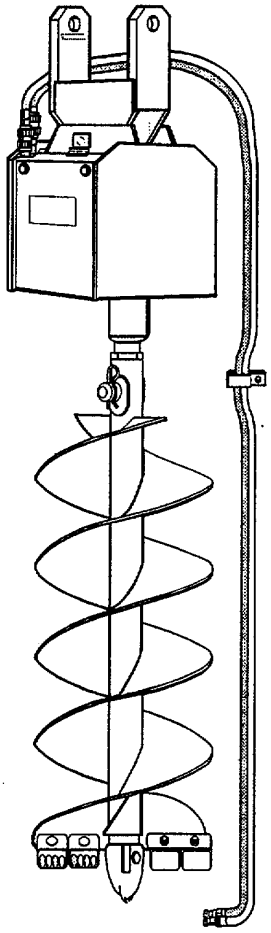
OPERATOR, UNIT MAINTENANCE, AND DIRECT SUPPORT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

FOR

EARTH AUGER ASSEMBLY

MODEL 1650EH-MS

LOWE Manufacturing Company
NSN 2590-01-384-6857
P/N 1650 EH-MS
CONTRACT DAAE07-93-C-1034
CAGEC ONAG9



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HEADQUARTERS, DEPARTMENT OF THE ARMY
16 January 1995

WARNING

Read and understand this TM before operating or servicing the auger.

Read and understand starting, warm-up, and digging precautions in cold climates or under unusual climate or terrain conditions.

WARNING

Hydraulic fluid under pressure can penetrate the skin or damage eyes. Fluid leaks under pressure may not be visible. Never use a bare hand to feel for leaks.

Hydraulic fluid, forced into the skin under pressure, must be removed by a doctor familiar with this injury and within a few hours.

Always wear safety goggles to protect eyes. Ensure hydraulic fluid power source is disconnected prior to servicing any component

DISPOSE OF HYDRAULIC FLUID PROPERLY.
Contact your Environmental Coordinator for information on proper use and disposal of fluid.

WARNING

Do not connect hydraulic quick disconnect fittings if SEE engine is running and operator is seated on SEE vehicle.

Hydraulic pressure remaining after SEE engine is off could cause unexpected auger rotation resulting in serious injury or death.

Depressurize system by shutting off SEE engine and operating all auger controls, several times, thru full range of motion, until no motion is felt from boom or stabilizers.

DISPOSE OF HYDRAULIC BRAKE FLUID PROPERLY. Contact your Environmental Coordinator for information on the proper use and disposal of Brake Fluid.

WARNING/

Prior to digging in developed areas, check with local utility authorities for locations of underground utility lines

WARNING

Listen for unusual noises when digging. Stop and investigate source.

WARNING/

Do not operate auger with loose, worn, damaged, missing, or unusable safety covers. Replace defective safety covers prior to operating auger.

WARNING

Locate safety labels and read them. Replace damaged labels.

WARNING

Ensure all lynch, hitch pin clips, cotter pins, and other retaining pins are in place and locked.

WARNING

Auger operator can not view auger hole site from his SEE seat position if hole being dug is in line with boom. Recommended position of boom Is 10 to 11 o'clock or from 1 to 2 o'clock position.

WARNING

Do not operate Earth Auger Assembly if hydraulic hoses are worn thru outer cover, kinked, or leaking fluid.

Tighten leaky fittings, or replace if defective. Always hand start threaded connectors prior to tightening with tools.

WARNING

Operate auger only when SEE vehicle is on fiat firm ground. Do not operate auger when SEE vehicle is tipped (as on a hill side or sloping ground).

WARNING

Do not modify equipment because damage or injury could occur.

WARNING

To transport Auger Drive Unit fold boom to lowered position, and tie Auger Drive Unit i rest position on SEE vehicle.

WARNING

Do not operate auger until all personnel are at least 10 feet away from rotating auger and cutting head.

WARNING

Do not wear loose fitting clothing.

WARNING

Dry cleaning solvent P-D-680 is toxic. Notify your Environmental Coordinator before using. Environmental Coordinator will refer to the Materiel Safety Data Sheets (MSDS) for instructions on proper use, cautions, storage, disposal, or less hazardous cleaning solvents.

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective gloves, face mask, and gloves, and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes. Don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for TYPE I dry cleaning solvent is 100°F (38°C), and for Type II it is 140°F (60°C) if you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made flush eyes with water and get immediate medical attention.

WARNING

Observe lift limits of personnel when moving or installing Auger Drive Unit or Auger. Use a lifting device when available.

Technical Manual
No. 5-2590-512-13&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, *16 January 1995*

OPERATOR, UNIT MAINTENANCE, AND DIRECT SUPPORT MAINTENANCE

MANUAL

(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR EARTH AUGER ASSEMBLY MODEL 1650 EH-MS

LOWE Manufacturing Company
NSN 2950-01-384-6857
P/N 1650 EH-MS

Contract DAAE07-93-C-1034

CAGEC ONAG9

Current As Of
December 12,1994

REPORTING OF ERRORS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 Recommended Changes to Publications and Blank Forms, or DA Form 2028-2, located in the back of this manual, direct to: Commander, US Army Tank automotive and Armaments Command, ATTN: AMSTA-IM-MMAA, Warren, Ml 48397-5000. A reply will be furnished directly to you.

You may also send DA-Form 2028/2028-2 information to TACOM via E-mail or data fax. Our fax number is DSN 786-6323. Our E-mail address is: amstammaa@cc. tacom.army.mil

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INTRODUCTION

SECTION I GENERAL INFORMATION

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SECTION III TECHNICAL PRINCIPLES OF OPERATION

SECTION I. GENERAL INFORMATION

1-1. Scope.

a. *Type of Manual*. Operator, Unit, and Direct Support Maintenance Manual (Including Repair Parts and Special Tools List).

b. *Model Number and Equipment Name*. LOWE Earth Auger Assembly, Model 1650EH-MS. Attaches to SEE Vehicle (Small Emplacement Excavator).

c. *Purpose of Equipment*. Earth Auger Assembly is used for boring 12" holes in natural earth soil, to a depth of approximately 72 inches (6 feet). These holes are used for countermobility, survivability, and sustainment engineering missions, such as emplacing pumps, slurry and cratering explosives, and setting utility posts and obstacles.

1-2. 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, *The Army Maintenance Management Systems (TAMMS).*

1-3. Reporting Equipment Improvement Recommendations (EIRs).

If your Earth Auger Assembly needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance, put it on an SF 368 (Product Quality Deficiency Report). Mail it to us at Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-GF, Warren, MI 483975000. We'll send you a reply.

1-4. Destruction of Army Materiel to Prevent Enemy Use.

Refer to TM 750-244-6, Procedures for Destruction of Tank-Automotive Equipment to Prevent Enemy Use.

1-5. Preparation for Storage or Shipment.

Refer to Chapter 4, Section IV, for procedures for preparing Earth Auger Assembly for storage or shipment.

SECTION II. EQUIPMENT DESCRIPTION AND DATA.

1-6. Equipment Characteristics, Capabilities, and Features.

Description. Earth Auger Assembly is attached to and controlled from SEE vehicle. SEE hydraulic pump delivers fluid under pressure, thru hoses, to hydraulic motor in Auger Drive Unit. This provides rotational movement to Auger. Four adjacent teeth (two per side), (10), mounted on cutting head (11), dig hole, as SEE operator lowers boom/dipper and attached Auger into ground. Boom will not obstruct line of vision of Earth Auger Assembly operator if hole site is at either 10 to 11 o'clock or 1 to 2 o'clock position.

Characteristics. Earth Auger Assembly is designed to be attached to rear of Small Emplacement Excavator (SEE) and is operated and powered from it. Metric sizes are not used and no special tools are required.

Capabilities and Features. SEE vehicle rear bucket is removed and Auger Drive Unit is installed in its place. Earth Auger Assembly can dig 12" holes in natural earth soil, to depth of approximately 72" or 6 feet.

Short Distance Moving. Earth Auger Assembly may be left attached to SEE vehicle, but it must be tied down or monitored to minimize swinging.

Long Distance Moving. There is no room or provision on SEE vehicle to secure Auger when moving it long distances. Disconnect Auger from Auger Drive Unit and transport it in a companion vehicle.

1-7. Location and Description of Major Components.

a. Earth Auger Assembly has two major components-Auger Drive Unit (1) and Auger (2).

b. Auger Drive Unit (1) uses connecting link (3) to interface with SEE dipper. Inside of Auger Drive Unit (1) is hydraulic drive motor, drive chain, sprockets, bearings, and a solid hex shape output shaft. Two 138" hoses (4) are connected thru two quick disconnect fittings into top of Auger Drive Unit.

1. Auger Drive Unit connecting link (3) is a universal type drive coupling and provides constant multi-direction Auger movement during hole digging.

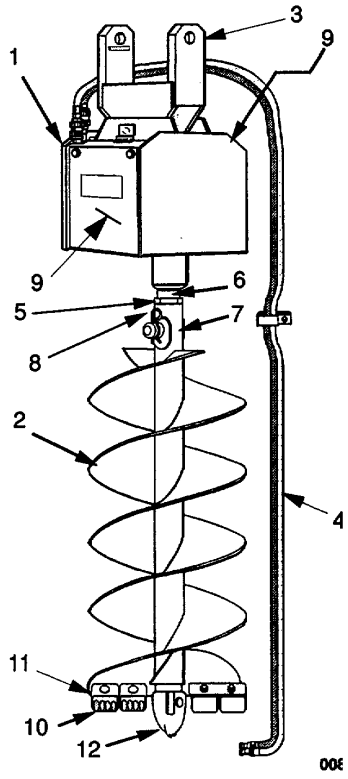
2. Auger shaft (5) is hollow and also hex shape. It slides over solid shaft (6) of Auger Drive Unit.

3. When Auger shaft (5) and Auger Drive Unit shaft (6) are nestled, pin (7) is inserted into aligned holes. Hitch Pin Clip (8) is inserted into pin (7) end hole, (with hitch pin clip loop facing up), to secure parts together.

4. Front and rear metal covers (9) are safety covers. Greased rotating parts are kept inside Auger Drive Unit (1) and dirt and contaminants kept out.

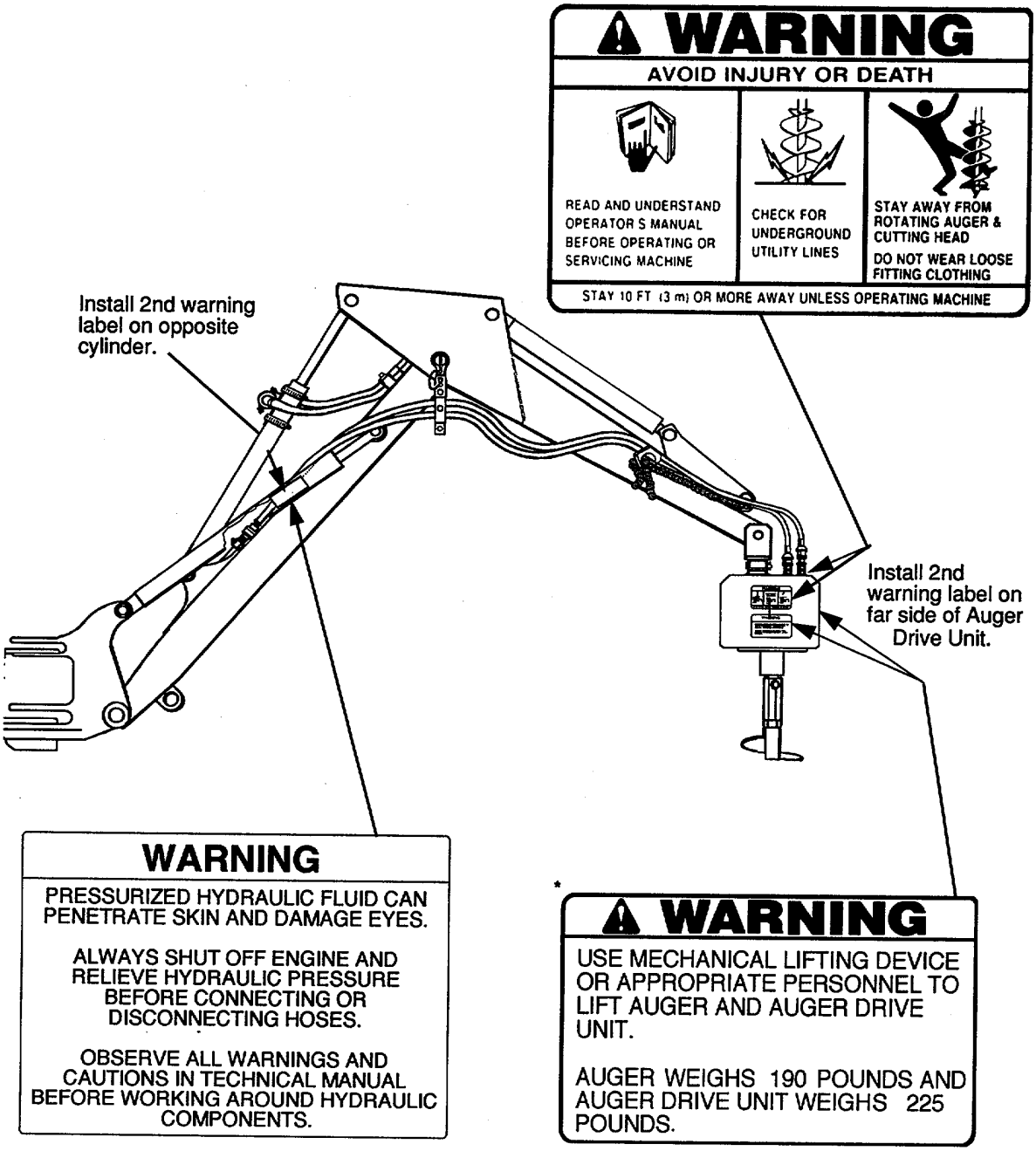
5. A spare chain master link is stored on flat washer welded to motor plate inside Auger Drive Unit (1).

c. Auger (2) is spiral shape. Four carbide tipped cutting teeth (10) are bolted to cutting head (11). Center point (12) guides Auger into center of selected hole.



1-8. Location of Decals.

Safety Warning Decals are located as shown. Duplicate label is located on opposite side of component.



*Note - Some units may be shipped without this safety warning decal.

Reference. Always refer to applicable operator's TM for SEE vehicle when operating Earth Auger Assembly.

1-9. Equipment Data.

Operating Range - Hydraulic pressure of Earth Auger Assembly is 2,000 to 3,000 PSI (13,790 to 20,684 Kpa) with oil flow of 14 to 25 GPM (52.9 to 75 LPM (Liters Per Minute)).

Weight. - Earth Auger Assembly weighs 415 lbs. Auger Drive Unit weighs 225 lbs. and Auger weighs 190 lbs. Appropriate personnel or a lifting device is required to lift and move the Auger when it is removed or installed on Auger Drive Unit. Lifting limits of personal must not be exceeded.

1-10. Safety Cautions.

Read and understand SEE operator's manual, and Earth Auger Assembly operator instructions in Chapter 2 of this manual, before operating or servicing.

Read and understand all safety precautions, instructions, Warnings, and Cautions prior to transporting, setting up, operating, storing or attaching to SEE vehicle. They guide you to avoid injury and machine damage.

Do not connect hydraulic hoses to Auger Drive Unit until it is mounted by connecting link to SEE vehicle.

Ensure hoses are securely mounted in place in their clamps prior to operating boom. Loose hoses are easily trapped and crushed by boom movement.

After digging hole, do not touch foot pedals when hoisting of Auger out of ground or boom will swing and bend Auger.

Wipe dirt off of quick disconnect fittings prior to connecting and use attached dust caps when disconnected.

Use care not to lose hitch pin clip when installing or removing Auger from Auger Drive Unit. Safety reasons do not allow a holding chain to be attached because of Auger rotation.

Observe lift limits of personnel in lifting or moving Earth Auger Unit or Auger. Use a lifting device when available.

Wear heavy gloves when moving or lifting Earth Auger Unit or Auger.

SECTION III. TECHNICAL PRINCIPLES OF OPERATION.

1-11. Auger.

Auger Drive Unit and Auger are two components that make up the Earth Auger Assembly. Earth Auger Assembly is connected to boom/dipper, thru a connecting link, at rear of SEE vehicle in place of bucket. An installation kit adapts one bucket control lever so that moving it will it cause Auger to rotate clockwise or counterclockwise.

a. Auger Drive Unit.

Auger Drive Unit contains chain driven sprockets that rotate attached Auger at high torque output. Auger is driven by an internal hydraulic motor using fluid under pressure delivered through hoses from attached SEE vehicle hydraulic pump. Quick disconnect fittings, on hydraulic hose ends, allow removing rotational source, for safety reasons, when servicing.

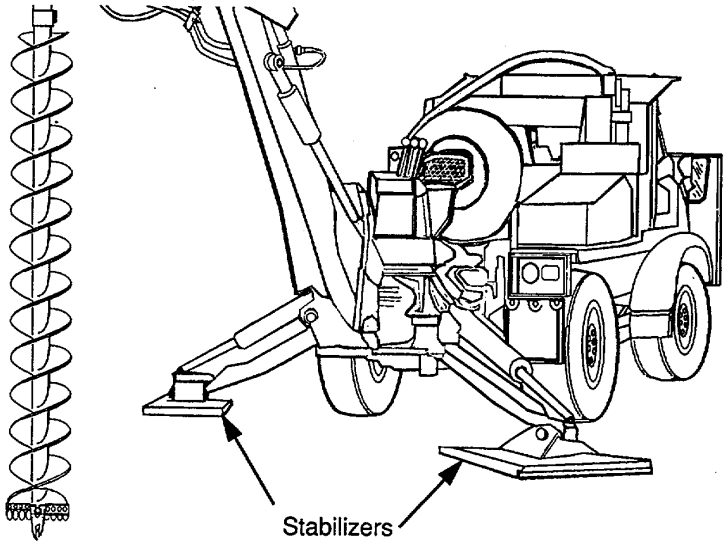
b. Auger.

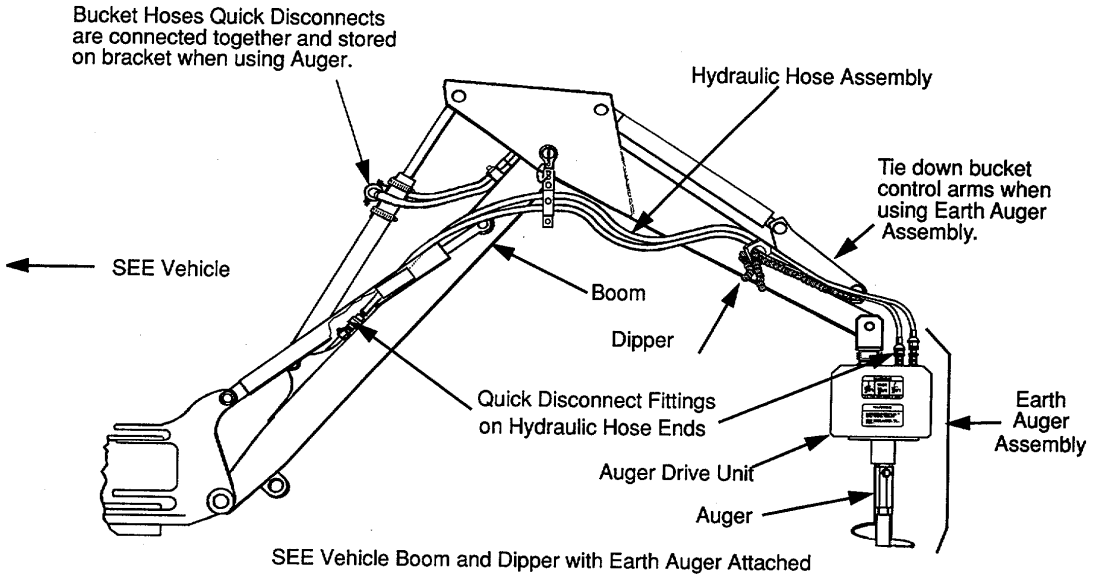
1. Auger is almost seven feet in length, spiral shaped, and can dig a 12 in. diameter hole into natural terrain. To dig, SEE operator, from seat at rear of SEE, moves control levers and foot pedals that move auger into position over hole site, lower boom, dipper and rotate Auger.

2. It is preferred that hole site be located to right or left of boom/dipper straight ahead position. Operator can swing boom over and view Auger as hole is being dug.

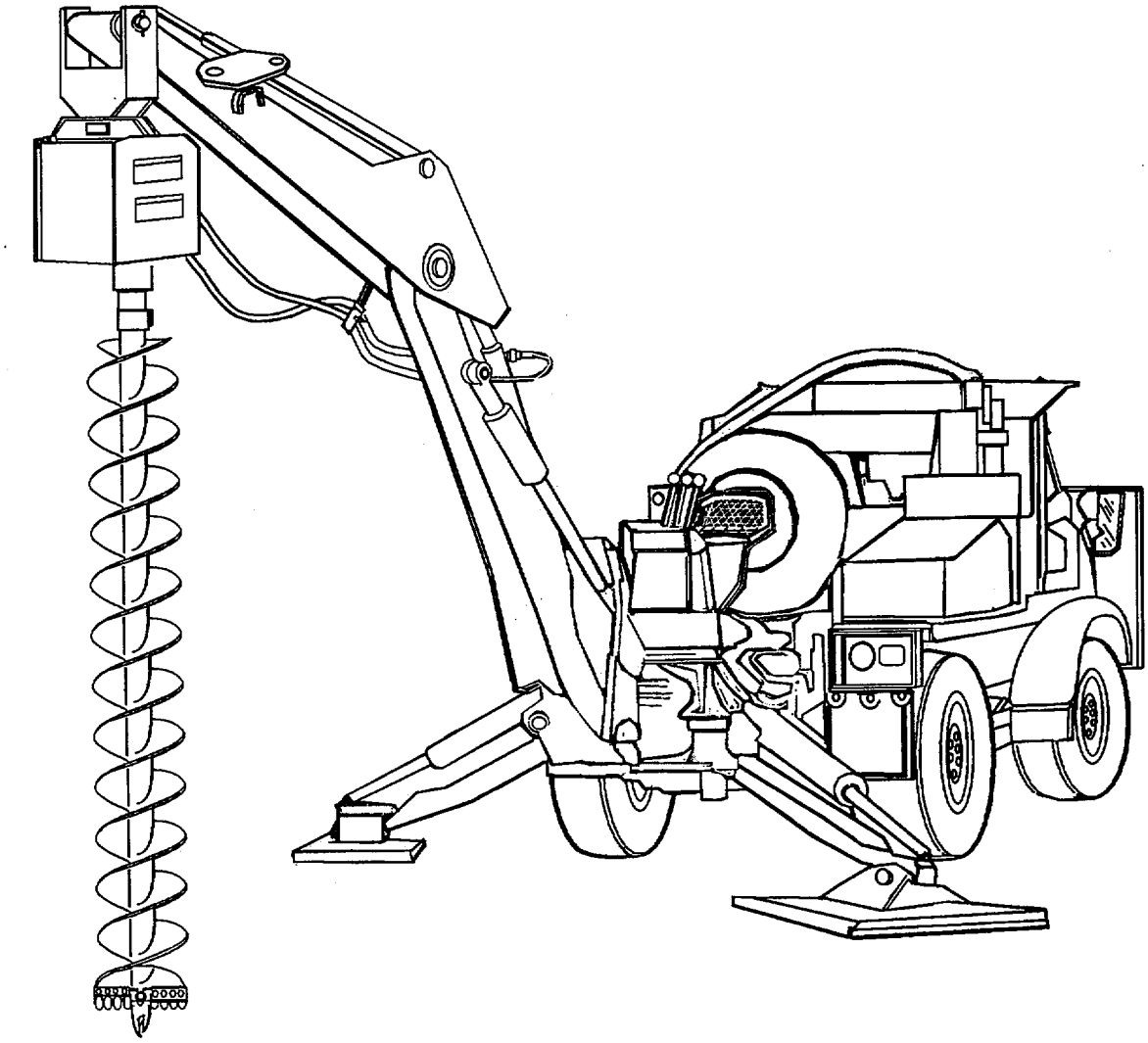
c. Stabilizers

Stabilizer arms, left and right, operated by control levers, extend from the SEE vehicle, to minimize SEE vehicle movement and provide firm support during auger movement.





SEE Vehicle Boom and Dipper with Earth Auger Attached



Earth Auger Assembly attached to SEE vehicle positioned to begin digging hole.

CHAPTER 2
OPERATING INSTRUCTIONS

SECTION I DESCRIPTION AND USE OF OPERATOR'S CONTROLS.

SECTION II OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

SECTION III OPERATION UNDER USUAL CONDITIONS

SECTION IV OPERATION UNDER UNUSUAL CONDITIONS

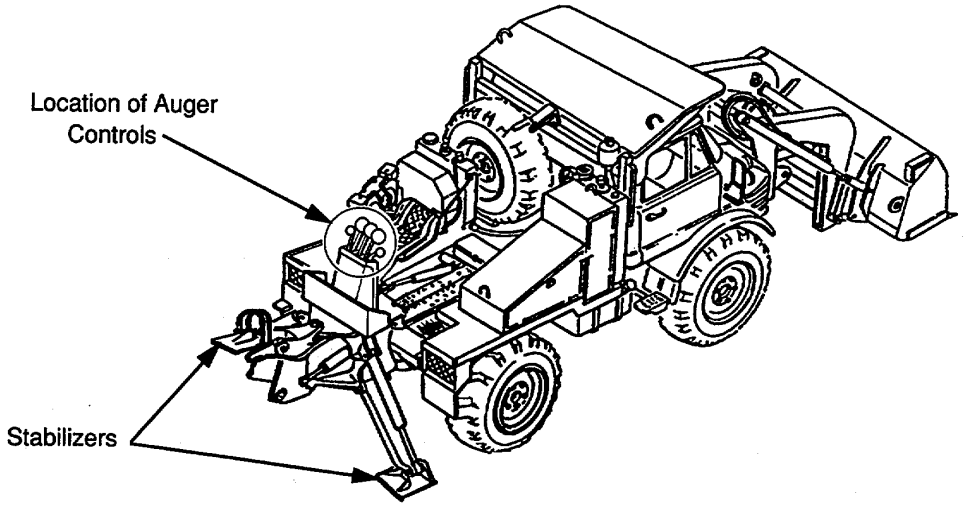
SECTION I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS.

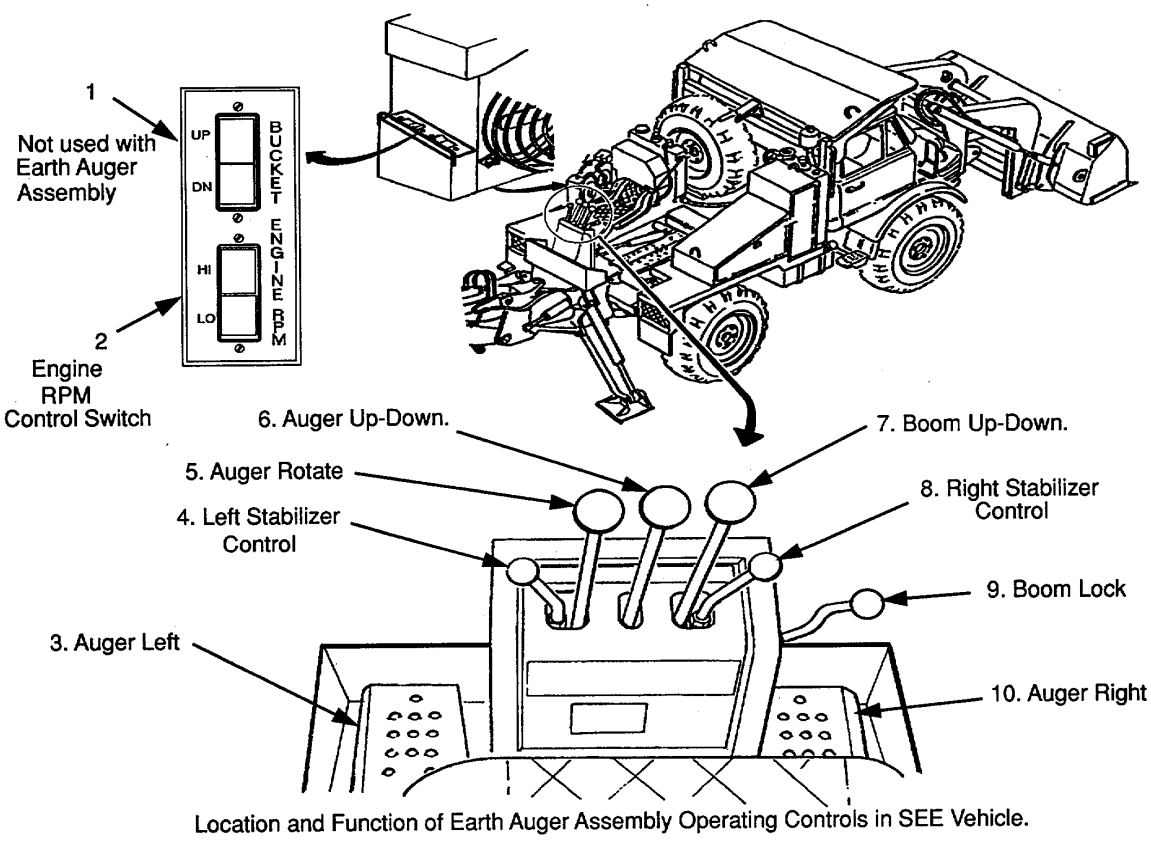
2-1. General.

a. This section lists and describes each control required to operate Earth Auger Assembly. Learn how each control operates before using Earth Auger Assembly.

b. The Earth Auger Assembly is positioned and rotated by levers and foot pedals located at rear of SEE vehicle. These controls actuate hydraulic cylinders located on boom and hydraulic rotational motor inside Auger Drive Unit.

c. All levers rest in center position. Moving a lever forward or backward, from rest position, raises, lowers, or rotates auger. Left and right foot pedals swing boom in horizontal arc. Stabilizers secure SEE vehicle.





Location and Function of Earth Auger Assembly Operating Controls in SEE Vehicle.

2-2. Controls

1. Bucket Up-down Switch:	Not Used In Auger Operation (Refers To SEE Front Bucket).
2. Engine RPM Control Switch:	Increases Engine RPM (Torque) From 750 (Idle) To 2000 RPM.
3. Left Swing Control Foot Pedal:	Swings Auger To Left.
4. Left Stabilizer Control Lever:	Extends (Push Lever) Or Retracts (Pull Lever) Left Rear Stabilizer.
5. Bucket Control Lever:	Rotates Auger Clockwise (Pull Lever Back) Or Counterclockwise (Push Lever Forward).
6. Dipper Control Lever:	Lowers Auger (Pull Lever Back) Or Raises Auger (Push Lever Forward).
7. Boom Control Lever:	Raises Boom (Pull Lever Back) Or Lowers Boom (Push Lever Forward).
8. Right Stabilizer Control Lever:	Extends (Push Lever) Or Retracts (Pull Lever) Right Rear Stabilizer.
9. Boom Lock Latch Lever:	Locks Boom In Place For Travel.
10. Right Swing Control Foot Pedal:	Swings Auger To Right.

SECTION II. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).

2-3. General PMCS Information.

*Before you operat*e: Always keep in mind Warnings and Cautions. Read safety decals on Auger Drive Unit and boom. Perform your (B) Before PMCS prior to equipment leaving its containment area or performing its intended mission.

While you Operate: Keep in mind Warnings and Cautions. Remember decal safety messages on Auger Drive Unit and boom (see para. 1 -8). Perform your (D) During PMCS when equipment is used for its intended mission.

After you Operate: Be sure to perform your (A) After PMCS when equipment has been taken out of mission mode or returned to containment area.

If your equipment fails to operate: Note unusual operation. Report any deficiencies using proper forms. See DA Pam 738-750.

2-4. PMCS Procedures.

Your PMCS table lists inspections and care required to keep your equipment in good operating condition.

If your equipment does not perform as required, refer to troubleshooting procedures in Chapter 3. Report any malfunctions or failures on DA Form 2404 or refer to DA 738-750.

2-5. Explanation Of Columns.

Item Number. This column lists a logical order for performing PMCS. Use number in this column as '"TM Item No." on DA Form 2404, Equipment Inspection and Maintenance Worksheet, when recording results of PMCS.

Interval: This column tells you how often a certain check or service is to be done.

Item To Be inspected: This column lists portion of equipment to be inspected and specific item being inspected.

Procedures. This column tells you how to do required checks and services. Carefully follow these instructions. If you do not have tools, or if procedure tells you to, have Unit maintenance do task.

NOTE

Both terms "ready/available" and "mission capable" mean that equipment is on hand and able to perform combat mission (See AR 700-138).

Equipment is Not Ready/Available if: This column tells you when and why your equipment cannot be used.

2-6. Leakage Definitions.

It is necessary for you to know how fluid leakage affects the status of your equipment. The following are definitions of the types/classes of leakage you need to know to determine the status of your Earth Auger Assembly.

LEAKAGE DEFINITIONS FOR OPERATOR PMCS

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 great enough to cause drops to drip from the item being inspected.

