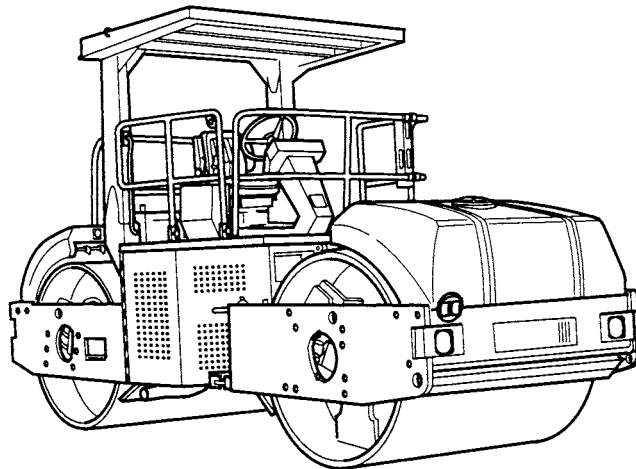


## TECHNICAL MANUAL

### Unit and Direct Support Maintenance

FOR

### ROLLER, MOTORIZED, VIBRATING TANDEM STEEL DRUMS CATERPILLAR MODEL CB534B (NSN 3895-01-396-2822) CATERPILLAR MODEL CB534C (NSN 3895-01-502-4005)



SUPERSEDURE NOTICE - This manual supersedes TM 5-3895-379-20, dated 28 March 2000,

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

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**HEADQUARTERS, DEPARTMENT OF THE ARMY**

**JULY 2005**

## 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 injury or death. 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.



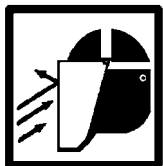
**ELECTRICAL** - electrical wire to arm with electricity symbol running through human body shows that shock hazard is present.



**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** - hand with heavy object on top shows that heavy parts can crush and harm.



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.



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.



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



SLICK FLOOR - wavy line on floor with legs prone shows that slick floor presents a danger from falling.

## 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 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 roller is operated.
1. DO NOT operate roller engine in enclosed areas.
  2. DO NOT idle roller engine without adequate ventilation.
  3. DO NOT drive roller 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!***



- 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, damage to equipment, and injury.
  - 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 injury or death.
- 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.



Particles blown by compressed air are hazardous. DO NOT exceed 15 psi (103 kPa) nozzle pressure when drying parts with compressed air. Use a maximum of 30 psi (207 kPa) when cleaning components. DO NOT direct compressed air against human skin. Failure to follow this warning may cause injury or death. Make sure air stream is directed away from user and other personnel in the area. To prevent injury, user must wear protective goggles or face shield.



- DO NOT smoke or permit any open flame in area of machine while you are servicing diesel 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 damage to machine and injury or death to personnel.
- Operating personnel must wear fuel-resistant gloves when handling fuels. If exposed to fuel, promptly wash exposed skin and change fuel-soaked clothing.



**WARNING**

***DRY CLEANING SOLVENT***



- Cleaning compound, solvent 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.
- NOTE: P-D-680 Type II is no longer in use and has been replaced by MIL-PRF-680 Type III.



**WARNING**

***ELECTRICAL SYSTEM MAINTENANCE***

Turn battery disconnect switch to OFF before working on any electrical system component. Failure to follow this warning could result in personal injury or damage to equipment.



**WARNING**

***ETHER COLD START 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.



**WARNING**

***EYE PROTECTION***

- Eye protection must be worn when performing maintenance where components or particles could fly out during procedure. Failure to take precautions could cause injury to personnel.
- Some components are under spring tension. Wear eye protection and use caution when disassembling them, to avoid injury.



**WARNING**

***HAZARDOUS WASTE DISPOSAL***

When servicing this machine, performing maintenance, or disposing of materials such as engine coolant, hydraulic fluid, 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.



**WARNING**

***HEARING PROTECTION***

Your hearing can be PERMANENTLY DAMAGED if you are exposed to constant high noise levels of 85 DB or greater. Hearing protection is required when operating machine or when working on machine while it is operating. Failure to wear hearing protection may cause hearing loss.



**WARNING**

***HOT COMPONENTS***



Hot oil or metal parts can cause severe burns. Wear insulated gloves, long sleeves and eye protection when working with heated parts.



**WARNING**

***HYDRAULIC SYSTEM PRESSURE***



- Do NOT remove hydraulic tank filler cap or disconnect or remove any hydraulic system line or fitting unless hydraulic system pressure has been relieved. Hydraulic system pressure can be over 2500 psi (17,237 kPa), even with engine and pump OFF. To relieve pressure, lower all hydraulic attachments to the ground and shut down engine. Move control levers through all operating positions, then SLOWLY loosen hydraulic tank filler cap. After maintenance, tighten all connections before applying pressure. Escaping hydraulic fluid under pressure can penetrate the skin, causing injury or death.
- At operating temperature hydraulic oil is hot. Allow hydraulic oil to cool before disconnecting any hydraulics. Failure to do so could result in injury.

**WARNING**

***MACHINE OPERATION***

This machine must be operated only by authorized personnel who have satisfactorily completed a program of training which must include familiarity with safe operating procedures, characteristics and a knowledge of applicable codes, regulations and facilities directives. Untrained personnel subject themselves and others to the possibility of death or injury from the improper operation of this machine. Understand the equipment, its function and the controls before operation.



**WARNING**  
*NBC EXPOSURE*



- 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 (FM 21-40) and must be disposed of by trained personnel.



***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 may cause serious burns.
- DO NOT remove 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.





**WARNING**

***LIFTING HEAVY PARTS***



- Lifting equipment used for lifting machine must be in good condition and of suitable load capacity. Failure to follow this warning may cause injury or death, or damage to equipment.
- Improper use of lifting equipment and improper attachment to machine can result in injury, or equipment damage. Observe all standard rules of safety.
- 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.



**WARNING**

***PROTECTIVE HEAD GEAR***

Operators and maintainers must wear protective head gear. Failure of operators and maintainers to wear protective head gear may result in serious injury or death.

**WARNING**

***OPERATION AND MAINTENANCE***

Do not operate or maintain this machine unless you have read and understand the instructions and warnings in the operation and maintenance sections of this manual. Failure to follow the instructions or heed the warnings could result in injury or death.

**LIST OF EFFECTIVE PAGES/WORK PACKAGES**

Date of issue for original manual is 15 July 2005

Original 15 July 2005

**TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 126 AND TOTAL NUMBER OF WORK PACKAGES IS 222 CONSISTING OF THE FOLLOWING:**

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| DA Form 2028            | 0                      |
| Metric Conversion Chart | 0                      |
| Back Cover              | 0                      |

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**Unit and Direct Support Maintenance**

**FOR**

**ROLLER, MOTORIZED,  
VIBRATING TANDEM STEEL DRUMS**

**CATERPILLAR MODEL CB534B (NSN 3895-01-396-2822)  
CATERPILLAR MODEL CB534C (NSN 3895-01-502-4005)**

**SUPERSEDURE NOTICE** - This manual supersedes TM 5-3895-379-20, dated 28 March 2000.

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# HOW TO USE THIS MANUAL

## INTRODUCTION

1. This manual is designed to help you perform lubrication, troubleshooting and maintenance on the CB534 Rollers, Motorized, Vibrating Tandem Steel Drum. Both the CB534B and CB534C Rollers are covered in this manual. If the work package title does not contain a “B” or “C” model designator, the work package applies to both models. If (CB534B) or (CB534C) is listed after the title, then the work package applies only to the model listed.
2. This manual is written in work package format.
3. Chapters divide the manual into major categories of information (e.g., *Introductory Information with Theory of Operation*, *Troubleshooting Procedures*, *Unit Level Field Maintenance*, *Direct Support Level Field Maintenance*, *General Maintenance Instructions*, and *Supporting Information*).
  - a. 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.
  - b. If a Change Package is issued to this manual, added work packages use the 5<sup>th</sup> and 6<sup>th</sup> digits of their number to indicate new material. For instance, work packages inserted between WP 0001 00 and WP 0002 00 are numbered WP 0001 01, WP 0001 02, etc.
4. Scan through this manual to become familiar with its organization and contents before attempting to operate or maintain the Roller.

## 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 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, *Introductory Information with Theory of Operation*, provides general information on the manual and the equipment.
4. Chapter 2 covers *Troubleshooting Procedures*. WP 0005 00 contains a *Troubleshooting Symptom Index*. If the machine malfunctions, this index should always be consulted to locate the appropriate troubleshooting procedure.
5. Chapter 3 deals with *Unit Level Field Maintenance Procedures*. Major areas covered are *Preventive Maintenance Checks and Services (PMCS)*, *Service Upon Receipt* and all maintenance procedures authorized by the Maintenance Allocation Chart (MAC) for this manual, organized in Functional Group Code (FGC) sequence. Refer to the *Table of Contents* for a complete listing of maintenance procedures.
6. Chapter 4 deals with *Direct Support Level Field Maintenance Procedures*. Major areas covered are all maintenance procedures authorized by the MAC for this manual, organized in Functional Group Code Sequence. Refer to the *Table of Contents* for a complete listing of maintenance procedures.
7. Chapter 5 deals with *General Maintenance Instructions*, including electrical GMI, preparation for storage and shipment, and torque limits.
8. Chapter 6 includes *Supporting Information: References; Maintenance Allocation Chart (MAC) Introduction; Maintenance Allocation Chart (MAC); Expendable and Durable Items List; Tool Identification List, Illustrated List of Manufactured Items, and Schematics*.

