

- (1) Remove hexagon nut (1), star washer (2), toggle switch (3), and retaining clip (4) from dashboard.
- (2) Tag and disconnect governor system wiring harness terminals from toggle switch (3).
- (3) Remove four self-tapping screws (5) and information plate (6) from dashboard.
- (4) Remove PTO control cable (7) from PTO by removing hexagon head cap screw (8), swivel bracket (9), hexagon nut (10), and loosening setscrew (11) in pivot pin (12).
- (5) Remove any tiewrap straps that may secure the PTO control cable to vehicle speedometer cable. Carefully slide PTO control cable thru the speedometer cable retaining clamp and speedometer cable grommet in the vehicle firewall into the cab of the vehicle.
- (6) Loosen and remove hexagon nut (13) and lockwasher (14) on rear side of dashboard and hexagon nut (15) on front side of dashboard.

5-22. PTO CONTROLS (CONT).



**Figure 5-32. PTO Controls.**

- (7) Pull PTO control cable (7) through mounting hole in dashboard. Hexagon nut (13), lockwasher (14), and hexagon nut (15) are not attached to anything, so they will drop off onto the cab floor when the PTO control cable is completely pulled through the mounting hole in the dashboard.

**b. CLEANING**

- (1) Remove all buildup of dirt or oil on all parts with a lint-free cloth (item 4, appx D).

<b>WARNING</b>
----------------

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable, and, if ignited, could cause injury to personnel and damage to equipment.**
- **Do not breathe cleaning solvents for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well ventilated areas away from open flame.**
- **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with the skin. In cold weather, contact of exposed skin with cleaning solvent can cause frostbite.**

- (2) Clean metal parts, except hardware, with medium bristle brush (item 2, appx D) and dry cleaning solvent (item 18, appx D). All dirt and grease must be removed. Allow parts to air dry.

**c. Installation.** (Refer to figure 5-32.)

- (1) Slide hexagon nut (15) onto PTO control cable (7); then start end of PTO control cable (7) through the mounting hole in dashboard.
- (2) Slide lockwasher (14) and hexagon nut (13) onto PTO control cable (7).
- (3) Pull PTO control cable (7) through dashboard mounting hole and route through grommet on firewall of vehicle. Pull PTO control cable completely through grommet and route with the speedometer cable, through clamp and over to the PTO. Tighten clamp and install tiewrap straps to secure the PTO control cable (7).
- (4) Tighten hexagon nut (13) on the rear of vehicle dashboard and hexagon nut (15) on front of vehicle dashboard to secure PTO control cable (7) to vehicle dashboard.
- (5) Attach PTO control cable (7) to PTO using pivot pin (12), setscrew (11), swivel bracket (9), hexagon head cap screw (8), and hexagon nut (10).
- (6) Install information plate (6) on dashboard and secure with four self-tapping screws (5).

**5-22. PTO CONTROLS (CONT).**

- (7) Connect governor system wiring harness terminals to toggle switch 93) and discard tags.
- (8) Insert retaining clip (4) on backside of dashboard mounting hole; install toggle switch (3) and secure with star washer (2) and hexagon nut (1).

**5-23. BUMPER ASSEMBLY.**


---

This task consists of:

- |             |                 |
|-------------|-----------------|
| a. Removal  | c. Inspection   |
| b. Cleaning | d. Installation |
- 

**INITIAL SETUP:****Tools Required:**

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)  
 or  
 Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

**Materials Required:**

Brush, Medium Bristle (Item 2, Appx D)  
 Cloth, Lint-Free (Item 4, Appx D)  
 Solvent, Dry Cleaning (Item 18, Appx D)

**Equipment Conditions:**

CMV shut down and cool.  
 Trailer receptacle removed.  
 CMV batteries disconnected.

---

- a. **Removal.** (Refer to figure 5-33.)

**NOTE**

**The following steps (1), (2), and (3) describe the removal of one blackout taillight. The same procedure applies to both blackout taillights on the bumper assembly.**

- (1) Disconnect blackout taillight wiring harness socket (1) from chassis wiring harness plug (2) on the blackout taillight (3).
- (2) Remove hexagon nut (4), lockwasher (5), bolt (6), and bracket (7) with blackout taillight (3) attached.
- (3) Remove hexagon nut (8), lockwasher (9), and chassis ground lead (10) from back of bracket (7). Remove hexagon nut (11), lockwasher (12), and separate blackout taillight (3) from bracket (7).
- (4) Remove two cotter pins (13), two straight headed pins (14), and two clevises (15) from tie down extensions (16).

**5-23. BUMPER ASSEMBLY (CONT).**

- (5) Remove two cotter pins (13), two straight headed pins (14), and two clevises (15) from tie down extensions (16).
- (6) Remove eight hexagon nuts (21), four cap screws (22), and four cap screws (23) from brackets (24 and 25).

**NOTE**

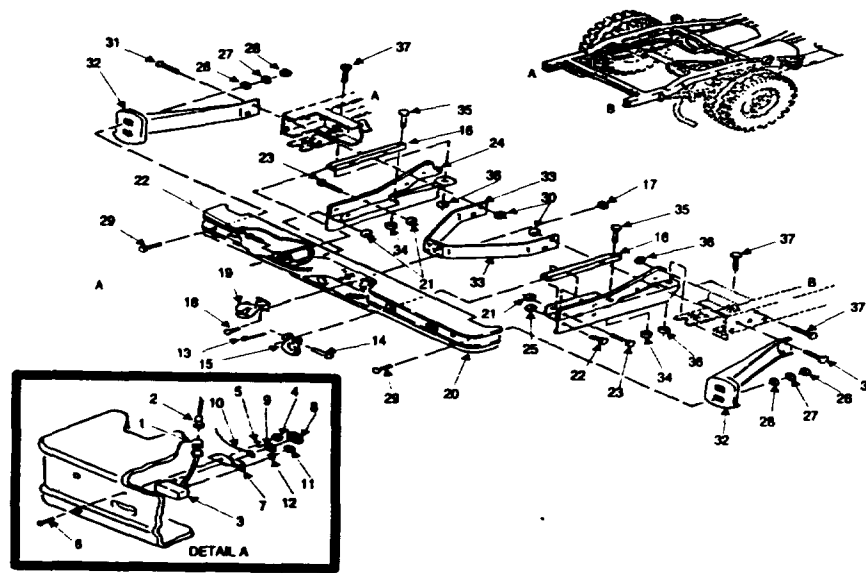
**Support bumper before performing the next step.  
Bumper could fall and cause injury to personnel**

- (7) Remove four hexagon nuts (26), four lockwashers (27), four flat washers (28), four bolts (29), and bumper (20).
- (8) Remove four hexagon nuts (30), four bolts (31), two brackets (32), and pintle assembly bracket (33).
- (9) Remove two hexagon nuts (34), two machine bolts (35), and two extensions (16) from two brackets (24 and 25).
- (10) Remove four hexagon nuts (36), four machine bolts (37), and two brackets (24 and 25) from vehicle chassis.

**b. Cleaning.**

- (1) Remove all buildup of dirt or oil on all parts with a lint-free cloth (item 4, appx D).

## 5-23. BUMPER ASSEMBLY (CONT').



*Figure 5-33. Bumper Assembly - Removal and Installation.*

<p><b>WARNING</b></p>
-----------------------

- Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for for these items are highly flammable, and if ignited, cause injury to personnel and equipment.
- Do not breathe cleaning vapor solvents for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas, away from open flames.
- Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if the solvents come in contact with skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.

**5-23. BUMPER ASSEMBLY (CONT).**

(2) Clean all metal parts using a clean, lint-free cloth (item 4, appx D) or a medium bristle brush (item 2, appx D) and cleaning solvent (item 18, appx D).

(3) Allow all parts to dry.

**c. Inspection.**

(1) Inspect bolts, cap screws, flat washers, lockwashers, hexagon nuts, etc., for stripped threads, corrosion, or cracks. Replace any hardware that is defective.

(2) Inspect metal parts, except tie down extensions, and bumper for cracks, rust, corrosion, and other signs of obvious damage. Replace any metal part that is defective.

**d. Installation.**

(1) Install two brackets (24 and 25) onto vehicle chassis and secure with four machine bolts (37) and four hexagon nuts (36).

(2) Install two tie down extensions (16) onto two brackets (24 and 25) and secure with two machine bolts (35) and two hexagon nuts (34).

(3) Install pintle assembly bracket (33) and two brackets (32) and secure with four bolts (31) and four hexagon nuts (30).

**WARNING**

**Ensure bumper is supported until completion of next step. Bumper could fall and cause injury to personnel.**

(4) Install bumper (20) onto brackets (32) and secure with four bolts (29), four flat washers (28), four lockwashers (27), and four hexagon nuts (26).

(5) Install four cap screws (23) through bumper brackets, brackets (24 and 25), and tie down extensions (16). Secure four cap screws (23) with four hexagon nuts (21). Install four cap screws (22) through bumper brackets and brackets (24 and 25). Secure four capscrews (22) with four hexagon nuts (21).

(6) Install pintle assembly (19) onto bumper and secure with four cap screws (18) and four hexagon nuts (17).

(7) Install two clevises (15) onto two tie down extensions (16). Secure each clevis with one straight headed pin (14) and one cotter pin (13).



**NOTE**

**The following steps (8), (9), and (10) describe the installation of one blackout taillight. The same installation procedure applies to both blackout taillights on the bumper assembly.**

- (8) Install blackout taillight (3) onto bracket (7) and chassis ground lead (10) onto blackout taillight (3). Secure with lockwasher (12), hexagon (11), lockwasher (9), and hexagon nut (8).
- (9) Install blackout taillight (3) and attached bracket (7) onto bumper (20) and secure with lockwasher (5) and hexagon nut (4).
- (10) Connect blackout taillight wiring harness socket (1) to chassis wiring harness plug (2).

## 5-24. EXPLOSIVE ORDNANCE DISPOSAL (EOD) HARDWARE.

---

This task consists of:

- |                |                  |
|----------------|------------------|
| a. Removal     | d. Inspection    |
| b. Disassembly | e. Assembly      |
| c. Cleaning    | f. Installation. |
- 

### INITIAL SETUP:

#### Tools Required:

Tool Kit, Contact Maintenance (Engineering) (SC 4940-95-B21)

Tool Kit, Contact Maintenance (Ordnance) (SC 4940-95-B22)

#### Materials Required:

Brush, Medium Bristle (Item 2, Appx D)

Cloth, Lint-Free (Item 4, Appx D)

Solvent, Dry Cleaning (Item 18, Appx D)

#### Equipment Conditions:

CMV shut down and cool.

CMV batteries disconnected.

AS-1729/VRC antenna and mounting hardware removed.

H-250/U handset removed.

C-2299/VRC radio set control removed.

\*AM-2060/VR amplifier power supply and mounting hardware removed.

\*RT-841/PRC-77 radio receiver-transmitter and mounting hardware removed.

\*RT-5240/VRC radio receiver-transmitter and mounting hardware removed.

\*MT-1029/VRC electrical equipment mounting base and mounting hardware removed.

\*TSEC/HYP57 vehicular power adapter.

\*TSEC/KY-57 security equipment and mounting hardware removed.

\*J-3513/U interconnecting box and mounting hardware removed.

\*MT-4626/U electrical equipment mounting base and mounting hardware removed.

\*If equipped.

---

- a. **Removal.** (Refer to figures 5-34 and 5-38.)

**WARNING**

**Radio operating voltage is present in EOD peculiar wiring harnesses which could cause serious injury or death. Turn off vehicle engine and remove battery terminals prior to performing any maintenance on EOD peculiar components.**

**NOTE**

- **Tag all required wiring before disconnecting from EOD peculiar components.**

- **Remove EOD components only to the extent necessary to repair.**

- (1) Remove six hexagon cap screws (1, fig. 5-34), six hexagon nuts (2), six lock washers (3), six flat washers (4), support assembly (5), backing plate (6), and backing plate (7) from exterior of cargo carrier.
- (2) Remove four hexagon cap screws (1, fig. 5-35), four hexagon nuts (2), four lock washers (3), four flat washers (4), backing plate (5), antenna support (6), and backing plate (7) from exterior of cargo carrier.
- (3) Remove four machine screws (1, fig. 5-36), four flat washers (2), four lock washers (3), and four hexagon nuts (4) from interior of cargo carrier. Remove four machine screws (5), four lock washers (7), and four hexagon nuts (8) from interior of cargo carrier. Remove bottom and support assembly shelf (9) from interior of cargo carrier. Mark location of cable assemblies (10) and (11) in rubber grommet (12) and carefully remove rubber grommet (12) from interior of cargo carrier. Carefully remove special purpose electrical cable assembly (10) and radio frequency cable assembly (11) from interior of cargo carrier. Mark locations of cable assemblies (13) and (14) in rubber of grommet (15) and carefully remove rubber grommet (15) from interior of cargo carrier.
- (4) Mark location of cable assemblies (1 and 2, fig. 5-37) in rubber grommet (3) and carefully remove rubber grommet (3) from rear of cab interior. From the inside of the cab, carefully pull electrical power cable assembly (1) and special purpose electrical cable assembly (2) through holes in cargo carrier and cab. Remove three self-tapping screws (4) and their cable clamps (5). Remove four self-tapping screws (6) and manual container (7) from cab interior.
- (5) Remove two self-tapping screws (1, fig. 5-38) and handset holder (2) from truck cab dashboard. Remove four self-tapping screws (3) and control box mount (4) from cab drive shaft tunnel. Remove clamp loop (5). Tag and disconnect electrical power cable assembly (6) from vehicle terminal block located on engine compartment firewall. Carefully pull electrical power cable assembly (6) through rubber grommet in firewall and remove electrical power cable assembly (6) from cab. Disconnect special purpose electrical cable assembly (7) from switch box assembly (8) and remove cable assembly (7) from cab. Disconnect special purpose electrical cable assembly (9) from switch box assembly (8) and remove cable assembly (9) from cab. Remove cap screw (10) flat washer (11) and switch box assembly (8) from speaker mount (12). Remove personal loudspeaker (13) from speaker

mount (12). Remove eight self-tapping machine screws (14) and speaker mount (12) from glove compartment of cab.

b. **Disassembly.** (Refer to figure 5-39.) Remove ten hexagon nuts (1), ten lock washers (2), ten flat washers (3), and ten machine screws (4). Remove support shelf (5), support shelf (6), from bottom shelf (7).

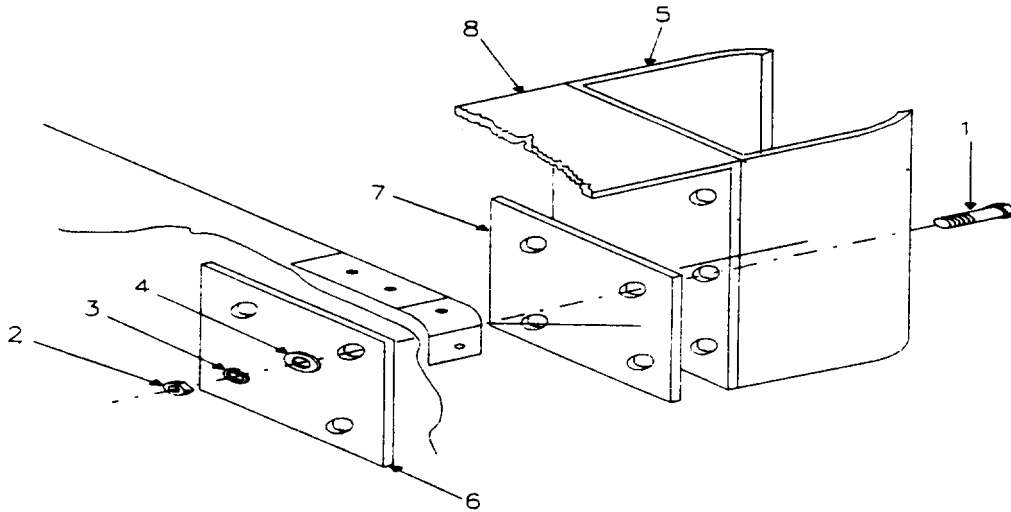
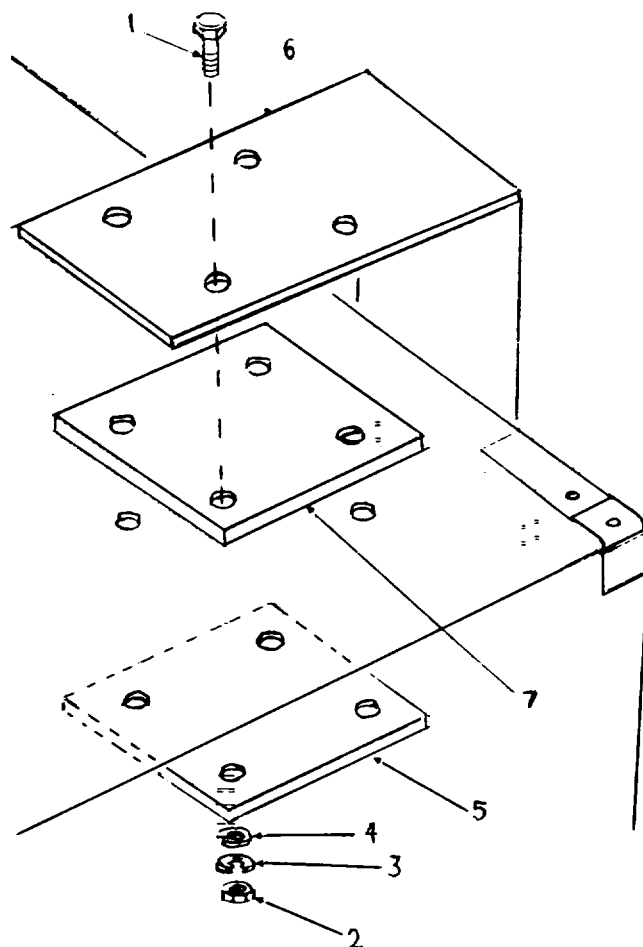