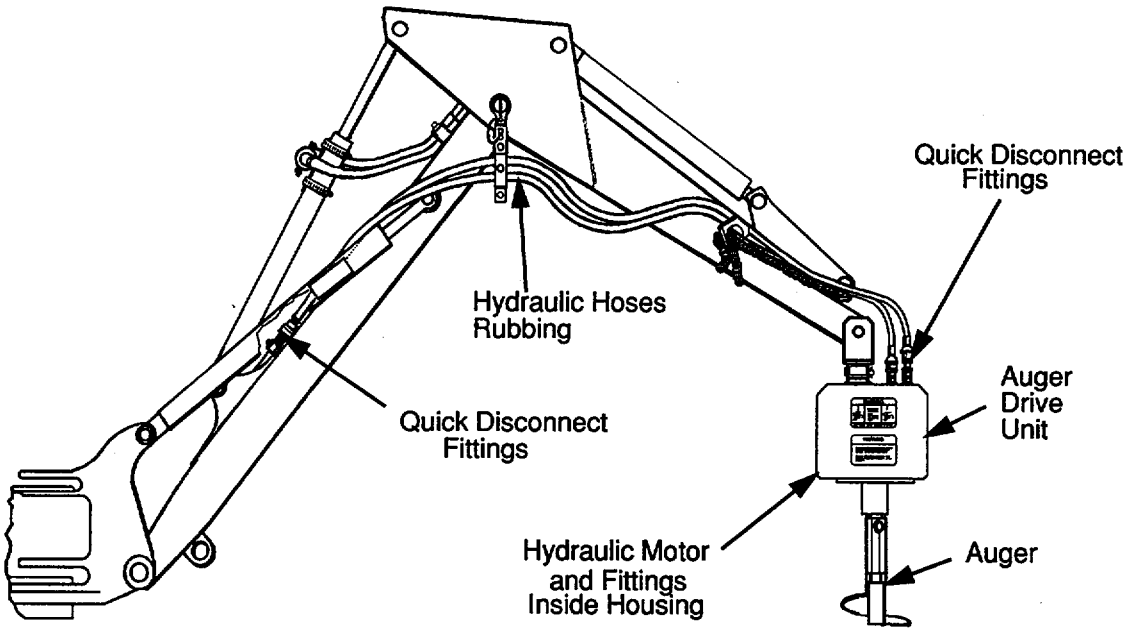
CLASS III Leakage of fluid great enough to form drops that fall from item being inspected.

CAUTION

Equipment operation is allowed with minor leakage (Class I or Class II). Of course, you must consider fluid capacity in item/system being checked/inspected. When In doubt notify your supervisor.

When operating with Class I or Class II leaks, continue to check fluid level in SEE vehicle hydraulic reservoir as required by the PMCS.

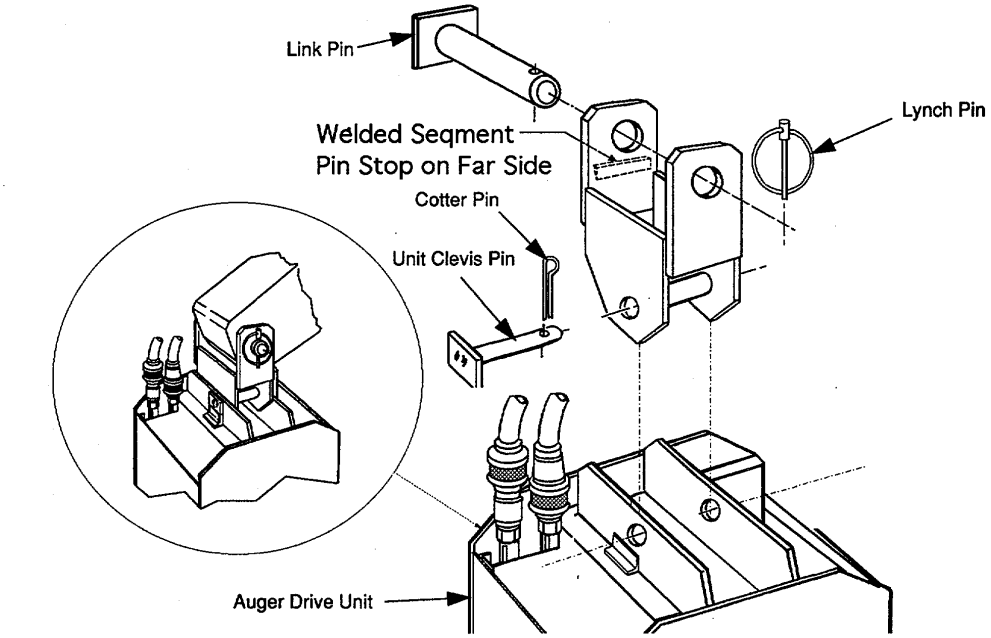
Report Class III leaks to your supervisor or unit maintenance.



Where to Check for Fluid Leaks in Earth Auger Assembly, Hydraulic Lines, and Boom.

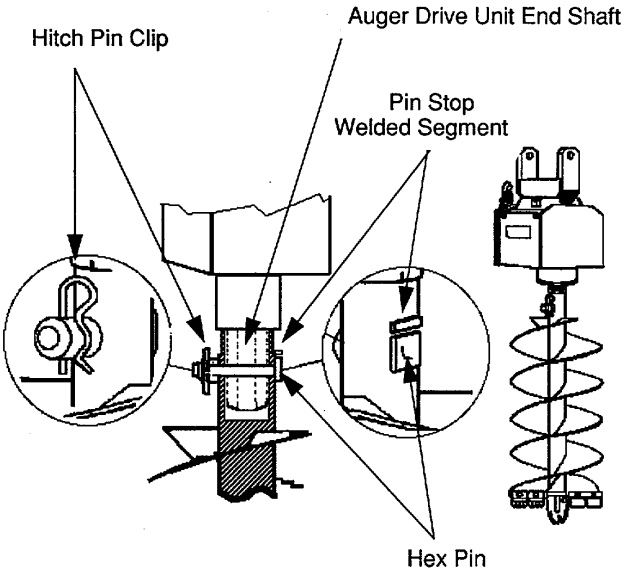
2-7. TABLE OF OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Item No.	Interval	Item to be Checked or Service	Procedure	Not Fully Mission Capable If:
1.	Before	Earth Auger Assembly Mounting at Connecting Link.	Check that Auger Drive Unit thru Connecting Link is mounted to SEE dipper and is secured in place by link pin. Check that oblong head of link pin is seated against pin stop.	Pins are bent or bind in place.
			Check that lynch pin is installed thru end hole in link pin and is in locked position.	Either pin worn, elongated holes in connecting link.
			Check that cotter pin is installed thru end hole of unit clevis pin and is in locked position.	Cotter pin missing, end broken off, ends not spread.
			Check Connecting Link for bent Rust thru. parts, enlongated pin holes, rust damage to pipe or defective welds.	



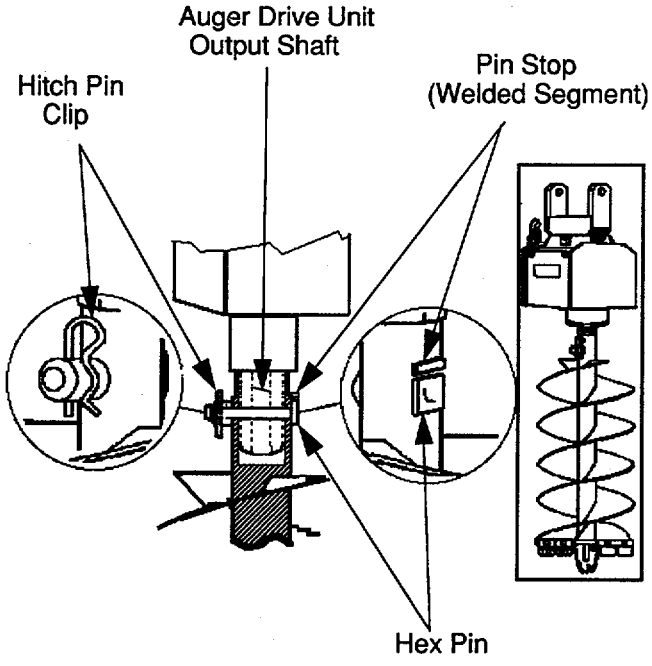
2-7. TABLE OF OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Item No.	Interval	Item to be Checked or Serviced	Procedure	Not Fully Mission Capable If:
2.	Before After	Auger Drive Unit, hex drive shaft, Auger center shaft, Hex pin, Hitch pin clip.	Check that Auger end shaft (hollow) is nestled over Auger Drive Unit shaft (solid). (Both are hex shape).	If not nestled.
			Check that hex pin is positioned thru both shafts. Check that hitch pin clip (retainer) is inserted thru hole in end of hex pin so that rounded section rests on hex pin side (not over hex pin end) and hitch pin loop is facing Auger Drive Unit.	If hex pin or locking hitch pin clip is missing.
			Check for bent hex pin, bent or missing hitch pin clip. Bends or cracks in shaft of Auger Drive Unit or shaft of Auger that would cause auger to wobble when rotating.	If any part is bent or damaged so as to cause binding or unsafe operation.



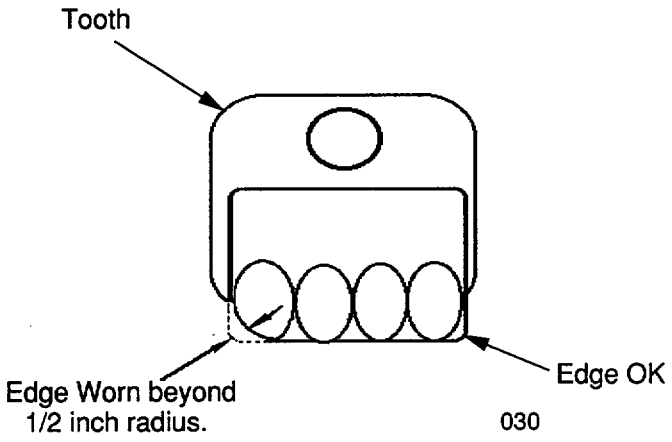
2-7 TABLE OF OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

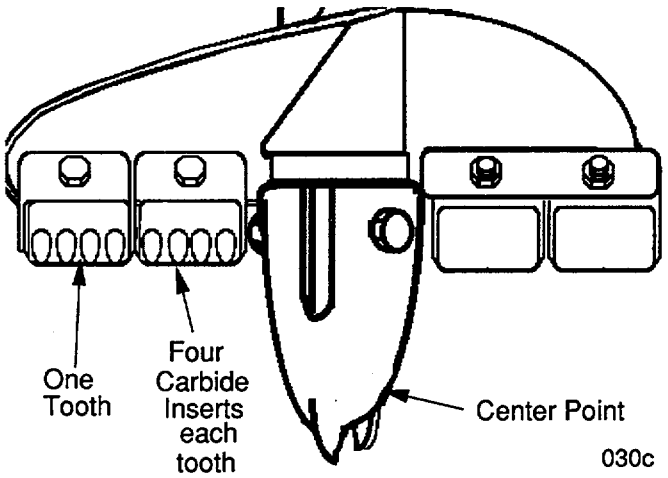
Item No.	Interval	Item to be Checked or Service	Procedure	Not Fully Mission Capable If:
3.	Before During After	Auger	Check that Auger and Auger Drive Unit are secured together in their shafts by hex pin. Check that rectangular shaped head of hex pin is installed thru side of shaft having pin stop, and is seated within pin stop. Check that hex pin is locked by hitch pin clip installed in hole at end of hex pin. Check that hitch pin loop faces upward. Check Auger for cracks, breaks, visible wear, or if bent.	Hex pin bent or missing, rectangle head not seated within welded pin stop. Hitch pin clip bent, loose, or missing. Cracks are seen, auger severely wobbles when turning, missing or broken metal anywhere on auger. Pin stop is broken or missing.



2-7. TABLE OF OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

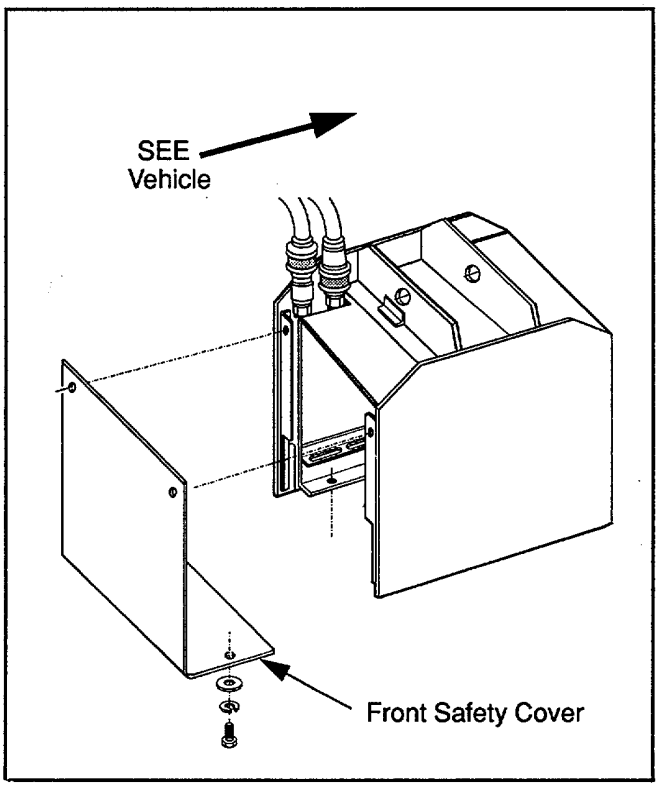
Item No.	Interval	Item to be Checked or Service	Procedure	Not Fully Mission Capable If:
4.	Before During After	Auger Teeth	Check for and tighten loose mounting hardware.	Carriage bolt rest/ lock surface rounded or nut threads stripped.
			Check for missing or broken Auger teeth. Check each of four cutting teeth for wear beyond 1/2 inch radius at corner as shown. Check if carbide insert is chipped or missing.	Any teeth are broken, missing, or worn more than 1/2 inch radius.
	Before During After	Center Point	Check center point for broken guide points. Replace with BII spare if worn, or defective.	Center point or hardware missing, broken, or bent.
NOTE In unusual operating conditions check for teeth wear after every hole, otherwise after every 10th hole Check teeth wear every third hole in hard soil.		**NOTE** Outside teeth will wear out faster than inside teeth. Their useful life may be extended by rotation of the inside teeth to the outside.	Check for and tighten loose mounting hardware.	If hardware is missing, or bolt or nut threads stripped.

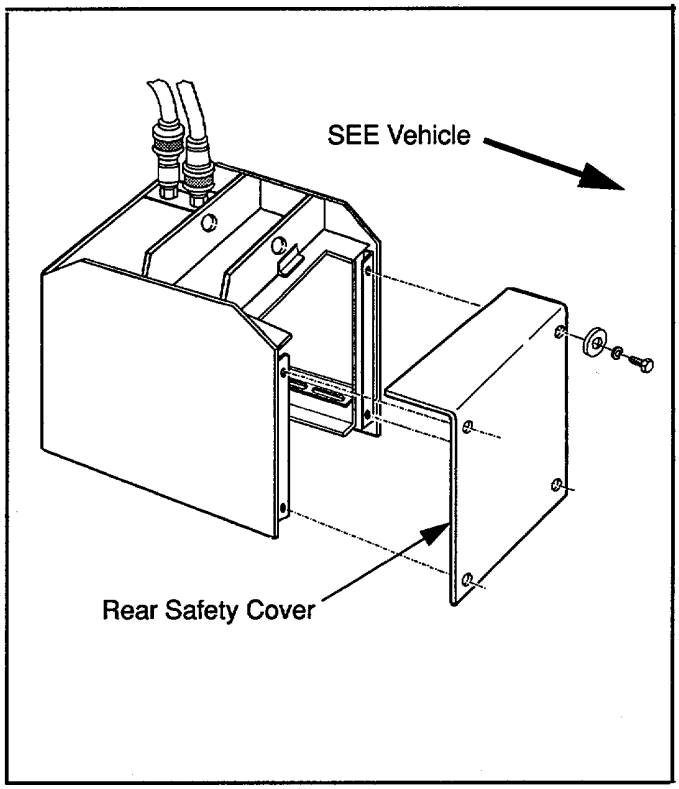




2-7. TABLE OF OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

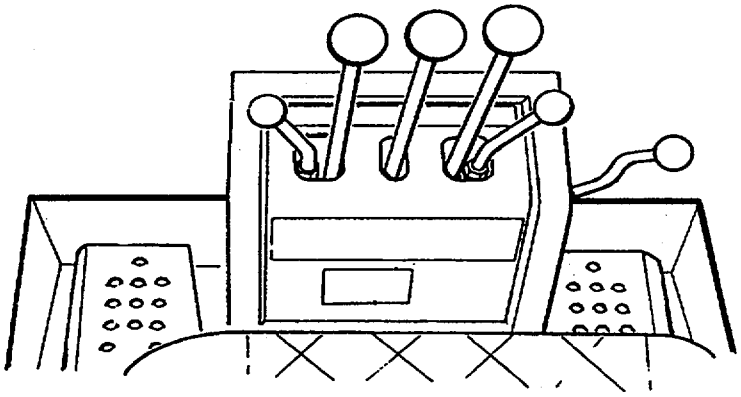
Item No.	Interval	Item to be Checked or Serviced	Procedure	Not Fully Mission Capable If:
5.	Before During After	Safety Covers	Check that front and rear safety covers are in place and mounting bolts are tight.	Front or rear covers are missing, deformed.
			Ensure flat washers and lockwashers are not broken and are in place.	Hardware is missing or defective.





2-7. TABLE OF OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

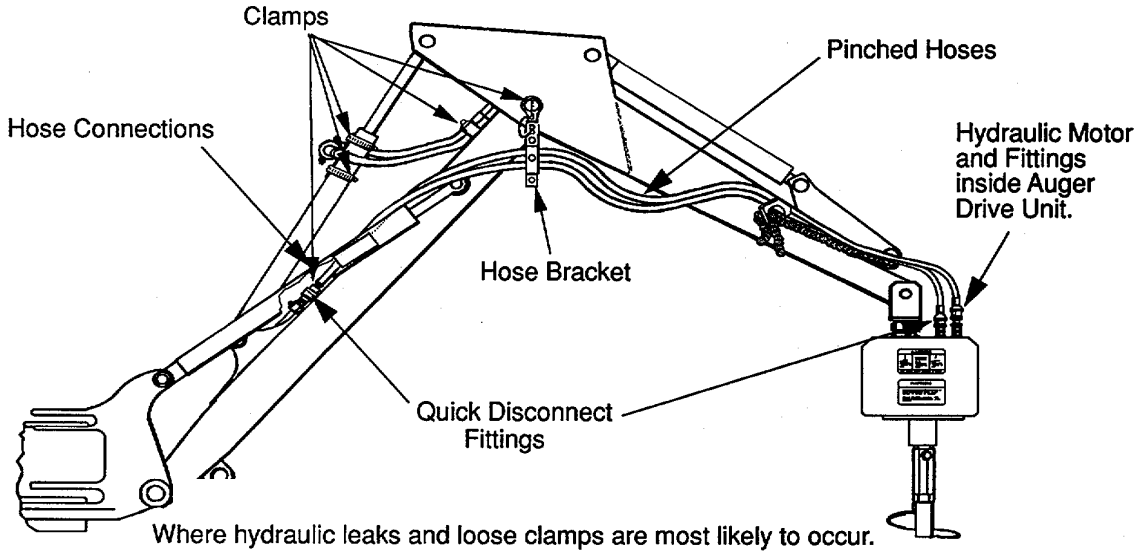
Item No.	Interval	Item to be Checked or Service	Procedure	Not Fully Mission Capable If:
6.	Before	Auger Controls	Ensure all SEE Auger lever controls operate without binding and return to their midpoint rest position (para. 2-2).	If binding is felt in any lever as it is moved thru out its range.
	During		Observe operation of Earth Auger Assembly during digging. Check movement of auger levers to see if auger control moves auger smoothly and without excessive jerking.	If excessive jerky movements are felt as each lever is moved thru out its range.



Auger Operating Controls on SEE vehicle (see para 2-2 Controls.)

2-7. TABLE OF OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).

Item No.	Interval	Item to be Checked or Service	Procedure	Not Fully Mission Capable If:
7.	Before During After	Hydraulic Hoses, Fittings, and Clamps		
		WARNING **Hydraulic fluid under pressure can penetrate the skin or damage eyes. Fluid leaks under pressure may not be visible. Never use a bare hand to feel for leaks.** **Hydraulic fluid, injected into the skin under pressure, must be removed by a doctor familiar with this injury and *within a few hours.*** **Always wear safety goggles to protect eyes. Ensure hydraulic fluid power source is disconnected prior to servicing any components.**		
			Check for hydraulic leaks at fittings. Ensure hoses are secured in brackets and clamps. Check bracket and clamp hardware for defects. Ensure clamps are tight.	If Class III Leak.
			Check hoses, hose fittings, and couplings for wear due to rubbing. They are OK unless wire mesh inside hose, (second layer), is showing.	Wire mesh showing.
8.	After	Auger Auger Drive Unit	Clean and remove excess debris before storage.	



Where hydraulic leaks and loose clamps are most likely to occur.

SECTION III. OPERATION UNDER USUAL CONDITIONS

2-8. Installation and Preparation for Use.

a. Positioning Auger and Auger Drive Unit.

1. Move SEE vehicle to excavation site with Auger Drive Unit in travel position on SEE vehicle (para 2-10, b.).

2. Position companion vehicle, with Auger on board, near rear of See.

NOTE

Operator should be familiar with the SEE vehicle controls that operate the Earth Auger Assembly (para. 2-2 Controls)

WARNING

Do not connect hydraulic quick disconnect fittings if SEE engine is running and operator is seated on SEE vehicle.

Hydraulic pressure remaining after SEE engine is off could cause unexpected auger rotation resulting in serious injury or death.

Release system pressure by shutting off SEE engine and operating all auger controls, several times, thru full range of motion, until no motion is felt from boom or stabilizers.

3. Shut down SEE engine and release pressure in hydraulic system.

4. Untie and remove rope (1) holding Auger Drive Unit (2) in travel position at rear of SEE. Store rope in SEE vehicle.

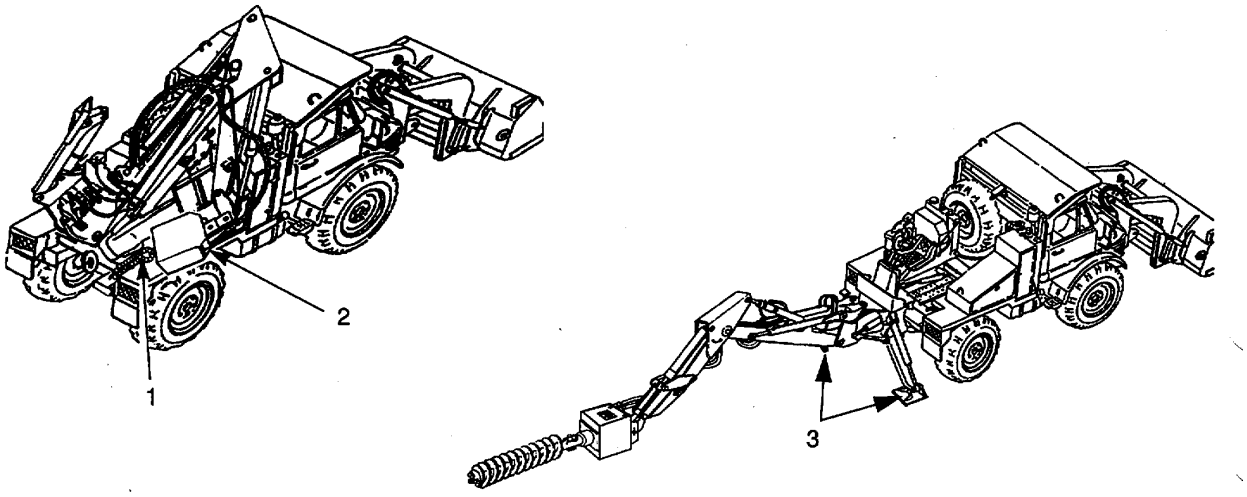
5. Unfold boom from transport position.

6. Use operator Earth Auger Assembly controls and lower left and right stabilizers (3) (para. 2-2 Controls).

7. Operate boom and place Auger Drive Unit horizontal with ground facing away from rear of SEE vehicle.

b. Installation of Auger to Auger Drive Unit.

1. Follow procedures in Operator Maintenance Tasks, c. Auger Installation, (para. 3-5).



2-9. Operating The Auger.

1. Start SEE vehicle engine. Raise Earth Auger Assembly up into air until auger clears ground para 2-2 Controls).

2. Drive SEE vehicle (short distant only) to hole site. Operate SEE controls and position Auger over hole site.

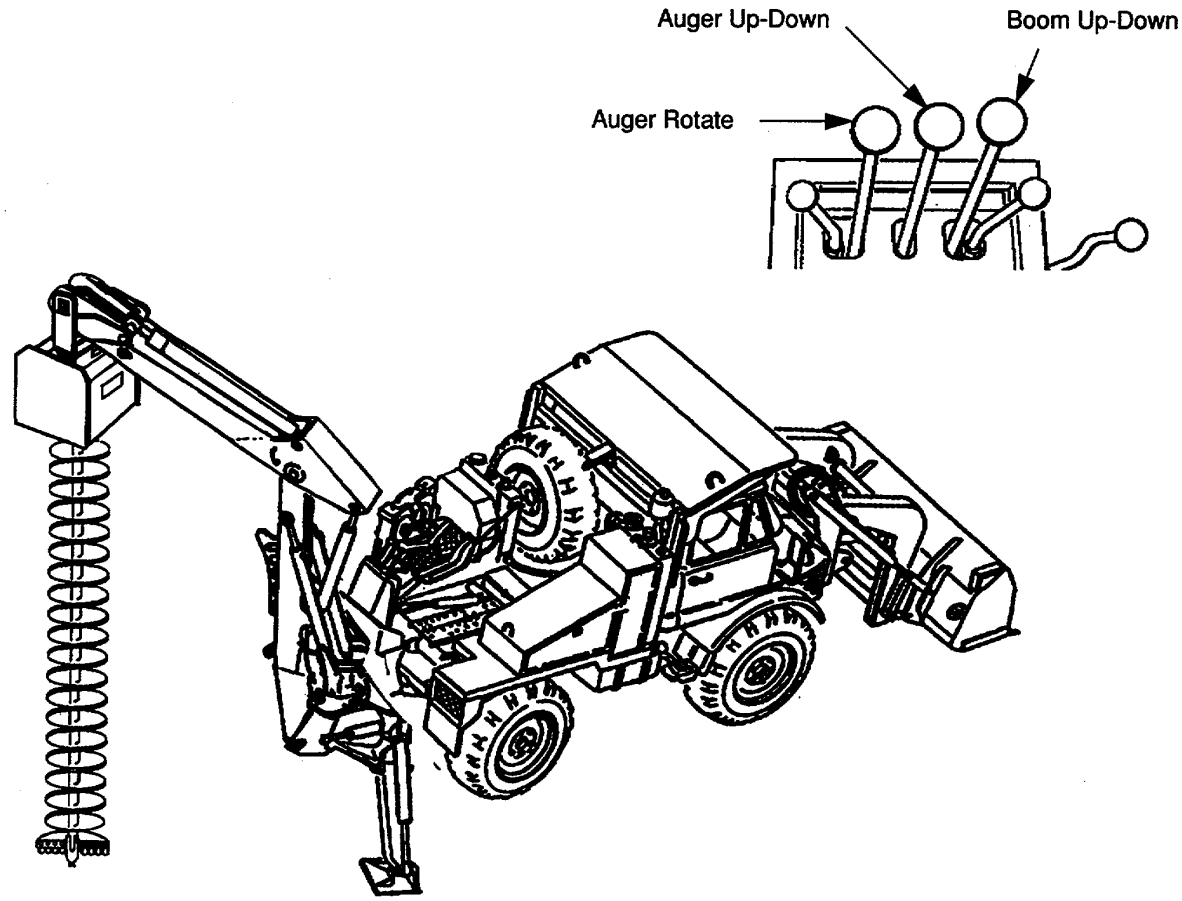
WARNING

Advise all nearby personnel to move at least 10 feet away from Auger prior to digging.

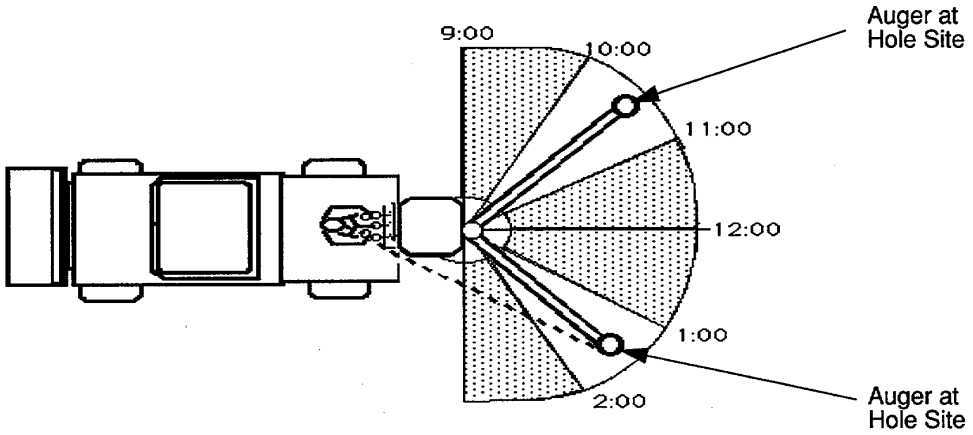
Before digging, wait until Auger stops swinging and do not rotate Auger, until Auger center point is touching ground at intended hole site.

Do not back up SEE with Auger attached.

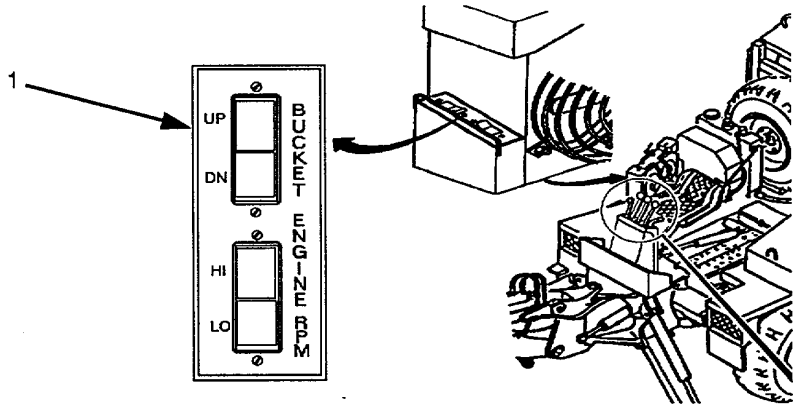
3. Earth auger may be swinging when SEE vehicle is stopped at hole site area. Wait until swinging stops before proceding.



4. Position Earth Auger Assembly so that boom/dipper may be moved horizontally and stopped over intended hole site. To be able to see Auger, when digging, locate first hole site in either 10 to 11 or 1 to 2 o' clock position, as shown.



5. Move SEE engine RPM rocker type control switch (1) from "LO" position (Idle) to "HI" (2000 RPM) (para. 2-2 Controls).



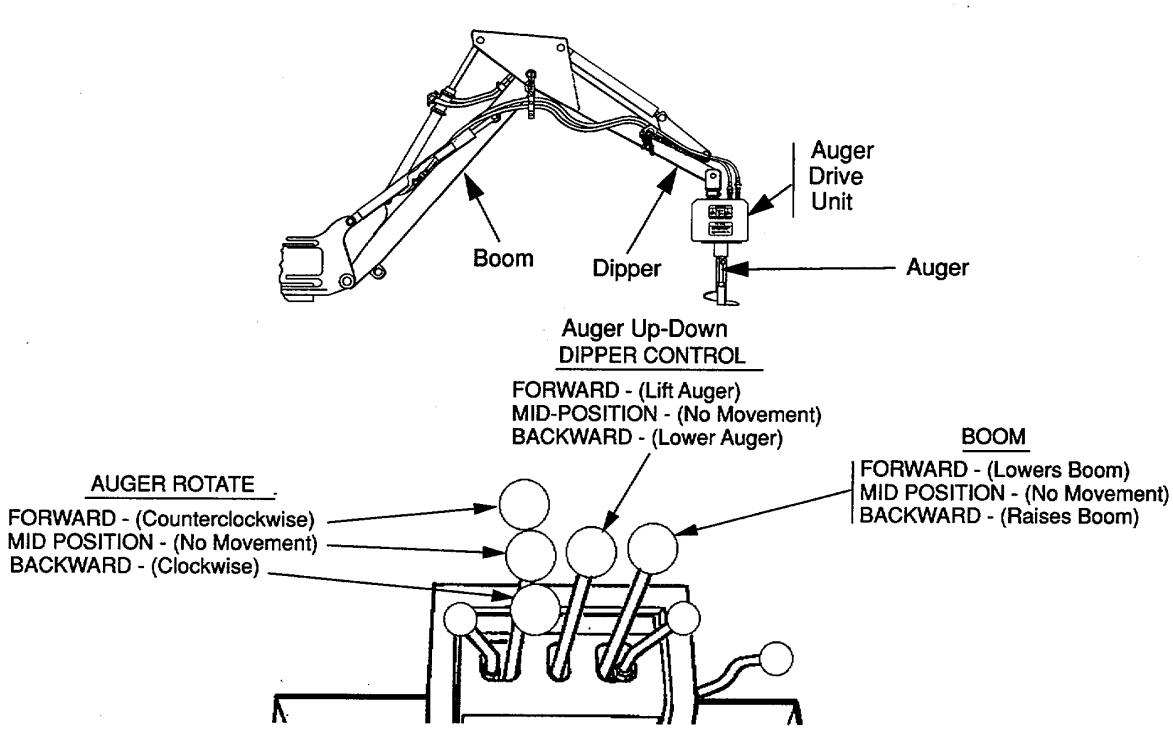
6. Do not begin hole digging if auger is swinging. Wait until it stops before preceding.

7. Move Auger controls and position Auger center point at center of intended hole. Slowly lower dipper and boom until the Auger center point touches ground.

8. Move boom, dipper, and auger rotational lever backward, as needed, to gently rotate and push Auger into ground. If Auger rotation binds or bogs down, ease up on controls and reverse direction (para. 2-2 Controls).

NOTE

Auger rotational lever must cause Auger to rotate clockwise when lever is moved backward (towards operator). If rotational direction is reversed, check Auger kit installation for reversed hydraulic hose connections (para. 4-13 thru 4-15).



CAUTION

If Auger stops, jams or binds up release controls and see 4-11 Unit Troubleshooting.

9. As hole depth increases, adjust boom and dipper controls to keep Auger vertical to ensure vertical hole will dug.

10. If Auger starts to bind up or jams while digging, move Auger rotation control forward to reverse rotation direction (counter clockwise), operate briefly, then stop. Move control rearward and continue digging.

NOTE

After hole is dug lift dipper and Auger out of hole without rotating. Otherwise dirt will be deposited back into hole.

WARNING

Do not touch foot pedals while hoisting Auger out of ground or boom will swing and bend Auger.

11. Stop Auger rotation when hole depth is reached. Gently hoist Auger out of hole, with no rotation, by moving only Auger boom and dipper levers.

