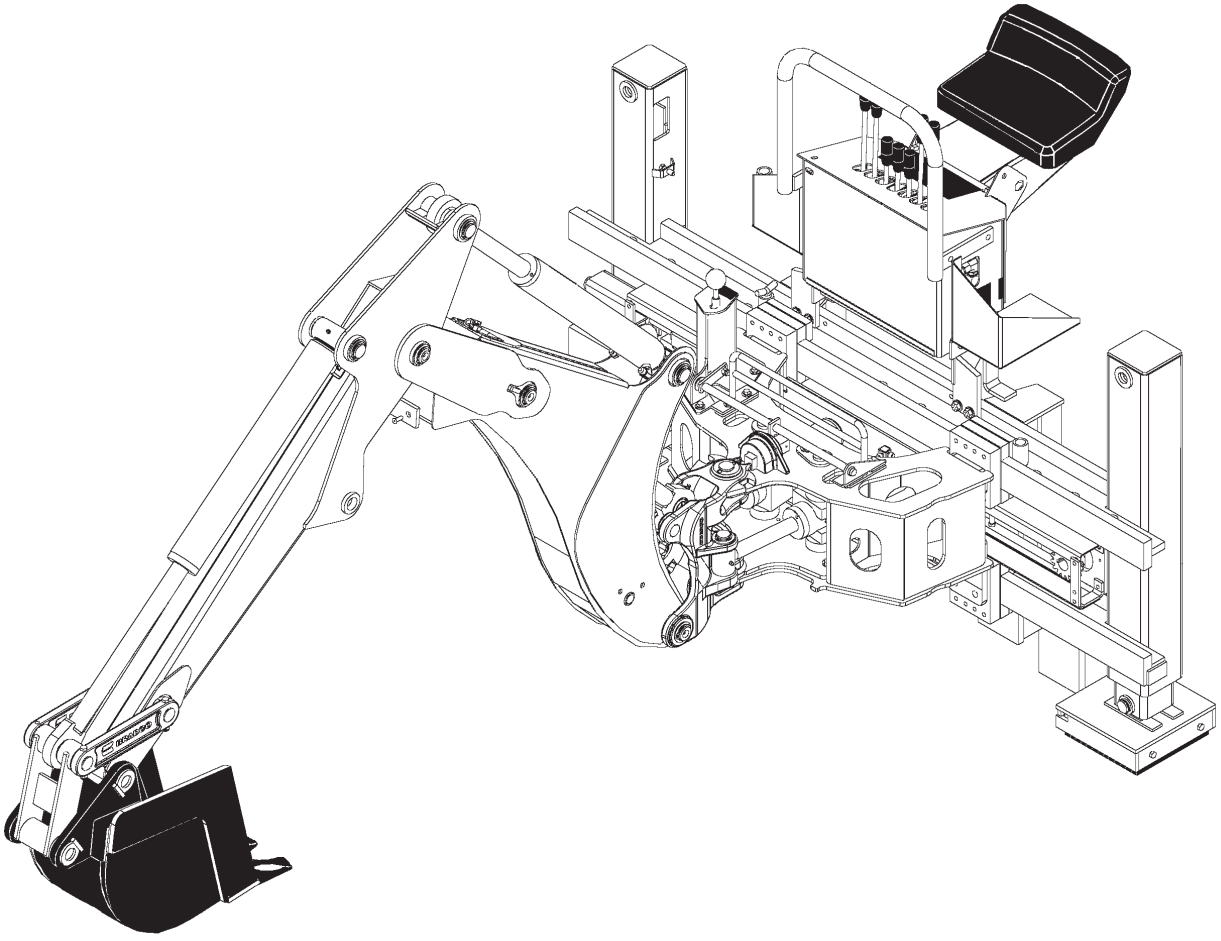
BRADCO
BY PALADIN

OPERATOR'S MANUAL

BACKHOE
485 Truck Mounted Side Shift - 7-Lever Controls



SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: OM732
Part Number: 75632
Rev. 5

800-456-7100 I www.paladinattachments.com 503 Gay Street, Delhi, IA 52223, United States of America

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PREFACE

GENERAL COMMENTS

Congratulations on the purchase of your new BRADCO product! This product was carefully designed and manufactured to give you many years of dependable service. Only minor maintenance (such as cleaning and lubricating) is required to keep it in top working condition. Be sure to observe all maintenance procedures and safety precautions in this manual and on any safety decals located on the product and on any equipment on which the attachment is mounted.

This manual has been designed to help you do a better, safer job. Read this manual carefully and become familiar with its contents.

WARNING! Never let anyone operate this unit without reading the "Safety Precautions" and "Operating Instructions" sections of this manual.
Always choose hard, level ground to park the vehicle on and set the brake so the unit cannot roll.

Unless noted otherwise, right and left sides are determined from the operator's control position when facing forward.

NOTE: The illustrations and data used in this manual were current (according to the information available to us) at the time of printing, however, we reserve the right to redesign and change the attachment as may be necessary without notification.

BEFORE OPERATION

The primary responsibility for safety with this equipment falls to the operator. Make sure the equipment is operated only by trained individuals that have read and understand this manual. If there is any portion of this manual or function you do not understand, contact your local authorized dealer or the manufacturer to obtain further assistance. Keep this manual available for reference. Provide the manual to any new owners and/or operators.

SAFETY ALERT SYMBOL

This is the "Safety Alert Symbol" used by this industry. This symbol is used to warn of possible injury. Be sure to read all warnings carefully. They are included for your safety and for the safety of others working with you.

SERVICE

Use only manufacturer replacement parts. Substitute parts may not meet the required standards.

Record the model and serial number of your unit on the cover of this manual. The parts department needs this information to insure that you receive the correct parts.

SOUND AND VIBRATION

Sound pressure levels and vibration data for this attachment are influenced by many different parameters: some items are listed below (not inclusive):

- prime mover type, age, condition, with or without cab enclosure and configuration
- operator training, behavior, stress level
- job site organization, working material condition, environment

Based on the uncertainty of the prime mover, operator, and job site, it is not possible to get precise machine and operator sound pressure levels or vibration levels for this attachment.

NOTE: A list of all Paladin Patents can be found at http://www.paladinattachments.com/patents.asp.

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SAFETY STATEMENTS

THIS SYMBOL BY ITSELF OR WITH A WARNING WORD THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY OR THE SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.

DANGER — **THIS SIGNAL WORD INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.**

WARNING — **THIS SIGNAL WORD INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.**

CAUTION — **THIS SIGNAL WORD INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN MINOR OR MODERATE INJURY.**

NOTICE — **NOTICE IS USED TO ADDRESS PRACTICES NOT RELATED TO PHYSICAL INJURY.**

GENERAL SAFETY PRECAUTIONS

WARNING!

READ MANUAL PRIOR TO INSTALLATION

Improper installation, operation, or maintenance of this equipment could result in serious injury or death. Operators and maintenance personnel should read this manual, as well as all manuals related to this equipment and the prime mover thoroughly before beginning installation, operation, or maintenance. **FOLLOW ALL SAFETY INSTRUCTIONS IN THIS MANUAL AND THE PRIME MOVER'S MANUAL(S).**

READ AND UNDERSTAND ALL SAFETY STATEMENTS

Read all safety decals and safety statements in all manuals prior to operating or working on this equipment. Know and obey all OSHA regulations, local laws, and other professional guidelines for your operation. Know and follow good work practices when assembling, maintaining, repairing, mounting, removing, or operating this equipment.

KNOW YOUR EQUIPMENT

Know your equipment's capabilities, dimensions, and operations before operating. Visually inspect your equipment before you start, and never operate equipment that is not in proper working order with all safety devices intact. Check all hardware to ensure it is tight. Make certain that all locking pins, latches, and connection devices are properly installed and secured. Remove and replace any damaged, fatigued, or excessively worn parts. Make certain all safety decals are in place and are legible. Keep decals clean, and replace them if they become worn or hard to read.

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GENERAL SAFETY PRECAUTIONS

WARNING! PROTECT AGAINST FLYING DEBRIS

Always wear proper safety glasses, goggles, or a face shield when driving pins in or out, or when any operation causes dust, flying debris, or any other hazardous material.