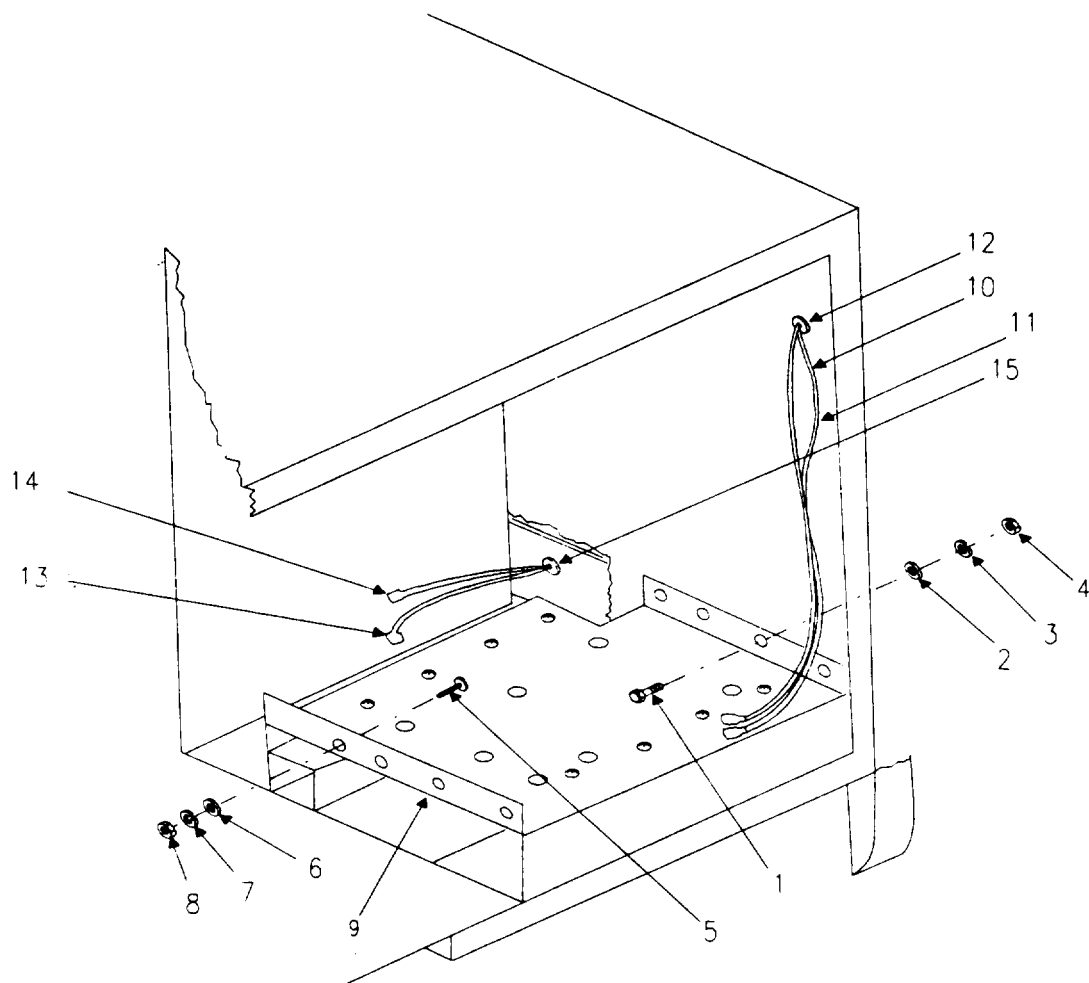
Figure 5-34. EOD Hardware - Removal and Installation.

5-24. EXPLOSIVE ORDNANCE DISPOSAL (EOD) HARDWARE (CONT).



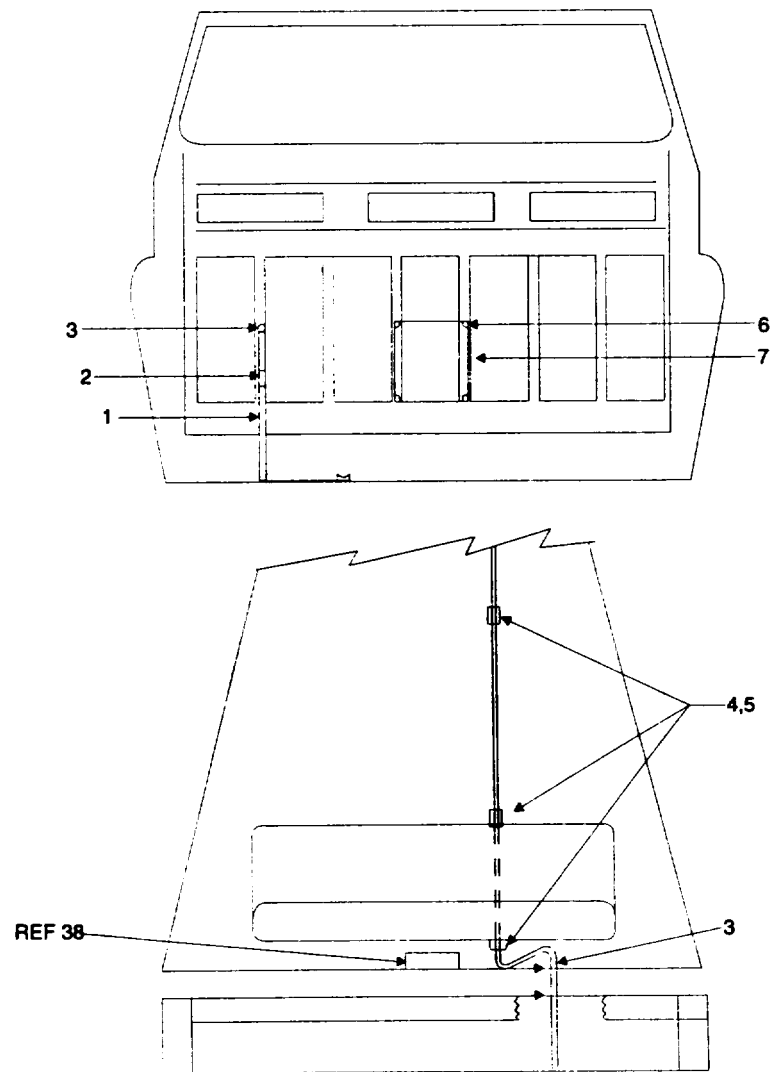
*Figure 5-35. EOD Hardware - Removal and Installation.*

5-24. EXPLOSIVE ORDNANCE DISPOSAL (EOD) HARDWARE (CONT).



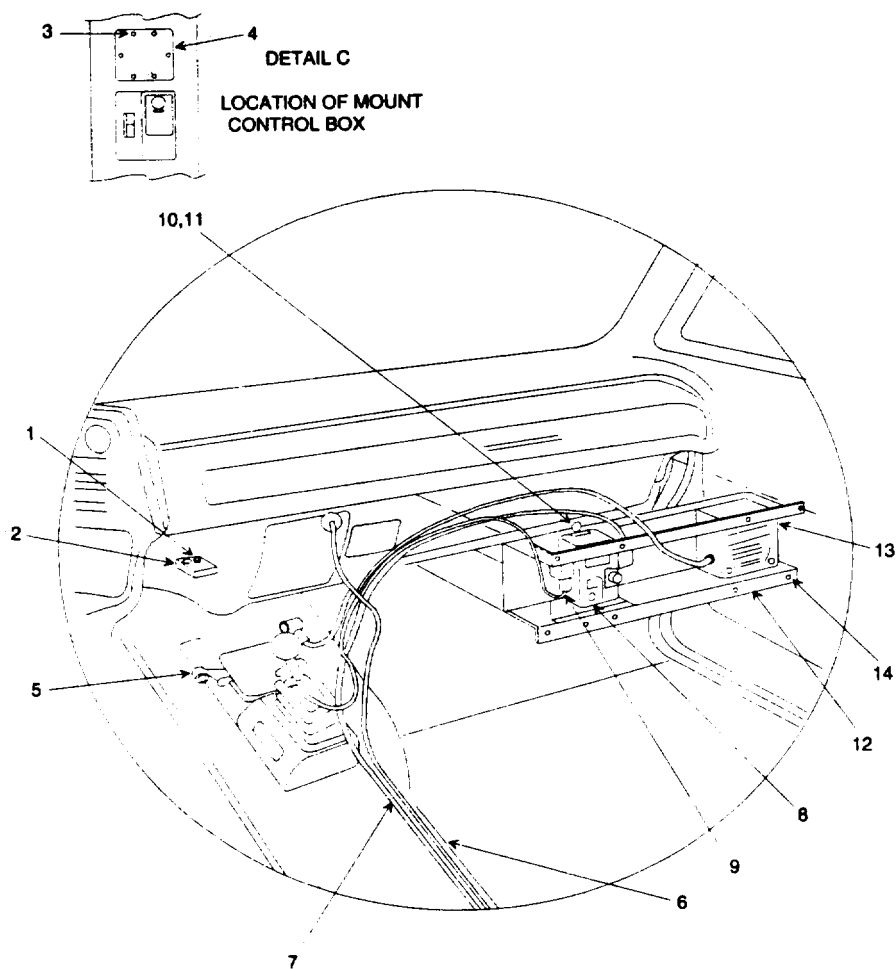
*Figure 5-36. EOD Hardware - Removal and Installation.*

**5-24. EXPLOSIVE ORDNANCE DISPOSAL (EOD) HARDWARE (CONT).**



***Figure 5-37. EOD Hardware - Removal and Installation.***

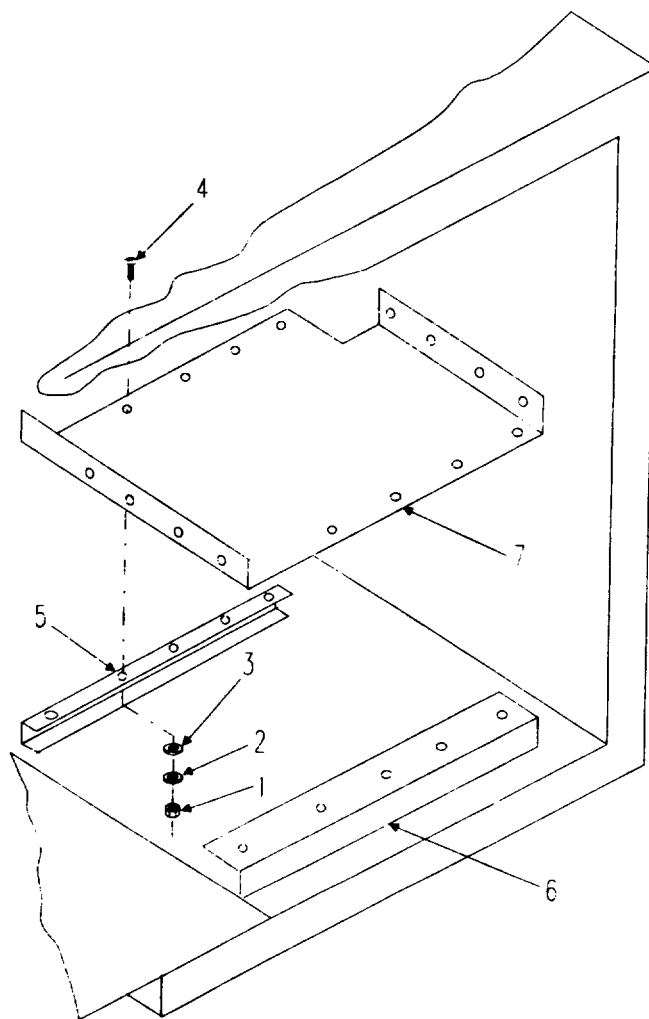
5-24. EXPLOSIVE ORDNANCE DISPOSAL (EOD) HARDWARE (CONT).



*Figure 5-38. EOD Hardware - Removal and Installation.*



5-24. EXPLOSIVE ORDNANCE DISPOSAL (EOD) HARDWARE (CONT).



*Figure 5-39. EOD Hardware - Removal and Installation.*

## 5-24. EXPLOSIVE ORDNANCE DISPOSAL (EOD) HARDWARE (CONT).

### c. Cleaning.

- (1) Remove all buildup of dirt and oil on all parts with a lint-free cloth (item 4, appx D).

<b>WARNING</b>
----------------

- **Do not use diesel fuel, gasoline, or benzene (Benzol) for cleaning, for these items are highly flammable, and, if ignited, cause injury to personnel and damage to equipment.**
  - **Do not breathe cleaning solvents for long periods of time or use solvent near open flames. To avoid illness, explosion, or fire, only use solvent in well-ventilated areas away from open flame.**
  - **Use extreme care with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin if solvents contact the skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite.**
- (2) Clean machine screws, nuts, washers and other metal parts with a medium bristle brush (item 2, appx D) and dry cleaning solvent (item 18, appx D). Allow parts to air dry.
  - (3) Clean cable assemblies with a lint-free cloth (item 4, appx D) or medium bristle brush (item 2, appx D).
  - (4) Clean rubber grommets with a lint-free cloth (item 4, appx D).
  - (5) Clean personal loudspeaker and switch box assembly with a lint-free cloth (item 4, appx D) or medium bristle brush (item 2, appx D).

### d. Inspection.

- (1) Inspect cable assembly insulation for cracks or fraying. Pay particular attention to areas where the cable assembly passes through holes or over metal edges. Inspect cable assembly terminals, i.e., individual pins, for tight connection to the wire runs. Inspect wire run/cable assembly terminal for burn spots or corrosion. Replace any cable assembly terminal that has burn spots/corrosion or is not securely attached to the wire run. Replace any wire run that is cracked/frayed/burned or cut.

- (2) Inspect machine screws and hexagon nuts for stripped threads, corrosion, or cracks. Replace any machine screws or hexagon nuts that are defective. Inspect flat washers and lock washers for corrosion and stress cracks. Replace any flat washer or lock washer that has corrosion or stress cracks.
- (3) Inspect metal parts, except, backing plates, antenna support, and support shelf, for cracks, rust, corrosion, and other signs of obvious damage. Replace any part that is defective.
- (4) Inspect rubber grommets for aging of rubber and loss of shape. Replace any rubber grommet that is defective.

**e. Assembly.** (Refer to figure 5-39.) Assemble support shelf(5) and support shelf (6) onto bottom shelf (7) and secure with ten machine screws (4), ten flat washers (3), ten lock washers (2), and ten hexagon nuts (1).

**f. Installation.** (Refer to figures 5-34 thru 5-38.)

- (1) Place backing plate (7, fig. 5-35) on top of cargo earner and position over four mounting holes. Place and align antenna support (6) over four machine screw holes of backing plate (7). Insert four machine screws (1) through mounting holes and install backing plate (5) four flat washers (4) four lock washers (3) and start hexagon nuts (2) on four machine screws (1). DO NOT TIGHTEN 4 HEXAGON NUTS. Align six holes of support assembly (5, fig 5-34) with six holes of antenna support (8). Align backing plate (7) with four bottom holes of antenna support (8). Insert four machine screws (1) through bottom four holes of support assembly (5), antenna support (8) backing plate (7) and into interior of cargo carrier. Install backing plate (6) and secure with four flat washers (4), four lock washers (3) and four hexagon nuts (2) onto four machine screws (1). Install two machine screws (1) though top two holes of the support assembly (5) antenna support (8) and into the interior of the cargo carrier interior. Install two flat washers (4), two lock washers (3), and two hexagon nuts (2) onto top two machine screws (1). Tighten all hexagon nuts (1, figs 5-34 and 5-35).
- (2) Install bottom and support shelf assembly (9, fig. 5-36) into cargo carrier and secure with four machine screws (1), four flat washers (2), four lock washers (3), four hexagon nuts (4), four machine screws (5), four flat washers (6), four lock washers (7) and four cable assembly (10) and radio frequency cable assembly (11) within rubber grommet (12) to position previously marked on cable assemblies (10 and 11). Carefully install rubber grommet (12) and cable assemblies (10 and 11) into interior hole of cargo carrier.

**5-24. EXPLOSIVE ORDNANCE DISPOSAL (EOD) HARDWARE (CONT).**

**NOTE**

**There should be enough of each cable assembly outside of the cargo carrier so that each cable assembly's terminals reach the AS-1729/VRC antenna's connections.**

Open rubber grommet (15) and place electrical power cable assembly (13) and special purpose electrical cable assembly (14) within rubber grommet (15) to positions previously marked on cable assemblies (13 and 14). Carefully push electrical power cable assembly (13) and special purpose electrical cable assembly (14) through holes in cargo carrier and vehicle cab. Carefully install rubber grommet (15) and cable assemblies (13 and 14) into interior hole of the cargo carrier.

- (3) Place manual container over four holes chilled in rear of cab. Secure manual container to rear of cab with four self-tapping screws (6, fig. 5-37). Open rubber grommet (3) and place 'electrical power cable assembly (1) and special purpose electrical cable assembly (2) with rubber grommet (3) to positions previously marked on cable assemblies (1 and 2). Carefully install rubber grommet (3) and cable assemblies (1 and 2) into hole in rear of cab. Secure cable assemblies (1 and 2) with three cable clamps (4) and three self-tapping screws (5).
- (4) Install handset holder (2, fig. 5-38) onto dashboard of cab and secure with two self-tapping screws (1). Install control box mount (4) on cab drive shaft tunnel and secure with four self-tapping screws (3). Install clamp loop (5). Route electrical power cable assembly (6) through cab, rubber grommet in firewall, and connect cable assembly terminal to vehicle terminal block located on engine compartment firewall. Install switch box assembly (8) into speaker mount (12) and secure with flat washer (11) and cap screw (10). Install personal loudspeaker (13) in speaker mount (12). Connect special purpose electrical cable assembly (7) to switch box assembly (8). Connect special purpose electrical cable assembly (9) to switch box assembly (8). Install speaker mount (12) into glove compartment of cab and secure with eight self-tapping machine screws (14).

## APPENDIX A

### REFERENCES

#### A-1. SCOPE.

This appendix lists all Army regulations, forms, field manuals, technical manuals, and miscellaneous publications referenced in this manual.

