

TM 10-3930-641-10

TECHNICAL MANUAL

OPERATOR'S MANUAL

FOR

TRUCK, CONTAINER HANDLER:

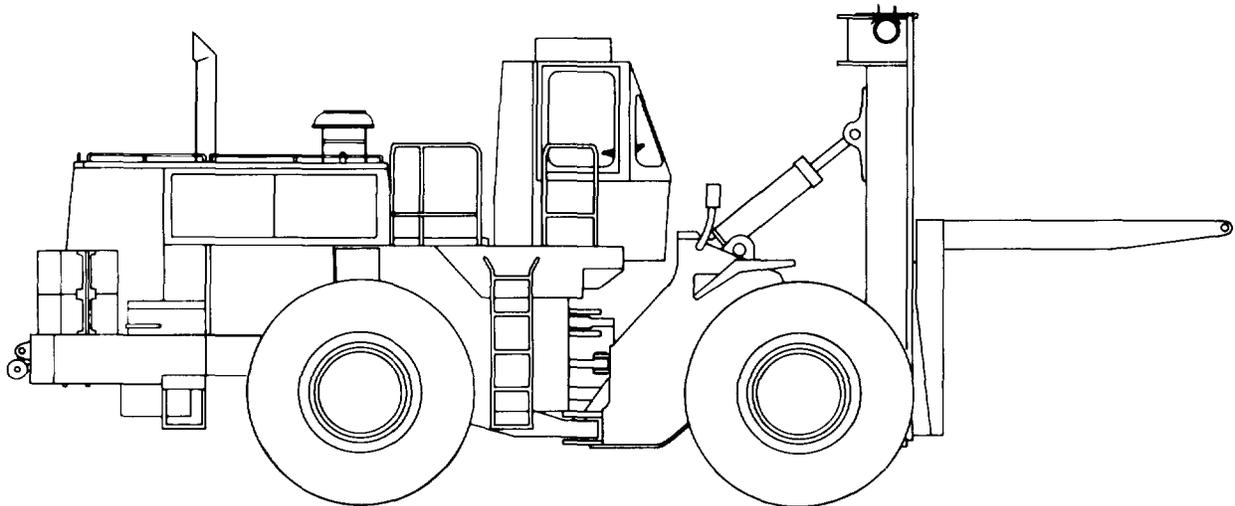
ROUGH TERRAIN, 50,000 LB CAPACITY,

DIESEL ENGINE DRIVEN (DED), PNEUMATIC TIRES (PT), MODEL DV43

NSN 3930-01-082-3758

WITH

TOPHANDLER(S)



SUPERSEDURE NOTICE - This manual supersedes TM 10-3930-641-10, dated 15 May 1981, including all changes.

DISTRIBUTION STATEMENT A - Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY

MAY 2006

WARNING SUMMARY

This warning summary contains general safety warnings and hazardous materials warnings that must be understood and applied during operation and maintenance of this equipment. Failure to observe these precautions could result in serious injury or death to personnel. Also included are explanations of safety and hazardous materials icons used within the technical manual.



BIOLOGICAL - abstract symbol bug shows that a material may contain bacteria or viruses that present a danger to life or health.



CHEMICAL - drops of liquid on hand shows that the material will cause burns or irritation to human skin or tissue.



EAR PROTECTION - headphones over ears show that noise level will harm ears.



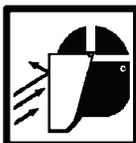
ELECTRICAL - electrical wire to arm with electricity symbol running through human body shows that shock hazard is present.



EYE PROTECTION - person with goggles shows that the material will injure the eyes.



FIRE - flame shows that a material may ignite and cause burns.



FLYING PARTICLES - arrows bouncing off face with face shield shows that particles flying through the air will harm face.



HEAVY PARTS - heavy object on human figure shows that heavy parts present a danger to life or limb.



HOT AREA - hand over object radiating heat shows that part is hot and can burn.



HYDRAULIC FLUID PRESSURE - hydraulic fluid spraying human figure shows that fluid escaping under great pressure can cause injury or death to personnel.



RADIOACTIVE - identifies a material that emits radioactive energy and can injure human tissue or organs.



VAPOR - human figure in a cloud shows that material vapors present a danger to life or health.

FOR INFORMATION ON FIRST AID, REFER TO FM 4-25.11.



WARNING

CARBON MONOXIDE (EXHAUST GASES) CAN KILL!

- Carbon monoxide is a colorless, odorless, deadly poison which, when breathed, deprives the body of oxygen and causes suffocation. Exposure to air containing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, and coma. Permanent brain damage or death to personnel can result from severe exposure.
 - Carbon monoxide occurs in exhaust fumes of internal combustion engines. Carbon monoxide can become dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to ensure safety of personnel when engine of RTCH is operated.
1. DO NOT operate engine in enclosed areas without adequate ventilation.
 2. DO NOT idle engine without adequate ventilation.
 3. DO NOT drive machine with inspection plates or cover plates removed.
 4. BE ALERT for exhaust poisoning symptoms. They are:
 - Headache
 - Dizziness
 - Sleepiness
 - Loss of muscular control
 5. If you see another person with exhaust poisoning symptoms:
 - Remove person from area.
 - Expose to fresh air.
 - Keep person warm.
 - DO NOT permit physical exercise.
 - Administer cardiopulmonary resuscitation (CPR), if necessary.
 - Notify a medic.
 6. BE AWARE. The field protective mask for nuclear-biological-chemical (NBC) protection will not protect you from carbon monoxide poisoning.

The Best Defense Against Carbon Monoxide Poisoning Is Good Ventilation!



WARNING
BATTERIES

- To avoid injury, eye protection and acid-resistant gloves must be worn when working around batteries. DO NOT smoke, use open flame, make sparks or create other ignition sources around batteries. If a battery is giving off gases, it can explode and cause injury to personnel. Remove all jewelry such as rings, ID tags, watches, and bracelets. If jewelry or a tool contacts a battery terminal, a direct short will result in instant heating or electric shock, damage to equipment, and injury to personnel.
 - Sulfuric acid contained in batteries can cause serious burns. If battery corrosion or electrolyte makes contact with skin, eyes or clothing, take immediate action to stop the corrosive burning effects. Failure to follow these procedures may result in injury or death to personnel.
 - DO NOT use compressed air to clean batteries. Use a clean, dry rag.
- a. Eyes. Flush with cold water for no less than 15 minutes and seek medical attention immediately.
 - b. Skin. Flush with large amounts of cold water until all acid is removed. Seek medical attention as required.
 - c. Internal. If corrosion or electrolyte is ingested, drink large amounts of water or milk. Follow with milk of magnesia, beaten egg, or vegetable oil. Seek medical attention immediately.
 - d. Clothing/Equipment. Wash area with large amounts of cold water. Neutralize acid with baking soda or household ammonia.



WARNING
ETHER STARTING AID SYSTEM

- Ether fuel is extremely flammable and toxic. DO NOT smoke and make sure you are in a well-ventilated area away from heat, open flames or sparks. Wear eye protection. Avoid contact with skin and eyes and avoid breathing ether fumes. If fluid enters or fumes irritate the eyes, wash immediately with large quantities of clean water for 15 minutes. Seek medical attention immediately if ether is inhaled or causes eye irritation. Failure to follow this warning may cause injury or death to personnel.
- NEVER use starting fluid or spray to aid in starting the engine, other than the on-board ether cold start system. Failure to follow this warning may cause injury or death to personnel or damage to equipment.



WARNING
FIRE EXTINGUISHER

Discharging large quantities of dry chemical fire extinguisher inside an enclosed cab may result in temporary breathing difficulty during and immediately after the discharge event. Discharge fire extinguisher from outside the cab. Ventilate cab thoroughly prior to reentry.



WARNING
FUEL HANDLING



- DO NOT smoke or permit any open flame in area of machine while you are servicing fuel system. Be sure hose nozzle is grounded against filler tube during refueling to prevent static electricity. Failure to follow this warning may cause injury to personnel or equipment damage.
- DO NOT perform fuel system checks, inspections or maintenance while smoking or near fire, flames or sparks. Fuel may ignite, causing injury or death to personnel or damage to machine.
- Operating personnel must wear fuel-resistant gloves when handling fuels. If exposed to fuel, promptly wash exposed skin and change fuel-soaked clothing.



WARNING
HAZARDOUS WASTE DISPOSAL

When servicing this machine, performing maintenance or disposing of materials such as engine coolant, hydraulic oil, lubricants, battery acids or batteries, and CARC paint, consult your unit/local hazardous waste disposal center or safety office for local regulatory guidance. If further information is needed, please contact The Army Environmental Hotline at 1-800-872-3845. Failure to follow this warning may result in injury to personnel.



WARNING
HEARING PROTECTION

Hearing protection is required when operating machine with cab windows open. Anyone within 50 ft (15 m) of an operating machine must also wear hearing protection. Failure to wear hearing protection may cause hearing loss.



WARNING
HOT COMPONENTS

With engine running, drivetrain components are hot to the touch. Use caution to safeguard against burns. Failure to follow this warning may result in injury to personnel.



WARNING
HYDRAULIC SYSTEM PRESSURE

DO NOT disconnect or remove any hydraulic system line or fitting unless engine is shut down and hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death to personnel.

WARNING

MACHINE OPERATION

- Use caution and maintain three-point contact at all times when mounting or dismounting machine. DO NOT use steering wheel as a handhold. Failure to follow this warning may cause injury to personnel.
- BE ALERT for personnel in the area while operating machine. Always check to ensure area is clear of personnel and obstructions before moving machine or raising or lowering container handler forks. Failure to follow this warning may cause injury or death to personnel or damage to equipment.
- DO NOT operate machine unless seat belt has been fastened. Failure to follow this warning may cause injury or death to personnel.
- Before operation, ensure shipping link, located near center of machine, is disconnected and pinned to retainer.
- Before operation, ensure Rollover Protective Structure (ROPS) is not damaged or altered. A structurally damaged ROPS will not protect you in a rollover accident.
- DO NOT move machine if LOW PRESS BRAKE light is flashing on and off. Shut down engine and report problem. Failure to follow warning may cause injury or death to personnel.
- DO NOT allow riders on machine. Failure to follow this warning may cause injury or death to personnel.
- NEVER leave operator compartment without applying parking brake. Failure to follow this warning may cause injury or death to personnel in the event machine moves inadvertently when parked.
- DO NOT use parking/emergency brake to stop a moving machine under usual conditions. Only if service brakes fail, apply parking/emergency brake. Failure to follow this warning may result in injury or death to personnel or damage to equipment.
- Machine will stop suddenly during emergency brake engagement. Use caution to guide machine to a stop as quickly and safely as possible. Failure to follow this warning may result in injury to personnel.
- Drive carefully, alertly, and at an appropriate speed for road conditions. Remember that machine has articulated frame steering and will require special handling.



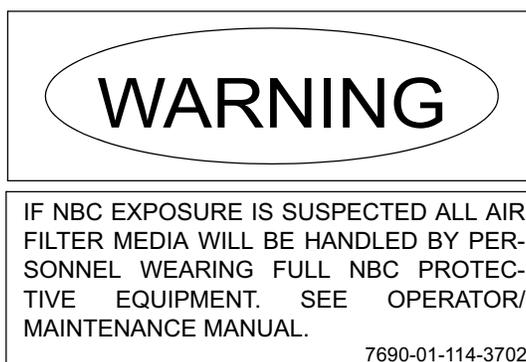
- NEVER operate RTCH or move load near a power line or overhead wires. Failure to follow this warning may result in injury or death to personnel or damage to equipment.
- To avoid tipping over, be careful when crossing or working on hills, banks or slopes. Look behind machine before backing up. Wear your seat belt. Know stopping distance of your machine at any speed, then adjust speed accordingly. Match speed with job conditions. Do not coast. Failure to follow this warning may cause injury or death to personnel or damage to equipment.
- Do NOT lift container unless green LOAD LOCKS LOCKED light is on. Failure to follow this warning may result in injury or death to personnel or damage to equipment.



WARNING
NBC EXPOSURE



- If NBC exposure is suspected, personnel wearing protective equipment must handle all air cleaner media. Consult your NBC Officer or NBC NCO for appropriate handling or disposal procedures.
- NBC contaminated filters must be handled using adequate precautions and must be disposed of by trained personnel.
- For more information, refer to: FM 3-3, *Chemical and Biological Contamination Avoidance*; FM 3-5, *NBC Decontamination*; FM 3-7, *NBC Field Handbook*; and FM 3-3-1, *Nuclear Contamination Avoidance*.



To order this NBC decal use:

National Stock Number (NSN) - 7690-01-114-3702

Part Number (PN) - 12296626

Commercial and Government Entity Code (CAGEC) - 19207



WARNING
PRESSURIZED COOLING SYSTEM



- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant will cause serious burns.
- DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns.
- Wear effective eye, glove, and skin protection when handling coolants. Failure to follow this warning may cause injury to personnel.



WARNING

SLAVE STARTING

- When slave starting, use NATO slave cable that does NOT have loose or missing insulation.
- DO NOT proceed if suitable cable is not available.
- DO NOT use civilian-type jumper cables.
- DO NOT allow disabled and booster machines to come in contact with each other at any time during slave starting. Failure to follow these warnings may cause injury or death to personnel.



WARNING

SOLVENT CLEANING COMPOUND



Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to follow this warning may cause injury or death to personnel.

WARNING

TIRES

- Operating machine with underinflated or defective tire may lead to tire failure and loss of traction or control. Failure to follow this warning may cause injury to personnel or damage to equipment.
- If tire pressure is 0 psi (0 kPa) DO NOT inflate. Notify Organizational Maintenance. Failure to follow this warning may cause injury or death to personnel.
- Use a self-inflating chuck and stand at a distance behind tire when inflating tire. Failure to follow this warning may cause injury or death to personnel.

WARNING

TOWING RTCH

- Always block wheels before preparing machine for towing.
- DO NOT use a tow line. Use a medium duty tow bar with bumper blocks.
- DO NOT allow personnel on machine that is being towed.
- DO NOT tow faster than 5 mph (8 kph).
- Failure to follow these warnings may result in injury or death to personnel.



WARNING
WORK SAFETY



- Lifting cables, chains, hooks, and slings used for lifting machine must be in good condition and of suitable capacity. Failure to follow this warning may cause injury or death to personnel and damage to equipment.
- Improper use of lifting equipment and improper attachment of cables to machine may cause injury to personnel and damage to equipment. Observe all standard rules of safety.
- Hitch and steering movement can reduce clearances suddenly and cause injury. Always stop engine BEFORE working in area of hitch.
- Ensure area around machine is clear of personnel or obstructions before articulating machine. Failure to follow this warning may cause injury or death to personnel or damage to equipment.
- Use caution when handling heavy parts. Provide adequate support and use assistance during procedure. Ensure that any lifting device used is in good condition and of suitable load capacity. Keep clear of heavy parts supported only by lifting device. Failure to follow this warning may cause injury or death to personnel.

LIST OF EFFECTIVE PAGES/WORK PACKAGES

Date of issue for original manual is:

Original 15 May 2006

TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 34 AND TOTAL NUMBER OF WORK PACKAGES IS 16 CONSISTING OF THE FOLLOWING:

Page/WP No.	*Change No.
Cover/(Back Blank)	0
a to i/(j Blank)	0
A/(B Blank)	0
i to iv	0
WP 0001 00 to WP 0016 00	0
Index-1 to Index-4	0
Authentication Page	0
DA Form 2028 - Sample	0
DA Form 2028 (three)	0
Back Cover/PIN Number	0

* Zero in this column indicates an original page or work package.

OPERATOR'S MANUAL

FOR

**TRUCK, CONTAINER HANDLER:
ROUGH TERRAIN, 50,000 LB CAPACITY,
DIESEL ENGINE DRIVEN (DED), PNEUMATIC TIRES (PT), MODEL DV43**

**NSN 3930-01-082-3758
WITH TOPHANDLER(S)**

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 Equipment Technical Publications*), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is <https://aeeps.ria.army.mil/>. The DA Form 2028 is located under the Public Applications section in the AEPS Public Home Page. 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-LMIT/TECH PUBS, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The e-mail address is: TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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HOW TO USE THIS MANUAL

NOTE

If at any time you are unsure how to use this manual or you cannot locate the information you need, notify your supervisor.

INTRODUCTION

1. This revised manual is designed to help you operate the RTCH and to perform operator troubleshooting and maintenance on the equipment.
2. This manual is written in work package format:
 - a. Chapters divide the manual into major categories of information (e.g., *General Information, Equipment Description, and Theory of Operation; Operator Instructions; Operator Troubleshooting; Operator Maintenance Instructions; and Supporting Information*).
 - b. Each Chapter is divided into work packages, which are identified by a 6-digit number (e.g., 0001 00, 0002 00, etc.) located on the upper right-hand corner of each page. The work package page number (e.g., 0001 00-1, 0001 00-2, etc.) is located centered at the bottom of each page.
 - c. If a Change Package is issued to this manual, added work packages will use the 5th and 6th digits of their number to indicate new material. For instance, work packages inserted between WP 0001 00 and WP 0002 00 will be numbered WP 0001 01, WP 0001 02, etc.
3. Read through this manual to become familiar with its organization and contents before attempting to operate or maintain the equipment.

CONTENTS OF THIS MANUAL

1. A *Warning Summary* is located at the beginning of this manual. Become familiar with these warnings before operating or performing operator troubleshooting or maintenance on the machine.
2. A *Table of Contents*, located in the front of the manual, lists all chapters and work packages in the publication.
 - a. The *Table of Contents* also provides *Reporting Errors and Recommending Improvements* information and DA Form 2028 addresses for the submittal of corrections to this manual.
 - b. If you cannot find what you are looking for in the Table of Contents, refer to the alphabetical *Index* at the back of the manual.
3. Chapter 1, *General Information, Equipment Description and Data, and Theory of Operation*, provides general information on the manual and the equipment.
4. Chapter 2, *Operation Instructions*, explains and illustrates all operator controls and indicators and contains a *Decal and Data Plate Guide*. It also describes how to perform all operating procedures for the RTCH: *Operation Under Usual Conditions* and *Operation Under Unusual Conditions*.
5. Chapter 3 covers all *Operator Troubleshooting*. WP 0009 00 contains a *Troubleshooting Symptom Index*. If the RTCH malfunctions, this index should always be consulted to locate the appropriate troubleshooting procedure.
6. Chapter 4 covers *Operator Maintenance Instructions*. Major areas covered are *Preventive Maintenance Checks and Services (PMCS) Introduction* and *Preventive Maintenance Checks and Services (PMCS)*.
7. Chapter 5 includes *Supporting Information: References, Components of End Item (COEI) and Basic Issue Items (BII) Lists, Additional Authorization List* and *Expendable and Durable Items List*.

FEATURES OF THIS MANUAL

1. WARNINGS, CAUTIONS, NOTES, subject headings, and other important information are highlighted in **BOLD** print as a visual aid.

WARNING

A WARNING indicates a hazard that may result in injury or death to personnel.

CAUTION

A CAUTION is a reminder of safety practices or directs attention to usage practices that may result in damage to equipment.

NOTE

A NOTE is a statement containing information that will make the procedures easier to perform.

2. Statements and words of particular interest may be printed in CAPITAL LETTERS to create emphasis.
3. Within a procedural step, reference may be made to another work package in this manual or to another manual. These references indicate where you should look for more complete information.
 - a. If you are told: "Service precleaner (WP 0012 00)," go to WP 0012 00 in this manual for instructions on this service.
 - b. If you are told: "For complete information on servicing batteries, refer to TM 9-6140-200-14," go to the *References* work package (WP 0013 00) for complete information on the referenced manual.
4. Illustrations are placed after, or as close to, the procedural steps to which they apply. Callouts placed on the art are text or numbers.
5. Numbers located at lower right corner of art (e.g., 422-001; 422-002, etc.) are art control numbers and are used for tracking purposes only.
6. Dashed leader lines used in the lubrication illustrations (WP 0011 00) and in the PMCS table (WP 0012 00) indicate that called out lubrication points are located on both sides of the machine.
7. Technical instructions include metric units as well as standard units. For your reference, a *Metric Conversion Chart* is located on the inside back cover of the manual.

CHAPTER 1
GENERAL INFORMATION, EQUIPMENT
DESCRIPTION AND DATA, AND THEORY OF OPERATION

SCOPE

1. **Type of Manual.** This manual is for your use in operating and performing operator maintenance on the Rough Terrain Container Handler (RTCH).
2. **Equipment Name and Model Number.**
 - a. Truck, Container Handler: Rough Terrain, 50,000 Lb Capacity, Diesel Engine Driven (DED), Pneumatic Tires (PT), NSN 3930-01-082-3758, Model DV43, with Tophandler(s).
 - b. A 20 ft tophandler, NSN 3990-01-107-5716, is available as part of the end item.
 - c. The following tophandlers are also available for use as Additional Authorization List (AAL) items (WP 0015 00):
 - (1) 35 ft tophandler, NSN 3990-01-107-5717
 - (2) 40 ft tophandler, NSN 3990-01-107-5718
3. **Purpose of Equipment.** The RTCH is used for loading, unloading, handling, and stacking ISO containers weighing 50,000 lb (22,700 kg) or less.

MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for the equipment will be those prescribed by DA PAM 750-8, *Functional User's Manual for The Army Maintenance Management System (TAMMS)*, as contained in the Maintenance Management Update.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRS)

If your RTCH 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 Form 368, *Product Quality Deficiency Report*. Mail it to us at: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-AC-NML, Rock Island, Illinois 61299-7630. We'll send you a reply.

CORROSION PREVENTION AND CONTROL (CPC)

1. 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.
2. 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 a corrosion problem. If a corrosion problem is identified, it can be reported using SF Form 368, *Product Quality Deficiency Report*. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will ensure that the information is identified as a CPC problem. The form should be submitted to the address specified in DA PAM 750-8.

THREAT OF NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC) CONTAMINATION

1. The RTCH incorporates a CARC painted exterior. Materials used in the machine are metal, rubber, plastic, fabric, and glass.
2. In the event of NBC contamination, decontaminants for these surfaces and materials are listed in FM 3-5, *NBC Decontamination*. For decontamination procedures, refer to FM 3-7, *NBC Field Handbook*.

ELECTROMAGNETIC PULSE (EMP) EXPOSURE

Components listed and designated as EMP susceptible may be damaged by EMP exposure. If the machine is exposed to an EMP incident, verify proper operation and repair as necessary.

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

For destruction of Army materiel to prevent enemy use, refer to TM 750-244-3.

WARRANTY INFORMATION

The RTCH is warranted by Caterpillar Inc. for 15 months or 1,500 hours of operation, whichever comes first. Warranty starts on the date found on DA Form 2408-9 in the logbook. Report all defects in material or workmanship to your supervisor, who will take appropriate action through your Field Maintenance shop.

LIST OF ABBREVIATIONS/ACRONYMS

NOTE

Refer to ASME Y14.38-1999 for standard abbreviations.

ABBREVIATION/ACRONYM	DEFINITION
AAL.....	Additional Authorization List
BII.....	Basic Issue Items
BTC.....	Before Top Center
CARC.....	Chemical Agent Resistant Coating
CID.....	Cubic Inch Displacement
cm.....	Centimeter
COEI.....	Components of End Items
CPC.....	Corrosion Prevention and Control
DED.....	Diesel Engine Driven
EIR.....	Equipment Improvement Recommendation
EMP.....	Electromagnetic Pulse
GCWR.....	Gross Combination Weight Rating
GVWR.....	Gross Vehicle Weight Rating
ISO.....	International Organization for Standardization
kg.....	Kilogram
km.....	Kilometer
kPa.....	Kilopascal
kph.....	Kilometers per Hour
kW.....	Kilowatt
L.....	Liter
lb-ft.....	Pound Foot
mph.....	Miles per Hour
mm.....	Millimeter
NATO.....	North Atlantic Treaty Organization
NBC.....	Nuclear, Biological, and Chemical
Nm.....	Newton Meter
NSN.....	National Stock Number
PMCS.....	Preventive Maintenance Checks and Services
PT.....	Pneumatic Tires
ROPS.....	Rollover Protective Structure
RTCH.....	Rough Terrain Container Handler
TOE/MTOE.....	Tables of Organization and Equipment/Modified Tables of Organization and Equipment

END OF WORK PACKAGE

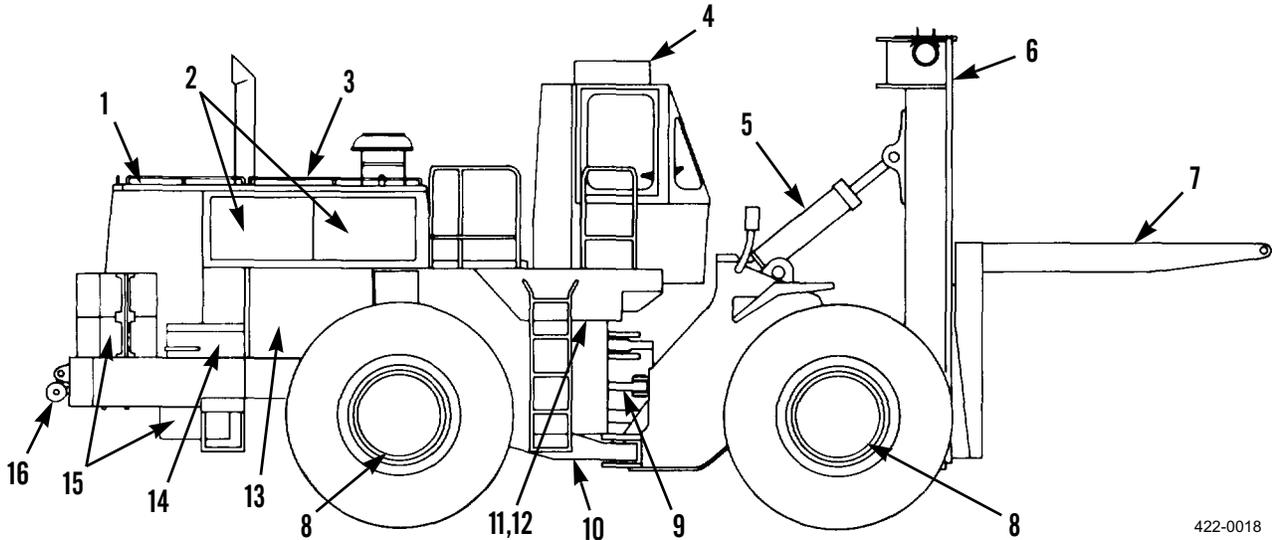
EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES1. **Characteristics.**

- a. Handles and stacks ISO (International Organization for Standardization) designation 1A or 1C cargo containers or Sealand containers.
- b. Loads and unloads flatbed trailers and rail cars.
- c. Makes over-the-shore landings.

2. **Capabilities and Features.****NOTE**

- Refer to *Equipment Data* at the end of this work package for machine dimensions, weights, fluid capacities, and other miscellaneous equipment data.
 - DO NOT transport RTCH by self-propulsion.
- a. The RTCH can be transported by trailers, rail, aircraft, or marine vessels.
 - b. The following is a list of RTCH capabilities and features:
 - (1) Operates over rough terrain, including beaches, snow, mud, and cross country
 - (2) Fords up to 60 in. (152 cm) in fresh or salt water
 - (3) Comes with a 20 ft tophandler; may also use a 35 ft or 40 ft tophandler
 - (4) Raises, lowers, tilts forward or backward, side shifts, or side tilts a container load
 - (5) Lifts a container from 12 in. (30 cm) below ground level to 118 in. (300 cm) above ground level (measured to bottom of container)
 - (6) Articulates (bends in center) for easy load handling
 - (7) Equipped with a NATO slave receptacle

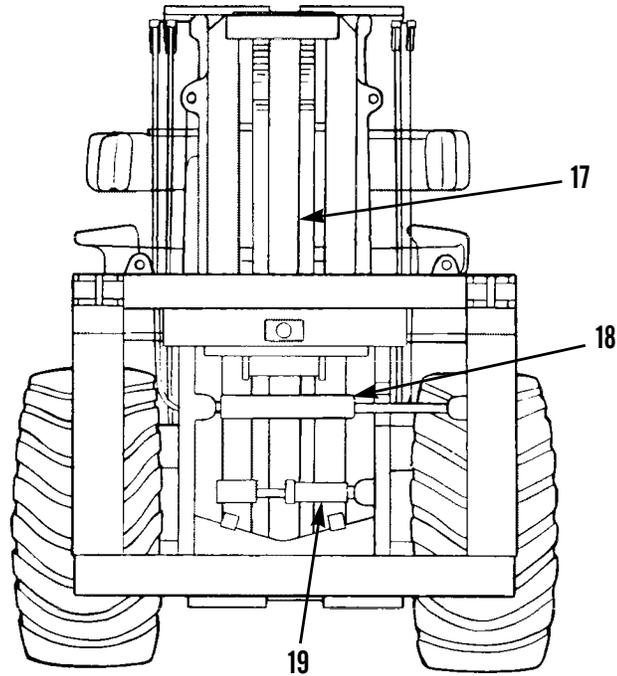
LOCATION AND DESCRIPTION OF MAJOR COMPONENTS



422-0018

KEY	COMPONENT	DESCRIPTION
1	Radiator	Transfers heat from coolant passing through radiator to the outside air. Grille faces rear.
2	Upper Engine Access Panels	Two on each side of machine. Allow access to engine for maintenance. Hinged for easy access.
3	Hood	Two-piece; can be removed for engine maintenance.
4	Operator Cab	Equipped with Rollover Protective Structure (ROPS) to protect operator.
5	Tilt Cylinder	One on each side of machine. Tilts mast forward and backward.
6	Mast	Tilts forward and backward, raises and lowers to position container.
7	Forks	Mount and secure tophandlers.
8	Wheels, Axles, and Final Drives	Steer and propel machine.
9	Steering Cylinder	One on each side of machine. Turns machine.
10	Hitch	Articulated for easy steering maneuverability.
11	Hydraulic Tank	On right side of machine. Contains hydraulic oil for front end components.
12	Fuel Tank	On left side of machine. Contains diesel fuel for engine operation.
13	Lower Engine Access Panels	One on each side of engine. Remove for access to engine compartment.
14	Battery Box	Houses and protects two batteries. There is a battery box on both sides of machine.
15	Counterweights	Provide stability when handling load.
16	Towing Pintle	For towing operations. Attaches to tow bar.

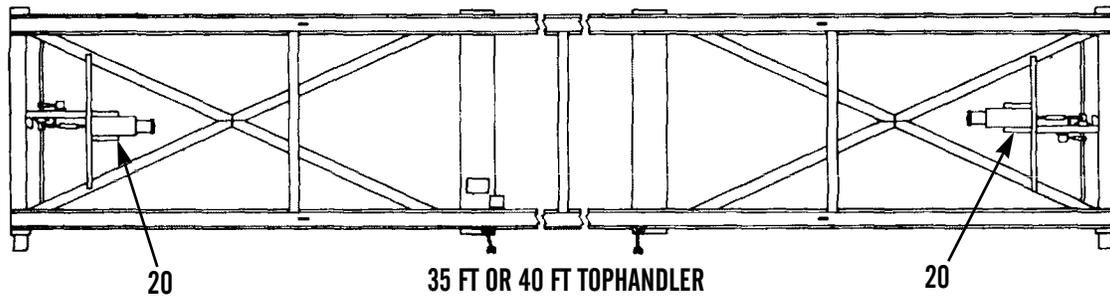
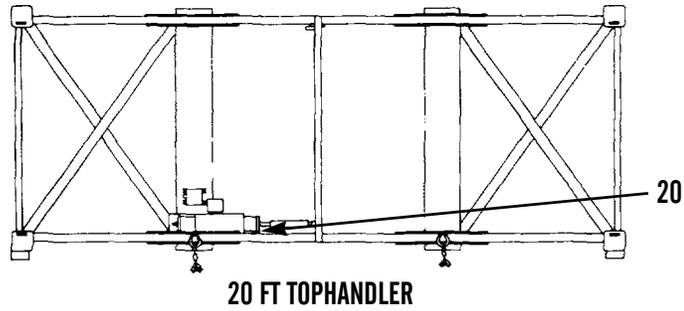
LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - CONTINUED



422-0001

KEY	COMPONENT	DESCRIPTION
17	Lift Cylinder	Raises and lowers mast.
18	Side Shift Cylinder	Shifts forks and tophandler to the side for loading or stacking.
19	Side Tilt Cylinder	Rotates forks and tophandler for loading or stacking.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - CONTINUED



422-0021

KEY	COMPONENT	DESCRIPTION
20	Container Lock Cylinder	Extends to lock tophandler to container. Retracts to unlock tophandler from container.