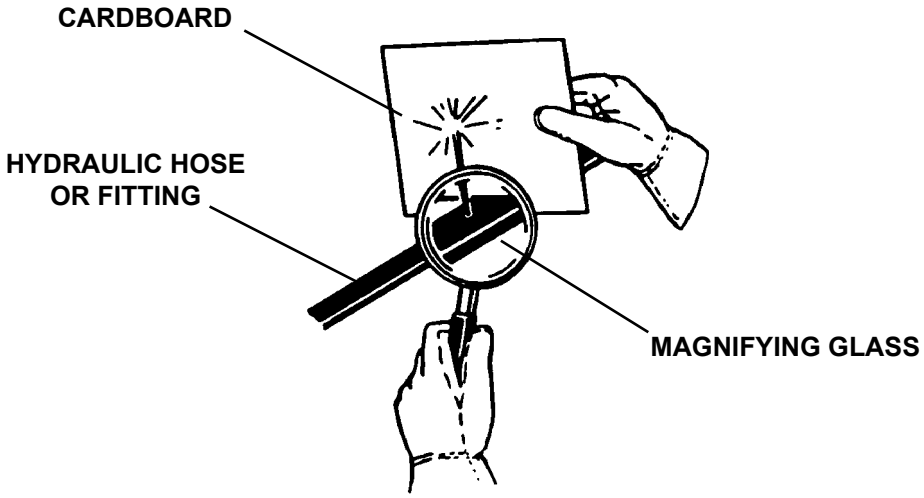
WARNING! LOWER OR SUPPORT RAISED EQUIPMENT

Do not work under raised booms without supporting them. Do not use support material made of concrete blocks, logs, buckets, barrels, or any other material that could suddenly collapse or shift positions. Make sure support material is solid, not decayed, warped, twisted, or tapered. Lower booms to ground level or on blocks. Lower booms and attachments to the ground before leaving the cab or operator's station.

WARNING! USE CARE WITH HYDRAULIC FLUID PRESSURE

Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death. Hydraulic leaks under pressure may not be visible. Before connecting or disconnecting hydraulic hoses, read your prime mover's operator's manual for detailed instructions on connecting and disconnecting hydraulic hoses or fittings.

- Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities.
- If injured by injected fluid, see a doctor at once. If your doctor is not familiar with this type of injury, ask him to research it immediately to determine proper treatment.
- Wear safety glasses, protective clothing, and use a piece of cardboard or wood when searching for hydraulic leaks. **DO NOT USE YOUR HANDS! SEE ILLUSTRATION.**



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GENERAL SAFETY PRECAUTIONS

WARNING!

DO NOT MODIFY MACHINE OR ATTACHMENTS

Modifications may weaken the integrity of the attachment and may impair the function, safety, life, and performance of the attachment. When making repairs, use only the manufacturer's genuine parts, following authorized instructions. Other parts may be substandard in fit and quality. Never modify any ROPS (Roll Over Protective Structure) or FOPS (Falling Object Protective Structure) equipment or device. Any modifications must be authorized in writing by the manufacturer.

WARNING!

SAFELY MAINTAIN AND REPAIR EQUIPMENT

- Do not wear loose clothing or any accessories that can catch in moving parts. If you have long hair, cover or secure it so that it does not become entangled in the equipment.
- Work on a level surface in a well-lit area.
- Use properly grounded electrical outlets and tools.
- Use the correct tools for the job at hand. Make sure they are in good condition for the task required.
- Wear the protective equipment specified by the tool manufacturer.

SAFELY OPERATE EQUIPMENT

Do not operate equipment until you are completely trained by a qualified operator in how to use the controls, know its capabilities, dimensions, and all safety requirements. See your machine's manual for these instructions.

- Keep all step plates, grab bars, pedals, and controls free of dirt, grease, debris, and oil.
- Never allow anyone to be around the equipment when it is operating.
- Do not allow riders on the attachment or the prime mover.
- Do not operate the equipment from anywhere other than the correct operator's position.
- Never leave equipment unattended with the engine running, or with this attachment in a raised position.
- Do not alter or remove any safety feature from the prime mover or this attachment.
- Know your work site safety rules as well as traffic rules and flow. When in doubt on any safety issue, contact your supervisor or safety coordinator for an explanation.

WARNING!

CALIFORNIA PROPOSITION 65 WARNING

This product may contain a chemical known to the state of California to cause cancer, or birth defects or other reproductive harm. www.P65Warnings.ca.gov

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EQUIPMENT SAFETY PRECAUTIONS

WARNING! KNOW WHERE UTILITIES ARE

Observe overhead electrical and other utility lines. Be sure equipment will clear them. When digging, call your local utilities for location of buried utility lines, gas, water, and sewer, as well as any other hazard you may encounter.

WARNING! EXPOSURE TO RESPIRABLE CRYSTALLINE SILICA DUST ALONG WITH OTHER HAZARDOUS DUSTS MAY CAUSE SERIOUS OR FATAL RESPIRATORY DISEASE.

It is recommended to use dust suppression, dust collection and if necessary personal protective equipment during the operation of any attachment that may cause high levels of dust.

WARNING! REMOVE PAINT BEFORE WELDING OR HEATING

Hazardous fumes/dust can be generated when paint is heated by welding, soldering or using a torch. Do all work outside or in a well ventilated area and dispose of paint and solvent properly. Remove paint before welding or heating.

When sanding or grinding paint, avoid breathing the dust. Wear an approved respirator. If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

WARNING! END OF LIFE DISPOSAL

At the completion of the useful life of the unit, drain all fluids and dismantle by separating the different materials (rubber, steel, plastic, etc.). Follow all federal, state and local regulations for recycling and disposal of the fluid and components.

OPERATING THE BACKHOE

- Block off work area from bystanders, livestock, etc. Allow plenty of room for backhoe swing.
- Operate only from the operator's station.
- Use the backhoe only for digging. Do not use the backhoe to pull things, as a battering ram, or attach ropes, chains etc., to the unit.
- Do not dig close to the stabilizers. The ground could collapse from under the backhoe.
- Do not lift loads in excess of the capacity of the backhoe or prime mover.
- When operating on slopes, dig with the backhoe uphill, and avoid swinging the backhoe to the downhill side. Avoid steep hillside operation, which could cause the prime mover to overturn.
- Reduce speed when driving over rough terrain, on a slope, or turning, to avoid overturning the vehicle.
- Do not adjust relief valve settings. Incorrect valve settings could result in equipment damage and/or personal injury.
- An operator must not use drugs or alcohol, which can change his or her alertness or coordination. An operator taking prescription or over-the-counter drugs should seek medical advice on whether or not he or she can safely operate equipment.
- Before exiting the prime mover, lower the backhoe bucket and stabilizers to the ground, turn off the prime mover's engine, remove the key and apply the brakes.

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EQUIPMENT SAFETY PRECAUTIONS

TRANSPORTING THE BACKHOE

- Be sure to engage boom and swing locks before transporting backhoe to prevent uncontrolled movement.
- When driving on public roads use safety lights, reflectors, Slow Moving Vehicle signs etc., to prevent accidents. Check local government regulations that may affect you.
- Do not drive close to ditches, excavations, etc., cave in could result.
- Do not smoke when refueling the prime mover. Allow room in the gas tank for expansion. Wipe up any spilled fuel. Secure cap tightly when done.