#### A-2. FORMS.

DA Form 2404 . . . . .	Equipment Inspection and Maintenance Worksheet
DA Form 2408 . . . . .	Equipment Log Assembly (Records)
DA Form 2407 . . . . .	Maintenance Request
DD Form 314 . . . . .	Preventive Maintenance Schedule and Record
DD Form 1397 . . . . .	Processing and Reprocessing Record for Shipment, Storage, and Issue of Vehicle and Spare Engine
SF 368 . . . . .	Product Quality Deficiency Report
DA Form 2028-2 . . . . .	Recommended Changes to Equipment Technical Publications
DA Form 2028 . . . . .	Recommended Changes to Publications and Blank Forms
SF 364 . . . . .	Report of Discrepancy

#### A-3. TECHNICAL MANUALS.

TM 9-2320-289-10 . . . . .	Operator's Manual for Truck, Chassis, Tactical, 1 1/4 Ton, 4 X 4, M1k031 (2320-01-133-5368)
TM 9-2320-289-10-HR. . . . .	Hand Receipt Manual Covering Contents of Components (COEI), Basic Issue Item (BII) and Additional Authorization List for Truck, Cargo, Tactical
TM 9-2320-289-20 . . . . .	Unit, Maintenance Manual for Truck, Cargo, Tactical
TM 9-2320-289-20P. . . . .	Unit Maintenance Repair Parts and Special Tools List for Truck, Cargo, Tactical
TM 9-2320-289-34 . . . . .	Direct Support and General Support Maintenance Manual for Truck, Cargo, Tactical
TM 9-2320-289-34P . . . . .	Direct Support and General Support Maintenance Repair Parts and Special Tools List for Truck, Cargo, Tactical
TM 9-4940-562-23P. . . . .	Organizational and Direct Support Maintenance, Repair Parts and Special Tools List for Shop Equipment, Contact Maintenance, Truck Mounted
TM 43-0139 . . . . .	Painting Instructions for Field Use.
TM 55-2200-001-12 . . . . .	Application of Blocking, Bracing, and Tiedown Materials for Rail Transport
TM 750-244-3 . . . . .	Procedures for Destruction of Equipment to Prevent Enemy Use

**A-4. MISCELLANEOUS.**

DoD 5200.22-M..... Industrial Security Program Manual  
LO 9-2320-289-12..... Lubrication Order for Truck, Chassis, Tactical, 1 1/4 Ton,  
4 X 4, M1031 (2320-01-133-5368)  
DA PAM 738-750..... The Army Maintenance Management System (TAMMS)  
FM 21-11..... First Aid for Soldiers  
SB 740-95-1..... Storage Serviceability Standards for AMCCOM Materiel  
SC 4940-95-CL-B22..... Supply Catalog, Contact Maintenance Vehicle (Ordnance)  
SC 4940-95-CL-B21..... Supply Catalog, Contact Maintenance Vehicle (Engineer)  
MIL-G-10924..... Military Specification - Grease, Automotive and Autillery  
MIL-V-62038..... Vehicles Wheeled: Preparation for Shipment and Storage  
O f

**A-5. ARMY REGULATIONS.**

AR 190-15..... The Army Physical Security Program  
AR 190-51..... Security of Army Property at Unit and Installation Level  
AR 220-1..... United States Reporting  
AR 735-5..... Basic Policies and Procedures for Property Accountability  
AR 750-1..... Army Materiel Maintenance Policies  
CTA 50-970..... Expendable/Durable Items (Except Medical, Class V,  
Repair Parts, and Heraldic Items

**A-6. COMMERCIAL LITERATURE.**

Form: OM-2205..... Owners Manual, Miller Welder, Model XMT300CC/CV  
Form: OM-1212B..... Owners Manual, Miller Gun/Feeder, Model Spoolmatic 3

## APPENDIX B

### MAINTENANCE ALLOCATION CHART

---

#### Section I. INTRODUCTION

##### B-1 . GENERAL.

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

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

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

##### B-2. MAINTENANCE FUNCTIONS.

Maintenance functions will be limited to and defined as follows:

a. **Inspection.** To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b. **Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. **Service.** Operations required periodically to keep an item in proper operating condition, i.e., to clean, to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. **Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. **Align.** To adjust specified variable elements of an item to bring about a optimum performance.

## B-2. MAINTENANCE FUNCTIONS (CONT).

f. **Calibrate.** To determine and cause corrections to be made or to be adjusted to instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. **Removal/Install.** To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. **Required.** To remove an unserviceable item and install a serviceable counterparts in its place. "Replace" is authorized by the MAC and is shown as the 3rd position code of the SMR code.

i. **Repair.** The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions to identify troubles, and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly) end item, or system).

## B-3. EXPLANATION OF COLUMNS IN THE MAC, SECTION II.

a **Column 1. Group Number** Column 1 lists functional group code numbers, the purpose of which to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group numbers shall be "00".

b. **Column 2. Component/Assembly.** Column 3 list the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. **Column Maintenance Function.** Column 3 lists the functions to be performed on the item listed in column 2. (For a detailed explanation of these functions, see paragraph B-2.)

d. **Column 4 Maintenance Category.** Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of task within a listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time



required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time, troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance categories are as follows:

C . . . . . Operator or crew  
 O . . . . . Unit Maintenance  
 F . . . . . Direct Support Maintenance  
 H . . . . . General Support Maintenance  
 D . . . . . Depot Maintenance

e. **Column 5. Tools and Equipment.** Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

f. **Column 6. Remarks.** This column shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in Section IV.

#### **B-4. EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III.**

a. **Column 1. Reference Code.** The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. **Column 2. Maintenance Category.** The lowest category of maintenance authorized to use the tool or test equipment.

c. **Column 3. Nomenclature.** Name or identification of the tool or test equipment.

d. **Column 4. National Stock Number.** The national stock number of the tool or test equipment.

e. **Column 5. Tool Number.** The manufacturer's part number.

#### **B-5. EXPLANATION OF COLUMNS IN REMARKS, SECTION IV.**

a. **Column 1. Reference Code.** The code recorded in column 6, Section II.

b. **Column 2. Remarks.** This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

**Section II. MAINTENANCE ALLOCATION CHART  
FOR  
SHOP EQUIPMENT, CONTACT MAINTENANCE, TRUCK MOUNTED**

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Unit		DS	GS	DEP		
			C	O	F	H	D		
00	Shop Equipment, Contact Maintenance, Truck Mounted								
01	Air Compressor Assembly	Inspect	.5	.3	.6				
		Adjust		.2				1,2	
		Service	1.0	.1				1,2	
		Repair			3.9			1,2	
		Replace		1.5	2.9			1,2	
0101	Air Line	Inspect		.1					
		Replace			.3			1,2	
0102	Air Filter Assembly	Inspect	.1						
		Service	.5					1,2	
		Repair		.5				1,2	
		Replace		.4				1,2	
0103	Pressure Switch	Inspect	.1						
		Adjust		.2				1,2	
		Replace			.3			1,2	
0104	Air Tank Reservoir	Inspect	.1						
		Service	.1					1,2	
		Repair			.9			1,2	
		Replace			.4			1,2	
0105	Air Pressure Gage	Inspect		.1					
		Replace		.2				1,2	
0106	Safety Valve	Inspect		.1					
		Replace		.3				1,2	
0107	Air Compressor	Inspect	.6		.3				
		Service	.8					1,2	
		Repair			3.5			1,2	
		Replace	.5		1.9			1,2	
010701	Belt Guard	Inspect	.1						
		Replace		.7				1,2	
010702	Belt	Inspect	.1						
		Adjust	.3					1,2	
		Replace		1.0				1,2	

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Unit		DS	GS	DEP		
			C	O	F	H	D		
010703	Motor	Inspect Service Repair Replace	.1	.1	1.5 1.0			1,2 1,2 1,2	
010704	Air Compressor Inlet Filter	Inspect Service Replace	.1 .3 .2					1,2 1,2	
010705	Air Compressor Body	Inspect Repair Replace			.3 2.0 1.0			1,2 1,2	
02	Governor and Drive	Inspect Adjust Repair Replace		.5 .8	1.3 1.0 4.3 6.8			1,2 1,2 1,2	
0201	Wiring Harness	Inspect Repair Replace	.4	.7 .2	1.5 1.5			1,2 1,2 1,2	
0202	Electronic Governor	Inspect Adjust Repair Replae	.3	.5	1.0 2.5 1.0			1,2 1,2 1,2 1,2	
0203	Electronic Actuator	Inspect Replae	.2		.5			1,2	
0204	Transfer Case Neutral Switch	Inspect Replae		.2	1.0			1,2	
0205	Power Take Off	Inspect Repair Replace	.2	.3	2.5 1.2			1,2 1,2	
0206	Power Take Off Controls/Indicators	Inspect Repair Replace	.1	.2 .7	.6 1.0			1,2 1,2 1,2	
0207	Power Take Off Magnetie Sensor	Replace			.5			1,2	

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Unit		DS	GS	DEP		
			C	O	F	H	D		
0208	Overspeed Switch	Test			.2				
		Replace			.4			1,2	
0209	Transmission Drive Indicator Switch	Inspect			.2				
		Replace			.5			1,2	
03	Electrical System	Inspect		.8					
		Repair			3.0			1,2	
		Replace		.5	5.1			1,2	
0301	Trailer Receptacle	Inspect		.2					
		Replace		.5				1,2	
0302	D.C. Wiring Harnesses	Inspect	.4					1,2	
		Repair			1.6			1,2	
		Replace			3.0			1,2	
0303	A.C. Wiring Harnesses	Inspect	.4	.6				1,2	
		Repair			1.4			1,2	
		Replace			1.6			1,2	
0304	Lights	Inspect	.2						
		Replace	.4					1,2	
04	Power Generation System	Inspect		.7	.9				
		Adjust		.6				1,2	
		Repair			6.2			1,2	
		Replace		.6	7.2			1,2	
0401	Alternator	Inspect	.2		.5			1,2	
		Repair			2.5			1,2	
		Replace			1.0			1,2	
0402	Alternator Mount	Inspect			.2				
		Repair			.3			1,2	
		Replace			1.3			1,2	
0403	Control Panel	Inspect	.2	.4	1.0				
		Repair		.7	1.3			1,2	
		Replace			1.0			1,2	
0404	Wiring Harness	Inspect	.2	.5	.5				
		Repair			.8			1,2	
		Replace			1.5			1,2	
0405	Positive Drive Belt	Inspect	.2						
		Adjust		.6				1,2	
		Replace		.6				1,2	

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			Unit		DS	GS	DEP		
			C	O	F	H	D		
0406	Propeller Shaft	Inspect Service Repair Replace	.4	.3				1,2 1,2 1,2	
0407	Sprockets	Inspect Replace			.4 1.2			1,2	
05	Special Purpose Body Assembly	Inspect Repair Replace	.5		3.0 3.6			1,2 1,2	
0501	Tailgate Assembly	Inspect Repair Replace	.1	.7 .5				1,2 1,2	
0502	Body Assembly	Inspect Repair Service			.4 1.0 .4			1,2 1,2	
0503	Rear Door Assemblies	Inspect Repair Replace	.2		.6 1.0			1,2 1,2	
0504	Side Door Assemblies	Inspect Repair Replace	.3		1.6 1.0			1,2 1,2	
0505	Reflectors	Inspect Replace		.1 .3				1,2	
0506	Gage Compartment Door	Repair			.3			1,2	
06	Miscellaneous Equipment								
0601	Storage Straps/Tiedowns	Inspect Replace		.1 .3					
0602	Brackets/Hardware	Inspect Replace	.2	.7				1,2	
07	Information Plates	Inspect Replace		.1 .2				1,2	
08	Rear Bumper Assembly	Inspect Repair Replace	.1		1.0 1.5			1,2 1,2	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) REFERENCE CODE	(2) MAINTENANCE LEVEL	(8) NOMENCLATURE	(4) NATIONAL STOCK NUMBER	(5) TOOL NUMBER
1	O,F	Tool Kit, Contact Maintenance, Truck Mounted (Engineer- ing) SC 4940-95-B21	4940-01-209-8824	-----
2	O,F	Tool Kit, Contact Maintenance, Truck Mounted (Ordnance) SC 4940-95-B22	4940-01-209-8825	-----

Section IV. REMARKS

REFERENCE CODE	REMARKS
----------------	---------

None

## APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST

---

## Section I. INTRODUCTION

## C-1. SCOPE.

This appendix lists components of end item and basic issue items for the contact maintenance vehicle to help you inventory items required for safe and efficient operation.

## C-2. GENERAL.

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

a. **Section II. Components of End Item.** This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. **Section III. Basic Issue Items.** These are minimum essential items required to place the contact maintenance vehicle in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the contact maintenance vehicle during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

## C-3. EXPLANATION OF COLUMNS.

The following provides an explanation of columns found in the tabular listing:

a. **Column (1) - Illustration Number (Illus Number).** This column indicates the number of the illustration which the item is shown.

b. **Column (2) - National Stock Number.** Indicates the national stock number assigned to the item and will be used for requisitioning purposes.

c. **Column (3) - Description.** Indicates the Federal item and name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

**C-3. EXPLANATION OF COLUMNS (CONT).**

d. **Column (4) - Unit of Measure (U/M).** Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea., in., pr).

e. **Column (5) - Quantity required (Qty rqr).** Indicate the quantity of the item authorized to be used with/on the equipment.

**Section II. COMPONENTS OF END ITEM**

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	(4) Usable on Code	(5) Qty rqr
Not applicable.				



## Section III. BASIC ISSUE ITEMS

(1) Illus Number	(2) National Stock Number	(3) Description Usable on FSCM and Part Number Code	(4) U/M	(5) Qty rqr
		TM 9-4940-562-13 Operator's, Unit, and Direct Support Maintenance Manual for Shop Equipment, Contact Maintenance, Truck Mounted Type I (NSN 2320-01-209-8823) (EIC: 2MA) Type II (NSN 4940-209-01-8824) (EIC: 2MB) Type III (NSN 4940-209-01-8825) (EIC: 2MC) EOD (NSN 4940-01-359-5085) TM 9-4940-562-23P Unit and Direct Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts) for Shop Equipment, Contact Maintenance, Truck Mounted 4940-01-209-8823 (Type I) SIG (EIC: 2MA) 4940-01-209-8824 (Type II) ENG (EIC: 2MB) 4940-01-209-8825 (Type III) ORD (EIC: 2MC) 4940-01-359-5085 (EOD)		



## APPENDIX D

EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

---

## Section I. INTRODUCTION

**D-1. SCOPE.**

This appendix lists expendable supplies and materials you will need to operate and maintain the contact maintenance vehicle. These items are authorized to you by CTA 50-970, Expendable/Durable Items (except Medical, Class V, Repair Parts and Heraldic Items), or CTA 8-100, Army Medical Department Expendable, Durable items.

**D-2. EXPLANATION OF COLUMNS.**

a. **Column 1 - Item Number.** This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use sealing compound, Item 6, Appendix D").

b. **Column 2 - Category.** This column identified the lowest category of maintenance that required the listed item:

- C - Operator/Crew
- O - Unit Maintenance

c. **Column 3 - National Stock Number.** This is the national stock number assigned to the item; use it to request or requisition the items.

d. **Column 4 - Description.** Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. **Column 5 - Unit of Measure (U/M).** Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea., in., pr). If the unit of measure differs from the rest of the issue, requisition the least unit of issue that will satisfy your requirements.

Section II. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4)	(5) U/M
1	C	8040-00-865-8991	ADHESIVE (01139) RTV103	CA
2	C	7520-00-223-8000	BRUSH, STENCIL (81348) H-B-00621	EA
3	C	5350-00-584-4654	CLOTH, ABRASIVE (58536) A-A-1049	PG
4	C	8305-00-205-3558	CLOTH, CHEESECLOTH (81348) DDD-C-301	LB
5	C	9150-00-935-1017	GREASE: AUTOMOTIVE AND ARTILLERY, 14 OUNCE CARTRIDGE (81349) MIL-G-10924	OZ
6	C	9150-00-257-5358	GREASE, SILICONE (81349) MILL-15719	OZ
7	C	9150-00-698-2382	HYDRAULIC FLUID, AUTOMATIC TRANSMISSION (24617) DEXRON II	PT
8	C	9150-00-189-6727	OIL, LUBRICATING: SAE 10W (81349) MIL-L-2104	QT
9	C	9150-00-765-0462	OIL, LUBRICATING: SAE 20W (29700) ESS020W	QT
10	C	9150-00-111-0209	OIL, LUBRICATING: SAE 30W (81349) MIL-L-21260	QT
11	C	5030-00-598-5537	PAPER, ABRASIVE (58536) A-A-1202	EA
12	C	8010-01-141-2419	POLYURETHANE COATING (BLACK NO. 383) (37030) MIL-C-53072	KT

<b>(1) ITEM NUMBER</b>	<b>(2) LEVEL</b>	<b>(3) NATIONAL STOCK NUMBER</b>	<b>(4) DESCRIPTION</b>	<b>(5) U/M</b>
13	C	8010-01-160-6744	POLYURETHANE COATING (BROWN NO. 383) (30051) MIL-C-53072	KT
14	C	8010-01-160-6441	POLYURETHANE COATING (GREEN NO. 383) (34094) MIL-C-53072	KT
15	C	8010-00-171-1518	PRIMER COATING (81349) MIL-P-11414	PT
16	C	7920-00-205-1711	RAG, WIPING (58536) A-A-2522	LB
17	C	8520-00-228-0598	SOAP, TOILET (81348) P-S-624	GL
18	C	6850-00-281-1985	SOLVENT, DRYCLEANING (81346) ASTM D 235 TY1	GL
19	C	8030-00-889-3535	TAPE, ANTISEIZING (81349) MIL-T-27730	RL
20	C	5970-00-636-2549	TAPE, INSULATION, ELECTRICAL (81349) MIL-I-15126	RO
21	C	5975-00-984-6502	STRAP, TIEDOWN (96906) MS 3367-1-0	EA



## APPENDIX E

### ILLUSTRATED LIST OF MANUFACTURED ITEMS

---

**E-1. GENERAL.** This appendix includes complete instructions for making items authorized to be manufactured or fabricated at direct support maintenance.

**E-2.** A part number index in alphanumeric order is provided at table E-1 for cross-referencing the part number of the item to be manufactured to the figure which covers fabrication criteria.

**E-3.** All bulk materials needed for manufacture of an item are listed by part number or specification number in table E-2.