EQUIPMENT DESCRIPTION AND DATA - CONTINUED

0002 00

EQUIPMENT DATA

Length:

Overall	35.25 ft (10.74 m)
Between Steering Pivot and Rear Axle.	6.25 ft (1.91 m)
20 Ft Tophandler.	19.8 ft (6.04 m)
35 Ft Tophandler.	34.9 ft (10.64 m)
40 Ft Tophandler.	39.7 ft (12.10 m)
20 Ft Tophandler (from Container Lock to Container Lock).....	19.2 ft (5.85 m)
35 Ft Tophandler (from Container Lock to Container Lock).....	34.25 ft (10.44 m)
40 Ft Tophandler (from Container Lock to Container Lock).....	39.3 ft (11.98 m)

Width:

Overall	11.66 ft (3.51 m)
Mast Width	9 ft (2.74 m)
20 Ft Tophandler.	8.3 ft (2.53 m)
35 Ft Tophandler.	8.3 ft (2.53 m)
40 Ft Tophandler.	8.3 ft (2.53 m)
Wheelbase.....	12.5 ft (3.81 m)

Height:

Top of ROPS.....	13.25 ft (4.04 m)
Top of Mast (Lowered).....	13.9 ft (4.24 m)
Top of Mast (Fully Extended)	19.1 ft (5.82 m)

Weight:

Shipping Weight (70% Fuel, Without Tophandler).....	105,120 lb (47,768 kg)
Operational Weight (Without Tophandler).....	103,230 lb (46,824 kg)
Operational Weight (with 20 Ft Tophandler).....	107,030 lb (48,558 kg)
Operational Weight (with 35 Ft Tophandler).....	112,350 lb (50,961 kg)
Operational Weight (with 40 Ft Tophandler).....	113,160 lb (51,329 kg)
20 Ft Tophandler.	3,800 lb (1,724 kg)
35 Ft Tophandler.	9,120 lb (4,137 kg)
40 Ft Tophandler.	9,930 lb (4,504 kg)

Maximum Speed:

With Rated Load (Forward)	14.5 mph (23.3 kph)
With Rated Load (Reverse)	14.9 mph (24 kph)
Without Rated Load (Forward).....	18.5 mph (29.8 kph)
Without Rated Load (Reverse).....	19.4 mph (31.2 kph)

Towing

5 mph (8 kph)
for 10 miles (16 km) max

Maximum Grade*	15% at 2 mph (3.2 kph)
Maximum Fording Depth*.....	60 in. (150 cm)
Maximum Side Slope*.....	15 degrees
Maximum Breakover Angle*.....	148 degrees
Maximum Approach Angle*	25 degrees
Maximum Departure Angle*	20 degrees
Maximum Ground Clearance*.....	16 in. (40 cm)
Curb Circle Clearance	70 ft (21 m)
Tilt Cycling Time (Each Direction)**.....	9 seconds
Lifting Capacity	50,000 lb (22,679 kg)

*Tophandler with container raised 1 ft (30 cm) full back tilt.

**Tophandler with container raised 1 ft (30 cm).

EQUIPMENT DESCRIPTION AND DATA - CONTINUED

0002 00

EQUIPMENT DATA - CONTINUED

Engine:

Manufacturer.....	Caterpillar Inc.
Type	Direct injection, 65 degree V-8 turbo diesel
Model	3308T
Flywheel Power at 2,100 RPM	393 HP (293 kW)
Torque at 1,300 RPM	1,210 lb-ft (1,640 Nm)
Engine RPM (Low Idle)	700 RPM
Engine RPM (High Idle).....	2,320 RPM
Injector Timing	28 degrees (BTC)
Bore.....	5.4 in. (137 mm)
Stroke	6 in. (152 mm)
Displacement	1,099 CID (18 L)
Compression Ratio	14.5:1
Firing Order	1-8-4-3-6-5-7-2
Fuel	Diesel no.2
Weight	3,200 lb (1,451 kg)

Transmission and Powertrain:

Manufacturer.....	Caterpillar Inc.
Type	Power shift planetary
Transmission Reduction Ratio in First	5.6049
Transmission Reduction Ratio in First (Reverse).....	4.9043
Transmission Reduction Ratio in Second	3.1429
Transmission Reduction Ratio in Second (Reverse)	2.7500
Transmission Reduction Ratio in Third	1.7751
Transmission Reduction Ratio in Third (Reverse).....	1.5532
Transmission Reduction Ratio in Fourth	1.0000
Transmission Reduction Ratio in Fourth (Reverse).....	0.8750
Weight	1,756 lb (796 kg)

Transfer Case:

Transfer Case Reduction Ratio (Input)	1.0256
Transfer Case Reduction Ratio (Output)	1.1795
Weight	1,080 lb (490 kg)

Final Drive Reduction Ratio	5.0526
Bevel Gear Reduction Ratio	3.7500

Axles:

Axle Oscillation (Front)	Fixed
Axle Oscillation (Rear).....	±13 degrees

Brakes..... All wheel disc

Type	Full hydraulic oil bath disc
Braking Surface	2,300 sq in. x 4 (14,839 cm ²)
Pump Type	Gear
Output	28 gpm at 1,000 psi (1.8 L/sec at 7,000 kPa)
Relief Valve Setting	2,200 psi (15,168 kPa)
Weight	70 lb (32 kg) non-adjustable

EQUIPMENT DESCRIPTION AND DATA - CONTINUED

0002 00

EQUIPMENT DATA - CONTINUED

Tires:

Type	Radial
Size	35/65-R33
Front Inflation	70 psi (482 kPa)
Rear Inflation	40 psi (276 kPa)
Weight (Tire and Rim)	3,000 lb (1,361 kg)

Steering:

Type	Full hydraulic, center point frame articulation
Steering Angle (Each Direction)	27 degrees
Pump Type	Gear
Output	101 gpm at 1,000 psi (6.4 L/sec at 7,000 kPa)
Relief Valve Setting	2,500 psi (17,236 kPa)
Operating Pressure (Max)	2,500 psi (17,236 kPa)
Weight	70 lb (32 kg)

Capacities:

Fuel Tank	165 gal. (625 L)
Radiator	28 gal. (106 L)
Engine Crankcase	11 gal. (41.6 L)
Hydraulic System	78 gal. (295.3 L)
Transmission and Differential	24 gal. (91 L)

Electrical System:

Batteries	Lead-acid
Quantity	4
Type	8D
Voltage (Each Battery)	12V
Voltage (System)	24V
Alternator	Integral regulator
Type	Solid state
Amperage	50A

Hydraulic System:

Type	Closed with vacuum relief
Pump:	
Type/Output	Gear, single stage/71 gpm (4.5 L/sec)
Relief Valve Setting	2,500 psi (17,236 kPa)
Operating Pressure (Max)	2,500 psi (17,236 kPa)
Weight	110 lb (50 kg)
Cylinders:	
Lift (Bore x Stroke)	10 x 69 in. (25.4 x 175 cm)
Tilt (Bore x Stroke)	7 x 19.25 in. (17.8 x 49 cm)
Side Shift (Bore x Stroke)	6 x 24 in. (15.2 x 61 cm)
Side Tilt (Bore x Stroke)	6 x 6.5 in. (15.2 x 16.5 cm)

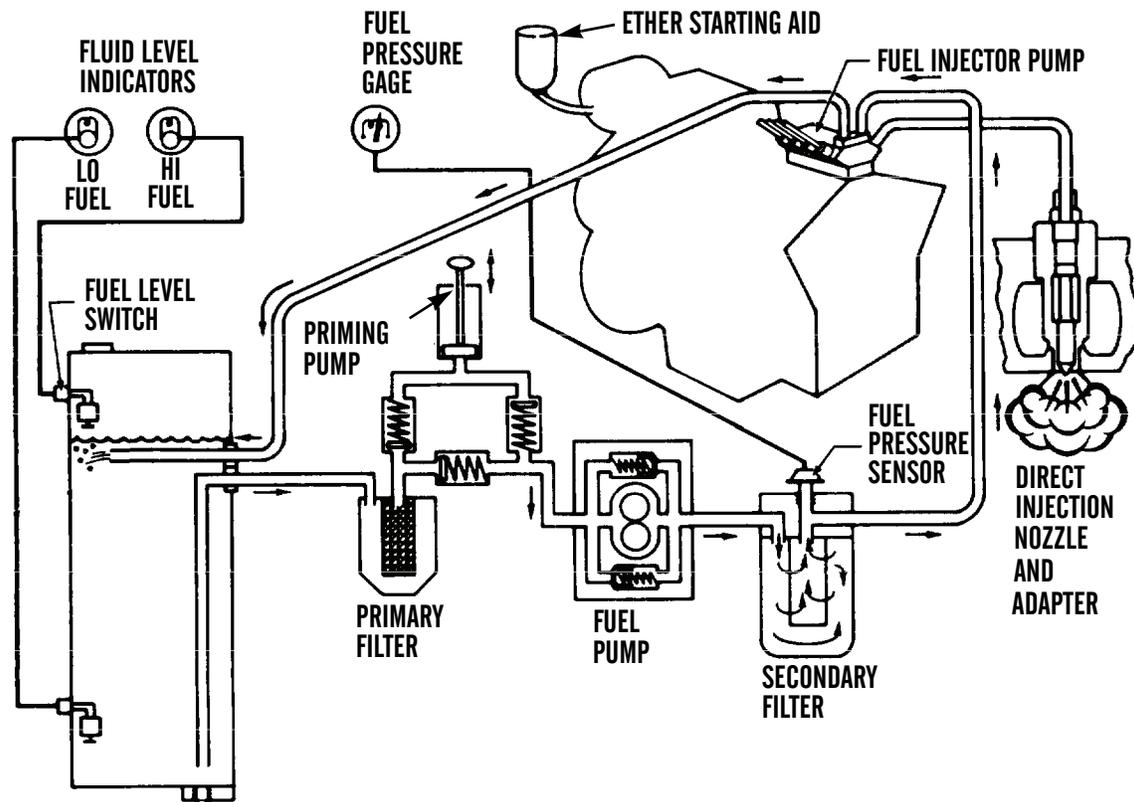
END OF WORK PACKAGE

INTRODUCTION

1. This work package describes the following functional systems: fuel system, air inlet and exhaust system, steering system, brake system, electrical system, and mast hydraulic system.
2. This work package explains how the systems and components of the machine work together. A functional description is provided for each major system and component.
3. The RTCH is an all-purpose, medium-sized, wheeled machine used for handling ISO containers. It is powered by a Caterpillar V-8, direct-injected, intercooled diesel engine. Hydraulically operated implements allow for up, down, side shift, and tilt positioning of the tophandler for ease of use during container handling operations. Articulated frame steering provides maximum maneuverability.

FUEL SYSTEM

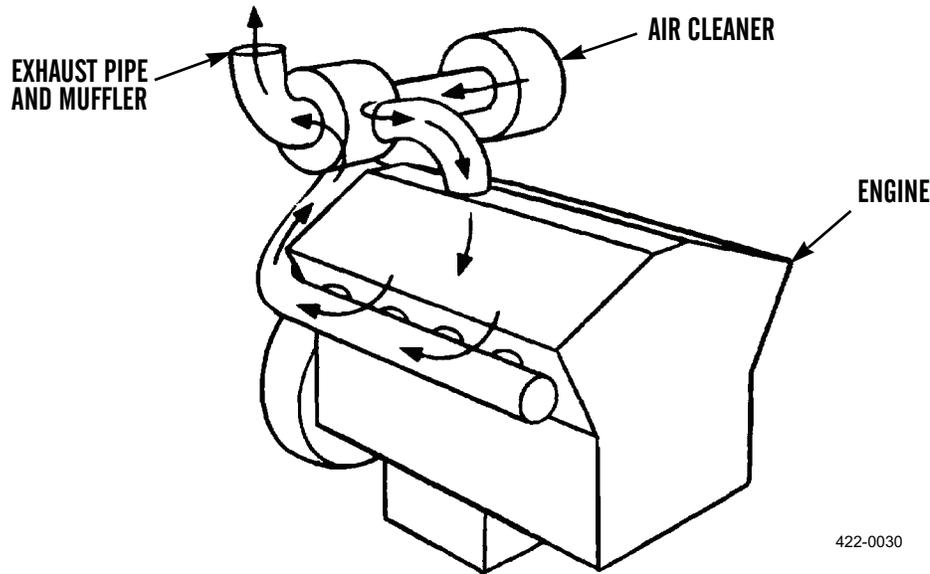
1. **General.** Diesel fuel is drawn from the tank by a fuel pump, filtered by a primary fuel filter, routed to the fuel injection pump and secondary filter, and then injected through the fuel injection nozzles into the engine cylinders. Air is drawn in through dry-type, replaceable filter elements. A dust ejector removes incoming dust from the air and routes it out through the exhaust system.
2. **Priming Pump.** The priming pump is used to prime the fuel system on initial startup or after changing fuel filters. It also removes air from the fuel system.
3. **Ether Starting Aid.** The ether starting aid delivers a measured amount of ether into the turbocharger outlet for ease in cold weather starting. The ether is stored under pressure in a cylinder, and the amount to be sprayed into the outlet pipe is controlled by an electrically activated valve.



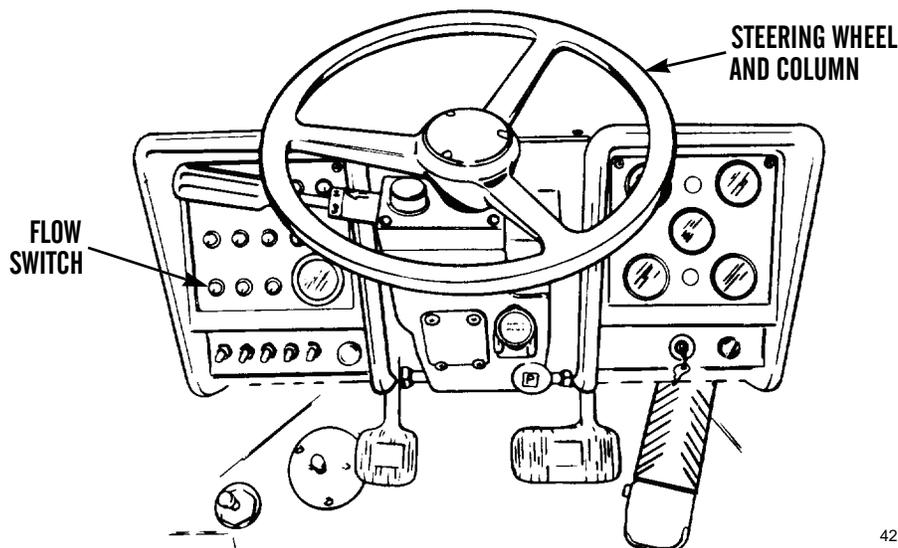
422-0029

AIR INLET AND EXHAUST SYSTEM

1. **Air Cleaner.** The air cleaner is a dual-element, dry-type filter. Outside air is drawn through the filter elements by a vacuum created in the turbocharger. When one or both of the elements get clogged, a high vacuum switch in the air cleaner housing turns on the PLUGGED AIR FILTER indicator on the instrument panel.
2. **Muffler and Exhaust Pipe.** These components reduce engine noise and carry exhaust gases away from the engine compartment.

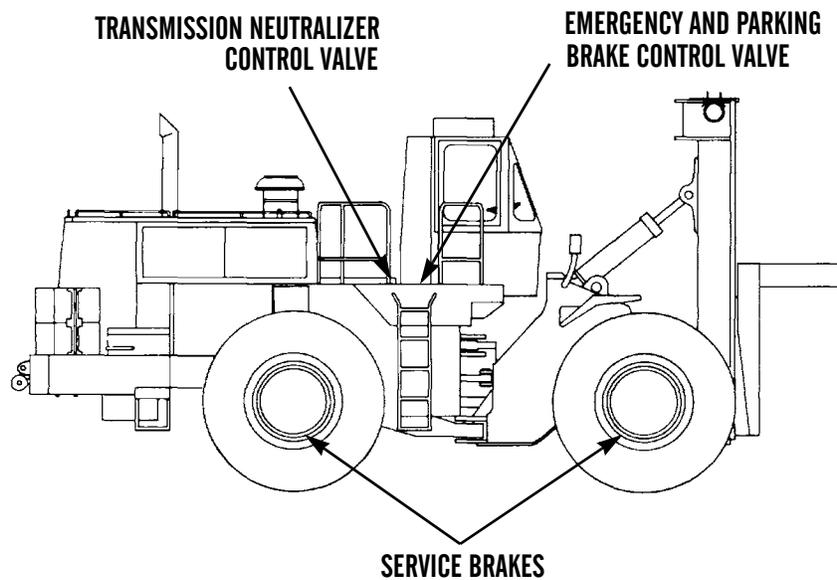
**STEERING SYSTEM**

1. **Steering Wheel and Column.** The steering wheel and column are adjustable to eight different positions. Seven of the positions are for operator comfort, while the eighth and most forward position is for storing and locking the wheel when not in use. Pushing the wheel into the stored position also moves the transmission control lever to NEUTRAL.
2. **Supplemental Steering.** The supplemental steering system has two purposes. It provides an oil supply for the steering system if the primary system fails or if the engine stops when the machine is moving. It also adds oil to the primary oil flow when the engine RPM is less than 1,170 and the machine is moving.
3. **Flow Switch.** This switch warns the operator of a primary pump or line failure.



BRAKE SYSTEM

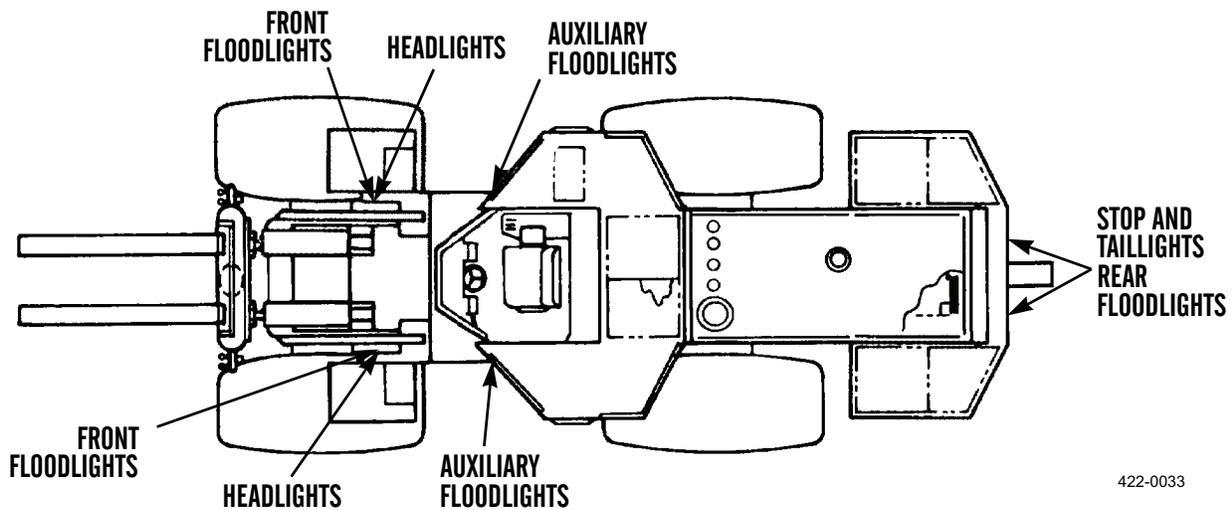
1. **Transmission Neutralizer Control Valve.** The control valve causes the transmission to shift into neutral when the left brake pedal is pushed. This provides full engine power to the hydraulic system.
2. **Service Brakes.** Service brakes are oil-activated, disc-type. Pushing either brake pedal causes pressurized oil from the brake control valve to push against discs and plates in the brake housing, causing friction. This friction causes the wheel to turn slower or stop. If the accumulator charging circuit malfunctions, causing pressure to drop below 700 psi (4,826 kPa), the brakes will automatically be activated.
3. **Emergency and Parking Brake Control Valve.** This valve controls oil flow from the accumulator to the emergency and parking brake. It is manually activated by the operator. Pulling out on the parking brake control knob, on the right side of steering column, causes the brake to be applied. Pushing in on knob causes the brake to release.



422-0032

ELECTRICAL SYSTEM

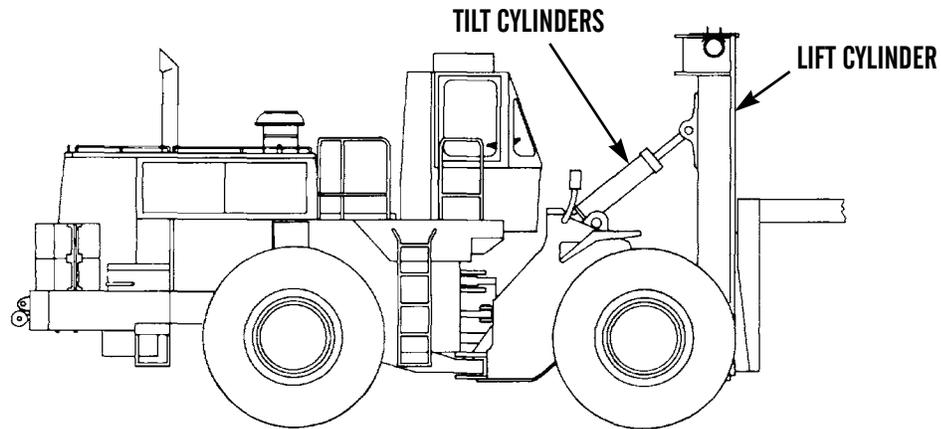
1. The electrical system consists of four 12-volt batteries connected in series-parallel with negative grounding, providing 24 volts to operate the electrical system and components.
2. The electrical system contains all the necessary switches, circuit breakers, fuses, relays, harnesses, and connectors to operate the machine, including a NATO slave receptacle.
3. The electrical system includes the following lights:
 - a. **Auxiliary Floodlights.** One on each side, on top of ROPS.
 - b. **Headlights.** One on each side of lamp group, mounted on outside.
 - c. **Front Floodlights.** One on each side of lamp group, mounted on inside.
 - d. **Stop and Taillights.** Combination light, mounted on each side of radiator guard, below floodlights.
 - e. **Rear Floodlights.** One on each side of radiator guard, above stop and taillights.



422-0033

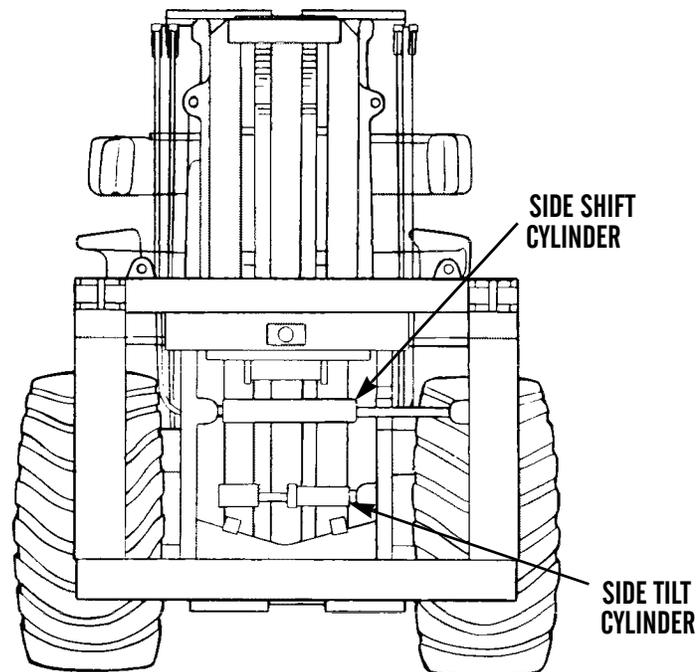
MAST HYDRAULIC SYSTEM

1. **Lift Cylinder.** The lift cylinder is a ram-type cylinder that moves up by oil pressure and moves down by gravity. The extended part of the cylinder is completely filled with oil.
2. **Tilt Cylinders.** Two double-acting tilt cylinders both extend and retract by hydraulic pressure. These cylinders control the forward and backward tilt angle of the mast.



422-0032

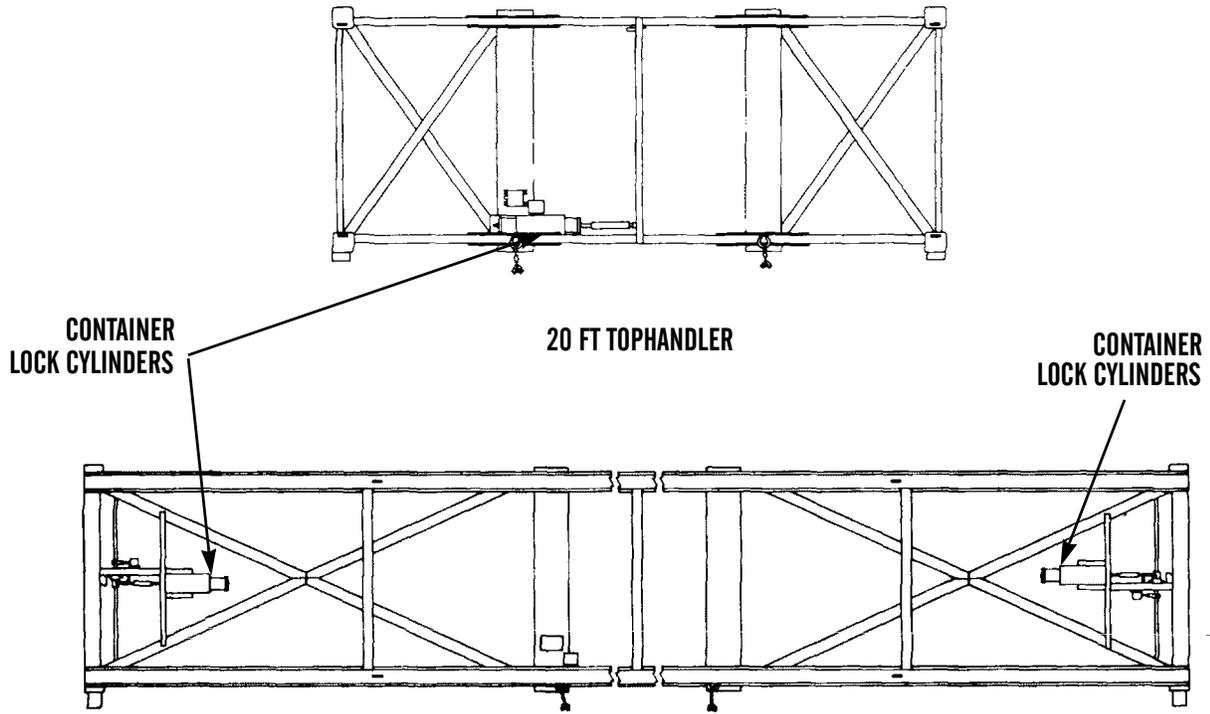
3. **Side Shift Cylinder.** A double-acting side shift cylinder controls the side shift of the forks and tophandler with respect to the center line of the machine.
4. **Side Tilt Cylinder.** This double-acting cylinder rotates the forks and tophandler.



422-0001

MAST HYDRAULIC SYSTEM - CONTINUED

5. **Container Lock Cylinders.** There is one container lock cylinder on the 20 ft tophandler and two on the 35 ft and 40 ft tophandlers. The cylinder extends to lock the tophandler to the container and retracts to release the tophandler from the container.



422-0021

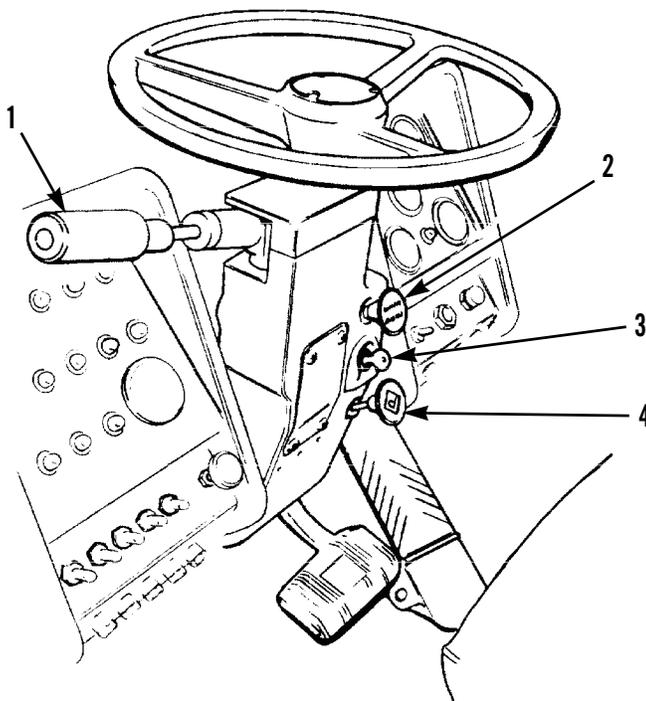
END OF WORK PACKAGE

CHAPTER 2
OPERATION INSTRUCTIONS

GENERAL

Do not attempt to operate RTCH until becoming familiar with the location and use of all controls and indicators. This work package describes all operator controls and indicators.

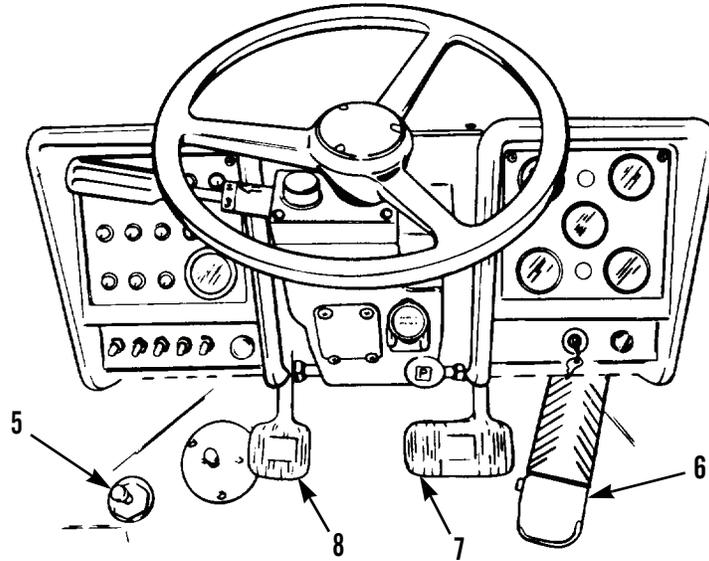
STEERING COLUMN-MOUNTED CONTROLS



422-0035

KEY	CONTROL OR INDICATOR	FUNCTION
1	Transmission Range Selector	To control direction of travel, push lever forward to select forward and pull back to select reverse. Center position is neutral. In either forward or reverse, rotate lever to select one of four forward or four reverse gears. Lower ranges yield higher power and lower speed. Higher ranges yield lower power and higher speed.
2	Steering Column Release Knob	While holding steering wheel, pull knob out to release steering column. Move column to desired position and release knob to lock column in place. Steering column release knob will not function unless steering column lock is unlocked.
3	Steering Column Lock	In locked position, key is straight up and steering column release knob is disabled. Turn key clockwise (right) to unlock and enable steering column release knob.
4	Parking Brake Control Knob	Pull knob out to engage parking brake. Push knob in to release parking brake.