12. If Auger is hard to remove from hole, stop hoisting operation. For a second, push auger rotation control yard, then stop. Continue hoisting Auger out of ground.

13. When Auger is out of ground the flighting will be filled with spoil dirt. Carefully swing Auger to side, start Auger rotation and then stop rotation. Unwanted excessive dirt will fly off flighting.

14. Operate Auger, if necessary, in same hole, and clean out any excessive dirt. Repeat Step 11.

CAUTION

In normal soil use, operator must check condition of Auger, center point, and teeth every 10th hole. In hard soil and soft limestone, check condition after digging every third or fourth hole (see operator PMCS Table in para 2-7).

2-10. Preparation for Movement.

a. Short Distance Transport.

CAUTION

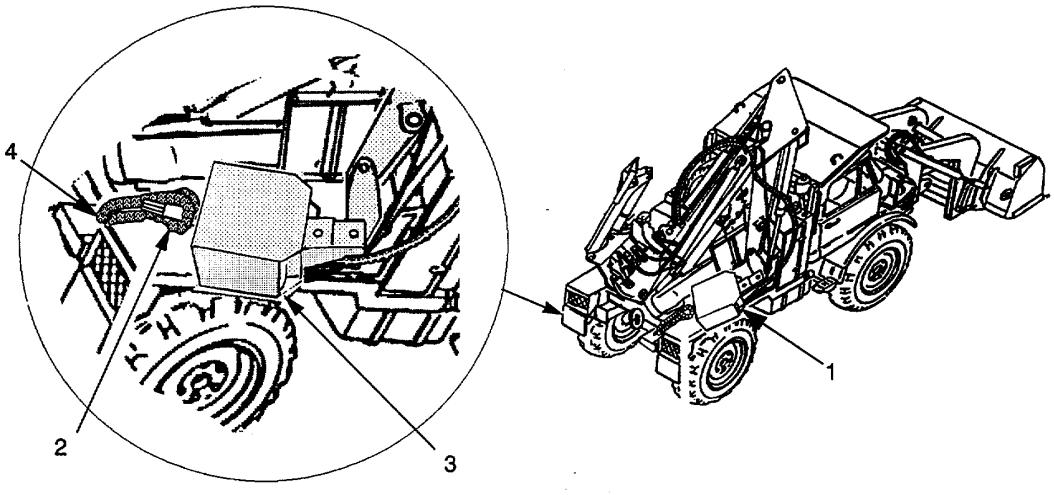
SEE driver cannot see Auger swing when driving to next nearby hole site. A swinging Auger could smash into rear of SEE and cause damage. Have ground guide advise SEE driver to stop or slow down when Auger begins to swing too much.

Operator must not back up SEE vehicle with Auger attached.

1. Keep Auger attached to Auger Drive Unit when moving short distances, as from hole site to hole site.
2. Raise left and right stabilizers and position Auger to clear ground by 1 or 2 inches.
3. Drive very slowly to next hole site to minimize Auger swinging.

b. Long Distance Transport.

1. Disconnect Auger from Auger Drive Unit when digging site is some distance away, (see Operator Maintenance Task "Auger Replacement" (para 3-5)).
2. Lock boom using SEE control.
3. Raise both left and right stabilizers.
4. Fold SEE boom into transport position (1). (Refer to SEE vehicle Operator's TM 5-2420-224-10).
5. Using 9 ft. rope (2), tie Auger Drive Unit (3) securely in place to stabilizer and frame (4) to minimize movement when transporting.



2-11. Decals, Instructions, and Data Plates.

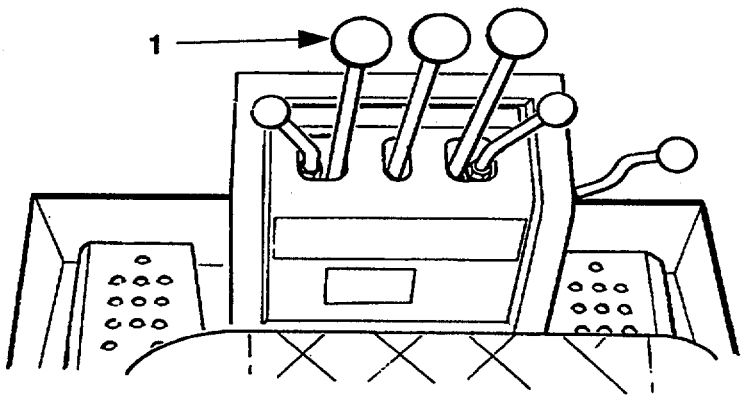
Data plate with Earth Auger Assembly Serial Number is located on top of Auger Drive Unit under the connecting link. Safety Decal locations are shown in paragraph 1-8.

2-12. Adjustment And Self Tests.

There are no adjustments or self tests on Auger.

2-13. Emergency Stopping procedures.

Auger rotation is stopped by moving Auger lever (1) to mid position.



Allow spring loaded control lever (1) to return to rest position at midpoint of travel to stop Auger.

SECTION IV. OPERATION UNDER UNUSUAL CONDITIONS

2-14. Cold Weather Conditions.

a. Follow procedures in Section III, Operation Under Usual Conditions, and observe the following precautions.

CAUTION

Do not move Auger rotation lever from mid-position to full forward or rearward position because this will force hot hydraulic fluid into cold Auger Drive Unit and could damage internal parts.

To ensure components warm up slowly move Auger rotation lever slowly and intermittently back and forth, for at least five minutes.

In frost or frozen ground, operator must check condition of Auger, center point, and teeth after every hole is dug. See operator PMCS Table in para. 2-7.

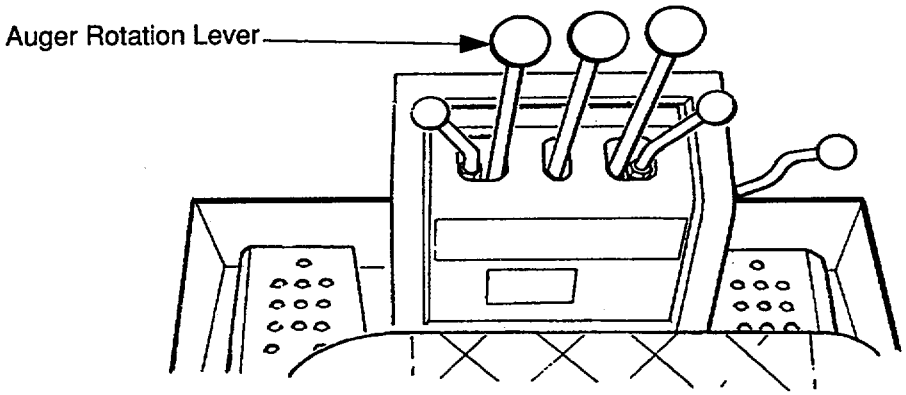
NOTE

Rotate Auger clockwise when digging. After hole depth is reached, stop auger rotation, then hoist Auger out of hole. Auger must not rotate when hoisting out of hole or dirt will be deposited back into hole.

b. Move Auger rotation control lever back and forth slowly and intermittently, for at least five minutes, to ensure components in Auger Drive Unit are warmed up slowly.

c. Lower Earth Auger Assembly until Auger is just touching frozen ground.

d. Begin digging hole.



CHAPTER 3

OPERATOR MAINTENANCE

SECTION I OPERATOR LUBRICATION INSTRUCTIONS

SECTION II. OPERATOR TROUBLESHOOTING PROCEDURES

SECTION III PREPARATION FOR OPERATION

SECTION IV OPERATOR'S MAINTENANCE PROCEDURES

SECTION I. LUBRICATION INSTRUCTIONS

3-1. General.

There are no operator/crew lubrication requirements. Lubrication is task of Unit maintenance.

SECTION II. TROUBLESHOOTING PROCEDURES

3-2. General.

There are no troubleshooting procedures at operator level. Operator will note and report any unusual operating conditions during PMCS.

SECTION III. PREPARATION FOR OPERATION

3-3. Preparation for Earth Auger Use.

Follow procedures in Chapter 4, paragraph 4-14, for preparation for Earth Auger Assembly Use.

3-4. Preparation for Backhoe Bucket Use.

Follow procedures in Chapter 4, paragraph 4-15, for preparation for Backhoe Bucket Use.

SECTION IV. OPERATOR'S MAINTENANCE TASKS

3-5. Auger Removal and Installation.

This task covers:	a. Removal (Flat ground)	b. Removal (Rough ground)	c. Installation

Initial Setup

Tools:

SEE vehicle Bll
Pliers, Item #13, 5120-01-243-5332

Materials and Parts:
Rags, 9 ft. Rope, Gloves,
Silicone Lubricant Spray

Equipment Conditions
Auger Drive Head attached to SEE vehicle.
Three personnel required, (See Operator, Auger Operator, and Ground Guide).

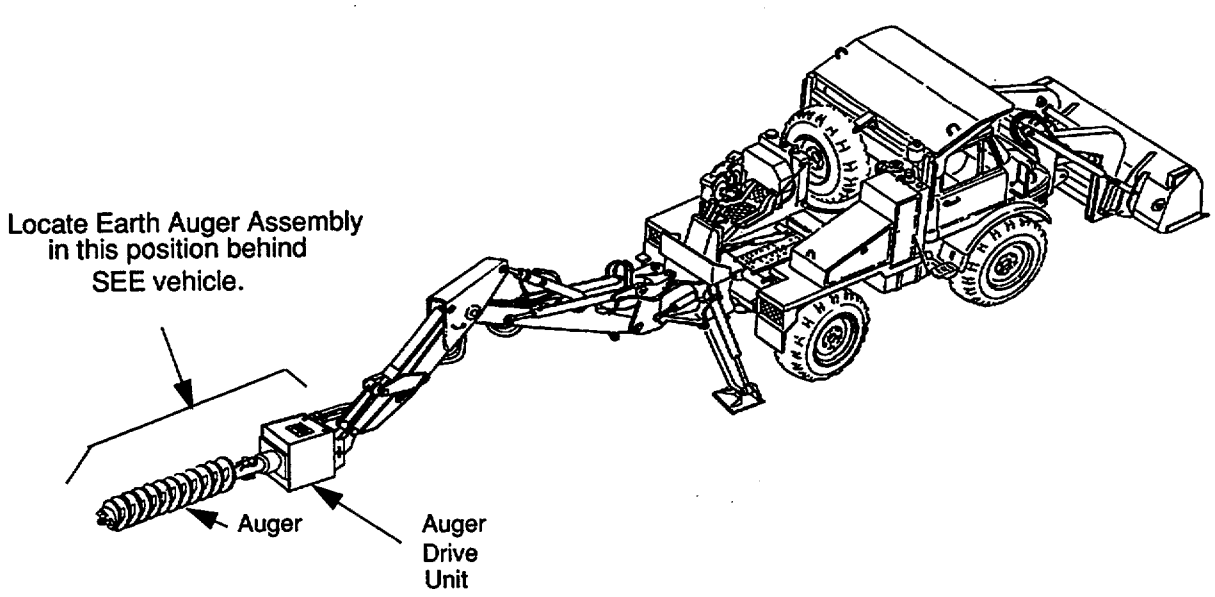
a. Removal (Flat ground).

1. Set SEE front wheels straight forward and raise the Earth Auger Assembly until Auger center point is off the ground.

2. Raise the SEE front loader and the SEE right and left stabilizers slightly off the ground.

3. Release the SEE vehicle parking brake.

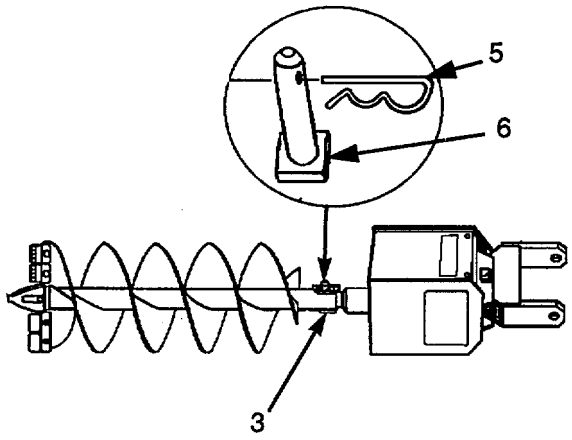
4. Ground guide directs SEE Operator to drive SEE slowly forward as Auger Operator lowers boom/dipper so as to allow Earth Auger Assembly to fall into horizontal position on ground. Ground guide then directs SEE operator to stop SEE and shut down engine.



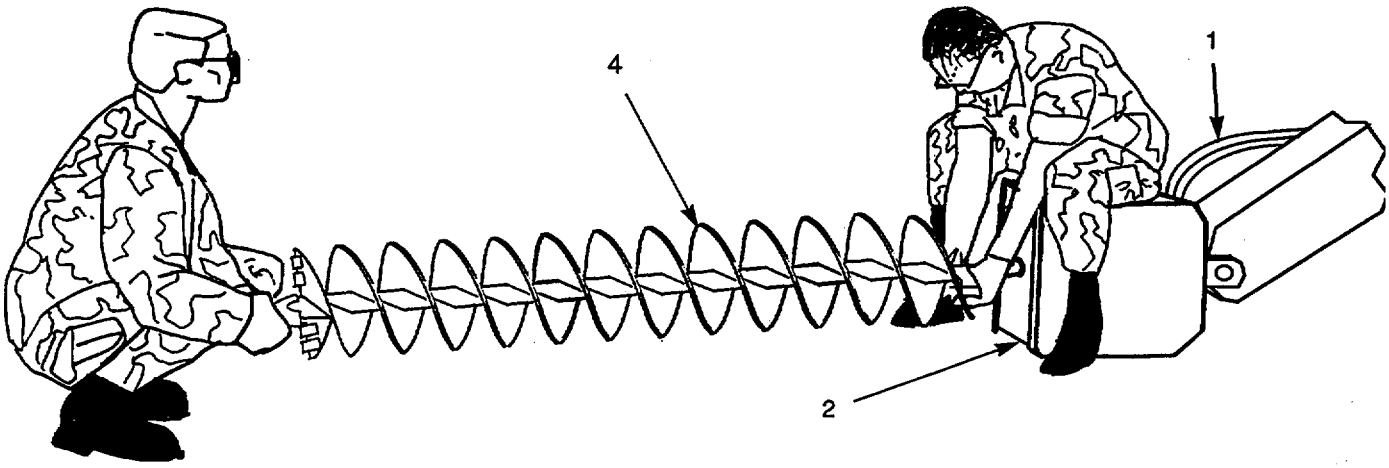
WARNING

Hydraulic pressure remaining after SEE engine is off could cause unexpected auger rotation resulting in serious injury or death. Prior to separating quick disconnect fittings, release system pressure by operating all auger controls thru full range of motion (para 2.2).

Display auger by separating both quick-disconnect fittings on hydraulic hoses located on boom. Expect some fluid to fittings and use rags to control spilling.



5. Separate both quick-disconnect fittings on both hydraulic hoses (1) located at Auger Drive Unit (2).
6. Remove any excess mud and dirt from the top area the Auger (4).
7. Remove the Hitch Pin Clip (5) and slide out hex pin (6).
8. Lift and slide Auger (4) away from Auger Drive Unit (2).
9. Store Hex Pin (6) and Hitch Pin clip (5) on Auger (4) output shaft.



WARNING

If moving to next excavation site, lift and transport Auger, with a suitable lifting device, and set into bed of companion vehicle. Tie down to secure.

b. Removal (Rough ground).

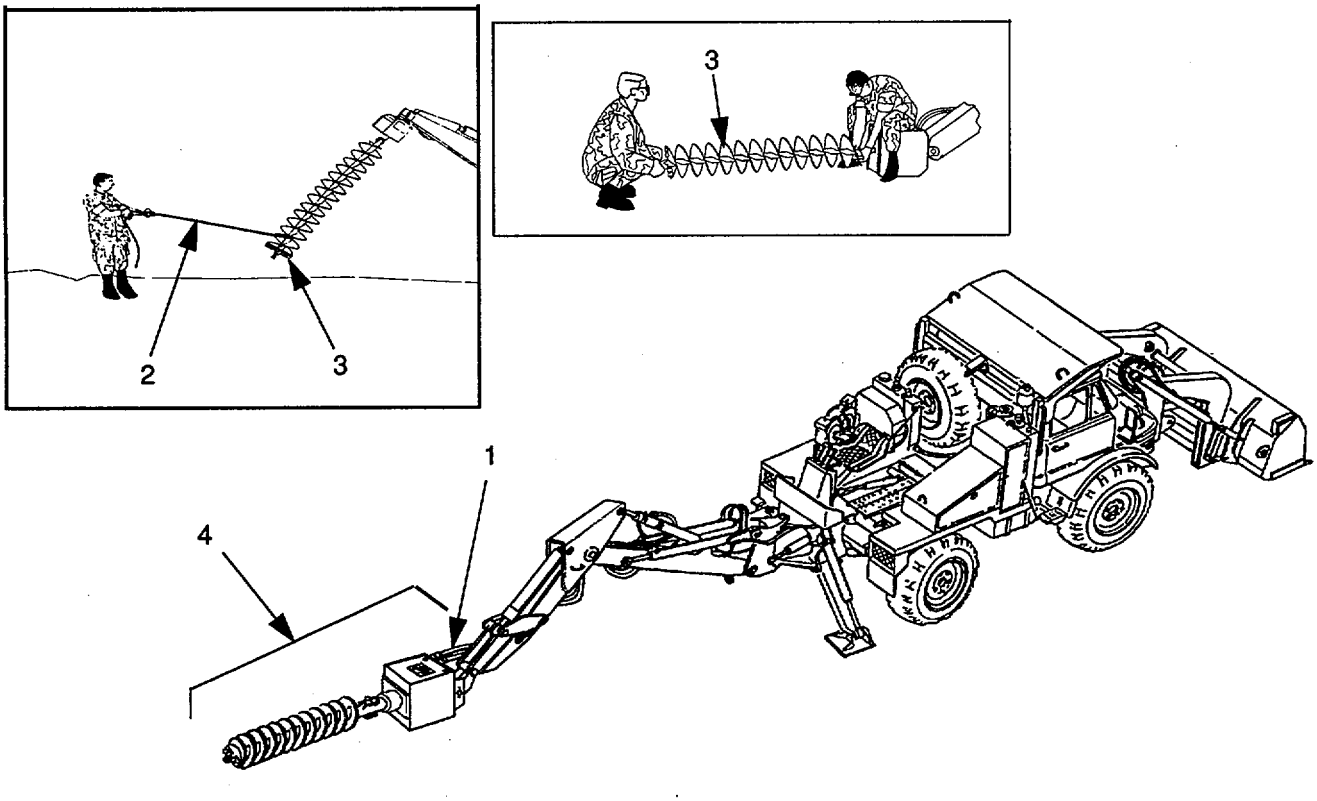
1. Shut down SEE engine

WARNING

Hydraulic pressure remains In system after SEE engine is off and could cause Auger to rotate resulting in serious injury or death. Prior to separating quick-disconnect fittings, depressurize system by operating all auger controls thru full range of motion.

2. Disconnect hoses at quick-disconnect fittings at Auger Drive Unit (1). Use rags to control spilling.

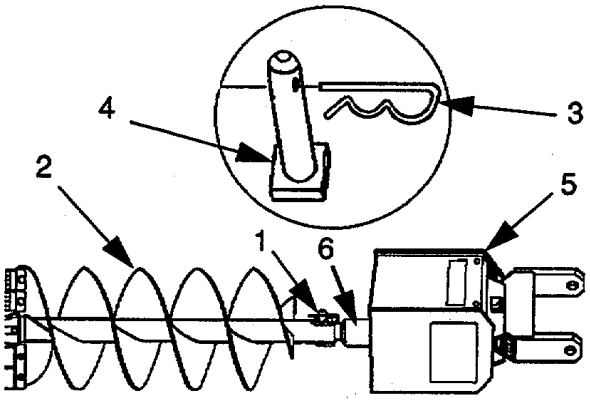
3. Attach 9 ft. rope (2), stored in SEE vehicle, to bottom of Auger (3). Stand back about 4 feet and pull on rope as ground guide directs Auger Operator to start SEE engine and lower boom/dipper so as to allow Earth Auger Assembly (4) to fall into horizontal position on ground.



4. Ground guide then directs Auger operator to stop, and shut down engine.

5. Remove any excess mud and dirt from the top area (1) of Auger (2).

6. Remove the hitch pin clip (3) and slide out hex pin (4) from Auger Drive Unit (5) shaft (6).



WARNING

Use a suitable lifting device or appropriate personnel to move auger: Use gloves when handling auger to prevent injury to hands.

7. Lift and slide Auger (2) away from Auger Drive Unit (5).

8. Store Hex Pin (4) and Hitch Pin clip (3) in thru hole on Auger (2) hex shape hollow output shaft at top area (1).

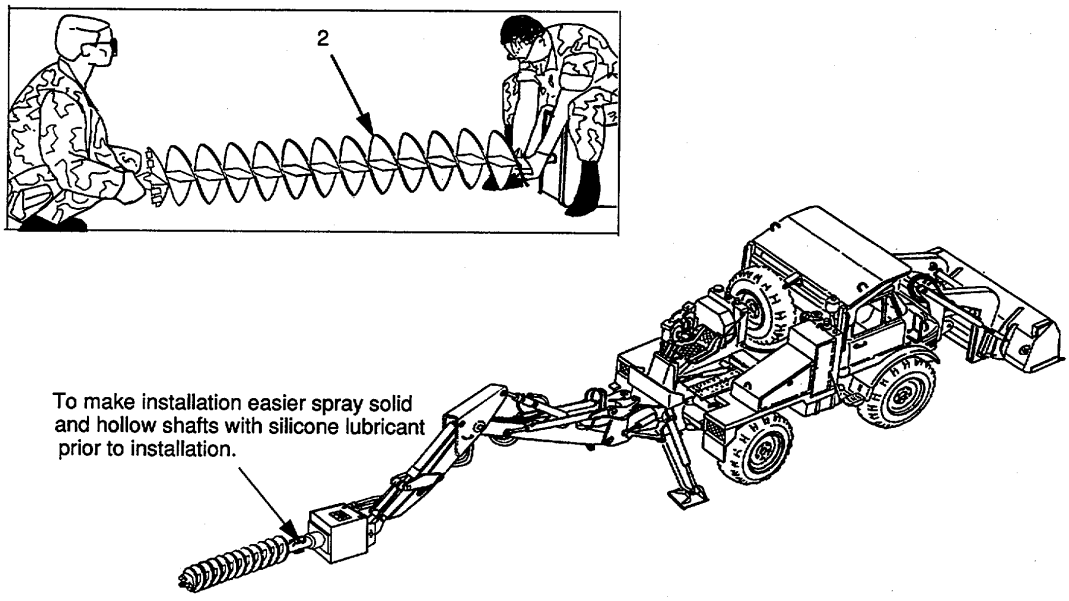
9. Move Auger to companion vehicle and secure for transporting.

c. Installation.

WARNING

Use a suitable lifting device or appropriate personnel to move auger. Use gloves when handling Auger to prevent injury to hands.

1. Remove Auger from companion vehicle and place in position on ground adjacent to Auger Drive nit.



NOTE

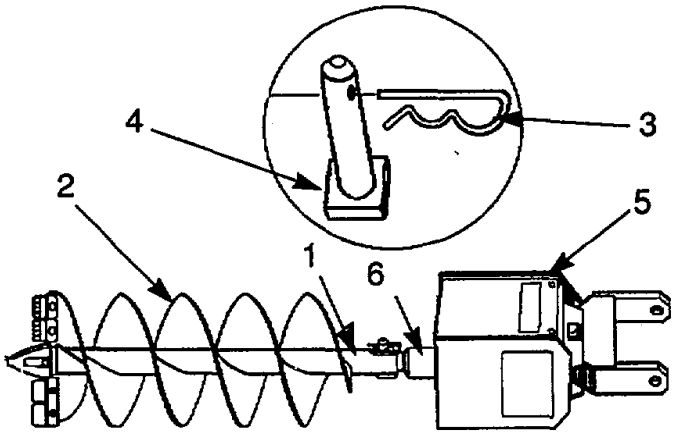
Install hex pin (4) thru side of auger hollow shaft (1) where raised anti-rotation pin stops are located. Ensure rectangle head of hex pin (4) rests inside of pin stop.

2. Use assistant and align both hex shafts so that pin holes will be in line. Slide Auger hollow hex shaft (1) over solid hex Auger Drive Unit shaft (6) and stop when hex pin holes line up.

3. Insert rectangle head hex pin (4) through aligned holes in Auger hex hollow shaft (1) and Auger Drive Unit hex shaft (6). Install hitch pin clip (3) with loop end pointing toward Auger Drive Unit (5). For safety reasons hitch pin clip is not tethered (to prevent dropping or loosing), so use care when removing or installing.

4. Wipe dirt from quick disconnects fittings and connect hydraulic hoses.

5.



FOLLOW ON TASK

Check level of hydraulic fluid in SEE vehicle reservoir (TM Series 5-2420-224).

END OF TASK

3-6. Auger Teeth Rotation or Replacement.

This task covers: a. Removal b. Installation

Initial Setup

Tools:
SEE vehicle Bll
Adjustable wrench Item #16.
5120-00-264-3796

Equipment Conditions:
SEE vehicle engine off
Hydraulic System Depressurized

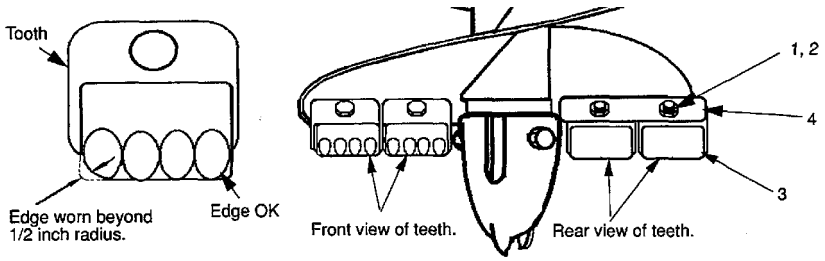
Materials and Parts:
Replacement Auger teeth in Bll., Rags

a. Removal.

WARNING

Prior to opening any hydraulic lines or fittings shut down SEE engine and move all SEE vehicle hydraulic controls and pedals through their full range of motion to relieve system pressure.

To prevent serious injury or death from unexpected auger rotation, disconnect auger hydraulic lines at quick disconnect fittings at top of Auger Drive Unit.



1. Relieve system pressure by separating both quick disconnect fittings on both hydraulic hoses located on Auger Drive Unit. Use rags to collect drippings.

NOTE

Outside teeth will wear out faster than inside teeth. The useful life of the teeth may be extended by rotation of the outside teeth to the Inside.

2. Remove any excess mud and dirt from auger teeth and hardware areas.

3. Remove nut (1), carriage bolt (2) and tooth (3), from cutting head (4).

4. Repeat the process for any remaining worn teeth.

b. Rotation or Replacement

1. Exchange outside teeth with inside teeth or replace, if worn (see illustration above). Install carriage bolt (2), tooth (3), and nut (1), to cutting head (4). Tighten nut to 200-220 Ib. ft. (271-285 N.m).

2. Repeat process for any remaining teeth.

3. Connect auger hydraulic hoses at quick disconnect fittings. Clean fittings and catch drippings with rags

FOLLOW ON TASK

Check level of hydraulic fluid in SEE vehicle reservoir.

END OF TASK

3-7. Auger Center Point Replacement.

This task covers:	a. Removal	b. Installation.

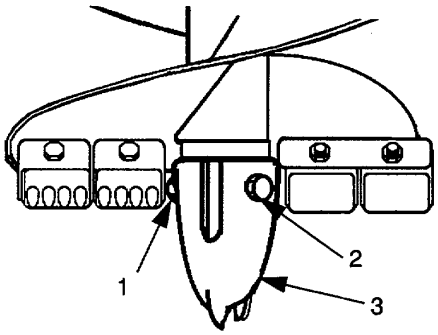
Initial Setup

Tools:
SEE Vehicle BII
13 MM wrench, Item #24, 5120-01-242-7225
Adjustable wrench, Item #16, 5120-00-264-37

Equipment Conditions:
SEE vehicle engine off.
Hydraulic System Depressurized.

Materials and Parts:
Center point in BII. Rags.

a. Removal



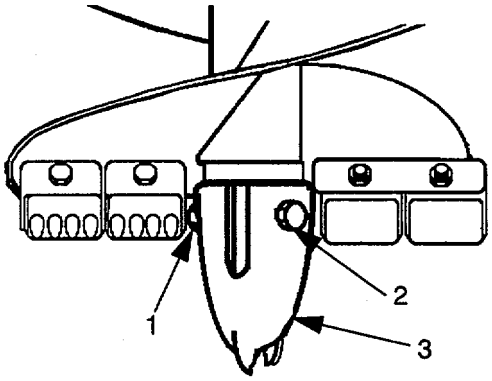
WARNING

Prior to opening any hydraulic lines or fittings shut down SEE engine and move all SEE vehicle hydraulic controls and pedals through their full range of motion to relieve system pressure.

To prevent serious injury or death from unexpected auger rotation disconnect auger hydraulic lines at quick-disconnect fittings at Auger Drive Unit.

1. Relieve system pressure. Disconnect hydraulic hoses at Auger Drive Unit quick disconnect fittings. Use rags to catch drippings.
2. Remove any excess mud and dirt from the auger center point.
3. Remove nut (1), bolt (2), and center point (3) from the Auger.

b. Replacement



1. Install center point (3), bolt (2), and nut (1) to Auger.
2. Tighten nut to 14-18 Ib.ft (19-24 N•m).
3. Connect both auger hydraulic hoses at the quick-disconnect fittings. Use rags to catch drippings and clean fittings.

FOLLOW ON TASKS

Check level of hydraulic fluid in SEE vehicle reservoir (TM series 5-2420-224).

END OF TASK

CHAPTER 4
UNIT MAINTENANCE

SECTION I REPAIR PARTS AND SPECIAL TOOLS (RPSTL)

SECTION II UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

SECTION III UNIT TROUBLESHOOTING PROCEDURES

SECTION IV INSTALLATION OF KIT

SECTION V UNIT MAINTENANCE PROCEDURES

SECTION I. REPAIR PARTS AND SPECIAL TOOLS (RPSTL)

4-1. Spare Parts.

A spare master link (for use in the repair of a broken drive chain link) is located and secured to a washer welded inside the Auger Drive Unit housing. Remove safety covers to gain access.

4-2. Special Tools.

None required. All hardware is S.A.E. standard. Snap ring pliers are included in Kit.

4-3. Repair Parts.

Repair parts are listed in Appendix F of this manual.

SECTION II. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).

4-4. PMCS Procedures.

Your PMCS table lists the inspections and care required to keep your equipment in good operating condition. If your equipment does not perform as required, refer to the troubleshooting procedures in Section III of this chapter. Report any malfunctions or failures on DA Form 2404 or refer to DA Pam 738-750.

4-5. General.

a. All moving drive parts of the Earth Auger Assembly are contained in the Auger Drive Unit. To gain access remove safety covers.

b. Inspect all parts for damage, broken or loose parts. Note condition of bearings, and inspect for cracks in housing.

c. Check chain for looseness. Adjust to correct tension if loose (see para 4-19).

4-6. Explanation of Columns.

Item No. This column lists a logical order for performing PMCS. Use the number in this column as the 'TM Item No." on DA Form 2404, Equipment Inspection and Maintenance Work sheet, when recording the results of PMCS.

Interval. This column tells you when to do a certain check or service.

Item to be inspected. This column lists the specific item being inspected.

Procedures. This column tells you how to do the required checks and services. Carefully follow these instructions.

4-7. Leakage Definitions.

It is necessary for you to know how fluid leakage affects the status of your equipment. The following are definitions of the types/classes of leakage you need to know to be able to determine the status of your Earth Auger Assembly.

Leakage Definitions for Unit PMCS.

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 great enough to cause drops to drip from the item being inspected.

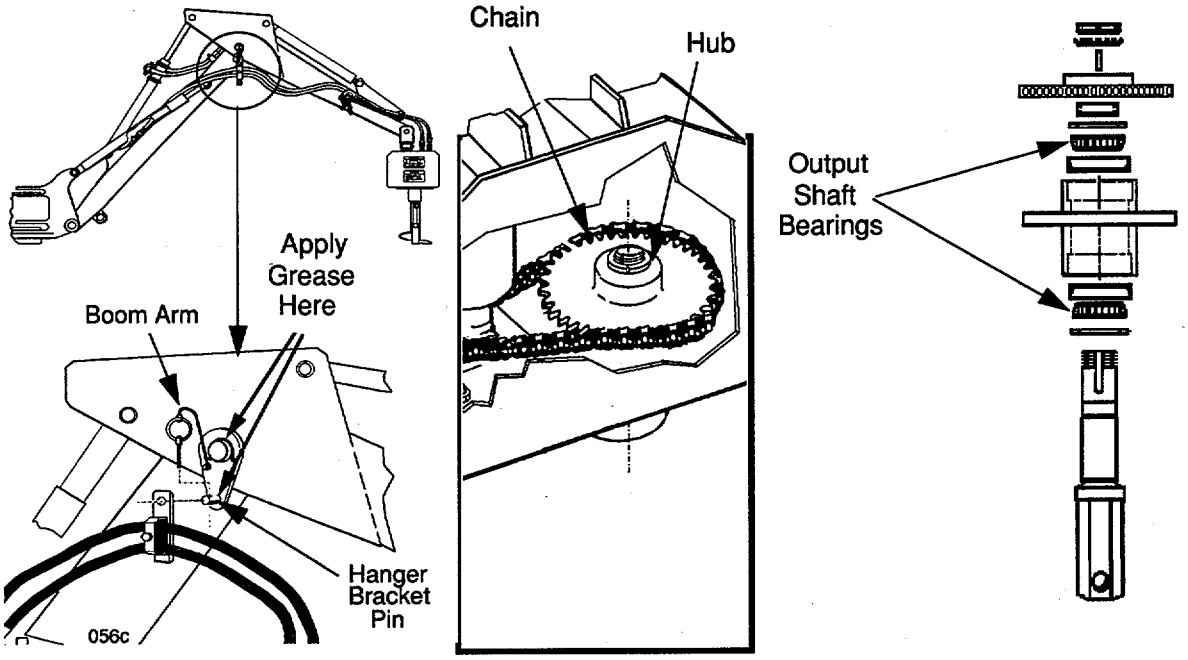
CLASS III. Leakage of fluid great enough to form drops that fall from the item/system being checked/ inspected.