**E-4.** The governor system wiring harness and wire runs and their components are listed in tables E-3 thru E-6.

**E-5.** The curbside and streetside DC cable assembly wire runs are listed in tables E-7 and E-8, respectively.

**E-6.** The AC cable assembly wire runs are listed in tables E-9, E-10, and E-11.

**E-7.** The control panel cable assemblies and their components are listed in tables E-12 and E-13.

Table E-1. Part Number Index

No.	CAGEC	Part Number	NSN	Description
1	96906	MS25036-106	5940-00-283-5280	Terminal, Lug
2	59730	RB-257	5940-00-926-0085	Terminal, Quick Disconnect
3	59730	RB-1253	5940-01-107-9491	Terminal, Quick Disconnect
4	81349	M7928/5-4	5940-01-079-1375	Connector, Electrical
5	96906	MS25036-153	5940-00-143-4774	Terminal, Lug
6	96906	MS27142-2	5935-00-462-6603	Connector, Plug, Electrical
7	96906	MS27144-2	5935-00-115-2307	Connector, Plug, Electrical
8	83330	1564	5940-00-644-7948	Terminal, Quick Disconnect
9	06090	401A212-3	5970-01-003-7640	Insulation Sleeving
10	96906	MS27144-1	5935-00-167-7775	Connector, Plug, Electrical
11	06090	301A212-3	5970-00-113-5840	Insulation, Sleeving
12	96906	MS25036-112	5940-00-143-4794	Terminal, Lug
13	59730	RC1123	5940-00-118-2239	Terminal, Lug
14	96906	MS25036-156	5940-00-143-4775	Terminal, Lug
15	92219	T-2016	5940-00-043-3110	Terminal, Lug
16	96906	MS25036-115	5940-00-143-5284	Terminal, Lug
17	96906	MS25036-157	5940-00-143-4777	Terminal, Lug
18	81349	M7928/3-3	5940-01-079-1375	Splice, Connector
19	24446	SP6124	5975-00-152-1147	Connector, Straight
20	19204	13217E0942-1	5940-01-124-5126	Splice, Cap, Crimp
21	19204	13217E0943-1	5940-00-871-8799	Insulator, Splice

Table E-2. Bulk Materials List

No.	CAGEC	Part Number	NSN	Description
1	81349	M5086/2-14-9	6145-00-578-6604	Wire, Electrical: 14 GA, 600V, 105 C
2	81349	M5086/2-12-9	6145-00-578-7514	Wire, Electrical: 12 GA, 600V, 105 C
3	81349	M5086/2-10-9	6145-00-578-7513	Wire, Electrical: 10 GA, 600V, 105 C
4	81349	M5086/2-8-9	6145-00-284-0657	Wire, Electrical: 8 GA, 600V, 105 C
5	81349	M27506-16TE2T14	6145-01-213-5495	Wire, Electrical
6	81348	J-C-30THHN/ THWNCG1/4TPJO	6145-01-019-0773	Wire, Electrical: 4 AWG, 600V, 90 C
7	81348	HHT791	5975-00-285-0907	Conduit,, Nonmetallic, Flexible: ID. .375 IN NOM, OD, .505 IN. Min and .525 IN. Max, Length 3,000 IN NOM
8	81349	M13486-1-5	6145-00-152-6499	Wire, Electrical 14 AWG, 30V



**Table E-2. Bulk Materials List (CONT')**

<b>No.</b>	<b>CAGEC</b>	<b>Part Number</b>	<b>NSN</b>	<b>Description</b>
9	81349	M5086/1-10-0	6145-01-323-1541	Wire, Electrical: 16 AWG, 600V, 105 C
10	81349	M5086/1-12-0	6145-00-044-3579	Wire, Electrical: 12 AWG, 600V, 105 C
11	81349	WWC566	5975-00-878-5153	Conduit, Metal, Flexible: Trade Size .500 IN.
12	96906	MS3367-1-0	5975-00-984-6582	Strap, Tiedown, Electrical Components: Nylon, 7.310 IN. LG, 0.184 IN. W, Green
13	81349	M3436/1-10	9905-00-818-8373	Band, Marker: 1.250 IN. LG, .010 IN. THK, Aluminum, White and Red
14	01881	3-4SEALTITE	5975-00-878-5154	Conduit, Metal, Flexible: ID 0.812 IN. NOM. OD 1.105 IN. NOM
15	70510	UASEALTITE1IN	5975-00-956-6105	Conduit, Metal, Flexible: ID 1.053 IN. NOM, OD 1.303 IN. NOM
16	81348	WW-C-566	5975-01-197-9049	Conduit, Metal, Flexible, Trade Size 0.750 IN. NOM

**Table E-3. Governor System Wiring Harness, P/N 11023746, Wire Run**

<b>Wire No.</b>	<b>From</b>	<b>Pin</b>	<b>P/N</b>	<b>To</b>	<b>Pin</b>	<b>Pin</b>	<b>Wire Length (In.)</b>	<b>Wire No. *</b>
9	GC1	4	2	GA1		1	174.5	1
10	GC1	5	3	GA1		1	174.5	1
11	RG1	4	3	S1	1	5	177.5	1
12	OS1	M	3	S1	2	5	182.5	1
14	GC1	2	3	GRD		1	111.0	1
15	R1	6	3	S1	3	5	183.5	1
16	R1	7	3	S4	NO	1	176.0	1
17	R1	2	3	L1	+	4	177.5	1
20	R1	3	3	S2	C	1	139.0	1
21	S4	C	1	L1	-	4	39.5	1
22	F1	+	4	S2	NO	1	127.0	1
23	S4	C	1	S3		2	77.0	1
24	S2	C	1	E1		4	70.0	1
25	S2	NO	1	E2		4	70.0	1
SC-WHITE	GC1	10	3	MS1	-	6	116.0	5
SC-RED	GC1	11	3	MS1	+	7	116.0	5

\* See table E-1 for parts list. See table E-2 for bulk materials list.

**Table E-4. Components Reference List**

<b>Ref Des</b>	<b>Part Number</b>	<b>Description</b>
GC1	DYN1-10652-000-0-12	Governor Controller
GA1	DYNC11024-000-0-12	Governor Actuator
RG1	DYN2-90007	Generator, Engine AC
S1	MS24523-23	Switch, Governor Circuit
OS1	ESSC-IM 540 HERTZ	Relay, Overspeed
R1	KRP5DG12VDC	Relay, Governor Control
<b>S4</b>	BZ2RQ1824-A2	Switch, Drive Indicator
L1	<b>LH77/3</b>	Light, Indicator
S2	BZ2RW8299-A2	Switch, Transfer Case Neutral
F1	<b>HRJ</b>	Fuseholder, In-Line
S3	30M13004	Switch, PTO Indicator
E1	13217E0942-1*	Splice, Cap, Crimp
E2	31217E0942-1*	Splice, Cap, Crimp
MS1	31M3030S	Sensor, Magnetic

\* Item shall fit and be retained by insulator, splice, P/N 13217E0943-1

**Table E-5. Electronic Governor System Wire Runs**

<b>Wire No.</b>	<b>From</b>	<b>Pin</b>	<b>No. *</b>	<b>To</b>	<b>Pin</b>	<b>No. *</b>	<b>Wire Length</b>	<b>Wire No. *</b>
<b>1</b>	GC1	<b>1</b>	<b>8</b>	RG1	<b>1</b>	<b>8</b>	8.3	<b>1</b>
<b>2</b>	<b>GC1</b>	<b>6</b>	<b>8</b>	RG1	<b>2</b>	<b>8</b>	10.0	<b>1</b>
<b>3</b>	GC1	<b>8</b>	<b>8</b>	RG1	<b>3</b>	<b>8</b>	10.3	<b>1</b>
<b>4</b>	<b>OS1</b>	<b>H</b>	<b>8</b>	RG1	<b>4</b>	<b>8</b>	10.5	<b>1</b>
<b>5</b>	GC1	<b>2</b>	<b>8</b>	RG1	<b>5</b>	<b>8</b>	<b>8.5</b>	<b>1</b>
<b>6</b>	GC1	<b>1</b>	<b>8</b>	<b>OS1</b>	<b>J</b>	<b>8</b>	18.5	<b>1</b>
<b>7</b>	GC1	<b>2</b>	<b>8</b>	OS1	<b>L</b>	<b>8</b>	16.5	<b>1</b>
<b>8</b>	GC1	<b>11</b>	<b>8</b>	OS1	<b>A</b>	<b>8</b>	18.0	<b>1</b>
<b>13</b>	OS1	<b>K</b>	<b>8</b>	OS1	<b>M</b>	<b>8</b>	4.0	<b>1</b>
<b>18</b>	R1	<b>2</b>	<b>8</b>	R1	<b>1</b>	<b>8</b>	4.0	<b>1</b>
<b>19</b>	R1	<b>1</b>	<b>8</b>	F1		<b>4</b>	3.0	<b>1</b>

\* See table E-1 for parts list. See table E-2 for bulk materials list.

**Table E-6. Components Reference List**

<b>Ref Des</b>	<b>Part Number</b>	<b>Description</b>
GC1 RG1 <b>OS1</b> R1 F1	DYN1-10652-000-0-12 DYN2-90007 ESSC-1M 540 HERTZ KRP5DG12VDC <b>HRJ</b>	Governor Controller Generator, Engine AC Relay, Overspeed Relay, Governor Control Fuseholder, In-Line

**Table E-7. Curbside DC Cable Assembly, P/N 13217E83113, Wire Run List**

<b>Wire No.</b>	<b>From No. *</b>	<b>To No. *</b>	<b>Wire Length (In.)*</b>	<b>Wire No. *</b>	<b>Nonmetallic Conduit No.*</b>	<b>Conduit Length (In.)</b>
13217E8313-3	10	9	3.00	8	7	35.00
13217E8313-4	<b>10</b>	<b>9</b>	5.00	<b>8</b>		
13217E8313-4	10	9	5.00	8		
13217E8313-4	10	9	5.00	8		
13217E8313-4	10	11	5.00	8		
13217E8313-5	9	11	35.00	<b>8</b>		
13217E8313-6	6	11	48.00	8		
13217E8313-7	<b>9</b>	9	51.00	8		
13217E8313-8	10	9	87.00	8		

\* See table E-1 for parts list. See table E-2 for bulk materials list.

Use band marker item #13 from table E-2 and locate 1.00 inch from each connector.

**Table E-8. Streetside DC Cable Assembly, P/N 13218E8314, Wire Run List**

<b>Wire No.</b>	<b>From No. *</b>	<b>To No. *</b>	<b>Wire Length (In.)</b>	<b>Wire No. *</b>	<b>Nonmetallic Conduit No.*</b>	<b>Conduit Length (In.)</b>
13217E8314-1	<b>6</b>	11	48.00	8	7	35.00
13217E8314-3	10	9	5.00	8		
13217E8314-3	<b>10</b>	9	5.00	8		
13217E8314-3	10	9	5.00	8		
13217E8314-3	10	11	5.00	8		
13217E8314-3	10	11	5.00	8		
13217E8314-3	10	11	5.00	8		
13217E8314-3	10	11	5.00	8		
13217E8314-4	11	11	85.00	8		
13217E8314-5	11	11	38.00	<b>8</b>		
13217E8314-6	9	11	55.00	8		

\* See table E-1 for parts list. See table E-2 for bulk materials list.

Use band marker item #13 from table E-2 and locate 1.00 inch from each connector.

**Table E-9. AC Cable Assembly, PIN 13217E8331, Wire Run List**

<b>Wire P/N</b>	<b>From No. *</b>	<b>To No.</b>	<b>Wire Length (In.)</b>	<b>Wire No. *</b>	<b>Nonmetallic Conduit No.***</b>	<b>Conduit Length (In.)</b>
13217E8331-1	13	**	59.00	9	11	51.00
13217E8331-1	13	**	59.00	9	11	51.00
13217E8331-1	13	**	59.00	9	11	51.00

\*See table E-1 for parts list. See table E-2 for bulk materials list.

\*\*End of wire to be stripped 3/4 inch and tinned to prevent wire strands from fraying

\*\*\*See table E-1 for parts list. Three wires are in conduit.

**Table E-10. AC Cable Assembly, P/N 11020942, Wire Run List**

<b>Wire P/N</b>	<b>From No. *</b>	<b>To No.</b>	<b>Wire Length (In.)</b>	<b>Wire No. *</b>	<b>Nonmetallic Conduit No.***</b>	<b>Conduit Length (In.)</b>
11020942-1	16	**	73.00	9	16	53.00
11020942-2	16	**	74.00	9	16	53.00
11020942-3	16	**	77.00	9	16	53.00
11020942-4	16	**	78.00	10	16	53.00
11020942-4	16	**	78.00	10	16	53.00
11020942-4	16	**	78.00	10	16	53.00

\*See table E-1 for parts list. See table E-2 for bulk materials list.

\*\*End of wire to be stripped 3/4 inch and tinned to prevent wire strands from fraying

\*\*\*See table E-1 for parts list. Six wires are in conduit.

**Table E-11. AC Cable Assembly, P/N 11023729, Wire Run List**

<b>Wire No.</b>	<b>From*</b>	<b>To*</b>	<b>Wire Length (In.)</b>	<b>Wire No. **</b>	<b>Nonmetallic Conduit No.***</b>	<b>Conduit Length (In.)</b>
10	L1 (Alternator)	T131-12	70.00	4	15	40.00
11	L2 (Alternator)	TB1-13	70.00	4	15	40.00
12	L3 (Alternator)	TB1-14	70.00	4	15	40.00
13	LO (Alternator)	TB1-15	70.00	4	15	40.00
14	GND (Alternator)	TB2-1	70.00	4	15	40.00

\*End of wire to be stripped 3/4 inch and tinned to prevent wire strands horn fraying

\*\*See table E-1 for parts list. See table E-2 for bulk materials list.

\*\*\*See table E-1 for parts list. Five wire runs are in conduit.

Table E-12. Control Panel Cable Assemblies Wire Run List

Wire No.	From	Pin	Item No. *	To	Pin	Item No. *	Wire Length (In.)	Wire No. *
9	TB1	15	16	TB1	16	16	4.00	4
10	TB1	17	16	TB1	18	16	4.00	4
11	TB1	19	16	TB1	20	16	4.00	4
12	TB1	21	16	TB1	22	16	4.00	4
14	TB1	15	12	S1	N	**	17.00	2
15	TB2	11	12	TB2	12	12	4.00	3
16	TB2	12	12	TB2	13	12	4.00	3
17	TB2	19	12	S1	COIL	**	16.00	2
20	TB2	18	12	S1	1	**	16.00	2
21	TB2	3	17	GRD STUD		17	33.00	3
22	TB1	6	12	TT1	2	12	33.50	2
23	TB1	4	12	TT1	1	12	33.50	2
24	CB2	C	12	S1	3	**	41.00	2
25	CB1	1	8	TB1	1	16	45.00	4
26	CB1	2	16	TB1	2	16	45.00	4
27	CB1	3	16	TB1	3	16	45.00	4
28	CB1	C	16	TB1	7	16	55.50	4
29	CB1	B	16	TB1	8	16	55.50	4
30	CB1	A	16	TB1	10	16	55.50	4
31	CB2	1	12	TB1	11	12	44.00	2
32	CB2	2	12	TB1	9	12	40.00	2
33	CB2	3	12	TB1	6	12	37.50	2
34	CB3	2	12	TB1	8	12	44.00	2
35	CB3	1	12	TB1	10	12	44.00	2
36	CB3	A	12	J7	1	**	4.00	2
37	CB3	B	12	J7	2	**	4.00	2
38	CB4	1	12	TB1	16	12	37.50	2
39	CB4	2	12	TB1	17	12	18.00	2
40	CB4	A	12	J1	1	**	3.00	2
41	CB4	B	12	J1	2	**	3.00	2
42	CB5	2	12	TB1	5	12	48.00	2
43	CB5	1	12	TB1	11	12	50.50	2
44	CB5	A	12	J2	1	**	3.00	2
45	CB5	B	12	J2	2	**	3.00	2
46	CB6	2	12	TB1	5	12	48.50	2
47	CB6	1	12	TB1	9	12	50.50	2
48	CB6	A	12	J3	1	**	3.00	2
49	CB6	B	12	J3	2	**	3.00	2
50	TT1	1	12	F1	1	**	10.00	2
51	TT1	2	12	F1	2	**	10.00	2
52	TB2	11	14	J1	GRD	15	28.50	2
53	TB2	2	14	J2	GRD	15	33.00	2
54	TB2	1	14	J3	GRD	15	28.00	2
55	TB2	2	14	J7	GRD	12	33.00	2
56	TB1	18	16	J8	1	**	37.00	4

Table E-12. Control Panel Cable Assemblies Wire Run List (CONT)

Wire No.	From	Pin	Item No. *	To	Pin	Item No. *	Wire Length (In.)	Wire No. *
57	TB1	20	16	J8	<b>2</b>	**	37.00	4
58	TB1	22	16	J8	<b>3</b>	**	34.50	4
59	TB2	13	12	J8	GRD	**	23.50	3
60	TB2	14	12	S1	C	**	14.50	2
61	TB2	15	12	S1	B	**	12.50	2
62	TB2	16	12	S1	A	**	11.00	2
63	CB2	A	12	S1	1	**	41.00	2
64	CB2	B	12	S1	2	**	41.00	2

\* See table E-1 for parts list. See table E-2 for bulk materials list.

\*\* End of wire to be stripped 3/4 inch and tinned to prevent strands from fraying.