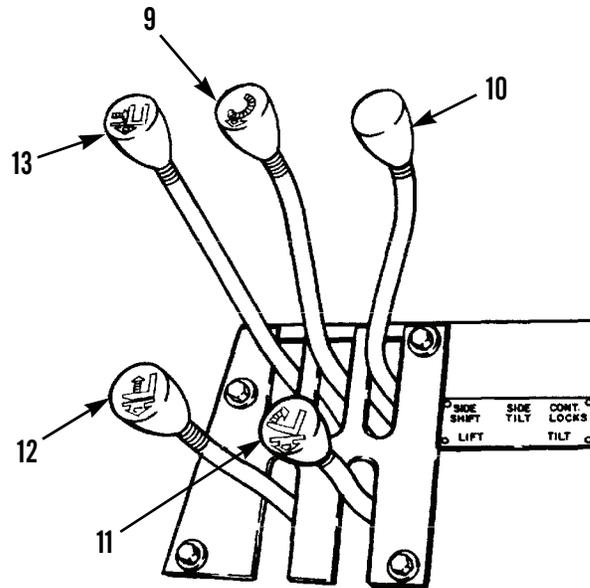
FOOT-OPERATED CONTROLS



422-0031

KEY	CONTROL OR INDICATOR	FUNCTION
5	Horn Switch	Push down to sound horn.
6	Accelerator Pedal	Press pedal to increase engine speed. Release to decrease engine speed.
7	Right Brake Pedal	Press to apply brakes.
8	Left Brake Pedal	Press to neutralize transmission and apply brakes.

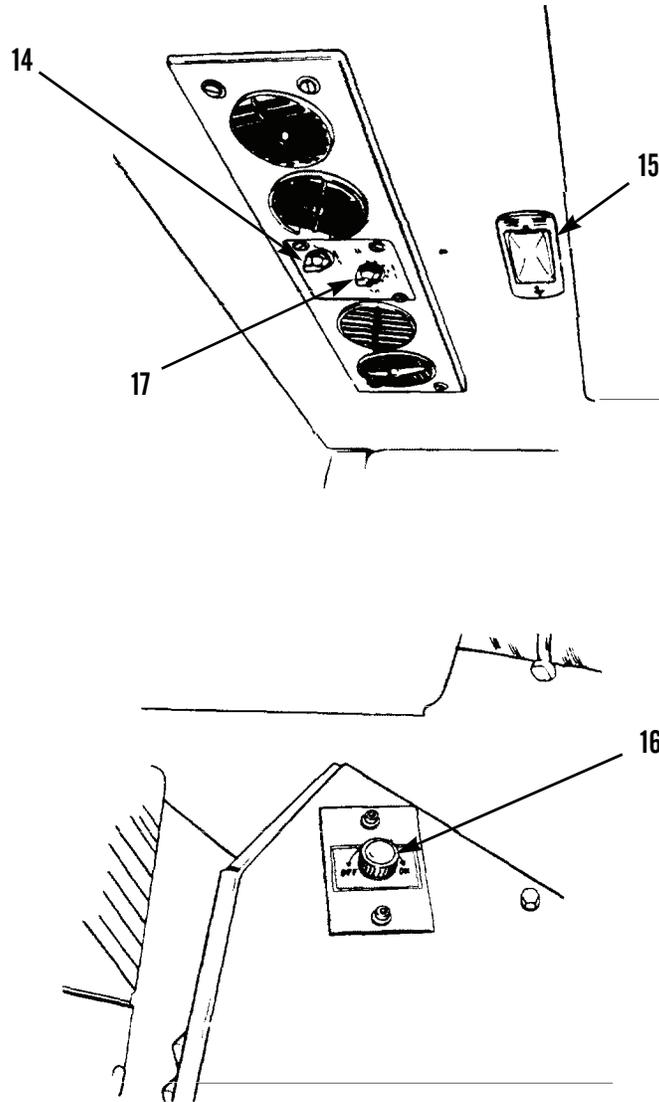
MAST CONTROLS



422-0037

KEY	CONTROL OR INDICATOR	FUNCTION
9	Side Tilt Control Lever	Tilts tophandler to the side. Pull back to tilt clockwise (right). Push forward to tilt counterclockwise (left).
10	Container Locks Control Lever	Locks tophandler to container. Pull back to lock. Push forward to unlock.
11	Tilt Control Lever	Tilts mast assembly forward or back. Pull back to tilt up. Push forward to tilt down.
12	Lift Control Lever	Raises and lowers container. Pull back to raise. Push forward to lower.
13	Side Shift Control Lever	Side shifts container. Pull back to shift right. Push forward to shift left.

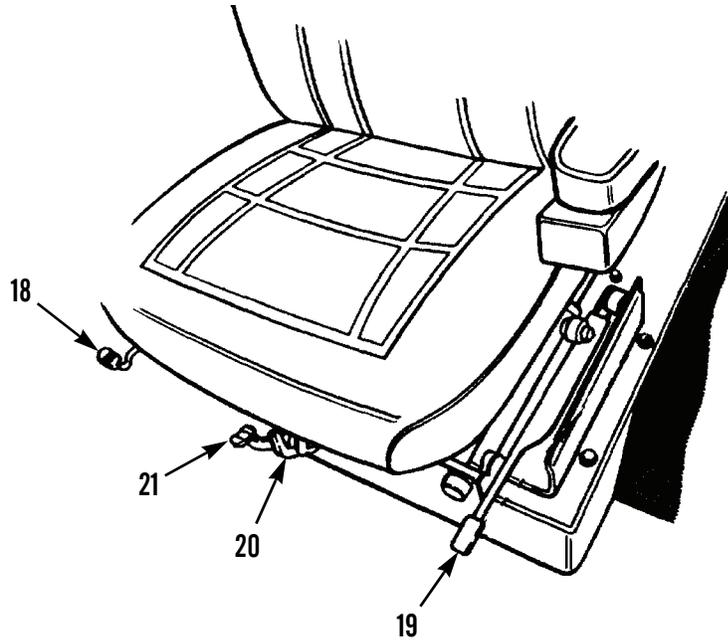
HEATER AND DOME LIGHT CONTROLS



422-0038

KEY	CONTROL OR INDICATOR	FUNCTION
14	Heater Temperature Control	Adjust switch between OFF and WARM to control amount of heat.
15	Dome Light Switch	Toggle switch between OFF and ON to control dome light.
16	Floor Heater	Located below container lock light panel. Adjust switch between OFF and ON to control amount of heat.
17	Fan Speed Control	Rotate clockwise (right) through OFF, low (L), medium (M), and high (H) settings to control heater fan speed.

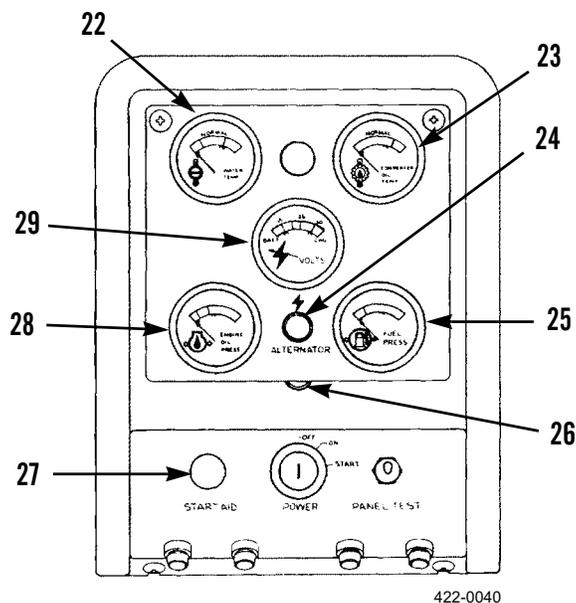
OPERATOR'S SEAT CONTROLS



422-0039

KEY	CONTROL OR INDICATOR	FUNCTION
18	Vertical (Height) Adjustment Lever	Push down to adjust seat up or down.
19	Seat Cushion Tilt Adjustment Lever	Pull up to tilt seat cushion.
20	Damper Control Lever	Pull out crank handle and rotate knob for desired amount of dampening (firm or soft).
21	Fore-Aft Adjustment Lever	Lift up and slide seat forward or back. Release lever to lock seat in desired position.

RIGHT-HAND INSTRUMENT PANEL



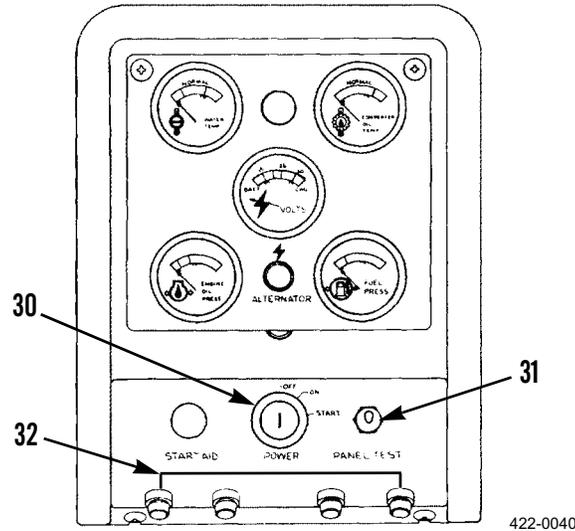
422-0040

KEY	CONTROL OR INDICATOR	FUNCTION
22	Water Temperature Gauge	Indicates engine coolant temperature: WHITE – COLD GREEN – NORMAL RED – HOT
23	Converter Oil Temperature Gauge	Indicates torque converter and transmission oil temperature: GREEN – NORMAL RED – HOT
24	Alternator Indicator	Indicates state of charging system. When engine is running, light comes on when there is a charging system malfunction. With main disconnect switch in ON position, amber indicator should be: ON during panel test ON when engine is not running OFF when engine is running
25	Fuel Pressure Gauge	Indicates primary fuel pump delivery pressure: RED – LOW GREEN – NORMAL
26	Panel Light	Provides light for switches and fuses in right-hand instrument panel.
27	Starting Aid Switch	A metered amount of starting fluid (ether) is released each time starting aid switch is operated in temperatures below 32°F (0°C).

RIGHT-HAND INSTRUMENT PANEL - CONTINUED

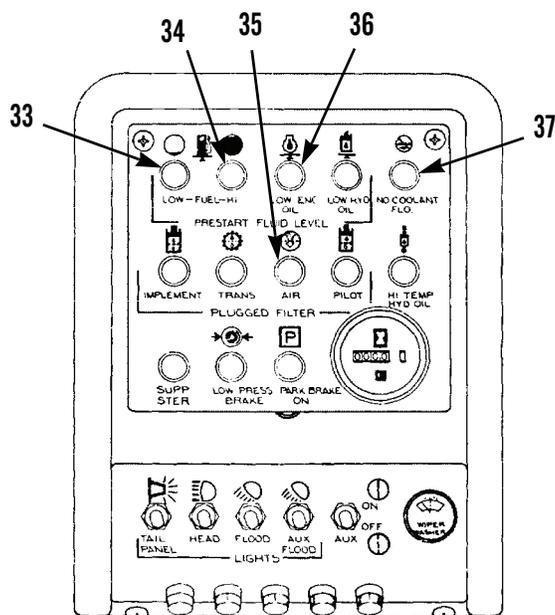
KEY	CONTROL OR INDICATOR	FUNCTION
28	Engine Oil Pressure Gauge	Indicates engine lubricating oil pressure: RED – LOW WHITE – NORMAL (Low Idle) GREEN – NORMAL (High Idle)
29	Voltmeter	Indicates electrical charging system output voltage: RED (21 volts or lower) – Bad battery charge when engine RPM is at low idle BLACK AND WHITE (21 to 24 volts) – below normal battery charge when engine RPM is at low idle BLACK AND GREEN (24 to 26 volts) – normal battery charge when engine RPM is at low idle GREEN (26 to 30 volts) – normal battery charge when engine RPM is at high idle RED (30 volts or higher) – above-normal battery charge when engine RPM is at high idle

RIGHT-HAND INSTRUMENT PANEL - CONTINUED



KEY	CONTROL OR INDICATOR	FUNCTION
30	Power Switch	Three-position keyed switch: ON turns on electrical system power when key is turned clockwise (right) to ON position. OFF turns off electrical system power when key is turned counter-clockwise (left) to OFF position. START starts engine when key is turned all the way clockwise (right) to START position and held. Returns to ON position when released.
31	Panel Test Switch	With main disconnect switch and power switch in ON position, push upward and hold to turn on all indicator lamps in right-hand and left-hand instrument panels, to check for burned out lamps.
32	Fuses	Protect machine electrical circuitry.

LEFT-HAND INSTRUMENT PANEL

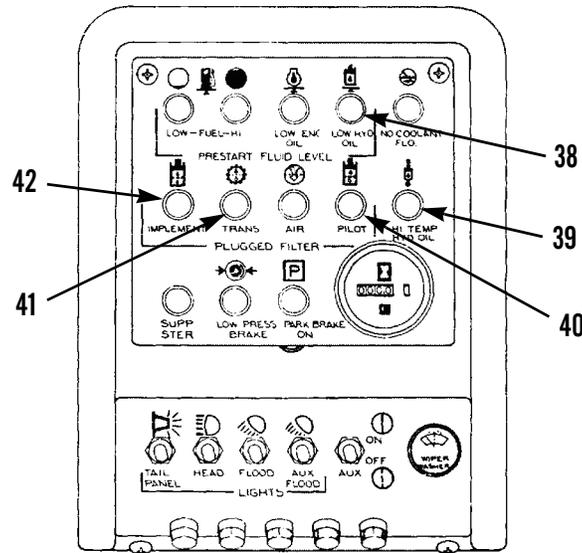


422-0041

LEFT-HAND INSTRUMENT PANEL

KEY	CONTROL OR INDICATOR	FUNCTION
33	Low Fuel Level Indicator	Amber indicator lamp should be: ON when testing panel lamps. ON if fuel level is less than 10% of tank capacity, whether engine is running or not.
34	High Fuel Level Indicator	Green indicator lamp should be: ON when testing panel lamps. ON only if enough fuel in tank for 10-hour day. Engine is not running. OFF during normal operation with engine running.
35	Air Cleaner Indicator	Amber indicator lamp should be: ON when testing panel lamps. OFF during normal operation or when engine is not running. ON when filter becomes plugged while engine is running.
36	Low Engine Oil Level Indicator	Amber indicator lamp should be: ON when testing panel lamps. ON when oil level in engine oil pan is low and engine is not running. OFF during normal operation with engine running.
37	No Coolant Flow Indicator	Amber indicator lamp should be: ON when testing panel lamps. ON when engine is not running. OFF during normal engine operation. ON and HORN WILL SOUND when coolant flow stops while engine is running.

LEFT-HAND INSTRUMENT PANEL - CONTINUED

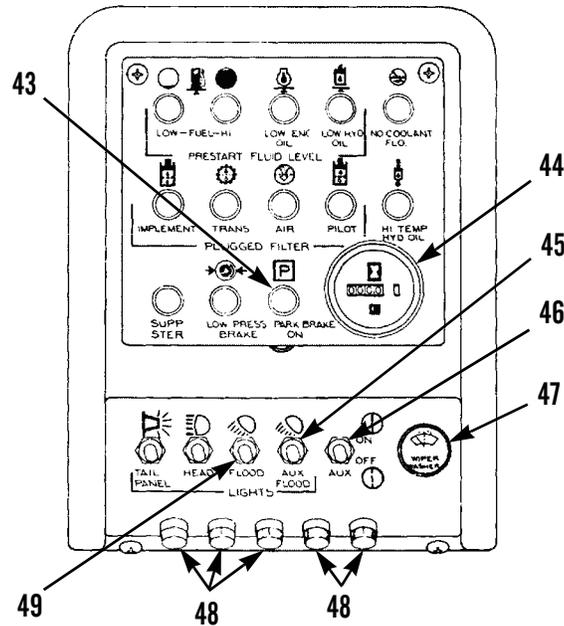


LEFT-HAND INSTRUMENT PANEL

422-0041

KEY	CONTROL OR INDICATOR	FUNCTION
38	Low Hydraulic Oil Level Indicator	Amber indicator lamp should be: ON when testing panel lamps. ON when hydraulic oil level in hydraulic tank is low and engine is not running. OFF during normal operation with engine running.
39	Hydraulic Oil High Temperature Indicator	Amber indicator lamp should be: ON when testing panel lamps. OFF during normal operation or when engine is not running. ON when temperature of oil in hydraulic tank is high while engine is running.
40	Brake Oil Filter Indicator (PILOT)	Amber indicator lamp should be: ON when testing panel lamps. OFF during normal operation or when engine is not running. ON when brake oil filter becomes plugged while engine is running.
41	Transmission Oil Filter Indicator	Amber indicator lamp should be: ON when testing panel lamps. OFF during normal operation or when engine is not running. ON when transmission filter becomes plugged while engine is running.
42	Hydraulic Tank Internal Oil Filter Indicator (IMPLEMENT)	Amber indicator lamp should be: ON when testing panel lamps. OFF during normal operation or when engine is not running. ON when filter in hydraulic tank becomes plugged while engine is running.

LEFT-HAND INSTRUMENT PANEL - CONTINUED

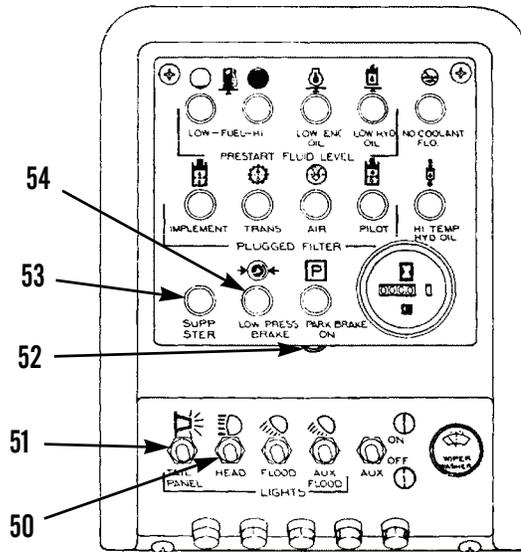


LEFT-HAND INSTRUMENT PANEL

422-0041

KEY	CONTROL OR INDICATOR	FUNCTION
43	Parking Brake On Indicator	<p>NOTE</p> <p>A warning buzzer behind cab will sound when parking brake is engaged and transmission is in forward or reverse.</p> <p>Red indicator lamp should be:</p> <ul style="list-style-type: none"> ON when testing panel lamps. ON when parking brake is engaged and engine is not running. OFF during normal operation with engine running.
44	Service Meter	Indicates hours machine has been in service with engine running. Used by maintenance personnel to schedule maintenance. Meter indicates up to 9,999 hours.
45	Auxiliary Floodlight Switch	Push up to turn on auxiliary floodlights on top of cab.
46	Auxiliary Switch	Push up to connect 24 VDC power to auxiliary connector at back of cab.
47	Windshield Wiper and Washer Switch	Turn knob clockwise (right) one or two clicks to turn on front and rear windshield wipers. ONE CLICK – LOW SPEED TWO CLICKS – HIGH SPEED Push knob in to turn on front windshield washer pump.
48	Fuses	Protect machine electrical circuitry.
49	Floodlight Switch	Push up to turn on front and rear floodlights.

LEFT-HAND INSTRUMENT PANEL - CONTINUED



LEFT-HAND INSTRUMENT PANEL

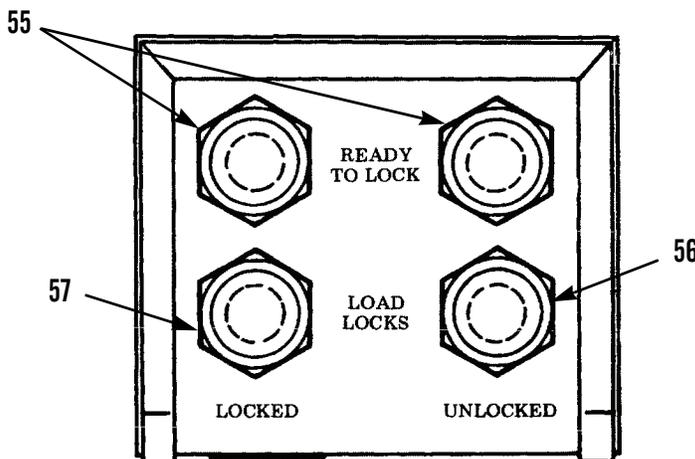
422-0041

KEY	CONTROL OR INDICATOR	FUNCTION
50	Headlight Switch	Push up to turn on headlights.
51	Tail and Panel Light Switch	Push up to turn on instrument panel lights, gage lights, and taillights.
52	Panel Light	Provides light for switches and fuses in left-hand instrument panel.
53	Supplemental Steering Indicator	Red indicator lamp should be: ON when testing panel lamps. ON when vehicle is operating with supplemental steering only and engine is running. ON when engine is not running. OFF when engine is running and machine is operating in normal steering mode.
54	Low Brake Pressure Indicator	Red indicator lamp: Should be ON when testing panel lamps. Will flash ON and OFF when accumulator oil pressure is low. Should be OFF when engine is running and brake pressure is normal.

CONTAINER LOCK INDICATOR PANEL

NOTE

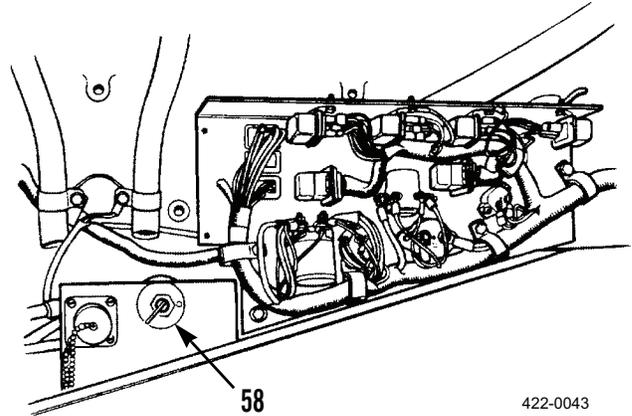
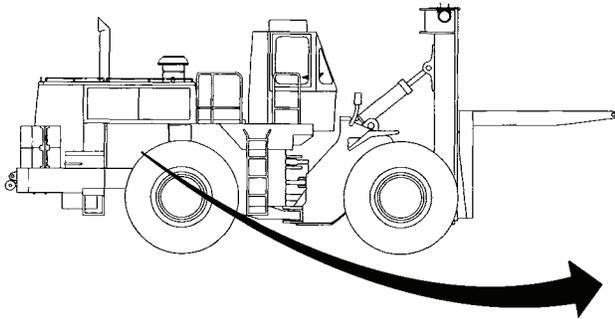
To test for burned out lamps on container lock indicator panel, press lenses inward while main disconnect switch is in ON position.



422-0042

KEY	CONTROL OR INDICATOR	FUNCTION
55	Ready to Lock Indicators	<p>NOTE</p> <p>Both yellow lights must be ON before attempting to lock tophandler container locks to container.</p> <p>Both yellow indicator lights should be:</p> <ul style="list-style-type: none"> ON – When testing light. ON – When tophandler container locks are engaged in top of container and ready to lock. <ul style="list-style-type: none"> Left light ON – Left side engaged Right light ON – Right side engaged ON – During lifting and while moving container. OFF – When tophandler container locks are disengaged.
56	Load Locks Unlocked Indicator	Red indicator light will be ON any time tophandler container locks are in unlocked position.
57	Load Locks Locked Indicator	<p>NOTE</p> <p>Green indicator light will not come on unless both READY TO LOCK indicators are on.</p> <p>Green indicator light must be ON before lifting container to ensure that all four comers of tophandler are locked to container. Remains ON after locking and while lifting and moving container.</p>

MAIN DISCONNECT SWITCH



422-0043

KEY	CONTROL OR INDICATOR	FUNCTION
58	Main Disconnect Switch	<p style="text-align: center;">CAUTION</p> <p>DO NOT turn switch to OFF when engine is running, or damage to electrical components will result.</p> <p>Turn switch counterclockwise (left) to OFF to remove ground from machine electrical circuits when performing maintenance in engine compartment or on any electrical circuits, or anytime machine is left unattended. Rotate switch clockwise (right) to ON to connect ground to machine electrical systems.</p>

END OF WORK PACKAGE

GENERAL

This machine has been designed to operate safely and efficiently within the limits specified in this TM. Operation beyond these limits is prohibited in accordance with AR 70-1 without written approval from: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-DSA-CS, Warren, MI 48397-5000.

**WARNING**

Hearing protection is required when operating machine with cab windows open. Anyone within 50 ft (15 m) of an operating machine must also wear hearing protection. Failure to wear hearing protection may cause hearing loss.

1. This work package contains instructions for safely operating this machine under usual conditions.
2. Read and become familiar with information in this work package BEFORE operating machine.
3. Operation under unusual conditions is described in WP 0006 00.

MOUNTING AND DISMOUNTING MACHINE**WARNING**

Use caution and maintain three-point contact all times when mounting and dismounting machine. DO NOT use steering wheel as a handhold. Failure to follow this warning may cause injury to personnel.

1. Mount and dismount machine only at locations with steps and/or grab handles.
2. Ensure steps and/or grab handles are clean and secure before using them.
3. Face machine when mounting and dismounting.
4. Maintain minimum three-point contact at all times, i.e., two feet and one hand or two hands and one foot.
5. Never mount or dismount a moving machine.
6. Never jump from machine.
7. DO NOT mount or dismount machine while carrying tools or supplies.

INITIAL ADJUSTMENTS AND DAILY CHECKS**NOTE**

Refer to WP 0004 00 for the location and operation of controls and indicators.

1. Ensure main disconnect switch is in clockwise (right) ON position.
2. Perform *Before* operation Preventive Maintenance Checks and Services (PMCS) BEFORE starting engine (WP 0011 00 and WP 0012 00).

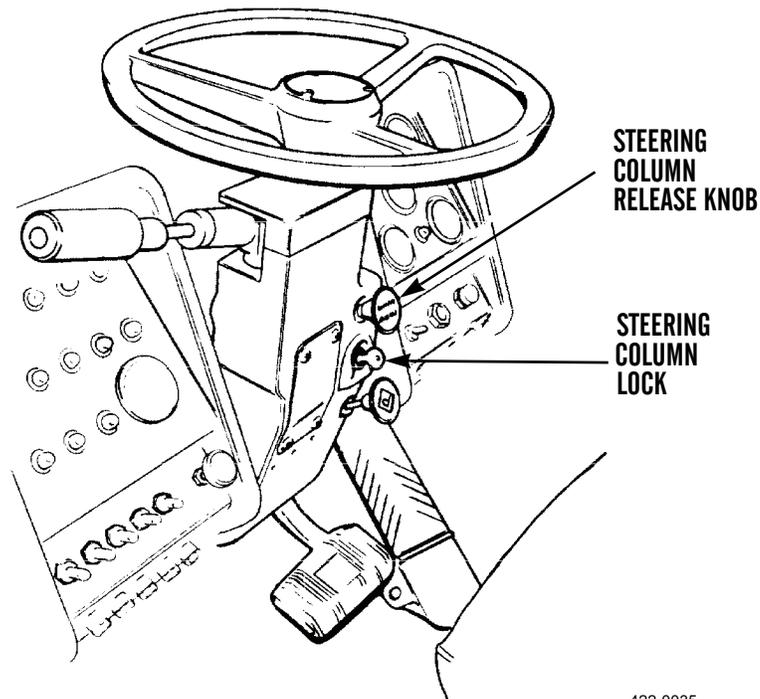
INITIAL ADJUSTMENTS AND DAILY CHECKS - CONTINUED

3. Occupy seat. Adjust seat to allow full brake pedal travel, with operator's back against seat back. This will permit application of maximum force on brake pedal.
4. Adjust rearview and exterior side view mirrors as required.

WARNING

DO NOT operate machine unless seat belt has been fastened. Failure to follow this warning may cause injury or death to personnel.

5. Fasten seat belt.
6. Turn steering column lock key clockwise (right) to unlock column release knob.
7. Hold steering wheel and pull column release knob out.
8. Adjust column and release knob when column is in desired position.



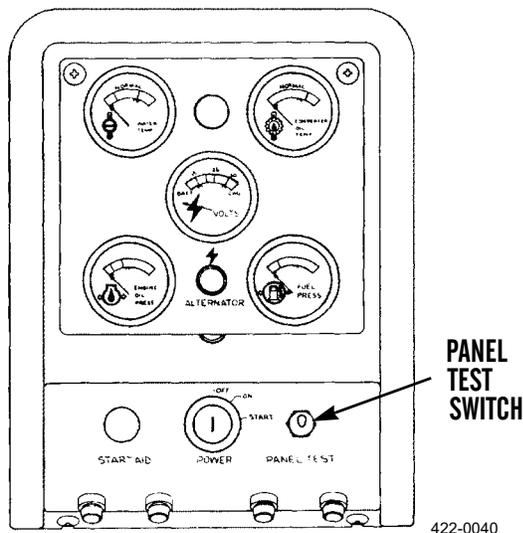
422-0035

INITIAL ADJUSTMENTS AND DAILY CHECKS - CONTINUED

NOTE

DO NOT start engine at this time.

9. Turn power switch on right-hand instrument panel to ON and perform panel test:
 - a. Press PANEL TEST switch. All indicator lights must illuminate.



- b. If all lights do not illuminate, refer to WP 0009 00 to perform troubleshooting.
10. Release panel test switch and observe indicators. They should indicate as follows:
 - a. HIGH FUEL indicator ON. If indicator does not come on, add fuel (WP 0012 00).
 - b. NO COOLANT FLOW indicator ON.
 - c. LOW ENG OIL indicator OFF. If light is on, add engine oil (WP 0011 00 and WP 0012 00).
 - d. LOW HYD oil indicator OFF. If light is on, add oil to hydraulic tank (WP 0011 00 and WP 0012 00).
 - e. PLUGGED FILTER indicators all OFF. If indicator on, notify Organizational Maintenance.
 - f. HI TEMP HYD OIL indicator OFF. If indicator on, notify Organizational Maintenance.
 - g. SUPP STER indicator ON.
 - h. LOW PRESS BRAKE indicator flashing ON and OFF.
 - i. PARK BRAKE ON indicator ON if parking brake is engaged.
 - j. ALTERNATOR INDICATOR ON.

START ENGINE**WARNING**

- DO NOT operate engine in enclosed areas due to the dangers of carbon monoxide poisoning from exhaust fumes. Always start and operate engine in a well-ventilated area and, if in an enclosed area, vent exhaust to the outside. Failure to follow this warning may cause injury or death to personnel.
- Hearing protection is required when operating machine with cab windows open. Anyone within 50 ft (15 m) of an operating machine must also wear hearing protection. Failure to wear hearing protection may cause hearing loss.
- Be ALERT for personnel in the area while operating machine. Always check to ensure area is clear of personnel before starting engine. Failure to follow this warning may cause injury or death to personnel.

NOTE

Refer to WP 0004 00 for the location and operation of controls and indicators.

1. **Starting Engine Above 32°F (0°C).**

- a. Ensure transmission is in N (Neutral).
- b. Ensure parking brake is applied by pulling parking brake control knob out.
- c. Ensure all hydraulic control levers are in a neutral position.
- d. Ensure all accessories are off.
- e. Ensure all personnel are clear of machine.
- f. Press and hold accelerator pedal 1/4 way down.

CAUTION

DO NOT crank starter motor for more than 30 seconds at a time. After 30 seconds, allow starter motor to cool for at least 2 minutes before attempting to start engine again. Excessive heating of starter motor may result in damage or premature starter failure.

- g. Turn power switch to START position.
- h. Release power switch when engine starts.
- i. If engine does not start after 30 seconds, let starter cool for two minutes, then try to start again.
- j. If engine oil pressure indicator does not stop flashing within 10 seconds after engine starts, stop engine by turning off power switch. Perform troubleshooting.
- k. After engine has started, verify that the following indicator lights are OFF:
 - (1) NO COOLANT FLOW indicator. If indicator does not turn OFF, perform troubleshooting.
 - (2) SUPP STER indicator. If indicator does not turn OFF, perform troubleshooting.
 - (3) LOW PRESS BRAKE indicator. If indicator does not stop flashing, perform troubleshooting.
 - (4) ALTERNATOR INDICATOR. If indicator does not turn OFF, perform troubleshooting.
- l. Proceed to *Machine Warmup*.

START ENGINE - CONTINUED

2. **Starting Engine Below 32°F (0°C) Using Ether Starting Aid.**
 - a. Ensure transmission is in N (Neutral).
 - b. Ensure parking brake is applied by pulling parking brake control knob out.
 - c. Ensure all hydraulic control levers are in a neutral position.
 - d. Ensure all accessories are off.
 - e. Ensure all personnel are clear of machine.
 - f. Press and hold accelerator pedal 1/4 way down.

CAUTION

DO NOT crank starter motor for more than 30 seconds at a time. After 30 seconds, allow starter motor to cool for at least 2 minutes before attempting to start engine again. Excessive heating of starter motor may result in damage or premature starter failure.

- g. Turn power switch to START position.