MAINTAINING THE BACKHOE

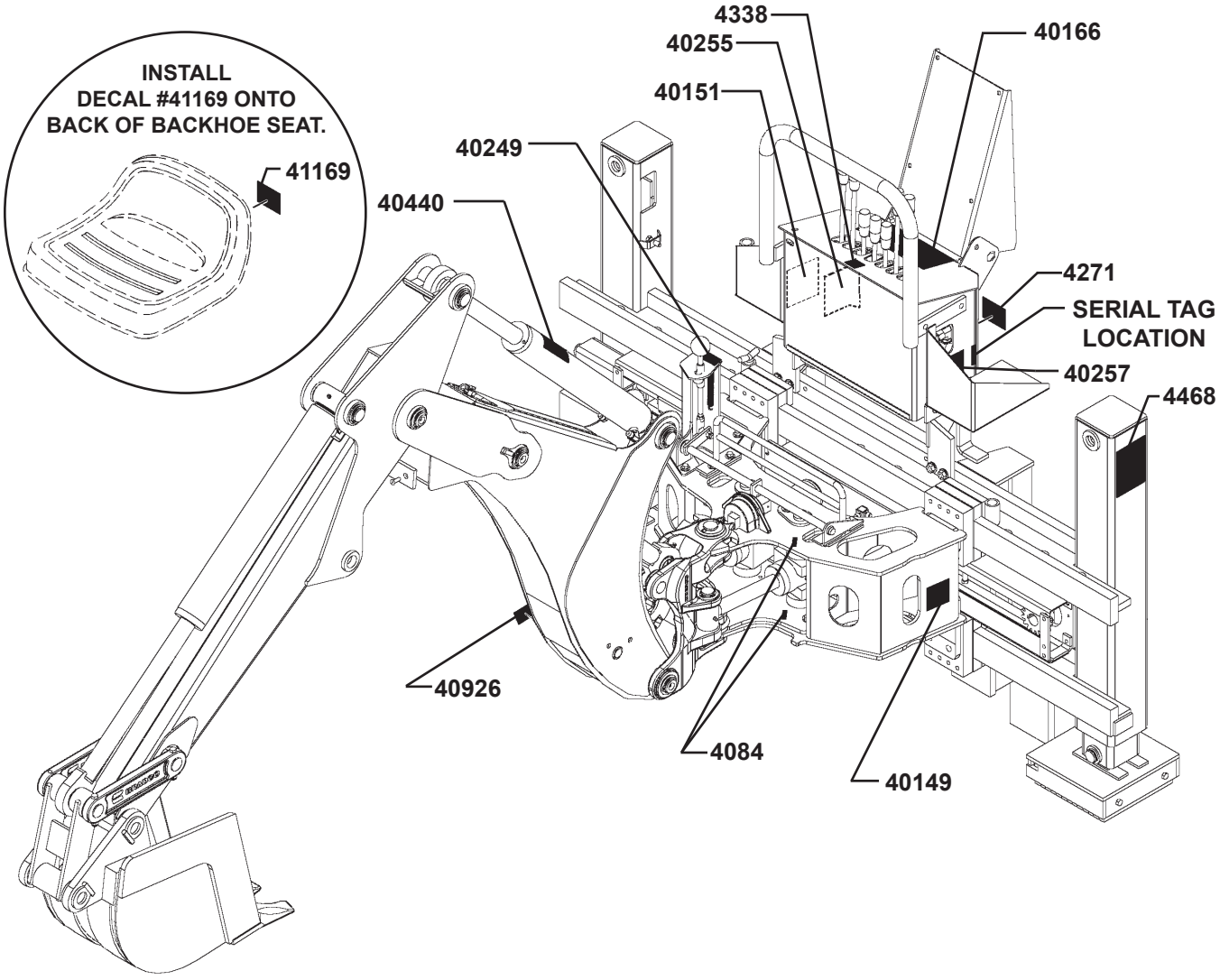
- Before performing maintenance, lower the attachment to the ground, turn off the engine, remove the key and apply the brakes.
- Never perform any work on the attachment unless you are authorized and qualified to do so. Always read the operator service manuals before any repair is made. After completing maintenance or repair, check for correct functioning of the backhoe. If not functioning properly, always tag “DO NOT OPERATE” until all problems are corrected.
- Worn, damaged, or illegible safety decals must be replaced. New safety decals can be ordered from Paladin.
- Never make hydraulic repairs while the system is under pressure, or cylinders under load. Serious personal injury or death could result.
- Never work under a raised attachment.

DECALS

DECAL PLACEMENT

GENERAL INFORMATION

The diagrams on this page show the location of all the decals used on the truck mounted 485 side shift backhoe. The decals are identified by their part numbers, with the reductions of the actual decals located on the following pages. Use this information to order replacements for lost or damaged decals. Be sure to read all decals before operating the backhoe. They contain information you need to know for both safety and backhoe longevity. All logo's and model numbers can be purchased from your local dealer.



IMPORTANT: Keep all safety decals clean and legible. Replace all missing, illegible or damaged safety decals. When replacing parts with safety decals attached, the safety decals must also be replaced.

REPLACING SAFETY DECALS: Clean the area of application with a nonflammable solvent, then wash the same area with soap and water. Allow the surface to dry. Remove the backing from the safety decal, exposing the adhesive surface. Apply the safety decal to the position shown in the diagram above, and smooth out any bubbles.

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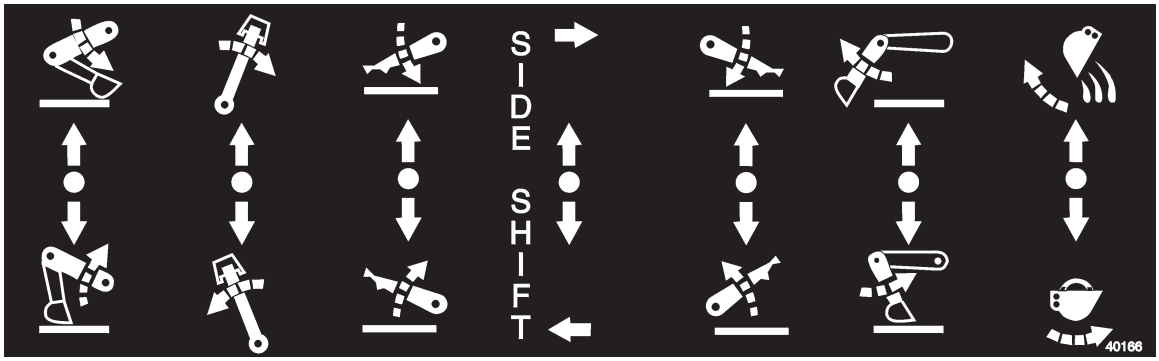
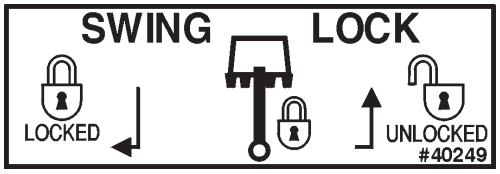
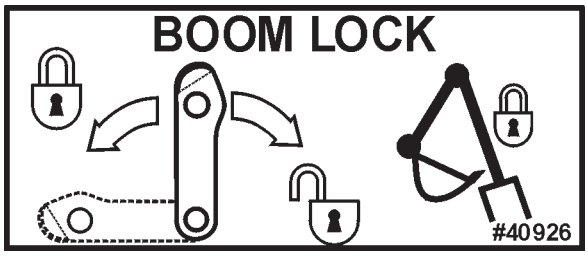
DECALS