When in doubt, notify your supervisor.

Class III leaks must be corrected before releasing Earth Auger Assembly for operation.

4-8. SECTION II. TABLE OF UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).

Item No.	Interval	Item to be Checked or Service	Procedure	Not Fully Mission Capable If:
			NOTE **Perform Operator PMCS prior to or in conjunction with Unit PMCS**	
1.	Quarterly	Drive Chain	Adjust and lubricate chain (para 4-32) after every 50 hours of operation (see para. 4-19 Chain adjustment).	
2.	Quarterly	Hose Hanger Bracket	Apply GAA Grease to Hose Hanger Bracket Pin	
3.	Quarterly	Boom Arm Pivot Pin	Apply GAA Grease to Boom Arm Pivot Pin end.	
4.	Annually	Shaft Bearings	Lubricate and adjust output shaft bearings inside shaft hub, (see para. 4-29 for bearing and seal service).	



SECTION III. UNIT TROUBLESHOOTING.

4-9. General

Paragraph 4-11 lists common malfunctions that you may find during the operation of the Earth Auger Assembly. You should perform the test/inspection and corrective actions in the order listed. This section cannot list all the malfunctions that may occur, nor all tests, inspections and corrective actions. If a malfunction is not listed, or is not corrected by the listed corrective action, notify your supervisor.

4-10. Explanation of Columns

a. Malfunction. A visual or operational indication that something is wrong with the Earth Auger Assembly.
b. Test or Inspection: A procedure to isolate the problem in a component or system.
c. Corrective Action. A procedure to correct the problem.

4-11. Unit Troubleshooting

WARNING

Prior to opening any hydraulic lines or fittings shut down SEE engine and move all SEE vehicle hydraulic controls and pedals several times through their full range of motion to relieve system pressure.

To prevent serious injury or death from unexpected auger rotation, disconnect Auger Drive Unit hydraulic lines at quick disconnect fittings.

Malfunction	Test or Inspection	Corrective Action
AUGER BINDS, STOPS DIGGING, OR ROTATING WHEN CUTTING HOLE INTO EARTH.		
	Step 1. Stop auger, remove from hole being dug. Look into hole being dug for obstruction.	
		Remove obstruction or drill hole elsewhere.
	Step 2. Stop rotation. Remove auger from hole, and inspect for worn, broken, or missing teeth or defective center point.	
		Relieve system pressure. Replace broken, missing, or dull teeth and worn center point (para 3-4,3-5).
	Step 3. Check hydraulic fluid level in SEE vehicle hydraulic reservoir. (See SEE TM Series 5-2420-224, Operators TM-1 0)	
		Add hydraulic fluid if level is tow. (See SEE Operators TM-10).
AUGER DOES NOT ROTATE WHEN CONTROL IS ACTIVATED.		
	Step 1. Ensure quick disconnects are properly connected.	
	Step 2. Check hydraulic fluid level in SEE vehicle hydraulic reservoir.	
		Add hydraulic fluid if level is low.
	Step 3. Remove covers from Auger Drive Unit and look for broken chain or stripped sprockets.	
		Depressurize hydraulic system and replace defective chain or sprockets or other damage (para. 4-17 thru 4-29).
	Step 4. Check auger operating levers on SEE vehicle.	
		If not operating properly see SEE TM manual Series 5-2420-224 for troubleshooting.
	Step 5. Replace/repair Auger Drive Unit hydraulic motor (para. 4-24).	

Malfunction
Test or Inspection
Corrective Action

AUGER ROTATES UNEVENLY OR ERRATICALLY.

Step 1. Inspect Auger for bent condition.

Depressurize hydraulic system and replace bent Auger if unable to dig hole.

Step 2. Remove safety covers and check for cracked housing, loose motor, defective chain, sprockets, or bearings.

Depressurize hydraulic system and replace defective parts (para. 4-17 thru 4-29).

Step 3. Remove auger from hole and stop rotation. Check auger teeth and center point.

Depressurize hydraulic system and replace broken, missing, or dull teeth and defective center point (para 3-6,3-7).

SECTION IV. KIT INSTALLATION

4-12. Introduction.

A portion of Earth Auger Assembly Kit must be installed on SEE vehicle before Earth Auger Assembly can be attached. The conversion kit can function with both backhoe bucket and Earth Auger Assembly. This conversion will allow the SEE to change from backhoe bucket use to Earth Auger Assembly use and vice-versa.

4-13. Unpacking Earth Auger Assembly Kit And Installation On SEE Vehicle.

a. Unpacking.

NOTE

Kit Installation Is necessary one time for each SEE vehicle. After kit is installed, Bucket or Auger Drive Unit may be installed on SEE vehicle in shop or by operator at excavation site. If Auger Drive Unit or Auger is installed at excavation site, they are transported in a companion vehicle.

WARNING

Appropriate personnel and/or a suitable lifting device must be used.

1. Remove packing crate boards to gain access to kit parts. Remove nails or fasteners from boards.

2. Remove kit parts from packing crate. Check kit parts against packing slip for correct parts and quantities. Note and report any missing or damaged parts.

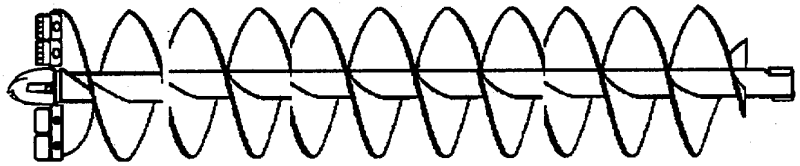
3. Earth Auger Assembly is shipped as a Kit. Part number is #1 650EH-MS, NSN 2590-01-384-6857. Parts are included to attach the Earth Auger Assembly to a SEE vehicle and also for backhoe bucket use. Kit contents are listed in the following table and illustrated in this section.

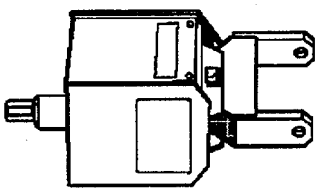
NOTE

Some parts are preassembled by the manufacturer.

Item #	Part of ID Number	Amt.	Description	Notes
1.		1	Earth Auger Assembly, (Link, Auger Drive Unit, and Auger)	CID A-A-52305
2.	Bulk	2	Rope, Tie down, Black- (6 Ft. to tie down Bucket control linkage to SEE when transporting). (9 ft. rope to pull Auger when removing from Auger Drive Unit, tie down to SEE).	Length 6 Ft. & 9 Ft.
3.	MS35842-16	2	Clamp, Low Pressure, Type F. Holds #10	Clamp to dipper cylinder.
4.	MSHC-A	1	Bracket, Hanger, Hose (with Lynch Pin on wire rope). place on boom elbow.	Holds auger hose assembly in
5.	3451	1	Hose Assembly, Auger, Boom Mounted, 138 inch	Two hoses w/clamp.
6.	MSHC-B	1	Hose Assembly 30 inch	Replaces rigid metal tubes.
7.	MSHC-C	1	Adapter Assembly, (Adapter with/Male Fitting and Adapter with/Female fitting).	Adapter Assembly consists of four fittings total.
8.	DOM	1	DOM Spacer Assembly (With Bolt and Lock washer)	Use in existing upper boom cyl. hose bracket.
9.	SD1-MS	2	Label, Warning. (Hydraulic System Warnings).	Mounts on Boom Cylinders.
10.	HR2T-30	1	Clamp (Holds bucket hoses in place during Auger use).	Mounts on Dipper Cylinder.
11	1234	1	Snap Ring Pliers	

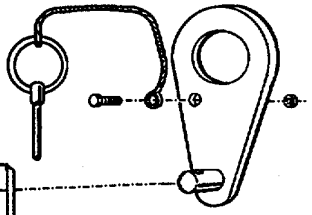
1. Earth Auger Assembly (Auger Drive Unit and Auger)



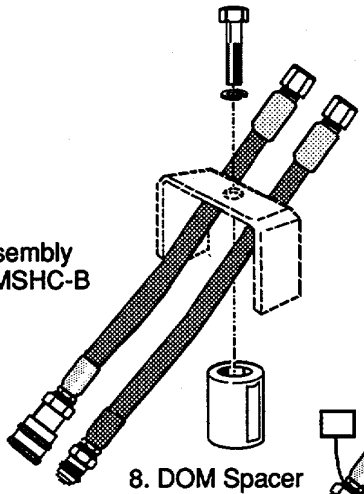


11. Snap Ring Pliers
1234

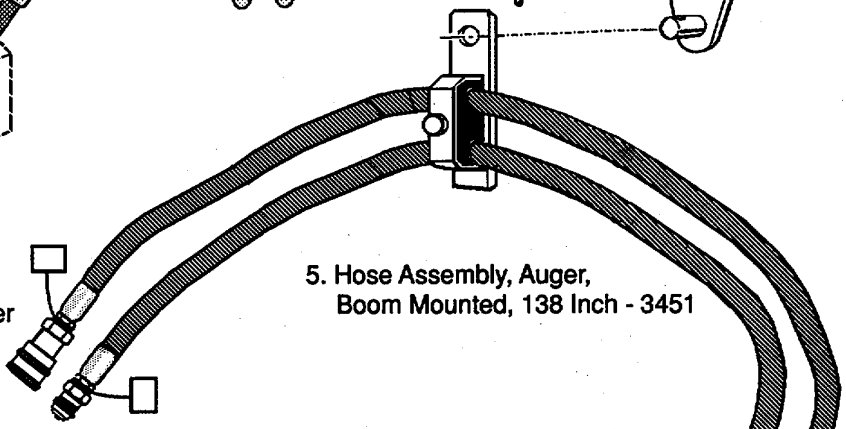
4. Bracket, Hanger
MSHC-A



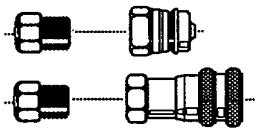
6. Hose Assembly
30 Inch, MSHC-B



8. DOM Spacer



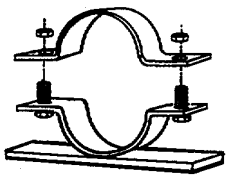
5. Hose Assembly, Auger,
Boom Mounted, 138 Inch - 3451



7. Adapter Assembly
MSHC-C.

2. Bulk Rope, 6 and 9 Ft.

9. Warning Label - SD1-MS



10. Clamp - HR2T - 30

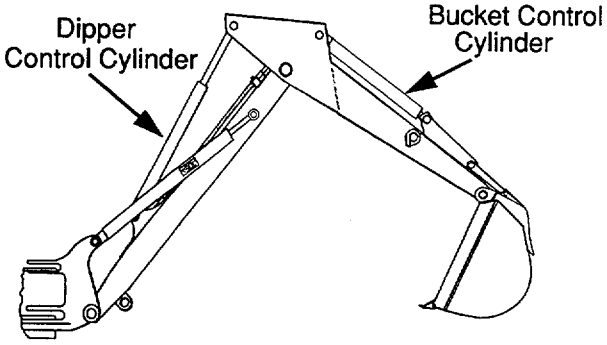
3. Clamp, Low Pressure,
Type F. MS35842-16

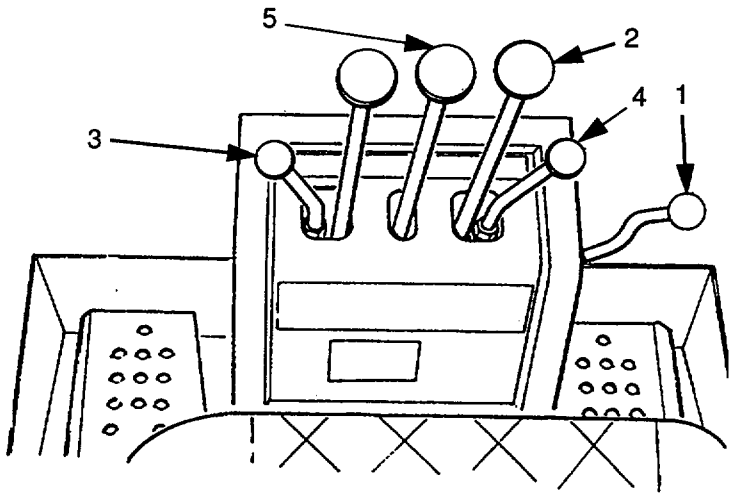
WARNING

To prevent personnel injury or equipment damage review all safety procedures in SEE TM(Series 5-2420-224)before installing Earth Auger Assembly.

4. Lower stabilizers using Left (3) and Right (4) Stabilizer Control Levers.

5. Unlock boom by holding Boom Lock Lever (1) to right and moving Boom Control Lever (2) forward, then release boom lock lever (1). Boom is now unlocked.





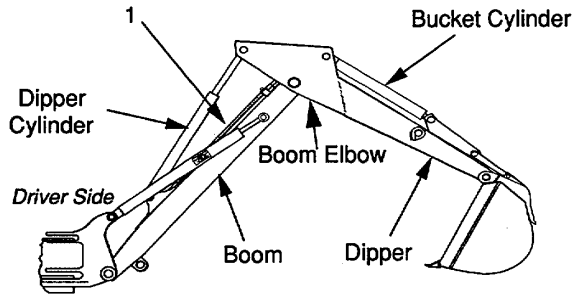
6. Move Boom Control Lever (2) and Dipper Control Lever (5) (see para. 2-2 Controls) and position bucket to rest on shop floor to approximate position shown.

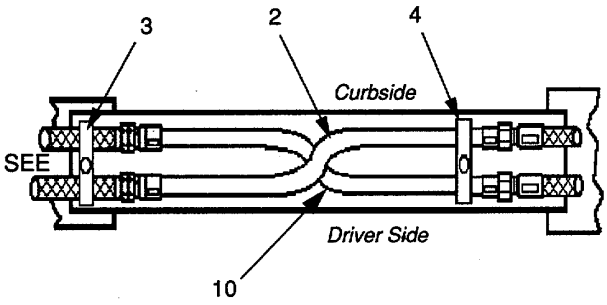
WARNING

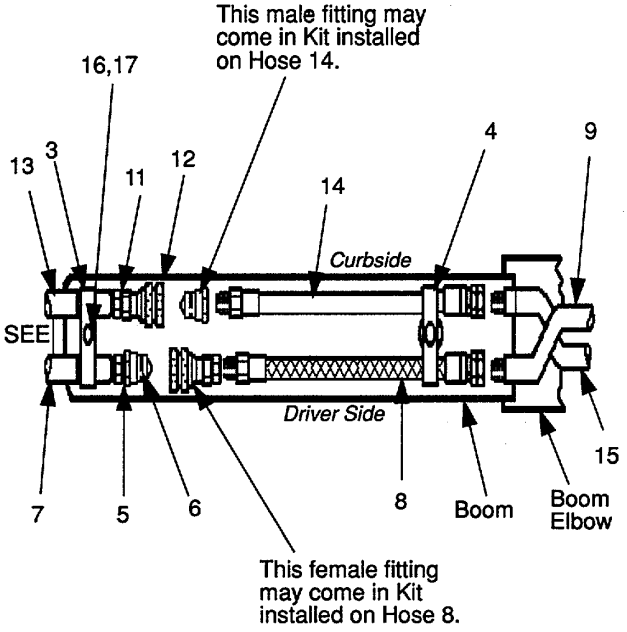
Hydraulic pressure remains in system after SEE engine is off. This pressure could cause auger to move unexpectedly and could injure personnel. Depressurize hydraulic system by moving all six SEE vehicle hydraulic controls and both pedals through their full range of motion several times.

Ensure all personnel stand clear of bucket prior to depressurizing hydraulic system. Bucket will drop when relieving hydraulic system pressure.

7. Stop SEE's engine and move all control levers through their full range of motion to relieve system pressure.







NOTE

Original Setup - Hoses (2, 10) cross on top side of boon.
Kit Install Setup - Hoses (9, 15) cross under boom elbow.

b. Kit Installation.

NOTE

SEE vehicle has backhoe bucket attached during Conversion Kit installation.

CAUTION

Start all fittings and hose connections by hand to avoid stripping threads. Use drip pans or shop rags to catch spilled hydraulic fluid.

1. Remove (crossed over) existing metal tube (2) under dipper cylinder (1)

2. Unscrew and disconnect fitting at each end of metal tube (2). Loosen hold-down bolts of two existing hose clamps (3) and (4). Remove and discard metal tube (2).

3. Assemble adapter (5) into male quick disconnect fitting (6). Install adapter assembly (5 and 6), into driver side hose (7) coming from rear of SEE.

4. Install 30 Inch hose (8) to Curb side bucket cylinder hose (9) where metal tube (2) was removed. (Thin 30" hose (8) has a female quick disconnect fitting on one end).

5. Remove remaining metal tube (10).

6. Assemble fitting adapter (11) into female quick disconnect fitting (12). Install fitting adapter assembly into curb side hose (13) coming from rear of SEE.

7. Install 30 inch hose (14) into driver side bucket cylinder hose (15).

8. Fasten top half of tube clamp (3) closest to rear SEE vehicle by tightening bolt (17)

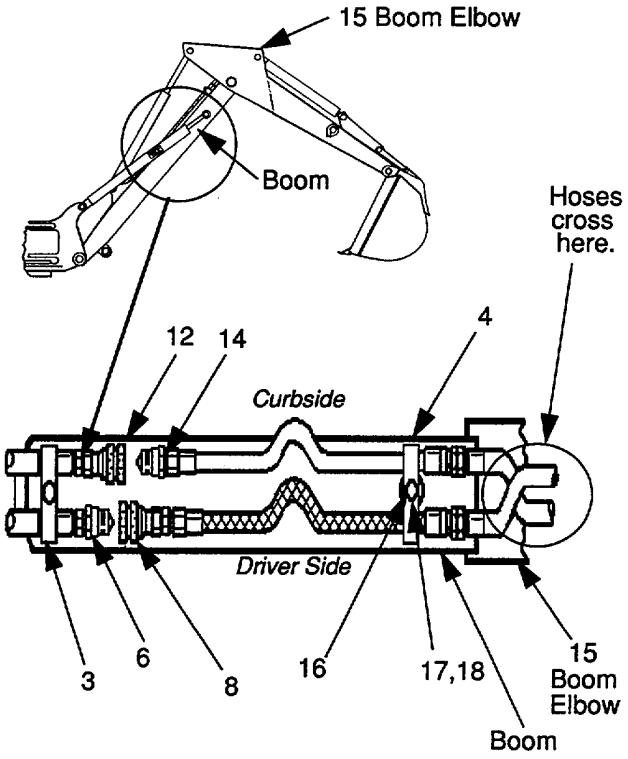
9. Seat hose (14) male quick disconnect fitting into female quick disconnect fitting (12).

10. Seat hose female quick disconnect fitting (8) into male quick disconnect fitting (6).

11. Position upper end of hoses so that they cross beyond clamp (4) and under boom elbow (15).

12. Remove top half of tube clamp (4).

13. Position 30 inch hoses over open clamp (4). Install DOM spacer (16), top half of clamp (4), lock washer (17), bolt (18), and tighten.



c. Verify Hose Installation.

1. When hoses are installed correctly, 30 inch hose (8) (with female quick disconnect), will be positioned along Driver Side of boom.

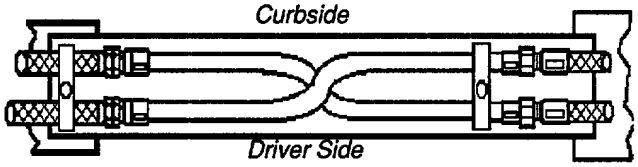
2. 30 inch hose(14) (with male quick disconnect), will be positioned along curbside of boom.

3. Hoses will crossover after clamp (4) and under boom elbow (15).

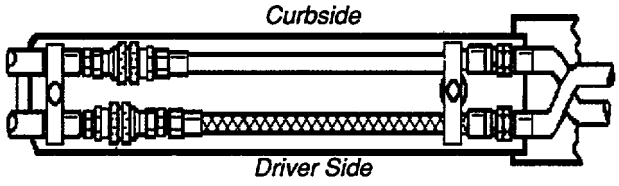
4. Hoses are positioned in clamps (3) and (4) so they do not stretch or bind when dipper or boom is moved throughout its range.

NOTE

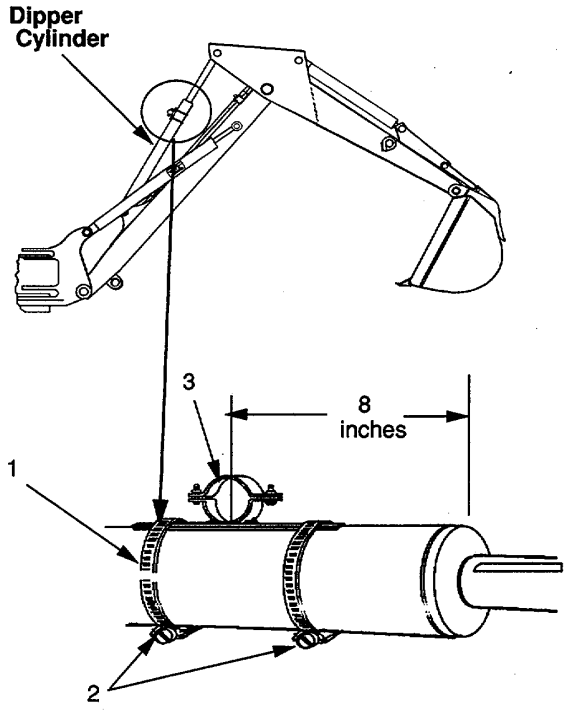
If hoses are not crossed bucket and auger controls will operate reverse of what is expected.



Layout of Metal Rigid Tubing Prior to Kit Installation.



Layout of Hoses and Connections after Kit Installation.



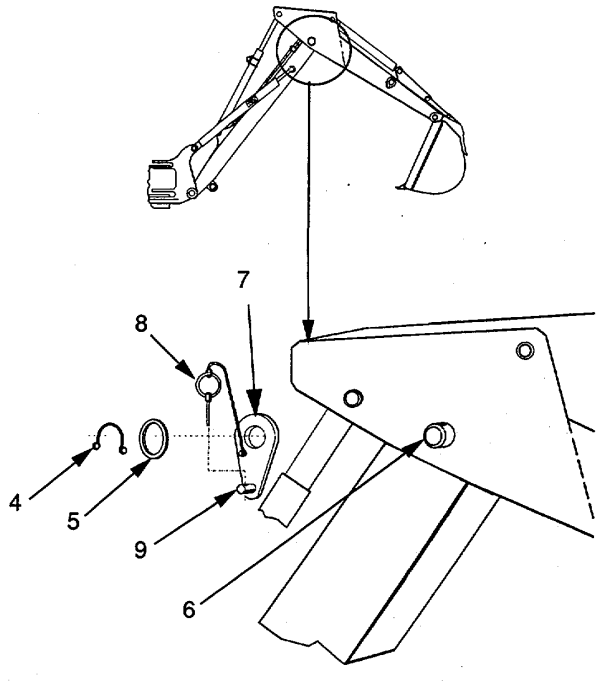
5. Install two spiral hose clamps (1), loosely on dipper cylinder near top so that screw tighteners (2) are on bottom of dipper cylinder.

6. Place hose clamp (3) on top of dipper cylinder. Place center of clamp about 8 inches from dipper cylinder upper end.

7. Slide spiral hose clamps (1) over base ends of hose clamp (3) and tighten.

NOTE

When dipper cylinder is extended, 30 inch hoses may need more slack, to avoid stretching. Adjust hoses as follows: Loosen clamps (1) and move clamp (3) lower or higher on dipper cylinder until enough slack Is obtained. Move and tighten clamps (1).



NOTE

Use snap ring pliers supplied in kit to remove 2 Inch retaining ring (4).

8. Remove 2 inch retaining ring (4) and flat washer (5) on driver's side boom arm pivot pin (6).

9. Discard flat washer (5).

10. Apply GAA grease to exposed end of boom arm pivot pin (6). Install hose hanger bracket (7) and existing 2 inch retaining ring (4) on boom arm pivot pin (6).

11. Insert lynch pin (8) downward through hole in lower pin (9) on hose hanger bracket (7) to store. Pivot ring section of lynch pin (8) to locking position.

12. Thoroughly clean driver's and curbside boom cylinders (1,2), where safety Warning labels are to be installed, to remove dirt, oil, and moisture. Ensure area is dry.

13. Install one label (3) to each boom cylinder (1,2).

14. Check and tighten all fittings (4), clamps (5), retainers (6) on boom and dipper installed from Kit.

15. Check hydraulic reservoir fluid level in SEE vehicle and replace any fluid lost during installation. (Reference SEE TM Series 5-2420-224).

NOTE

Clean up fluid spills on fittings, hoses, and around area.

d. Conclusion.

1. Start SEE vehicle engine.

2. Visually examine kit installation parts for leaks from hoses at fittings. If there are any leaks, shut down SEE engine and tighten fittings.

3. Pull bucket control lever towards you. Ensure bucket curls towards operator (see para 2-2 Controls).

4. Move bucket control lever away from you. Ensure bucket uncurls away from operator.

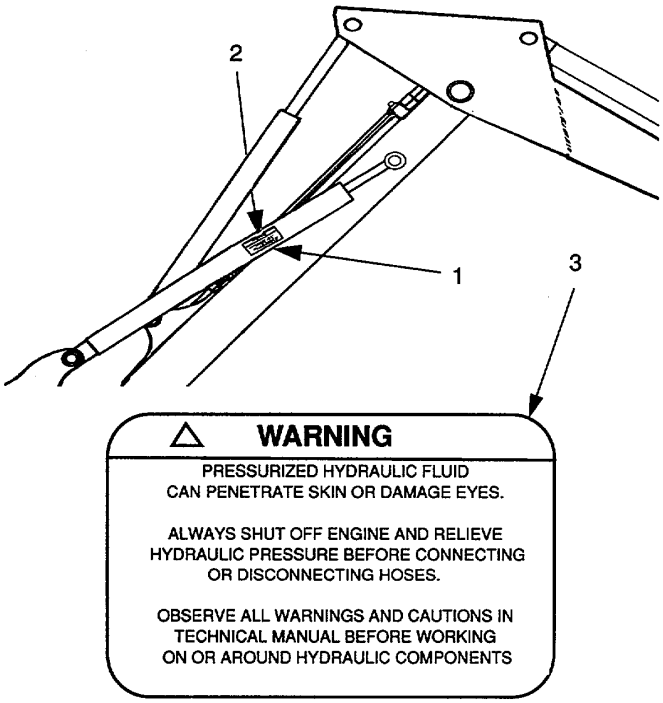
NOTE

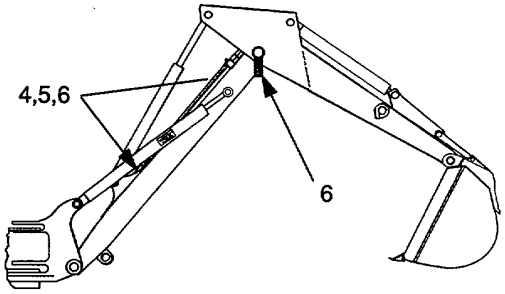
If controls work in reverse, hoses were not crossed during installation. Check steps in Kit installation procedures.

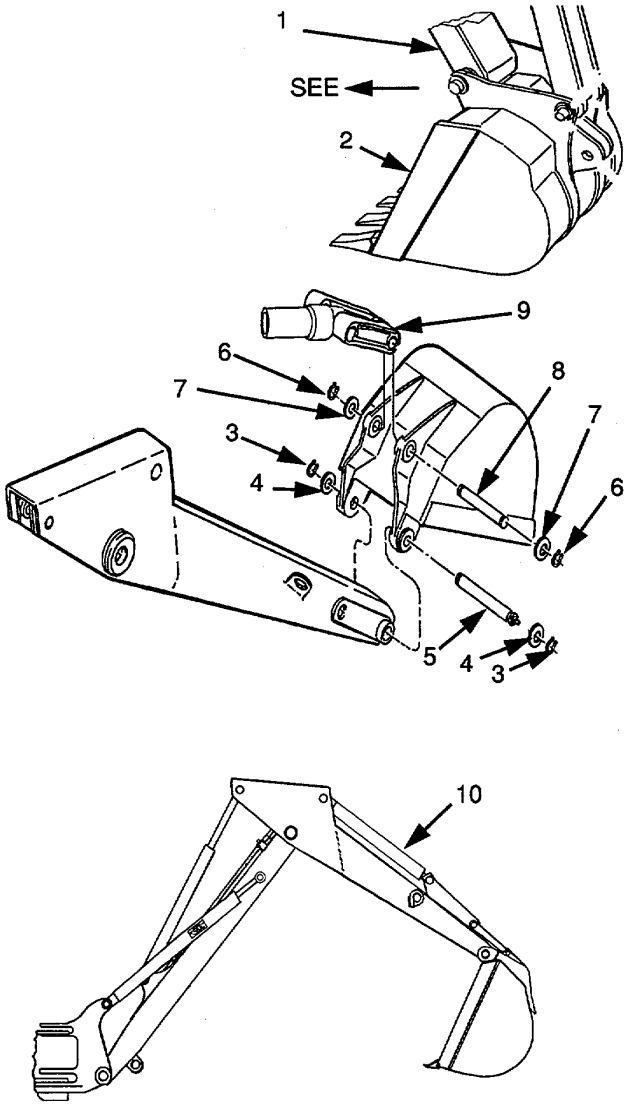
5. Operate bucket controls thru full range of motion and have assistant look for hose binding or stretching. Adjust clamp if necessary (see NOTE on previous page).

NOTE

This completes one-time conversion kit installation. SEE may be switched from Earth Auger Assembly use to Backhoe Bucket use, quickly, and easily.







4-14. Preparation for Earth Auger Assembly Use.

a. Removing Backhoe Bucket from SEE vehicle.

NOTE

The bucket is normally removed in the shop and the bucket stored there. However, the bucket may also be removed in the field by the SEE operator.

WARNING

Hydraulic pressure remains in system after SEE engine is off. This pressure causes boom to drift downward and could injure personnel.

Depressurize hydraulic system by moving all six SEE vehicle hydraulic controls and both pedals through their full range of motion several times.

Ensure all personnel stand clear of bucket prior to depressurizing hydraulic system. Bucket will drop when relieving hydraulic system pressure.

1. Lower boom and dipper (1) to move bucket (2) to rest position on floor.

2. Remove two retaining rings (3), washers (4), and rod (5).

NOTE

Use snap ring pliers supplied with kit to remove retaining rings (3) and (6).

3. Remove retaining ring (6), washers (7), tapered pin (8), and sleeve spacer (9).

4. Start SEE engine and raise dipper (1) away from backhoe bucket (2). Store all retaining hardware in same holes on bucket.

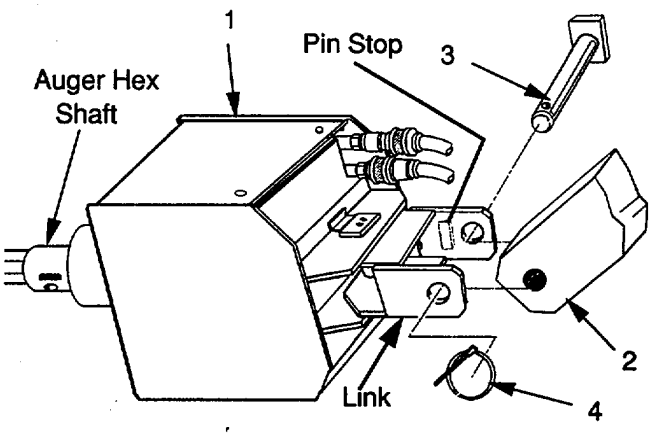
5. Retract bucket control cylinder (10) and stop SEE engine.

End of Task

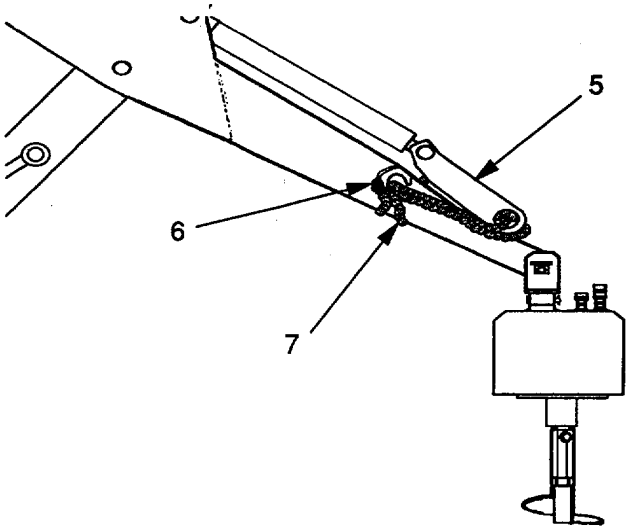
b. Attach Auger Drive Unit.

1. Position Auger Drive Unit (1) on ground near dipper end (2) so that Auger hex shaft is away from SEE and hoses are on driver's side. Move dipper (2) into place and install link pin (3). Install link pin (3) into side of link with pin stop and seat oblong head against pin stop. Install lynch pin (4).

2. Move lynch pin (4) into locked position.



3. Tie bucket control cylinder linkage (5) to dipper arm bracket (6) with 6 ft. rope (7).



c. Removing And Storing Bucket Hoses.

1. Disconnect both 30 inch backhoe bucket cylinder hoses (8) and (9) at quick disconnect fittings (10). Use rags to catch fluid and wipe fittings clean.

2. Loop hoses (8,9) and couple quick disconnect fittings (11) together over the dipper cylinder (12).

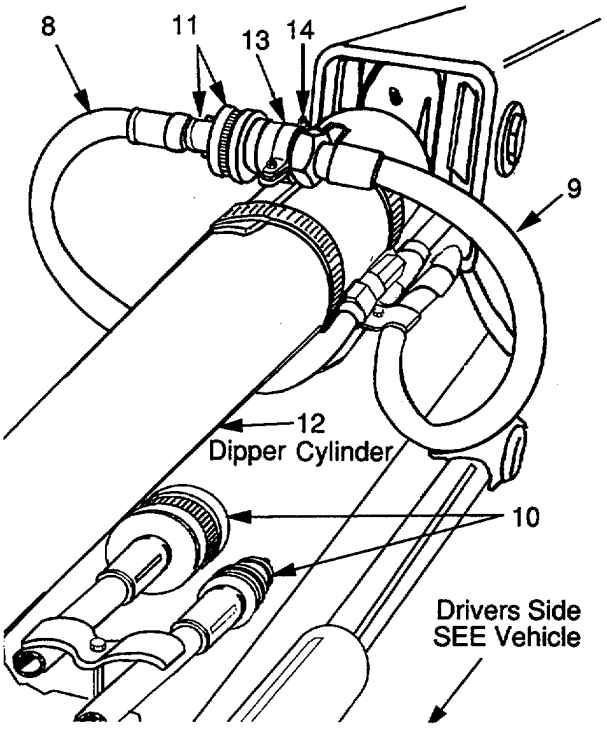
3. Remove two nuts (14) at hose clamp (13) and remove top half of hose clamp (13).