CAUTION

Use ether starting aid sparingly and for cold starting purposes ONLY. Excessive ether without cranking can cause piston and ring damage.

NOTE

Inject ether only while cranking engine or after initial start-up, until engine is running smoothly.

- h. Push ether starting aid switch down for 2-3 seconds, then release for 2-3 seconds. Operate switch at 2-3 second intervals as engine is cranked. Continue to use switch at 2-3 second intervals until engine starts and is running smoothly.
- i. Release power switch when engine starts.
- j. If engine does not start after 30 seconds, let starter cool for two minutes, then try to start again.
- k. If engine oil pressure indicator does not stop flashing within 10 seconds after engine starts, stop engine by turning off power switch. Perform troubleshooting.
- l. After engine has started, verify that the following indicator lights are OFF:
 - (1) NO COOLANT FLOW indicator. If indicator does not turn OFF, perform troubleshooting.
 - (2) SUPP STER indicator. If indicator does not turn OFF, perform troubleshooting.
 - (3) LOW PRESS BRAKE indicator. If indicator does not stop flashing, perform troubleshooting.
 - (4) ALTERNATOR INDICATOR. If indicator does not turn OFF, perform troubleshooting.
- m. Proceed to *Machine Warmup*.

MACHINE WARMUP

1. Operate engine at low idle for five minutes to warm up engine. During warmup, monitor instrument panel indicators for any signs of abnormal temperatures or pressures. Shut down engine at the first sign of a problem.
2. Continue to warm up machine as follows:
 - a. If temperature is greater than 32°F (0°C), warm up machine for a total of approximately 15 minutes.
 - b. If temperature is less than 32°F (0°C), warm up machine for a total of approximately 30 minutes.
 - c. If temperature is less than 0°F (-18°C) or if hydraulic functions are sluggish, additional time may be needed.
3. Cycle steering and machine controls to assist in hydraulic system warmup. Ensure that all are functioning properly.

OPERATE MACHINE**WARNING**

- Be ALERT for personnel in the area while operating machine. Always check to ensure area is clear of personnel and obstructions before moving machine or raising or lowering container handler forks. Failure to follow this warning may cause injury or death to personnel or damage to equipment.
- DO NOT allow riders on machine. Failure to follow this warning may cause injury or death to personnel.
- To avoid tipping over, be careful when crossing or working on hills, banks or slopes. Look behind machine before backing up. Wear your seat belt. Know stopping distance of your machine at any speed, then adjust speed accordingly. Match speed with job conditions. Do not coast. Failure to follow this warning may cause injury or death to personnel or damage to equipment.

NOTE

- Without a load, drive forward, not reverse, when traveling long distance. With a load, travel in reverse. Know traffic pattern of job. Obey flag men, road signs, and signals. Carry load close to ground.
- Refer to WP 0004 00 for the location and operation of controls and indicators.

1. **Transmission Ranges.**

- a. N (Neutral) is normal transmission position when machine is not in use. Use N to start engine, when idling engine, and for parking. Always lock transmission in Neutral by applying parking brake when machine is left unattended, parked or stopped.
- b. To select a specific reverse gear range, pull transmission range selector back and rotate to desired gear, normally second or third. Backup alarm will sound when in a reverse gear.
- c. To select a specific forward gear range, push transmission range selector forward and rotate to desired gear, normally second or third.

WARNING

- Ensure all personnel are clear of machine and work area.
 - Ensure your seat belt is fastened.
 - DO NOT coast down hills. Keep transmission engaged.
- d. Downshift one position at a time when reducing engine and ground speeds. Downshift when going downhill (to same gear used to climb grade) or when operating on side slopes where high speed may compromise safety.

OPERATE MACHINE - CONTINUED2. **Driving RTCH.****WARNING**

DO NOT move machine if LOW PRESS BRAKE light is flashing on and off. Shut down engine and report problem.

- a. Press and hold right brake pedal.

NOTE

If transmission is placed in gear with parking brake on, park brake on indicator light will come on and a warning buzzer will sound.

- b. Push parking brake control knob in to release parking brake.
- c. Move transmission range selector to desired direction of travel.
- d. Rotate transmission range selector to desired speed:
 - (1) Low ranges for extra power.
 - (2) High ranges for faster speed.
- e. Release right brake pedal.

NOTE

- During operation, watch gauges and indicators often. All gauges must indicate in normal range and all indicators must operate properly.
 - Operate under a light load for the first five minutes.
- f. Press accelerator pedal to move machine faster. Release accelerator pedal and machine will resume governed speed.
 - g. Upshift one position at a time as engine and ground speeds increase.
 - h. Downshift one position at a time while at the same time reducing machine speed with service brake applications.

3. **Steering RTCH.****WARNING**

Drive carefully, alertly, and at an appropriate speed for road conditions. Remember that machine has articulated frame steering and will require special handling.

- a. Operator controls machine direction using steering wheel.
- b. Become familiar with steering characteristics of machine before attempting maneuvers in limited space. Avoid oversteering.
- c. In the event of steering system failure, perform the following:
 - (1) Stop machine in a safe location.
 - (2) Apply parking/emergency brake.
 - (3) Shut down engine and troubleshoot malfunction.
 - (4) DO NOT operate machine until problem has been corrected.

OPERATE MACHINE - CONTINUED4. **Stopping/Parking RTCH.**

- a. Release accelerator pedal to reduce engine speed.

WARNING

- DO NOT use parking brake to stop a moving machine under usual conditions.
 - Only if service brakes fail, apply parking brake. Failure to follow these warnings may result in injury or death to personnel or damage to equipment.
- b. Apply right brake pedal to stop machine. Select a level surface to stop/park if possible.
 - c. Move transmission range selector to neutral.

WARNING

NEVER leave operator compartment without applying parking brake. Failure to follow this warning may cause injury or death to personnel in the event machine moves inadvertently when parked.

- d. Apply parking brake by pulling out on parking brake control knob.
- e. Lower forks/tophandler to the ground by pushing lift control lever forward.

ENGINE SHUTDOWN**CAUTION**

- Stopping engine immediately after it has been operating under a load can result in overheating and accelerated wear of engine components.
- The following shutdown procedures allow engine to cool. This will prevent excessive temperatures in turbocharger center housing. Failure to shut down engine properly may cause premature engine failure.
- Avoid prolonged idling as this may cause sludge buildup in engine.

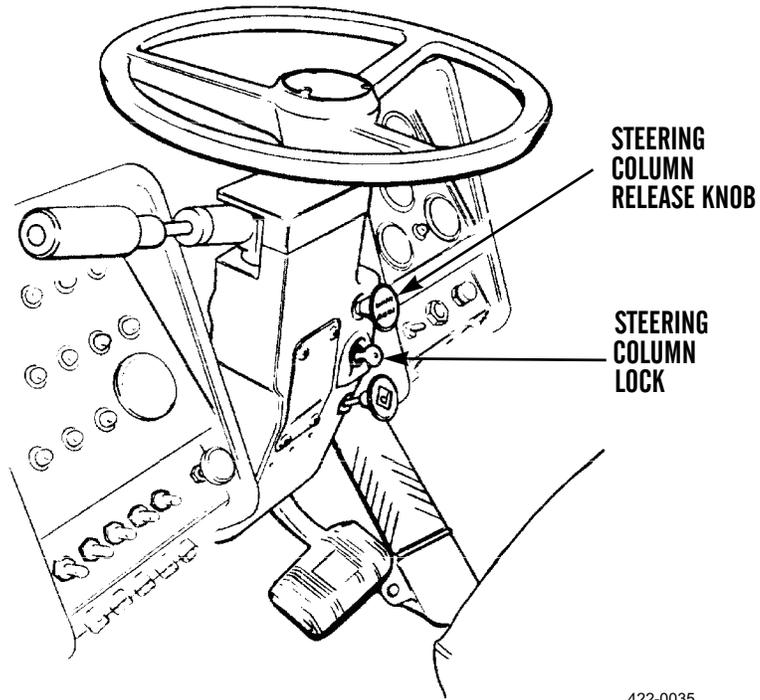
NOTE

Refer to WP 0004 00 for the location and operation of controls and indicators.

1. Operate engine at half speed for five minutes.
2. Operate engine at low idle for 30 seconds.
3. Turn power switch off and remove key.

ENGINE SHUTDOWN - CONTINUED

4. Turn steering column lock key clockwise (right) to unlock column release knob.
5. Hold steering wheel and pull column release knob out.
6. Move steering column all the way forward to stowed position. Release column release knob.



422-0035

7. Dismount machine.
8. Turn main disconnect switch counterclockwise (left) to OFF position.
9. Chock wheels.

AFTER OPERATION

1. Perform *After* operation PMCS (WP 0011 00 and WP 0012 00).
2. Remove key from main disconnect switch.
3. Close and lock doors and windows.

LOADING AND UNLOADING CONTAINER**WARNING**

- NEVER operate RTCH or move load near a power line or overhead wires. Failure to follow this warning may result in injury or death to personnel or damage to equipment.
- Be ALERT for personnel in the area while operating machine. Always check to ensure area is clear of personnel and obstructions before moving machine or raising or lowering container handler forks. Failure to follow this warning may cause injury or death to personnel or damage to equipment.

NOTE

- During lifting operation, do not exceed maximum lifting capacity of 50,000 lb (22,700 kg).
- Refer to WP 0004 00 for the location and operation of controls and indicators.

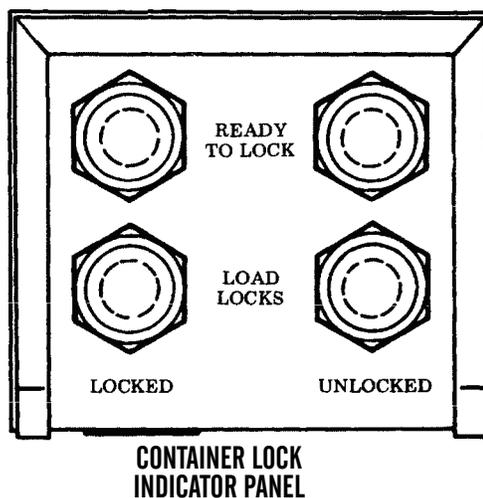
1. **Loading.**

- a. Center and level tophandler when approaching container.
- b. Position front of machine to broadside of container.

NOTE

Tophandler aligning arm mounting bolts will break under pressure to prevent damage to container or tophandler. If bolts break, notify Organizational Maintenance.

- c. Approach container cautiously.
- d. Position container locks over container corners, using tophandler corner guides.
- e. Push lift control lever to lower container locks into container fittings. Ensure that BOTH yellow READY TO LOCK lights come on. One light means only one container locks is in position. Red LOAD LOCKS UNLOCKED light will also be on.
- f. Pull container locks control lever to lock tophandler to container. Ensure that green LOAD LOCKS LOCKED light comes on. Two yellow READY TO LOCK lights will also stay on, but red LOAD LOCKS UNLOCKED light will go out.



422-0042

LOADING AND UNLOADING CONTAINER - CONTINUED

1. **Loading - Continued.**

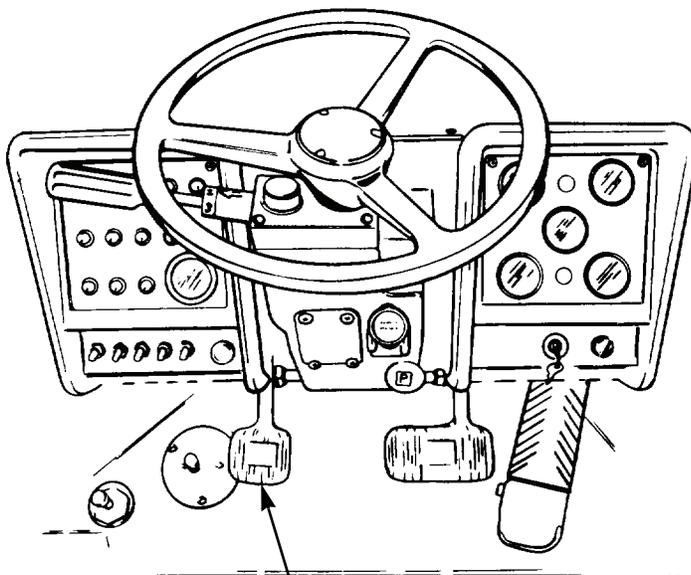
WARNING

DO NOT lift container unless green LOAD LOCKS LOCKED light is on. Failure to follow this warning may result in injury or death to personnel or damage to equipment.

NOTE

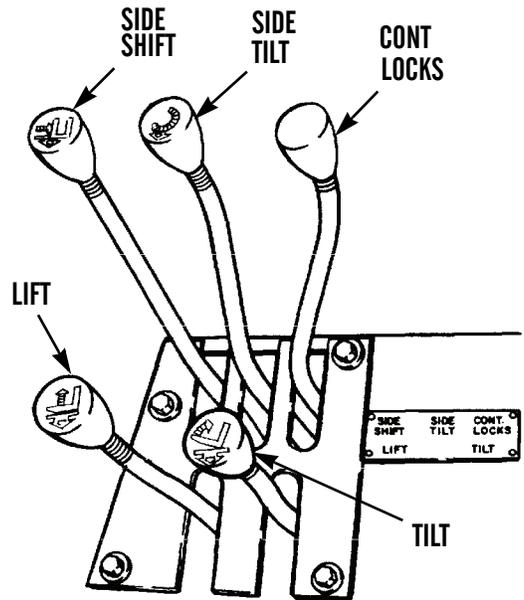
Left brake pedal disengages transmission to provide higher engine speed during lifting.

- g. Press left brake pedal while accelerating and pull lift control lever to lift container to minimum traveling height of 12 in. (30 cm) from ground.
- h. Use side shift control lever to center load for carrying.
- i. Use tilt control lever to tilt load full back for carrying.



422-0031

LEFT BRAKE PEDAL

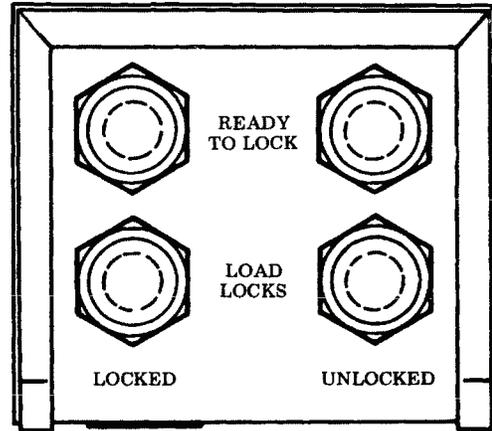


422-0037

LOADING AND UNLOADING CONTAINER - CONTINUED

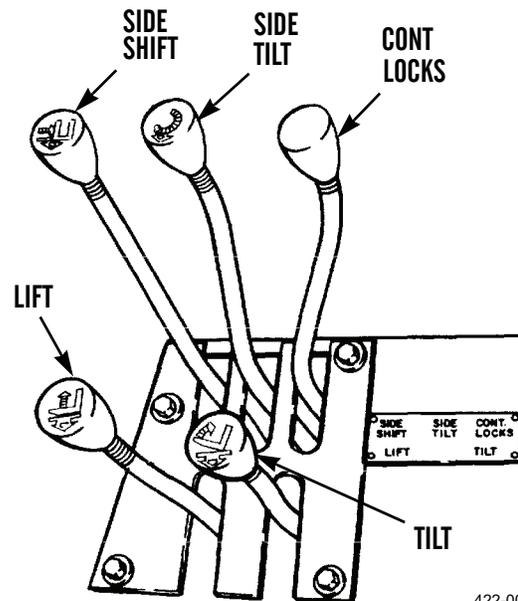
2. **Unloading.**

- a. Use side shift control lever, tilt control lever, and side tilt control lever to position container at drop-off point.
- b. If stacking container on another container on ground, use lift control lever to position loaded container over container on ground.
- c. When container to be unloaded is in full contact with the ground or with other container (when stacking), push container locks control lever to unlock tophandler container locks.
- d. Observe LOAD LOCKS UNLOCKED red light on. Two yellow READY TO LOCK lights will stay on.
- e. Pull lift control lever to clear tophandler from container. Two yellow READY TO LOCK lights will go off.
- f. Carefully back away from drop-off point.
- g. Use side shift control lever, tilt control lever, and side tilt control lever to center and level tophandler.



**CONTAINER LOCK
INDICATOR PANEL**

422-0042



422-0037

TOPHANDLER REMOVAL AND INSTALLATION**WARNING**

Be ALERT for personnel in the area while operating machine. Always check to ensure area is clear of personnel and obstructions before moving machine or raising or lowering container handler forks. Failure to follow this warning may cause injury or death to personnel or damage to equipment.

NOTE

It will be necessary to change tophandlers to accommodate different size containers. 35 ft and 40 ft tophandlers are available as AAL items (WP 0015 00).

1. **Removal.****NOTE**

Tophandler can only be lowered to 7 ft (2.1 m) above ground level.

- a. Lower tophandler to rest on an elevated support, such as a container.

**WARNING**

DO NOT disconnect or remove any hydraulic system line or fitting unless engine is shut down and hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death to personnel.

- b. Shut down engine. Move hydraulic control levers through all positions to relieve hydraulic system pressure.

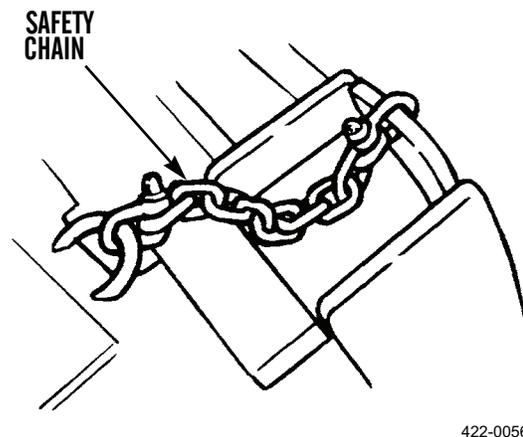
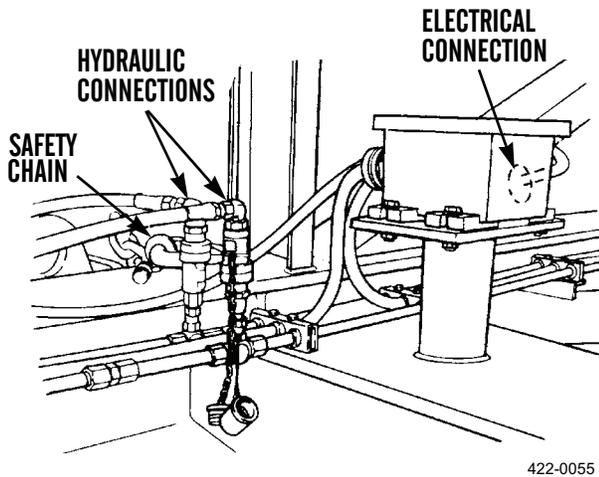
TOPHANDLER REMOVAL AND INSTALLATION - CONTINUED

1. **Removal - Continued.**

NOTE

For access to hydraulic and electrical connections, it will be necessary to climb up fender and stand on tire (left side).

- c. Disconnect two hydraulic connections at tophandler. Cap or plug openings.
- d. Disconnect electrical connector.
- e. Remove two safety chains.
- f. Start engine.
- g. Back RTCH slowly and directly away from tophandler until forks are clear.



2. **Installation.**

- a. Slowly approach tophandler, which is resting on an elevated support, such as a container.
- b. Insert forks into openings on tophandler.
- c. Inch RTCH forward until forks are fully inserted into tophandler.



WARNING

DO NOT disconnect or remove any hydraulic system line or fitting unless engine is shut down and hydraulic system pressure has been relieved. Tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death to personnel.

- d. Shut down engine. Move hydraulic control levers through all positions to relieve hydraulic system pressure.
- e. Install and secure two safety chains.
- f. Connect electrical connector.
- g. Connect two hydraulic connections.

END OF WORK PACKAGE

GENERAL**WARNING**

This machine has been designed to operate safely and efficiently within the limits specified in this TM. Operation beyond these limits is prohibited in accordance with AR 70-1 without written approval from: Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-DSA-CS, Warren, MI 48397-5000.

This section contains instructions for safely operating the RTCH under unusual conditions. In addition to normal preventive maintenance, special care must be taken to keep the machine operational in extreme temperatures and other environmental conditions.

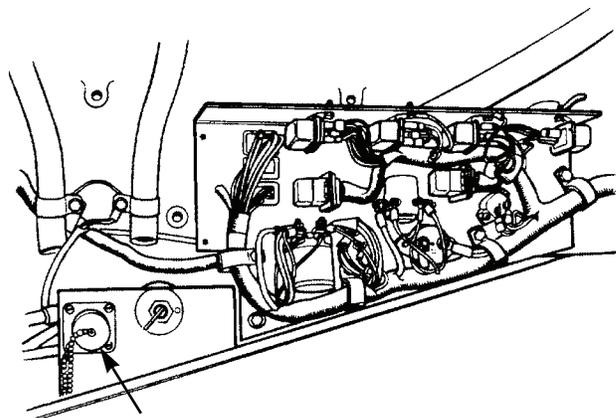
SLAVE STARTING**WARNING**

- When slave starting, use NATO slave cable that does NOT have loose or missing insulation.
- DO NOT proceed if suitable cable is not available.
- DO NOT use civilian-type jumper cables.
- DO NOT allow disabled and booster machines to come in contact with each other at any time during slave starting. Failure to follow these warnings may cause injury or death to personnel.

NOTE

Ensure that both disabled machine and booster machine are equipped with serviceable NATO slave receptacles.

1. Remove slave receptacle cover on disabled machine and booster machine.
2. Connect slave cable to booster machine slave receptacle.
3. Connect other end of slave cable to slave receptacle of disabled machine, located on right side of engine compartment.
4. Turn main disconnect switch of disabled machine to ON position.
5. Start booster machine and run at a speed just above idle.
6. Wait approximately five minutes, then start disabled machine. If engine fails to start, notify Organizational Maintenance.
7. After starting disabled machine, return booster machine to idle.
8. Remove slave cable from disabled machine, then from booster machine.



NATO SLAVE RECEPTACLE

422-0044

OPERATE IN EXTREME COLD1. **General.**

Extreme cold causes many problems:

- a. Lubricants thicken or congeal.
- b. Batteries may freeze or lose their electrical efficiency.
- c. Electrical insulation may crack and cause short circuits.
- d. Fuel may not readily atomize for combustion.
- e. Various materials will become hard, brittle, and easily damaged.
- f. The cooling system requires adequate protection from extreme cold.
- g. Fuels, lubricants, and antifreeze compounds require special storage, handling, and use.

Refer to FM 9-207 for additional information.

2. **Cooling System.**

- a. Inspect for leaks and general condition.
- b. Make sure clamps are tight.
- c. Check fluid level in radiator.
- d. Notify Organizational Maintenance if system needs service.

3. **Fuel Tank.**

- a. Do not allow fuel tank to remain partially empty for a long period of time in extremely cold weather.
- b. Fill fuel tank after each work period to help avoid water condensation in tank.
- c. Remove all ice and snow from around fuel filler opening before refueling.

4. **Electrical System.**

- a. Inspect battery cables, wiring harnesses, and wiring.
- b. Check for breaks or cracks caused by cold weather. Report any problems found to Organizational Maintenance.
- c. Conserve batteries. Use lights and other electrical equipment as little as possible.

5. **Lubrication.**

Lubricate according to *Preventive Maintenance Checks and Services (PMCS) Introduction* (WP 0011 00), with temperature range that applies to lowest expected temperature.

6. **Engine Operation.****NOTE**

If oil drips from engine dipstick, it is thin enough for engine to be started.

- a. Before starting, ensure fuel and oil in engine and transmission are thin enough to flow.
- b. Use *Starting Engine Below 32°F (0°C) Using Ether Starting Aid* procedure in WP 0005 00 and allow engine time to reach operating temperature. Be alert that tires may be frozen to ground.
- c. Run engine at reduced speed only long enough to circulate oil through engine. Then increase engine speed and warm up engine. Low idling speeds during extremely cold temperatures can result in incomplete combustion and form heavy deposits on valves.
- d. Cover radiator if necessary to bring engine up to operating temperature.

OPERATE IN EXTREME COLD - CONTINUED7. **Machine Operation.**

- a. Test brakes and machine controls carefully.
- b. Move all hydraulic controls slowly to warm hydraulic oil. Cycle each control several times. Normal warm-up period in extreme cold is 30 minutes.
- c. Operate under a light load for the first five minutes of operation.
- d. Start driving very slowly for about 300 ft (91.4 m). If a problem is noted, notify Organizational Maintenance as required.

8. **Parking Machine.**

- a. If machine will be parked for a short period, park in a sheltered area out of the wind. If shelter is not available, park machine so that radiator does not face into the wind.
- b. If machine will be parked for a long shutdown period, try to park on high ground and use planks or brush to make a raised and relatively dry surface. Keep tires out of snow, water, ice, and mud, if possible.
- c. Clean snow, ice, and mud from machine as soon as possible after shutdown.
- d. If machine will be parked for a long period of time, have Organizational Maintenance prepare machine for storage.
- e. Ensure tires are properly inflated.

OPERATE IN EXTREME HEAT1. **General.** During very hot weather, it may be necessary to alter operating procedures to prevent machine from overheating:

- a. Avoid continuous high engine RPM. However, it is important to maintain sufficient engine RPM to help cooling.
- b. Inspect engine oil, transmission oil, hydraulic oil, and engine coolant often and keep at proper levels.
- c. Be alert for evidence of overheating. Closely monitor all coolant and oil temperature gauges and indicators. Reduce operation to 3/4 workload.
- d. If indicators stay on after more than 10 minutes of reduced workload, stop machine and notify Organizational Maintenance.
- e. Inspect the following items often and notify Organizational Maintenance if you see any signs of wear or damage:
 - (1) Alternator belt
 - (2) Fan belts
 - (3) Hydraulic system hoses and cylinder rods
 - (4) Transmission and drive axle housings
 - (5) Cooling system, coolant level, and rubber hoses
 - (6) Tires and tire pressure
 - (7) Protective tubing in electrical system
- f. Be alert for leaks. Report any leaks found.

OPERATE IN EXTREME HEAT - CONTINUED2. **Cooling System.****WARNING**

- DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant will cause serious burns.
 - DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Failure to follow this warning may cause serious burns.
 - Wear effective eye, glove, and skin protection when handling coolants. Failure to follow this warning may cause injury to personnel.
- a. Check coolant level at frequent intervals and keep radiator cap tight.
 - b. Ensure radiator is free of bugs, dust, and other foreign debris.
 - c. Check fan belt tension frequently. Report any damaged or loose belts to Organizational Maintenance.

3. **Lubrication.**

Lubricate according to WP 0011 00, *Preventive Maintenance Checks and Services (PMCS) Introduction*, with the temperature range that applies to the highest expected temperature.

4. **Air Cleaner.**

- a. Check air cleaner indicator frequently. Air cleaner filters may need to be serviced at more frequent intervals than normal.
- b. Notify Organizational Maintenance to service air cleaner filters if red air cleaner indicator light comes on.

5. **Parking Machine.**

- a. Park machine under cover, if possible. Cover windshield to protect against sand blasting.
- b. Ensure all tires are inflated to proper pressure.
- c. Check frequently for rust. Clean and lubricate machine to help prevent deterioration.

OPERATE IN MUD OR SOFT SURFACES

1. Before entering mud or other soft surfaces, select low transmission gear ranges. Enter soft area at a medium speed for gear range selected.
2. Maintain steady pressure on accelerator pedal to keep machine rolling until solid ground is reached. DO NOT accelerate to point where wheels spin, if possible.
3. If machine gets stuck, try to pull out slowly or rock it back and forth (always in low range) in a low gear. Boards, brush, or similar materials may be placed under tires to provide traction.
4. Notify Organizational Maintenance to clean and inspect for proper lubrication.

OPERATE IN SANDY OR DUSTY CONDITIONS

1. Maintain steady, even movement with transmission in lower gears. Try to keep machine rolling without straining engine and powertrain. If machine gets stuck, notify Organizational Maintenance.
2. When operating machine on soft sand at slow speeds, tire inflation pressure may be decreased for improved traction. Refer to FM 21-305.
3. Whenever operating in sandy or dusty areas, you should:
 - a. Have engine air cleaner serviced more frequently. Notify Organizational Maintenance.
 - b. Ensure each tire has a valve cap.
 - c. Clean engine oil filler tube and transmission fluid filler tube before dipsticks are removed to check fluid levels. Clean accumulations of sand and dirt from around fluid filler locations before checking or adding fluids.
 - d. Clean spouts of fuel containers and areas around filler caps on fuel tanks before adding fuel. Under extremely sandy or dusty conditions, filter fuel when filling tanks.
 - e. Inspect mast slider blocks and mast chains daily.
 - f. Check hydraulic cylinder rods for leakage. Dirt may enter system where leak starts. Notify Organizational Maintenance if leaks are found.
 - g. Cover windshield to protect against sand blasting.
 - h. Notify Organizational Maintenance to clean, inspect, and lubricate more frequently.
 - i. Check hydraulic cylinders frequently. DO NOT allow dust, dirt, or sand to collect in these areas, especially on cylinder rods.

OPERATION IN SALTWATER AREAS

1. Keep machine as clean as possible. Wash down with fresh water after use.
2. Inspect wiring connections closely for corrosion.
3. Keep lubrication points clean and well lubricated.
4. Carefully check for rust all areas that could seriously affect operation of RTCH.
5. Check all hydraulic cylinders for rusting and pitting. If you see rusting or pitting, notify Organizational Maintenance.
6. Have Organizational Maintenance check for water in any of the oils.

OPERATION AT HIGH ALTITUDES**NOTE**

Engine operates at less than peak performance at high altitudes.

1. Coolant level and engine indicators must be watched closely.
2. Add coolant if necessary.

OPERATE IN SNOW AND ICE

1. **General.**
 - a. Fuel tank should be kept full. Keep snow and ice away from fuel filler.
 - b. Clean snow away from outside indicators.

OPERATE IN SNOW AND ICE - CONTINUED2. **Driving.**

- a. Drive at slower speeds.
- b. Give signals sooner.
- c. Apply brakes sooner to give early warning of intention to stop. This will also help to avoid skidding.
- d. Maintain double the normal distance from machine ahead.
- e. Keep windshields, mirrors, and lights clean and free of snow and ice.
- f. If approaching a difficult stretch of road, stop and inspect road carefully before driving on it.
- g. Select transmission gear range that best suits driving condition.

3. **Stopping.**

- a. Ease up on accelerator, leaving machine in gear.
- b. Apply service brakes lightly and evenly. DO NOT pump service brake pedal.
- c. Always avoid sudden braking.

4. **Parking.** If parking on icy, slushy, wet, or muddy surfaces, place boards, brush, or other materials that will provide traction underneath tires. This will guard against tires freezing to the ground or becoming pocketed in ice, and will provide some traction when machine is started and moving again.

FORDING

The RTCH can be forded in water depths up to 60 in. (1.50 m). Observe the following precautions when fording any body of water:

1. **Before Fording.**

- a. Check depth of water at its deepest point. Do not ford even the narrowest stream more than 60 in. (1.50 m) deep.
- b. Ensure bottom is level enough for fording.
- c. Ensure engine is operating at full efficiency.
- d. Set transmission speed in low ranges.
- e. Check tire pressure before entering water and adjust as needed:
 - (1) Front tire inflation should be 70 psi (480 kPa).
 - (2) Rear tire inflation should be 40 psi (275 kPa).

2. **During Fording.**

- a. Enter water slowly to minimize waves and backwash.
- b. Do not exceed speed of 3-4 mph (5-6 kph).
- c. If stalling occurs, notify Organizational Maintenance.

3. **After Fording.**

- a. Within 10 minutes of fording, check the following fluid levels:
 - (1) Engine oil
 - (2) Transmission oil
 - (3) Fuel
 - (4) Hydraulic oil
- b. Have Organizational Maintenance check:
 - (1) Each differential
 - (2) Each wheel
- c. Thoroughly wash machine after saltwater fording.

TOWING**WARNING**

- DO NOT tow faster than 5 mph (8 kph).
- DO NOT allow personnel on machine that is being towed.
- Always block wheels before preparing machine for towing.
- DO NOT use a tow line. Use a medium duty tow bar with bumper blocks.
- Failure to follow these warnings may result in injury or death to personnel.