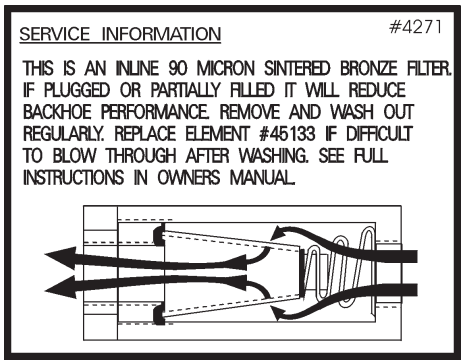
PART #40166
OPERATING CONTROLS DECAL



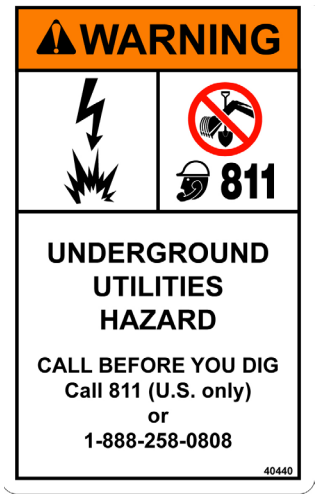
PART #40249
SWING LOCK DECAL



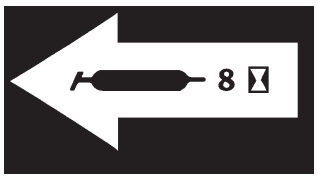
PART #40926
BOOM LOCK DECAL



PART #4271
INLINE FILTER DECAL



PART #40440
CALL BEFORE YOU DIG



PART #4084
GREASE 8 HOURS

PART #4338
MADE IN U.S.A. DECAL

PART #4468
WARNING! BODILY INJURY

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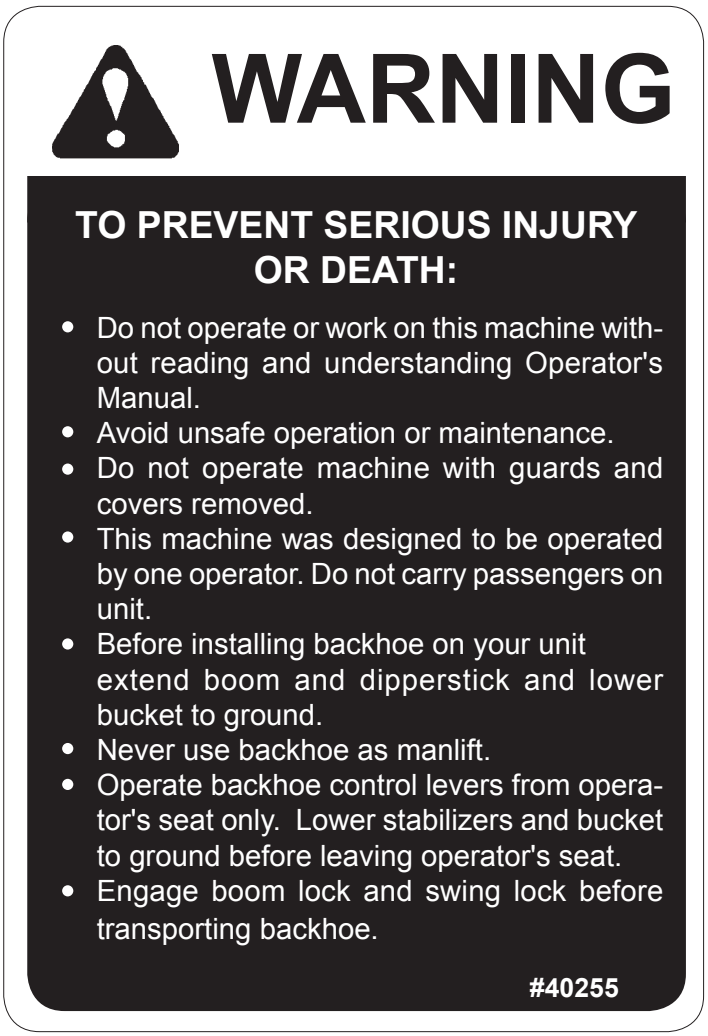
DECALS

PART #40151
HIGH PRESSURE FLUID DECAL

PART #41169
DANGER! BACKHOE SECURE



PART #40255
OPERATIONAL WARNING DECAL

PART #40257
IMPORTANT! DECAL

PART #40149
DANGER! PINCH POINTS

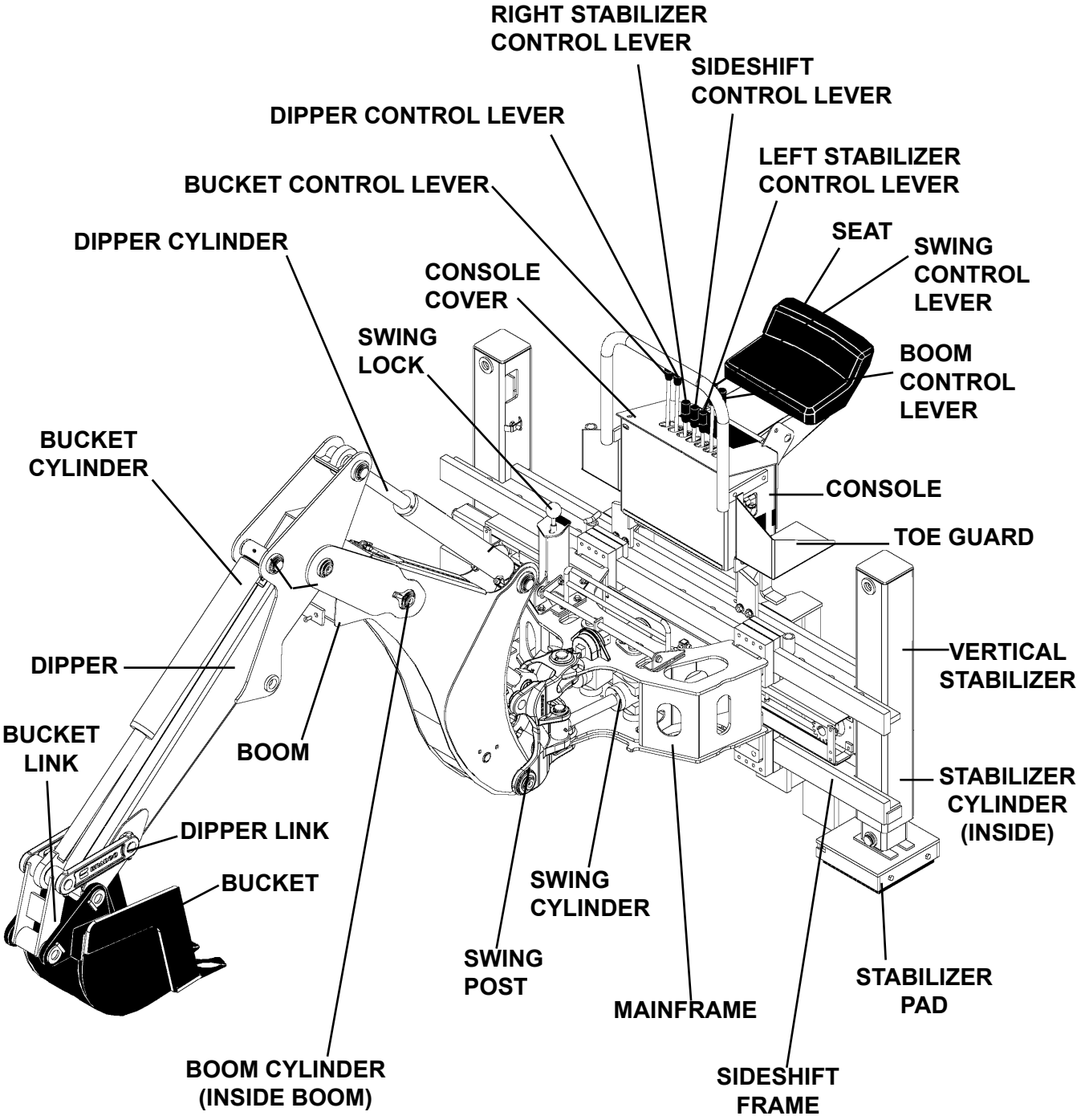
6790 7-6-10-4

INSTALLATION

NOMENCLATURE

GENERAL INFORMATION

Throughout this manual, reference is made to various backhoe components. The purpose of this page is to acquaint you with the various names of these components. This knowledge will be helpful when reading through this manual or when ordering service parts.