## HOW TO USE THIS MANUAL - Continued

### **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 which may cause injury or death.

### **CAUTION**

A CAUTION directs attention to usage practices that may cause 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.  
If you are told: "Replace engine oil filler (WP 0015 00)", go to Work Package 0015 00 in this manual for instructions on replacing the filler.
4. Illustrations are placed after, and as close to, the procedural steps to which they apply. Callouts placed on the art may be text or numbers, or both; whichever method is easier for the soldier.
5. Numbers located at lower right corner of art (e.g. 401-001; 401-002, etc.) are art control numbers and are used for tracking purposes. Disregard these numbers.
6. Dashed leader lines used in the Lubrication Chart (WP 0008 00) indicate lubrication points that are located on both sides of the equipment.
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.

### **NOTE**

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

**CHAPTER 1**  
**INTRODUCTORY INFORMATION WITH**  
**THEORY OF OPERATION**

---

**GENERAL INFORMATION**

---

0001 00

**SCOPE**

1. **Type of Manual.** This manual is for use in performing Field Maintenance on the CB534B and CB534C Rollers, Motorized, Vibrating Tandem Steel Drums.
2. **Equipment Name and Model Number.** Roller, Motorized, Vibrating Tandem Steel Drums: Caterpillar Models CB534B and CB534C.
3. **Purpose of Equipment.** The CB534B and CB534C Rollers are self-propelled and designed to compact asphalt and gravel bases for parking lots, streets, roads, and highways.

**MAINTENANCE FORMS, RECORDS, AND REPORTS**

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, *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 roller 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. Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.
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.
3. 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 738-750.

**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**

1. Caterpillar warrants the following products sold by it and operating within the area specified under "Limitations" to be free from defects in material and workmanship:
  - a. New earthmoving, construction materials handling, and paving product machines designated by Caterpillar as having a 6 month/unlimited hour warranty. See your Caterpillar dealer for a complete listing of covered models.
  - b. New engines used as replacements in such Caterpillar machines.
  - c. Attachments installed on such machines prior to delivery.
2. An additional warranty against breakage is applicable to certain Caterpillar Ground Engaging Tools. An additional warranty against wear is also applicable to certain weld-on landfill compactor plus tips. Refer to the appropriate warranty statement for coverage details. This warranty does not apply to Caterpillar brand batteries which are covered by a different Caterpillar warranty.

**WARRANTY INFORMATION - CONTINUED**

3. The warranty is subject to the following:
- a. **Warranty Period.**
    - (1) For the CB534B Roller, the warranty period is 6 months, starting from date of delivery to the first user.
    - (2) For the CB534C Roller, the warranty period is 12 months, starting from the date of delivery to the first user.
  - b. **Caterpillar Responsibilities.** If a defect in material or workmanship is found during the warranty period, Caterpillar will, during normal working hours and at a place of business of a Caterpillar or other authorized source:
    - (1) Provide (at Caterpillar's expense) new, Major Component Exchange (MCE), Remanufactured, or Caterpillar-approved repaired parts or assembled components needed to correct the defect.

**NOTE**

Items replaced under this warranty become the property of Caterpillar.

- (2) Replace lubricating oil, filters, antifreeze and other service items made unusable by the defect.
  - (3) Provide labor needed to correct the defect except in the case of a new replacement engine originally installed by other than a Caterpillar dealer or other authorized source. In that case, labor is limited to repair only, and removal and installation is the user's responsibility.
- c. **User Responsibilities.** The user is responsible for:
- (1) The costs associated with transporting the machine.
  - (2) Labor costs, except as stated under "Caterpillar Responsibilities."
  - (3) Local taxes, if applicable.
  - (4) Parts shipping charges in excess of those which are usual and customary.
  - (5) Costs to investigate complaints unless the problem is caused by a defect in Caterpillar material or workmanship.
  - (6) Giving timely notice of a warrantable failure and promptly making the product available for repair.
  - (7) Performance of the required maintenance and use of proper fuel, oil, lubricants and coolant.
- d. **Limitations.** Caterpillar is not responsible for failures resulting from:
- (1) Any use or installation which Caterpillar judges improper.
  - (2) Attachments, accessory items and parts not sold by Caterpillar.
  - (3) Abuse, neglect and/or improper repair.
  - (4) User's unreasonable delay in making the product available after being notified of a potential product problem.

NEITHER THE FOREGOING EXPRESS WARRANTY NOR ANY OTHER WARRANTY BY CATERPILLAR, EXPRESS OR IMPLIED, IS APPLICABLE TO ANY ITEM CATERPILLAR SELLS WHICH IS WARRANTED TO THE USER BY ITS MANUFACTURER.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. REMEDIES UNDER THIS WARRANTY ARE LIMITED TO THE PROVISION OF MATERIAL AND SERVICES, AS SPECIFIED HEREIN. CATERPILLAR IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

**GENERAL INFORMATION - CONTINUED**

**0001 00**

**WARRANTY INFORMATION - CONTINUED**

4. This warranty applies to all the geographic areas covered by the U.S.A. and Canadian dealers only. In other areas, different warranties may apply. Copies of applicable warranties may be obtained by writing Caterpillar Inc., 100 N.E. Adams Street, Peoria, IL 61829-3345.
5. As used in this warranty, the term "Caterpillar" means Caterpillar Inc., or one of its subsidiaries, except Caterpillar Overseas S.A., Caterpillar France S.A., Caterpillar (U.K.) Limited, or Caterpillar Belgium S.A., whichever last sold the product involved.

**NOMENCLATURE CROSS-REFERENCE**

**COMMON NAME**

**OFFICIAL NOMENCLATURE**

Roller . . . . . Roller, Motorized, Vibrating Tandem Steel Drums  
Caterpillar Model CB534B and Model CB534C

**LIST OF ABBREVIATIONS**

**NOTE**

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

**ABBREVIATION**

**DEFINITION**

|                 |                                      |
|-----------------|--------------------------------------|
| AC . . . . .    | Alternating Current                  |
| AAL . . . . .   | Additional Authorization List        |
| BII . . . . .   | Basic Issue Items                    |
| CW . . . . .    | Clockwise                            |
| CCW . . . . .   | Counterclockwise                     |
| daN . . . . .   | deka Newton                          |
| fpm . . . . .   | Feet Per Minute                      |
| hp . . . . .    | horsepower                           |
| in . . . . .    | inches                               |
| kg . . . . .    | kilograms                            |
| lb . . . . .    | pounds                               |
| KPH . . . . .   | Kilometers Per Hour                  |
| mm . . . . .    | millimeters                          |
| MPH . . . . .   | Miles Per Hour                       |
| No . . . . .    | Number                               |
| pli . . . . .   | pounds per linear inch               |
| ROPS . . . . .  | Rollover Protective Structure        |
| rpm . . . . .   | revolutions per minute               |
| RPSTL . . . . . | Repair Parts and Special Tools Lists |
| Vac . . . . .   | Volts of alternating current         |
| Vdc . . . . .   | Volts of direct current              |
| VPM . . . . .   | Vibrations Per Minute                |

**GLOSSARY**

|                       |   |
|-----------------------|---|
| Amplitude . . . . .   | The amount of vibratory movement measured from the start of one stroke to the start of the next |
| Articulate . . . . .  | Move or shift at pivot point or joint   |
| Compaction . . . . .  | The state of being pressed or packed together   |
| Eccentric . . . . .   | Offset  |
| Hydrostatic . . . . . | Pressure exerted or transmitted by liquid at rest   |
| Static . . . . .      | Without movement  |

**END OF WORK PACKAGE**

**EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES****NOTE**

Characteristics, capabilities and features are the same for the CB534B and CB534C Rollers, Motorized, Vibrating Tandem Steel Drums, except as noted.

**1. Characteristics.**

- a. The roller is designed to be operated by one operator.
- b. The motion of the roller is controlled by the operator using a steering wheel and propel control lever (joystick).
- c. The roller is propelled by a hydrostatic transmission driven by a four-cylinder, turbocharged engine.
- d. Compaction is achieved with two cylindrical drums. Hydraulic motor-driven eccentric weights produce vibration in the drums which enhances compaction.

**2. Capabilities and Features.**

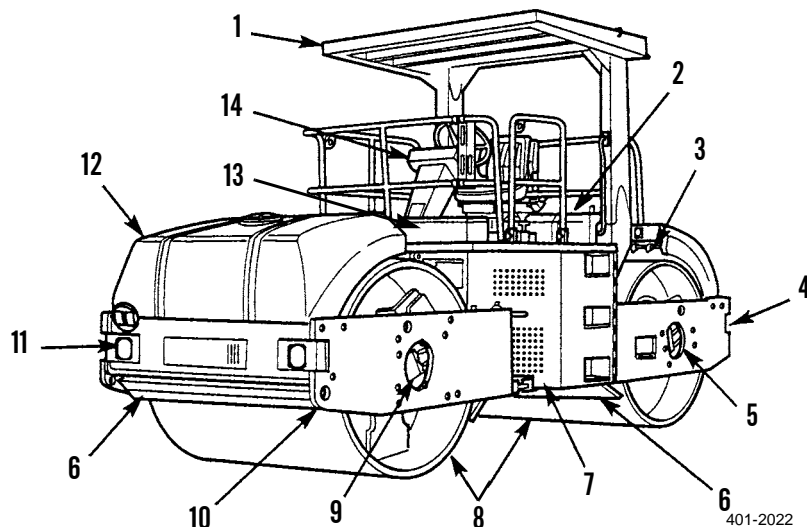
- a. The roller has a static tip angle range of 40 to 50 degrees. The static tip angle is the slope angle where a stationary roller will begin to tip over to the side when it is parallel to the slope, in straight-ahead travel position.
  - (1) Roller operating stability depends upon many factors including operating speed, steering, braking, terrain conditions, fluid levels, and most of all, operator's skill and judgement.
  - (2) The best operating roller stability indicator is the human operator with the ability to comprehend working conditions based on the relevant environmental situation and the operator's feel for the roller to predetermined situations potential hazards and determine the proper operating decisions to keep the roller in a safe operating mode.
- b. Vibration selection allows independent vibratory or static operation of either drum.
- c. Two amplitudes of vibration (high and low) are always available to the operator to accommodate the needs of a variety of operations.
- d. A water spray system wets the drum to help prevent hot asphalt from sticking to the drum surfaces during the compacting operation. Water spray can be constant or intermittent to accommodate the needs of a variety of environments. Two identical but separate tanks, each with their own pump and filter, are located on the front and rear of the roller and allow for extended operation between fill-ups. A tie line is provided allowing the operator to use one pump and tank to supply water to spray both drums in the event of failure of the other pump.
- e. 60/40 articulation simplifies maneuvering of the roller. Sixty percent of the roller is behind the pivot, while forty percent is ahead of the pivot. This allows the operator to concentrate on only one drum when entering or leaving a curve, and decreases the risk of damage when moving roller away from curbs or other stationary objects.
- f. The operator station pivots 90 degrees in either direction to allow the operator to view drum surfaces and edges during back-and-forth rolling operation. The gauges and controls move with the operator station.
- g. The Rollover Protective Structure (ROPS) canopy helps protect the operator from potential hazards resulting from equipment rollover and falling objects.



LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

**NOTE**

Location and description of major components are the same for the CB534B and CB534C Rollers. CB534B Roller is shown.



| KEY | COMPONENT                            | DESCRIPTION  |
|-----|--------------------------------------|--|
| 1   | Rollover Protective Structure (ROPS) | The ROPS canopy helps protect operator from potential hazards resulting from equipment rollover and falling objects.   |
| 2   | Hydraulic/Fuel Tank                  | The fuel and hydraulic tanks are connected, yet separate. Fuel is stored in the right-side. The left-side stores hydraulic oil.  |
| 3   | Water Spray Bars                     | The water spray bars spray the drum surfaces with water to help prevent hot asphalt from sticking to drums. There is a water spray bar located above front and rear drum.  |
| 4   | Frame Assembly                       | The frame assembly provides a means of support for roller components.  |
| 5   | Vibratory Motors                     | The vibratory motors turn eccentric weights inside drums which create vibrating force that aids in surface material compaction. They are located on left-side of the rear drum and right-side of the front drum. |
| 6   | Scrapers                             | The scrapers keep drums clean to provide a smooth compacted surface.   |
| 7   | Engine Compartment                   | The engine and hydraulic pumps are located in this compartment. The engine and pumps power the steering, propulsion, and vibratory systems.  |

**LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - CONTINUED**

| KEY | COMPONENT         | DESCRIPTION  |
|-----|-------------------|--|
| 8   | Drums             | The drums provide a smooth surface for surface material compaction.  |
| 9   | Propel Motors     | The propel motors provide power to drums to move roller. They are located on right-side of rear drum and left-side of front drum.                |
| 10  | Yoke Assembly     | The yoke assembly provides support for front drum and pivots on frame assembly for steering.   |
| 11  | Work Lights       | The work lights provide light for use in poor visibility situations. They are located at front and rear of roller.                               |
| 12  | Water Spray Tanks | The water spray tanks hold water for delivery to drums via water spray nozzles on spray bars. A water spray tank is mounted above each drum.     |
| 13  | Toolbox           | The toolbox holds tools the operator needs to do all authorized maintenance.   |
| 14  | Operator Station  | The pivoting console may be moved 90 degrees left or right to increase visibility. The gauges and controls move with console for easy operation. |

**DIFFERENCES BETWEEN MODELS**

| ITEM         | CB534B  | CB534C  |
|--------------|---|---|
| Throttle     | Mechanically controlled by cable                  | Electronic toggle switch (high/low)               |
| Speedometer  | No  | Yes   |
| Starting Aid | Water heater jacket                               | Air inlet heater                                  |
| Handrails    | Design differences; same function, different look | Design differences; same function, different look |

**EQUIPMENT DATA**

**General:**

|  |   |
|--|---|
| Type .....                             | Roller, Motorized, Vibrating Tandem Steel Drums |
| Model .....                            | Caterpillar, CB534B and CB534C Rollers          |
| Length (CB534B Roller) .....           | 203 in. (5156 mm)                               |
| Length (CB534C Roller) .....           | 195 in. (4953 mm)                               |
| Height .....                           | 118 in. (2997 mm)                               |
| Width .....                            | 73 in. (1854 mm)                                |
| Height at Steering Wheel .....         | 95 in. (2413 mm)                                |
| Operating Weight (CB534B Roller) ..... | 21232 lb (9631 kg)                              |

**EQUIPMENT DESCRIPTION AND DATA - CONTINUED**

**0002 00**

**EQUIPMENT DATA - CONTINUED**

**General - Continued:**

|  |                    |
|--|--------------------|
| Operating Weight (CB534C Roller) ..... | 21832 lb (9903 kg) |
| Static Tip Angle .....                 | 40-50°             |

**Functional:**

|                                   |                    |
|-----------------------------------|--------------------|
| Drum Width .....                  | 67 in. (1700 mm)   |
| Drum Diameter .....               | 51 in. (1300 mm)   |
| Drum Shell Thickness .....        | 0.71 in. (18 mm)   |
| Curb Clearance .....              | 16 in. (406 mm)    |
| Side Clearance .....              | 3 in. (76 mm)      |
| Wheelbase .....                   | 124 in. (3150 mm)  |
| Steering Angle - Left/Right ..... | +/-35°             |
| Minimum Turning Angle:            |                    |
| Inside Drum Edge .....            | 164 in. (4166 mm)  |
| Outside Drum Edge .....           | 231 in. (5867 mm)  |
| Weight at Front Drum .....        | 10330 lb (4686 kg) |
| Weight at Rear Drum .....         | 11530 lb (5230 kg) |

**Refill Capacities:**

|   |                       |
|---|-----------------------|
| Engine Oil .....                                  | 2.3 gal. (9 l)        |
| Fuel Tank .....                                   | 55 gal. (208 l)       |
| Hydraulic Tank (CB534B Roller) .....              | 15.5 gal. (59 l)      |
| Hydraulic Tank (CB534C Roller) .....              | 24 gal. (91 l)        |
| Front and Rear Vibratory Bearing Reservoirs ..... | 3.1 gal. (12 l)       |
| Water Spray Tank .....                            | 132 gal. (500 l) each |
| Cooling System .....                              | 7.3 gal. (28 l)       |
| Front Propel Gearbox .....                        | 0.5 gal. (2 l)        |
| Rear Propel Gearbox .....                         | 0.6 gal. (2.4 l)      |

**Power Train:**

|                           |   |
|---------------------------|---|
| Engine .....              | Caterpillar 3045T<br>Turbocharged,<br>Four-cylinder, diesel |
| Horsepower .....          | 107 hp (80 kw)@<br>2200 RPM                                 |
| Displacement .....        | 243 cu in. (4.0 l)  |
| Transmission .....        | Hydrostatic   |
| Speed in Low Range .....  | 4.5 mph (7.2 kph)   |
| Speed in High Range ..... | 7.0 mph (11.2 kph)  |

**Vibratory System:**

|                             |                      |
|-----------------------------|----------------------|
| Electrical System .....     | 24 Volt              |
| Frequency .....             | 2520 vpm (42 Hz)     |
| Nominal Amplitude:          |                      |
| Low .....                   | 0.022 in. (0.56 mm)  |
| High .....                  | 0.043 in. (1.092 mm) |
| Centrifugal Force per Drum: |                      |
| Low .....                   | 13480 lb (6000 daN)  |
| High .....                  | 26550 lb (11810 daN) |

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**EQUIPMENT DESCRIPTION AND DATA - CONTINUED**

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**0002 00**

***EQUIPMENT DATA - CONTINUED***

**Vibratory System - Continued:**

Pli:

|                         |                         |
|-------------------------|-------------------------|
| Static .....            | 161 lb/in. (28.8 kg/cm) |
| Centrifugal (max) ..... | 396 lb/in. (70.7 kg/cm) |

**Water Spray System:**

|                                  |              |
|----------------------------------|--------------|
| Tank Material .....              | Polyethylene |
| Number of Pumps .....            | 2            |
| Number of Nozzles per Drum ..... | 7            |
| Number of Draincocks .....       | 3            |
| Number of Screens .....          | 2            |

**END OF WORK PACKAGE**

***INTRODUCTION***

1. This work package explains how components of the Roller, Motorized, Vibrating Tandem Steel Drums work together. A functional description is given for the engine system, fuel system, electrical system, propel system, steering system, vibratory system and water spray system.
2. Theory of operation is the same for the CB534B and CB534C Rollers. CB534B Roller is shown unless otherwise indicated.

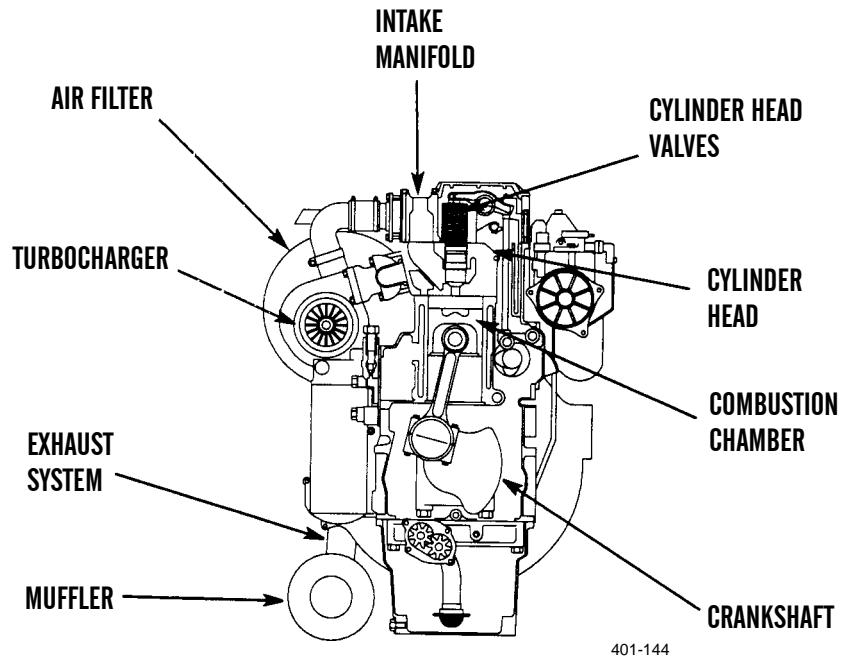
***BASIC OPERATION***

1. The roller is designed to compact asphalt and gravel bases for constructing parking lots, roads, landing strips, and other asphalt-paved areas.
2. The roller is controlled by a single operator.
3. An on-board water spray system is provided to prevent hot asphalt from sticking to the drum surfaces.
4. The roller operates in vibratory mode, using twin vibrating drums, as the means for compacting surface material.
5. The roller operates in static-mode in order to smooth surface material.