NOTE

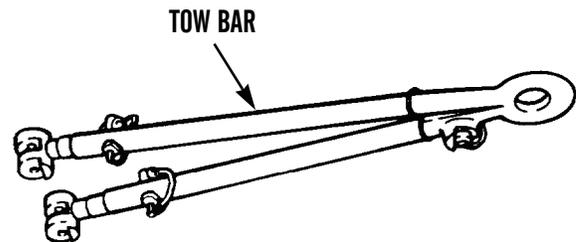
- Assistance from Organizational Maintenance is required to tow RTCH.
- Because engine is not running during towing, service brakes and parking brake will not function properly. Transmission lubrication will be insufficient.

1. Chock wheels.
2. Have Organizational Maintenance install shipping link (WP 0014 00) on front and rear frames.
3. Have Organizational Maintenance inspect powertrain for damage. If damaged, have Organizational Maintenance remove axle shafts.
4. Have Organizational Maintenance manually release parking brake.
5. Have Organizational Maintenance reverse steering cylinder hoses on one cylinder, so cylinders move freely.

CAUTION

Ensure shipping link is disconnected before towing, or damage to machine may result.

6. Have Organizational Maintenance remove shipping link.
7. Attach tow bar.
8. Remove wheel chocks.
9. Tow machine slowly, at no more than 5 mph (8 kph).
10. After towing, have Organizational Maintenance reconnect steering cylinder hoses and restore parking brake.



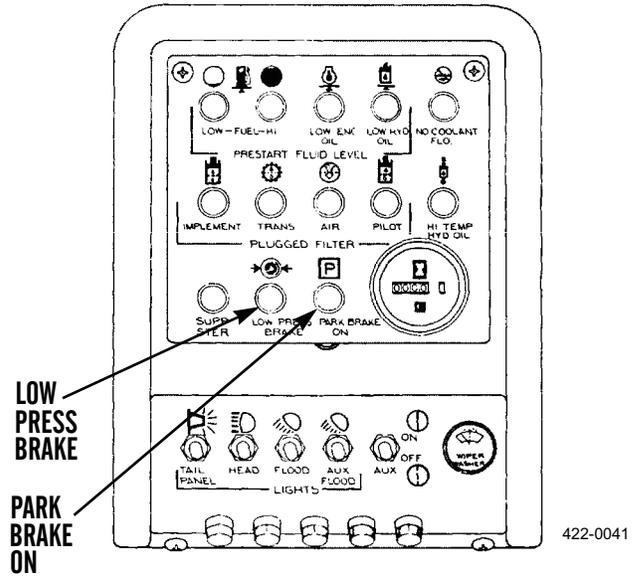
422-0054

EMERGENCY BRAKE OPERATIONS

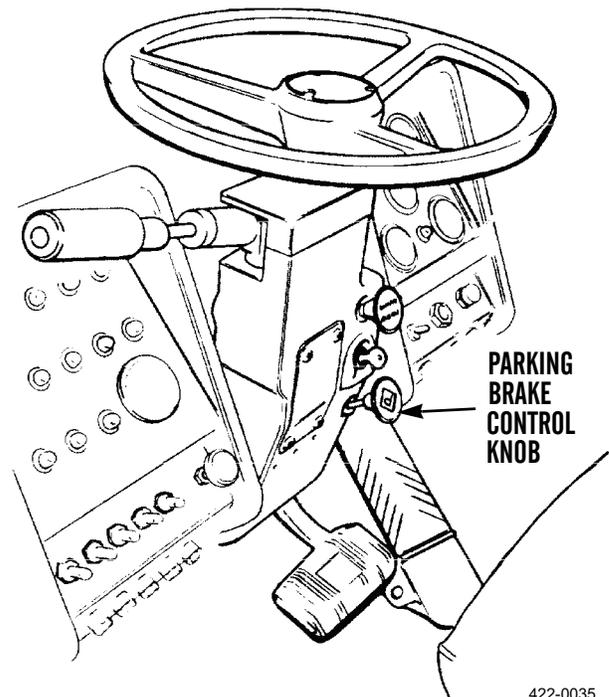
WARNING

Machine will stop suddenly during emergency brake engagement. Use caution to guide machine to a stop as quickly and safely as possible. Failure to follow this warning may result in injury to personnel.

1. When service brake oil pressure is below safe operating pressure, LOW PRESS BRAKE indicator will flash, PARK BRAKE ON indicator will come on, and emergency/parking brake will automatically engage.



2. If machine has a load, a horn will keep sounding.
3. After machine makes an emergency stop, do the following:
 - a. Shift transmission into neutral.
 - b. Run engine at high idle for three minutes to increase brake oil pressure.
 - c. Try to release parking/emergency brake by pushing in parking brake control knob.



OPERATION UNDER UNUSUAL CONDITIONS - CONTINUED

0006 00

EMERGENCY BRAKE OPERATIONS - CONTINUED

- d. LOW PRESS BRAKE indicator should stop flashing. If it does not, park machine, stop engine, and lower load or mast. Notify Organizational Maintenance.
4. In an emergency, machine can be moved in first speed range with emergency/parking brake engaged. This may damage the emergency/parking brake; have emergency/parking brake serviced before machine is returned to operation.
5. After an emergency stop or trouble with brakes, do not operate machine until brake systems have been inspected and repaired.

END OF WORK PACKAGE

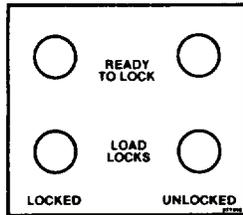
SCOPE

This work package includes illustrations showing the location of all decals and data plates on the machine.

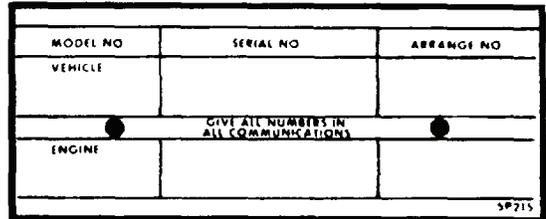
DECALS AND DATA PLATES



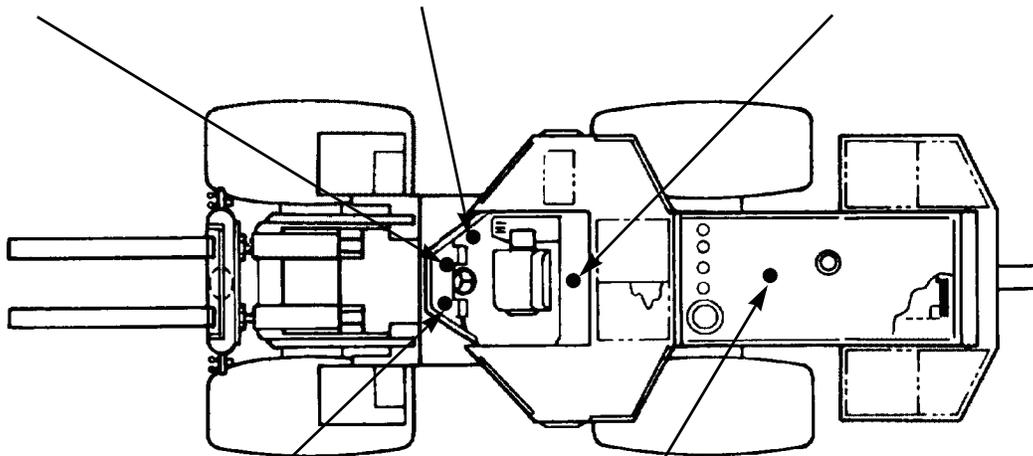
ON FACE OF STEERING COLUMN RELEASE LOCK



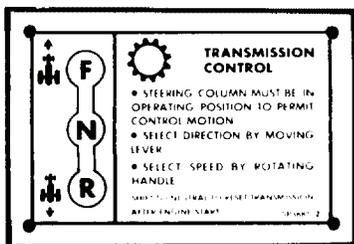
CONTAINER LOCK LIGHT INDICATOR PANEL - RIGHT SIDE



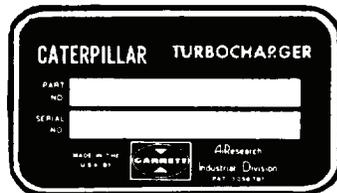
MASTER SERIAL NO. PLATE ON SHELF BEHIND SEAT



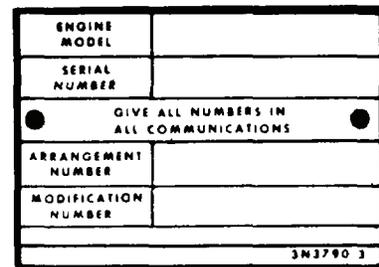
ON VERTICAL SURFACE TO LEFT OF DASH



ON TURBOCHARGER

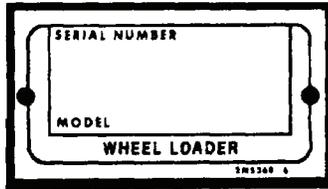


ON RH SIDE OF ENGINE BLOCK BEHIND ALTERNATOR



422-0022

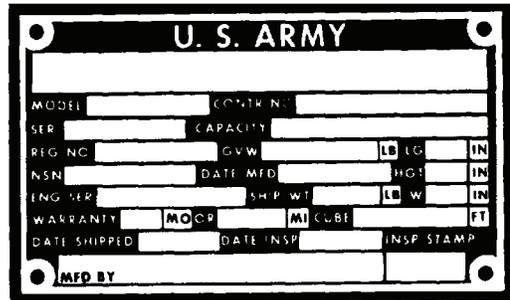
DECALS AND DATA PLATES - CONTINUED



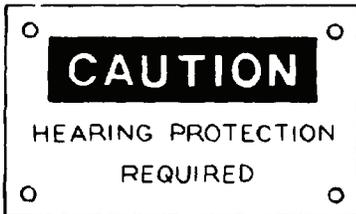
RIGHT-HAND SIDE OF FRAME



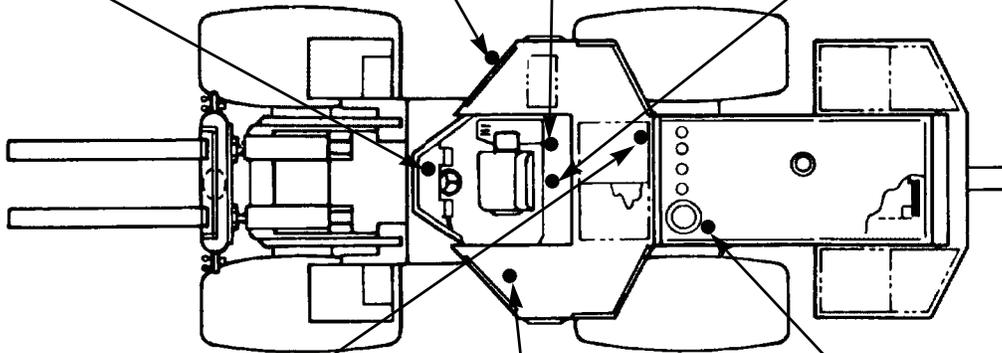
SHELF BEHIND SEAT - BELOW MASTER SERIAL NO. PLATE



SHELF BEHIND SEAT - TO RIGHT OF MASTER SERIAL NO. PLATE

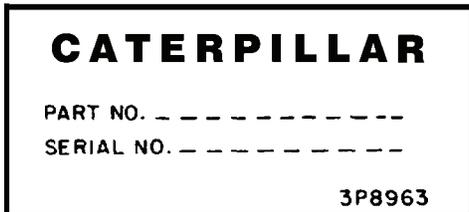


RIGHT-HAND SIDE OF DASH

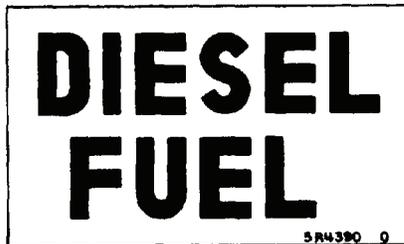
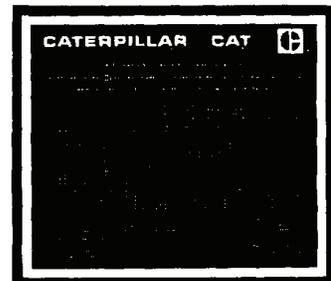


SIDE OF TORQUE CONVERTER AT REAR OF ENGINE

ENGINE PATENT - ON AIR CLEANER



ON PLATFORM NEAR FUEL FILLER CAP



CHAPTER 3
OPERATOR TROUBLESHOOTING

INTRODUCTION

1. Troubleshooting procedures are grouped by system, containing information you need to locate malfunctions. A troubleshooting symptom index in WP 0009 00 is provided to aid in locating a malfunction or symptom and direct you to the appropriate troubleshooting table in WP 0010 00.
2. The troubleshooting table contains a listing of malfunctions, test or inspection procedures, and corrective actions. The corrective action column further directs you to the required corrective maintenance procedure within this manual by work package number. However, if the required maintenance procedure is beyond Operator level capabilities, the direction is to notify Organizational Maintenance.

PRELIMINARY TROUBLESHOOTING PROCEDURES**NOTE**

Fluid leaks are classified as either Class I, Class II, or Class III.

Class I	Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
Class II	Leakage of fluid great enough to form drops, but not enough to cause drops to drip from item being checked/inspected.
Class III	Leakage of fluid great enough to form drops that fall from item being checked/inspected.

Before starting any specific troubleshooting procedures, perform the following:

1. Visually check all hoses and tubes for leaks.
2. Check for mechanical jamming or binding caused by rocks or other foreign matter.
3. Check fluid levels in subject area and fill as required (WP 0011 00 and WP 0012 00).

ELECTRICAL TROUBLESHOOTING

1. Analyze the symptoms and conditions to determine the most likely cause for the problem, then troubleshoot that circuit first. The more information you have concerning the problem, the easier it will be to troubleshoot.
2. Isolate to the subsystem level (in cases where more than one subsystem is involved); next isolate the problem to a single circuit within the subsystem; then, isolate the problem to the faulty component using the Troubleshooting Symptom Index (WP 0009 00).
3. Frayed, broken, loose, or corroded wiring is a common source of problems in any electrical circuit. Always make a visual inspection before starting detailed troubleshooting. Inspect contacts to ground carefully because components with case grounds are especially troublesome.

END OF WORK PACKAGE

Malfunction/Symptom **Troubleshooting Procedure Page**

BRAKES

- 1. Service Brakes Do Not Operate Correctly. 0010 00-1
- 2. Parking/Emergency Brake Will Not Engage or Disengage. 0010 00-1
- 3. Transmission Does Not Disengage When Left Brake Pedal (Inching Pedal) Is Pushed. 0010 00-1

ELECTRICAL INDICATORS

- 1. Low Brake Pressure Indicator Light Comes On. 0010 00-1
- 2. Back-up Warning Buzzer Does Not Sound When in Reverse. 0010 00-1
- 3. Alternator Indicator Light Comes On. 0010 00-1
- 4. Low Engine Oil Level Indicator Light Comes On. 0010 00-1
- 5. Implement Plugged Filter Light Comes On. 0010 00-2
- 6. Transmission Plugged Oil Filter Light Comes On During Operation. 0010 00-2

ELECTRICAL SYSTEM

- 1. Floodlights/Auxiliary Floodlights Inoperative. 0010 00-2
- 2. Horn Will Not Sound When Button Is Pressed. 0010 00-2
- 3. Headlight(s) Do Not Operate. 0010 00-3
- 4. Stoplights Do Not Operate When Brake Pedal Is Pressed. 0010 00-3
- 5. Taillights Do Not Come On. 0010 00-3

ENGINE

- 1. Engine Cranks but Fails to Start (Operating Temperature Above 32°F [0°C]). 0010 00-4
- 2. Engine Cranks but Fails to Start (Operating Temperature Below 32°F [0°C]). 0010 00-4
- 3. Engine Misfires, Runs Rough, or Stalls at Low RPM. 0010 00-5
- 4. Engine Does Not Develop Full Power. 0010 00-5
- 5. Engine Does Not Idle Properly. 0010 00-5
- 6. Unusual Engine Vibration. 0010 00-5
- 7. Engine Knocks. 0010 00-5
- 8. Black or Gray Smoke from Exhaust. 0010 00-5
- 9. White or Blue Smoke from Exhaust. 0010 00-5
- 10. Engine Overheats – Water Temperature Gage Indicates in Red Area. 0010 00-6
- 11. Engine Fails to Crank When Power Switch Is Turned to Start. 0010 00-6
- 12. Alternator Is Noisy. 0010 00-6
- 13. Excessive Exhaust Smoke (at Normal Operating Temperature). 0010 00-7

HYDRAULIC SYSTEM

- 1. Hydraulic System Will Not Lift Load or Will Not Lower Load Correctly. 0010 00-7
- 2. Lift or Tilt Cylinders Do Not Hold Position with Hydraulic Control Levers in Neutral Position. 0010 00-7
- 3. Oil Temperature Is Too High – Hydraulic Oil High Temperature Indicator Light Comes On. 0010 00-7
- 4. Noisy Hydraulic Pump. 0010 00-7

TROUBLESHOOTING SYMPTOM INDEX - CONTINUED

0009 00

Malfunction/Symptom

Troubleshooting Procedure Page

STEERING

- 1. Machine Doesn't Turn When Steering Wheel Is Turned. 0010 00-7
- 2. Steering Wheel Is Hard To Turn. 0010 00-7
- 3. Steering Wheel Can Still Be Turned When Vehicle Is at Full Turn. 0010 00-8

TRANSMISSION

- 1. Transmission Will Not Shift from One Speed or Direction to Another or Shifts Rough. 0010 00-8
- 2. Transmission Shifts Slowly. 0010 00-8
- 3. Transmission Doesn't Work When Speed Selection Lever Is Placed in Any Speed. 0010 00-8

TRANSFER CASES

- 1. System Loses Oil. 0010 00-8
- 2. Noisy Transfer Gears. 0010 00-8

END OF WORK PACKAGE

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<i>BRAKES</i>		
<p>1. Service Brakes Do Not Operate Correctly.</p>	<p>1. Inspect hydraulic oil level (WP 0012 00).</p> <p>2. Check for mud or dirt under brake pedal.</p> <p>3. Inspect brake linkage for binding, damage, or defective parts.</p> <p>4. Inspect for leaking brake lines or fittings.</p>	<p>Add hydraulic oil if needed (WP 0011 00 and WP 0012 00). If problem still exists, go to test step 2.</p> <p>Clean mud or dirt from under brake pedal. If problem still exists, go to test step 3.</p> <p>If damage or binding is found, notify Organizational Maintenance. If problem still exists, go to test step 4.</p> <p>If damage is found, notify Organizational Maintenance.</p>
<p>2. Parking/Emergency Brake Will Not Engage or Disengage.</p>	<p>Shut down engine.</p>	<p>Notify Organizational Maintenance.</p>
<p>3. Transmission Does Not Disengage When Left Brake Pedal (Inching Pedal) Is Pushed.</p>	<p>Shut down engine.</p>	<p>Notify Organizational Maintenance.</p>
<i>ELECTRICAL INDICATORS</i>		
<p>1. Low Brake Pressure Indicator Light Comes On.</p>	<p>1. Inspect hydraulic oil level, (WP 0012 00).</p> <p>2. Inspect for leaking brake lines or fittings.</p>	<p>Add hydraulic oil if needed (WP 0011 00 and WP 0012 00). If problem still exists, go to test step 2.</p> <p>If damage is found, notify Organizational Maintenance.</p>
<p>2. Back-up Warning Buzzer Does Not Sound When in Reverse.</p>	<p>Inspect direction control linkage (at access opening behind operator's cab) for defective parts.</p>	<p>If damage is found, notify Organizational Maintenance.</p>
<p>3. Alternator Indicator Light Comes On.</p>	<p>1. Inspect for missing or loose drive belt.</p> <p>2. Check for loose battery connections.</p>	<p>Notify Organizational Maintenance. If problem still exists, go to test step 2.</p> <p>Notify Organizational Maintenance.</p>
<p>4. Low Engine Oil Level Indicator Light Comes On.</p>	<p>1. Check engine oil level (WP 0012 00).</p>	<p>Add engine oil as needed (WP 0011 00 and WP 0012 00). If problem still exists, notify Organizational Maintenance.</p>

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<i>ELECTRICAL INDICATORS - CONTINUED</i>		
<p>5. Implement Plugged Filter Light Comes On.</p>	<p>1. Inspect hydraulic oil level (WP 0012 00).</p> <p>2. Inspect implement filter for dirt.</p>	<p>Add hydraulic oil as needed (WP 0011 00 and WP 0012 00). If problem still exists, go to test step 2.</p> <p>Notify Organizational Maintenance.</p>
<p>6. Transmission Plugged Oil Filter Light Comes On During Operation.</p>	<p>1. Check transmission oil level (WP 0012 00).</p>	<p>Add transmission oil as needed (WP 0011 00 and WP 0012 00). If problem still exists, notify Organizational Maintenance.</p>
<i>ELECTRICAL SYSTEM</i>		
<p>1. Floodlights/Auxiliary Floodlights Inoperative.</p>	<p>1. Ensure main disconnect switch, power switch, and floodlight switch are in ON position.</p> <p>2. Check for blown fuse #2 or #3 in left-hand instrument panel.</p> <p>3. Check light(s) for separated connection or damage.</p>	<p>Turn switches to ON position. If problem still exists, go to test step 2.</p> <p>If fuse is blown, request a replacement fuse of same rating from Organizational Maintenance. If fuse is OK, go to test step 3.</p> <p>Reconnect connector, if required. If connector(s) is OK, notify Organizational Maintenance.</p>
<p>2. Horn Will Not Sound When Button Is Pressed.</p>	<p>1. Check for blown fuse #15 at right-hand instrument panel.</p> <p>2. Check horn for separated connections or damage.</p>	<p>If fuse is blown, request a replacement fuse of same rating from Organizational Maintenance. If fuse is OK and problem still exists, go to test step 2.</p> <p>Reconnect connectors, if required. If connectors are OK, notify Organizational Maintenance.</p>

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
<i>ELECTRICAL SYSTEM - CONTINUED</i>		
<p>3. Headlight(s) Do Not Operate.</p>	<ol style="list-style-type: none"> 1. Ensure headlight switch, main disconnect switch and power switch are in ON position. 2. Check lights for disconnected connectors or damage. 	<p>Turn switches to ON position. If problem still exists, go to test step 2.</p> <p>Reconnect connectors, if required. If any damage to lights is found, notify Organizational Maintenance. If connectors and lights are OK, notify Organizational Maintenance.</p>
<p>4. Stoplights Do Not Operate When Brake Pedal Is Pressed.</p>	<ol style="list-style-type: none"> 1. Check for blown fuse #1 at left-hand instrument panel. 2. Check lights for disconnected connectors or damage. 	<p>If fuse is blown, request a replacement fuse of same rating from Organizational Maintenance. Install new fuse. If fuse is OK and problem still exists, go to test step 2.</p> <p>Reconnect connectors, if required. If any damage to lights is found, notify Organizational Maintenance.</p>
<p>5. Taillights Do Not Come On.</p>	<ol style="list-style-type: none"> 1. Ensure main disconnect switch, power switch, and headlight switch are in ON position. 2. Check operation of the left-hand panel lamp. 3. Check lights for disconnected connectors or damage. 	<p>Turn switches to ON position. If problem still exists, go to test step 2.</p> <p>If left-hand panel lamp is also inoperative, request a replacement fuse of same rating from Organizational Maintenance. Install new fuse. If fuse is OK and problem still exists, go to test step 3.</p> <p>Reconnect connectors, if required. If problem still exists, notify Organizational Maintenance.</p>

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
ENGINE - CONTINUED		
<p>2. Engine Cranks but Fails to Start (Operating Temperature Below 32°F [0°C]) - Continued.</p>	<p>CAUTION</p> <p>DO NOT crank starter motor for more than 30 seconds at a time. After 30 seconds, allow starter motor to cool for at least 2 minutes before attempting to start engine again. Excessive heating of starter motor may result in damage or premature starter failure.</p>	
	<p>3. While cranking engine, press ether starting aid switch. Wait approximately 2 seconds between injections.</p>	<p>If engine still will not start, notify Organizational Maintenance.</p>
<p>3. Engine Misfires, Runs Rough, or Stalls at Low RPM.</p>	<p>1. Check fuel level (WP 0012 00).</p> <p>2. Inspect fuel lines between fuel tanks and fuel transfer pump for leaks, crimps, and bends.</p>	<p>Add fuel as necessary (WP 0012 00). If problem still exists, go to test step 2.</p> <p>Notify Organizational Maintenance.</p>
<p>4. Engine Does Not Develop Full Power.</p>	<p>Check air cleaner indicator on instrument panel.</p>	<p>If indicator is illuminated, service precleaner (WP 0012 00) and retest. If problem still exists, notify Organizational Maintenance.</p>
<p>5. Engine Does Not Idle Properly.</p>	<p>Check air cleaner indicator on instrument panel.</p>	<p>If indicator is illuminated, service precleaner (WP 0012 00) and retest. If problem still exists, notify Organizational Maintenance.</p>
<p>6. Unusual Engine Vibration.</p>	<p>Check air cleaner service indicator.</p>	<p>If indicator is illuminated, service precleaner (WP 0012 00) and retest. If problem still exists, notify Organizational Maintenance.</p>
<p>7. Engine Knocks.</p>	<p>Check for water, sediment, and cloudiness in fuel.</p>	<p>Notify Organizational Maintenance.</p>
<p>8. Black or Gray Smoke from Exhaust.</p>	<p>Check air cleaner service indicator.</p>	<p>If indicator is illuminated, service precleaner (WP 0012 00) and retest. If problem still exists, notify Organizational Maintenance.</p>
<p>9. White or Blue Smoke from Exhaust.</p>	<p>Inspect for overfilled engine oil crankcase (WP 0012 00).</p>	<p>Notify Organizational Maintenance.</p>

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
ENGINE - CONTINUED		
<p>10. Engine Overheats – Water Temperature Gage Indicates in Red Area.</p>	<div style="text-align: center;">   <p>WARNING</p> <ul style="list-style-type: none"> • DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant may cause serious burns. • DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns. • Wear effective eye, glove, and skin protection when handling coolants. Failure to do so may cause injury. </div>	
<p>11. Engine Fails to Crank When Power Switch Is Turned to Start.</p>	<ol style="list-style-type: none"> 1. Check coolant level (WP 0012 00). 2. Inspect radiator for debris blocking the air flow through the core. 1. Check position of main disconnect switch. 2. Check position of transmission range selector lever. 3. Check for dirty, loose, or damaged battery cables. 	<p>Add coolant as necessary (WP 0011 00 and WP 0012 00). If problem still exists, go to test step 2.</p> <p>Remove debris.</p> <p>Place main disconnect switch in ON position. If problem still exists, go to test step 2.</p> <p>Place transmission range selector lever in N (Neutral). If problem still exists, go to test step 3.</p> <p>Clean dirty cables (WP 0012 00). Tighten loose connections. If cable is damaged, notify Organizational Maintenance.</p>
<p>12. Alternator Is Noisy.</p>	<p>Inspect drive belt for damage or wear (WP 0012 00).</p>	<p>Notify Organizational Maintenance.</p>

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
ENGINE - CONTINUED		
<p>13. Excessive Exhaust Smoke (at Normal Operating Temperature).</p>	<p>1. Check air filter indicator.</p> <p>2. Check for restrictions in exhaust system.</p> <p>3. Check engine oil level (WP 0012 00).</p>	<p>If indicator is illuminated, service precleaner (WP 0012 00) and retest. If problem still exists, go to test step 2.</p> <p>Remove restrictions. If problem still exists, go to test step 3.</p> <p>If oil level is above FULL, notify Organizational Maintenance.</p>
HYDRAULIC SYSTEM		
<p>1. Hydraulic System Will Not Lift Load or Will Not Lower Load Correctly.</p>	<p>1. Inspect lines and fittings for leaks.</p> <p>2. Inspect mast sliding blocks, rollers, and chains for correct lubrication.</p>	<p>If leaks are found, notify Organizational Maintenance. If problem still exists, go to test step 2.</p> <p>Lubricate as needed (WP 0011 00 and WP 0012 00).</p>
<p>2. Lift or Tilt Cylinders Do Not Hold Position with Hydraulic Control Levers in Neutral Position.</p>	<p>1. Inspect lines and fittings for leaks.</p>	<p>If leaks are found, notify Organizational Maintenance.</p>
<p>3. Oil Temperature Is Too High – Hydraulic Oil High Temperature Indicator Light Comes On.</p>	<p>1. Check hydraulic oil level (WP 0012 00).</p> <p>2. Lengthen unloaded return trip to give hydraulic cooling system time to cool oil. Park machine, lower mast all the way, and run engine at high idle.</p>	<p>Add oil as necessary (WP 0011 00 and WP 0012 00). If problem still exists, go to test step 2.</p> <p>If problem still exists, notify Organizational Maintenance.</p>
<p>4. Noisy Hydraulic Pump.</p>	<p>Check hydraulic oil level (WP 0012 00).</p>	<p>Add oil as necessary (WP 0011 00 and WP 0012 00).</p>
STEERING		
<p>1. Machine Doesn't Turn When Steering Wheel Is Turned.</p>	<p>1. Ensure that shipping link is not installed.</p> <p>2. Check hydraulic oil level (WP 0012 00).</p>	<p>Notify Organizational Maintenance. If problem still exists, go to test step 2.</p> <p>Add oil as necessary (WP 0011 00 and WP 0012 00).</p>
<p>2. Steering Wheel Is Hard To Turn.</p>	<p>Allow hydraulic oil to warm up to normal operating temperatures.</p>	<p>If steering wheel is still hard to turn, notify Organizational Maintenance.</p>

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
STEERING - CONTINUED		
3. Steering Wheel Can Still Be Turned When Vehicle Is at Full Turn.	Shut down engine.	Notify Organizational Maintenance.
TRANSMISSION		
1. Transmission Will Not Shift from One Speed or Direction to Another or Shifts Rough.	Inspect speed control linkage (at access opening behind operator's cab) for defective parts.	Notify Organizational Maintenance.
2. Transmission Shifts Slowly.	Check transmission oil level (WP 0012 00).	If transmission oil is low, fill to correct level (WP 0011 00 and WP 0012 00). If problem still exists, notify Organizational Maintenance.
3. Transmission Doesn't Work When Speed Selection Lever Is Placed in Any Speed.	Check transmission oil level (WP 0012 00).	If transmission oil is low, fill to correct level (WP 0011 00 and WP 0012 00). If problem still exists, notify Organizational Maintenance.
4. Transmission Overheats (Torque Converter Temperature Gage Needle is in the Red).	1. Check transmission oil level (WP 0012 00).	If transmission oil is low, fill to the correct level (WP 0011 00 and WP 0012 00). If oil level is OK, go to test step 2.
	2. Inspect transmission magnetic strainer (WP 0012 00).	If necessary, clean magnetic strainer (WP 0012 00). If magnetic strainer is OK or if problem still exists, notify Organizational Maintenance.
TRANSFER CASES		
1. System Loses Oil.	Check all lines, fittings, drain, and plug for leaks.	Notify Organizational Maintenance.
2. Noisy Transfer Gears.	Check transmission oil level (WP 0012 00).	If transmission oil is low, fill to correct level (WP 0011 00 and WP 0012 00). If problem still exists, notify Organizational Maintenance.

END OF WORK PACKAGE

CHAPTER 4
OPERATOR MAINTENANCE INSTRUCTIONS

GENERAL

To ensure that the machine is ready for operation at all times, it must be inspected on a regular basis so that defects may be found and corrected before they result in serious damage, equipment failure, or injury to personnel. This PMCS contains systematic instructions on inspections, lubrications, adjustments, and corrections to be performed by the operator to keep your equipment in good operating condition and ready for its primary mission.

EXPLANATION OF TABLE ENTRIES

1. **Item Number (Item No.) Column.** Numbers in this column are for reference. When completing DA Form 2404 or DA Form 5988-E (*Equipment Inspection and Maintenance Worksheet*), include the item number for the check/service indicating a fault. Item numbers also appear in the order that you must perform checks and services for the interval listed.
2. **Interval Column.** This column tells you when you must perform the procedure in the procedure column.
 - a. *Before* procedures must be done immediately before you operate the machine.
 - b. *During* procedures must be done while you are operating the machine.
 - c. *After* procedures must be done immediately after you have operated the machine.
 - d. *Weekly* procedures must be done once each week.
 - e. *Monthly* procedures must be done once each month.
3. **Man-Hours Column.** This column indicates man-hours required to complete prescribed lubrication service.
4. **Location, Item to Check/Service Column.** This column provides the location and item to be checked or serviced.