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INSTALLATION

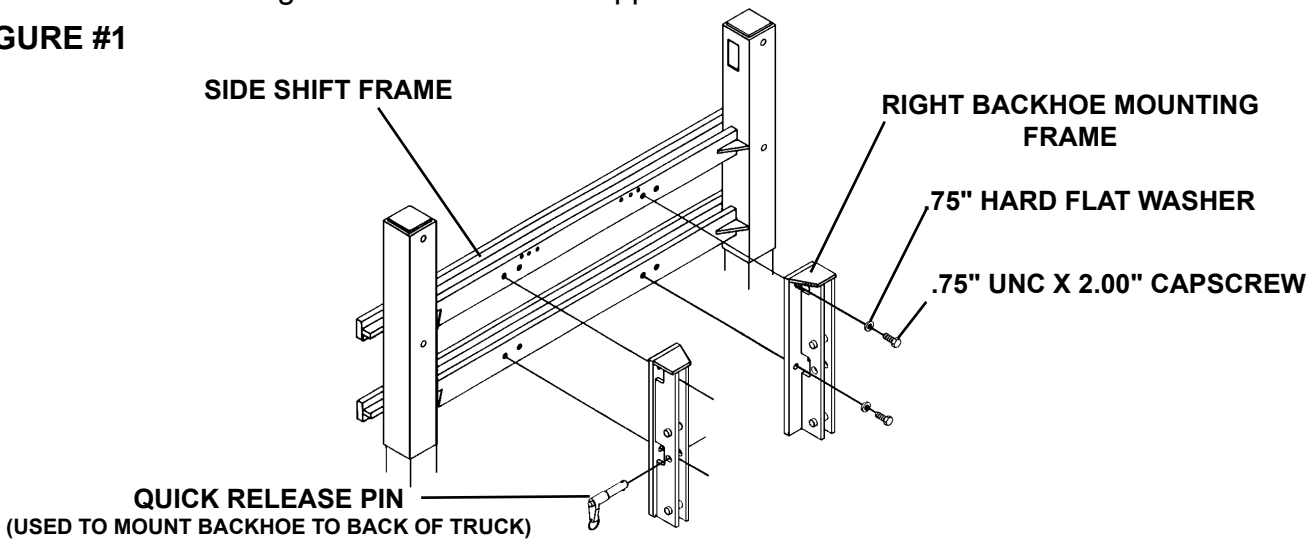
GENERAL INFORMATION

The hydraulic side shift backhoe requires the use of a mounting kit to adapt it to the truck. The following instructions are for installing this kit on the backhoe. Read this section carefully before attempting to mount the backhoe, and remember to read all safety warnings before operating the unit.

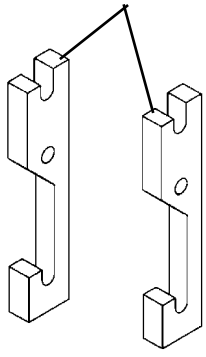
MOUNTING INSTRUCTIONS

You may have received your backhoe with the backhoe mounts already installed. If the mounts were not previously installed, install them now. The backhoe mounts are secured to the backhoe by .75" UNC X 2.00" hex capscrews (part #1139) , and .75" hard flat washers (part #1649). The capscrews and washers pass through the set of eight holes in the left and right backhoe mounting frames and into the tapped holes in the backhoe side shift frame.

FIGURE #1



MOUNTING EARS #79221



Mounting the backhoe onto your truck requires modifications to the truck for proper fit-up. Truck modifications should be completed by a shop with experience in custom truck body modifications. Utility body installers can do this type of work. Mounting ears (#79221) can be purchased from your dealer for welding onto your truck chassis for backhoe installation. There will be approximately 2000 pounds of added weight to the truck with backhoe installation . Because of the added weight, it may be necessary to add additional springs to the truck.

The information in this section is designed to assist you with the installation of the side-shift backhoe. Your judgement in locating, reinforcing and welding will be necessary to obtain a good solid mounting for your specific type of truck. Other than the mounting ears #79221, BRADCO does not supply any additional parts to adapt to various applications and does not assume liability for proper reinforcing or mounting of the backhoe.

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INSTALLATION

GENERAL GUIDELINES

Upon initial installation, it is recommended that you tack weld the mounting ears to the truck and test fit the sideshift frame. The sideshift frame should be centered on the back of the truck and the distance under the stabilizers should be approximately 16” for curb clearance. There are optional adjustment plates available to raise or lower (up to 3”) the backhoe on the sideshift frame.

NOTE: Digging specifications are directly related to the boom pivot height. After the backhoe is installed, check the distance between the swing post / boom pivot and the ground, adjust specifications accordingly.

HYDRAULIC APPLICATION INFORMATION

Due to the many combinations available, we do not have a specific kit designed for your specific application.

Power and return hoses have been installed onto your backhoe from the factory. These hoses have an 8MBo end that will require adapting to your application.

NOTE: The direction of hydraulic flow throughout the hydraulic system must be maintained for proper operation of he backhoe. The hydraulic flow must come out of the backhoe at the check valve (hex) and return to the backhoe through the inline filter (round). Improper hose routing could result in possible damage to the backhoe or vehicle.

If you are in a situation that you must design an auxiliary hydraulic system on your truck, please realize there is a responsibility that goes along with being in the design business. You become the engineer and manufacturer and accept the associated risk involved.

Always know your hydraulic systems and be sure to observe the following:

- **Always use hoses of adequate pressure rating for your highest available pressure. (SAE J517)**
- **Always use hoses of sufficient size to handle the highest flow available. (SAE J517)**
- **Always route the hoses to the backhoe in a way that loops, kings, sharp edges or snagging possibilities are eliminated. (SAE J1273)**
- **Always route the hoses as far a possible from areas occupied by operator or other personnel. (SAE J1273)**

INSTALLATION

GENERAL INFORMATION

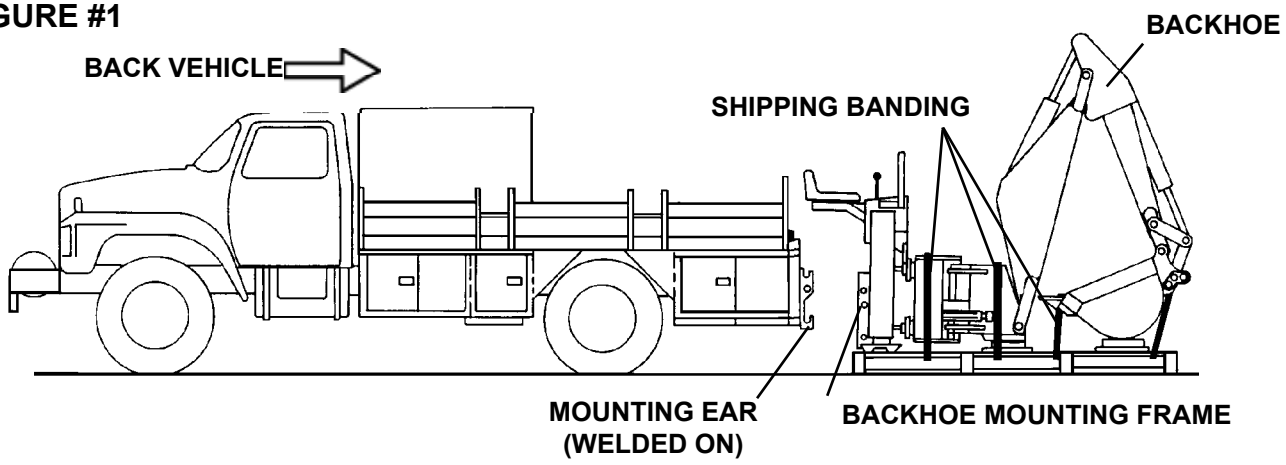
The following instructions will help you to mount your backhoe onto your vehicle. Read this section carefully before attempting to mount the backhoe. Be sure to read the "Safety Precautions" and "Operating Instructions" sections of this manual as well as any truck manuals before operating the backhoe. Read and follow all safety warning decals on the equipment.

NOTE: The mounting ears must be welded to the back of the truck chassis prior to installing the backhoe. The width between the mounting ears must be between 25.38" - 25.88" to accommodate the left and right backhoe mounting frames. (The height of the mounting ears on your vehicle will determine the height of the backhoe.)

MOUNTING INSTRUCTIONS

1. Remove the steel shipping banding from around the backhoe and skid. See Figure #1
2. Following the proper manufacturer's operating techniques, start the vehicle and back the unit up squarely to within one foot of the backhoe, aligning the mounting ears with the left and right backhoe mounting frames. Shut off the vehicle and set the parking brake. See Figure #1

FIGURE #1



3. Connect the existing backhoe hydraulic hoses to the auxiliary hydraulic system on your vehicle. Refer to Hydraulic Application Information located in this section of this manual.

NOTE: The direction of hydraulic flow throughout the hydraulic system must be maintained for proper operation of he backhoe. The hydraulic flow must come out of the backhoe at the check valve (hex) and return to the backhoe through the inline filter (round). Improper hose routing could result in possible damage to the backhoe or vehicle.