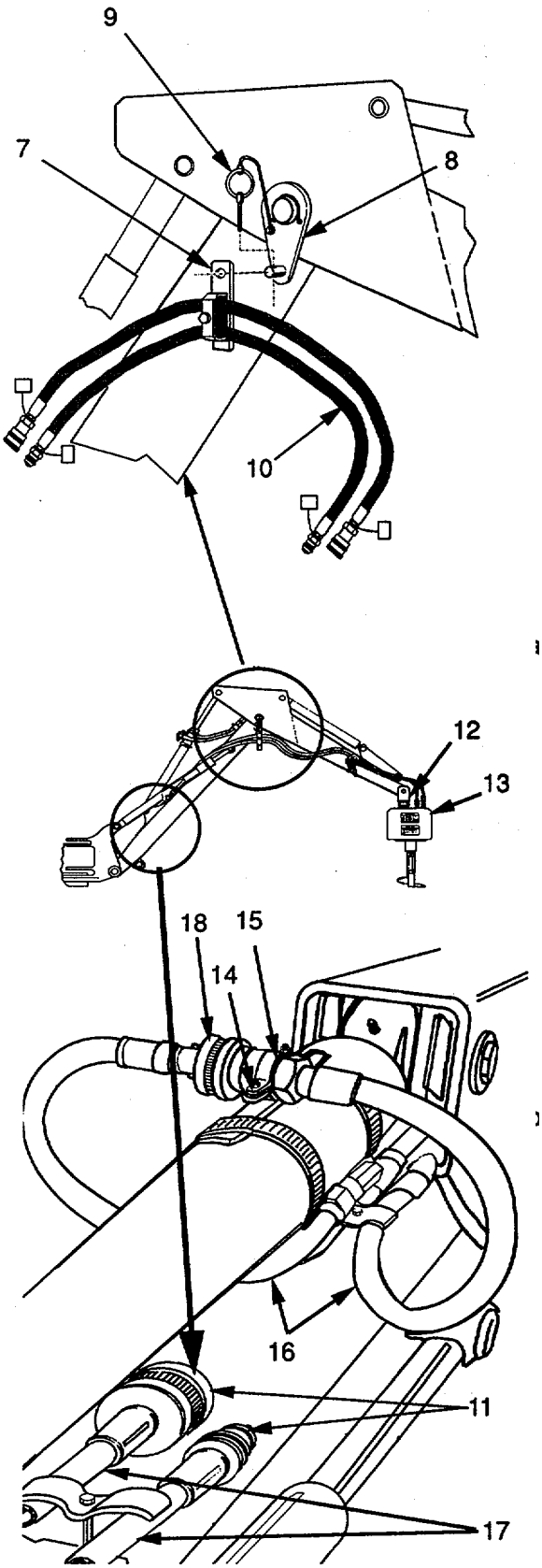
4. Install coupled hose assembly (8,9) so that female part of quick disconnect fitting (11) seats into lower half of hose clamp (13).

5. Install top half of hose clamp (13) and nuts (14). Tighten nuts to 3-5 lb. ft. (4-7 N•m).

NOTE

Installation of hoses into clamp is correct when hoses are secured and not moveable.





d. Installing Auger 138 Inch Hoses
   1. Grease short shaft on hose hanger bracket (8) with GAA grease.
   2. Install 138 inch hose assembly (10) by placing hose hanger clamp (7) on short shaft of hose hanger bracket (8). Install lynch pin (9) download thru hole in short shaft on hose hangar bracket (8). Pivot lynch pin ring (9) into locking position.
   3. Connect 138 inch hoses (10) at bucket control cylinder hose disconnects (11).
   4. Connect 138 Inch hoses at Auger Drive Unit quick disconnects (12).
   5. Check for loose or open or open fittings. Replace any hydraulic fluid lost during installation.

NOTE

Auger will be installed at evacuation site

4-15. PREPARATION FOR BUCKET USE

NOTE

This procedure may also be performed by the operator at the excavation site.

a. Removing Auger 138 Inch Hoses.
   1. Disconnect 138 inch hoses (10) at quick-disconnects from bucket control cylinder hoses (11). Use rags to keep fittings clean. Install protective dust cap and plugs.
   2. Disconnect other end of 138 inch hose assembly (10) from quick disconnect fittings (12) at Auger Drive Unit (13). Use rags to keep fittings clean. Install protective dust cap and plugs.
   3. Unlock and remove tethered lynch pin (9) holding hose hangar clamp(7) on hose hangar bracket (8). Remove hose hangar clamp (7) with hoses attached. Store and lock lynch pin downward in short shaft on hose hangar bracket (8). Coil hoses up for storage.

b. Installing Bucket Control Hoses.
   1. Remove two nuts (14) at hose clamp (15) and remove the top half of clamp (15).
   2. Remove and disconnect coupled bucket control cylinder hoses at quick fitting (18).
   3. Install top half of hose clamp (15) and nuts (14). Tighten nuts (14) to 3-5 lb. Ft. (4-7 N.m).
   4. Connect bucket control cylinder hoses (16) to hoses (17) coming from rear of SEE at quick disconnect (11).

NOTE

Before starting SEE engine check for loose or unconnected hoses and loose fittings. Also check hydraulic fluid level in SEE reservoir and replace hydraulic fluid lost when hoses were installed.

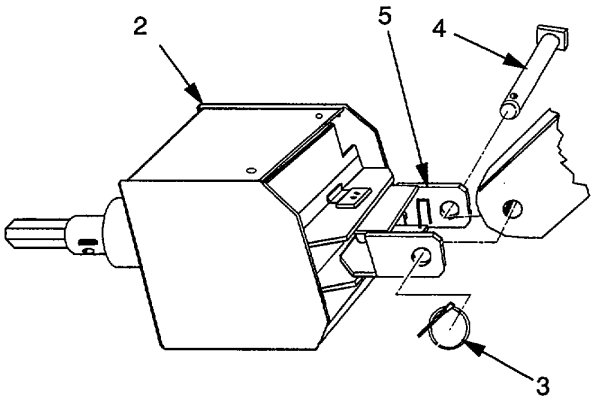
c. Remove Auger Drive Unit.

WARNING

Hydraulic Pressure remaining after SEE engine is off could cause unexpected anger rotation resulting in serious injury or death.

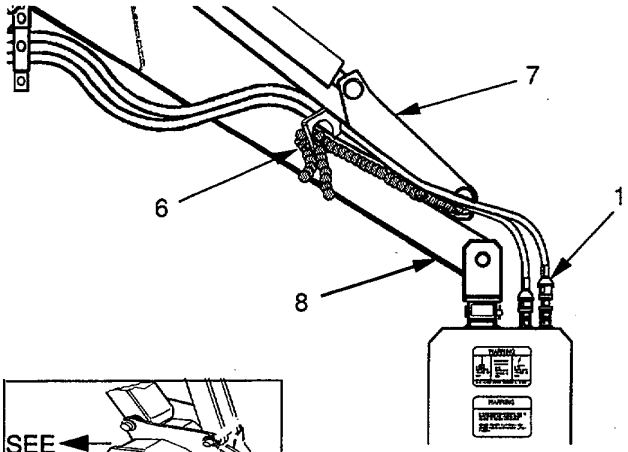
Depressurize system by shutting off SEE engine and operating auger controls thru full range of motion.

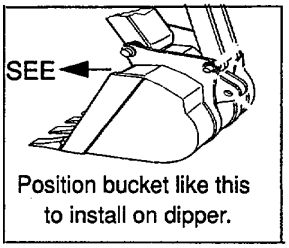
1. If necessary, remove hoses at quick disconnect fittings (1). Use rags to catch and clean fittings.
2. Place Auger Drive Unit (2) on floor.
3. Remove lynch pin (3), and link pin (4). Pull Auger Drive Unit (2) away from dipper arm or start SEE engine and guide operator to move dipper end (8) away from Auger Drive Unit (2).
4. Install link pin (4) and lynch pin (3) on connecting link (5) for storage.



d. Install Bucket.

1. Untie rope (6) holding bucket control linkage (7) to the dipper (8). Store rope (6) in SEE's tool box.
2. Use a suitable lifting device, or move SEE boom and dipper, and position bucket (9) at rear of SEE vehicle dipper as shown.
3. Start SEE engine and guide operator to position dipper end (8) into bucket mounting bracket (10).
4. Visually align dipper hole with bucket mounting bracket (10). Signal SEE operator to stop dipper movement. Install rod (11) and washers (12).

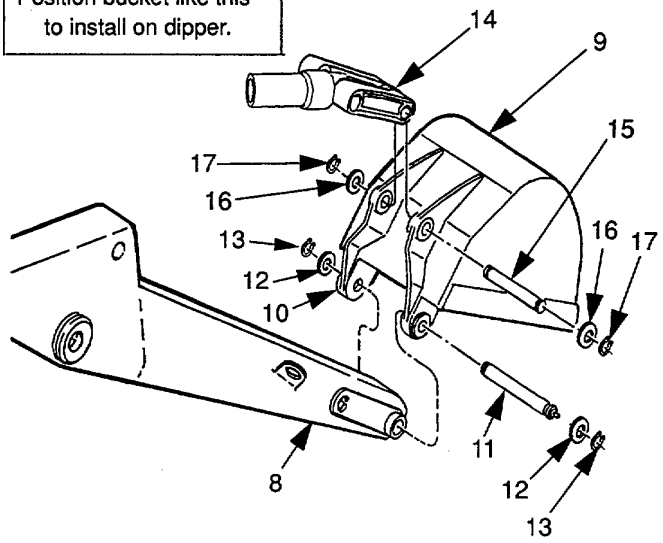




NOTE

Use snap ring pliers, supplied with kit, to install retainer rings (13) and (17).

5. Install two retaining rings (13) into slots at ends of rod (11).
6. Position spacer (14) into place on bucket bracket and align holes through links and spacer (14).
7. Install washer (16) and retaining ring (17) on one end of pin (15). Insert pin (15) into place.
8. Add washers (16) to shim clearances until retaining ring groove on end of pin (15) is at edge of last washer.
9. Install retaining ring (17) on end of pin (15).



SECTION V. UNIT MAINTENANCE PROCEDURES

4-16. Connecting Link Replacement (Universal Drive Interface).

This task covers:	a. Removal	b. Installation

Initial Setup

Tools:
General Mechanic's Tool Kit
5180-00-177-7033

Equipment Conditions:
Auger Drive Unit removed from SEE and placed on ground (para. 4-15 c).

Materials and Parts:
One cotter pin

a. Removal.

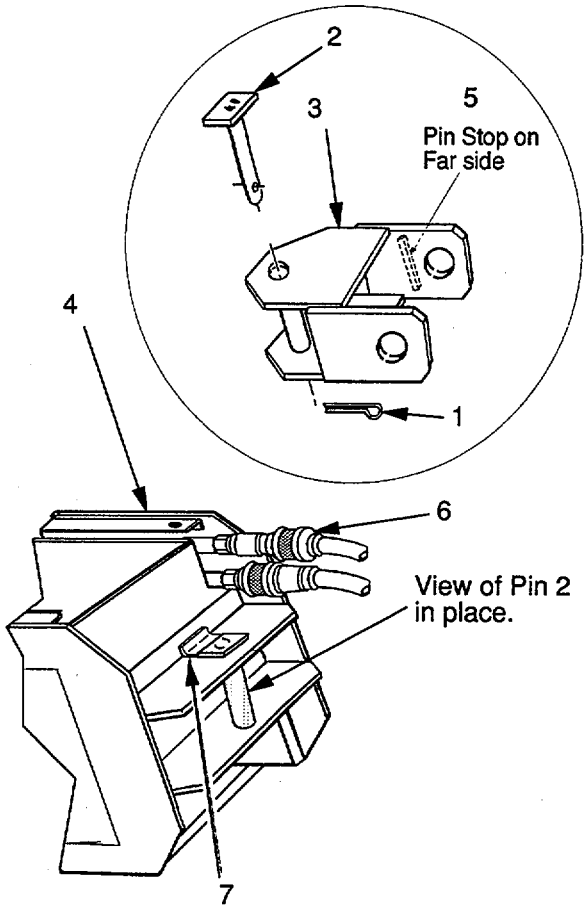
1. Remove cotter pin (1) from clevis pin (2). Discard cotter pin (1)
2. Remove clevis pin (2) from connecting link (3).
3. Remove connecting link (3) from drive unit (4).

b. Installation.

NOTE

Link (3) can be incorrectly installed into Auger Drive Unit (4) bracket. Correct installation requires link pin stop (5), be located on hydraulic hose side (6) of Auger Drive Unit (para 2-7).

1. Position connecting link (3) into place in Auger Drive Unit (4). Align holes in connecting link (3) to holes in Auger Drive Unit (4). Install oblong head clevis pin (2) thru side of Auger Drive Unit (4) that has metal pin stop angle (7) welded in place.
2. Push clevis pin (2) through holes in both brackets and ensure oblong clevis pin head is seated flush with pin stop (7) on Auger Drive Unit (4).
3. Insert new cotter pin (1) thru end hole in clevis pin (2) and spread ends.



FOLLOW ON TASK.
Install Auger Drive Unit on SEE vehicle (para 4-14).
END OF TASK

SECTION V. UNIT MAINTENANCE PROCEDURE

4-17 Front Safety Cover Replacement.

This task covers:	a. Removal.	b. Installation.

Initial Setup

Tools:
General Mechanic's Tool Kit
5180-00-177-7033

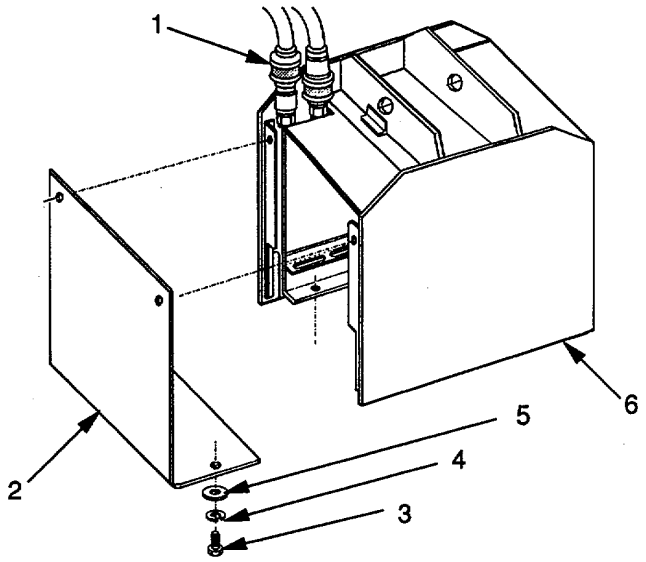
Equipment Conditions:
None

Materials and Parts:
Four lock washers, Rags

WARNING

Hydraulic Pressure remaining after SEE engine is off could cause unexpected auger rotation resulting in serious injury or death.

Depressurize system by shutting off SEE engine and operating auger controls thru full range of motion.



a. Removal.

1. Depressurize system.
2. Disconnect hydraulic hoses at Auger Drive Unit quick-disconnect fittings (1). Use rags to catch drippings.
3. Remove any excess mud or dirt.
4. Remove four bolts (3), four lock washers (4), and four flat washers (5) from front safety cover (2).
5. Remove front safety cover (2) from Auger Drive Unit (6).

b. Installation.

1. Position front safety cover (2) into place on Auger Drive Unit (6).
2. Install four bolts (3), four lock washers (4), and four flat washers (5). Tighten bolts (3) to 14-18 lb. ft. (19-24 N•m).

FOLLOW ON TASKS.

Connect hydraulic hoses at Auger Drive Unit quick-disconnect fittings (1). Use rags to catch drippings and clean fittings.

NOTE

Replacement cover may need CARC painting (see TM 43-0139 Painting of Army Materiel and AR 750-1, para 4-41, Painting CPP and CARC for Army Materiel).

END OF TASK.

SECTION V. UNIT MAINTENANCE PROCEDURE

4-18 Rear Safety Cover Replacement.

This task covers:	a. Removal.	b. Installation.

Initial Setup

Tools:
General Mechanic's Tool Kit
5180-00-177-7033.

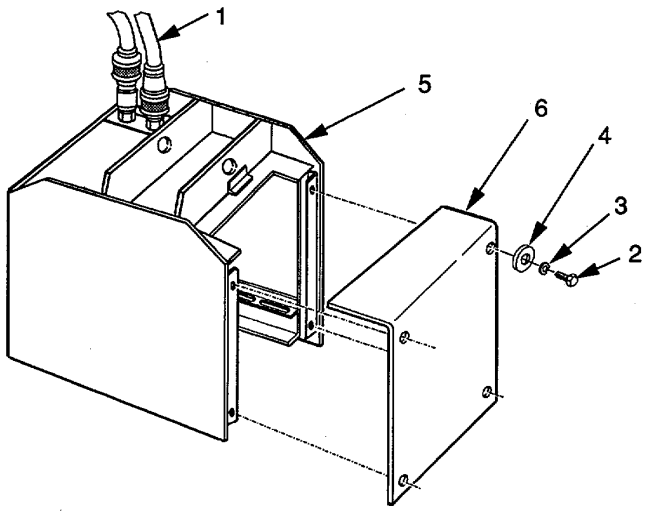
Equipment Conditions:
None.

Materials and Parts:
Four lock washers.
Rags.

WARNING

Hydraulic pressure remaining after SEE engine Is off could cause unexpected auger rotation and death.

Depressurize system by shutting off SEE engine and operating auger controls thru full range of motion.



a. Removal

1. Depressurize system.

2. Disconnect hydraulic hoses at Auger Drive Unit quick disconnect fittings (1). Use rags to catch drippings.

3. Remove any excess mud or dirt.

4. Remove four bolts (2), four lock washers (3), and four flat washers (4), from rear safety cover (6).

5. Remove rear safety cover (6) from Auger Drive Unit (5).

b. Installation

1. Position rear safety cover (6) into place on Auger Drive Unit (5). Install four bolts (2), four lock washers (3), and four flat washers (4). Tighten bolts to 14-18 lb-ft. (19-24 N•m).

FOLLOW ON TASKS.

Connect the hydraulic hoses at Auger Drive Unit quick-disconnect fittings. Use rag to catch drippings and clean connections.

NOTE

Replacement cover may need CARC painting (see TM 43-0139 Painting of Army Materiel and AR 750-1, Para 4-41, Painting CPP and CARC for Army Materiel).

END OF TASK.

SECTION V. UNIT MAINTENANCE PROCEDURE

4-19 Chain Adjustment.

This task covers: a. Adjustment.

Initial Setup

Tools:
General Mechanic's Tool Kit 5180-00-177-7033 is

Equipment Conditions:
Front Safety Cover Removed (para. 4-17).

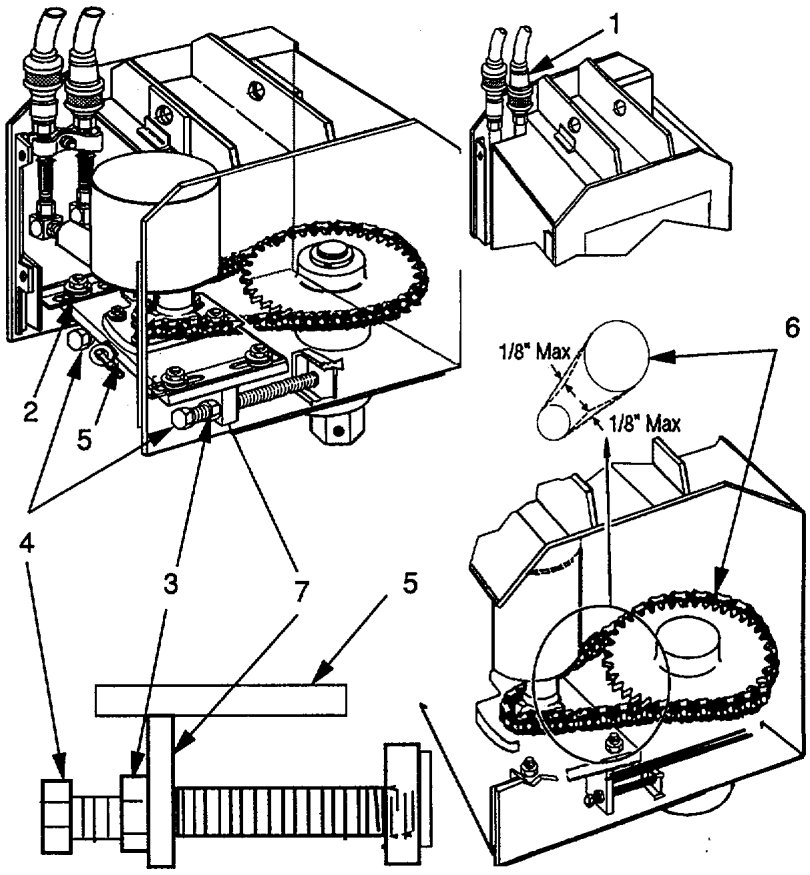
Materials and Parts:
Rags.

WARNING

Hydraulic pressure remaining after SEE engine is off could cause unexpected auger rotation resulting in death.

Depressurize system by shutting off SEE engine and operating auger controls thru full range of motion.

a. Adjustment
1. Depressurize hydraulic system.
2. Disconnect two hydraulic hoses at quick-disconnect fittings (1). Use rag to catch drippings.
3. Loosen four motor plate nuts (2).
4. Loosen two lock-up nuts (3).
5. Turn two adjusting rod nuts (4) until motor plate (5) will slide in its slots and chain (6) is loose.



CAUTION

The drive chain is adjusted when there is 1/8 inch slack at midpoints on both sides of sprocket. Do NOT overtighten chain. This will cause shafts and sprockets to fail and void warranty.

6. Turn adjusting rod nuts (4) until chain slack is 1/8 inch (6). Adjust both sides of motor plate (5) equally. If necessary, repeat steps until correct adjustment is attained.
7. Hold adjusting rod nut (4) and tighten lock-up nut (3) equally on both sides.
8. Tighten four motor plate nuts (2) to 63-75 lb. ft. (88-102 N•m). Re-check for correct 1/8 inch slack in chain on both sides of sprocket. Repeat adjustment if necessary.

FOLLOW ON TASKS.

Install front safety cover (see para. 4-17).

Connect hydraulic hoses at quick-disconnect fittings at Auger Drive Unit. Use rag to catch drippings and clean connections.

END OF TASK.

SECTION V. UNIT MAINTENANCE PROCEDURE

4-20 Chain Replacement.

This task covers: a. Removal. b. Installation.

Initial Setup

Tools:
General Mechanic's Tool Kit
5180-00-177-7033.

Materials and Parts:
Rags.

Equipment Conditions:
Hydraulic System Depressurized
Front safety cover removed (para. 4-17).
Rear safety cover removed (para. 4-18)

a. Removal

1. Disconnect two hydraulic hoses at quick disconnect fittings (1) at top of Auger Drive Unit (2). Use rag to catch fluid drippings.

2. Rotate chain (3) so that chain master link (4) is located between chain sprockets as shown. (Move chain by inserting leverage bar in opening in auger drive unit hex shaft (5) and turning).

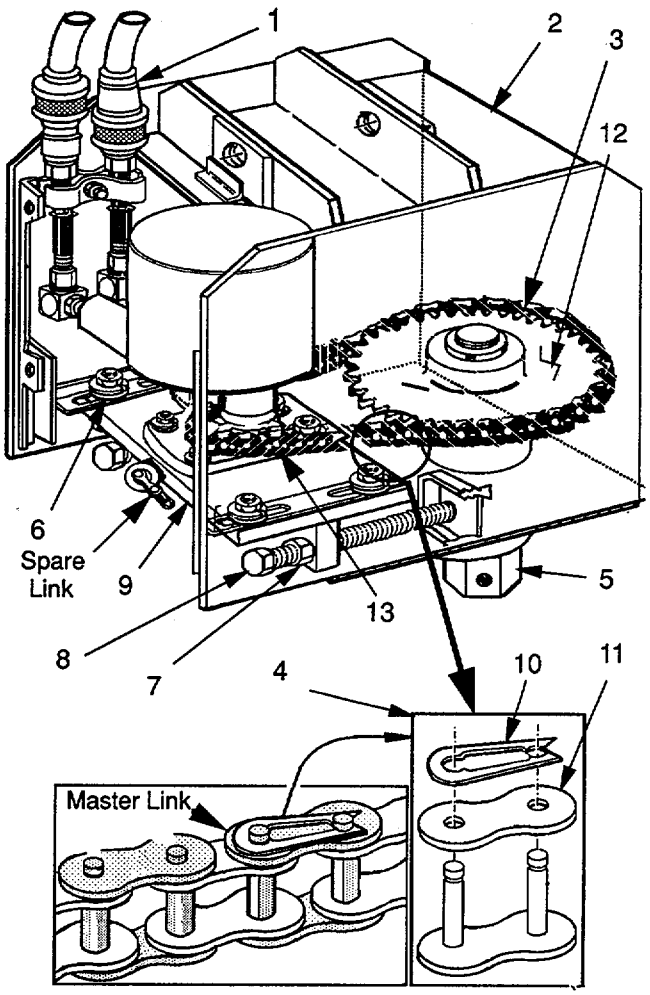
NOTE

If resistance is felt when attempting to turn shaft, have assistant relieve residual hydraulic pressure inside Auger Drive Unit by holding open quick disconnect fittings (1).

3. Loosen four nuts (6), two lock up nuts (7), two adjusting rod bolts (8), until motor plate (9) is free to slide. Move motor plate (9) until chain (3) is loose.

4. Remove spring lock (10), keeper (11), from master link (4). Slide lower section of master link (4) down and out of adjacent links.

5. Remove chain.



b. Installation.

1. Thread replacement chain around drive sprocket (12), allowing both ends of chain to meet on motor sprocket (13).
2. Insert lower master link (4), through ends of drive chain (3). Install keeper (11).
3. Install master link spring lock (10) (widest opening) over one post of master link (4) lower half. Then slide spring lock (10) over other post until seated into locked position.

FOLLOW ON TASKS:

Chain adjustment (see para 4-19).
Install front and rear safety covers (see para. 4-17 and 4-18).
Connect hydraulic hoses at quick disconnect fittings (1). Use rag to wipe up drippings and clean connections.

END OF TASK.

SECTION V. UNIT MAINTENANCE PROCEDURE

4-21 Chain Repair.

This task covers: a. Repair. b. Installation.

Initial Setup

Tools:
General Mechanic's Tool Kit
5180-00-177-7033

Equipment Conditions:
Chain removed (see para. 4-20).

Materials and Parts
Rags, Tags.

a. Repair.

1. Remove spare master link (1) stored in washer welded inside Auger Drive Unit (2).

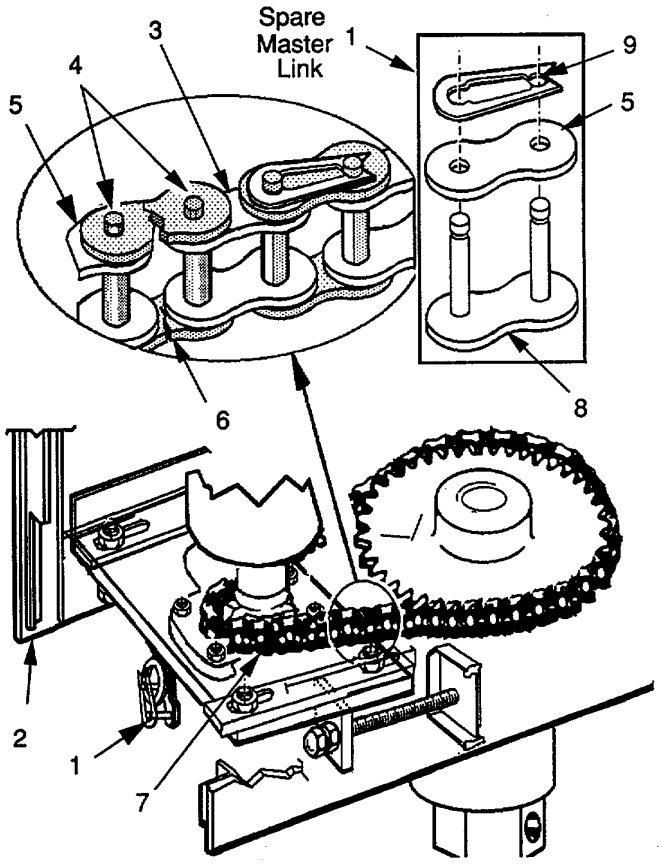
2. Place chain (3) in vice or other holding device. Grind or file off link ends (4). Remove keeper (5), and defective link (6). Use center punch and tap out if necessary.

b. Installation.

1. Thread chain (3) around both sprockets, allowing both ends of chain to meet on motor sprocket (7).

2. Insert lower part (8) of spare master link (1) through both ends of drive chain (3). Install keeper (5).

3. Install master link spring lock (9) (widest opening) over one post of master link (8) lower half. Then slide spring lock.(9) over other post until seated into locked position.



NOTE

All chain repairs are a temporary fix. Always order new chain and spare link and install as soon as possible.

Tag auger to Identify that new chain is on order.

FOLLOW ON TASKS:

Chain adjustment (see para. 4-19).
Install front and rear safety covers (see para. 4-17 and 4-18).
Connect hydraulic hoses at quick disconnect fittings. Use rag to catch drippings and clean fittings.

END OF TASK.

SECTION V. UNIT MAINTENANCE PROCEDURE

4-22 Motor Sprocket Replacement.

This task covers: a. Removal. b. Installation.

Initial Setup

Tools:
General Mechanic's Tool Kit
5180-00-177-7033

Equipment Conditions:
Chain removed (see para. 4-20).

Materials and Parts:
Lock washer.
Rags.
GAA Grease.

a. Removal.

1. Remove bolt (1), lock washer (2), flat washers (3), and spacer (4) from hydraulic motor shaft (5).

2. Slide motor sprocket (6), and shaft key (7) off from shaft of hydraulic motor (5).

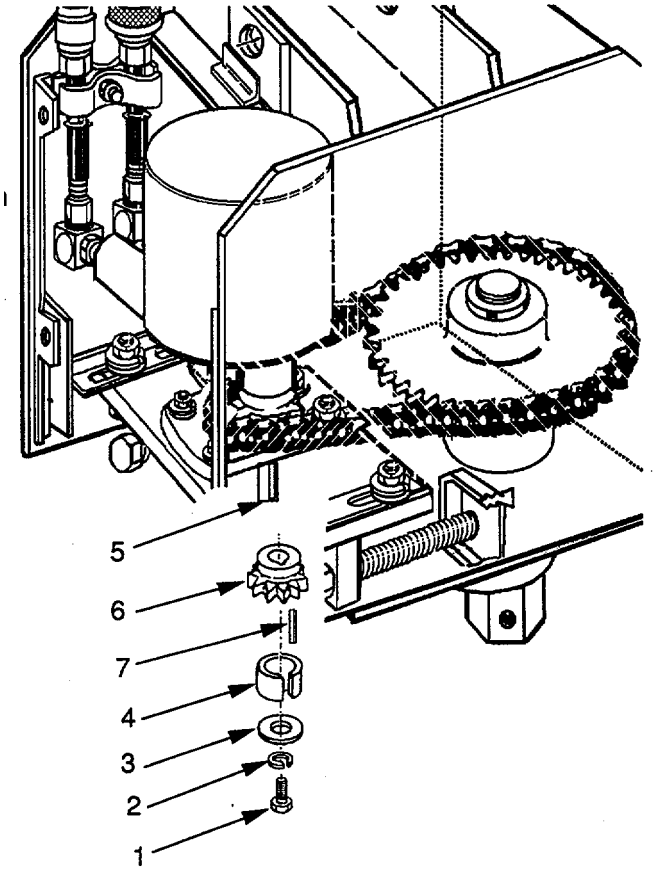
b. Installation.

1. Remove rust, dirt, etc. and lightly grease shaft of hydraulic motor (5).

NOTE
Disregard alien head set screw which may be in some sprockets.

2. Slide motor sprocket (6) and shaft key (7) onto motor shaft (5). Do not force.

3. Install bolt (1), new lock washer (2), flat washer (3) and spacer (4). Torque to 180 to 250 lb. ft.



FOLLOW ON TASKS:

Install chain (see para 4-20).

END OF TASK

SECTION V. UNIT MAINTENANCE PROCEDURE

4-23 Motor Plate Replacement.

This task covers: a. Removal b. Installation

Initial Setup

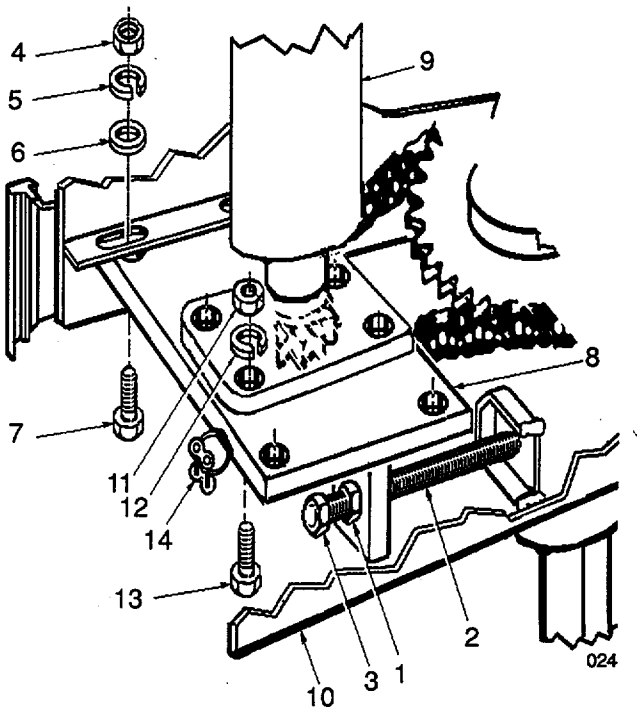
Tools:
General Mechanic's Tool Kit
5180-00-177-7033

Equipment Conditions:
Chain removed (4-20).