NOTE

The WARNINGS and CAUTIONS appearing in your PMCS table must always be observed. WARNINGS and CAUTIONS appear before applicable procedures. You must observe these WARNINGS to prevent serious injury to yourself and others, and CAUTIONS to prevent your equipment from being damaged.

5. **Procedure Column.** This column gives the procedure you must perform to know if the equipment is ready or available for its intended mission or for operation. You must perform the procedure at the time stated in the interval column.
6. **Not Fully Mission Capable If: Column.** Information in this column tells you what faults will keep your equipment from being capable of performing its primary mission. If you perform check/service procedures that show faults listed in this column, the equipment is not mission-capable. Follow standard operating procedures for maintaining the equipment or reporting equipment failure.

GENERAL PMCS PROCEDURES

1. Always perform PMCS in the same order. With experience, you should be able to identify problems easily. If the machine does not perform as required, refer to the Troubleshooting Symptom Index (WP 0009 00). If anything looks wrong and you can't fix it, write it on your DA Form 2404 or DA Form 5988-E. If you find something seriously wrong, IMMEDIATELY report it to your supervisor.
2. Before performing preventive maintenance, read all the checks required for the applicable interval and prepare everything needed to make all the checks. For example, you'll always need a rag (Item 12, WP 0016 00) or two.

GENERAL PMCS PROCEDURES - CONTINUED**WARNING**

Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to do so may cause injury or death to personnel.

- a. **Keep It Clean.** Dirt, grease, oil, and debris get in the way and may cover up a serious problem. Clean as you work and as needed. Use solvent cleaning compound (Item 2, WP 0016 00) on all metal surfaces. Use detergent (Item 4, WP 0016 00) and water when you clean rubber, plastic, and painted surfaces.

**WARNING**

When servicing this machine, performing maintenance or disposing of materials such as engine coolant, hydraulic oil, lubricants, battery acids, or batteries, and CARC paint, consult your unit/local hazardous waste disposal center or safety office for local regulatory guidance. If further information is needed, please contact The Army Environmental Hotline at 1-800-872-3845. Failure to follow this warning may result in injury to personnel.

- b. **Hazardous Waste Disposal.** Ensure all spills are cleaned up and disposed of in accordance with local policy and ordinances.
- c. **Rust and Corrosion.** Check metal parts for rust and corrosion. If any bare metal or corrosion exists, report it to your supervisor.
- d. **Bolts, Nuts, and Screws.** Check bolts, nuts, and screws for obvious looseness and missing, bent or broken condition. You can't try them all with a tool, but look for chipped paint, bare metal, or rust around bolt heads. If you find one you think is loose, tighten it or report it to your supervisor.
- e. **Welds.** Look for loose or chipped paint, rust or gaps where parts are welded together. If you find a bad weld, report it to your supervisor.
- f. **Electric Wires and Connectors.** Look for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors and ensure that the wires are in good condition.
- g. **Hoses and Fluid Lines.** Look for wear, damage, and signs of leaks. Ensure that clamps and fittings are tight. Wet spots indicate leaks, but a stain around a fitting or connector can also mean a leak. If a leak comes from a loose fitting or connector, tighten it. If something is broken or worn out, report it to your supervisor.
- h. **Fluid Leakage.** It is necessary for you to know how fluid leakage affects the status of your machine. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your machine. Learn and be familiar with them, and remember - when in doubt, notify your supervisor.

GENERAL PMCS PROCEDURES - CONTINUED**CAUTION**

Operation is allowable with Class I and Class II leakage. WHEN IN DOUBT, NOTIFY YOUR SUPERVISOR. When operating with Class I or Class II leaks, check fluid levels more frequently. Class III leaks must be reported immediately to your supervisor. Failure to do this will result in damage to machine and/or components.

NOTE

Notify Organizational Maintenance of any leaks the operator cannot fix.

Leakage Definitions for PMCS

Class I	Leakage indicated by wetness or discoloration, but not great enough to form drops.
Class II	Leakage great enough to form drops, but not enough to cause drops to drip from the item being checked/inspected.
Class III	Leakage great enough to form drops that fall from the item being checked/inspected.

GENERAL LUBRICATION PROCEDURES**NOTE**

- Lubrication instructions contained in this PMCS are mandatory.
 - Overall views of lubrication points are located at the end of this work package.
 - Refer to FM 9-207 for lubrication in arctic operation.
1. Included in this PMCS are lubrication services to be performed by the operator.
 2. Lubrication intervals are based on normal operation. Lubricate more during constant use and less during inactive periods. Use correct grade of lubricant for seasonal temperature expected (Refer to *KEY* on pages 0011 00-4 and 0011 00-5).
 3. For equipment under manufacturer's warranty, hardtime intervals shall be followed. Shorten intervals if lubricants are known to be contaminated or if operation is under adverse conditions (e.g., longer than usual operating hours, extended idling periods, extreme dust, etc.).
 4. Keep all lubricants in an environmental storage container and store in a clean, dry place away from extreme heat. Keep container covers clean and do not allow dust, dirt, or other foreign material to mix with lubricants. Keep lubrication equipment clean and ready for use. Clean top of container before opening.

**WARNING**

Solvent cleaning compound MIL-PRF-680 Type III is an environmentally compliant and low toxic material. However, it may be irritating to the eyes and skin. Use protective gloves and goggles. Use in well-ventilated areas. Keep away from open flames and other sources of ignition. Failure to do so may cause injury or death to personnel.

5. Clean area around lubrication points with solvent cleaning compound (Item 2, WP 0016 00) or equivalent before lubricating equipment. Keep all external parts of equipment not requiring lubrication free of lubricants. After lubrication, wipe off excess lubricant to prevent accumulation of foreign matter.
6. Maintain a record of lubrication performed and report any problems noted during lubrication. Refer to DA PAM 750-8 for forms and procedures to record and report any findings.

GENERAL LUBRICATION PROCEDURES - CONTINUED

NOTE

Only lubricants authorized for use by the operator are listed in this KEY.

- KEY -

LUBRICANT/ COMPONENT	REFILL CAPACITY	EXPECTED TEMPERATURES*			INTERVALS
		+6°F to +122°F (-14°C to +50°C)	-4°F to +50°F (-20°C to +10°C)	-25°F to +32°F (-4°C to 0°C)	
OE/HDO Lubricating Oil, ICE, Tactical					D - Daily W - Weekly M - Monthly
OEA Lubricating Oil, ICE, Arctic					
Engine Crankcase	11 Gal. (41.6 L)		See Chart A		
Transmission	24 Gal. (90.8 L)		See Chart B		
Hydraulic System	130 Gal. (492.1 L)		See Chart C		
Mast Chains					
GAA Grease, Automotive and Artillery	As Required		All Temperatures		
Mast Rollers					
Carriage Pivot Pin					
Carriage Rollers					
Side Shift Cylinder					
Side Tilt Cylinder					
Mast Mount- ing Hinges					
Tilt Cylinders					
Fan Drive and Belt Tightener Pulley					
Pintle Hook					
Steering Cylinder Bearings					
Driveshaft Spline					
Rear Axle Trunion Bearings					
Tophandler Container Lock Housing					

GENERAL LUBRICATION PROCEDURES - CONTINUED

LUBRICANT/ COMPONENT	REFILL CAPACITY	EXPECTED TEMPERATURES*			INTERVALS
		+6°F to +122°F (-14°C to +50°C)	-4°F to +50°F (-20°C to +10°C)	-25°F to +32°F (-4°C to 0°C)	
Tophandler Force Limiter Guide Rods					D - Daily W - Weekly M - Monthly
Tophandler Operat- ing Shaft Bearings					
ANTIFREEZE Ethylene Glycol, Inhib- ited, Heavy Duty					
Engine Radiator	28 Gal. (106 L) System Capacity	All Temperatures			
For arctic operation, refer to FM 9-207.					

GENERAL LUBRICATION PROCEDURES - CONTINUED

Table 1. CHART A—ENGINE CRANKCASE

Lubricant	EXPECTED TEMPERATURES																			
	°F	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120
	°C	-57	-51	-46	-40	-34	-29	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+49
OE/HDO	Lubricating Oil, ICE, Tactical																			
OEA	Lubricating Oil, ICE, Arctic																			
OE/HDO 10W/30																				
OE/HDO 15W/40																				
OEA																				

Table 2. CHART B—TRANSMISSION

Lubricant	EXPECTED TEMPERATURES																			
	°F	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120
	°C	-57	-51	-46	-40	-34	-29	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+49
OE/HDO	Lubricating Oil, ICE, Tactical																			
OEA	Lubricating Oil, ICE, Arctic																			
OE/HDO 30																				
OE/HDO 10*																				
OEA *																				

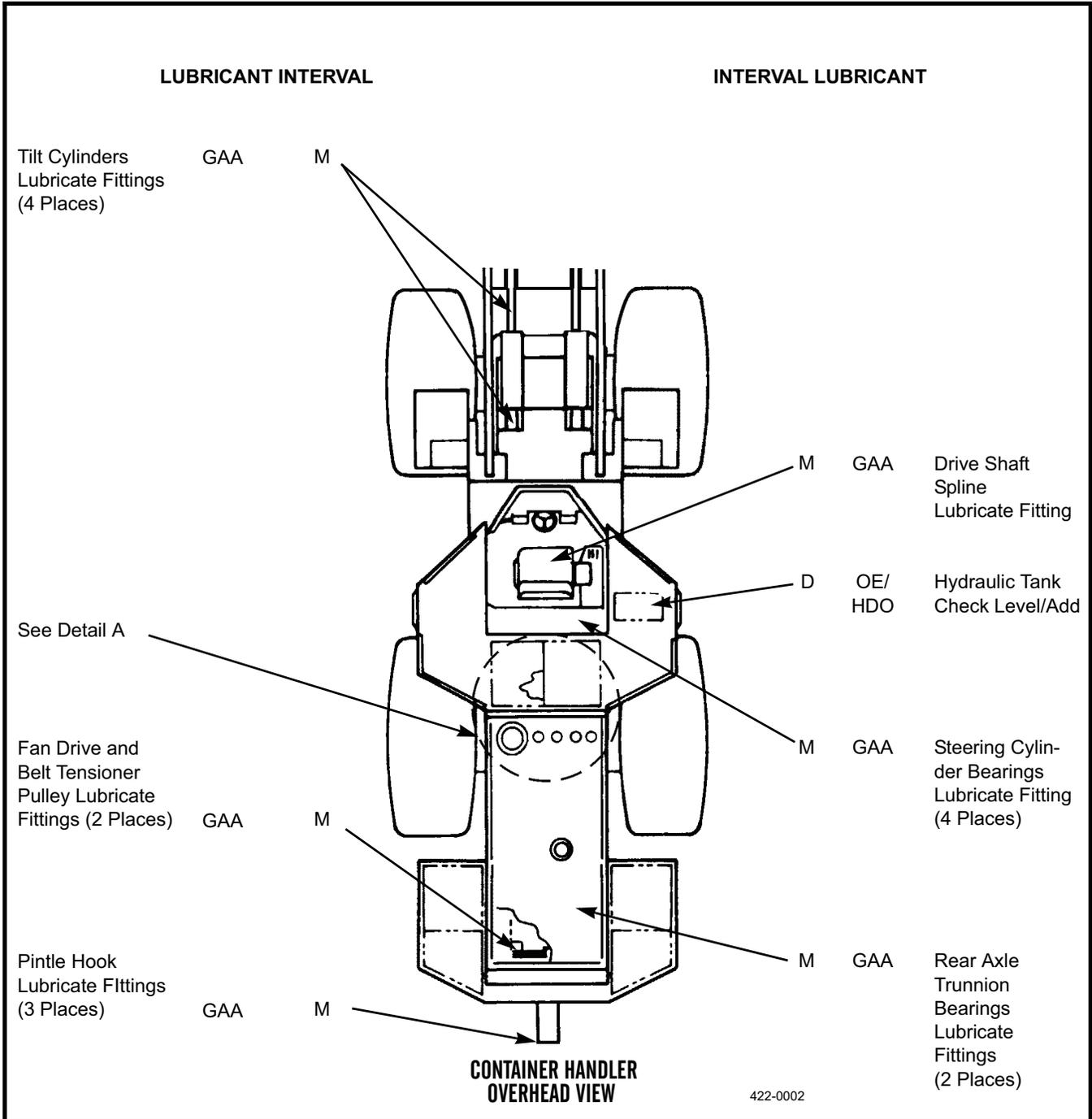
*If OEA lubricant is required to meet the low expected-temperature range, OEA lubricant is to be used in lieu of OE/HDO 10 lubricant for all expected temperatures where OE/HDO 10 is specified.

Table 3. CHART C—HYDRAULIC SYSTEM

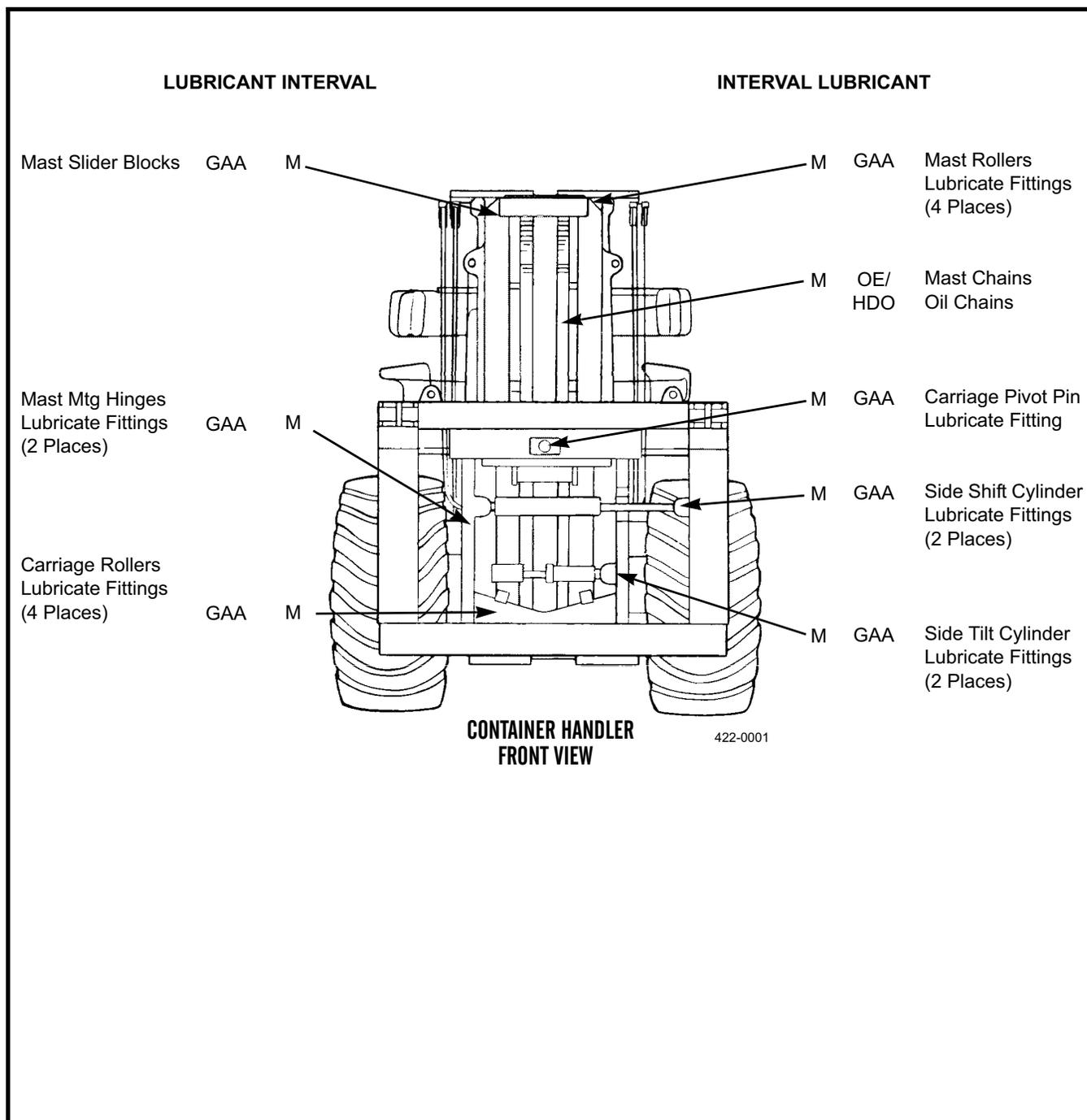
Lubricant	EXPECTED TEMPERATURES																			
	°F	-70	-60	-50	-40	-30	-20	-10	0	+10	+20	+30	+40	+50	+60	+70	+80	+90	+100	+120
	°C	-57	-51	-46	-40	-34	-29	-23	-18	-12	-7	-1	+4	+10	+16	+21	+27	+32	+38	+49
OE/HDO	Lubricating Oil, ICE, Tactical																			
OEA	Lubricating Oil, ICE, Arctic																			
OE/HDO 30																				
OE/HDO 10																				
OEA *																				

*If OEA lubricant is required to meet the low expected-temperature range, OEA lubricant is to be used in lieu of OE/HDO 10 lubricant for all expected temperatures where OE/HDO 10 is specified.

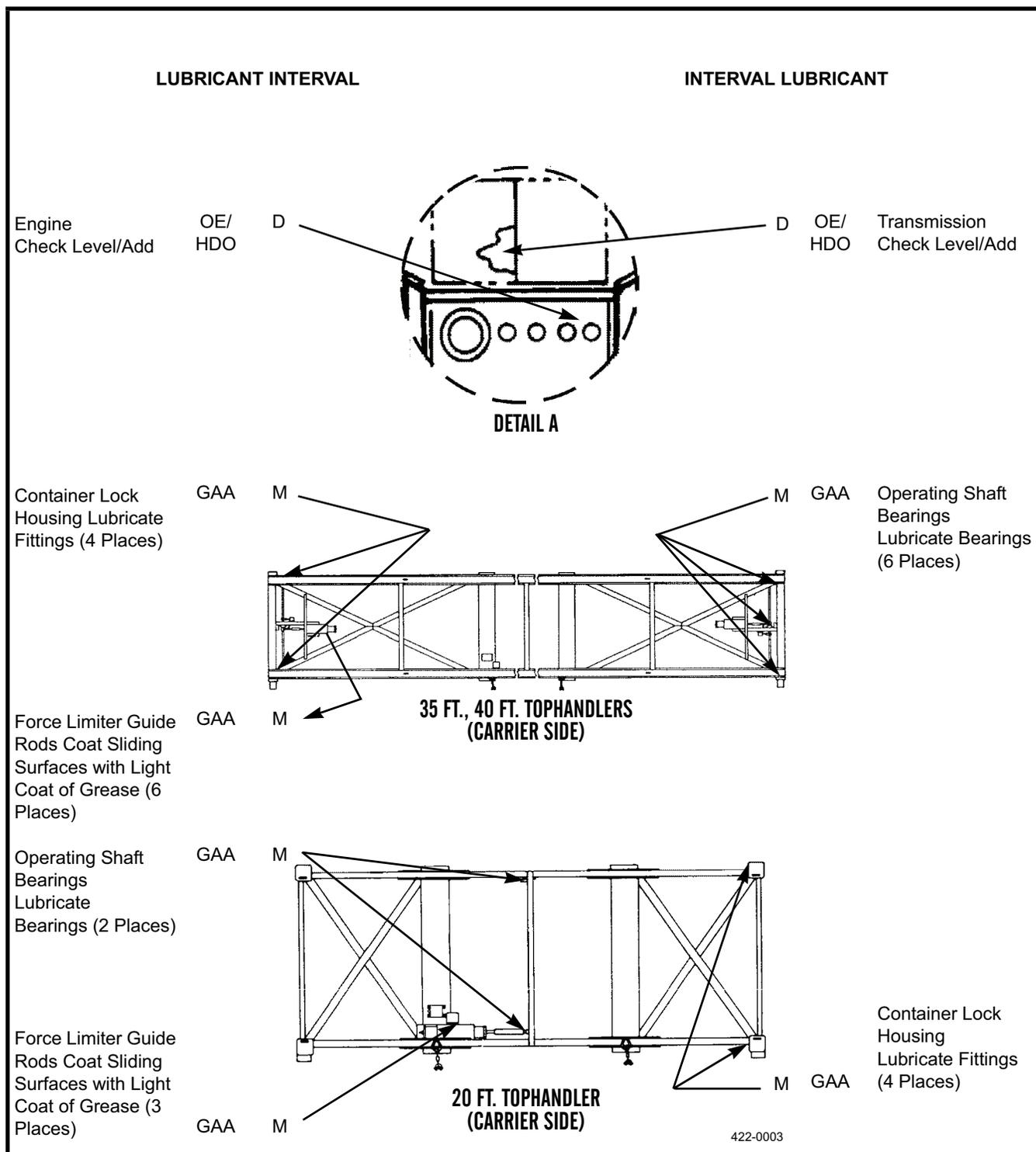
GENERAL LUBRICATION PROCEDURES - CONTINUED



GENERAL LUBRICATION PROCEDURES - CONTINUED



GENERAL LUBRICATION PROCEDURES - CONTINUED



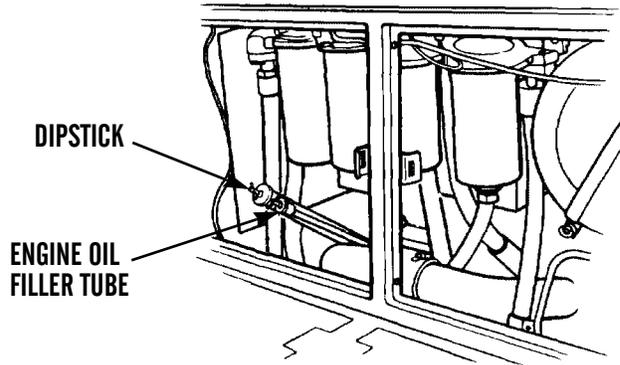
END OF WORK PACKAGE

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
				NOTE	
				<ul style="list-style-type: none"> • Review all WARNINGS, CAUTIONS, and NOTES before performing PMCS and operating the machine. • Perform all PMCS checks if: <ul style="list-style-type: none"> a. You are the assigned operator but have not operated the machine since the last weekly checks. b. You are operating the machine for the first time. • Unless otherwise indicated, perform PMCS with machine parked on level ground, parking brake applied, transmission in N (Neutral), container handler forks lowered to the ground, engine shut down, and wheels blocked. • If leakage is detected during performance of PMCS, further investigation is required to determine location and cause of leak. 	
			LEFT SIDE AND REAR		
1	Before		Overall View	Visually check for leakage on or under machine (oil, fuel, coolant, and hydraulic oil).	Class III oil, coolant, or hydraulic oil leaks are evident. Any fuel leak is evident.
2	Before		Lights	Check left-front headlight and floodlights for missing or damaged components.	Missing or damaged components are evident, if necessary for mission.
3	Before		Tires and Wheels	Visually check left-side tires for obviously low tire pressure.	Low or flat tire is evident.
4	Before		Fuel Tank	Ensure fuel tank filler cap is present and secure.	Fuel tank filler cap is missing.
5	Before		Left Engine Compartment	a. Release retainer and open left-side engine compartment access doors. b. Check left engine compartment for evidence of fluid leakage such as oil, coolant, and fuel.	b. Class III oil or coolant leaks are evident. Any fuel leak is evident.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
6	Before	0.1 Hours	Engine Oil Level (Cold Check)	<p>a. Wipe area around dipstick and filler tube with a clean rag (Item 12, WP 0016 00).</p> <p>b. Remove dipstick and read oil level on dipstick. Level must be between LOW and FULL marks on ENGINE STOPPED side of dipstick.</p> <p>c. If level is low, add oil (Item 7, 9, or 10, WP 0016 00) through filler tube opening until level on dipstick reads between LOW and FULL marks.</p>	



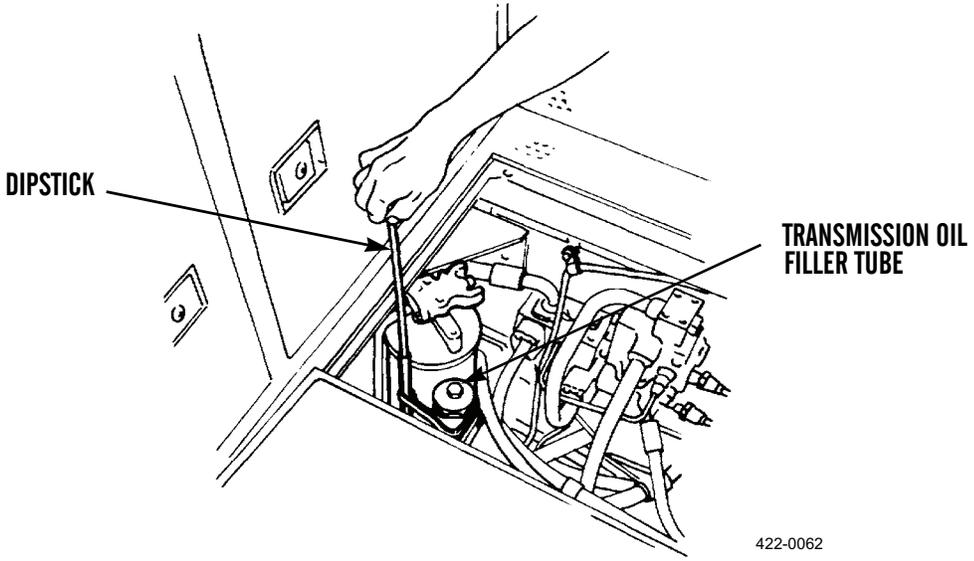
422-0058

7	Before		Rear Lights	Check rear floodlights, taillights, and stoplights for missing or damaged components.	Missing or damaged components are evident, if required for mission.
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PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

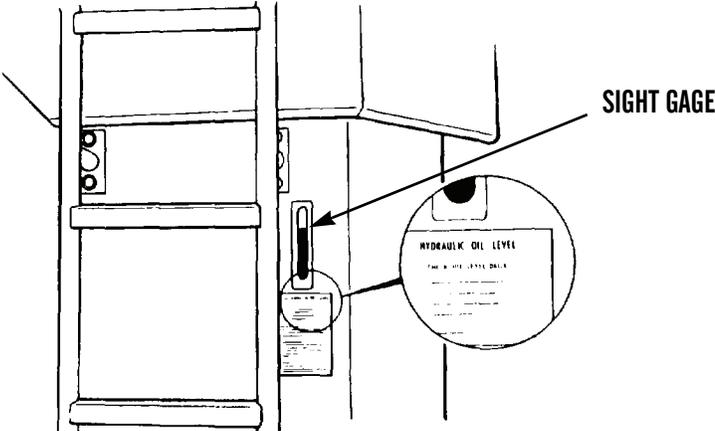
0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
8	Before		RIGHT SIDE AND FRONT Overall View	Visually check for leakage on or under machine (oil, fuel, coolant, and hydraulic oil).	Class III oil, coolant, or hydraulic oil leaks are evident. Any fuel leak is evident. b. Missing or damaged components are evident. c. Class III oil or coolant leaks are evident. Any fuel leak is evident.
9	Before		Right Engine Compartment	a. Release retainer and open right-side engine compartment access doors. b. Check right engine compartment for damaged or missing drive belts and damaged or leaking coolant hoses. c. Check for evidence of fluid leakage such as oil, coolant, and fuel.	
10	Before		Main Disconnect Switch	Insert key (if removed) and turn main disconnect switch clockwise (right) to ON position.	

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
11	Before	0.1 Hours	Transmission Oil Level (Cold Check)	<p>a. Access transmission under floor panel behind cab.</p> <p>b. Wipe area around dipstick and fill cap with a clean rag (Item 12, WP 0016 00).</p> <p>c. Remove dipstick and read oil level on dipstick. Level must be between LOW and FULL marks on dipstick.</p> <p>d. If level is low, add oil (Item 7, 8, or 11, WP 0016 00) through filler tube opening until level on dipstick reads between LOW and FULL marks.</p>	
 <p style="text-align: right; margin-right: 100px;">422-0062</p>					
12	Before		Radiator	Visually check that radiator cap is present.	Radiator cap is missing.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
13	Before	0.1 Hours	Hydraulic Tank	Check level of hydraulic oil in sight gage. With oil cold and engine not running, oil level must be at FULL COLD mark in sight gage. If level is low, unlock and raise floor plate, remove filler cap, and add oil (Item 7, 8, or 11, WP 0016 00) until level is at FULL COLD mark or completely fills sight gage.	
					
14	Before		Tires and Wheels	Visually check right-side tires for obviously low tire pressure.	Low or flat tire is evident.
15	Before		Lights	Check right-front headlight and floodlights for missing or damaged components.	Missing or damaged components are evident, if required for mission.
16	Before		Fire Extinguisher	<ul style="list-style-type: none"> a. Visually check for missing or damaged fire extinguisher. Ensure it is securely stowed in mounting bracket. b. Check gage for reading in green area on gage. c. Check for damaged or missing seal. d. Inspect fire extinguisher inspection tag. 	<ul style="list-style-type: none"> a. Fire extinguisher is missing or damaged. b. Pressure gage needle is in red area. c. Seal is broken or missing. d. Inspection date is not current and/or tag is missing.