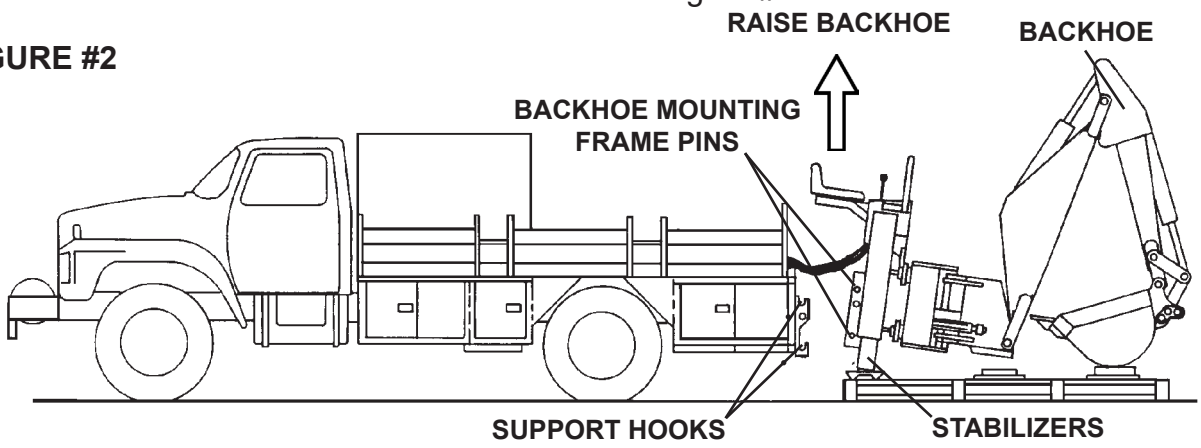
IMPORTANT: ONCE THE BACKHOE HYDRAULIC HOSES ARE HOOKED UP TO THE VEHICLE AUXILIARY HYDRAULIC SYSTEM, THE BACKHOE IS LIVE.

INSTALLATION

IMPORTANT: During installation and removal the operator must be standing on the ground. Do not install or detach backhoe while seated in the operator's station of the backhoe.

4. Standing on the right side of the backhoe and working the backhoe controls, raise the rear of the backhoe with the stabilizers. Continue to raise the rear of the backhoe until the backhoe mounting frame pins will clear the support hooks on the mounting ears that are welded to the back of the vehicle. See Figure #2

FIGURE #2



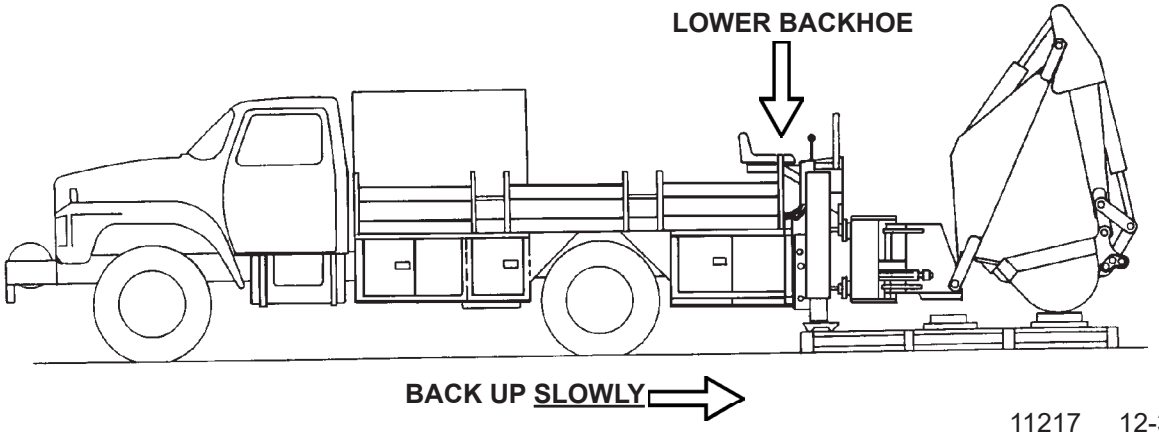
5. Working the boom and dipper controls, level off the backhoe. The backhoe mounting frames should be vertical with the mounting pins still above their respective support hooks.

6. Start the vehicle, fasten your seat belt, and release the parking brake. Now slowly back the vehicle so that the mounting ears **gently** contact the backhoe mounting frame pins. See Figure #3

IMPORTANT: When backing the vehicle, use caution to avoid pinching the hydraulic hoses between the truck and the backhoe.

7. Set the parking brake and shut off the engine. Standing to the right of the backhoe and working the backhoe controls, operate the boom, dipper, and stabilizers to lower the four backhoe mounting frame pins into the support hooks on the mounting ears. Make sure all pins are resting securely in the hooks. See Figure #3.

FIGURE #3



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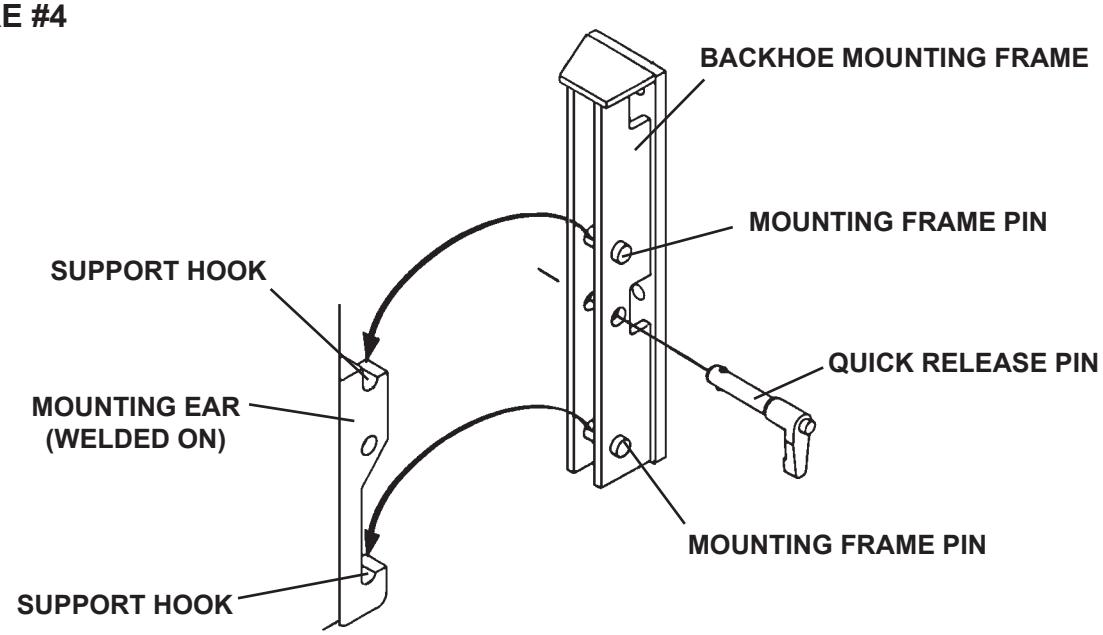
INSTALLATION

8. Insert one quick release pin (part #78407) into each mounting frame. This will secure the backhoe to the vehicle. See Figure #4

FIGURE #4



WARNING! It is important that you insert the quick release pins completely to secure the backhoe to the vehicle. Failure to do so could result in the quick release pins working themselves out. This would leave the backhoe loose on the vehicle. If this should happen, the backhoe could fall off the vehicle resulting in damage to backhoe, personal injury, or even death.

9. Curl the bucket and dipper. Raise the boom, side shift the backhoe to one side, swing the backhoe 90° and latch the swing/boom transport lock (See Operating Instructions "Transporting" for proper transportation of backhoe). Raise the stabilizer and install locking pins. Remove shipping skid.