**ENGINE SYSTEM**

1. **General.**
  - a. The engine system provides power for the roller. The engine combines fuel and pressurized air together and compresses it until ignition occurs, creating mechanical energy. The internal explosion from the ignited air/fuel mixture pushes the pistons down, turning the crankshaft. The crankshaft is connected to a pulley and gear on the front of the engine and an output shaft on the rear of the engine. The pulley forces belts to turn the alternator which keeps the electrical system fully charged with electricity. The front gear also turns both the power steering hydraulic pump and the fuel injection pump. The output shaft turns both of the main hydraulic pumps. A cam lobe operates the fuel lift pump.
  - b. The engine is turbocharged. When the ignited air is pushed out of the engine, it is routed to the turbocharger. The exhaust from the engine turns the turbocharger which forces high pressure air into the engine intake manifold.
2. **Turbocharger.** The turbocharger forces air into the intake manifold. Exhaust gases coming out of the combustion chamber force a rotor inside the turbocharger to spin at a very high rate of speed. This rotor is attached to the intake impeller. The impeller pulls air in from the air filter and forces it into the intake manifold at a high pressure. The faster the engine runs, the faster the turbocharger spins and the higher the air pressure it produces.
3. **Cylinder Head.** The fuel/air mixture is ignited in the combustion chambers of the cylinder head, located directly over each piston. The intake ports of the cylinder head route air into the combustion chamber while the injectors supply the fuel to the mixture. The exhaust ports route burned gases out of the engine.
4. **Cylinder Head Valves.** The cylinder head valves open or close the passages in the cylinder head that allow flow from the intake manifold or to the exhaust manifold. Valve lash must be adjusted periodically.
5. **Combustion Chamber.** The combustion chamber is where combustion and ignition occur. Ignition occurs when diesel fuel or JP-8 is injected into air heated by being compressed by the piston. When the air/fuel is ignited, it pushes down the piston, turning the crankshaft.
6. **Crankshaft.** The crankshaft is an eccentric shaft that changes the up-and-down piston motion into a rotating motion. The crankshaft uses this motion at the front of the engine to power the alternator, cooling system, and steering and fuel pumps.
7. **Exhaust System.** The exhaust system allows the exhaust gases to be drawn out of the combustion chamber. The exhaust is pushed out of the cylinder by the piston. It then goes into the turbocharger and makes it spin. The exhaust is then vented into the air out of an exhaust pipe.
8. **Air Filter.** The air filter cleans the air entering the engine. The filter consists of a primary element and a secondary element. Air is pulled through both elements to remove particulates that could damage the engine.

ENGINE SYSTEM - CONTINUED

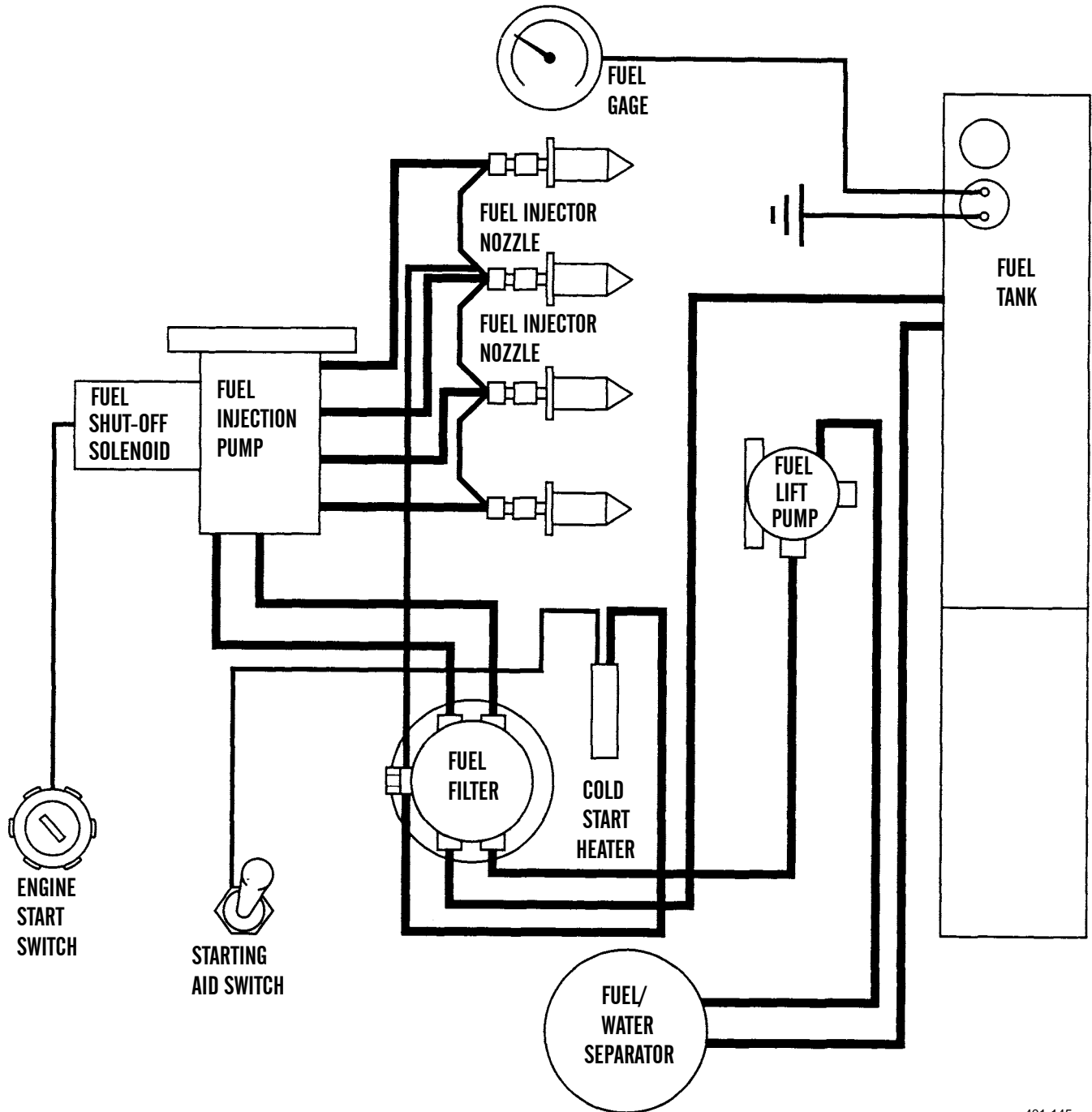


**FUEL SYSTEM**

1. **General.**
  - a. When the engine is turning, fuel is pulled from the fuel tank through the fuel/water separator by the fuel lift pump. The fuel lift pump sends the fuel at low pressure to the fuel filter. From the fuel filter, the fuel is sent to the fuel injection pump. The fuel injection pump sends high pressure fuel through the high pressure fuel lines to the fuel injector nozzles. The four fuel injector nozzles spray fuel into the cylinders of the engine. Any fuel not used by the fuel injection pump is returned to the inlet side of the fuel filter.
  - b. The engine is equipped with a cold start heater to warm fuel for starting the engine in cold weather.
2. **Fuel Tank.** The fuel tank is part of the fuel/hydraulic tank assembly. The fuel tank is located on the right side of the assembly. The fuel and hydraulic tanks are welded together, but are separate containers. The capacity of the fuel tank is 55 gal. (208 l) of diesel fuel or JP-8.
3. **High Pressure Fuel Lines.** The high pressure fuel lines deliver fuel from the fuel injection pump to the fuel injector nozzles.
4. **Fuel/Water Separator.** The fuel/water separator separates any water from the fuel before reaching the fuel filter and the engine. The water that is separated from the fuel collects at the bottom of a glass bowl located on the bottom of the separator. A drain valve is located at the bottom of the bowl and can be used to drain the water from the fuel/water separator.
5. **Fuel Lift Pump.** The fuel lift pump delivers fuel to the fuel injection pump. The manually-operated lever primes the pump by removing air and introducing fuel. Priming is needed after the fuel system has been opened or air is in the system.
6. **Fuel Filter.** The fuel filter removes foreign matter from the fuel before fuel enters the fuel injection pump.
7. **Fuel Injection Pump.** The fuel injection pump forces high pressure fuel into the fuel injector nozzles. The fuel injection pump is gear-driven from the crankshaft. The fuel injection pump needs fuel for lubrication. The precision parts are easily damaged. For this reason, the engine must NOT be started until the fuel injection pump is full of fuel that is free of air.
8. **Fuel Injectors.** The fuel injectors spray fuel into the cylinders of the engine.
9. **Cold Start Heater.** The cold start heater is installed in the inlet manifold to heat inlet air in cold weather. When activated by operator controls, the current from the electrical wire causes the coil inside the heater to become very hot. A small amount of fuel will flow through the heater as the engine is cranking.