Table E-13. Components Reference List

Ref Des	Part Number	Description
CB1	AM3A3A45-3	Circuit Breaker 3 Pole, 60 Hz, 45 Amp
CB2	M55629/5-080	Circuit Breaker 3 Pole, 60 Hz, 10 Amp
CB3	M55629/3-094	Circuit Breaker 2 Pole, 60 Hz, 10 Amp
CB4	M55629/3-094	Circuit Breaker 2 Pole, 60 Hz, 10 Amp
CB5	M55629/3-094	Circuit Breaker 2 Pole, 60 Hz, 10 Amp
CB6	M55629/3-094	Circuit Breaker 2 Pole, 60 Hz, 10 Amp
F1	34FHXX	Meter, Electrical Frequency 56-64 CPS, 9 Reeds, 1 CPS between reeds
J1	WC596/12-4	Connctor, Receptacle: Straight Shape Duplex, 125 V AC, 15 Amp
J2	WC596/12-4	Connector, Receptacle: Straight Shape Duplex, 125 V AC, 15 Amp
J3	WC596/12-4	Connector, Receptacle: Straight Shape Duplex, 125 V AC, 15 Amp
J7	WC596/12-4	Connector, Receptacle: Straight Shape Duplex, 125 V AC, 15 Amp
J8	8450	Connector, Receptacle: Single, 50 Am s, 250 V AC
S1	C10BN30A	Contractor, Magnetic Contacts Rated @ 600 V, 18 Amp, 60 Hz, Coil Voltage 115 V AC, 60 Hz
TB1	603-11-SS	Terminal Board: 1100 V, 30 Amp
TB2	39TB10F	Terminal Board: 60 V, 50 Amp
TT1	M3971/2-5	Meter, Time Totalizing Hour Measurement, 120 V AC, 60 Hz

## APPENDIX F

### ON-VEHICLE EQUIPMENT LOADING PLAN

---

#### F-1. INTRODUCTION.

a. **General.** Depending on the particular vehicle configuration, the compartments of the body on the contact maintenance vehicle (fig. F-1) may be loaded with various pieces of equipment for the performance of its mission. This appendix provides a listing of the equipment for the Type II (Engineer) and Type III (Ordnance) vehicle configurations and the exact location of each piece of equipment on-board the vehicle.

b. **Shop Type.** There are four types of contact maintenance vehicle shop sets: Type I, Type II, and Type III, and Explosive Ordnance Disposal (EOD). The Type I shop is empty of any tools and equipment when issued to Signal units. The Type II shop set (Engineer) equipment and location is shown in table F-1. The Type III shop set (Ordnance) equipment and location is shown in table F-2. The EOD shop set is empty of tools and equipment when it is issued to field EOD units. The compartment number column in tables F-1 and F-2 refer to those locations shown in figure F-1.

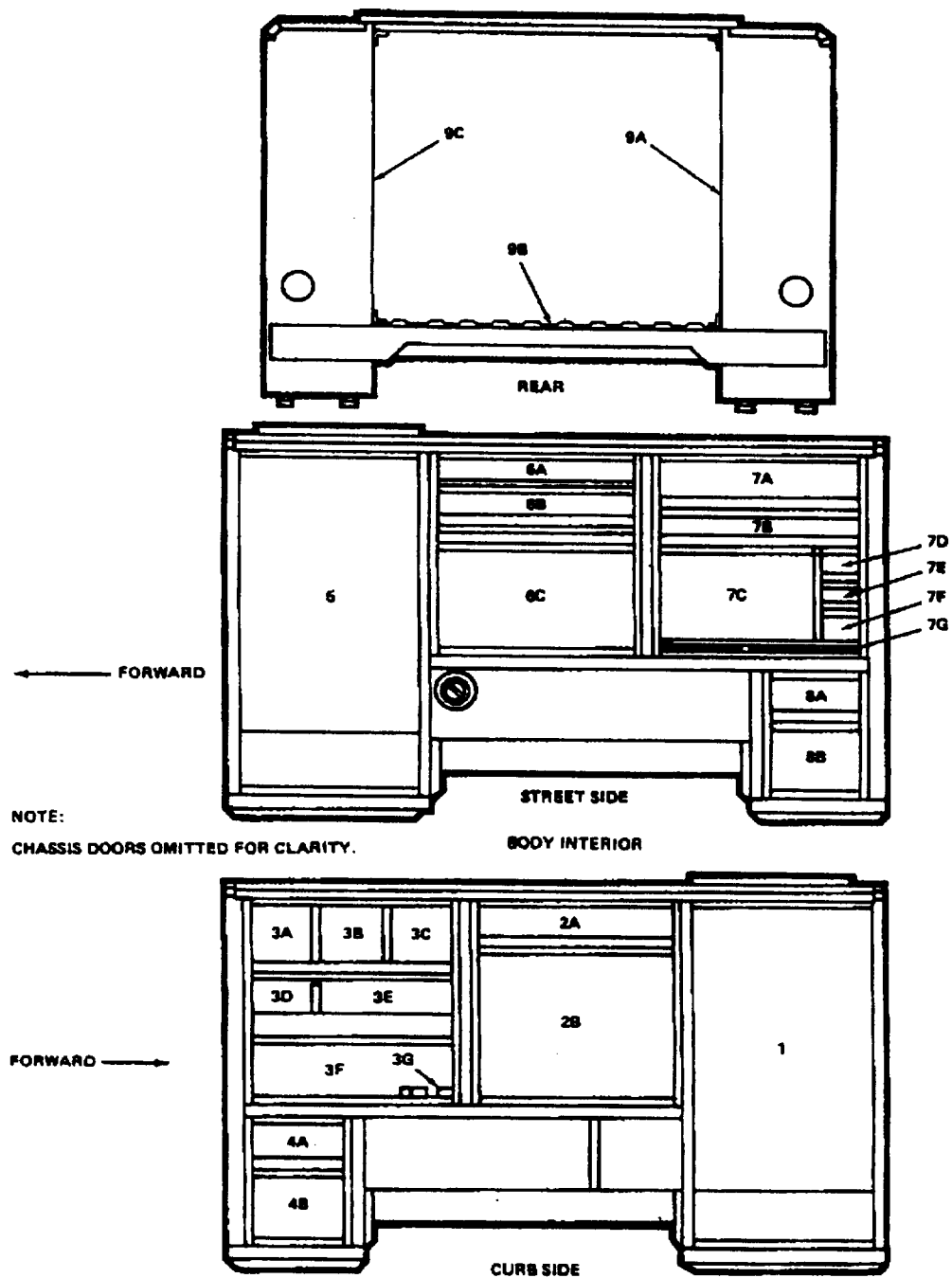


Figure F-1. Shop Equipment Compartment Identification and Location.



Table F-1. Type II Shop Set Component Items and Location

NSN	NOMENCLATURE	COMPART- MENT NO. (SEE FIG. F-1)	QTY
5130-00-293-2330	Adapter, Spindle, Portable Sander	2B	1
8040-00-142-9193	Adhesive	7E	1
5120-00-596-1034	Adjusting Tool, Brake Shoe	9B	1
8415-00-250-2531	Apron, Welder's	8A	1
*5120-00-224-1389	Bar Pry	--	1
5120-01-008-3632	Bar, Torque Wrench	2B	1
6140-00-808-7325	Battery, Filler, Syringe	8A	1
4910-00-733-9341	Bead Breaker, Pneumatic Tire	9A	1
5120-00-293-0019	Bender Set, Tube, Hand	9B	1
5110-00-277-4591	Blade, Hand Hacksaw	9B	1
*5110-00-277-4587	Blade, Hand Hacksaw	--	10
**5140-00-473-6260	Box, Tool, Portable	--	1
*7920-00-291-5815	Brush, Wire, Scratch	--	1
2590-00-148-7961	Cable Kit, Special Purpose	2A	1
6150-00-198-4688	Cable Assembly, Power, Electrical	2A	1
2920-01-027-0125	Cable Assembly	2B	1
6150-00-682-3460	Cable Assembly, Power Electrical	2A	1
5180-00-000-0157	Chart, Metric Conversion	9B	1
*5110-00-554-7345	Chisel, Cape, Hand	--	1
*5110-00-186-7107	Chisel, Cold, Hand	--	1
*5110-00-236-3272	Chisel, Cold, Hand	--	1
*5110-00-293-0556	Chisel, Rivet Buster, Hand	--	1
5120-00-180-0909	Clamp, C	3E	2
5120-00-840-3358	Clamp, C	3E	2
5999-00-913-0883	Clamp, Electrical	9B	1
4730-00-826-4268	Clamp, Hose	9B	5
4730-00-908-3194	Clamp, Hose	9B	5
4730-00-908-3193	Clamp, Hose	9B	4
4730-00-909-8627	Clamp, Hose	9B	3
4730-00-908-6282	Clamp, Hose	9B	3
5120-00-494-1895	Clamp, Plier	9B	2
**3439-00-383-3634	Cleaner Set, Welding and Cutting Tips	--	1
**3439-00-403-0970	Cleaner Set, Welding and Cutting Tips	--	1
5350-00-192-5047	Cloth, Abrasive	3C	1
5350-00-192-5050	Cloth, Abrasive	3C	1
5935-01-005-3579	Connector, Plug, Electrical	9B	2
4910-00-138-1819	Constrictor, Bead Expanding, Pneumatic Tire	9B	1
5330-00-291-1685	Cork Sheet	3D	2
5315-00-753-3981	Cotter Pin Assortment	2B	1
7510-00-223-6708	Crayon, Marking	7B	1
5120-00-240-6040	Crowbar	9B	1
5180-00-596-1038	Cutter and Flaring Tool Kit, Tube, Hand	7E	1
* Part of SC 5180-90-NO5			
**Part of SC 3433-90-NO1			

Table F-1. Type II Shop Set Component Items and Location (Cont.)

NSN	NOMENCLATURE	COMPART- MENT NO. (SEE FIG. F-1)	QTY
8120-00-663-3019	Cylinder, Compressed Gas	1	1
8120-00-282-8077	Cylinder, Compressed Gas	1	1
8120-00-866-0206	Cylinder, Compressed Gas	1	1
5136-00-357-7508	Die and Tap Set, Thread Cutting	2B	1
5130-00-293-1849	Drill, Electric	2B	1
5133-01-247-4746	Drill Set, Twist	7D	1
4720-00-223-7381	Duplex Hose, Rubber	1	1
**4720-00-034-2560	Duplex Hose, Rubber	--	1
**4720-01-043-4099	Duplex Hose, Rubber	--	1
3439-00-892-4383	Electrode, Welding	9A	5
3439-01-191-5017	Electrode, Welding	9A	5
3439-01-803-9496	Electrode, Welding	9A	5
4210-00-889-2221	Extinguisher, Fire Dry Chemical	9C	1
*5120-00-305-2275	Extinguisher Set, Screw	6C	1
*5120-00-610-1888	Extinguisher Set, Screw	--	1
*5110-00-234-6534	File, Hand	--	1
*5110-00-211-9151	File, Hand	--	1
*5110-00-234-6555	File, Hand	--	1
*5110-00-234-6550	File, Hand	--	1
*5110-00-234-6553	File, Hand	--	1
*5110-00-595-8295	File, Hand	--	1
4910-00-273-3658	Filler Bleeder	9B	1
*5120-00-629-6258	Finger, Mechanical	--	1
6545-00-922-1200	First Aid Kit, General Purpose	3B	1
4730-00-470-6625	Fitting Kit, Tube-Pipe	9B	1
**5120-00-965-0603	Flint Tip Friction Igniter, Sleeve Type	--	1
6230-00-815-5022	Floodlight, Electric	9C	2
3439-00-255-4566	Flux, Soldering	7G	1
3439-00-255-4576	Flux, Welding	7F	1
*5110-00-289-9657	Frame, Hand Hacksaw	--	1
7240-00-527-9868	Funnel	8B	1
7240-00-559-7364	Funnel	8B	1
*5210-00-278-1248	Gage, Gap Setting	--	1
*5210-00-221-1999	Gage, Thickness	--	1
**8415-00-268-7859	Gloves, Leather	--	1
**4240-00-816-3819	Goggles, Industrial	--	2
4240-00-052-3776	Goggles, Industrial	3B	2
* Part of SC 5180-90-NO5 **Part of SC 3433-90-NO1			

Table F-1. Type II Shop Set Component Items and Location (Cont.)

NSN	NOMENCLATURE	COMPART- MENT NO. (SEE FIG. F-1)	QTY
4930-00-222-2680	Gun, Fluid, Direct Delivery	4A	1
**5120-00-240-3096	Hammer-Brush, Welders	--	1
5120-00-900-6098	Hammer, Hand	9A	1
5120-00-900-6111	Hammer, Hand	9B	1
5120-01-097-4520	Hammer, Hand	9A	1
*5120-00-061-8543	Hammer, Hand	--	1
*5120-00-061-8546	Hammer, Hand	--	1
*5120-01-071-5356	Hammer, Hand	--	1
*5120-01-065-9037	Hammer, Hand	--	1
5120-01-013-1676	Hammer, Slide	9B	1
*5110-00-263-0349	Handle, File	--	1
5120-00-240-5364	Handle, Socket Wrench	7D	1
5120-00-230-6385	Handle, Socket Wrench	7D	1
5120-00-541-8444	Handle, Socket Wrench	7D	1
5120-00-221-7960	Handle, Socket Wrench	7D	1
5120-00-240-5396	Handle, Socket Wrench	7F	1
5120-00-221-7958	Handle, Socket Wrench	7F	1
5120-00-236-7590	Handle, Socket Wrench	7F	1
4140-00-540-0623	Helmet, Welders	3A	1
3950-00-235-4237	Hoist, Chain	9B	1
3439-00-238-1638	Holder, Electrode, Welding	9B	1
5985-01-317-5127	Hole Cutter	2B	1
4720-00-449-6632	Hole Assembly, Nonmetallic	9A	1
4720-00-278-4887	Hose, Nonmetallic	6A	25
4910-00-204-2644	Inflator Gage, Pneumatic Tire	8A	1
**5120-00-965-0326	Igniter, Friction	--	1
5340-01-008-6652	Insert and Tool Assortment	2B	2
5120-00-224-7330	Jack, Hydraulic, Hand	8B	1
*5120-00-935-4641	Key Set, Socket Head Screw	--	1
5120-01-046-5079	Key Set, Socket Head Screw	9B	1
*5110-00-240-5943	Knife, Pocket	--	1
*5120-00-221-1536	Knife, Putty	--	1
5940-00-525-0907	Kit, Quick Splice	7B	1
6240-00-222-0276	Lamp, Incandescent	3F	2
6240-00-155-8634	Lamp, Incandescent	3F	4
6240-00-155-8651	Lamp, Incandescent	3F	2
6240-00-553-1881	Lamp, Incandescent	3C	4
6150-00-665-9799	Lead, Electrical	7A	2
<hr/> * Part of SC 5180-90-NO5 **Part of SC 3433-90-NO1			

Table F-1. Type II Shop Set Component Items and Location (Cont.)

NSN	NOMENCLATURE	COMPART- MENT NO. (SEE FIG. F-1)	QTY
4240-00-262-7099	Lens, Goggles, Industrial		1
	Lens, Helmet, Welders		1
	Lens, Helmet, Welders		6
	Light, Extension		2
	Light, Extension		1
	Lubricating Gun, Hand		1
	Measure, Liquid		1
	Moisture Stabilizer, Welding Electrode		1
	Multimeter		1
	Multiplier, Torque		1
	Nipple, Pipe		1
	Nipple, Pipe		1
	Nipple, Pipe		1
	Nut, Plain, Hexagon		1
	Nut, Plain, Hexagon		1
	Nut, Plain, Hexagon		1
	Nut, Plain, Hexagon		1
	Nut, Plain, Hexagon		1
	Nut, Plain, Hexagon		1
	Nut, Plain, Hexagon		1
	Oiler, Hand		1
	Packing Assortment, Preformed		1
	Padlock Set		2
	Pail, Utility		1
	Paper, Abrasive		1
	Paper, Abrasive		1
	Paper, Gasket		6
	Paper, Gasket		2
	Pliers		1
	Pliers, Brake Repair		1
	Pliers, Diagonal Cutting		1
	Pliers, Lineman's		1
	Pliers, Retaining Rings		1
	Pliers, Set, Retaining		1
	Pliers, Slip Joint		1
	Pliers, Slip Joint		1
<hr/>			
** Part of SC 3433-90-NO1			
**** Installed on shop set doors			

**Table F-1. Type II Shop Set Component Items and Location (Cont.)**

NSN	NOMENCLATURE	COMPART- MENT NO. (SEE FIG. F-1)	QTY
**5120-00-537-3375	Pliers, Slip Joint		1
	Pliers, Slip Joint		1
	Puller, Batter Terminal		1
	Puller, Mechanical		1
	Punch, Aligning		1
	Punch, Center Drive		1
	Punch, Drive Pin		1
	Punch Set, Drive Pin		1
	Repair Kit, Fuel Tank Repair		2
	Repair Kit, Puncture		1
	Repair Kit, Tire		1
	Repair Tool, Pneumatic Tire		1
	Retrieving Tool, Magnetic		1
	Rod, Grounding		1
	Rod, Welding		15
	Rod, Welding		1
	Rod, Welding		10
	Rod, Welding		10
	Rod, Welding		10
	Roll, Tools and Accessories		2
	Rule, Steel, Machinists		1
	Sander, Disk, Electric		1
	Screwdriver, Flat Tip		1
	Screwdriver, Flat Tip		1
	Screwdriver, Flat Tip		1
	Screwdriver, Flat Tip		1
	Screwdriver, Flat Tip		1
	Screwdriver, Offset		1
	Screwdriver, Set		1
	Screw, Machine		1
	Screw, Machine		1
	Screw, Machine		1
	Screw, Machine		1
	Screw, Machine		1
	Screw, Machine		1
	Screw, Machine		1
	Screw, Machine		1
	Screw, Machine		1
	Screw, Machine		1
	Screw, Machine		1

\*\* Part of SC 3433-90-NO1

Table F-1. Type II Shop Set Component Items and Location (Cont.)