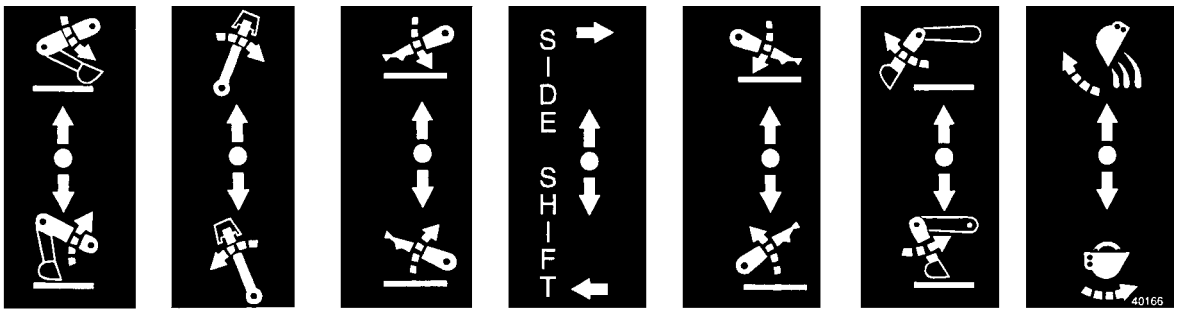
Your backhoe is now mounted and ready for use.

OPERATING INSTRUCTIONS

CONTROLS

GENERAL INFORMATION

Your backhoe is operated by seven different control levers. Two are for stabilizer operation and one each to operate the swing, boom, dipper, bucket and side shift functions. The information contained below will help you become familiar with the operation of each control lever. Read the safety precautions (Section B) of this manual before attempting to use the backhoe. Remember, right and left when referred to on this page are determined by the operator's position seated at the backhoe controls facing the bucket.



BOOM **SWING** **LEFT STABILIZER** **SIDE SHIFT** **RIGHT STABILIZER** **DIPPER** **BUCKET**

BOOM CONTROL LEVER

Pushing the boom lever forward will "lower" the boom, dipstick and bucket. Pulling the lever backward will "Lift" the boom, dipstick, and bucket.

SWING CONTROL LEVER

Pushing the swing lever forward will swing the boom and bucket to the "Right". Pulling the lever backward will swing the boom and bucket to the "Left".

LEFT STABILIZER CONTROL LEVER

Pushing the stabilizer lever forward will bring the left backhoe stabilizer "Down". Pulling the stabilizer lever backward will raise the left backhoe stabilizer "Up". Both stabilizers are required to be down for proper stability of the backhoe when in operation.

SIDE SHIFT CONTROL LEVER

Pushing the sideshift lever forward will move the backhoe to the "Right" on the sideshift frame. Pulling the sideshift lever backward will move the backhoe to the "Left" on the sideshift frame.

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OPERATING INSTRUCTIONS

CONTROLS

RIGHT STABILIZER CONTROL LEVER

Moving the stabilizer lever forward will bring the right backhoe stabilizer "Down". Moving the stabilizer lever backward will raise the right backhoe stabilizer "Up". Both stabilizers are required to be down for proper stability of the backhoe when in operation.

DIPPER CONTROL LEVER

Pushing the dipper lever forward will move the dipstick and bucket "Out", or away from the operator. Pulling the lever backward will move (crowd) the dipper and bucket "In", or toward the operator.

BUCKET CONTROL LEVER

Pushing the bucket lever forward will "Dump" the bucket (move outward). Pulling the lever backward will "Fill", or curl the bucket (move inward).

GENERAL INFORMATION

When operating the backhoe, smoothness of technique should be strived for at all times. Smoothness will come with experience and practice at feathering the controls. Establish a flowing digging cycle to increase operator efficiency and save unnecessary wear on the machine.

Observe the following points to obtain the best results and to fully utilize the digging force of the backhoe.

WARNING! Operate the backhoe only when seated at the controls. Any other method could result in serious personal injury or death.

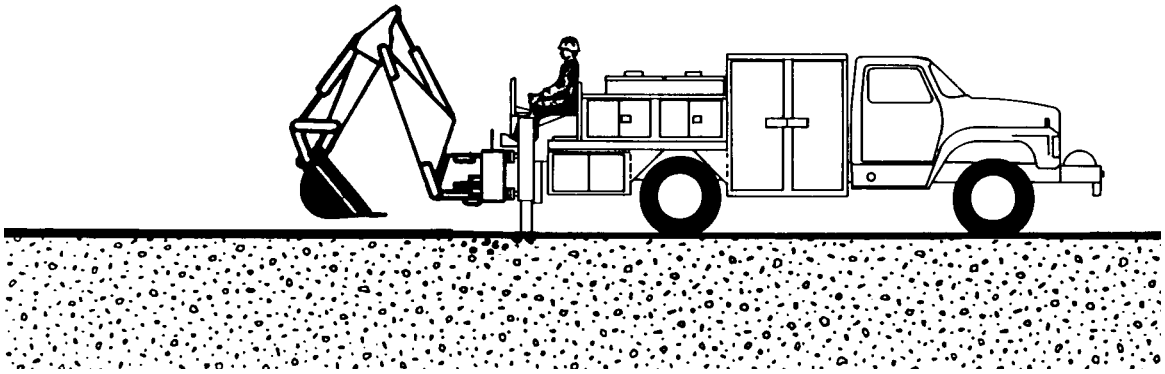
Check the prospective digging area for hidden utility lines before operating the backhoe or when in doubt of their location, contact the local utility companies. When operating the backhoe in an area where utilities are expected to be present, throttle the backhoe down and proceed with caution. If you feel the backhoe bucket made contact with anything out of the ordinary, stop digging at once. Have the obstruction checked by hand. If a utility line has been damaged, contact the affected utility at once.

BEFORE YOU START DIGGING

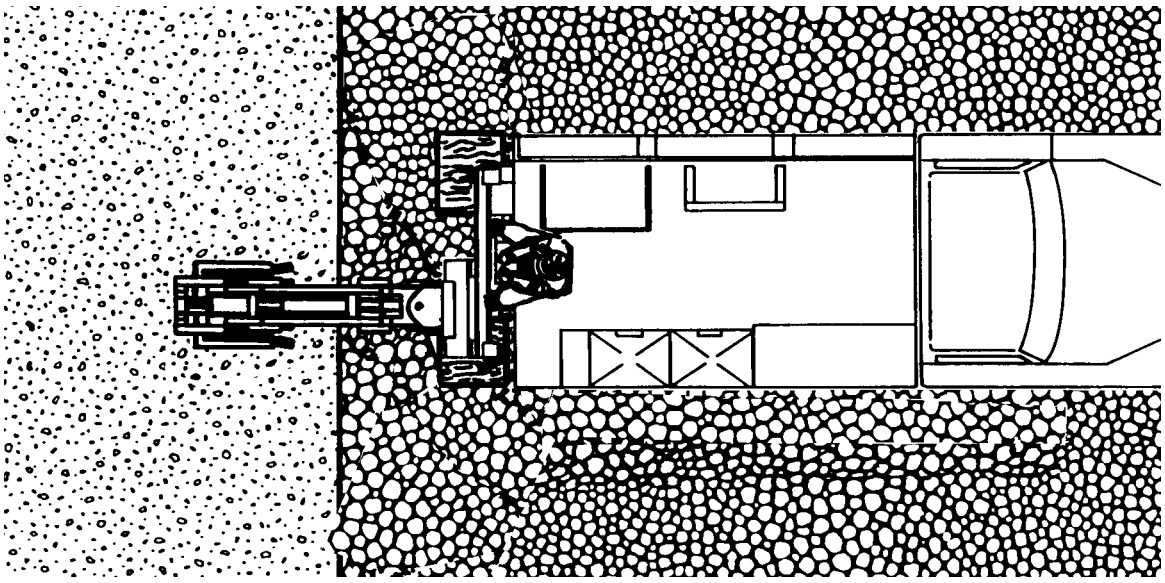
Before any excavating is started, it is always a good idea to plan out the job first. Various things need to be considered and taken into account prior to the actual digging. The operator should inspect the job site and take notice of any potential hazards in the area. He should have a complete understanding of the tasks he is expected to perform. Figure out what will be done with the spoil (excavated soil), will it be used to backfill or be trucked out? What are the soil conditions like? Will you have to work around others? Etc.

Once the operator has become familiar with the job site and understands the job requirements, it is time to set up for the actual digging. Position the backhoe in such a way as to minimize repositioning the unit and to maximize digging efficiency. Consider the placement of spoil and position the backhoe to be able to dig the maximum amount of soil, accurately, while leaving enough room for the spoil removed to be piled in the desired area.