Materials and Parts:
Lock washers

a. Removal

1. Loosen lock-up nut (1) on each adjusting rod (2),
2. Remove two adjusting rods (2) by turning welded nut (3) on each adjusting rod end.
3. Remove four nuts (4), four lock washers (5), four flat washers (6) and four bolts (7), from motor plate (8).
4. Slide motor plate (8), with hydraulic motor (9), (with short hoses) attached, out of main housing (10).
5. Remove four nuts (11), four lock washers (12), and four bolts (13), from motor plate (8). Remove motor (9) (with sprocket and hoses attached) from motor plate (8).
6. Remove and save spare master link (14).



b. Installation

1. Install hydraulic motor (9) on motor plate (8), with four bolts (13), four lock washers (12), and four nuts (11).Tighten four nuts (11) to 65-75 lb. ft. (88-102 N•m)
2. Slide motor plate (8), and hydraulic motor (9) into the main housing (10). Ensure master link holder (14) is facing outward.
3. Install four bolts (7), four flat washers (6), four lock washers (5) and four nuts (4) fastening the motor plate to drive housing. Finger tighten four nuts (4).
4. Install the two adjusting rods (2). Do not tighten lock-up nuts (1).
5. Install spare master link (14) in welded washer on replacement motor plate (8).

FOLLOW ON TASKS:
Install chain (para. 4-20)

END OF TASK

SECTION V. UNIT MAINTENANCE PROCEDURE

4-24. Hydraulic Motor Replacement.

This task covers: a. Removal b. Installation

Initial Setup

Tools:
General Mechanic's Tool Kit
5180-00-177-7033

Materials and Parts:
Thread sealant, Rags

Equipment Conditions:
Motor Plate removed (para. 4-23)
Hoses removed (see para. 4-31)

a. Removal

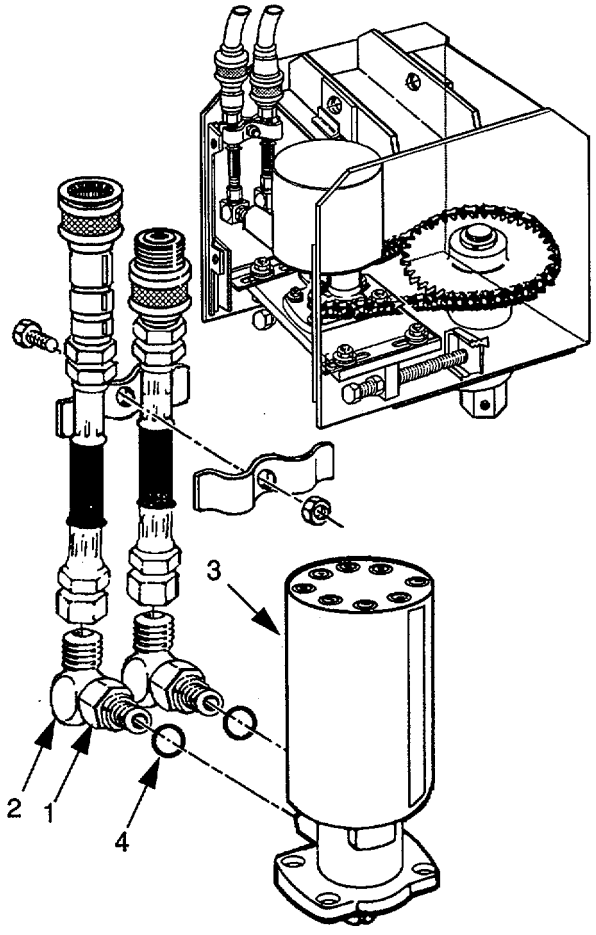
CAUTION
Use two wrenches to loosen or tighten fittings. When installing, start fittings by hand to avoid stripping threads.

1. Loosen slip fitting (1) on elbows (2).
2. Remove elbows (2) from hydraulic motor (3). Catch any spilled fluid with rags.

NOTE
Elbow has two, one inch, slip nut connectors at hydraulic motor.

b. Installation

1. Inspect preformed packing (4) on elbows (2). Replace from shop supply source if damaged or flattened.
2. Apply sealant on threads and install elbows (2) into threaded ports on hydraulic motor (3). Hand start elbow slip nuts (1)
3. Tighten slip nut (1).



FOLLOW ON TASKS:
Install motor plate (para. 4-23).
Install hoses (para 4-31).

END OF TASK

SECTION V. UNIT MAINTENANCE PROCEDURE

4-25. Driven Sprocket Replacement.

This task covers: a. Removal b. Installation

Initial Setup

Tools:
General Mechanic's Tool Kit
5180-00-177-7033
Materials and Parts:
None.

Equipment Conditions:
Chain Removed (para 4-20).

a. Removal.

1. Straighten the tangs on lock washer (1).
2. Remove lock nut (2) and lock washer (1).

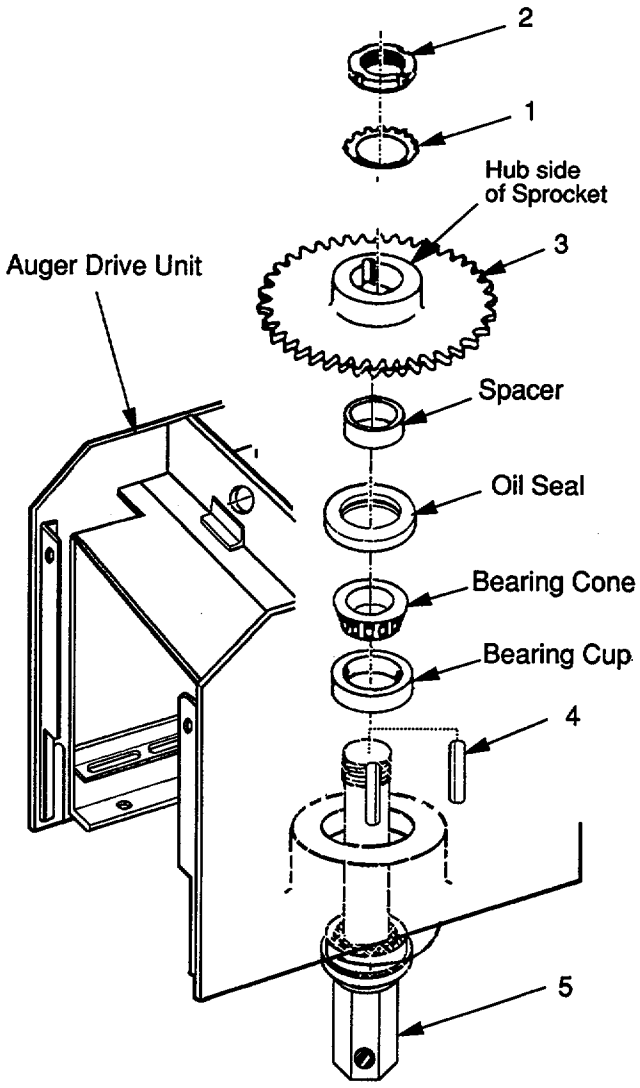
NOTE
Use a spanner wrench to remove lock nut (2)

3. Support output shaft (5) to prevent movement while carefully sliding off driven sprocket (3) and shaft key (4)

NOTE`
Use care in removing driven sprocket to avoid damage to shaft threads.

b. Installation.

1. Install shaft key (4) in slot in output shaft (5) and slide replacement driven sprocket (3) (with hub side up) onto shaft (5). Use care to avoid damaging threads.
2. Install lock washer (1) and lock nut (2). Finger tighten lock nut (2). Do not bend tangs on lock washer (1) at this time.



FOLLOW ON TASKS:
Shaft bearing adjustment (see para 4-27).
Install chain (see para 4-20).

END OF TASK

SECTION V. UNIT MAINTENANCE PROCEDURE

4-26. Output Shaft Replacement.

This task covers:	a. Removal	b. Installation

Initial Setup

Tools:
General Mechanic's Tool Kit
5180-00-177-7033.

Equipment Conditions:
Chain Removed (para 4-20).

Materials and Parts:
None.

a. Removal.

1. Straighten tangs on lock washer (1).
2. Remove lock nut (2) and lock washer (1). Use spanner wrench.
3. Carefully slide off driven sprocket (3) along with shaft key (4) from output shaft (5).

NOTE
Use care in removing sprocket to avoid damage to shaft threads.

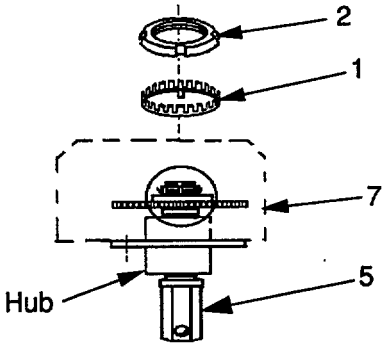
4. Slide output shaft (5) out thru bottom of Auger Drive Unit housing (7).
5. Remove spacer (6) positioned between sprocket (3) and bearing (9) and nestled inside of shaft seal (8).

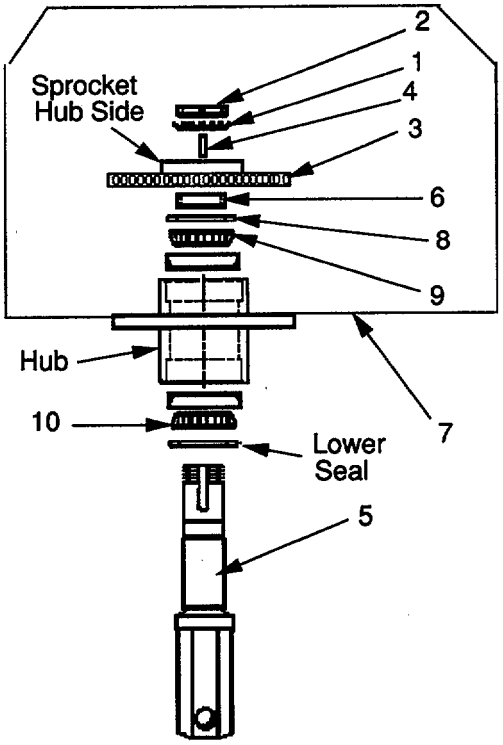
b. Installation.

1. Carefully slide output shaft (5) into opening in bottom of Auger Drive Unit housing (7). Check that it rotates, without binding, on hub bearings (9,10).
2. Place spacer (6) on output shaft (5) so it fits snugly inside of upper shaft seal (8) and on top race of bearing (9).
3. Install shaft key (4) in slot in output shaft (5) and slide driven sprocket (3) (with hub side up) onto shaft (5). Use care to avoid damaging shaft threads.
4. Install lock washer (1) and lock nut (2).Finger tighten lock nut (2). Do not bend tangs on lock washer (1) at this time.

FOLLOW ON TASKS:
Shaft Bearing Adjustment (see para 4-27)
Install Chain (see para. 4-20).

END OF TASK.





NOTE
Items 8, 9, and 10 are in place inside hub.

SECTION V. UNIT MAINTENANCE PROCEDURE

4-27. Shaft Bearing Adjustment.

This task covers:

Initial Setup

Tools
General Mechanic's Tool Kit
5180-00-177-7033

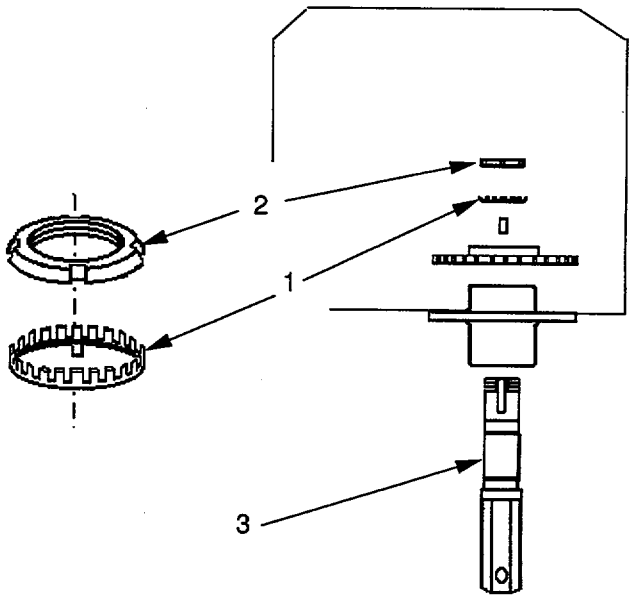
Equipment Conditions:
Chain removed (para.4-20).

Materials and Parts:
None.

a. Adjustment.

NOTE
The bearing nut is properly adjusted when a moderate force is required to turn shaft by hand.

1. Straighten tangs on lock washer (1) so that nut (2) is unlocked.
2. Tighten (or loosen), lock nut (2) to 115 to 165 lb.ft. A moderate force should now be felt when turning the output shaft (3) by hand. Use a spanner wrench to adjust nut (2).
3. When shaft bearing adjustment is achieved, bend one lock washer (1) tang into one slot on the lock nut (2).



FOLLOW ON TASKS

Install chain (para.4-20).

END OF TASK.

SECTION V. UNIT MAINTENANCE PROCEDURE

4-28. Shaft Bearing and Seal Replacement.

This task covers:	a. Removal	b. Installation

Initial Setup

Tools:
General Mechanic's Tool Kit.
5180-00-177-7033.

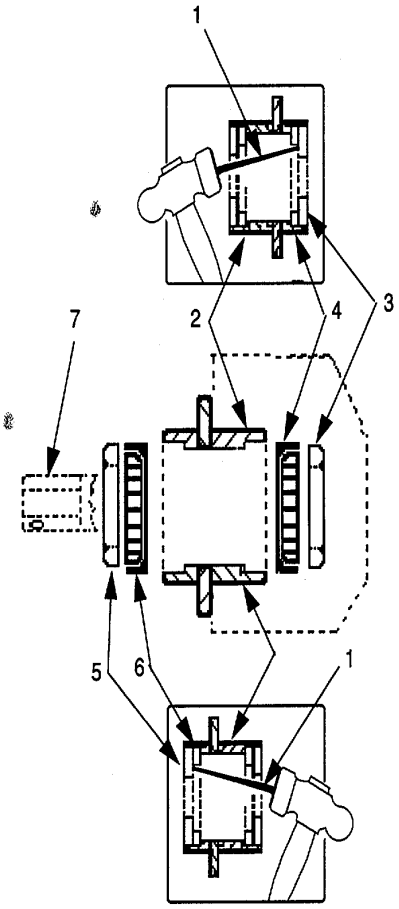
Equipment Conditions:
Output shaft removed (see para. 4-26).

Materials and Parts:
Seals, Bearings cones, Bearing cups, GAA Grease, Rags, P-D-680 Solvent.

a. Removal

1. Insert drift (1) into hub (2) thru bottom hub opening. Gently tap around metal exposed edge of upper seal (3) until seal comes out. Remove upper bearing cup and cone (4).

2. Insert drift (1) into hub (2) thru top hub opening. Gently tap around metal exposed edge of lower seal (5) until seal comes out. Remove bottom bearing cup and cone (6).



b. Installation

WARNING

Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes, and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for Type dry cleaning solvent is 100^{0}F (38^0 C) and for Type II is 140^0 F. (60^0- C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

1. Carefully clean output shaft (7) and inside of hub (2). Inspect for any cracks, breaks, bends, visible wear, or general defects. Replace any defective parts.

2. Install lower bearing cup and lower bearing cone (6) in hub (2).

3. Use cylinder shape tool on lower seal (5) to apply uniform force and tap lower seal in place in hub (2).

4. Install upper bearing cup and upper bearing cone (4) in hub (2).

5. Use cylinder shape tool on upper seal (3) surface to apply uniform force and tap seal in place in hub (2).

FOLLOW ON TASKS
Install Output Shaft (para 4-26).

END OF TASK

SECTION V. UNIT MAINTENANCE PROCEDURE

4-29. Shaft Bearing and Seal Service.

This task covers: a. Service

Initial Setup

Tools:
General Mechanic's Tool Kit
5180-00-177-7033

Equipment Conditions:
Output shaft removed (see para. 4-26)

Materials and Parts:
GAA Grease, P-D-680 Dry Cleaning Solvent. Rags.

a. Service.

1. Insert drift (1) into hub (2) thru top hub opening and gently tap out (on metal exposed part) lower seal (3). Remove lower bearing cup (4) with lower bearing cone (5).

NOTE
Leave upper bearing cone and cup and seal in place.

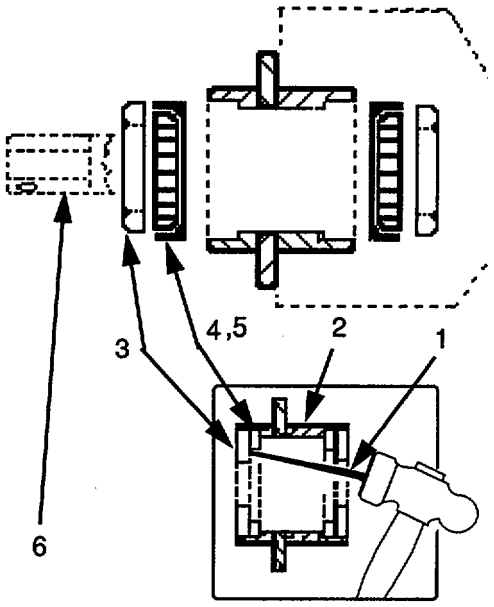
2. Carefully inspect the drive shaft (6) and the inside of the hub (2) for any cracks, breaks, bends, visible wear, or general defects. Rotate bearings to check for rough spots or symptoms that bearings need replacement. Replace any defective parts.

WARNING
Dry cleaning solvent P-D-680 is toxic and flammable. Wear protective goggles, face mask, and gloves and use only in a well ventilated area. Avoid contact with skin, eyes, and clothes, and don't breathe vapor. Do not use near open flame or excessive heat. The flashpoint for Type I dry cleaning solvent is 1000F (380C) and for Type II is 1400F. (600C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, flush eyes with water and get medical aid immediately.

3. Wipe excess grease from inside hub (2) with clean rags. Clean bearings one at a time with solvent and immediately apply grease. Rotate bearing as you work grease into cone and cup surfaces.

4. Install lower bearing cup (4) and lower bearing cone (5) in hub (2).

5. Use cylinder shape tool on lower seal (3) surface to apply uniform force and tap seal in place in hub (2).



FOLLOW ON TASKS
Install Output Shaft (para 4-26).
END OF TASK

SECTION V. UNIT MAINTENANCE PROCEDURE

4-30. Elbow Replacement.

This task covers: a. Removal b. Installation

Initial Setup

Tools:
General Mechanic's Tool Kit
5180-00-177-7033.

Equipment Conditions:
Front Safety Cover Removed (para. 4-17).

Materials and Parts:
Thread Sealant, Tags.

a. Removal

CAUTION

Use two wrenches to loosen or tighten fittings. When installing, start fittings by hand to avoid cross threading or stripping fittings.

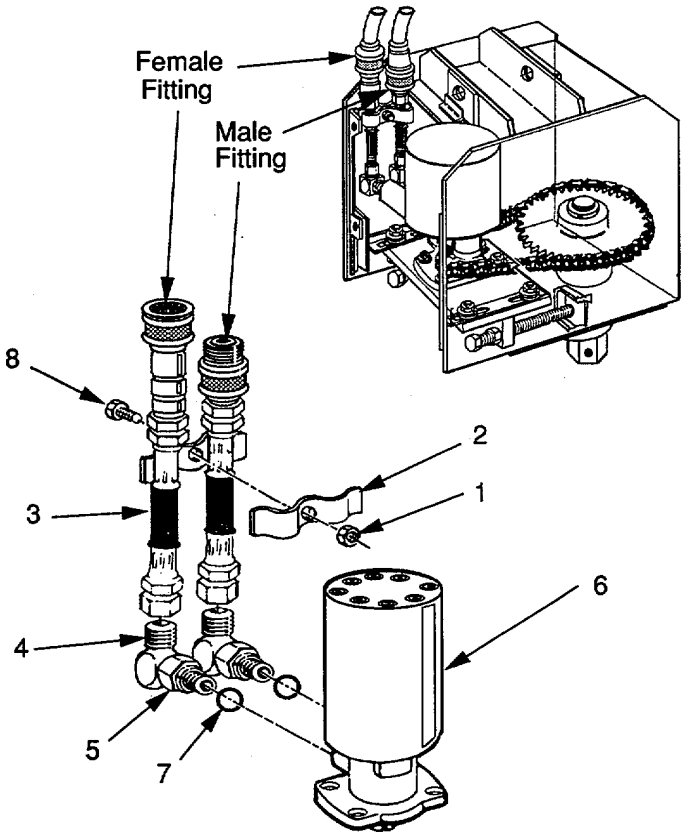
1. Remove nut (1) from bracket (2). Remove upper and lower bracket (2) and bolt (8).
2. Tag and remove two hydraulic hoses (3) from elbow (4).
3. Loosen slip fittings (5) on elbows (4). 4. Remove elbows (4) from hydraulic motor (6). Catch any spilled fluid with rags.

b. Installation

1. Inspect preformed packing (7) on elbows (4). Replace from shop supply source if damaged or flattened.

2. Apply sealant on threads and install elbows (4) into threaded ports on hydraulic motor (6). Hand start, then tighten elbow slip nuts (5).

3. Refer to tags and install hydraulic hose (3) to elbow (4).
4. Install bolt (8) thru lower hose bracket. Position to rear of hoses and install upper bracket (2), and nut (1). Tighten nut to 7-11 lb.ft. (9-15 N.m).



FOLLOW ON TASKS
Install Front Safety Cover (para 4-17).

END OF TASK

SECTION V. UNIT MAINTENANCE PROCEDURE

4-31. Hose Replacement.

This task covers: a. Removal b. Installation

Initial Setup

Tools:
General Mechanic's Tool Kit
5180-00-177-7033

Equipment Conditions:
Front Safety Cover removed (para. 4-17)

Materials and Parts:
Tags, Rags,

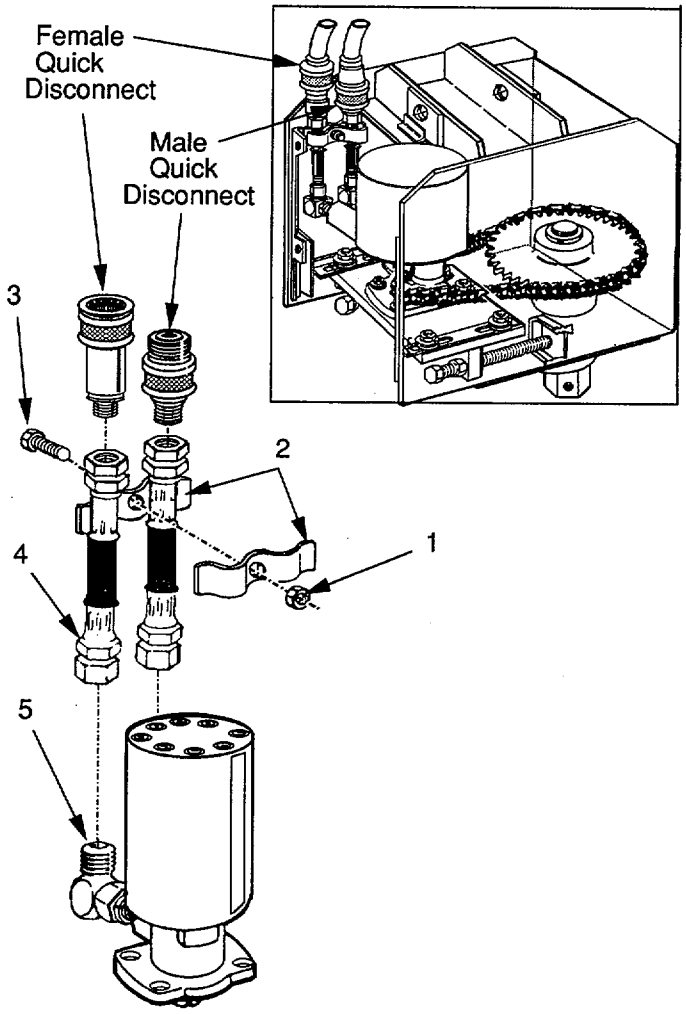
a. Removal.

CAUTION
Use two wrenches to loosen or tighten fittings. When installing, start fittings by hand to avoid cross threading or stripping fittings.

1. Remove nut (1), upper and lower hose bracket (2), and bolt (3) holding hoses (4).
2. Tag and remove hydraulic hoses (4) from elbow (5).
3. Remove female and male quick disconnects from hoses.

b. Installation.

1. Install replacement hydraulic hoses (4) to elbow (5).
2. Install female and male quick disconnects onto hoses.
3. Install bolt (3), upper and lower hose bracket (2), and nut (1). Tighten nut to 7-11 lb.ft. (9-15 N.m).



FOLLOW ON TASKS:
Install Front Safety Cover (para 4-17).

END OF TASK.

SECTION V. UNIT MAINTENANCE PROCEDURE

4-32. Drive Chain Lubrication.

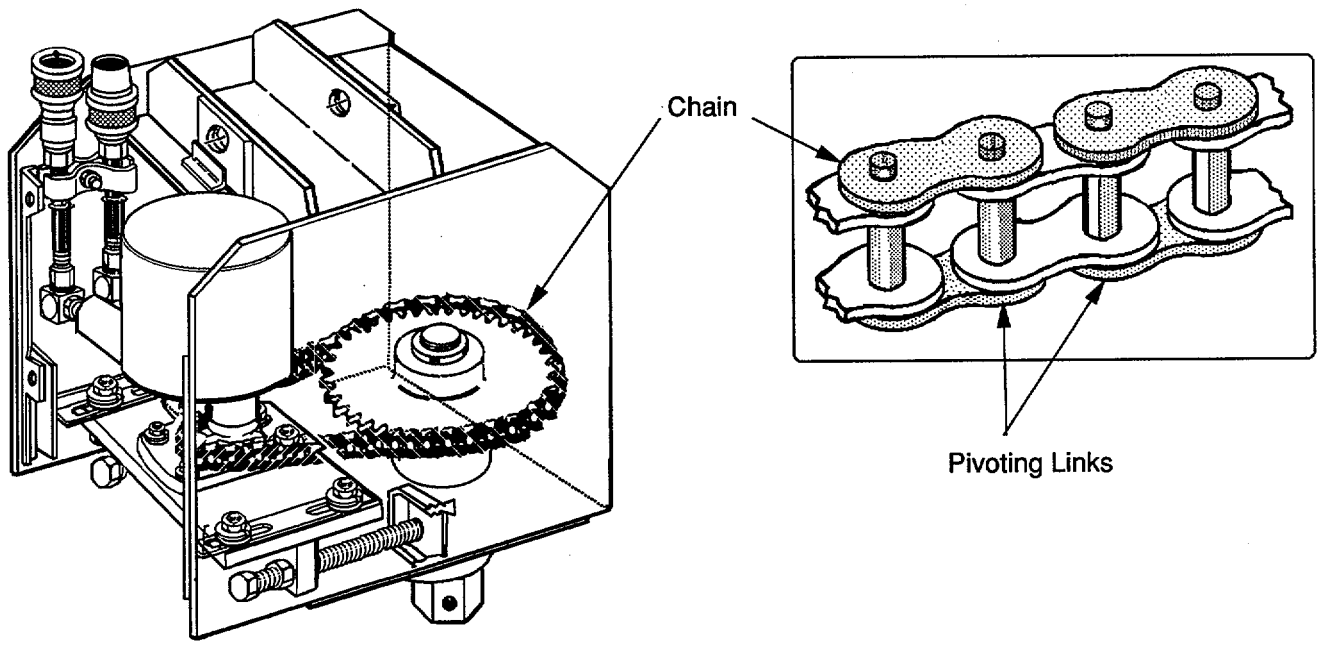
This task covers:

Initial Setup

Tools:
General Mechanic's Tool Kit
5180-00-177-7033

Equipment Conditions:
Front Safety Cover Removed (para.4-17).
Rear Safety Cover Removed (para. 4-18).

Materials and Parts:
GAA Grease



a. Service.

NOTE
For best results apply lubricant to a warm chain.

1. Apply and allow lubricant time to melt into pivoting hinged parts of chain before resuming operation.

FOLLOW ON TASKS:

Install Front Safety Cover (para. 4-17).
Install Rear Safety Cover (para. 4-18).

END OF TASK

SECTION V. UNIT MAINTENANCE PROCEDURE

4-33. Main Housing Replacement.

This task covers:	a. Removal	b. Installation

Initial Setup

Tools:
General Mechanic's Tool Kit
5180-00-177-7033.

Equipment Conditions:
Motor Plate Removed (para.4-23).
Shaft Bearings and Seals Removed (para.4-28).

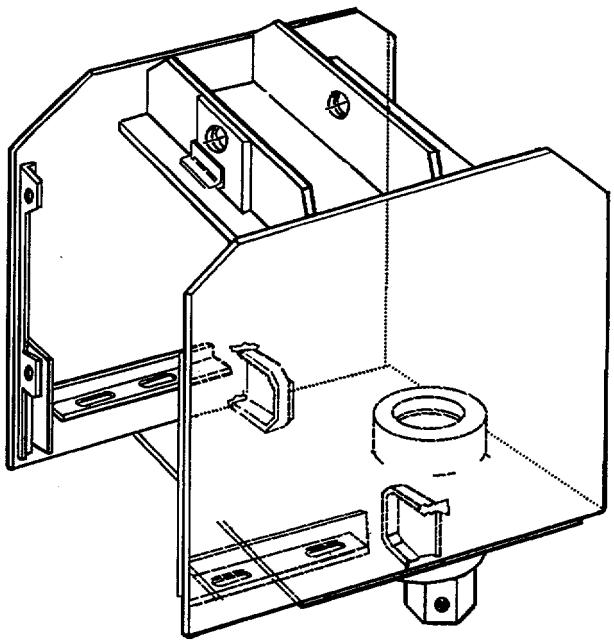
Materials and Parts:
Tags

a. Removal.

1. and remove all remaining internal parts and hardware. Note removal sequence. Only main housing should remain.

b. Installation.

1. Install all parts removed in a. Removal above into replacement main housing using sequence noted during removal.



FOLLOW ON TASKS

Install Shaft Bearings and Seals (para. 4-28).
Install Motor Plate (para.4-23).

NOTE
Replacement housing may need CARC painting (see TM 43-0139 Painting of Army Materiel and AR 750-1, para 4-41, Painting CPP and CARC for Army Materiel).

END OF TASK

CHAPTER 5
DIRECT SUPPORT MAINTENANCE

SECTION I. REPAIR HYDRAULIC MOTOR

5-1. Hydraulic Motor Repair

This task covers: a. Repair

INITIAL SETUP

Tools:
Tool Kit, General Mechanics
5180-00-177-7033

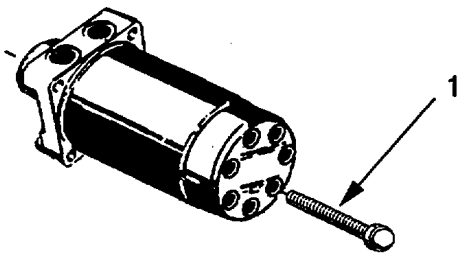
Equipment Conditions:
Hydraulic Motor Removed
(para 4-24).

Materials/Parts:
Seal Kit, Rags

a. Repair

NOTE
Repair of hydraulic motor consists of replacing the seals only. All repairs of hydraulic motor must take place in a clean type environment.

1. Remove seven bolts (1) from hydraulic motor.



2. Carefully pull the motor apart and clean each section. Inspect each section for cracks, breaks, general defects.

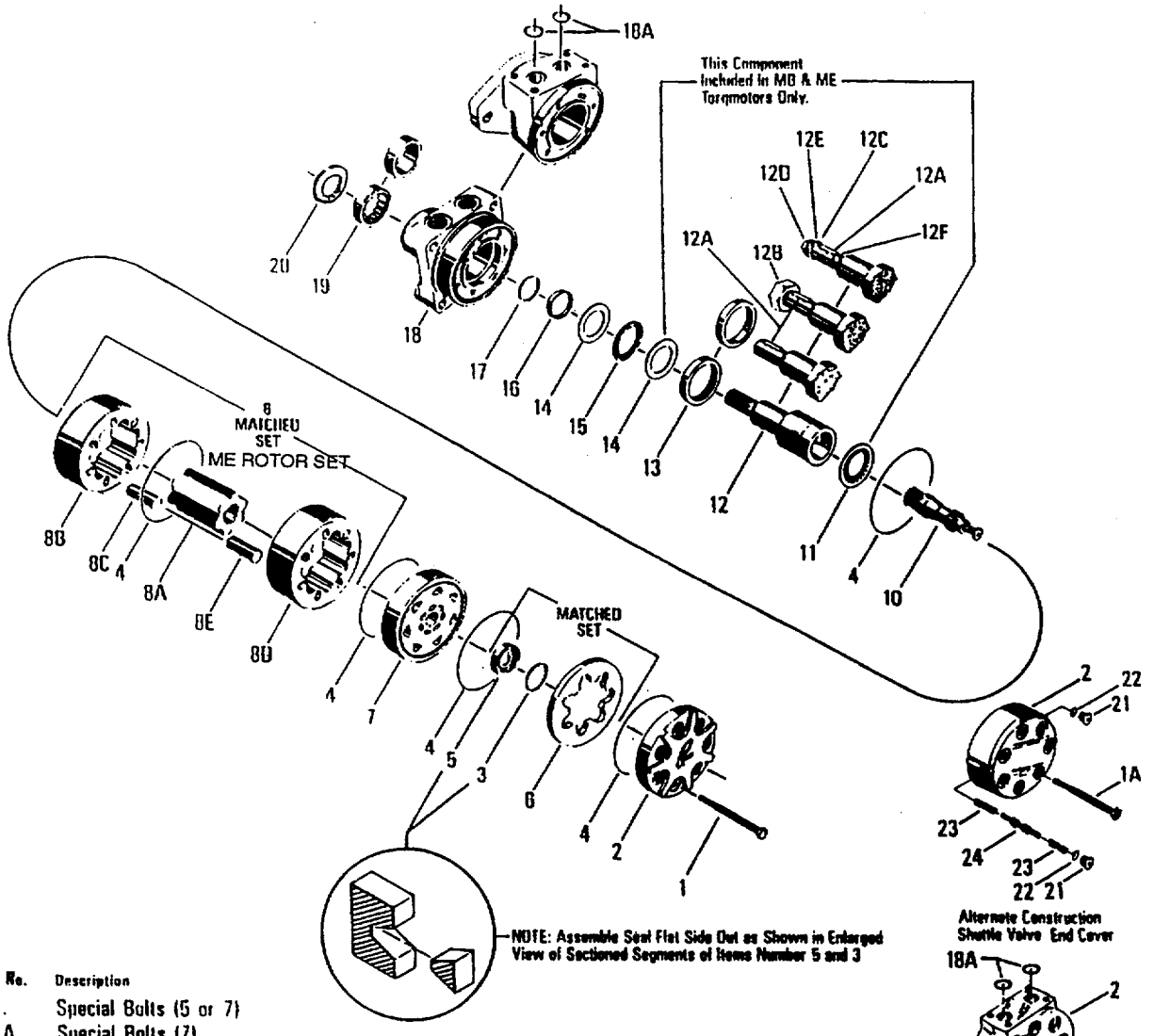
NOTE
If any defects are found replace the hydraulic motor

3. Install the seal kit into hydraulic motor. Use parts view on next page as guide and follow instructions seal kit.

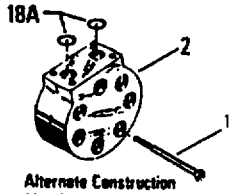
4. Install seven bolts (1) and torque to 22-26 ft.lb.(30-35 N.m).