NSN	NOMENCLATURE	COMPART- MENT NO. (SEE FIG. F-1)	QTY
5305-00-958-5249	Screw, Machine	***	1
5305-00-958-5450	Screw, Machine	***	1
5305-00-958-5458	Screw, Machine	***	1
5305-00-958-5460	Screw, Machine	***	1
5305-00-958-5462	Screw, Machine	***	1
5305-00-958-5471	Screw, Machine	***	1
5305-00-958-5481	Screw, Machine	***	1
5305-00-958-5482	Screw, Machine	***	1
5305-00-958-5483	Screw, Machine	***	1
5305-00-957-6264	Screw, Machine	***	1
5305-00-957-6265	Screw, Machine	***	1
5305-00-957-6269	Screw, Machine	***	1
5305-00-957-6270	Screw, Machine	***	1
5305-00-957-6640	Screw, Machine	***	1
5305-00-957-6646	Screw, Machine	***	1
5305-00-952-7756	Screw, Machine	***	1
5305-00-088-8358	Screw, Machine	***	1
5305-00-984-6214	Screw, Machine	***	1
5305-00-984-6216	Screw, Machine	***	1
5305-00-984-6218	Screw, Machine	***	1
5305-00-889-3118	Screw, Machine	***	1
5305-00-954-3938	Screw, Machine	***	1
5305-00-889-2999	Screw, Machine	***	1
5305-00-889-3116	Screw, Machine	***	1
5305-00-984-4976	Screw, Machine	***	1
5305-00-889-3000	Screw, Machine	***	1
5305-00-984-4983	Screw, Machine	***	1
5305-00-984-4992	Screw, Machine	***	1
5305-00-984-6221	Screw, Machine	***	1
5305-00-984-6223	Screw, Machine	***	1
5305-00-984-6225	Screw, Machine	***	1
5305-00-984-6193	Screw, Machine	***	1
5305-00-984-6195	Screw, Machine	***	1
5305-00-984-6197	Screw, Machine	***	1
5305-00-984-6199	Screw, Machine	***	1
5305-00-984-6201	Screw, Machine	***	1
5305-00-988-1171	Screw, Machine	***	1
5305-00-988-1728	Screw, Machine	***	1
5305-00-988-1730	Screw, Machine	***	1
5305-00-988-1723	Screw, Machine	***	1
5305-00-988-1725	Screw, Machine	***	1
5305-00-988-1727	Screw, Machine	***	1
5305-00-984-6210	Screw, Machine	***	1
<hr/> * Part of SC 5180-90-NO5 ** Part of SC 3433-90-NO1 *** Stored in available space within the shop set			

Table F-1. Type II Shop Set Component Items and Location (Cont.)

NSN	NOMENCLATURE	COMPART- MENT NO. (SEE FIG. F-1)	QTY
5305-00-984-6212	Screw, Machine	***	1
8030-00-291-1787	Sealing Compound	9B	1
8415-00-164-0513	Sleeve, Welders	8A	1
*5120-00-596-8622	Socket Set, Socket Wrench	--	1
3439-01-074-9983	Solder, Lead Alloy	7F	1
3439-00-184-8960	Solder, Lead Alloy	7F	1
3439-00-618-6623	Soldering Gun	7G	1
4940-01-131-1915	Splicing Kit, O-Ring	2B	1
*5120-00-288-6578	Stud Remover and Setter	--	1
5970-00-419-4291	Tape, Insulation, Electrical	7B	4
5970-00-644-3167	Tape, Insulation, Electrical	7B	2
*5210-00-245-0301	Tape, Measuring	--	1
5340-01-292-9398	Terminal, Special	8A	2
6630-00-105-1418	Tester, Battery, Electrolyte Solution	8A	2
5180-00-422-4975	Threading Set, Screw	6C	1
5180-00-448-2362	Threading Set, Screw	6C	1
5120-00-293-0871	Tire Removing Tool	9A	2
*5140-00-388-3416	Tool Box, Portable	--	1
*5140-00-498-8772	Tool Box, Portable	--	1
3431-00-165-4113	Torch, Outfit, Welding	7A	1
**3433-00-294-6743	Torch Set, Cutting and Welding	--	12
**3433-00-200-1748	Torch Welding	--	1
4920-01-194-9324	Valve, Cylinder, Gas	7C	1
**4820-00-828-7192	Valve, Fire Check	--	1
**4820-00-828-7190	Valve, Fire Check	--	1
4820-01-270-6039	Valve, Fire Check	4B	1
4820-01-270-2166	Valve, Fire Check	4B	1
4820-00-664-6655	Valve, Fire Check	4B	1
**4820-00-551-1094	Valve, Regulating, Fluid	--	1
**4820-00-641-3519	Valve, Regulating, Fluid	--	1
5120-00-223-1951	Vise, Bench and Pipe	9B	1
5310-00-087-0057	Washer, Flat	***	3
5310-00-951-4679	Washer, Flat	***	3
5310-00-983-8483	Washer, Flat	***	2
5310-00-082-1404	Washer, Flat	***	3
5310-00-809-8546	Washer, Flat	***	1
5310-00-823-8804	Washer, Flat	***	3
5310-00-950-1310	Washer, Flat	***	3
5310-00-809-8544	Washer, Flat	***	3
5310-00-809-4058	Washer, Flat	***	3
<hr/> <p>* Part of SC 5180-90-NO5  ** Part of SC 3433-90-NO1  *** Stored in available space within the shop set</p>			

Table F-1. Type II Shop Set Component Items and Location (Cont.)

NSN	NOMENCLATURE	COMPART- MENT NO. (SEE FIG. F-1)	QTY
3431-01-305-7257	Welding Set, Arc	5	1
5130-00-049-7912	Wheel, Abrasive	3G	6
6145-00-643-0956	Wire, Electrical	7G	25
5315-00-271-4251	Woodrott Key Assortment	64	1
5120-00-240-5328	Wrench, Adjustable	9B	2
5120-00-264-3796	Wrench, Adjustable	9B	1
*5120-00-264-3795	Wrench, Adjustable	--	1
*5120-00-449-8083	Wrench, Adjustable	--	1
*5120-00-222-1596	Wrench, Box	--	1
*5120-00-228-9515	Wrench, combination Box and Open End	--	1
*5120-00-228-9516	Wrench, combination Box and Open End	--	1
5130-00-221-0607	Wrench, Impact, Electric	2B	2
*5120-00-187-7123	Wrench, Open End	--	1
*5120-00-277-8310	Wrench, Open End	--	1
*5120-00-277-8312	Wrench, Open End	--	1
*5120-00-277-8314	Wrench, Open End	--	1
*5120-00-277-3414	Wrench, Open End	--	1
*5120-00-473-6538	Wrench, Open End	--	1
*5120-00-277-2327	Wrench, Open End	--	1
5120-00-892-4946	Wrench, Open End, Box	3B	1
5120-00-892-4947	Wrench, Open End, Box	3B	1
5120-01-122-9392	Wrench, Open End, Box	3B	1
*5120-00-494-1911	Wrench, Plier	--	1
*5120-00-277-4244	Wrench, Plier	--	1
*5120-00-277-1485	Wrench, Pipe	--	1
5120-00-277-1477	Wrench, Pipe	9B	1
5120-00-277-1479	Wrench, Pipe	9B	1
5120-00-277-1481	Wrench, Pipe	9A	1
*5120-00-293-3453	Wrench Set, Box	--	1
*5120-00-148-7917	Wrench Set, Box and Open End	--	1
5120-01-119-0010	Wrench Set, Box and Open End	9B	1
5120-01-115-1148	Wrench Set, Open End	9B	1
5120-01-056-0871	Wrench Set, Socket	9B	1
5120-00-148-3706	Wrench Set, Socket	9B	1
5120-01-067-5015	Wrench Set, Socket	9B	1
5120-00-204-1999	Wrench Set, Socket	3F	1
*5120-00-322-6231	Wrench Set, Socket	--	1
*5120-00-081-2305	Wrench Set, Socket	--	1
*5120-00-081-2307	Wrench Set, Socket	--	1
5120-01-116-6047	Wrench Set, Socket	2B	1
<p>* Part of SC 5180-90-NO5</p> <p>** Part of SC 3433-90-NO1</p>			





Table F-2. Type III Shop Set Component Items and Location

NSN	NOMENCLATURE	COMPART- MENT NO. (SEE FIG. F-1)	QTY
8120-00-695-5867	Adapter	2B	1
8415-00-250-2531	Apron, Welders	8A	1
5120-00-293-0019	Bender Set, Tube Hand	3D	1
5110-00-277-4591	Blade, Hand Hacksaw	9B	2
6150-00-198-4688	Cable Assembly, Power, Electrical	7G	3
6150-00-485-6149	Cable Assembly, Power, Electrical	6C	2
6150-00-682-3460	Cable Assembly, Power, Electrical	2B	4
2920-01-027-0125	Cable Assembly	2B	1
2590-00-148-7961	Cable Kit, Special Purpose	2A	1
5120-00-293-1231	Caps, Vise Jaw	9B	1
5120-00-840-3358	Clamp, C	3E	2
4730-00-877-6298	Clamp, Hose	9B	4
4730-00-908-3194	Clamp, Hose	9B	4
4730-00-908-3193	Clamp, Hose	9B	4
4730-00-909-8627	Clamp, Hose	9B	4
4730-00-908-6292	Clamp, Hose	9B	4
4730-00-278-2480	Clamp, Hose	9B	4
5120-00-926-5175	Cleaner, Battery Terminal	2B	1
3439-00-383-3634	Cleaner Set, Welding and Cutting Tips	9B	1
3439-00-262-7556	Cleaner Set, Welding and Cutting Tips	9B	1
5350-00-192-5047	Cloth, Abrasive	3C	1
5350-00-192-5050	Cloth, Abrasive	3C	1
5935-01-005-3579	Connector, Plug, Electrical	9B	2
7510-00-223-6708	Crayon, Marking	7B	1
5120-00-240-6040	Crowbar	9B	1
5120-00-224-1390	Crowbar	9B	1
5120-01-114-4933	Crowfoot Attachment, Socket Wrench	*	1
5120-01-092-3276	Crowfoot Attachment, Socket Wrench	*	1
5120-00-224-7288	Crowfoot Attachment, Socket Wrench	*	1
5120-00-189-7896	Crowfoot Attachment, Socket Wrench	*	1
5120-00-189-7898	Crowfoot Attachment, Socket Wrench	*	1
5120-00-189-7895	Crowfoot Attachment, Socket Wrench	*	1
5120-00-181-6765	Crowfoot Attachment, Socket Wrench	*	1
5120-00-541-4075	Crowfoot Attachment, Socket Wrench	*	1
5120-00-229-2772	Crowfoot Attachment, Socket Wrench	*	1
5120-00-181-6764	Crowfoot Attachment, Socket Wrench	*	1
5120-00-229-2773	Crowfoot Attachment, Socket Wrench	*	1
5120-00-229-2774	Crowfoot Attachment, Socket Wrench	*	1
5120-00-181-6759	Crowfoot Attachment, Socket Wrench	*	1
5120-00-181-6760	Crowfoot Attachment, Socket Wrench	*	1
5120-00-181-6757	Crowfoot Attachment, Socket Wrench	*	1
5120-00-181-6758	Crowfoot Attachment, Socket Wrench	*	1
5120-00-181-6755	Crowfoot Attachment, Socket Wrench	*	1
5110-00-224-7055	Cutter, Bolt	9A	1

\* Stored in available space within the shop set.

Table F-2. Type III Shop Set Component Items and Location (Cont).

NSN	NOMENCLATURE	COMPART- MENT NO. (SEE FIG. F-1)	QTY
5110-00-224-7057	Cutter, Bolt	**	1
5180-00-596-1038	Cutter and Flaring Tool Kit	7E	1
8120-00-663-3019	Cylinder, Compressed Gas	1	1
8120-00-966-0206	Cylinder, Compressed Gas	1	1
5130-00-807-3009	Drill, Electric, Portable	2B	1
5130-00-293-1849	Drill, Electric, Portable	2B	1
5133-00-293-0983	Drill Set, Twist	7D	1
4720-00-223-7381	Duplex Hose, Rubber	1	1
5120-00-243-1691	Extension, Socket Wrench	*** *	1
5120-00-243-1697	Extension, Socket Wrench	**** *	1
5120-00-243-7326	Extension, Socket Wrench	**** *	1
5120-00-227-8074	Extension, Socket Wrench	**** *	1
5120-00-243-1689	Extension, Socket Wrench	**** *	1
5120-00-227-8107	Extension, Socket Wrench	**** *	1
4210-00-270-4512	Extension, Fire, Carbon Dioxide	9C	1
5110-00-373-1691	File, Thread Restorer	9B	1
5110-01-045-3511	File, Thread Restorer	9B	1
6545-00-922-1200	First Aid Kit, General Purpose	3B	1
5120-01-046-5083	Flaring Tool, Tube	9B	1
5120-00-965-0603	Flint Tip, Friction Igniter	9B	1
6230-00-815-5022	Floodlight, Electric	9C	3
3439-00-255-4566	Flux, Solder	**	1
5110-00-289-9657	Frame, Hand, Hacksaw	9B	1
7240-00-404-9795	Funnel	2B	1
4240-00-052-3776	Goggles, Industrial	4B	2
4240-00-816-3819	Goggles, Industrial	4B	1
8415-00-268-7859	Gloves, Welders	8A	3
4930-00-222-2680	Gun, Fluid, Direct Delivery	4A	2
5120-01-070-4541	Hammer, Hand	9B	1
5120-00-900-6098	Hammer, Hand	9A	1
5120-01-065-9037	Hammer, Hand	9B	1
5120-01-071-5356	Hammer, Hand	9B	1
5120-01-065-2211	Hammer, Hand	9B	1
5120-00-221-7959	Handle, Socket Wrench	**	1
5120-00-240-5364	Handle, Socket Wrench	7F	1
5120-00-230-6385	Handle, Socket Wrench	7F	1
5120-00-541-8444	Handle, Socket Wrench	7F	1
5120-00-221-7960	Handle, Socket Wrench	7F	1
5120-00-240-5396	Handle, Socket Wrench	7F	1
5120-00-221-7958	Handle, Socket Wrench	**	1
5120-00-236-7590	Handle, Socket Wrench	7F	1
3950-00-235-4237	Hoist, Chain	9A	1
5120-00-965-0326	Igniter, Friction	9B	1

\* Stored in available space within the shop set.

\*\* USAOCS deletion to tools/equipment load, Sep 92

\*\*\* USAOCS additions to tools/equipment load, Sep 92

Table F-2. Type III Shop Set Component Items and Location (Cont).

NSN	NOMENCLATURE	COMPART- MENT NO. (SEE FIG. F-1)	QTY
5340-01-008-6625	Insert and Tool Assortment	3E	1
5120-00-224-7330	Jack, Hydraulic, Hand	9B	1
5120-01-046-5079	Key Set, Socket Head Screw	3G	1
6240-00-553-1881	Lamp, Incandescent	3A	2
6240-00-824-4676	Lamp, Incandescent	**	12
6240-00-153-6494	Lamp, Incandescent	**	4
6240-00-927-3845	Lamp, Incandescent	***,3C	6
4240-01-311-6917	Lens, Helmet, Welders	9B	1
4240-00-540-2424	Lens, Helmet, Welders	9B	2
4240-00-262-7106	Lens, Goggles, Industrial	9B	2
6230-00-901-9755	Light, Extension	7B	4
6230-00-729-9259	Light, Extension	**	1
4930-00-253-2478	Lubricating Gun, Hand	4A	2
6625-01-265-6000	Multimeter	7A	1
5330-00-966-8647	Packing Assortment, Preformed	4B	1
5340-00-291-4213	Padlock Set	****	2
7240-00-160-0455	Pail, Utility	2B	1
5330-00-467-3615	Paper, Gasket	9A	6
5330-00-270-8470	Paper, Gasket	9A	2
5120-00-239-8251	Pilers, Lineman's	9B	1
5120-00-789-0492	Pilers, Snap Ring	9B	1
5140-00-329-4306	Pouch, Tool	***, *	1
5120-00-224-7592	Press. Lead Seal, Hand	9B	1
5180-00-313-9496	Puller Kit, Mechanical	6A	1
5120-00-516-3120	Puller, Mechanical	7C	1
5120-00-595-9485	Puller, Aligning	9B	1
8040-01-108-6660	Repair Kit	4B	4
5120-00-545-4268	Retrieving Tool, Magnetic	9B	1
5975-00-878-3791	Rod, Ground	9B	1
3439-00-247-2978	Rod, Welding	9A	5
5120-00-287-2130	Screwdriver, Offset	9B	1
5120-00-580-0334	Screwdriver, Set,Cross	9B	1
5340-00-835-9815	Seal, Antipilferage	9B	1
5110-00-221-1085	Shears, Metal Cutting, Hand	9B	1
4910-01-243-5556	Sling, Engine and Transmission	9B	1
3439-00-184-8960	Solder, Lead Alloy	9B	1
3439-01-074-9983	Solder, Lead Alloy	9B	1
5510-00-246-0975	Stripper, Wire Hand	9B	1

\* Stored in available space the shop set.

\*\* USAOCS deletion to tools/equipment load, Sep92.

Table F-2. Type III Shop Set Component Items and Location (Cont).

NSN	NOMENCLATURE	COMPART- MENT NO. (SEE FIG. F-1)	QTY
3439-00-808-0528	Soldering Gun Kit	7G	1
5120-01-073-2821	Socket Set, Socket Wrench	**	1
5120-01-113-8076	Socket Set, Socket Wrench	**	1
5120-00-596-8622	Socket Set, Socket Wrench	3D	1
5120-01-115-1149	Socket Set, Socket Wrench	7D	1
5110-00-803-6339	Splitting Tool, Nut	9B	1
5970-00-419-4290	Tape, Insulation	9B	5
5970-00-149-4291	Tape, Insulation	**	2
6630-00-105-1418	Tester, Battery, Electrolyte Solution	8A	1
5136-01-119-0005	Threading Set, Screw	***, *	1
5180-00-422-4975	Threading Set, Screw	6C	1
5180-00-448-2362	Threading Set, Screw	6C	1
3433-00-294-6743	Torch Set, Cutting and Welding	7A	1
4910-00-251-8013	Trestle, Motor Vehicle Maintenance	9B	2
5120-00-224-9215	U-Joint Socket Wrench	*** *	1
5120-00-269-7971	U-Joint Socket Wrench	*** *	1
4820-00-551-1094	Valve, Regulator, Fluid Pressure	6C	1
4820-00-194-9324	Valve, Regulator, Fluid Pressure	8A	1
5120-00-223-1951	Vise, Bench and pipe	9B	1
9505-00-191-3680	Wire, Nonelectrical	2A	1
9505-00-224-7534	Wire, Nonelectrical	1	1
5120-00-542-4171	Wire, Twister, Piller	9B	1
5120-00-240-5328	Wrench, Adjustable	9B	1
5120-00-264-3796	Wrench, Adjustable	9B	1
5120-00-264-3793	Wrench, Adjustable	9B	2
5120-00-278-0634	Wrench, Box	9B	1
5120-00-224-3144	Wrench, Box	6A	1
5120-00-264-5212	Wrench, Box	9B	1
5130-00-221-0607	Wrench, Impact, Electric	6C	2
5120-00-171-3117	Wrench, Impact, Manual	3D	1
5120-00-277-1479	Wrench, Pipe	9B	1
5120-00-227-1485	Wrench, Pipe	9B	1
5120-00-277-1481	Wrench, Pipe	9A	1
5120-00-277-2694	Wrench, Open End	9B	1
5120-00-277-2322	Wrench, Open End	*****	1
5120-00-449-8141	Wrench, Open End	9B	1
5120-00-184-8439	Wrench, Open End	9B	1
5120-00-081-9099	Wrench, Open End	9B	1
5120-00-081-9100	Wrench, Open End	*****	1

\* Stored in available space within the shop set.