422-0061

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
17	Before		CAB INTERIOR	a. Enter cab and occupy seat. b. Adjust seat (WP 0004 00). Ensure seat adjustments can be made and seat locks in place. c. Check and adjust rearview mirror. With assistance, check and adjust side view mirrors. d. Check seat belt for damage and proper operation. Adjust as needed and fasten seat belt. e. Unlock and adjust steering column (WP 0004 00).	b. Seat will not adjust/lock in place. d. Seat belt is missing, damaged, or can not be fastened. Date on belt is more than three years old. e. Steering column does not unlock or hold adjustment.
			Operator Station		
18	Before		Panel Test	Turn power switch to ON and push panel test switch upward and hold. Check that all indicator lights in right-hand and left-hand instrument panels come on.	Any indicator light does not function.
19	Before		Engine Start-up	Start engine and allow to warm up (WP 0005 00).	
20	Before		Instrument Panel	a. With engine running, ensure the following indicator lights are off: (1) LOW ENG OIL indicator. (2) LOW HYD OIL indicator. (3) NO COOLANT FLOW indicator. (4) IMPLEMENT filter indicator. (5) TRANS filter indicator. (6) AIR filter indicator. (7) PILOT filter indicator. (8) HI TEMP HYD OIL indicator. (9) LOW PRESS BRAKE indicator. (10) SUPP STER indicator. b. With machine at normal operating temperature, monitor readings on gages (WP 0004 00).	a. Indicator light(s) remain on while engine is running. b. Gages indicate an abnormal reading.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

0012 00

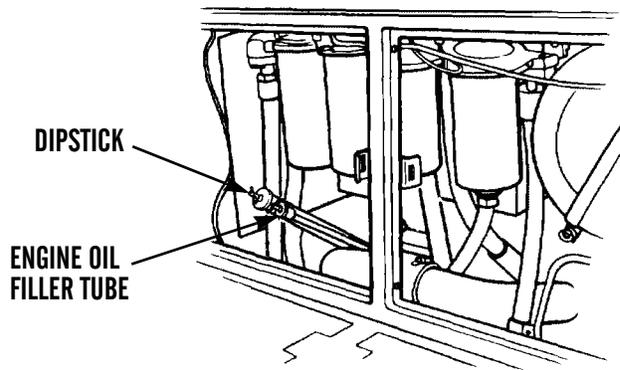
ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
21	Before		Backup Alarm and Horn	a. Verify that backup alarm functions when transmission is placed in R (Reverse). b. Check operation of horn.	a. Backup alarm does not function. b. Horn does not function.
22	Before		Lights	Check operation of lights.	Any lights do not function, if required for mission.
23	Before		Hydraulic Control Levers	Move all control levers through each position and observe mast movement. Ensure movement is smooth without binding.	Mast does not respond to control lever movements.
24	Before		Service Brakes	Release parking brake and drive machine slowly forward. Apply service brakes to ensure correct functioning.	Service brakes do not stop machine.
25	During		Overall Leakage	Watch for evidence of fluid leakage.	Class III oil, coolant, or hydraulic oil leaks are evident. Any fuel leak is evident.
26	During		Wipers and Windshield Washers	Operate windshield wipers and washer to verify correct operation.	
27	During		Accelerator and Brake Pedals	Check accelerator pedal and left and right brake pedals for binding and obstructions.	Pedal binds or does not operate properly.
28	During		Service Brakes	Check service brakes for pulling, grabbing, or reduced braking capacity. Notify Organizational Maintenance of any malfunction.	Brakes pull, grab, or do not operate properly.
29	During		Steering	Check for smooth, controlled steering without pulling or drifting. Notify Organizational Maintenance of any malfunction.	Steering is erratic.
30	During	0.1 Hours	Hydraulic Tank	With warm oil and engine running, ensure oil level in sight gage is above ADD COLD mark in sight gage. Add oil (Item 7, 8, or 11, WP 0016 00) if level is low.	
31	During		Hydraulic Control Levers	Check all control levers for proper operation. Ensure mast movement is smooth without binding.	Mast does not respond to control lever movements.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
32	During		Transmission	<p>NOTE</p> <p>Do not shift from forward to reverse or reverse to forward without stopping.</p> <p>Monitor transmission functioning as transmission range selector is moved through all ranges.</p>	Transmission does not operate correctly.
33	During		Cab Heater	Check operation of cab heater and defroster if weather warrants use.	
			ENGINE IDLING		
34	After	0.1 Hours	Engine Oil Level (Hot Check)	<div style="text-align: center;">  <p>WARNING</p> <p>With engine running, drivetrain components are hot to the touch. Use caution to safeguard against burns. Failure to follow this warning may result in injury to personnel.</p> <p>NOTE</p> <p>To ensure accurate engine and transmission oil level checks, machine must be stopped on level ground.</p> <p>a. With engine running at low idle and warm, release retainer and open left-side engine compartment access doors.</p> <p>b. Wipe area around dipstick and filler tube with a clean rag (Item 12, WP 0016 00).</p> <p>c. Remove dipstick and read oil level on dipstick. Level must be between LOW and FULL marks on LOW IDLE side of dipstick.</p> </div>	

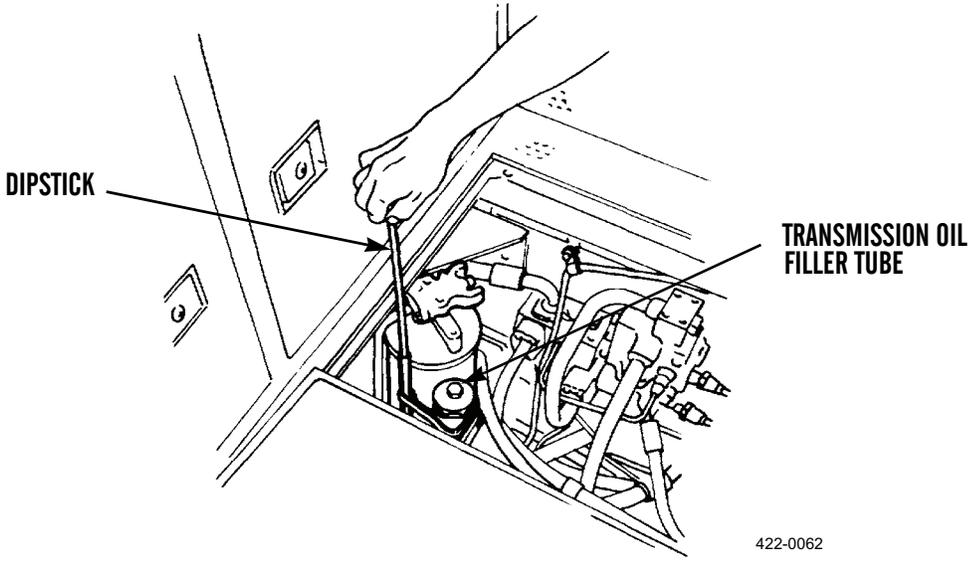
PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
34 Cont.	After	0.1 Hours	Engine Oil Level (Hot Check)	d. If level is low, add oil (Item 7, 9, or 10, WP 0016 00) through filler tube opening until level on dipstick reads between LOW and FULL marks.	



422-0058

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
35	After	0.1 Hours	Transmission Oil Level (Hot Check)	<p>a. With engine running at low idle and warm, access transmission under floor panel behind cab.</p> <p>b. Wipe area around dipstick and fill cap with a clean rag (Item 12, WP 0016 00).</p> <p>c. Remove dipstick and read oil level on dipstick. Level must be between LOW and FULL marks on dipstick.</p> <p>d. If level is low, add oil (Item 7, 8, or 11, WP 0016 00) through filler tube opening until level on dipstick reads between LOW and FULL marks.</p>	
 <p style="text-align: right;">422-0062</p>					

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
36	After		Brake System Tests	<p style="text-align: center;">WARNING</p> <p>Be ALERT for personnel in the area while operating machine. Always check to ensure area is clear of personnel. Failure to follow this warning may cause injury or death to personnel.</p> <p>a. With engine running, apply service brakes, release parking brake, and shift transmission to 2nd gear forward. Slowly increase engine speed to full throttle for not more than five seconds. Machine must not move. Reduce engine speed, shift transmission to NEUTRAL and apply parking brake.</p> <p style="text-align: center;">NOTE</p> <ul style="list-style-type: none"> • Indicator light will come on and horn will sound if brake is on and transmission is engaged. • It will be necessary to hold transmission range selector in REVERSE, or spring load will cause lever to move to NEUTRAL. <p>b. With engine running, apply parking brake and shift transmission to 2nd gear reverse. Parking brake on indicator light and buzzer should activate and backup alarm should sound.</p> <p style="text-align: center;">CAUTION</p> <p>Extended load on drivetrain, such as load produced when the following test is NOT completed quickly, could result in damage to machine. Only hold throttle wide open momentarily.</p> <p>c. Gradually increase engine speed to full throttle and then immediately decrease engine to idle. Shift transmission to neutral and shut down engine.</p> <p>d. Shut down engine and park machine on level ground (WP 0005 00). Ensure parking brake is applied, transmission is in N (Neutral), container handler forks are lowered to the ground, and wheels are blocked.</p>	<p>a. Machine moves with service brakes applied at full throttle in gear.</p> <p>b. Parking brake on indicator light or buzzer don't activate or backup alarm does not sound.</p> <p>c. Machine moves more than 5 ft (1.5 m) during test.</p>

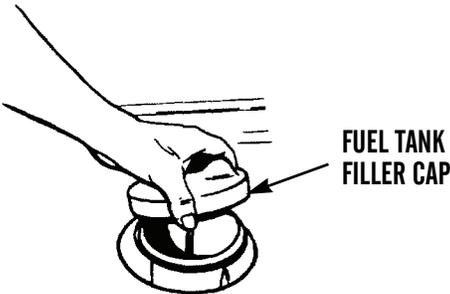
ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
37	After		LEFT SIDE AND REAR	<p>NOTE</p> <p>Ensure machine is clean in order to facilitate performance of PMCS inspections.</p> <p>a. Check under machine for evidence of fluid leakages such as oil, coolant, fuel, or hydraulic oil.</p> <p>b. Check machine for obvious damage to fenders, mirrors, handrails, ladders, engine covers, and guards.</p> <p>c. Check for loose wiring or damaged lines or hoses.</p> <p>d. Check for loose or damaged parts.</p>	<p>a. Class III oil, coolant, or hydraulic oil leaks are evident. Any fuel leak is evident.</p> <p>b. Damage that would impair operation is evident.</p> <p>c. Parts are damaged or missing.</p> <p>d. Parts are damaged or missing.</p>
			Overall View		
38	After		Front of Machine	<p>a. Check for missing parts or damage to tophandler, hydraulic cylinder, container locks, container lock cylinders, forks, carriage, lift chains, and mast cylinders.</p> <p>b. Check condition of windshield, cab windows, windshield wiper, and blades.</p> <p>WARNING</p> <p>Improperly inflated tires can cause excessive heat buildup resulting in blowouts. Failure to follow this warning may cause injury to personnel or damage to equipment.</p>	<p>a. Parts are missing or damaged.</p>
			Left-Front Wheel and Tire		
39	After		Left-Front Wheel and Tire	<p>a. Visually check left-front tire for cuts, abrasions, or bulges in tread or sidewall area. Check for uneven wear or underinflation. Look for foreign material embedded in tread or sidewall area. Remove foreign material if found.</p> <p>b. Check for loose or missing lug nuts or valve stem caps.</p>	<p>a. Tire has cuts, abrasions, or bulges in tread or sidewall area. Other damage that would impair operation is evident.</p> <p>b. Two or more lug nuts are missing or valve stem is damaged.</p>

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
40	After		Steering	a. Check steering linkage for cracks, distortion, or damage. b. Check left-front steering cylinder and hoses for damage or leaks.	a. Cracks or distortion in steering linkage that would impair operation are evident. b. Class III leaks or damage that would impair operation are evident.
41	After		Hydraulic Cylinders	Check all hydraulic cylinders and hoses for damage or leaks.	Class III leaks or damage that would impair operation are evident.
42	After		Cab Door	Check door for damage or missing components.	Components are missing or damaged, if required for mission.
43	After		Left Mirror and Ladders	Check left-side mirror and front and rear ladders for damage or missing components.	Components are missing or damaged, if required for mission.
44	After		Below Operator Compartment	Check hoses, cables, and connections below left side of operator compartment for damage or leaks.	Class III leaks or damage that would impair operation are evident.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:										
			ITEM TO CHECK/SERVICE												
45	After		Fuel Tank	 <p>WARNING</p> <ul style="list-style-type: none"> • DO NOT smoke or permit any open flame in area of machine while you are servicing fuel system. Be sure hose nozzle is grounded against filler tube during refueling to prevent static electricity. Failure to follow this warning may cause injury to personnel or equipment damage. • Operating personnel must wear fuel-resistant gloves when handling fuels. If exposed to fuel, promptly wash exposed skin and change fuel-soaked clothing. <p>NOTE</p> <ul style="list-style-type: none"> • Place portable fire extinguisher within reach prior to refueling. • DO NOT overfill fuel tank. If fuel starts foaming from fuel tank, stop IMMEDIATELY to avoid fuel spillage. <table border="0"> <tr> <td>a. Check fuel tank filler tube and cap for damage or leaks.</td> <td>a. Class III fuel leaks or damage are evident.</td> </tr> <tr> <td>b. Remove fuel tank filler cap. Inspect cap gasket for damage.</td> <td>b. Fuel cap gasket is missing or damaged.</td> </tr> <tr> <td>c. If debris is present in filler screen, clean debris from screen.</td> <td>c. Filler screen is missing or damaged.</td> </tr> <tr> <td>d. As required, fill tank with diesel fuel (Item 5, WP 0016 00).</td> <td></td> </tr> <tr> <td>e. Reinstall filler cap securely.</td> <td></td> </tr> </table>	a. Check fuel tank filler tube and cap for damage or leaks.	a. Class III fuel leaks or damage are evident.	b. Remove fuel tank filler cap. Inspect cap gasket for damage.	b. Fuel cap gasket is missing or damaged.	c. If debris is present in filler screen, clean debris from screen.	c. Filler screen is missing or damaged.	d. As required, fill tank with diesel fuel (Item 5, WP 0016 00).		e. Reinstall filler cap securely.		
a. Check fuel tank filler tube and cap for damage or leaks.	a. Class III fuel leaks or damage are evident.														
b. Remove fuel tank filler cap. Inspect cap gasket for damage.	b. Fuel cap gasket is missing or damaged.														
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e. Reinstall filler cap securely.															

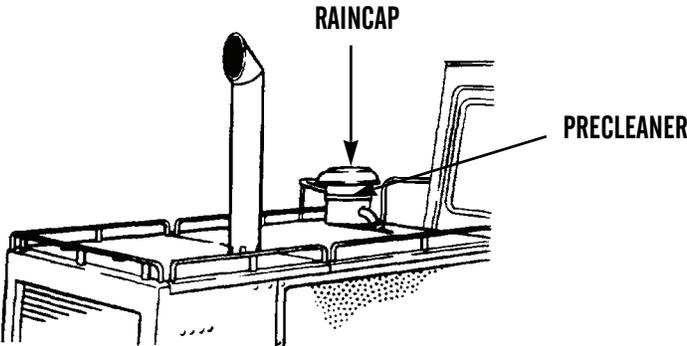


422-0060

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

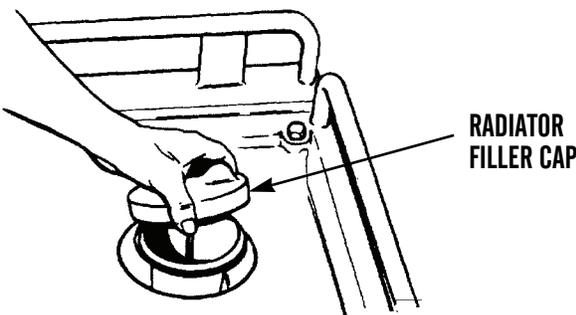
0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
46	After		Left-Rear Wheel and Tire	<p style="text-align: center;">WARNING</p> <p>Improperly inflated tires can cause excessive heat buildup resulting in blowouts. Failure to follow this warning may cause injury to personnel or damage to equipment.</p> <p>a. Visually check left-rear tire for cuts, abrasions, or bulges in tread or sidewall area. Check for uneven wear or underinflation. Look for foreign material embedded in tread or sidewall area. Remove foreign material if found.</p> <p>b. Check for loose or missing lug nuts or valve stem caps.</p>	<p>a. Tire has cuts, abrasions, or bulges in tread or sidewall area. Other damage that would impair operation is evident.</p> <p>b. Two or more lug nuts are missing or valve stem is damaged.</p>
47	After		Engine Air Precleaner	<div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: center;"> <p>WARNING</p> <ul style="list-style-type: none"> • If NBC exposure is suspected, personnel wearing protective equipment should handle all air cleaner media. Consult your NBC Officer or NBC NCO for appropriate handling or disposal procedures. • NBC contaminated filters must be handled using adequate precautions and must be disposed of by trained personnel. • For more information, refer to: FM 3-3, <i>Chemical and Biological Contamination Avoidance</i>; FM 3-5, <i>NBC Decontamination</i>; FM 3-7, <i>NBC Field Handbook</i>; and FM 3-3-1, <i>Nuclear Contamination Avoidance</i>. </div>  </div>	

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
47 Cont.	After		Engine Air Precleaner	Clean engine air precleaner if debris is visible in precleaner. Remove raincap and clean screen and precleaner housing with a clean rag (Item 12, WP 0012 00).	
 <p style="text-align: center;">422-0064</p>					
48	After		Radiator	<div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: center;"> <p>WARNING</p> <ul style="list-style-type: none"> • DO NOT service cooling system unless engine has been allowed to cool down. This is a pressurized cooling system and escaping steam or hot coolant will cause serious burns. • DO NOT remove cooling system radiator cap when engine is hot. Allow engine to cool down. Loosen cap to first stop and let any pressure out of cooling system, then remove cap. Failure to follow this warning may cause serious burns. • Wear effective eye, glove, and skin protection when handling coolants. Failure to do so may cause injury to personnel. </div>  </div> <ol style="list-style-type: none"> a. Remove filler cap slowly. b. Check coolant level. Coolant should be within 1/2 in. (1.3 cm) of bottom of fill opening. c. If level is low, add a 50/50 mixture of antifreeze (Item 1, WP 0016 00) and water to bring level up to correct level (TB 750-651). 	

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

0012 00

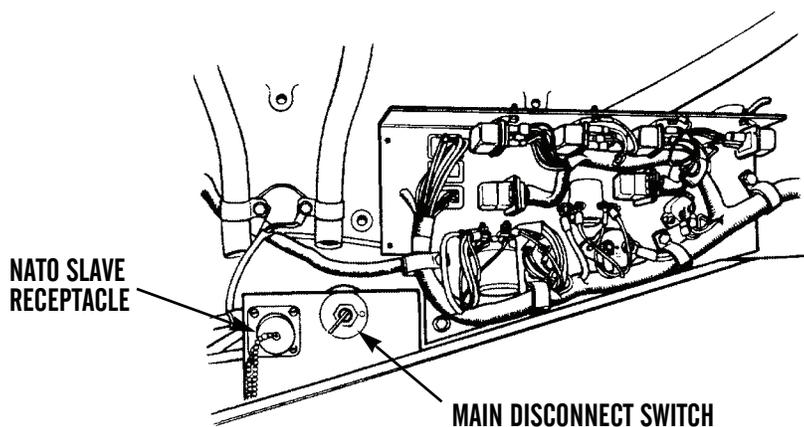
ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
48 Cont.	After		Radiator	d. Inspect filler cap gasket. Ensure it is present and in good condition. e. Reinstall filler cap securely.	d. Filler cap gasket is missing or damaged.
 <p>422-0059</p>					
49	After		Rear of Machine	f. Check radiator grille for damage or debris. Remove debris. If debris cannot be removed or if grille is damaged, notify Organizational Maintenance. g. Visually check radiator for signs of leakage or damage. Check backup alarm and pintle hook for damage.	g. Class III leaks or damage that would impair operation are evident. Damage that would impair operation is evident.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

0012 00

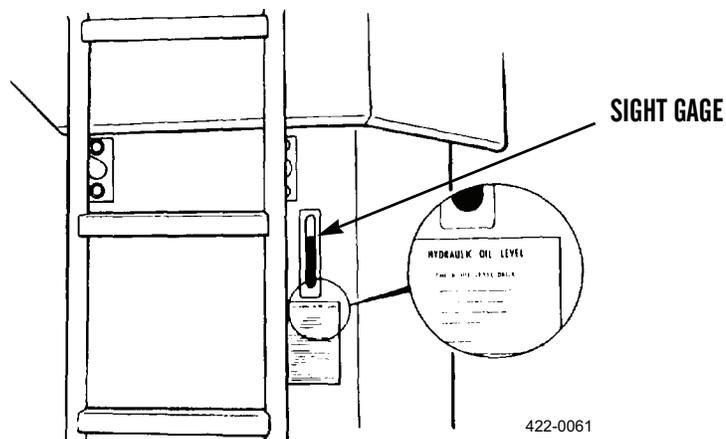
ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
50	After		RIGHT SIDE AND FRONT Overall View	a. Check under machine for evidence of fluid leakages such as oil, coolant, fuel, or hydraulic oil. b. Check machine for obvious damage to fenders, mirrors, handrails, ladders, engine covers, and guards. c. Check for loose wiring, damaged lines, or hoses. d. Check for loose or damaged parts.	a. Class III oil, coolant, or hydraulic oil leaks are evident. Any fuel leak is evident. b. Damage that would impair operation is evident. c. Parts are damaged or missing. d. Parts are damaged or missing.
51	After		Right-Rear Wheels and Tires	a. Visually check right-rear tire for cuts, abrasions, or bulges in tread or sidewall area. Check for uneven wear or underinflation. Look for foreign material embedded in tread or sidewall area. Remove foreign material if found. b. Check for loose or missing lug nuts or valve stem caps.	a. Tire has cuts, abrasions, or bulges in tread or sidewall area. Other damage that would impair operation is evident. b. Two or more lug nuts are missing or valve stem is damaged.

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
52	After		NATO Receptacle	a. Release retainer and open right-side engine compartment access doors. b. Inspect NATO slave receptacle and cover for damage. Ensure cover is installed. c. Turn main disconnect switch counterclockwise (left) to OFF position. Remove key from switch.	



422-0044

53	After	0.1 Hours	Hydraulic Tank	a. Check level of hydraulic oil at sight gage. Level must be at FULL COLD mark in sight gage or completely fill sight gage.	
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422-0061

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

0012 00

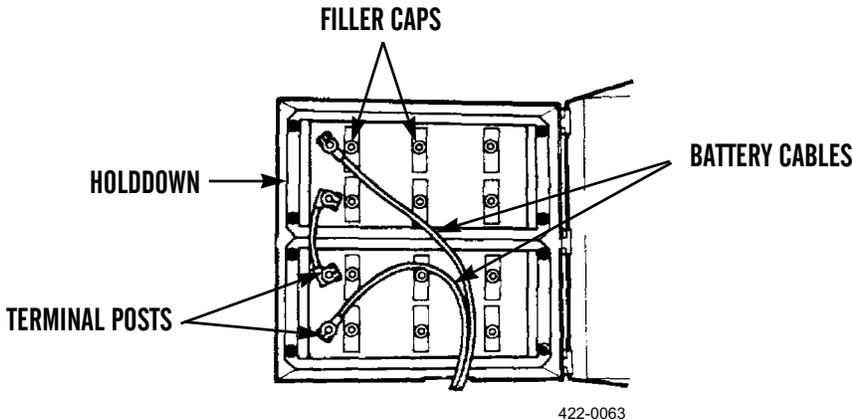
ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
53 Cont.	After	0.1 Hours	Hydraulic Tank	b. If level is low, access hydraulic tank by unlocking and raising floor plate and removing filler cap from tank. Ensure filler cap gasket is present and in good condition.	
<p style="text-align: right;">422-0045</p>					
54	After		Below Operator Compartment	<p>c. Ensure strainer is present, in good condition, and free of debris. Remove debris from strainer, as required.</p> <p>d. Add oil (Item 7, 8, or 11, WP 0016 00) until level is at FULL COLD mark on sight gage or completely fills sight gage.</p> <p>e. Reinstall filler cap securely. Lower floor plate and lock.</p> <p>a. Check hoses, cables, and connections below right-side of operator compartment for damage or leaks.</p> <p>b. Check cables for fraying or damage.</p> <p>c. Check fuse box for missing fuses, damage, or corrosion.</p>	<p>a. Class III leaks or damage that would impair operation are evident.</p> <p>b. Damage that would impair operation is evident.</p> <p>c. Missing or damaged components are evident, if required for mission.</p>

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
55	After		Rollover Protective Structure (ROPS)	Check ROPS for damage and loose or missing mounting bolts.	One loose or missing mounting bolt or damage to ROPS are evident.
56	After		Right Mirror and Ladders	Check right-side mirror and front and rear ladders for damage or missing components.	Components are missing or damaged, if required for mission.
57	After		Hydraulic Cylinders	Check all hydraulic cylinders and hoses for damage or leaks.	Class III leaks or damage that would impair operation are evident.
58	After		Steering	<p>a. Check steering linkage for cracks, distortion, or damage.</p> <p>b. Check right-front steering cylinder and hoses for damage or leaks.</p>	<p>a. Cracks or distortion in steering linkage that would impair operation are evident.</p> <p>b. Class III leaks or damage that would impair operation are evident.</p>
59	After		Right-Front Wheel and Tire	<p>a. Visually check right-front tire for cuts, abrasions, or bulges in tread or sidewall area. Check for uneven wear or underinflation. Look for foreign material embedded in tread or sidewall area. Remove foreign material if found.</p> <p>b. Check for loose or missing lug nuts or valve stem caps.</p>	<p>a. Tire has cuts, abrasions, or bulges in tread or sidewall area. Other damage that would impair operation is evident.</p> <p>b. Two or more lug nuts are missing or valve stem is damaged.</p>

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:						
			ITEM TO CHECK/SERVICE								
60	Weekly		Left-Side Battery Compartment	 <p>WARNING</p> <ul style="list-style-type: none"> To avoid injury, eye protection and acid-resistant gloves must be worn when working around batteries. DO NOT smoke, use open flame, make sparks, or create other ignition sources around batteries. If a battery is giving off gases, it can explode and cause injury. Remove all jewelry such as rings, ID tags, watches, and bracelets. If jewelry or a tool contacts a battery terminal, a direct short will result in instant heating, damage to equipment, and injury to personnel. Sulfuric acid contained in batteries can cause serious burns. If battery corrosion or electrolyte makes contact with skin, eyes, or clothing, take immediate action to stop the corrosive burning effects. Failure to follow these procedures may cause death or serious injury to personnel. DO NOT use compressed air to clean batteries. Use a clean, dry rag. <p>CAUTION</p> <p>To reduce battery damage, check battery box for corrosion (greenish/white powder) and DO NOT jerk or pull on battery cables during visual inspection.</p> <table border="0"> <tr> <td>a. Open battery compartment cover. Check battery holddowns for looseness or damage.</td> <td>a. Holddown is loose or damaged.</td> </tr> <tr> <td>b. Inspect each battery for a cracked case and evidence of leaking.</td> <td>b. Battery case is cracked or leaks are evident.</td> </tr> <tr> <td>c. Check for damaged or missing battery filler caps.</td> <td>c. Damaged or missing filler caps are noted.</td> </tr> </table>	a. Open battery compartment cover. Check battery holddowns for looseness or damage.	a. Holddown is loose or damaged.	b. Inspect each battery for a cracked case and evidence of leaking.	b. Battery case is cracked or leaks are evident.	c. Check for damaged or missing battery filler caps.	c. Damaged or missing filler caps are noted.	
a. Open battery compartment cover. Check battery holddowns for looseness or damage.	a. Holddown is loose or damaged.										
b. Inspect each battery for a cracked case and evidence of leaking.	b. Battery case is cracked or leaks are evident.										
c. Check for damaged or missing battery filler caps.	c. Damaged or missing filler caps are noted.										

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION ITEM TO CHECK/ SERVICE	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
60 Cont.	Weekly		Left-Side Battery Compartment	d. Check for missing, broken, split, or frayed battery cables.	d. Damage is noted.
				<p>e. Check for damaged battery posts.</p> <p>f. Check for rust, corrosion, and cleanness.</p> <p>g. Check battery cable grommets for dry rot and loose or missing condition.</p> <p>h. Check electrolyte level. Electrolyte must be to bottom of filler openings.</p> <p>i. Notify Organizational Maintenance of any problems noted.</p>	<p>e. Damage is noted.</p> <p>f. Rust or corrosion is noted.</p> <p>h. Electrolyte level is low.</p>

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:												
			ITEM TO CHECK/SERVICE														
61	Weekly		Exhaust System	Check exhaust system pipes, clamps, and muffler for looseness, leakage, and damage.	Damage or leaks are noted.												
62	Weekly		Right-Side Battery Compartment	 <p>WARNING</p> <ul style="list-style-type: none"> To avoid injury, eye protection and acid-resistant gloves must be worn when working around batteries. DO NOT smoke, use open flame, make sparks, or create other ignition sources around batteries. If a battery is giving off gases, it can explode and cause injury. Remove all jewelry such as rings, ID tags, watches, and bracelets. If jewelry or a tool contacts a battery terminal, a direct short will result in instant heating, damage to equipment, and injury to personnel. Sulfuric acid contained in batteries can cause serious burns. If battery corrosion or electrolyte makes contact with skin, eyes, or clothing, take immediate action to stop the corrosive burning effects. Failure to follow these procedures may cause death or serious injury to personnel. DO NOT use compressed air to clean batteries. Use a clean, dry rag. <p>CAUTION</p> <p>To reduce battery damage, check battery compartment for corrosion (greenish/white powder) and DO NOT jerk or pull on battery cables during visual inspection.</p> <table border="0"> <tr> <td>a. Open battery compartment cover. Check battery holddowns for looseness or damage.</td> <td>a. Holddown is loose or damaged.</td> </tr> <tr> <td>b. Inspect each battery for a cracked case and evidence of leaking.</td> <td>b. Battery case is cracked or leaks are evident.</td> </tr> <tr> <td>c. Check for damaged or missing battery filler caps.</td> <td>c. Damaged or missing filler caps are noted.</td> </tr> <tr> <td>d. Check for missing, broken, split, or frayed battery cables.</td> <td>d. Damage is noted.</td> </tr> <tr> <td>e. Check for damaged battery posts.</td> <td>e. Damage is noted.</td> </tr> <tr> <td>f. Check for rust, corrosion, and cleanness.</td> <td>f. Rust or corrosion is noted.</td> </tr> </table>	a. Open battery compartment cover. Check battery holddowns for looseness or damage.	a. Holddown is loose or damaged.	b. Inspect each battery for a cracked case and evidence of leaking.	b. Battery case is cracked or leaks are evident.	c. Check for damaged or missing battery filler caps.	c. Damaged or missing filler caps are noted.	d. Check for missing, broken, split, or frayed battery cables.	d. Damage is noted.	e. Check for damaged battery posts.	e. Damage is noted.	f. Check for rust, corrosion, and cleanness.	f. Rust or corrosion is noted.	
a. Open battery compartment cover. Check battery holddowns for looseness or damage.	a. Holddown is loose or damaged.																
b. Inspect each battery for a cracked case and evidence of leaking.	b. Battery case is cracked or leaks are evident.																
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e. Check for damaged battery posts.	e. Damage is noted.																
f. Check for rust, corrosion, and cleanness.	f. Rust or corrosion is noted.																

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
62 Cont.	Weekly		Right-Side Battery Compartment	g. Check battery cable grommets for dry rot and loose or missing condition. h. Check electrolyte level. Electrolyte must be to bottom of filler openings. i. Notify Organizational Maintenance of any problems noted.	h. Electrolyte level is low.
63	Weekly		ROPS	a. Check ROPS for loose, damaged, or missing mounting hardware. Notify Organizational Maintenance to retorque/ replace mounting hardware. b. Check ROPS for any signs of cracking in base metal or welded areas.	a. Loose, damaged, or missing mounting hardware is noted. b. Any signs of damage or cracked welds are noted.
64	Weekly		Wheels and Tires	a. Check for loose or missing lug nuts or valve stem caps. Notify Organizational Maintenance if lug nuts are loose. <p style="text-align: center;">WARNING</p> <ul style="list-style-type: none"> • Operating machine with underinflated or defective tire may lead to tire failure and loss of traction or control. Damage to equipment or injury to personnel may result. • If tire pressure is 0 psi (0 kPa), DO NOT inflate. Notify Organizational Maintenance. Failure to follow this warning may cause injury or death to personnel. b. Park machine so that valve stem is at 9 o'clock or 3 o'clock. c. Clean area around valve stem, then remove valve stem cap. d. Check air pressure in each tire with tire pressure gage. Tire inflation should be 70 psi (483 kPa) for front tires and 40 psi (276 kPa) for rear tires.	a. Two or more lug nuts are missing or valve stem is damaged.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

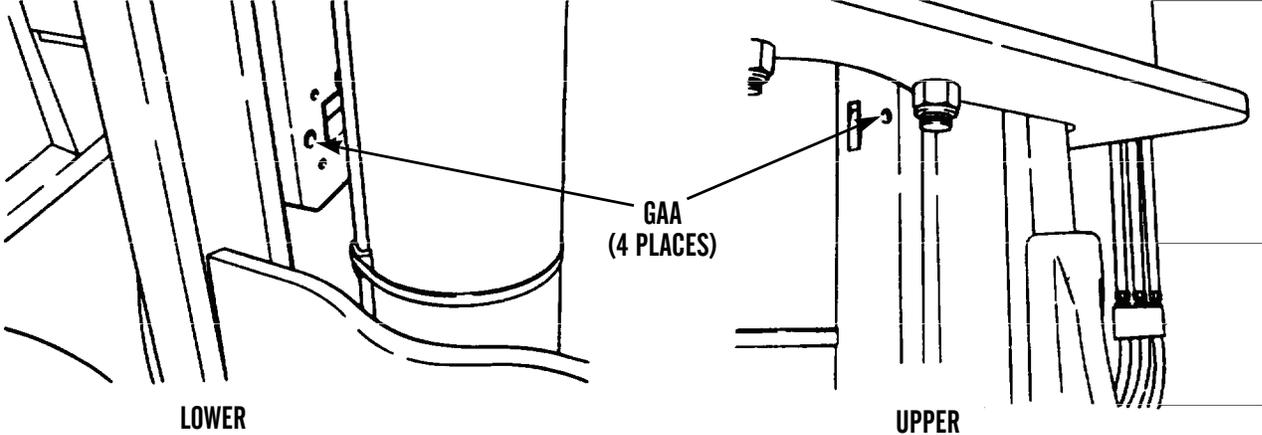
0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
64 Cont.	Weekly		Wheels and Tires	<p style="text-align: center;">WARNING</p> <p>Use a self-inflating chuck and stand at tread side of tire at maximum distance allowed by inflation hose. Failure to do so could result in injury or death to personnel.</p> <p>e. Adjust air pressure in tire as required to 70 psi (483 kPa) for front tires and 40 psi (276 kPa) for rear tires. Use pneumatic tire inflation hose assembly.</p> <p>f. Install valve stem cap.</p>	
65	Monthly		Brake Accumulator and Emergency Brake Test	<p>a. With main disconnect switch in ON position, turn power switch to ON and push up and hold panel test switch. Low brake pressure indicator should come on. If light does not come on, notify Organizational Maintenance.</p> <p>b. Start engine (WP 0005 00). Run engine at half speed for two minutes to increase accumulator pressure, then shut down engine.</p> <p>c. Apply service brakes. It should take at least five brake applications before low brake pressure indicator comes on. Emergency brake should come on at the same time.</p> <p>d. If brakes do not pass this test, notify Organizational Maintenance.</p>	<p>a. Low brake pressure indicator does not come on.</p> <p>c. Low brake pressure indicator comes on with less than five brake applications. Emergency brake does not come on.</p>
66	Monthly		Upper And Lower Frame Pivot and Bearings	Check pivots for obvious cracks.	Pivots contain cracks.
67	Monthly	0.2 Hours	Mast Slider Blocks	Raise inner channel 2 ft (61 cm). Apply GAA grease (Item 6, WP 0016 00) to mast sliders. Lower and raise channel a few times to spread lubricant.	