FOLLOW ON TASKS
Install Hydraulic Motor (para 4-24).

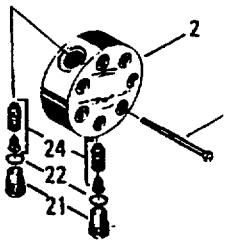
END OF TASK



Alternate Construction
Shuttle Valve End Cover



Alternate Construction
Manifold Port
End Cover



Alternate Construction
Relief Valve End Cover

Item No.	Description				
1.	Special Bolts (5 or 7)	11.	Thrust Bearing	20.	Dirt & Water Seal
1A.	Special Bolts (7)	12.	Coupling Shaft	21.	Plug (2)
1B.	Special Bolts (7)	12A.	Key	22.	O-Ring (2)
1C.	Special Bolts (7)	12B.	Nut	23.	Spring
2.	End Cover	12C.	Washer	24.	Valve (Shuttle or Relief)
3.	Seal Ring-Commutator	12D.	Bolt		
4.	Seal Ring (5)	12E.	Lockwasher		
5.	Commutator	12F.	Retaining Ring		
6.	Commutator Ring	13.	Bearing/Bushing, Inner		
7.	Manifold	14.	Thrust Washer		
8.	Rotor Set	15.	Thrust Bearing		
8A.	Rotor	16.	Seal		
8B.	Stator or Stator Half	17.	Backup Washer		
8C.	Vane (7)	18.	Housing		
8D.	Stator Half	18A.	O-Ring (2)		
8E.	Vane (7)	19.	Bearing/Bushing, Outer		
9.	Wear Plate				
10.	Drive Link				

APPENDIX A
WARRANTY

CONTENTS

The Earth Auger Assembly is not covered by the standard government warranty provisions associated with some TACOM managed Equipment.

However, the Lowe Manufacturing Company, Inc. (LOWE) will provide the using Army unit the standard warranty available to their commercial customers.

It is highly recommended that prior to any work being initiated or repair parts requested, LOWE be notified of such actions to ensure that no work and/or repairs are requested that are not covered under warranty.

Any cost associated with work and/or repairs accomplished by LOWE that is not covered under warranty, shall be the sole responsibility of the using Army unit.

This warranty is to be exercised exclusively between the using Army unit and LOWE.

Warranty registration of the ARMY equipment with LOWE is NOT required and it is NOT necessary to notify the TANK-automotive and Armaments Command (TACOM) regarding any warranty claim submission.

The local Warranty Control Office/Officer (WARCO) should pursue warranty coverage by administering the guidelines prescribed within the LOWE Commercial Warranty.

For information regarding this warranty, please contact:

Lowe Manufacturing Company, Inc.
P.O. Box 275
Readstown, Wisconsin 54652

Toll Free 1-800-356-9180
FAX 608-629-5666

APPENDIX A

WARRANTY

LOWE Manufacturing Company, Incorporated, (LOWE) is proud of its reputation for producing products with high standards of quality and workmanship. When LOWE products are used and maintained in the prescribed manner, you can be assured that will provide reliable service.

Period of Warranty: Any new LOWE product purchased and registered with LOWE will be warranted against defects in materials and workmanship for a period of one year from the date of purchase, subject to the exclusions noted herein. Replacement parts used in warranty repairs will be warranted for the balance of the applicable warranty period.

Warranty Registration: To be eligible for warranty coverage, LOWE product(s) first must be registered with LOWE. A warranty registration form is provided in the Operator's Manual. This form must be completed, signed, and mailed to LOWE by either the authorized selling dealer or the purchaser.

Customers Responsibility: Under the terms of this warranty, the customer will be responsible for ensuring the product is properly operated and maintained as specified in the Operator's Manual. The owner of the product shall give notice to an authorized dealer of any and all apparent defects within ten (10 days of discovery and make the product available for inspection and repairs at the dealer's place of business.

The customers responsibilities include all cost of normal maintenance, replacement wear parts, non-warranty repairs, accidents, collusion damage, or other repairs resulting from abnormal strain, neglect, or abuse. Specific examples include but are not limited to, bending or prying with the product, failure to monitor wear, use of contaminated hydraulic fluid, excessive oil flow or pressure, and operations with a broken or damaged part which causes another part to fail. If you have any specific questions on operation or maintenance, please contact your dealer for advice.

General Exclusions From Warranty: This warranty is not transferable and applies only to the original owner of the equipment. It does not apply to products sold or used previously, rental fleets, products subject to abuse, service other than normal, damage in transit or handling, normal wear of products which in the opinion of LOWE have had unauthorized alterations or repair.

LOWE will replace any warrantable parts with LOWE parts. LOWE will not pay for unauthorized parts, nor will also not pay for freight, labor, travel time, or mileage connected with the replacement of warranty parts. LOWE will also not pay third party repair or replacement charges.

All defective parts against which warranty claims are made must first be returned to LOWE, freight prepaid, in accordance with the LOWE Official Return Policy current at the time of warranty claim. The hydraulic motor(s) used in LOWE products are warranted by the motor manufacturer, and, in case of possible warranty failure, must be returned to LOWE or the nearest hydraulic motor distributor for service. Any attempt by you, your dealer, or another company to repair the motor will result in denial of warranty credit.

This warranty is in lieu of all other warranties, expressed or implied. Any claims for incidental or consequential damages are hearby disclaimed by LOWE and excluded from this Warranty. LOWE neither assumes nor authorizes any person or company to assume for it any other obligations or liabilities in connection with its products.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Model Number_____ Serial Number _____ Date Purchased_____

Owners Name and Address_____

Dealer's Name_____

Dealer's Address_____

City _____ State _____ Zip_____

Dealer's Phone Number_____

RAL 22592

APPENDIX B
MAINTENANCE ALLOCATION CHART (MAC)

Section I. INTRODUCTION

B-1. The Army Maintenance System MAC

a. This introduction (Section I) provides a general explanation of all maintenance and repair functions authorized at various maintenance levels under the standard Army Maintenance System concept.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels. Which are shown on the MAC in column (4) as:

Unit - includes two subcolumns, C (operator/crew) and O (unit) maintenance.

Direct Support - includes an F subcolumn.

General Support - includes an H subcolumn.

Depot - includes a D subcolumn.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2. MAINTENANCE FUNCTIONS. Maintenance functions are limited to and defined as follows: (see 3.2.5.2g for ammunition MAC exception).

a. **Inspect.** To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

b**. Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. **Service.** Operations required periodically to keep an item in proper operating condition, e.g., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

d. **Adjust**. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. **Align.** To adjust specified variable elements of an item to bring about optimum and desired performance.

f. **Calibrate.** To determine and cause correction to be made or to be adjusted on instruments or test measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. **Remove/Install.** To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h**. Replace.** To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and the assigned maintenance level is show as the 3rd position code of the SMR code.

i. **Repair.** The application of maintenance services, including fault location /troubleshooting2, removal / installation, and disassembly / assembly3 procedures and maintenance actions4 to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. **Overhaul.** That maintenance effort (service/action) prescribed to restore an item to completely serviceable/ operational condition as required by maintenance standards in appropriate technical publications (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army.
Overhaul does not normally return an item to like new condition.

k. **Rebuild.** Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g., hour/miles) considered in classifying Army equip ment/components.

B-3. Explanation of Columns in the MAC, Section II.

a. **Column 1, Group Number.** Column 1 lists functional grouping codes, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly.

b. **Column 2, Component / Assembly.** Column 2 contains the item names of components, assemblies subassemblies, and modules for which maintenance is authorized.

c. **Column 3, Maintenance Function.** Column 3 lists the functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, see Paragraph B-2.)

d. **Column 4, Maintenance Level**. Column 4 specifies each level of maintenance authorized to perform each function listed in Column 3, by indicating work time required (expressed as manhours in whole hours or decimals) in the appropriate subcolumn. This work-time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work-time figures are shown for each level. The work-time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance levels are as follows:

C - Operator or crew maintenance
O - Unit maintenance
F - Direct support maintenance
L - Specialized Repair Activity (SRA)s
H - General support maintenance
D - Depot maintenance

[1] Services - Inspect, test, service, adjust, align, calibrate, and/or replace.
[2] Fault location/troubleshooting - The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UT).
[3] Disassembly/assembly - The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).
[4] Actions - Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.
[5] This maintenance level is not included in Section II, column (4) of the Maintenance Allocation Chart. Functions to this level of maintenance are identified by a work-time figure in the "H" column of Section II, column (4), and an associated reference code is used in the Remarks column (6). This code is keyed to Section IV, Remarks, and the SRA complete repair application is explained there.

e. **Column 5, Tools and Test Equipment reference code.** Column 5 specifies, by code, those common tools sets (not individual tools), common TMDE, and special support equipment required to perform the designated function. Codes are keyed to tools and test equipment in section III.

f. **column 6, Remarks**. When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks contained in Section IV.

B-4. Explanation of Columns in Tool and Test Equipment Requirements, Section III.

a. **Column 1, Reference Code.** The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. **Column 2, Maintenance Level.** The lowest level of maintenance authorized to use the tool or test equipment.

c. **Column 3, Nomenclature**. name or identification the tool or test equipment.

d. **Column 4, National Stock Number.** The National
Stock Number of the tool or test equipment.

e. **Column 5, Tool Number.** The manufacturer's number, model number, or type number.

B-5. Explanation of Columns In Remarks, Section IV.

a. **Column 1, Remarks Code**. The code recorded in column 6, Section II.

b. **Column 2, Remarks.** This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

SECTION II. MAINTENANCE ALLOCATION CHART FOR EARTH AUGER ASSEMBLY

(1)	(2)	(3)	(4) Maintenance Level					(5)	(6)
			UNIT		DIRECT SUPPORT	GEN. SUPPORT	DEPOT		
Group Number	Component/Assembly	Maintenance Function	C	O	F	H	D	Tools and Equipment	Remarks
	EARTH AUGER ASS'Y								
7400	Cranes, Shovels And Earth Moving Equipment Components								
7473	**Lift and Swing Mechanisms**								
	Connecting Link	Inspect	0.1						
	TBH	Replace		0.1					
7474	**Drive Mechanism**								
	Housing								
	Main Housing	Inspect	0.1						
		Replace			2.0				
	Front Safety Cover	Inspect	0.1						
		Replace		0.1					
	Rear Safety Cover	Inspect	0.1						
		Replace		0.1					
	Chain	Inspect		0.1					
		Service		0.2					
		Adjust		0.4					
		Replace		0.8					
		Repair		0.9					A.
	Output Shaft	Inspect	0.1						
		Replace		1.0					
	Shaft Bearings	Inspect		0.1					
		Service		1.3					
		Adjust		0.8					
		Replace		1.3					
	Driven Sprocket	Inspect		0.1					
		Replace		1.0					

Section II. MAINTENANCE ALLOCATION CHART FOR EARTH AUGER ASSEMBLY

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment	(6) Remarks
			UNIT		DIRECT SUPPORT	GEN. SUPPORT	DEPOT		
			C	O	F	H	D		
	Motor Sprocket	Inspect		0.1					
		Replace		0.8					
	Hydraulic Motor	Inspect		0.1					
		Replace		1.1					
		Repair			1.8				B.
	Motor Plate	Inspect		0.1					
		Replace		1.0					
7475	**Spindle and Cutter**								
	Auger	Inspect	0.1						
		Replace	0.1						
	Auger Teeth	Inspect	0.1						
		Replace	0.2						C.
	Auger Center Point	Inspect	0.1						
		Replace	0.1						
7488	**Pipes, Hoses, Valves**								
	Elbows	Inspect	0.1						
		Replace		0.4					
	Hoses	Inspect	0.1						
		Replace		0.3					

Section III. TOOLS AND TEST EQUIPMENT FOR EARTH AUGER ASSEMBLY.

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	0	General Mechanics Tool Kit	5180-00-177-7033	SC5180-90-CL-N26

Section IV. REMARKS FOR EARTH AUGER ASSEMBLY.

REFERENCE CODE	REMARKS
A.	Repair of the chain consists of substituting a master link for the defective link in the chain. temporary fixes. A new chain must be ordered whenever the spare link is used in a repair procedure.
B.	Full repair of the hydraulic motor entails replacing all the seals within the motor using Seal Kit SK000092 as illustrated in Chapter 5. This procedure is normally done in a "clean room" environment.
C.	Outside Auger teeth tend to wear at a faster rate than inside teeth. Exchanging inside teeth with outside teeth will prolong periods between full replacement of Auger Teeth.

APPENDIX C

COMPONENTS OF END ITEM AND BASIS ISSUE ITEMS LIST

The Earth Auger Assembly does not have any Components of End Item

BASIC ISSUE ITEMS

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC and Part Number	Usable On Code	(4) U/M	(5) QTY Req'd
1		Hex Pin (0NAG9) L-50A		EA	1
2		Hitch Pin Clip (0CUJ4) HAIR-12		EA.	1
3		Carbide Tooth Assembly (0NAG9) L13-G558		EA.	4
4		Center Point (ONAG9) Cap-55B		EA	1
5		Rope 6 Ft. Length (ONAG9) 560Rp		EA.	1
6		Rope 9 Ft. Length (ONAG9) 590Rp		EA.	1
7		Snap Ring Pliers (ONAG9) 1234		EA.	1

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

The Earth Auger Assembly does not have any Additional Authorization Items for its support.

APPENDIX E

SECTION II. EXPENDABLE SUPPLIES AND MATERIALS LIST.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	O	8030-01-054-0740	Compound, Sealing, Pipe Thread	CC
2	C		Grease, Automotive and Artillery (81349) MIL-G-10924	oz.
		9150-00-065-0029	2-I/V4oz. Tube	oz.
		9150-00-936-1017	14 oz. cartridge	oz.
		9150-00-190-0904	1 lb. can	lb.
		9150-00-190-0905	5 lb. can	lb.
		9150-00-190-0907	35 lb. can	lb.
3	C		Lubricant, Silicone, Heavy Duty Six - 9.75 oz. Spray Cans (5573) 21946	pg.
4	C		Rag, Wiping: Cotton and cotton synthetic (58536) A-A-531	lb.
4	C		Solvent, Dry Cleaning, SD type II (58536) P-D-680	
		6850-00-110-4498	1 pint	pt.
		6850-00-664-5685	1 quart	qt.
		6850-00-274-5421	5 gallons	gl.
		6850-00-285-8011	55 gallons	gl.
5	C		Tags, Identification (81349) MIL-T-1 2755	
		9905-00-537-8954	Red (Bundle of 50)	ea.
		9905-00-537-8955	Yellow (Bundle of 50)	ea.
		9905-00-537-8956	Green (Bundle of 50)	ea.
		9905-00-537-8957	White (Bundle of 50)	ea.

REPAIR PARTS AND SPECIAL TOOLS LISTS FOR EARTH AUGER ASSEMBLY

SECTION I. INTRODUCTION

1. Scope.

This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of Unit, Direct Support and General Support Maintenance of the Earth Auger Assembly. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

2. General.

In addition to Section I. Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. *Section II*. Repair Parts List. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Bulk materials are listed in item name sequence. Repair kits are listed separately in their own functional group within Section II. Repair parts for repairable special tools are also listed in the section. Items listed are shown on the associated illustration(s)/figure(s).

b. *Section* III. Special Tools List. A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in DESCRIPTION AND USABLE ON CODE column) for the performance of maintenance.

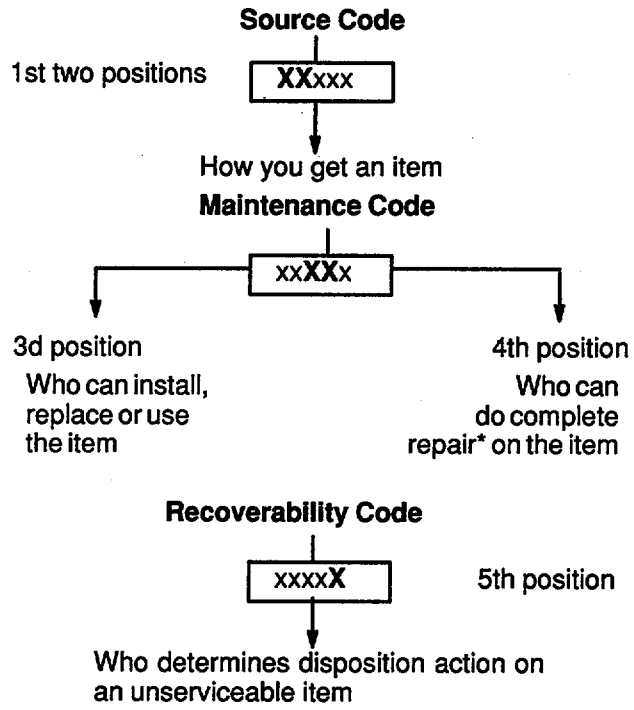
c. *Section IV.* National Stock Number and Part Number Cross-reference Indexes. A list, in National Item Identification Number (NIIN) sequence, of all National stock numbered items appearing in the listing, followed by a list in alphanumeric sequence of all part numbers appearing; in the listings. National stock numbers and part numbers are cross-referenced to each illustration, figure and item number appearance

The figure and item number index lists figure and item numbers in alphanumeric sequence and cross-references NSN, CAGE and part numbers.

3. Explanation of Columns (Sections II and III).

a. *ITEM NO. (Column (1)).* Indicates the number used to identify items called out in the illustration.

b. *SMR CODE (Column (2)).* The Source, Maintenance, and Recoverability (SMR) code is a 5-position code containing supply/requisitioning information, maintenance category authorization criteria and disposition instructions, as shown in the following breakout:



**Complete Repair*. Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

(1) Source Code. The source code tells you how to get an item needed for maintenance, repair or overhaul of an end item/equipment. Explanations of source codes follows:

Code	Application/Explanation
PA PB PC** PD PE PF PG	Stocked items; use the applicable NSN to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in 3d position of the SMR code. **Items coded PC are subject to deterioration.
KD KF KB	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category indicated in the 3d position of the SMR code. The complete kit must be requisitioned and applied.
MO-*(Made at UM AVUM Level)* MF-*(Made at DS/ AVUM Level)* MH-(Made at GS Level) ML-*(Made at Specialized Repair Act (SRA))* MD-*(Made at Depot)*	Items with these codes are not to be requested/ requisitioned individually. They must be made from bulk material which is identi fied by the part number in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the Bulk Material group of the repair parts list in this RPSTL. If the item is authorized to you by the 3d position code of the SMR code, but if the source code indicates it is made at a higher level, order the item from the higher level of maintenance.
AO-(*Assembled by UM/A VUM Level*) AF-*(Assembled by DS/A VIM Level)* AH-*(Assembled by GS Category)* AL-*(Assembled by SRA)* AD-*(Assembled by Depot)*	Items with these codes are not to be requested/requisitioned individually The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the 3d position code of the SMR code by authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.
XA-	Do not requisition an "XA"-coded Item.Order its next higher assembly. (Also, refer to the NOTE below.)
XB-	If an "XB" item is not available from salvage order it using the CAGE and part number given
XC-	Installation drawing, diagram, instruction sheet, field service drawing, that is identified by the manufacturer's part number.
XD-	Item is not stocked. Order an "XD"-coded item through normal supply channels using the CAGE and part number given, if no NSN is available.

NOTE: Cannibalization or controlled exchange, when authorized, may be used as source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 700-42.

(2) Maintenance Code. Maintenance codes tell you the level(s) of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR Code as follows:

(a) The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace and use an item. The maintenance code entered in the third position will indicate authorization to one of the following levels of maintenance:

Code	Application/Explanation
C -	Crew or operator maintenance done within unit or aviation unit maintenance.
O -	Unit maintenance or aviation unit category can remove, replace and use the item.
F -	Direct support or aviation intermediate level can remove, replace and use the item.
H -	General support level can remove, replace and use the item.

L - Specialized repair activity can remove, replace and use the item.

D - Depot level can remove, replace and use the item.

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (i.e., perform all authorized repair functions.) (NOTE: Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.) This position will contain one of the following maintenance codes:

Code	Application/Explanation
O -	Unit maintenance or Aviation unit is the low est level that can do complete repair of the item
F -	Direct support or aviation intermediate is the lowest level that can do complete repair of the item.
H -	General support is the lowest level that can do complete repair of the item.
L -	Specialized repair activity is the lowest level that can do complete repair of the item.
D -	Depot is the lowest level that can do complete repair of the item.
Z-	Nonreparable. No repair is authorized.
B -	No repair is authorized. (No parts or special tools are authorized for the maintenance of a "B" coded item). However, the item may be reconditioned by adjusting, lubrication, etc, at the user level.

(3) Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR Code as follows:

Code	Application/Explanation
Z-	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in 3d position of the SMR code.
O -	Reparable item. When uneconomical to repair, condemn and dispose of the item at unit maintenance or aviation unit level.
F-	Reparable item. When uneconomically reparable, condemn and dispose of the item at the direct support or aviation intermediate level.
H -	Reparable item. When uneconomically reparable, condemn and dispose of the item at the general support level
D -	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level.
L-	Reparable item. Condemnation and disposal of item not authorized below specialized repair activity (SRA).
A -	Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

c. *CAGEC (Column (3)).* The Commercial And Government Entity (CAGE) Code (C) is a 5-digit alphanumeric code which is used to identify the manufacturer, distributor or Government agency, etc., that supplies the item.

d. *PART NUMBER (Column (4)).* Indicates the primary number used by the manufacturer (individual, company, firm, corporation or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards and inspection requirements to identify an item or range of items.

NOTE: When you use a NSN to requisition an item, the item you receive may have a different part number from the part ordered.

e. DESCRIPTION AND USABLE ON CODE (UOC)
(Column (5)). This column includes the following information:

(1) The Federal item name and, when required, a minimum description to identify the item.

(2) The physical security classification is indicated by the parenthetical entry (insert applicable physical security classification, e.g., Phy Sec Cl (C)- Confidential, Phy Sec Cl (S) - Secret, Phy Sec Cl (T) Top Secret).

(3) Items that are included in kits and sets are listed below the name of the kit or set on Figure KIT.

(4) Spare/repair parts that make up and assembled item are listed immediately following the assembled item line entry.

(5) Part numbers for bulk materials are referenced in this column in the line item entry for the item to be manufactured/fabricated.

(6) When the item is not used with all serial numbers of the same model, the effective serial numbers are shown on the last line(s) of the description (before UOC) Not applicable.

(7) The usable on code, when applicable (see paragraph 5, Special information)

(8) In the Special Tools List section, the basis of issue (BOI) appears as the last line(s) in the entry for each special tool, special TMDE and other special support equipment. When density of equipments supported exceeds density spread indicated in the basis of issue, the total authorization is increased proportionately.

(9) The statement "END OF FIGURE" appears just below the last item description in Column 5 for a given figure in both Section II and Section III.

f. QTY (Column (6)). The QTY (quantity per figure column) indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and the quantity may vary from application to application.

4. Explanation of Columns (Section IV).

a. NATIONAL STOCK NUMBER (NSN) INDEX.

(1) STOCK NUMBER column. This column lists the NSN by National item identification number (NIIN) sequence. The NIIN consists of the last nine

NSN

digits of the NSN (i.e., 5305-01-674-1467)

NIIN

When using this column to locate an item, ignore the first 4 digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

(2) FIG. column. This column lists the number of the Figure where the item is identified/located. The figures are in numerical order in Section II and Section III.

(3) ITEM column. The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

b. *PART NUMBER INDEX*. Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e., vertical arrangement of letter and number combination which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order.)

(1) CAGEC column. The Commercial And Government Entity (CAGE) Code (C) is a 5 digit alphanumeric code used to identify the manufacturer, distributor or Government agency, etc., that supplies the item.

(2) PART NUMBER column. Indicates the primary number used by the manufacturer (individual, firm, corporation or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

(3) STOCK NUMBER column. This column lists the NSN for the associated part number and manufacturer identified in the PART NUMBER and CAGEC columns to the left.

(4) FIG. column. This column lists the number of the figure where the item is identified/located in Section II and III.

(5) ITEM column. The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

c. *FIGURE AND ITEM NUMBER INDEX.*

(1) FIG. column. This column lists the number of the figure where the item is identified/located in Section II and III.

(2) ITEM column. The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

(3) STOCK NUMBER column. This column lists the NSN for the item.

(4) CAGEC column. The Commercial And Government Entity (CAGE) Code (C) is a 5 digit alphanumeric code used to identify the manufacturer, distributor or Government agency, etc., that supplies the item.

(5) PART NUMBER column. Indicates the primary number used by the manufacturer (individual, firm, corporation or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards and inspection requirements to identify an item or range of items.

5. Special Information.

Use the following subparagraphs as applicable:

a. *USABLE ON CODE*. The usable on code appears in the lower left corner of the Description Column heading. Usable on codes are shown as "UOC:..." in the Description Column (justified left) on the first line applicable item description/nomenclature. Uncoded items are applicable to all models. Identification of the usable on codes used in the RPSTL are:

Code	Used On
GE1	**Model SEE**

b. *FABRICATION INSTRUCTIONS*. Bulk materials required to manufacture items are listed in the Bulk Material Functional Group of this RPSTL. Part numbers for bulk materials are also referenced in the description column of the line item entry for the item to be manufactured/fabricated. Detailed fabrication instructions for items source coded to be manufactured or fabricated are found in the applicable maintenance level manual.

c. *ASSEMBLY INSTRUCTION*. Detailed assembly instructions for items source coded to be assembled from component spare/repair parts are found in the applicable maintenance level manual. Items that make up the assembly are listed immediately following the assembly item entry or reference is made to an applicable figure.

d. *KITS.* Line item entries for repair parts kits appear in group 9401 in Section II.

e. *ASSOCIATED PUBLICATIONS*. The publications listed below pertain to the Tractor, Wheeled, 4 x 4 DED, Small Emplacement Excavator (SEE).

TM5-2420-224-10	Operators Manual
TM 5-2420-224-1 0-HR	Hand Receipt
LO5-2420224-12	Lubrication Order
TM5-2420-224-24P	RPSTL
TM5-2420-224-20	Unit Maintenance Man.
TM5-2420-224-34	Dir & Gen Sup Man.
DMWR5-2420-224	Depot Main Work Req.

6. How to Locate Repair Parts.

a. When National Stock Number or Part Number is Not Known.

(1) First. Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the some groups.

(2) Second. Find the figure covering the assembly group or subassembly group to which the item belongs.

(3) Third. Identify the item on the figure and use the Figure and Item Number Index to find the NSN.

b. When National Stock Number or Part Number is Known.

(1) First. Using the National Stock Number or the Part Number Index, find the pertinent National Stock Number or Part Number. The NSN index is in National Item Identification Number (NIIN) sequence (see 4.a(1)). The part numbers in the Part Number index are listed in ascending alphanumeric sequence (see 4.b). Both indexes cross-reference you to the illustration/figure and item number of the item you are looking for.

(2) Second. Turn to the figure and item number, verify that the item is the one you're looking for, then locate the item number in the repair parts list for the figure.

7. Abbreviations.

For standard abbreviations see MIL-STD-1 2D, Military Standard Abbreviations For Use On Drawings, Specifications, Standards And In Technical Documents.

1	2
1 thru 3	2 and 3

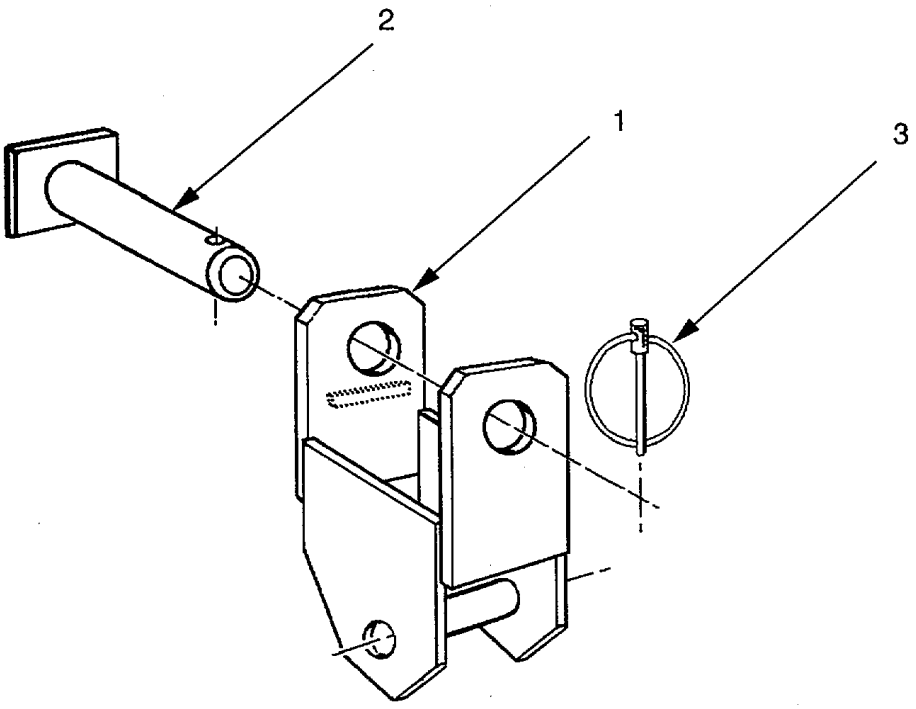


FIGURE 1. CONNECTING LINK

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 74 CRANES, SHOVELS AND EARTH MOVING EQUIPMENT COMPONENTS	
				GROUP 7473 LIFT AND SWING MECHANISMS	
				FIGURE 1 - CONNECTING LINK	
1	PAOZZ	ONAG9	10-012MS	CONNECTING LINK, RIG	1
2	PFOZZ	ONAG9	10-013MS	PIN, STRAIGHT, HEADED.....	1
3	PAOZZ	OJKFO	826/00512A	PIN, STRAIGHT, HEADED.....	1
				END OF FIGURE	