\*\* USAOCS deletion to tools/equipment load, Sep 92.

\*\*\* USAOCS addition to tools/equipment load, Sep 92.

\*\*\*\* Installed on shop set doors.

\*\*\*\*\* Deleted from shop set with no replacement.

Table F-2. Type III Shop Set Component Items and Location (Cont).

NSN	NOMENCLATURE	COMPART- MENT NO. (SEE FIG. F-1)	QTY
5120-00-277-2323	Wrench, Open End	9B	1
5120-00-892-4946	Wrench, Open End, Box	9B	1
5120-00-892-4947	Wrench, Open End, Box	9B	1
5120-01-122-9392	Wrench, Open End, Box	9B	1
5120-01-354-1750	Wrench, Open End, Box	***, *	1
5120-01-119-0010	Wrench, Set, Combination Box and Open End	3E	1
5120-01-041-1585	Wrench Set, Combination Box and Open End	9B	1
5120-00-895-9566	Wrench Set, Box and Open End	3E	1
5120-00-935-4641	Wrench Set, Hexagon Key	***, *	1
5120-00-103-9754	Wrench Set, Open End, Box	***, *	1
5120-00-103-9766	Wrench Set, Socket	9B	1
5120-00-152-2284	Wrench Set, Socket	***, *	1
5120-00-935-7311	Wrench Set, Socket	***, *	1
5120-00-204-1999	Wrench Set, Socket	3F	1
5120-00-081-2305	Wrench Set, Socket	***, *	1
5120-01-115-1151	Wrench Set, Socket	9B	1
5120-00-935-7309	Wrench Set, Socket	9B	1
5120-01-112-9541	Wrench Set, Socket	7C	1
5120-01-042-0982	Wrench, Torque	3E	1

\* Stored in available space within the shop set.

\*\* USAOCS deletion to tools/equipment load, Sep 92.

\*\*\* USAOCS addition to tools/equipment load, Sep 92.

\*\*\*\* Installed on shop set doors.

\*\*\*\*\* Deleted from shop set with no replacement.

## ALPHABETICAL INDEX

	Para	Page
<b>A</b>		
Administrative Storage .....	1-6	1-2
Air Compressor .....	5-6	5-17
Assembly .....	5-6f	5-24
Cleaning .....	5-6c	5-21
Disassembly .....	5-6b	5-18
Inspection .....	5-6d	5-22
Installation .....	5-6g	5-26
Removal .....	5-6a	5-18
Repair .....	5-6e	5-24
Air Compressor Belt .....	4-14	4-18
Cleaning .....	4-14b	4-18
Installation .....	4-14c	4-19
Removal .....	4-14a	4-18
Air Compressor Belt Adjustment .....	3-7	3-6
Air Compressor (Functions of Controls and Indicators) .....	2-2c	2-4
Air Compressor Motor .....	5-5	5-12
Assembly .....	5-5e	5-16
Cleaning .....	5-5c	5-15
Disassembly .....	5-5b	5-13
Installation .....	5-5f	5-16
Removal .....	5-5a	5-13
Repair .....	5-5d	5-15
Air Compressor (Operation Under Usual Conditions) .....	2-7	2-16
Air Compressor Pressure Switch .....	4-10	4-10
Adjustment .....	4-10	4-10
Air Filter .....	4-26	4-43
Assembly .....	4-26e	4-45
Cleaning .....	4-26c	4-44
Disassembly .....	4-26b	4-44
Installation .....	4-26f	4-45
Removal .....	4-26a	4-43
Air Filter (Cont)		
Repair .....	4-26d	4-44
Testing .....	4-26g	4-45
Air Line .....	5-2	5-2
Cleaning .....	5-2c	5-4
Inspection .....	5-2b	5-4
Installation .....	5-2d	5-5

# ALPHABETICAL INDEX (CONT)

	Para	Page
<b>A (CONT)</b>		
Removal .....	5-2a	5-2
Air Pressure Gage .....	4-11	4-12
Inspection .....	4-11a	4-12
Installation .....	4-11c	4-13
Removal .....	4-11b	4-13
Air Tank Reservoir .....	5-4	5-8
Cleaning .....	5-4b	5-10
Installation .....	5-4d	5-11
Removal .....	5-4a	5-8
Repair .....	5-4c	5-11
Test .....	5-4e	5-12
Alternator .....	5-13	5-81
Assembly .....	5-13g	5-88
Cleaning .....	5-13c	5-86
Disassembly .....	5-13b	5-82
Inspection .....	5-13d	5-87
Installation .....	5-13h	5-89
Removal .....	5-13a	5-82
Repair .....	5-13f	5-87
Testing .....	5-13e	5-87
Alternator Mount .....	5-14	5-90
Cleaning .....	5-14b	5-91
Inspection .....	5-14c	5-92
Installation .....	5-14d	5-92
Removal .....	5-14a	5-90

## B

Belt Guard .....	4-13	4-15
Cleaning .....	4-13b	4-16
Inspection .....	4-13c	4-16
Installation .....	4-13d	4-16
Removal .....	4-13a	4-15
Body Assembly .....	4-21	4-32
Cleaning .....	4-21	4-32
Bumper Assembly .....	5-23	5-127
Cleaning .....	5-23b	5-128
Inspection .....	5-23c	5-130
Installation .....	5-23d	5-130
Removal .....	5-23a	5-127



## C

Cable Assemblies (Control Panel) .....	5-16	5-99
Disassembly .....	5-16a	5-100
Inspection .....	5-16b	5-102
Installation .....	5-16d	5-102
Repair .....	5-16c	5-102
Cable Assemblies (Alternating Current) .....	5-12	5-73
Cleaning .....	5-12b	5-75
Inspection .....	5-12c	5-78
Installation .....	5-12e	5-80
Removal .....	5-12a	5-74
Repair .....	5-12d	5-78
Cable Assemblies (Direct Current) .....	5-11	5-66
Cleaning .....	5-11b	5-70
Inspection .....	5-11c	5-70
Installation .....	5-11e	5-71
Removal .....	5-11a	5-67
Repair .....	5-11d	5-71
Clearance Lights .....	3-10	3-13
Inspection .....	3-10a	3-13
Installation .....	3-10d	3-15
Removal .....	3-10b	3-13
Repair .....	3-10c	3-15
CMV Components (Operation Under Usual Conditions) .....	2-7	2-16
Common Tools and Equipment .....	4-1	4-1
Control Panel Assembly .....	5-15	5-92
Assembly .....	5-15d	5-98
Cleaning .....	5-15b	5-94
Disassembly .....	5-15a	5-93
Inspection .....	5-15c	5-97
Control Panel Assembly CB2 .....	4-24	4-37
Assembly .....	4-24d	4-38
Cleaning .....	4-24b	4-38
Inspection .....	4-24c	4-38
Removal .....	4-24a	4-37
Control Panel Assembly S1 .....	4-25	4-39
Assembly .....	4-25d	4-41
Cleaning .....	4-25b	4-40
Inspection .....	4-25c	4-40
Removal .....	4-25a	4-40
Control Panel Assembly (Functions of Controls and Indicators) . . . . .	2-2b	2-2
Controls and Indicators, Functions of -- SEE: Functions of Controls and Indicators		
Corrosion Prevention and Control .....	1-7	1-6

# ALPHABETICAL INDEX (CONT)

	Para	Page
<b>D</b>		
Description and Use of Operator's Control and Indicators .....	N A	2-1
Destruction of Army Materiel to Prevent Enemy Use.....	1-5	1-2
Differences Between Models.....	1-10	1-14
Direct Support Maintenance Instructions .....	N A	5-1
Drive Belt, Positive -- SEE: Positive Drive Belt		

<b>E</b>		
Equipment Improvements and Recommendations (EIRs) .....	1-3	1-2
Electrical Theory.....	1-13	1-15
Electronic Governor System .....	5-8	5-35
Adjustment .....	5-8f	5-47
Cleaning.....	5-8b	5-40
Inspection.....	5-8c	5-41
Installation .....	5-8e	5-43
Repair.....	5-8d	5-42
Removal .....	5-8a	5-36
Emergency Shutdown.....	2-9	2-23
Equipment Characteristics, Capabilities, and Features.....	1-8	1-7
Equipment Data.....	1-11	1-14
Equipment Description.....	N/A	1-7
Explosive Ordnance Disposal (EOD) Hardware.....	5-24	5-132
Assembly .....	5-24e	5-141
Cleaning . . . . .	5-24c	5-140
Disassembly.....	5-24b	5-134
Inspection.....	5-24d	5-140
Installation .....	5-24f	5-141
Removal .....	5-24a	5-132
Extreme Cold, Operation in -- SEE: Operation in Extreme Cold		
Extreme Heat and Different Altitudes, Operation in -- SEE: Operation in Extreme Heat and Different Altitudes		

**F**

Functions of Controls and Indicators .....	2-2	2-1
--	-----	-----

**G**

Gage Compartment Door .....	5-19	5-115
Assembly .....	5-19b	5-115
Disassembly .....	5-19a	5-115
General Care and Preparation for Storage .....	4-30	4-54
Governor System, Electronic -- SEE: Electronic Governor System		
Governor Wiring Harness .....	4-16	4-21
	5-7	5-27
Cleaning .....	4-16b	4-21
	5-7b	5-30
Inspection .....	4-16a	4-21
	5-7c	5-30
Installation .....	5-7e	5-31
Removal .....	5-17a	5-28
Repair .....	4-16c	4-24
	5-7d	5-30

**I**

Information Plates .....	4-23	4-34
Installation .....	4-23b	4-35
Removal .....	4-23a	4-35
Inlet Filter Servicing .....	3-8	3-7
Cleaning .....	3-8b	3-9
Installation .....	3-8c	3-10
Removal .....	3-8a	3-7

**L**

Limited Storage .....	4-29a	4-52
Location and Description of Major Components .....	1-9	1-13
Long-Term Storage .....	4-31	4-55
Lubrication Instructions .....	3-2	3-1

**M**

Major Components (Location and Description) .....	1-9	1-13
Maintenance Forms and Records .....	1-2	1-1
Mechanical Theory .....	1-14	1-16
Model Number and Equipment Name .....	1-1b	1-1
Motor Servicing .....	4-15	4-20

# ALPHABETICAL INDEX (CONT)

	Para	Page
<b>M (CONT)</b>		
Cleaning.....	4-15a	4-20
Lubrication .....	4-15b	4-21
M1031 Vehicle (Operation Under Usual Conditions) .....	2-7a	2-16

## N

Neutral Switch, Transfer Case -- SEE: Transfer Case Neutral Switch		
Nomenclature Cross Reference List .....	1-4	1-2

## O

Operating Instructions .....		2-1
Operation Under Unusual Conditions .....	2-10	2-24
General.....	2-10a	2-24
Operation.....	2-10b	2-24
Operation in Extreme Cold.....	2-10c	2-24
Operation in Extreme Heat and Different Altitudes .....	2-10d	2-25
Operation in Salt Water Areas .....	2-10f	2-25
Operation in Sandy or Dusty Areas .....	2-10e	2-25
Operation Under Usual Conditions .....	2-7	2-16
CMV Components.....	2-7	2-16
M1031 Vehicle .....	2-7a	2-16
Overspeed Switch Shutdown and Reset.....	2-7d	2-20
Power Unit.....	2-7b	2-16
Power Unit Shutdown.....	2-5c	2-19
Operator Maintenance .....		3-1
Operator Maintenance Procedures.....		3-6
Operator Preventive Maintenance Checks and Services (PMCS) . . . . .		2-5
	2-5	2-7
Operator Troubleshooting Procedures .....		3-3
Symptom Index.....	3-4	3-3

## P

Positive Drive Belt .....	4-19	4-27
Inspection.....	4-19b	4-28
Installation/Adjustment .....	4-19c	4-28
Removal .....	4-19a	4-27
Power Take Off Unit .....	5-10	5-56
Cleaning.....	5-10c	5-60

Disassembly .....	5-10b	5-57
Inspection .....	5-10d	5-61
Installation .....	5-10g	5-64
Reassembly .....	5-10f	5-62
Removal .....	5-10a	5-56
Repair .....	5-10e	5-62
Power Unit (Operation Under Usual Conditions) .....	2-7b	2-16
Power Unit Shutdown (Operation Under Usual Conditions) .....	2-7c	2-19
Preparation for Limited Storage and Reshipment .....	4-29	4-52
Limited Storage .....	4-29a	4-52
Reshipment .....	4-29b	4-52
Pressure Switch .....	5-3	5-5
Adjustment .....	5-3d	5-7
Cleaning .....	5-3b	5-6
Installation .....	5-3c	5-7
Removal .....	5-3a	5-4
Principles of Operation .....		1-15
Propeller Shaft .....	5-17	5-110
Assembly .....	5-17f	5-108
Cleaning .....	5-17c	5-107
Disassembly .....	5-17b	5-105
Inspection .....	5-17d	5-108
Installation .....	5-17g	5-110
Removal .....	5-17a	5-105
Repair .....	5-17e	5-108
PTO and Governor (Functions of Controls and Indicators) .....	2-2a	2-1
PTO Controls .....	5-22	5-123
Cleaning .....	5-22b	5-124
Installation .....	5-22c	5-125
Removal .....	5-22a	5-123
PTO Controls and Indicators .....	4-17	4-24
Cleaning .....	4-17b	4-24
Installation .....	4-17c	4-25
Removal .....	4-17a	4-24
Purpose of Equipment .....	1-1c	1-1

## R

Rear Door Assemblies (Left Hand and Right Hand) .....	5-20	5-117
Assembly .....	5-20b	5-117
Disassembly .....	5-20a	5-117
Reflectors .....	4-22	4-33
Cleaning .....	4-22b	4-34
Inspection .....	4-22a	4-33
Installation .....	4-22d	4-34

# ALPHABETICAL INDEX (CONT)

	Para	Page
<b>P (CONT)</b>		
Removal.....	4-22c	4-34
Repair Parts, Special Tools, Test, Measurement, and Diagnostic Equipment (TMDE), and Support Equipment .....		4-1
Reshipment.....	4-29b	4-52
Repair Parts .....	4-3	4-1

## S

Safety Valve .....	4-12	4-13
Inspection.....	4-12a	4-13
Installation .....	4-12c	4-14
Removal .....	4-12b	4-14
Scope .....	1-1	1-1
Model Number and Equipment Name .....	1-1b	1-1
Purpose of Equipment.....	1-1c	1-1
Type of Manual.....	1-1a	1-1
Service Upon Receipt of Equipment.....	4-4	4-2
Side Door Assemblies.....	5-21	5-120
Assembly .....	5-21b	5-120
Disassembly.....	5-21a	5-120
Special Tools, TMDE, and Support Equipment.....	4-2	4-1
Sprockets .....	5-18	5-110
Cleaning.....	5-18b	5-112
Inspection.....	5-18c	5-113
Installation .....	5-18d	5-113
Removal .....	5-18a	5-110
Storage Straps/Tiedowns.....	4-27	4-48
Cleaning.....	4-27c	4-49
Inspection.....	4-27b	4-48
Installation .....	4-27d	4-49
Removal .....	4-27a	4-48

## T

Tailgate Assembly.....	4-20	4-30
Installation .....	4-20b	4-31
Removal .....	4-20a	4-30
Taillights .....	3-9	3-10
Cleaning.....	3-9b	3-10
Inspection.....	3-9c	3-12
Installation.....	3-9d	3-12

Removal .....	3-9a	3-10
Trailer Receptacle .....	4-18	4-25
Installation .....	4-18b	4-26
Removal .....	4-18a	4-26
Transfer Case Neutral Switch.....	5-9	5-52
Cleaning.....	5-9b	5-53
Inspection.....	5-9c	5-54
Transfer Case Neutral Switch (Cont) .....		
Installation .....	5-9e	5-55
Removal .....	5-9a	5-52
Repair.....	5-9d	5-54
Troubleshooting Table		
Operator.....	3-5	3-4
Unit .....	4-8	4-7
Type of Manual .....	1-1a	1-1