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

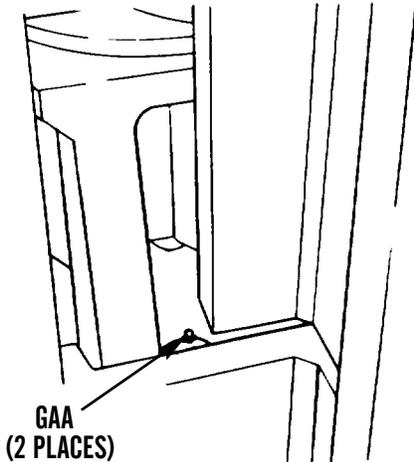
0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
68	Monthly	0.2 Hours	Mast Rollers	Lower carriage to bottom. Apply GAA grease (Item 6, WP 0016 00) to four fittings.	
69	Monthly	0.3 Hours	Carriage Rollers	a. With carriage lowered, apply GAA grease (Item 6, WP 0016 00) to two upper fittings, through holes in carriage.	

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
69 Cont.	Monthly	0.3 Hours	Carriage Rollers	 <p>WARNING</p> <p>DO NOT proceed unless carriage is securely supported. Failure to suitably support carriage could cause injury or death to personnel if carriage should fall.</p> <p>b. Raise carriage 4 ft (122 cm) and block securely to prevent lowering. Apply GAA grease (Item 6, WP 0016 00) to two lower fittings, through holes in carriage.</p>	
 <p style="text-align: center;">GAA (4 PLACES)</p> <p style="text-align: center;">LOWER UPPER</p>					
422-0005					

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

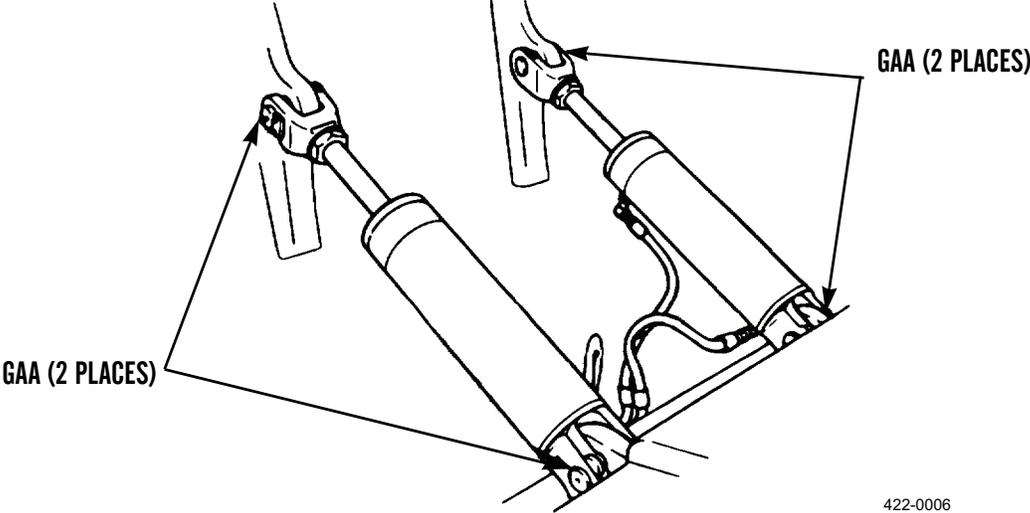
0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
70	Monthly	0.2 Hours	Mast Mounting Hinges	With carriage still raised 4 ft (122 cm) and supported, apply GAA grease (Item 6, WP 0016 00) to two fittings, through holes in carriage.	
					
71	Monthly	0.2 Hours	Mast Chains	Lubricate full length of chains with lubricating oil (Item 8, WP 0016 00).	
72	Monthly	0.1 Hours	Carriage Pivot Pin	Apply GAA grease (Item 6, WP 0016 00) to pivot pin fitting.	
73	Monthly	0.2 Hours	Side Tilt Cylinder	Apply GAA grease (Item 6, WP 0016 00) to two fittings.	
74	Monthly	0.2 Hours	Side Shift Cylinder	Apply GAA grease (Item 6, WP 0016 00) to two fittings.	

422-0004

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

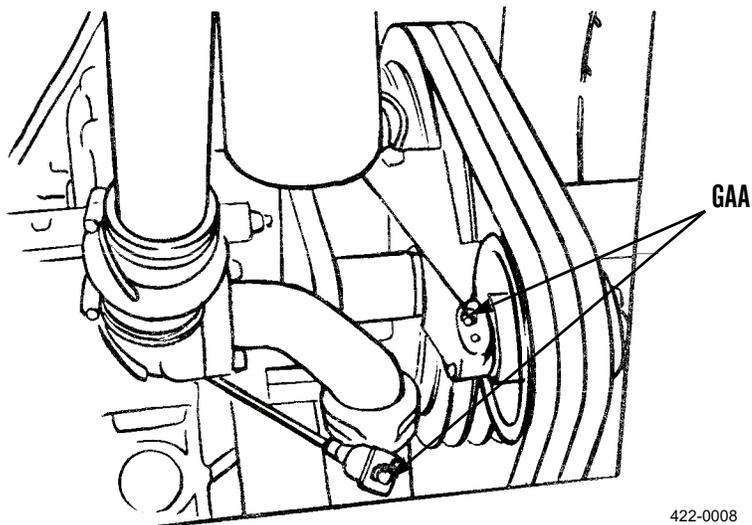
0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
75	Monthly	0.2 Hours	Tilt Cylinders	Apply GAA grease (Item 6, WP 0016 00) to Apply GAA grease (Item 6, WP 0016 00) to four fittings.	
 <p style="text-align: right;">422-0006</p>					
76	Monthly		Drive Belts	a. Check for missing, frayed, or cracked drive belts. b. Check for loose or damaged drive pulleys.	a. Drive belt is missing or damaged. b. Pulley is loose or damaged.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

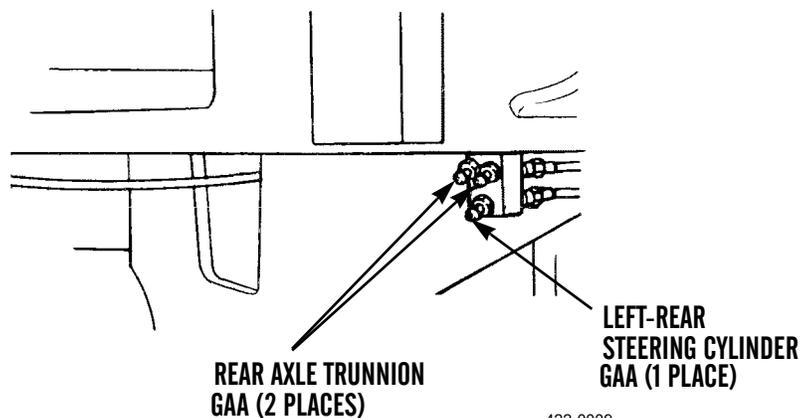
0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
77	Monthly	0.2 Hours	Fan Drive and Belt Tightener Pulley	Apply GAA grease (Item 6, WP 0016 00) to two fittings.	



422-0008

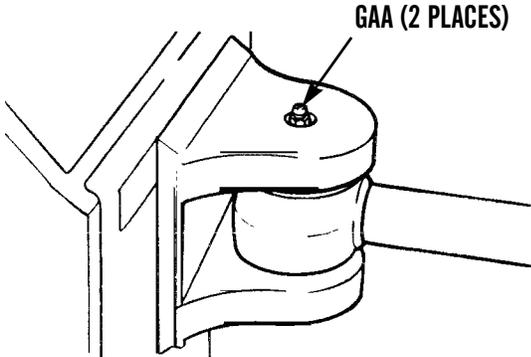
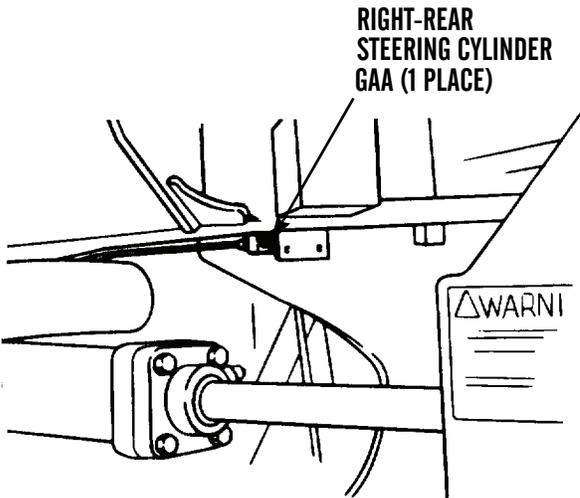
78	Monthly	0.2 Hours	Pintle Hook	Apply GAA grease (Item 6, WP 0016 00) to three fittings.
79	Monthly	0.2 Hours	Rear Axle Trunnion	Apply GAA grease (Item 6, WP 0016 00) to two fittings.



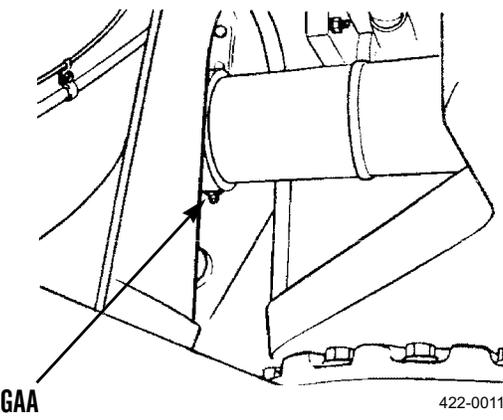
422-0009

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
80	Monthly	0.2 Hours	Steering Cylinders	Apply GAA grease (Item 6, WP 0016 00) to four fittings.	
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>GAA (2 PLACES)</p> </div> <div style="text-align: center;">  <p>RIGHT-REAR STEERING CYLINDER GAA (1 PLACE)</p> <p>△WARN!</p> </div> </div> <p style="text-align: right; margin-right: 50px;">422-0010</p>					

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
81	Monthly	0.1 Hours	Center Drive Shaft Spline	 <p>WARNING</p> <ul style="list-style-type: none"> • Ensure area around machine is clear of personnel or obstructions before articulating machine. Failure to follow this warning may cause injury or death to personnel or damage to equipment. • Hitch and steering movement can reduce clearances suddenly and cause injury. Always stop engine BEFORE working in area of hitch. <p>CAUTION</p> <p>Articulate machine full right or left before lubricating center drive shaft spline, to prevent damage to seal.</p> <p>With shipping link in stowed position, start engine and steer machine to full right or full left. Shut down engine. Apply GAA grease (Item 6, WP 0016 00) to spline fitting.</p>	

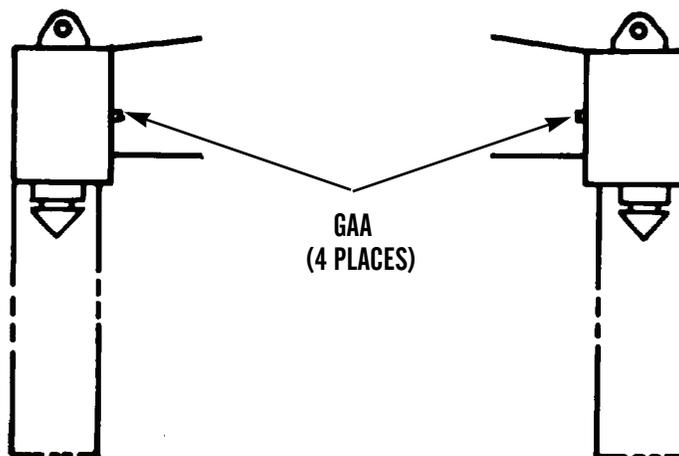


GAA 422-0011

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

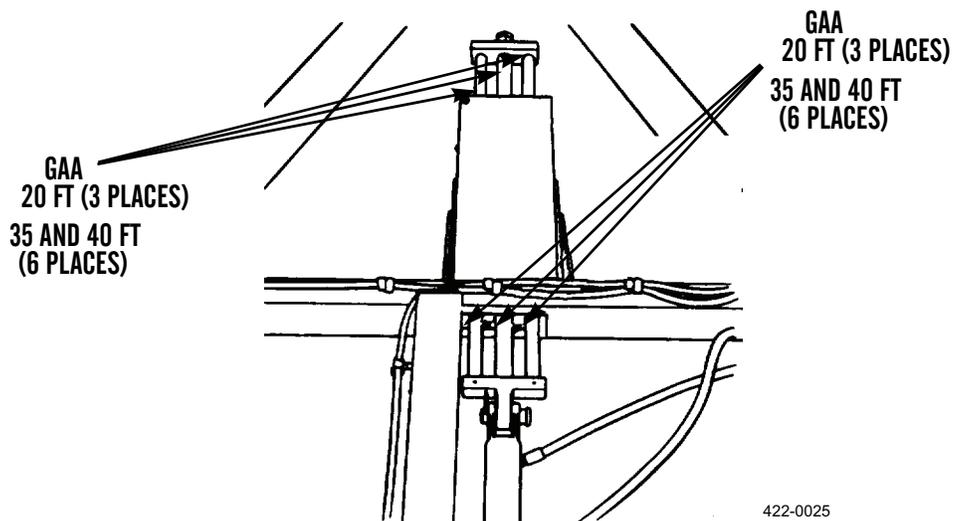
0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
82	Monthly	0.2 Hours	Tophandler Container Lock Housings	Apply GAA grease (Item 6, WP 0016 00) to four fittings.	



422-0016

83	Monthly	0.3 Hours	Tophandler Force Limiter Guide Rods	Coat three sliding surfaces (20 ft tophandler) and six sliding surfaces (35 and 40 ft tophandlers) with a light coat of GAA grease (Item 6, WP 0016 00).
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422-0025

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
84	Monthly	0.3 Hours	Tophandler Operating Shaft Bearings	Apply GAA grease (Item 6, WP 0016 00) to two fittings (20 ft tophandler) and six fittings (35 and 40 ft tophandlers).	
85	Monthly		All Systems - Machine Exercise	<p>CAUTION</p> <p>DO NOT perform this PMCS exercise when temperature is below 0°F (-18°C).</p> <p>NOTE</p> <p>DO NOT exercise machine if it has been operated within the past month.</p> <p>a. Perform <i>Before</i> operation PMCS.</p> <p>b. Start and warm up engine (WP 0005 00).</p> <p>c. While machine is warming up, perform a walkaround inspection, checking for evidence of leaks.</p>	<p>c. Class III oil, coolant, or hydraulic oil leaks are evident. Any fuel leak is evident.</p>

422-0026

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) - CONTINUED

0012 00

ITEM NO.	INTERVAL	MAN-HOURS	LOCATION	PROCEDURE	NOT FULLY MISSION CAPABLE IF:
			ITEM TO CHECK/SERVICE		
85 Cont.	Monthly		All Systems - Machine Exercise	<p style="text-align: center;">NOTE</p> <p>If temperature is below 32°F (0°C), operate controls before moving machine.</p> <p>d. When machine has warmed up, begin to operate ALL controls slowly:</p> <ol style="list-style-type: none"> (1) Transmission in all ranges including reverse (2) Parking and service brakes applied and released (3) Steering from full left to full right (4) All hydraulic controls <p>e. Operate controls for another five minutes.</p> <p>f. Move machine and operate all controls through full motion to bring all systems to operating temperature.</p> <p>g. Move machine and continue to operate all controls through full motion for 30 minutes AFTER machine systems have reached operating temperature.</p> <p>h. Stop machine and allow to idle for five minutes.</p> <p>i. Shut down engine.</p> <p>j. Perform <i>After</i> operation PMCS.</p>	

END OF WORK PACKAGE

CHAPTER 5
SUPPORTING INFORMATION

SCOPE

This work package lists all publication indexes, forms, field manuals, technical bulletins, technical manuals, and other publications referenced in this manual and which apply to operation and operator maintenance of the RTCH.

PUBLICATION INDEXES

The following indexes should be consulted frequently for latest changes or revisions and for new publications relating to material covered in this technical manual.

- Consolidated Army Publications and Forms Index DA PAM 25-30
- Functional Users Manual for the Army Maintenance Management System (TAMMS) DA PAM 750-8

FORMS

NOTE

Refer to DA PAM 750-8, *Functional Users Manual for the Army Maintenance Management System (TAMMS)*, for instructions on the use of maintenance forms.

- Equipment Inspection and Maintenance Worksheet DA Form 2404, DA Form 5988-E
- Product Quality Deficiency Report SF Form 368
- Recommended Changes to Publications and Blank Forms DA Form 2028

FIELD MANUALS

- Basic Cold Weather Manual FM 31-70
- Chemical and Biological Contamination Avoidance FM 3-3
- Desert Operations FM 90-3
- First Aid FM 4-25.11
- Manual for the Wheeled Vehicle Driver FM 21-305
- NBC Decontamination FM 3-5
- NBC Field Handbook FM 3-7
- Northern Operations FM 31-71
- Nuclear Contamination Avoidance FM 3-3-1
- Operation and Maintenance of Ordnance Materiel in Cold Weather FM 9-207

TECHNICAL BULLETINS

- Color, Marking and Camouflage Painting of Military Vehicles, Construction
Equipment, and Materials Handling Equipment TB 43-0209
- Use of Antifreeze Solutions, Antifreeze Extender, Cleaning Compounds and Test Kit in Engine
Cooling Systems TM 750-651

TECHNICAL MANUALS

- Materials Used for Cleaning, Preserving, Abrading, and Cementing Ordnance
Materiel and Related Materials Including Chemicals TM 9-247
- Operator's, Unit, Direct Support and General Support Maintenance Manual for
Lead-Acid Storage Batteries TM 9-6140-200-14
- Procedures for Destruction of Equipment to Prevent Enemy Use
(Mobility Equipment Command) TM 750-244-3

REFERENCES - CONTINUED

0013 00

OTHER PUBLICATIONS

Abbreviations and Acronyms ASME Y14.38-1999
Army Acquisition Policy AR 70-1
Army Medical Department Expendable/Durable Items CTA 8-100
Expendable/Durable Items (Except Medical, Class V Repair Parts, and Heraldic Items) CTA 50-970

END OF WORK PACKAGE

SCOPE

This work package lists COEI and BII for the RTCH, to help you inventory items required for safe and efficient operation.

GENERAL

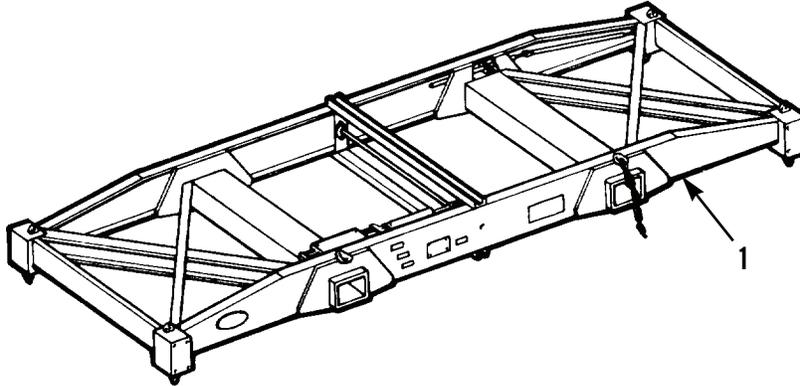
The COEI and BII information is divided into the following tabular lists:

1. **Table 1, Components of End Item List.** 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 and 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.
2. **Table 2, Basic Issue Items List.** These are the minimum essential items required to place the RTCH in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the RTCH during operation and whenever it is transferred between property accounts. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of end item. Illustrations are furnished to assist you in identifying the items.

EXPLANATION OF COLUMNS

Below is an explanation of columns found in the tabular listings:

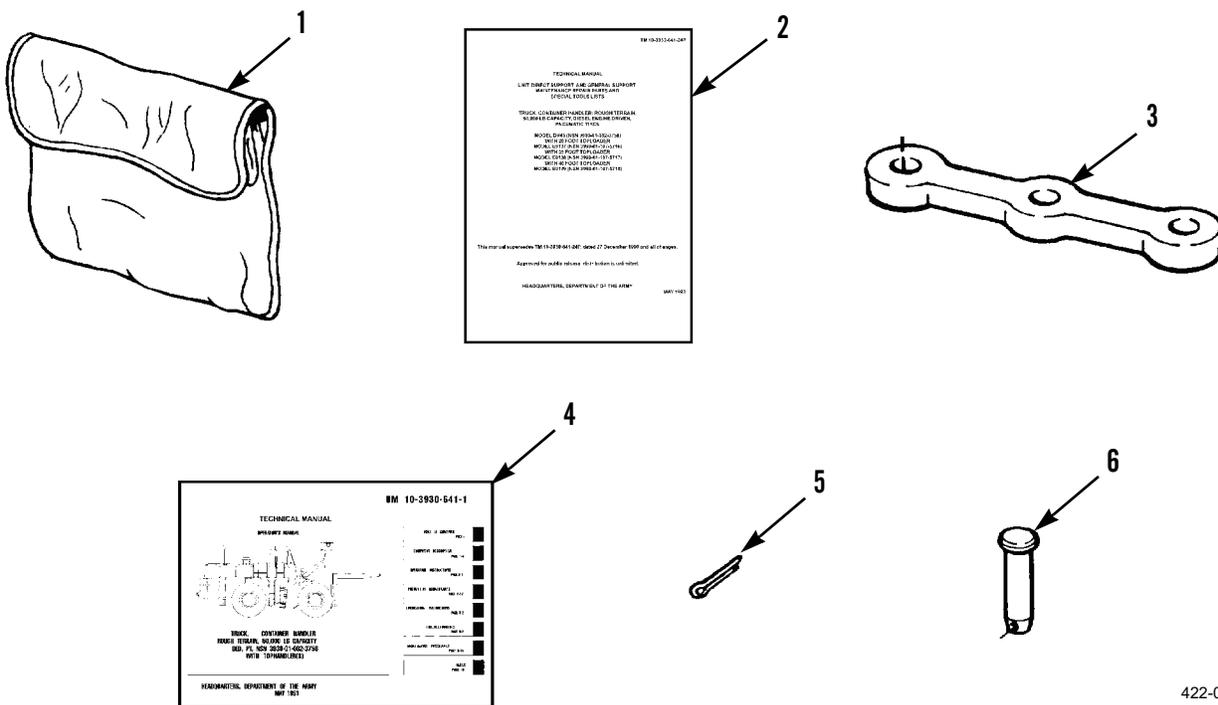
1. **Column (1) - Illustration Number (Illus Number).** This column indicates the number of the illustration that shows the item.
2. **Column (2) - National Stock Number.** Indicates the National Stock Number (NSN) assigned to the item and used for requisitioning purposes.
3. **Column (3) - Description, CAGEC, and Part Number.** Indicates the Federal item name (in all capital letters) and, if required, a minimum description in parentheses to identify and locate the item. The entry for each item ends with the Commercial and Government Entity Code (CAGEC) in parentheses followed by the part number.
4. **Column (4) - Usable on Code.** "USABLE ON" codes are used to help identify which component items are used on different models. This column is not used in this manual.
5. **Column (5) - Unit of Measure (U/M).** Indicates how the item is issued for the NSN shown in Column (2).
6. **Column (6) - Quantity Required (Qty Rqd).** Indicates the quantity of the item required.



422-0027

Table 1. Components of End Item List .

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) U/M	(6) QTY RQD
1	3990-01-107-5716	Tophandler, 20 Ft (65508) 30622		EA	1



422-0065

Table 2. Basic Issue Items List.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) U/M	(6) QTY RQD
1	7520-00-559-9618	Case, Maintenance, and Operational Manuals (83421) 7520-00-559-9618		EA	1
2		Hand Receipt Manual TM 10-3930-641-10HR		EA	1
3	2540-01-444-7987	Link, Shipping, Towbar (11083) 1V7943		EA	2
4		Operator Manual for Rough Terrain Container Handler TM 10-3930-641-10		EA	1
5	5315-00-011-9198	Pin, Cotter (11083) 3B4647		EA	2
6	5315-01-98-3295	Pin, Straight, Headed (11083) 9K5639		EA	2

END OF WORK PACKAGE

ADDITIONAL AUTHORIZATION LIST (AAL)

0015 00**SCOPE**

This work package lists additional items that you are authorized for the support of the RTCH.

GENERAL

This list identifies items that do not have to accompany the machine and that do not have to be turned in with it. These items are authorized to you by CTA, MTOE, TDA, or JTA.

EXPLANATION OF COLUMNS

1. **Column (1) - National Stock Number.** Indicates the National Stock Number (NSN) assigned to the item and will be used for requisitioning purposes.
2. **Column (2) - Description, CAGEC, and Part Number.** Indicates the Federal item name followed by a minimum description when needed. The entry for each item ends with the Commercial and Government Entity Code (CAGEC) in parentheses followed by the part number.
3. **Column (3) - Usable on Code.** Indicates a code if the item needed is not the same for different models of equipment. Usable on Code is not applicable to the RTCH.
4. **Column (4) - Unit of Measure (U/M).** Indicates how the item is issued for the National Stock Number (NSN) shown in Column (1).
5. **Column (5) - Qty Recm.** Indicates the quantity recommended.

Table 1. Additional Authorization List.

(1) National Stock Number	(2) Description, Cagec, and Part Number	(3) Usable on Code	(4) U/M	(5) Qty RECM
3990-01-107-5717	TOPHANDLER, 35 FT (65508) E9138		EA	1
3990-01-107-5718	TOPHANDLER, 40 FT (65508) E9139		EA	1

END OF WORK PACKAGE

EXPENDABLE AND DURABLE ITEMS LIST

0016 00**SCOPE**

This work package lists expendable and durable items you will need to operate and maintain the RTCH. This listing is for informational purposes only and is not authority to requisition the listed items. 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*.

EXPLANATION OF COLUMNS

1. **Column (1) - Item Number.** This number is referenced in the appropriate work package Initial Setup list and in the narrative instructions to identify the item; e.g., Use antifreeze (Item 1, WP 0016 00).
2. **Column (2) - Level.** This column identifies the lowest level of maintenance that requires the listed item.
C - Operator/Crew
3. **Column (3) - National Stock Number.** This is the National Stock Number assigned to the item, which you can use to requisition it.
4. **Column (4) - Description, CAGEC, and Part Number.** This provides the other information you need to identify the item.
5. **Column (5) - Unit of Measure (U/M).** This column shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

EXPENDABLE AND DURABLE ITEMS LIST - CONTINUED

0016 00

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
1	C	6850-01-464-9125	ANTIFREEZE: Permanent Ethylene Glycol, Inhibited, Heavy-Duty (58536) A-A-52624 1 Gallon Can	CN
		6850-00-181-7933	(81349) MILA46153 5 Gallon Container	CN
		6850-01-441-3223	(58536) A-A-52624 55 Gallon Drum	DR
2	C	6850-01-474-2318 6850-01-474-2320 6850-01-474-2321	CLEANING COMPOUND: Solvent, Type III (81349) MIL-PRF-680 1 Gallon Can 5 Gallon Can 55 Gallon Drum	CN CN DR
3	C	6850-00-926-2275	CLEANING COMPOUND: Windshield (0FTT5) 0854-000 16 Ounce Bottle	BT
4	C	7930-00-282-9699	DETERGENT: General Purpose, Liquid (83421) 7930-00-282-9699 1 Gallon Can	CN
5	C	9140-00-286-5294 9140-00-286-5295 9140-00-286-5296	DIESEL FUEL: DF-2 Grade (81346) ASTM D 975 Bulk 5 Gallon Can 55 Gallon Drum	GL CN DR
6	C	9150-01-197-7688	GREASE: Automotive and Artillery GAA (81349) M-10924-A 1-1/4 Ounce Tube	TU
		9150-01-197-7693	(81349) M-10924-B 14 Ounce Cartridge	CA
		9150-01-197-7690	(81349) M-10924-C 1-3/4 Pound Can	CN
		9150-01-197-7692	(81349) M-10924-E 35 Pound Can	CN

EXPENDABLE AND DURABLE ITEMS LIST - CONTINUED

0016 00

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION, CAGEC, AND PART NUMBER	(5) U/M
7	C	9150-00-402-4478	OIL: Lubricating, Arctic, OEA (81349) MIL-L-46167 1 Quart Can	CN
		9150-00-402-2372	(81349) MIL-PRF-46167 5 Gallon Can	CN
		9150-00-491-7197	(81349) MIL-PRF-46167 55 Gallon Drum	DR
8	C		OIL: Lubricating, OE/HDO 10 (81349) MIL-PRF-2104	
		9150-00-189-6727	1 Quart Can	CN
		9150-00-186-6668 9150-00-191-2772	5 Gallon Can 55 Gallon Drum	CN DR
9	C	9150-00-247-0481	OIL: Lubricating, OE/HDO 10W/30 (81349) MIL-L-2104	QT
10	C		OIL: Lubricating, OE/HDO 15W/40 (81349) MIL-PRF-2104	
		9150-01-152-4117	1 Quart Can	CN
		9150-01-152-4118 9150-01-152-4119	5 Gallon Can 55 Gallon Drum	CN DR
11	C		OIL: Lubricating, OE/HDO 30 (81349) MIL-PRF-2104	
		9150-00-186-6681 9150-00-188-9858	1 Quart Can 5 Gallon Can	CN CN
12	C	7920-00-205-1711	RAG: Wiping (64067) 7920-00-205-1711 50 Pound Bale	BL

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By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

A handwritten signature in black ink that reads "Joyce E. Morrow". The signature is written in a cursive style with a large initial "J".

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
0606902

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ITEM	PAGE	PARA-	LINE	FIGURE NO.	TABLE	RECOMMENDED CHANGES AND REASON
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THE METRIC SYSTEM AND EQUIVALENTS

<p>Linear Measure</p> <p>1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches 1 Kilometer = 1000 Meters = 0.621 Miles</p> <p>Weights</p> <p>1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces 1 Kilogram = 1000 Grams = 2.2 Pounds 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons</p> <p>Liquid Measure</p> <p>1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces</p>	<p>Square Measure</p> <p>1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches 1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet 1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles</p> <p>Cubic Measure</p> <p>1 Cu Centimeter = 1,000 Cu Millimeters = 0.06 Cu Inches 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet</p> <p>Temperature</p> <p>$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$ 212° Fahrenheit is equivalent to 100° Celsius 90° Fahrenheit is equivalent to 32.2° Celsius 32° Fahrenheit is equivalent to 0° Celsius $9/5 \text{ C}^{\circ} + 32 = \text{F}^{\circ}$</p>
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APPROXIMATE CONVERSION FACTORS

To Change	To	Multiply By
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Sq Inches	Sq Centimeters	6.451
Sq Feet	Sq Meters	0.093
Sq Yards	Sq Meters	0.836
Sq Miles	Sq Kilometers	2.590
Acres	Sq Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Sq Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

To Change	To	Multiply By
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Sq Centimeters	Sq Inches	0.155
Sq Meters	Sq Feet	10.764
Sq Meters	Sq Yards	1.196
Sq Kilometers	Sq Miles	0.386
Sq Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Sq Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621

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