FUEL SYSTEM - CONTINUED

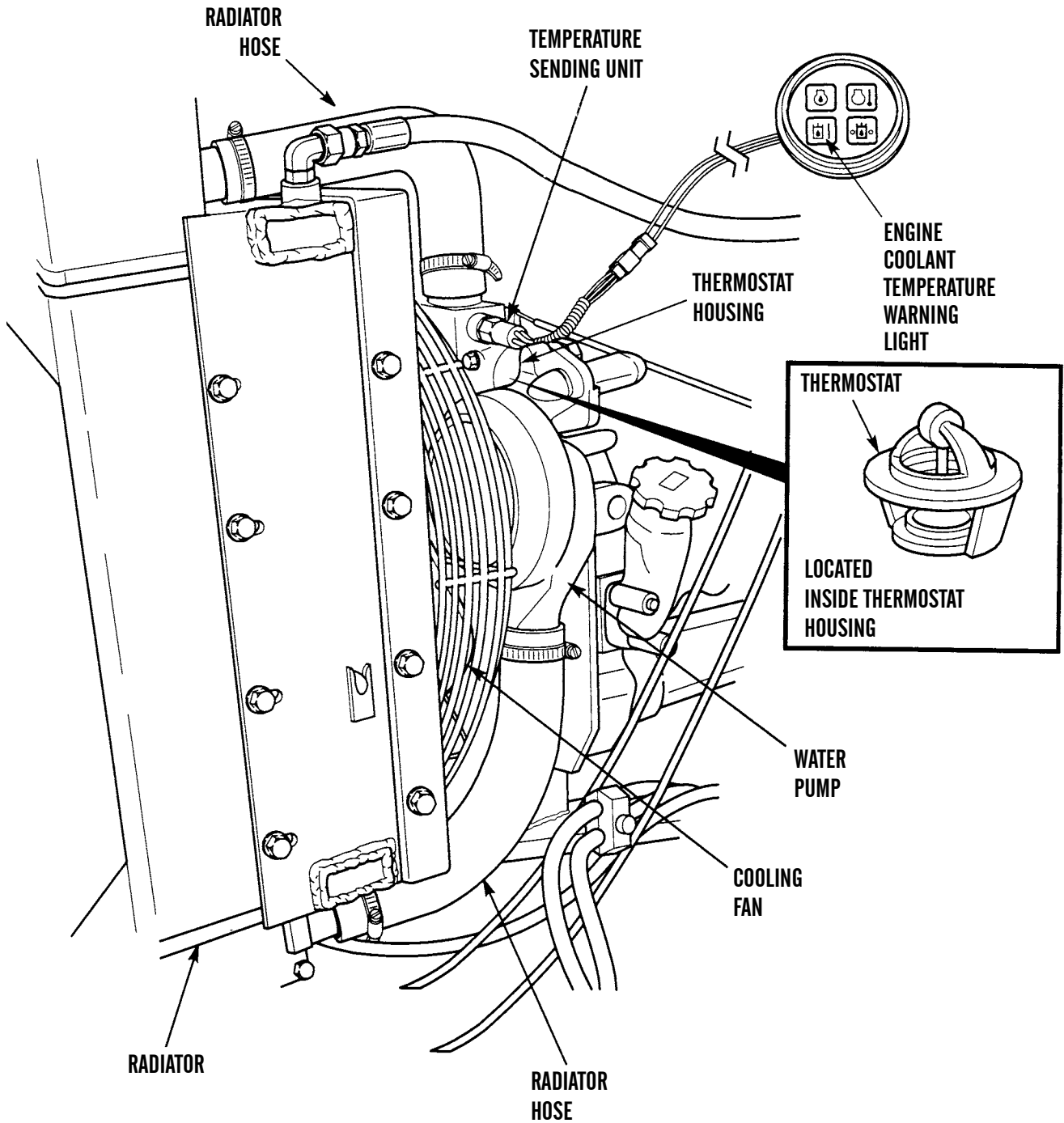


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**COOLING SYSTEM**

1. **General.** Coolant from the bottom of the radiator passes through the centrifugal water pump which is installed on the front of the engine timing case. The pump is gear-driven from the gear of the fuel injection pump and assists the flow of coolant through the system. From the pump, coolant goes through a passage in the timing case to the front of the cylinder block. The coolant passes through a passage in the left-side of the cylinder block. Some of the coolant passes through a lubricating oil cooler before going to the rear of the cylinder block. The coolant then passes around the cylinder and up to the cylinder head. Coolant leaves the front of the cylinder head and passes to the thermostat housing. If the thermostat is closed, the coolant goes directly through a by-pass to the inlet side of the water pump. If the thermostat is open, the coolant passes to the top of the radiator. A push-type fan forces air through the radiator, relieving the coolant of heat.
2. **Radiator.** The radiator acts as a coolant reservoir. The radiator cools the heater coolant from the engine while it is being stored.
3. **Water Pump.** The centrifugal water pump draws coolant from the radiator and forces it into the coolant passages in the engine. After the coolant has flowed through the entire engine, pressure from the water pump pushes it back into the radiator. The water pump is gear driven from the engine.
4. **Radiator Hose (Two Hoses).** The radiator hoses connect the radiator to the water pump and engine. These hoses provide a passage for coolant transfer between the radiator and the engine.
5. **Fan.** The cooling fan pushes air through the radiator to aid in helping lower the temperature of the coolant by relieving heat from the coolant.
6. **Temperature Sending Unit.** The temperature sending unit sends a signal to the engine coolant temperature warning light when the engine coolant temperature is too high for safe operation.
7. **Engine Coolant Temperature Warning Light.** The engine coolant temperature warning light is connected to the temperature sending unit. When the sending unit signals high operating temperature, the warning light will illuminate to alert the operator. A warning horn is connected to the light for both a visual and an audible warning.
8. **Thermostat.** The thermostat controls the temperature of the coolant and engine. The thermostat blocks the path of the coolant traveling back to the radiator. Until the engine reaches proper operating temperature, the thermostat will not allow the coolant to pass into the radiator.

COOLING SYSTEM - CONTINUED



**ELECTRICAL SYSTEM**1. **General.**

- a. Two batteries wired in series provide the roller with a 24-volt electrical system. Battery cables connect the batteries to the starter and the alternator. From the starter, electricity is sent to the engine wiring harness and to the operator station. When the roller is running, the alternator produces 24 volts that are sent to the batteries to maintain a full charge. Control switches at the operator station allow the flow of electricity to power the roller systems through the wiring harnesses. There are four wiring harnesses on the roller: the instrument, engine, and front and rear harnesses. Electricity is sent through the harnesses to the electrical systems then returned to the harness, which ground the electricity to the roller chassis. Fuses are used to protect the electrical systems from an overload. The negative battery cable is attached to the chassis, completing the circuit. A NATO connector on the battery positive side allows the roller to be connected to another vehicle. This connector allows another roller's electrical system to be connected to the roller if, for example, the roller does not have enough electrical energy to start the motor with its own batteries.
- b. The starting system is used to start the engine. When the start switch is turned to the start position, electricity is sent from the battery to the fuses and then through the main relay, the neutral start relay and the starter relay. The starter relay engages the starter solenoid. The starter solenoid sends electricity to the electric starter motor and forces it to turn the engine crankshaft. The engine will crank until the start switch is turned to the center or off position.

2. **Batteries.** Two 12-volt batteries provide stored electricity to the electrical system. Combined, the two batteries provide 24 volts. The batteries are negatively grounded.

3. **Battery Cables.** The positive battery cable is connected to the NATO connector and the starter. The negative cable is connected to the battery disconnect switch which is then connected to the roller chassis.

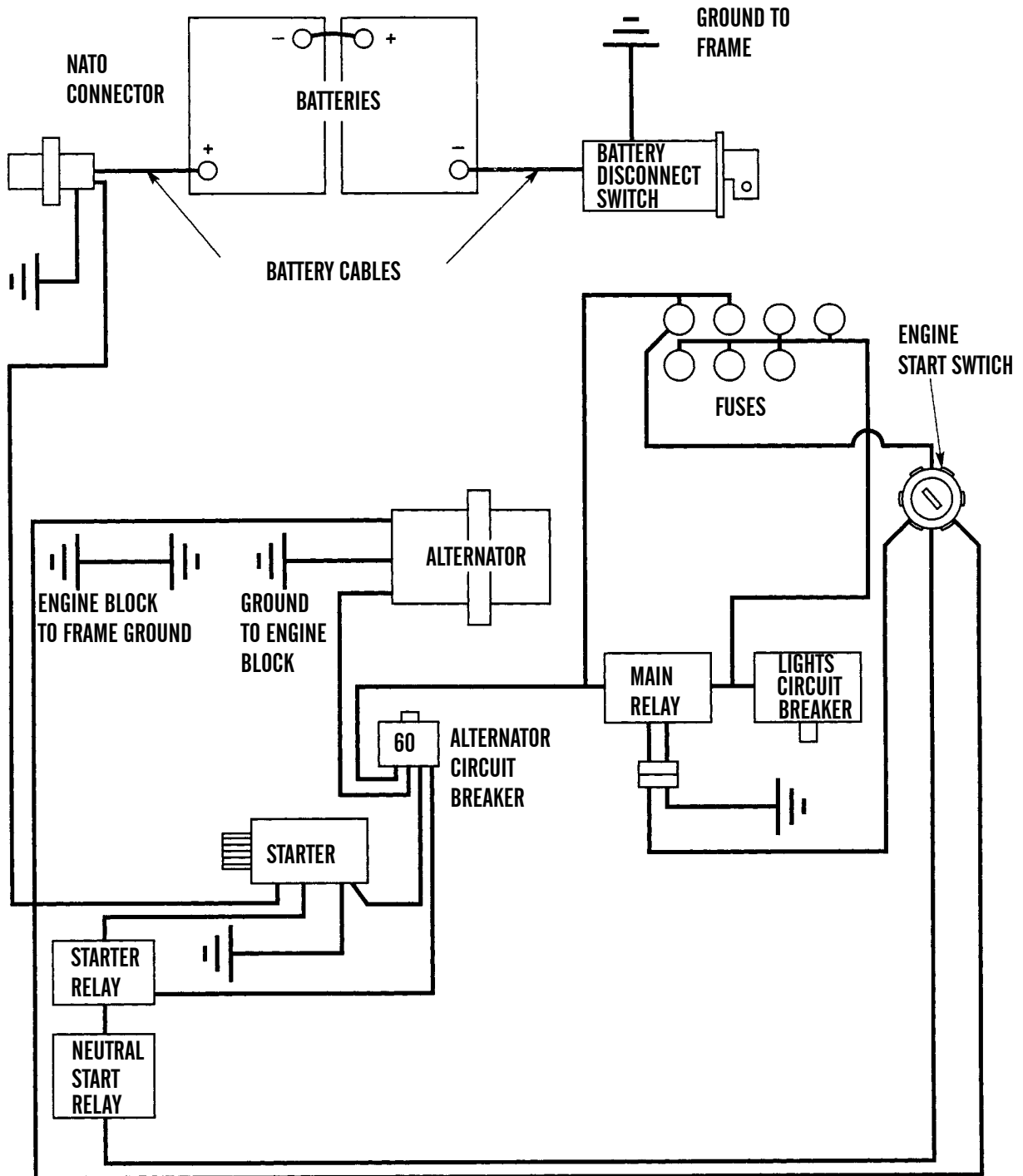
4. **NATO Connector.** The NATO connector is a standard receptacle with which NATO jumper cables can be used to "jump start" one roller by another roller in the event of battery failure.