## U

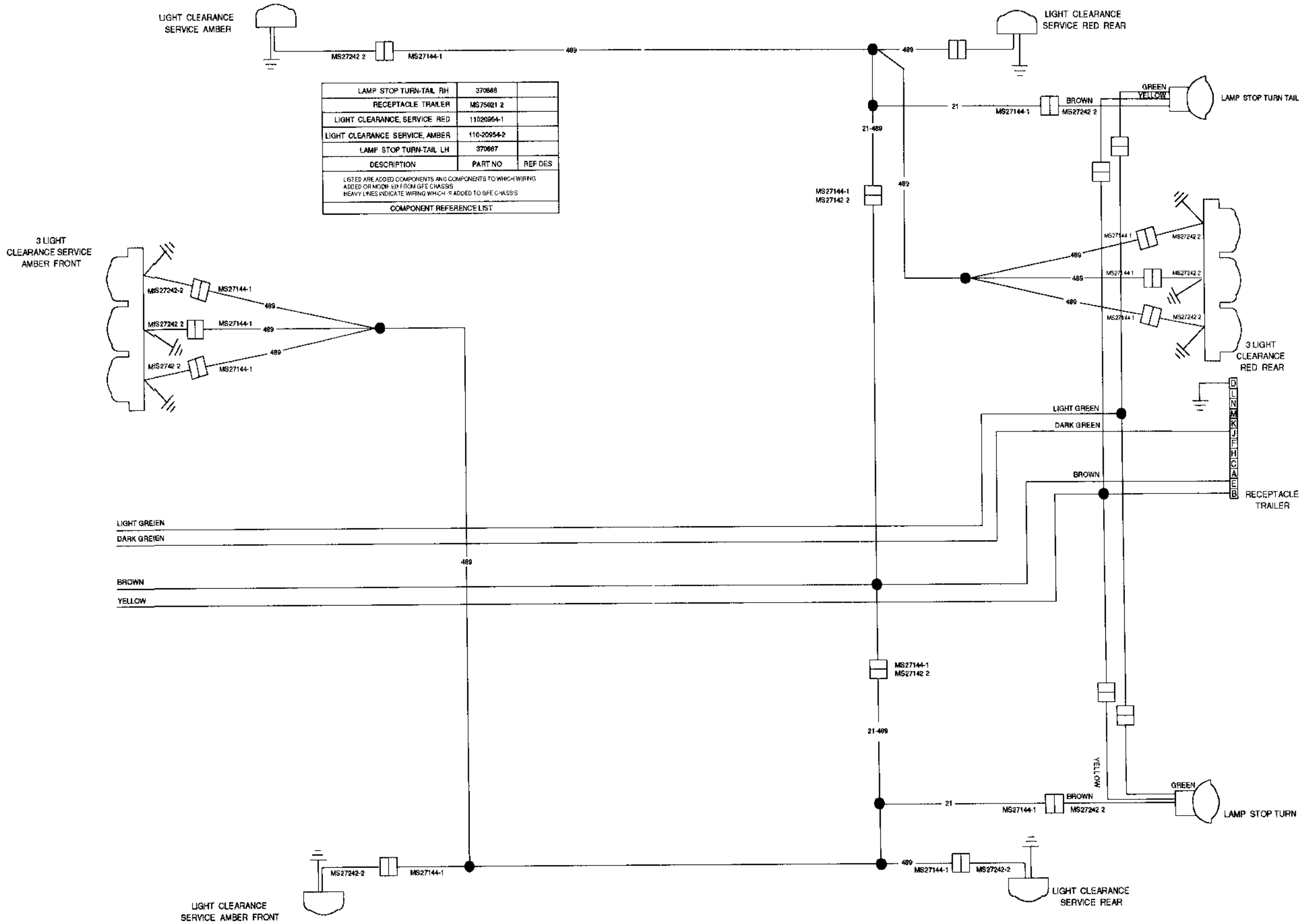
Unit Maintenance Procedures .....	4-1
Unit Preventive Maintenance Checks and Services (PMCS) . . . . .	4-3
Unit Troubleshooting Procedures.....	4-7

## W

Warning Summary.....	a
Welder.....	2
Setup for GMAW .....	2-7c
Setup for SMAW.....	2-7b









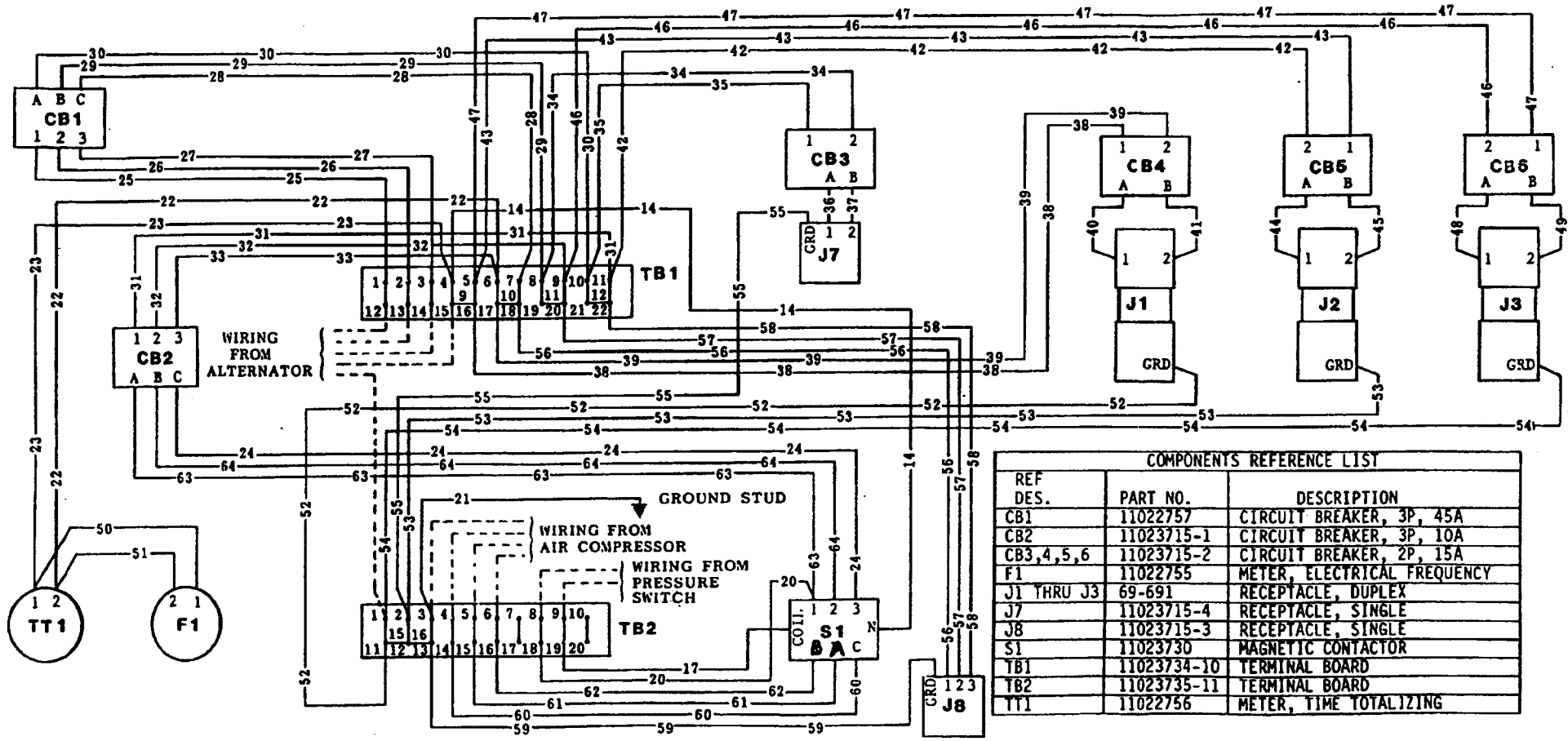


Figure FO-2 Control Panel Wiring Diagram.



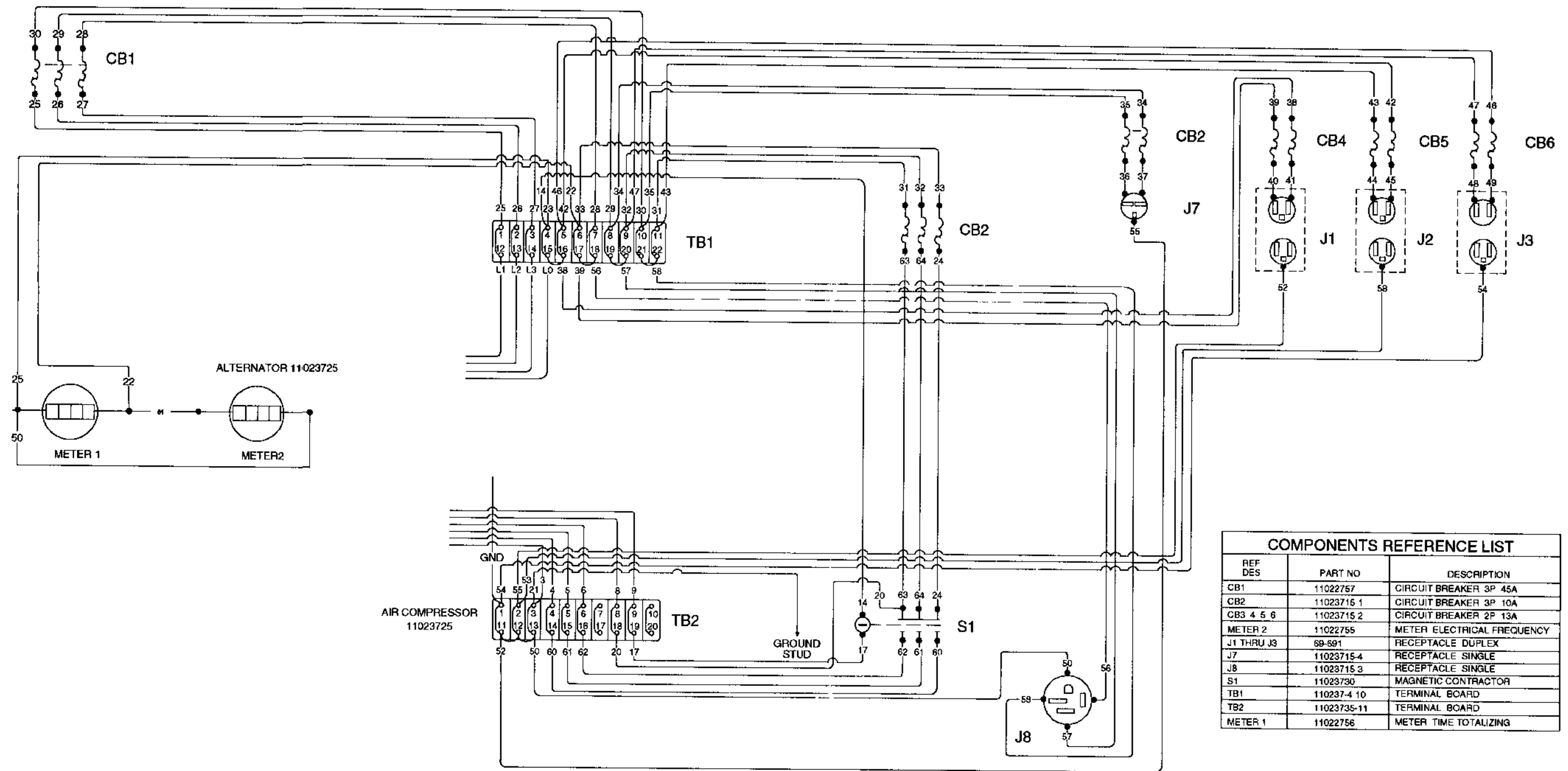


Figure 5-25 Control Panel Wiring Diagram



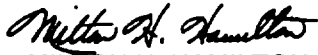






**By Order of the Secretary of the Army:**

Official:



MILTON H. HAMILTON

*Administrative Assistant to the*

*Secretary of the Army*

07639

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

**DISTRIBUTION:**

To be distributed in accordance with DA Form 12-25-E, block 5404 requirements for TM 9-4940-562-13.



TEAR ALONG PERFORATED LINE

<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b> For use of this form, see AR 25-30; the proponent agency is OAASA						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/ Supply Manuals (SC/SM)		DATE	
<b>TO:</b> (Forward to proponent of publication or form) (Include ZIP Code)						<b>FROM:</b> (Activity and location) (Include ZIP Code)  Your Name and Unit Address			
<b>PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS</b>									
PUBLICATION/FORM NUMBER					DATE		TITLE		
ITEM	PAGE	PARA -	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON			
<div style="transform: rotate(-15deg); font-size: 100px; opacity: 0.3;">SAMPLE</div>									
<i>*Reference to line numbers with in the paragraph or sub paragraph.</i>									
TYPED NAME, GRADE, OR TITLE  Your Name and Grade					TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION  Your Telephone Number			SIGNATURE  Your Signature	



<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b> For use of this form, see AR 25-30; the proponent agency is OAASA					Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/ Supply Manuals (SC/SM)					DATE	
TO: (Forward to proponent of publication or form) (Include ZIP Code)					FROM: (Activity and location) (Include ZIP Code)						
<b>PART I – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS</b>											
PUBLICATION/FORM NUMBER					DATE			TITLE			
ITEM	PAGE	PARA-	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON					
TYPED NAME, GRADE, OR TITLE					TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION				SIGNATURE		

TO: (Forward to proponent of publication or form) (Include ZIP Code)	FROM: (Activity and location) (Include ZIP Code)
--	--

PART II – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER				DATE			TITLE	
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTIONS

PART III – REMARKS (Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)

--

\*Reference to line numbers with in the paragraph or sub paragraph.

TYPED NAME, GRADE, OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
-----------------------------	--	-----------

TEAR ALONG PERFORATED LINE

## THE METRIC SYSTEM AND EQUIVALENTS

### LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meter = 0.3937 Inch  
1 Decimeter = 10 Centimeters = 3.94 Inches  
1 Meter = 10 Decimeters = 100 Centimeters  
= 1000 Millimeters = 39.37 Inches  
1 Dekameter = 10 Meters = 32.8 Feet  
1 Hectometer = 10 Dekameters = 328.08 Feet  
1 Kilometer = 10 Hectometers = 1000 Meters  
= 0.621 Mile = 3,280.8 Feet  
Millimeters = Inches times 25.4  
Inches = Millimeters divided by 25.4

### WEIGHTS

1 Centigram = 10 Milligrams = 0.154 Grain  
1 Decigram = 10 Centigrams = 1.543 Grains  
1 Gram = 0.001 Kilogram = 10 Decigrams  
= 1000 Milligrams = 0.035 Ounce  
1 Dekagram = 10 Grams = 0.353 Ounce  
1 Hectogram = 10 Dekagrams = 3.527 Ounces  
1 Kilogram = 10 Hectograms = 1000 Grams = 2.205 Pounds  
1 Quintal = 100 Kilograms = 220.46 Pounds  
1 Metric Ton = 10 Quintals = 1000 Kilograms = 1.1 Short Tons

### LIQUID MEASURE

1 Milliliter = 0.001 Liter = 0.034 Fluid Ounce  
1 Centiliter = 10 Milliliters = 0.34 Fluid Ounce  
1 Deciliter = 10 Centiliters = 3.38 Fluid Ounces  
1 Liter = 10 Deciliters = 1000 Milliliters = 33.82 Fluid Ounces  
1 Dekaliter = 10 Liters = 2.64 Gallons  
1 Hectoliter = 10 Dekaliters = 26.42 Gallons  
1 Kiloliter = 10 Hectoliters = 264.18 Gallons

### SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inch  
1 Sq Decimeter = 100 Sq Centimeters = 15.5 Sq Inches  
1 Sq Meter (Centare) = 10 Sq Decimeters  
= 10,000 Sq Centimeters = 10.764 Sq Feet  
1 Sq Dekameter (Are) = 100 Sq Meters = 1,076.4 Sq Feet  
1 Sq Hectometer (Hectare) = 100 Sq Dekameters  
= 2.471 Acres  
1 Sq Kilometer = 100 Sq Hectometers  
= 1,000,000 Sq Meters = 0.386 Sq Mile

### CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.061 Cu Inches  
1 Cu Decimeter = 1000 Cu Centimeters = 61.02 Cu Inches  
1 Cu Meter = 1000 Cu Decimeters  
= 1,000,000 Cu Centimeters = 35.31 Cu Feet

### TEMPERATURE

$5/9 (°F - 32°) = °C$   
 $(9/5 \times °C) + 32° = °F$   
-35° Fahrenheit is equivalent to -37° Celsius  
0° Fahrenheit is equivalent to -18° Celsius  
32° Fahrenheit is equivalent to 0° Celsius  
90° Fahrenheit is equivalent to 32.2° Celsius  
100° Fahrenheit is equivalent to 38° Celsius  
212° Fahrenheit is equivalent to 100° Celsius

## APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>	<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Inches.....	Centimeters.....	2.540	Centimeters.....	Inches.....	0.394
Feet.....	Meters.....	0.305	Meters.....	Feet.....	3.280
Yards.....	Meters.....	0.914	Meters.....	Yards.....	1.094
Miles.....	Kilometers.....	1.609	Kilometers.....	Miles.....	0.621
Square Inches.....	Square Centimeters.....	6.451	Square Centimeters.....	Square Inches.....	0.155
Square Feet.....	Square Meters.....	0.093	Square Meters.....	Square Feet.....	10.764
Square Yards.....	Square Meters.....	0.836	Square Meters.....	Square Yards.....	1.196
Square Miles.....	Square Kilometers.....	2.590	Square Kilometers.....	Square Miles.....	0.386
Acres.....	Square Hectometers.....	0.405	Square Hectometers.....	Acres.....	2.471
Cubic Feet.....	Cubic Meters.....	0.028	Cubic Meters.....	Cubic Feet.....	35.315
Cubic Yards.....	Cubic Meters.....	0.765	Cubic Meters.....	Cubic Yards.....	1.308
Fluid Ounces.....	Milliliters.....	29.573	Milliliters.....	Fluid Ounces.....	0.034
Pints.....	Liters.....	0.473	Liters.....	Pints.....	2.113
Quarts.....	Liters.....	0.946	Liters.....	Quarts.....	1.057
Gallons.....	Liters.....	3.785	Liters.....	Gallons.....	0.264
Ounces.....	Grams.....	28.349	Grams.....	Ounces.....	0.035
Pounds.....	Kilograms.....	0.454	Kilograms.....	Pounds.....	2.205
Short Tons.....	Metric Tons.....	0.907	Metric Tons.....	Short Tons.....	1.102
Pound-Feet.....	Newton-Meters.....	1.356	Newton-Meters.....	Pound-Feet.....	0.738
Pound-Inches.....	Newton-Meters.....	0.11375	Kilopascals.....	Pounds per Square Inch.....	0.145
Pounds per Square Inch.....	Kilopascals.....	6.895	Kilometers per Liter.....	Miles per Gallon.....	2.354
Ounce-Inches.....	Newton-Meters.....	0.007062	Kilometers per Hour.....	Miles per Hour.....	0.621
Miles per Gallon.....	Kilometers per Liter.....	0.425	°Fahrenheit.....	°Celsius.....	$°C = (°F - 32) \times 5/9$
Miles per Hour.....	Kilometers per Hour.....	1.609	°Celsius.....	°Fahrenheit.....	$°F = (9/5 \times °C) + 32$

**PIN: 073363-000**