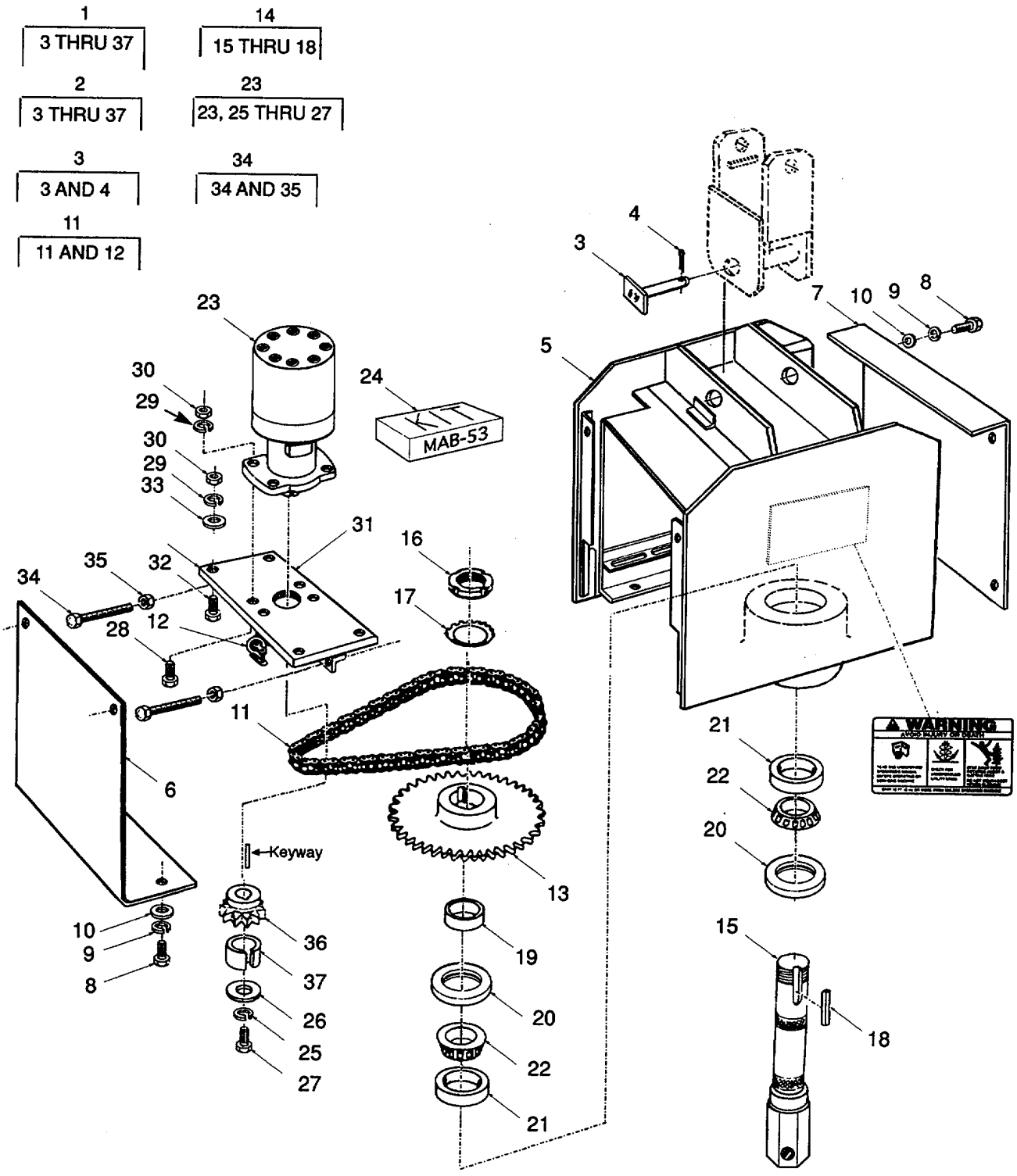


FIGURE 2. DRIVE MECHANISM

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 7474 DRIVE MECHANISM	
				FIGURE 2 - DRIVE MECHANISM	
1	PFOFZ	0NAG9	1650HMS-012	DRIVE UNIT WITH CONNECTING LINK	1
2	PFOFZ	0NAG9	165OHMS	DRIVE UNIT WITHOUT CONNECTING LINK	1
3	PFOZZ	0NAG9	10-013	.PIN, STRAIGHT, HEADED	1
4	PFOZZ	96906	MS24665-623	..PIN, COTTER	1
5	PFOZZ	0NAG9	CR-001	.HOUSING, MECHANICAL	1
6	PFOZZ	0NAG9	CR-002A	.COVER, ACCESS	1
7	PFOZZ	0NAG9	CR-004A	.COVER, ACCESS	1
8	PFOZZ	80204	818218H036C075D	.SCREW, CAP, HEXAGON H	8
9	PFOZZ	96906	MS35338-46	.WASHER, LOCK 3/8	8
10	PFOZZ	96906	MS27183-14	.WASHER, FLAT	8
11	PAOZZ	0NAG9	46-60H	.CHAIN	1
12	PAOZZ	0NAG9	C-60H	..CHAIN, MASTER LINK	1
13	PAOZZ	0NAG9	40-60	.SPROCKET, WHEEL	1
14	PFOZZ	0NAG9	HE255-13	.SHAFT, SHOULDERED	1
15	XAOZZ	0NAG9	HE255-13A	..SHAFT, OUTPUT	1
16	PFOZZ	60038	TN-10	..NUT, PLAIN, ROUND	1
17	PFOZZ	60038	TW110	..WASHER, KEY	1
18	PFOZZ	0NAG9	10-15	..SHAFT KEY	1
19	PFOZZ	0NAG9	10-14	.SPACER, RING	1
20	PAOZZ	0NAG9	10-25028	.SEAL, PLAIN, ENCASED	2
21	PAOZZ	60038	362A	.CUP, TAPERED ROLLER	2
22	PAOZZ	60038	368A	.CONE AND ROLLERS, TA	2
23	PAOFF	77640	ME180103AAAB	.HYDRAULIC MOTOR	1
24	PFFZH	77640	SK000092	..PARTS KIT, SEAL REPL	1
25	PFOZZ	52793	CW7435-57C	..WASHER, LOCK	1
26	PFOZZ	96906	MS27183-21	..WASHER, FLAT	1
27	PFOZZ	96906	MS90727-158	..SCREW, CAP, HEXAGON H	1
28	PFOZZ	80204	818218H050C200N	.SCREW, CAP, HEXAGON H	4
29	PFOZZ	0AHU0	09169665	.WASHER, LOCK	8
30	PFOZZ	96906	MS51967-14	.NUT, PLAIN, HEXAGON	8
31	PFOZZ	0NAG9	CR-005	.MOTOR PLATE, HYDRAUL	1
32	PFOZZ	80204	81821BH050CI50N	.SCREW, CAP, HEXAGON H	4
33	PFOZZ	96906	MS27183-17	.WASHER, FLAT	4
34	PFOZZ	0NAG9	10-006	.ROD, CONTINUOUS THRE	2
35	PFOZZ	96906	MS51967-14	..NUT, PLAIN, HEXAGON	1
36	PAOZZ	0NAG9	11-60	.SPROCKET, WHEEL	1
37	PFOZZ	0NAG9	10-007	.SPACER, SLEEVE	1

END OF FIGURE

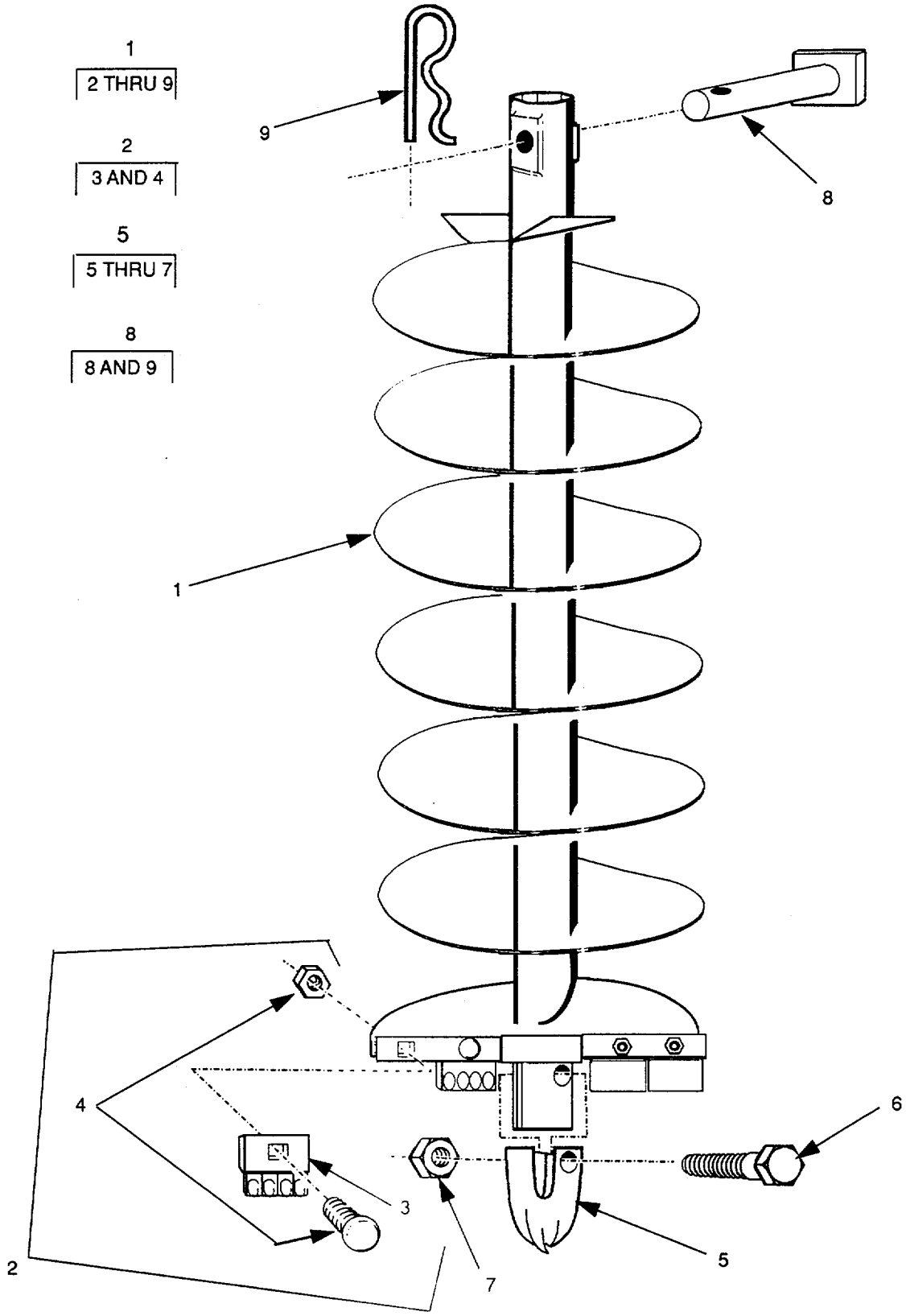


FIGURE 3. CUTTING COMPONENTS

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 7475 SPINDLE AND CUTTER	
				FIGURE 3 - CUTTING COMPONENTS	
1	PAOZZ	0NAG9	DFB-12H-MS	AUGER, EARTH	1
2	PAOZZ	0NAG9	L13-G558	.TOOTH, SURFACE RIPPI	4
3	PAOZZ	0NAG9	L-1336	..TOOTH, SURFACE RIPPI PART OF KIT P/N L13-G558	1
4	PFOZZ	0NAG9	G558-112	..NUT AND BOLT PART OF KIT P/N L13-G558	1
5	PAOZZ	0NAG9	CAP-55B	.CENTER POINT CAP	1
6	PFOZZ	80204	818218H038C200N	..SCREW, CAP, HEXAGON	1
7	PFOZZ	96906	M551967-8	..NUT, PLAIN, HEXAGON	1
8	PAOZZ	0NAG9	L-50A	.HEX PIN	1
9	PAOZZ	0CUJ4	HAIR-12	..CLIP, RETAINING	1

END OF FIGURE

1
1 Thru 3

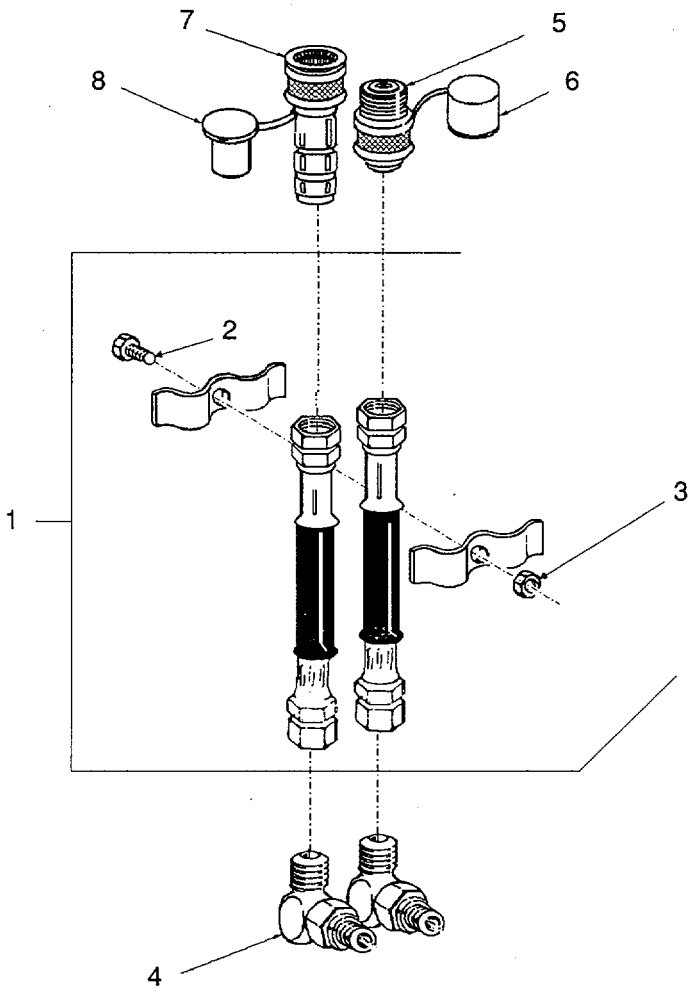


FIGURE 4. ELBOWS, HOSES, AND BRACKETS

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 7488 PIPES, HOSES, VALVES	
				FIGURE 4 - ELBOWS, HOSES AND BRACKETS	
1	PFOZZ	0NAG9	10-009MS	HOSE AND CLAMP ASSY	1
2	PFOZZ	80204	B1821BH031C150N	.BOLT, MACHINE	1
3	PFOZZ	96906	MS51967-5	.NUT, PLAIN, HEXAGON	1
4	PFOZZ	30327	849-FSO-08X10	ELBOW, TUBE TO BOSS	2
5	PFOZZ	01276	FD45-1002-12-12	COUPLING HALF, QUICK	1
6	PFOZZ	01276	F045-1040-12	CAP, PROTECTIVE, DUST	1
7	PFOZZ	01276	F045-1003-12-12	COUPLING HALF, QUICK	1
8	PFOZZ	01276	F045-1041-12	PLUG, PROTECTIVE, DUS	1

END OF FIGURE

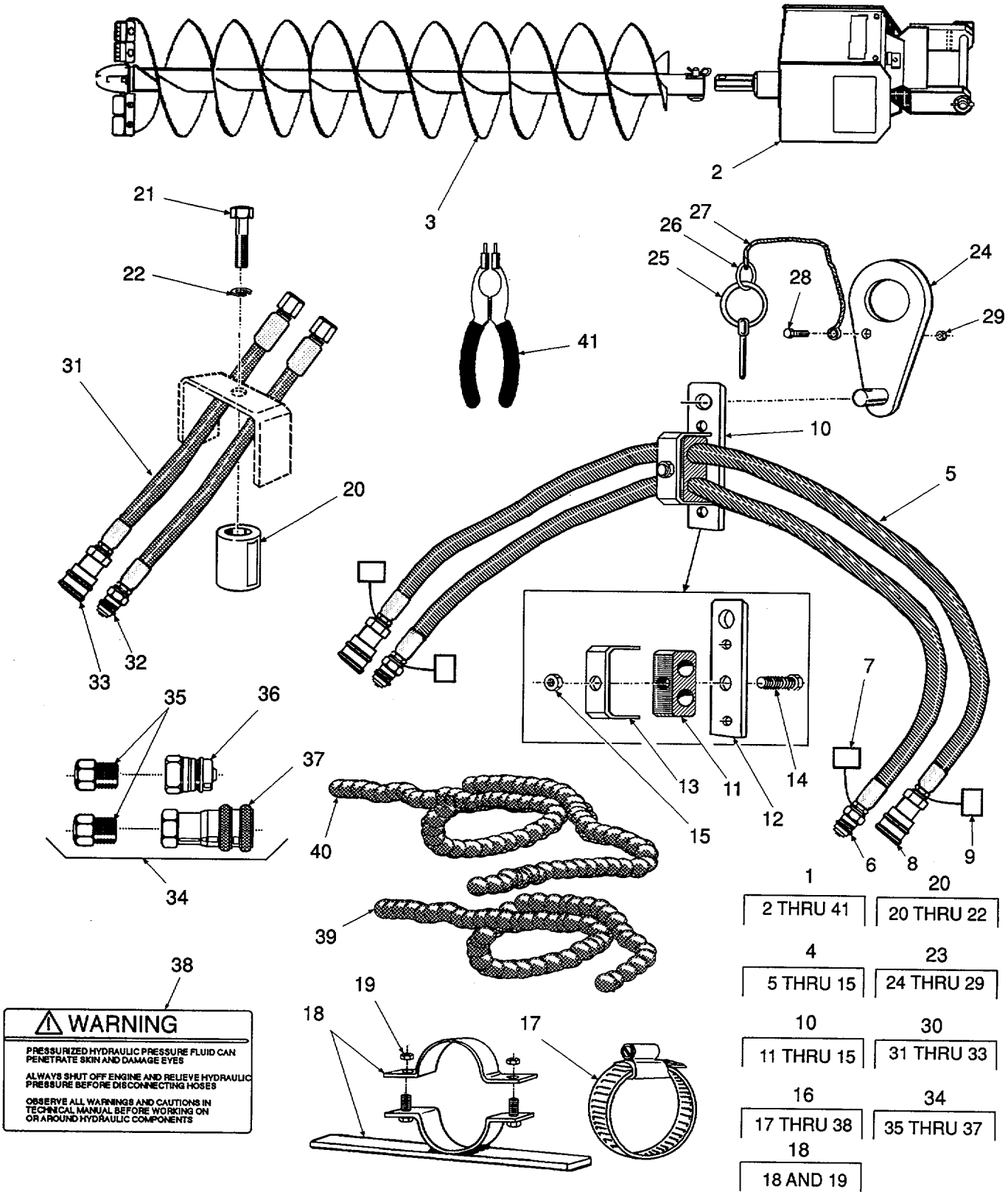


FIGURE 5. INSTALLATION KIT

(1) ITEM NO	(2) SMR CODE	(3) CAGEC	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES (UOC)	(6) QTY
				GROUP 94 INSTALLATION KITS	
				GROUP 9404 INSTALLATION KITS	
				FIGURE 5 - INSTALLATION KITS	
1	PAOZZ	0NAG9	1650CEH-MS	INST KIT W/AUG ASSY	1
2	PFOFZ	0NAG9	165C'MS-012	.DRIVE UNIT	1
3	PAOZZ	0NAG9	DFB-12H-MS	.AUGER, EARTH	1
4	PFOZZ	0NAG9	3451	.HOSE ASSY,138"X.75	1
5	PFOZZ	0NAG9	HR2T12-138	..HOSE ASSEMBLY, NONME	1
6	PFOZZ	01276	FD45-1G02-12-12	..COUPLING HALF, QUICK	2
7	PFOZZ	01276	F045-1040-12	..CAP, PROTECTIVE, LIST	2
8	PFOZZ	01276	FD45-1003-12-12	..COUPLING HALF, QUICK	2
9	PFOZZ	01276	FD45-1041-12	..PLUG, PROTECTIVE, DUS	2
10	PFOZZ	0NAG9	MSHC-D	..HANGER ASSY, HOSE	1
11	PFOZZ	0NAG9	M3447	...CUSHION, HOSE HANGER	1
12	PFOZZ	0NAG9	MSHC-5	...PLATE, MOUNTING	1
13	PFOZZ	0NAG9	MSHC-2	...CLAMP	1
14	PFOZZ	80204	81821BH038C300N	...SCREW, CAP, HEXAGON H	1
15	PFOZZ	96906	MS51922-17	...NUT, SELF-LOCKING, HE	1
16	PAOZZ	0NAG9	CKIT	.KIT, CONVERSION	1
17	PFOZZ	96906	MS35842-16	..CLAMP, HOSE	2
18	PFOZZ	0NAG9	HR2T-30	..CLAMP, HOSE	1
19	PFOZZ	96906	MS51967-2	...NUT, PLAIN, HEXAGON	2
20	PFOZZ	0NAG9	DOM	..SPACER	1
21	PFOZZ	80204	B18218HO38C175N	...SCREW, CAP, HEXAGON H	1
22	PFOZZ	96906	MS35338-46	...WASHER, LOCK 3/18	1
23	PFOZZ	0NAG9	MSHC-A	..BRACKET	1
24	PFOZZ	0NAG9	MSHC-34	...HANGER BASE, HOSE	1
25	PFOZZ	0CUJ4	HANG-12	...PIN, RING, SELF-LOCK	1
26	PFOZZ	0CUJ4	RING-11	...RING, RETAINING	1
27	PFOZZ	0CUJ4	L47P-600-2	...LANYARD	1
28	XBOZZ	0NAG9	6-32RDHSLTD	...SCREW, MACHINE PAN-H	1
29	XBOZZ	0NAG9	6-32NYLOCK	...NUT, LOCK, HEX HEAD	1
30	PFOZZ	0NAG9	MSHC-8	..HOSE ASSEMBLY, NONME	1
31	PFOZZ	0NAG9	HR2T10O-30	...HOSE ASSEMBLY ,NONME	2
32	PFOZZ	01276	F045-1002-12-12	...COUPLING HALF, QUICK	1
33	PFOZZ	01275	FD45-1003-12-12	...COUPLING HALF, QUICK	1
34	PFOZZ	0NAG9	MSHC-C	..ADAPTER ASSEMBLY	1
35	PFOZZ	01276	2018-12-12S	...ADAPTER, STRAIGHT, PI	2
36	PFOZZ	01276	FD45-1002-12-12	...COUPLING HALF,QUICK1	1
37	PFOZZ	01276	F045-1003-12-12	...COUPLING HALF, QUICK	1
38	PFOZZ	0NAG9	SD1-MS	..DECAL	1
39	XBOZZ	0NAG9	56OROPE	.ROPE, NYLON 1/2X6 FT	1
40	XBOZZ	0NAG9	590ROPE	.ROPE, NYLON 1/2X9 FT	1
41	XBOZZ	0NAG9	1234	.PLIERS, SNAP RING	1

END OF FIGURE

CROSS- REFERENCE-INDEXES

NATIONAL STOCK NUMBER INDEX

STOCK NUMBER	FIG.	ITEM	STOCK NUMBER	FIG.	ITEM
5310-00-003-4094	2	29			
5310-00-003-9174	2	26			
5305-00-071-2069	2	32			
5305-00-071-2071	2	28			
5310-00-080-6004	2	10			
5310-00-087-4652	5	15			
3110-00-100-0220	2	22			
3110-00-100-0295	2	21			
5305-00-115-9526	2	8			
5310-00-185-6462	2	16			
5310-00-186-0969	2	17			
5306-00-226-4831	4	2			
5315-00-297-2444	2	4			
4730-00-608-1044	4	7			
	5	8			
	5	33			
	5	37			
5305-00-726-2525	2	27			
5310-00-732-0558	3	7			
5310-00-761-6882	5	19			
5310-00-768-0318	2	30			
	2	35			
5305-00-782-9489	3	6			
5310-00-809-5997	2	33			
5310-00-820-6653	2	25			
5305-00-821-3869	5	21			
5305-00-846-5703	5	14			
5310-00-880-7744	4	3			
4730-00-908-6294	5	17			
4730-01-192-4450	4	5			
	5	6			
	5	32			
	5	36			
5340-01-230-1646	4	6			
	5	7			
5340-01-236-2094	4	8			
	5	9			
4730-01-310-4669	5	35			
4730-01-311-4247	4	4			
5330-01-343-8789	2	24			

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CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
80204	B1821BH031C150N	5306-00-226-4831	4	2
80204	B1821BH038C075D	5305-00-115-9526	2	8
80204	B1821BH038C175N	5305-00-821-3869	5	21
80204	B1821BH038C200N	5305-00-782-9489	3	6
80204	B1821BH038C300N	5305-00-846-5703	5	14
80204	B1821BH050C150N	5305-00-071-2069	2	32
80204	B1821BH050C200N	5305-00-071-2071	2	28
0NAG9	C-60H		2	12
0NAG9	CAP-55B		3	5
0NAG9	CKIT		5	16
0NAG9	CR-001		2	5
0NAG9	CR-002A		2	6
0NAG9	CR-004A		2	7
0NAG9	CR-005		2	31
52793	CW7435-57C	5310-00-820-6653	2	25
0NAG9	DFB-12H-MS		3	1
			5	3
0NAG9	DOM		5	20
01276	F045-1002-12-12	4730-00-608-1043	4	5
			5	6
			5	32
			5	36
01276	FD45-1003-12-12	4730-00-608-1044	4	7
			5	8
			5	33
			5	37
01276	F0D45-1040-12	5340-01-230-1646	4	6
			5	7
01276	FD45-1041-12	5340-01-236-2094	4	8
			5	9
0NAG9	G558-112		3	4
0CUJ4	HAIR-12		3	9
0CUJ4	HANG-12		5	25
0NAG9	HE255-13		2	14
0NAG9	HE255-13A		2	15
0NAG9	HR2T-30		5	18
0NAG9	HR2T10-30		5	31
0NAG9	HR2T12-138		5	5
0NAG9	L-1336		3	3
0NAG9	L-50A		3	8
0NAG9	L13-G558		3	2
0CUJ4	L47P-600-2		5	27
77640	ME180103AAAB		2	23
0NAG9	MSHC-A		5	23
0NAG9	MSHC-8		5	30
0NAG9	MSHC-C		5	34
0NAG9	MSHC-D		5	10
0NAG9	MSHC-2		5	13
0NAG9	MSHC-34		5	24
0NAG9	MSHC-5		5	12
96906	MS24665-623	5315-00-297-2444	2	4

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PART NUMBER INDEX

CAGEC	PART NUMBER	STOCK NUMBER	FIG.	ITEM
96906	MS27183-14	5310-00-080-6004	2	10
96906	MS27183-17	5310-00-809-5997	2	33
96906	MS27183-21	5310-00-003-9174	2	26
96906	MS35338-46		2	9
			5	22
96906	M535842-16	4730-00-908-6294	5	17
96906	MS51922-17	5310-00-087-4652	5	15
96906	MS51967-14	5310-00-768-0318	2	30
			2	35
96906	MS51967-2	5310-00-761-6882	5	19
96906	MS51967-5	5310-00-880-7744	4	3
96906	MS51967-8	5310-00-732-0558	3	7
96906	M590727-158	5305-00-726-2525	2	27
0NAG9	M3447		5	11
0CUJ4	RING-11		5	26
0NAG9	501-MS		5	38
77640	SK000092	5330-01-343-8789	2	24
60038	TN-10	5310-00-185-6462	2	16
60038	TW110	5310-00-186-0969	2	17
0AHU0	09169665	5310-00-003-4094	2	29
0NAG9	10-006		2	34
0NAG9	10-007		2	37
0NAG9	10-009MS		4	1
0NAG9	10-012MS		1	1
0NAG9	10-013		2	3
0NAG9	10-013MS		1	2
0NAG9	10-14		2	19
0NAG9	10-15		2	18
0NAG9	10-25028		2	20
0NAG9	11-60		2	36
0NAG9	1234		5	41
0NAG9	1650HMS		2	2
0NAG9	1650HMS-012		2	1
			5	2
01276	2018-12-12S	4730-01-310-4669	5	35
0NAG9	3451		5	4
60038	362A	3110-00-100-0295	2	21
60038	368A	3110-00-100-0220	2	22
0NAG9	40-60		2	13
0NAG9	46-60H		2	11
0NAG9	560ROPE		5	39
0NAG9	590ROPE		5	40
0NAG9	6-32NYLOCK		5	29
0NAG9	6-32RDHSLTD		5	28
0JKF0	826/00512A		1	3
30327	849-FSO-0BX10	4730-01-311-4247	4	4

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
1	1		0NAG9	10-012MS
1	2		0NAG9	10-013MS
1	3		0JKF0	926/00512A
2	1		0NAG9	1650HMS-012
2	2		0NAG9	1650HMS
2	3		0NAG9	10-013
2	4	5315-00-297-2444	96906	MS24665-623
2	5		0NAG9	CR-001
2	6		0NAG9	CR-002A
2	7		0NAG9	CR-C04A
2	8	5305-00-115-9526	80204	81821H0038C075D
2	9		96906	MS35338-46
2	10	5310-00-080-6004	96906	MS27183-14
2	11		0NAG9	46-60H
2	12		0NAG9	C-60H
2	13		0NAG9	40-60
2	14		0NAG9	HE255-13
2	15		0NAG9	HE255-13A
2	16	5310-00-185-6462	60038	TN-10
2	17	5310-00-186-0969	60038	TW110
2	18		0NAG9	10-15
2	19		0NAG9	10-14
2	20		0NAG9	10-25028
2	21	3110-00-100-0295	60038	362A
2	22	3110-00-100-0220	60038	368A
2	23		77640	ME180103AAAB
2	24	5330-01-343-8789	77640	SK000092
2	25	5310-00-820-6653	52793	CW7435-57C
2	26	5310-00-003-9174	96906	MS27183-21
2	27	5305-00-726-2525	96906	MS90727-158
2	28	5305-00-071-2071	80204	B18218H050C200N
2	29	5310-00-003-4094	0AHU0	09169665
2	30	5310-00-768-0318	96906	MS51967-14
2	31		0NAG9	CR-005
2	32	5305-00-071-2069	80204	B1821BH050C150N
2	33	5310-00-809-5997	96906	MS27183-17
2	34		0NAG9	10-006
2	35	5310-00-768-0318	96906	MS51967-14
2	36		0NAG9	11-60
2	37		0NAG9	10-007
3	1		0NAG9	DFB-12H-MS
3	2		0NAG9	L13-G558
3	3		0NAG9	L-1336
3	4		0NAG9	G558-112
3	5		0NAG9	CAP-558
3	6	5305-00-782-9489	80204	818218H038C200N
3	7	5310-00-732-0558	96906	MS51967-8
3	8		0NAG9	L-50A
3	9		0CUJ4	HAIR-12
4	1		0NAG9	10-009MS
4	2	5306-00-226-4831	80204	81821BH031C150N

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FIGURE AND ITEM NUMBER INDEX

FIG.	ITEM	STOCK NUMBER	CAGEC	PART NUMBER
4	3	5310-00-880-7744	96906	MS51967-5
4	4	4730-01-311-4247	30327	849-FS0-08X10
4	5	4730-00-608-1043	01276	FD45-1002-12-12
4	6	5340-01-230-1646	01276	FD45-1040-12
4	7	4730-00-608-1044	01276	FD45-1003-12-12
4	8	5340-01-236-2094	01276	FD045-1041-12
5	2		0NAG9	1650HMS-012
5	3		0NAG9	DFB-12H-MS
5	4		0NAG9	3451
5	5		0NAG9	HR2T12-138
5	6	4730-00-608-1043	01276	FD45-1002-12-12
5	7	5340-01-230-1646	01276	FD45-1040-12
5	8	4730-00-608-1044	01276	F045-1003-12-12
5	9	5340-01-236-2094	01276	FD45-1041-12
5	10		0NAG9	MSHC-D
5	11		0NAG9	M3447
5	12		0NAG9	MSHC-5
5	13		0NAG9	MSHC-2
5	14	5305-00-846-5703	80204	81821BH038C300N
5	15	5310-00-087-4652	96906	MS51922-17
5	16		0NAG9	CK1T
5	17	4730-00-908-6294	96906	MS35842-16
5	18		0NAG9	HR2T-30
5	19	5310-00-761-6882	96906	MS51967-2
5	20		0NAG9	D0M
5	21	5305-00-821-3869	80204	818218H038C175N
5	22		96906	MS35338-46
5	23		0NAG9	MSHC-A
5	24		0NAG9	MSHC-34
5	25		0CUJ4	HANG-12
5	26		0CUJ4	R1NG-11
5	27		0CUJ4	L47P-600-2
5	28		0NAG9	6-32RDHSLT0
5	29		0NAG9	6-32NYL0CK
5	30		0NAG9	MSHC-B
5	31		0NAG9	HR2T10-30
5	32	4730-00-608-1043	01276	FD45-1002-12-12
5	33	4730-00-608-1044	01276	F045-1003-12-12
5	34		0NAG9	MSHC-C
5	35	4730-01-310-4669	01276	2018-12-12S
5	36	4730-00-608-1043	01276	F045-1002-12-12
5	37	4730-00-608-1044	01276	F045-1003-12-12
5	38		0NAG9	S01-MS
5	39		0NAG9	560R0PE
5	40		0NAG9	590R0PE
5	41		0NAG9	1234

APPENDIX G
TORQUE LIMITS

Use the torque values listed in the maintenance procedures, if they are given. When no torque values are given in the maintenance procedures, use the following guides.

Table G-1. TORQUE VALUE GUIDE (Pound-Feet)

Screw Diameter	Torque Lb-Ft. No Dashes (SAE Grade 2)	Torque Lb-Ft. 3 Dashes (SAE Grade 5)	Torque Lb-Ft. 6 Dashes (SAE Grade 8)	Socket Size
1/4-20 UNC	3-5	6-8	10-12	7/16
1/4-28 UNC	4-6	8-10	9-14	7/16
5/16-18 UNC	7-11	13-17	19-24	1/2
5/16-24 UNC	7-11	14-19	23-28	1/2
3/8-16 UNC	14-18	26-31	39-44	9/16
3/8-24 UNC	15-19	30-35	46-51	9/16
7/16-14 UNC	23-28	44-49	65-70	5/8
7/16-20 UNC	23-28	44-54	69-79	5/8
1/2-13 UNC	32-37	65-75	95-105	3/4
1/2-20 UNC	34-41	73-83	113-123	3/4
9/16-12 UNC	46-56	100-110	145-155	13/16
9/16-18 UNC	47-57	107-117	165-175	13/16
5/8-11 UNC	62-72	140-156	200-210	15/16
5/8-18 UNC	67-77	153-163	235-245	15/16
3/4-10 UNC	106-116	200-270	365-375	1-1/4
3/4-16 UNC	115-125	268-278	417-427	1-1/4
7/8-9 UNC	165-175	385-395	595-605	1-5/16
7/8-14 UNC	178-188	424-434	663-673	1-5/16
1-8 UNC	251-261	580--590	900-910	1-1/2
1-14 UNC	255-265	585-634	943-993	1-1/2
1-1/4-7 UNC	441-461	1070-1120	1767-1817	1-7/8
1-1/4-12 UNC	488-498	1211-1261	1963-2013	1-7/8
1-1/2-6 UNC	727-737	1899-1949	3111-3161	2-1/4
1-1/2-12 UNC	816-826	2144-2194	3506-3556	2-1/4

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By order of the Secretary of the Army:

GORDON R. SULLIVAN
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Chief of Staff

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THE METRIC SYSTEM AND EQUIVALENTS

'NEAR MEASURE

. 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

'VEIGHTS

Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

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

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

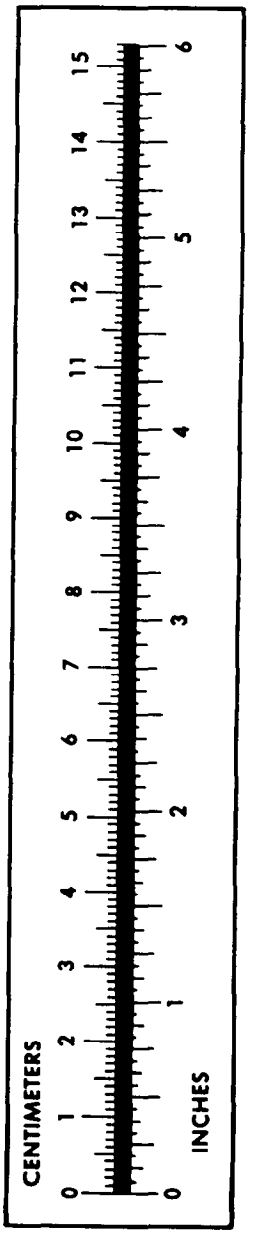
TEMPERATURE

5/9(°F - 32) = °C
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5C° + 32 =°F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
ıts	Liters	0.473
arts	Liters	0.946
allons	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 Square 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
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square 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
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
lometers per Liter	Miles per Gallon	2.354
meters per Hour	Miles per Hour	0.621



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