5. **Alternator.**

- a. The alternator is an electrical and mechanical component driven by a belt from engine rotation. The alternator is used to charge the storage batteries during engine operation. The alternator is cooled by an external fan mounted behind the pulley. The fan pulls air through holes in the back of the alternator and exits to the front, cooling the alternator.
- b. The alternator converts mechanical and magnetic energy to Alternating Current (AC) and voltage by rotating a Direct Current (DC) field inside a three-phase stator. The alternating current and voltage are changed to direct current by a three-phase, full wave rectifier system. Direct current flows to the alternator output terminal. The rectifier has three exciter diodes that rectify the current needed to start the charging process.
- c. A solid state regulator is installed in the back of the alternator. A capacitor protects the rectifier from high voltages.
- d. The alternator is connected to the battery through the engine start switch for alternator turn-on. Therefore, alternator excitation occurs when the engine start switch is turned on.

6. **Alternator Circuit Breaker.** The alternator circuit breaker is a heat-triggered switch that opens the battery circuit when the current in the electrical system goes higher than the rating of the circuit breaker (60 amps). Push the reset button to close the circuit again.

ELECTRICAL SYSTEM - CONTINUED



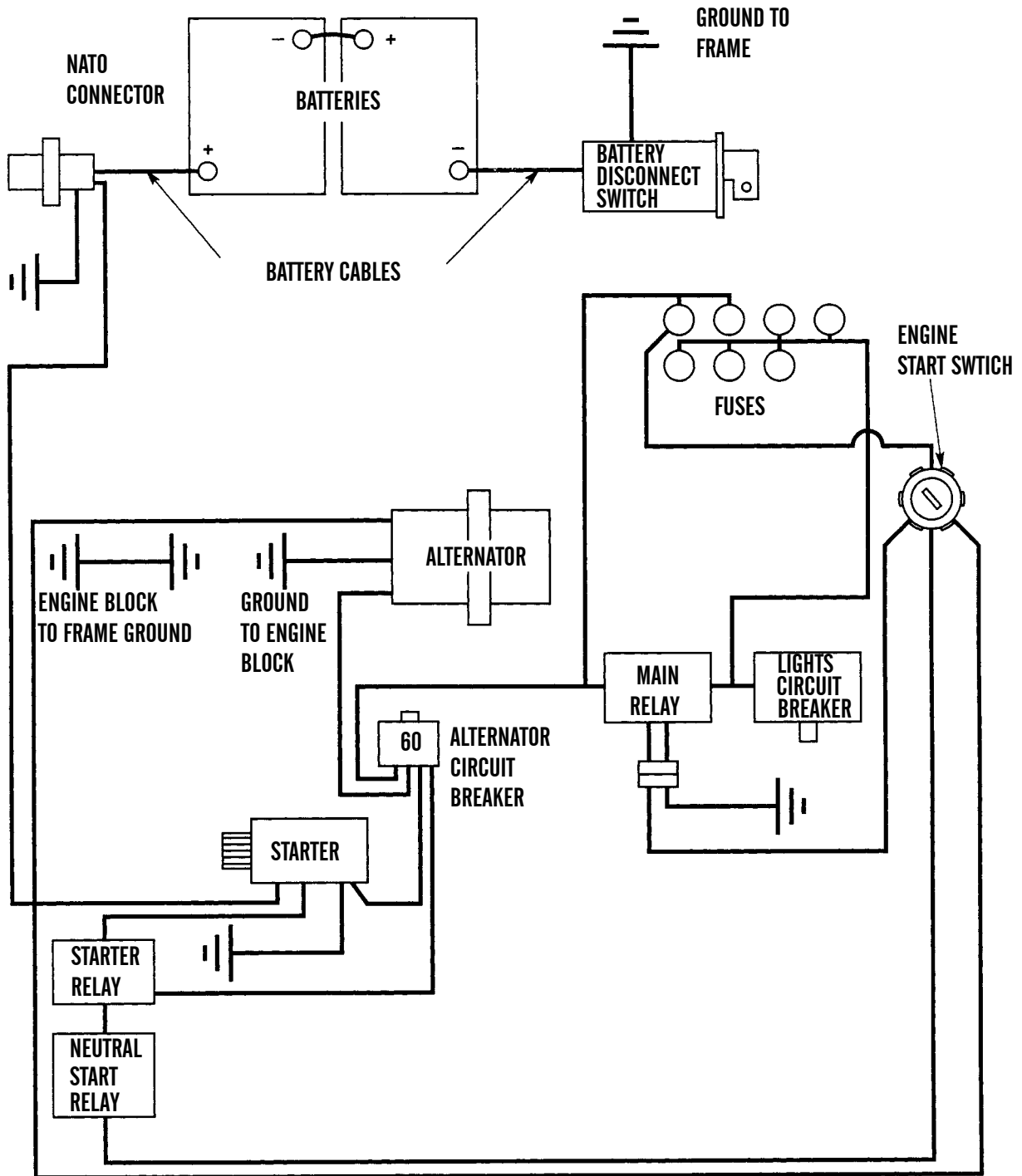
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**ELECTRICAL SYSTEM - CONTINUED**7. **Starter.**

- a. The starter is used to turn the engine flywheel fast enough to start the compression/ignition process and make the engine run. When the engine start switch is activated, voltage from the electrical system causes a solenoid to move a pinion toward the flywheel ring gear of the engine. The electrical contacts in the solenoid close the circuit between the battery and the starter just before the pinion engages the ring gear causing the starter to rotate. A starter with this type of turn-on is known as a positive shift starting motor.
- b. When the engine begins to run, the overrunning clutch portion of the pinion drive prevents damage to the starter caused by excessive speeds by breaking the mechanical connection. The pinion will stay meshed with the ring gear until the engine start switch is released from the start position. A return spring in the overrunning clutch returns the clutch to its rest position.

8. **Fuses.** Fuses are safety devices which open an electrical circuit in the event of a short or malfunction to protect the system from damage. A filament inside the fuse allows a measured amount of current to travel through the circuit. The filament disintegrates when too much current attempts to pass through the fuse. Once a fuse has “blown” it must be replaced. Fuses are provided for each of the major system circuits.
9. **Engine Start Switch.** The engine start switch is a rotary key-type switch that turns the electrical system on or off and activates the starter. When the start switch is turned to the start position (held to far right), electricity is sent through the neutral start and main relays. After these relays, the electricity then goes to the starter.
10. **Starter Relay.** The starter relay allows electricity to flow to the starter when the engine start switch is in the start position.
11. **Neutral Start Relay.** The neutral start relay is a safety device that stops the flow of electricity to the starter when the propel control lever is set in a position other than neutral.
12. **Lights Circuit Breaker.** The lights circuit breaker is a heat-triggered switch that opens the lights circuit when the current in the electrical system goes higher than the rating of the circuit breaker (20 amps). Push the reset button to close the circuit again.
13. **Main Relay.** The main relay allows electricity to flow to all circuits only when the engine start switch is in the accessory, run or start positions.

ELECTRICAL SYSTEM - CONTINUED



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**PROPEL SYSTEM**

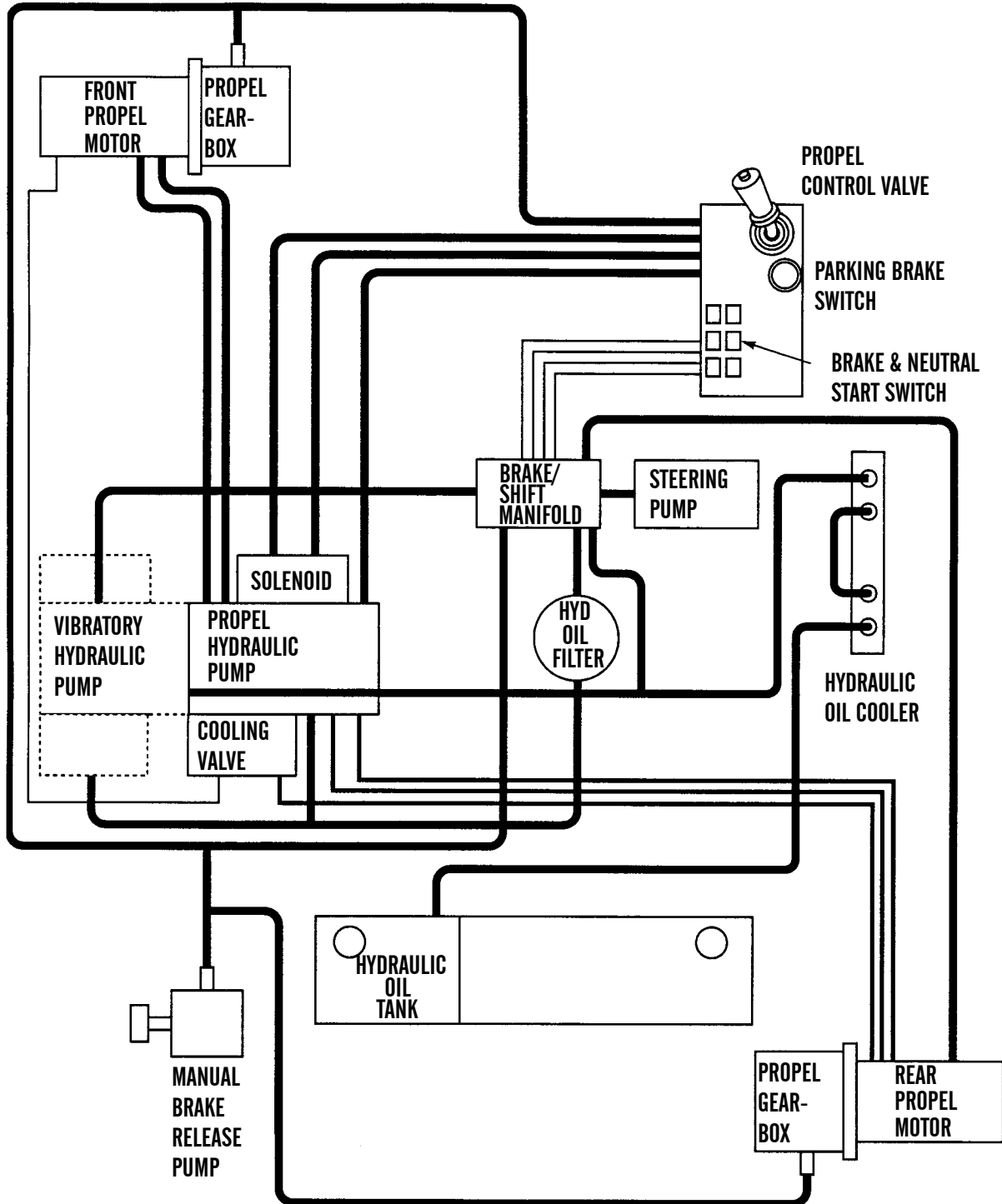
1. **General.** The propel system allows the roller to move either forward or backward. When the engine is started, oil under pressure from the charge (control) circuit flows to the propel control valves. When the propel control lever (which is connected to the propel control valves) is in the forward or reverse position, oil is sent to the propel hydraulic pump. The further the lever is pushed, the higher the oil pressure sent to the hydraulic pump. The more pressure there is, the faster the roller will move. The hydraulic pump pushes oil through hydraulic lines until the oil enters the propel motors. The front and rear propel motors turn the propel gearboxes which turn the roller drums. Inside each propel gearbox is a brake. This brake is always engaged unless pressure from the brake/shift manifold is present. This pressure is controlled by the propel control valve.  

If the roller needs to move while the engine is not able to supply the pump with power, there is a manual brake release pump on the roller. This manual brake release pump pressurizes the hydraulic lines releasing the brakes. Also, there are brake and neutral start relays in the system which prevent movement of the roller during the starting procedure.
2. **Fuel/Hydraulic Oil Tank.** The fuel/hydraulic oil tank consists of the hydraulic tank (located on the right-side) and the fuel tank (located on the right-side). Although the tanks are welded together, they are separate in their function. The CB534B Roller hydraulic oil tank holds 15.5 gal. (59 l) of hydraulic oil. The CB534C Roller hydraulic oil tank holds 24 gal. (91 l) of hydraulic oil.
3. **Propel Hydraulic Pump.** The propel hydraulic pump is a variable displacement, piston-type pump mounted in tandem with the vibratory hydraulic pump to the engine. Both run at engine speed and rotate clockwise as seen from the drive end of the pump.
4. **Propel Motors.** The hydraulic propel motors are located on the left-side of the front drum and the right-side of the rear drum. The front motors is a fixed displacement axial piston-type motor. The rear motor is a variable displacement axial piston-type motor.
5. **Propel Control Lever and Valve.** The propel control lever controls the direction of the roller. If the lever is pushed forward, the control valve, which is connected to the lever, directs fluid to the propel hydraulic pump in such a way that the hydraulic pump sends oil to the propel motor to turn forward. This propel pump sends fluid the opposite direction if the control lever is pulled backward. The further the lever is pulled, the higher the oil pressure being sent from the control valve is. The more control valve pressure, the more volume of fluid the pump sends to the motors and the faster the roller travels.
6. **Parking Brake Switch.** The parking brake switch keeps the roller from moving by interrupting the inputs from the control valve. The hydraulic pump will not send oil to the motors that the brake will not disengage while the parking brake is on. The parking brake switch glows red when parking brake is engaged.
7. **Brake and Neutral Start Relays.** The brake and neutral start relays are safety devices that interrupt the electrical signal to the starter if the control lever is not in the neutral, or center position. This ensures that the roller will not move while the engine is being started.
8. **Steering Pump.** The steering pump provides a charge pressure to the propel system. This charge pressure sends source pressure to the brake/shift valves. The charge pressure is used to supply the propel control valve with signal oil, and to disengage the brakes.
9. **Brake/Shift Valves.** The brake/shift valves distribute the charge pressure to the propel control valve and the brakes. When pressure is sent from the control valve, the brake/shift valve sends pressure to release the brakes. The brake/shift valves also control the speed range of the roller operates. The operator controls the speed range by an electrical switch that operates the valve solenoid. This solenoid either opens or closes the brake/shift valve changing the fluid pressure to the propel control valve which effectively changes the speed range.
10. **Manual Brake Release Pump.** The manual brake release pump is a manually operated plunger-type pump that forces hydraulic oil to the brakes. The manual brake release pump is used when normal means of brake disengagement are not possible.
11. **Cooling Valve.** The cooling valve is a two-position pilot-operated valve. Pilot oil from the high pressure side of the closed loop circuit opens the valve, allowing some of the hydraulic oil in the return side of the closed loop circuit to be directed to the oil cooler.



**PROPEL SYSTEM - CONTINUED**

12. **Propel Gearbox.** The propel gearboxes are attached to the drums. The propel motors turn the gearboxes which turn the drums. There is a brake inside the gearbox that is always engaged until hydraulic pressure from the brake/shift valves is present.



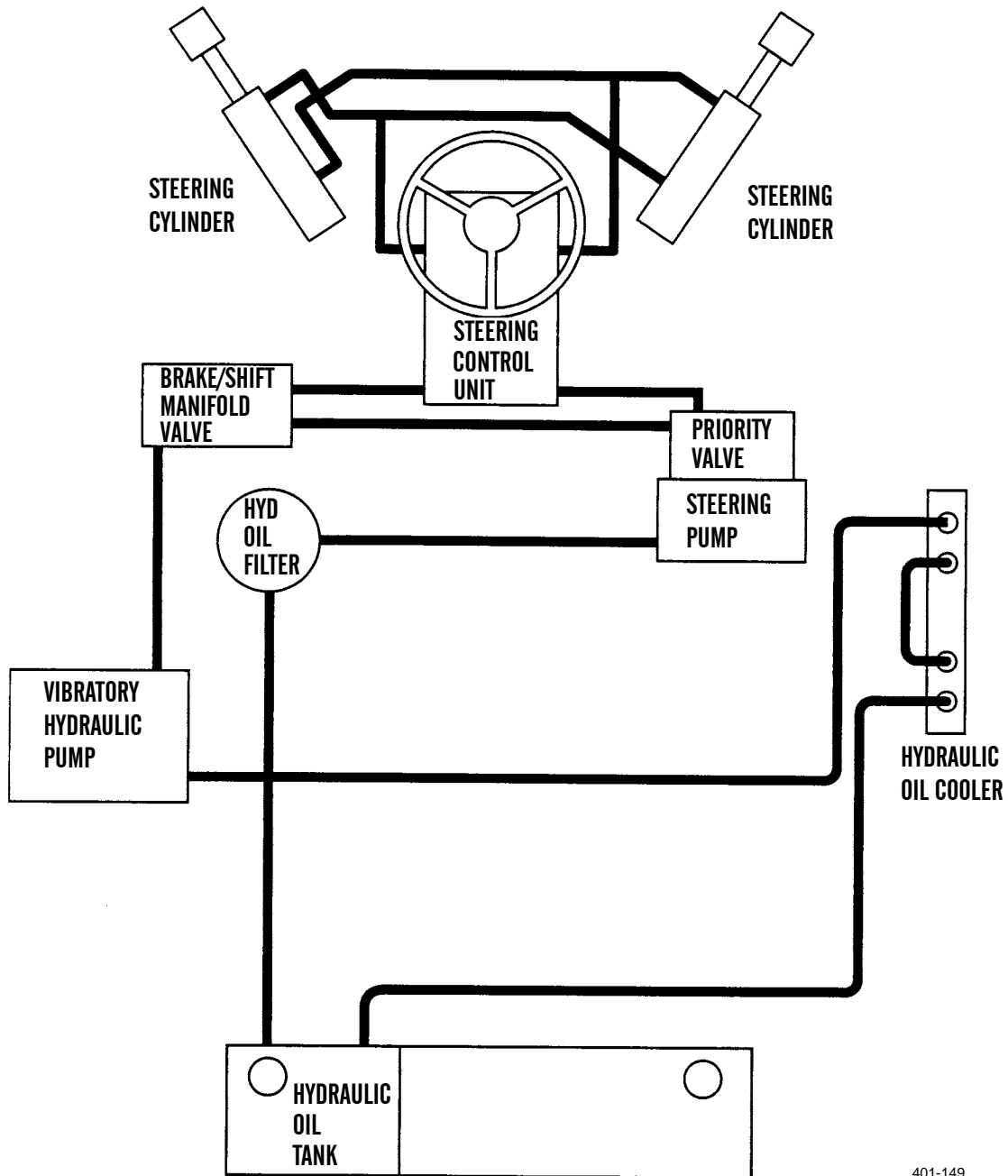
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**HYDRAULIC STEERING SYSTEM**

1. **General.** The hydraulic steering system has two functions. The primary purpose is for steering the roller. The steering pump receives oil from the hydraulic oil tank after it has been cleaned by a hydraulic filter. Oil from the steering pump flows through a priority valve and continues on in two directions. The primary path for the oil is to the steering control unit. The steering control unit sends hydraulic oil to the steering cylinders. When the steering wheel is turned, the steering control unit sends hydraulic oil through the steering hydraulic lines to force the steering cylinders to turn the roller.  

The secondary flow of oil and return oil from the steering control unit is combined with the parking brake and two-speed shift manifold by way of an oil line. This oil is used for the charge system. The charge system supplies the control circuit and replenishes the main closed loop and cooling circuit of the vibratory system.
2. **Steering Control Unit.** The steering control unit is a spring-centered, non-load, reaction-type pump which sends pressurized hydraulic oil to the steering cylinders. The steering control unit has two sections: the control section and the metering section. Oil from the steering pump goes into the control section. As the steering wheel is turned, the control sends oil out from the metering section. Metered oil from the metering section is directed by the control section to either the left turn port or right turn port.
3. **Steering Pump.** The steering pump is a gear-type pump mounted to the accessory drive on the engine and turns clockwise as the engine is running. The steering pump supplies pressurized hydraulic oil to the steering system and charge oil to the propel and vibratory systems. A priority valve gives the steering system priority over the propel charge circuits. A pressure compensator valve regulates a constant 6 gallons per minute flow to the steering system.
4. **Priority Valve.** Inside the steering pump is the priority valve which is a pressure compensated flow divider. The priority valve divides flow between the steering circuit and the propel charge circuits. The steering circuit has priority.
5. **Brake/Shift Manifold Valve.** The brake/shift manifold valve is part of the propel system, yet receives its charge from the steering pump.
6. **Steering Cylinders.** The steering cylinders are piston-type hydraulic cylinders mounted at the pivot joint of the frame and yoke assemblies. When the steering control unit sends pressurized oil to them, the steering cylinders force the yoke assembly to shift its relative placement on the frame assembly, causing the roller to steer either left or right.
7. **Fuel/Hydraulic Oil Tank.** The fuel/hydraulic oil tank consists of the hydraulic tank (located on the left side) and the fuel tank (located on the right side). Although the tanks are welded together, they are separate in their function. The CB534B Roller hydraulic oil tank holds 15.5 gal. (59 l) of hydraulic oil. The CB534C Roller hydraulic oil tank holds 24 gal. (91 l) of hydraulic oil.
8. **Hydraulic Oil Filter.** The hydraulic oil filter cleans all hydraulic oil used in the propel, vibratory and steering systems. When the filter element is clogged, or oil is cold, the bypass valve opens and oil flows past the element and a signal is sent to the warning light. On the CB534B Roller, an indicator is mounted on the filter assembly to display the condition of the filter element.

HYDRAULIC STEERING SYSTEM - CONTINUED

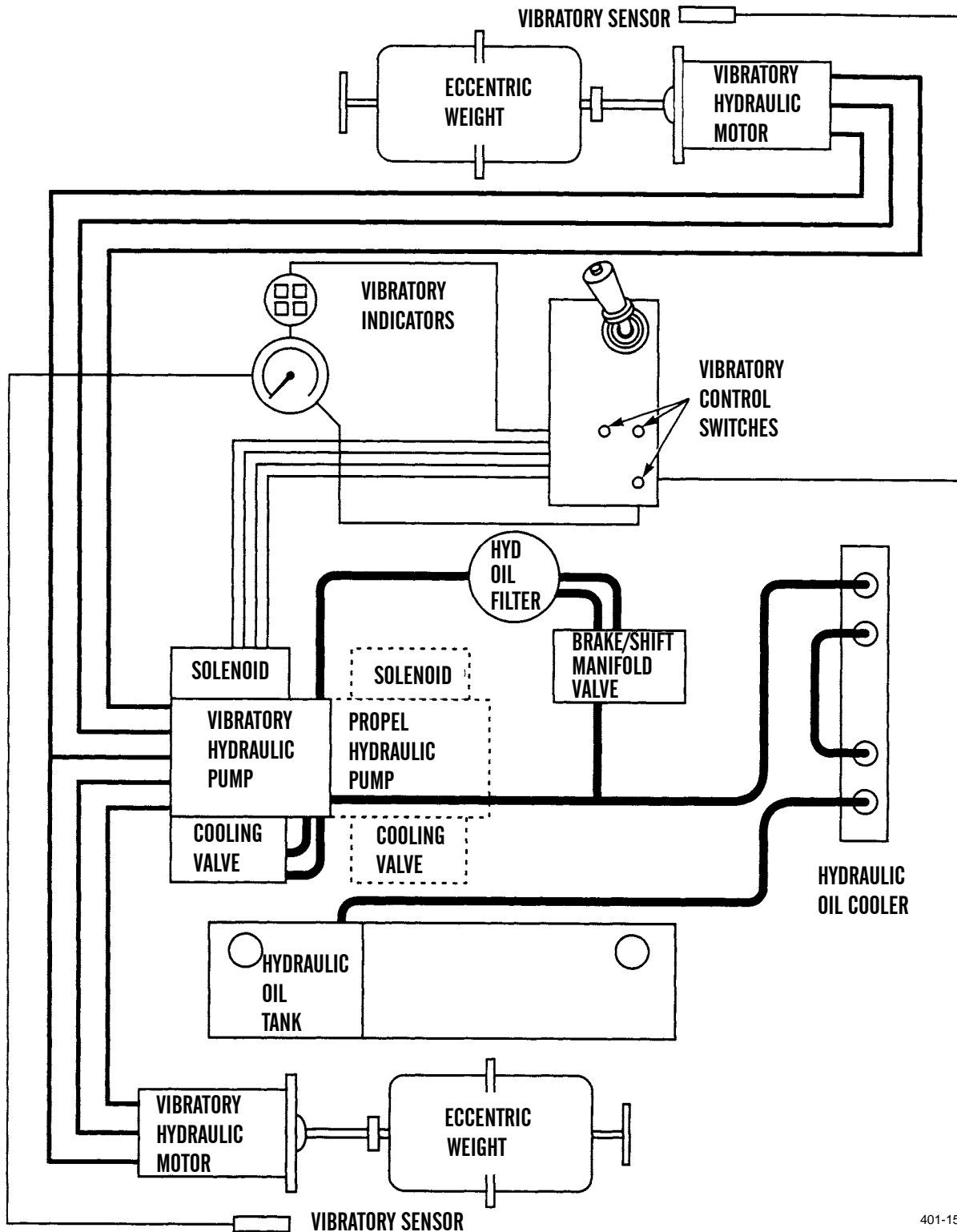


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**VIBRATORY SYSTEM**

1. **General.**
  - a. The drum vibration is produced by the turning of an eccentric weight mounted inside each drum. Hydraulic motors, mounted on the left-side of the axis of the front drum and on the right-side of the axis of the rear drum, turn the eccentric weights. A hydraulic pump provides power to the motors. Controls are provided for the operator to implement the use of the vibratory system in high or low range.
  - b. The vibratory system is a hydrostatic, closed loop system. Oil for the vibratory system is supplied by the steering charge circuit pressure created by the steering pump. Charge pressure is used to supply the control circuit and replenish the main closed loop and cooling circuits of the vibratory system.
2. **Vibratory Hydraulic Pump.** The vibratory hydraulic pump is a variable displacement, piston-type pump mounted in tandem with the propel hydraulic pump to the engine. Both run at engine speed and rotate clockwise as seen from the drive end of the pump.
3. **Vibratory Hydraulic Motor.** The vibratory hydraulic motors are located on the right-side of the front drum and the left-side of the rear drum. The front and rear motors are fixed displacement bidirectional motors that are identical.
4. **Eccentric Weights.** As the eccentric weight spins, kinetic energy creates forces that cause the drum to vibrate, which intensifies the roller compaction of surface material. The eccentric weight is a chamber filled with steel shot and has a weight attached to one side. Inside the chamber are baffles. As the weight is turned one direction, the baffle collects the steel shot on the same side as the weight to produce a severe imbalance in the rotation. The imbalance causes the entire drum to vibrate. This is the high amplitude range. As the weight is turned the other direction, the baffle collects the steel shot on the opposite side as the weight to produce a mild imbalance in the rotation causing less vibration. This is the low amplitude range.
5. **Vibratory Indicators.** The vibratory indicators allow the operator to monitor the vibratory system. A vibratory sensor is located on each drum and measures how many Vibrations Per Minute (VPM) the drums produce. This sensor is connected to a VPM meter on the control panel. The VPM meter points to a number which shows the vibrations per minute reading. A system light is also illuminated whenever the vibratory system is engaged.
6. **Brake/Shift Manifold Valve.** The brake/shift manifold valve will not allow the vibratory system to engage when the system is in automatic mode until the propel lever is positioned for roller movement.
7. **Cooling Valve.** The cooling valve is a two-position pilot operated valve. Pilot oil from the high pressure side of the closed loop circuit opens the valve allowing some of the oil in the return side of the closed loop circuit to be directed to the oil cooler.
8. **Hydraulic Oil Cooler.** The hydraulic oil cooler is mounted between the fan shroud and the radiator and is a heat transfer device which cools the oil in the hydraulic system.

VIBRATORY SYSTEM - CONTINUED



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