BEFORE YOU START DIGGING (CONTINUED)

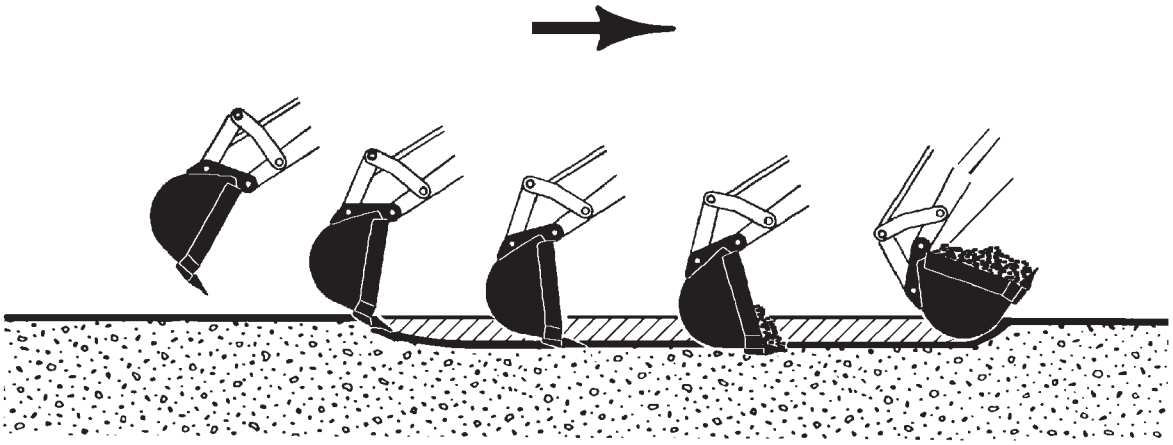


Once the unit is positioned, lower the stabilizers to the ground. The tires should still be supporting most of the vehicle weight with the stabilizers relieving only part of the weight, and mainly acting to give the unit a wider base for increased stability and to keep the unit from moving or bouncing with backhoe use. The vehicle should at no time be supported by the stabilizers with any of its wheels off the ground. Severe damage to the vehicle could result. When operating the unit on a delicate surface (such as concrete, or stone work) or on sandy, loose, or soft ground place plywood under the stabilizers to help distribute the load over a wider area.



BASIC DIGGING TECHNIQUE

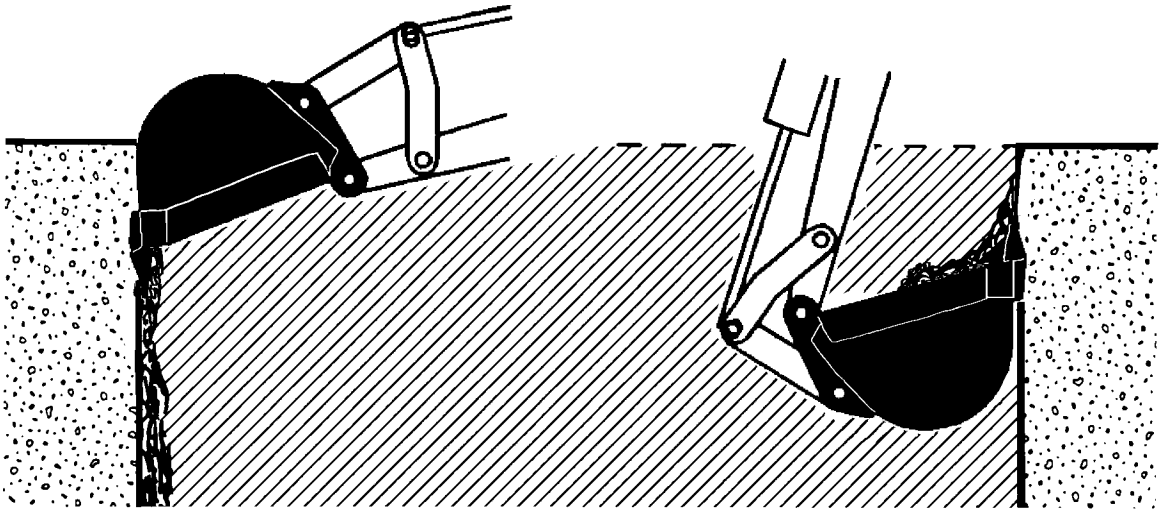
When starting an excavation, make the first cut of each section shallow, being careful to follow the exact layout of the excavation. The reason for the shallow cut is to minimize damage to the sod and to facilitate replacement. These first cuts are also important because they will act as guides for the remaining cuts, thus getting the first few cuts as accurate as possible will help in keeping all future cuts accurate.



When digging with the backhoe, extend the boom, dipper and bucket out, away from the operator. Lower the boom and dipper to start the digging process. The bucket teeth should be at a 30° to 45° entry angle. As the digging starts, curl the bucket until the cutting edge is level with the horizon. Crowd the bucket in toward the operator working the bucket lever to keep the bucket level. As the bucket moves toward the operator, manipulate the boom lever to keep the cut level. At the end of the digging cycle, crowd the dipper out and completely curl the bucket while lifting it from the excavation. Once you have cleared the excavation, swing the bucket to the spoil pile. Start to dump the bucket before the pile is approached. Once the bucket is empty, swing the unit back to the excavation, positioning the bucket and dipper for the next cut in the process. The whole digging process should be one smooth cycle that is repeated until the excavation is completed.

When the excavation has been dug to within six inches of the finished bottom, clear and touch up the sides of the excavation. Use the flat sides of the bucket to scrape off any high spots. Dislodge any exposed rocks if they seem loose. When finishing walls, finish the far wall by curling the bucket out, crowding the dipper out, and forcing the bucket down. To finish the closest wall, lift the bucket up and curl it in.

BASIC DIGGING TECHNIQUES (CONTINUED)

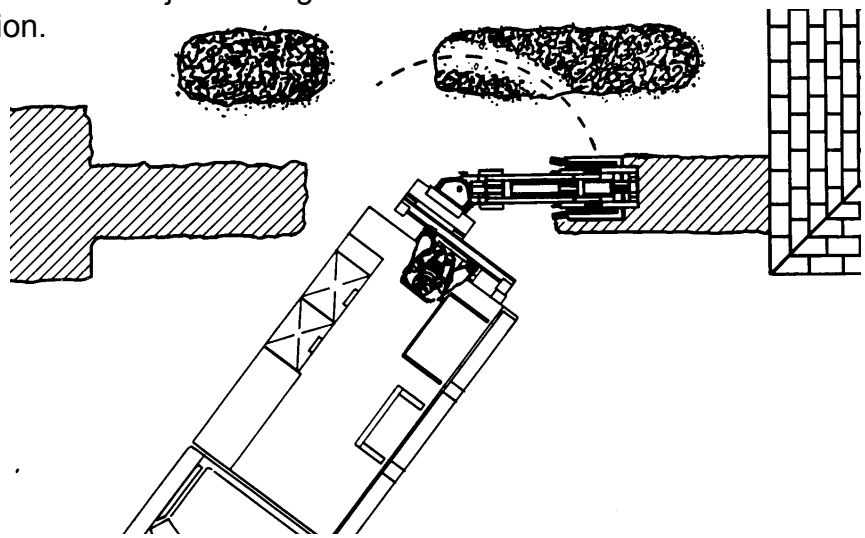


Once the sides are cleaned up, finish grading the bottom of the excavation. This is done by making the remaining cuts long and shallow, concentrating on making them level and smooth. Remove any remaining spoil. Check the excavation bottom for depth and levelness, making any adjusting cuts as needed.

The basic steps just listed are the same regardless of the excavation. All other digging jobs are simply variations of this basic procedure. Remember to make your cuts in smooth cycles. This will reduce operator fatigue and machine wear, while increasing productivity and efficiency.

SPECIAL APPLICATIONS
TRENCHING BETWEEN A BUILDING AND AN OPEN EXCAVATION

Start the trench at the building and trench toward the open excavation. Dig toward the open excavation until there is just enough room to move the unit out from between the trench and open excavation.



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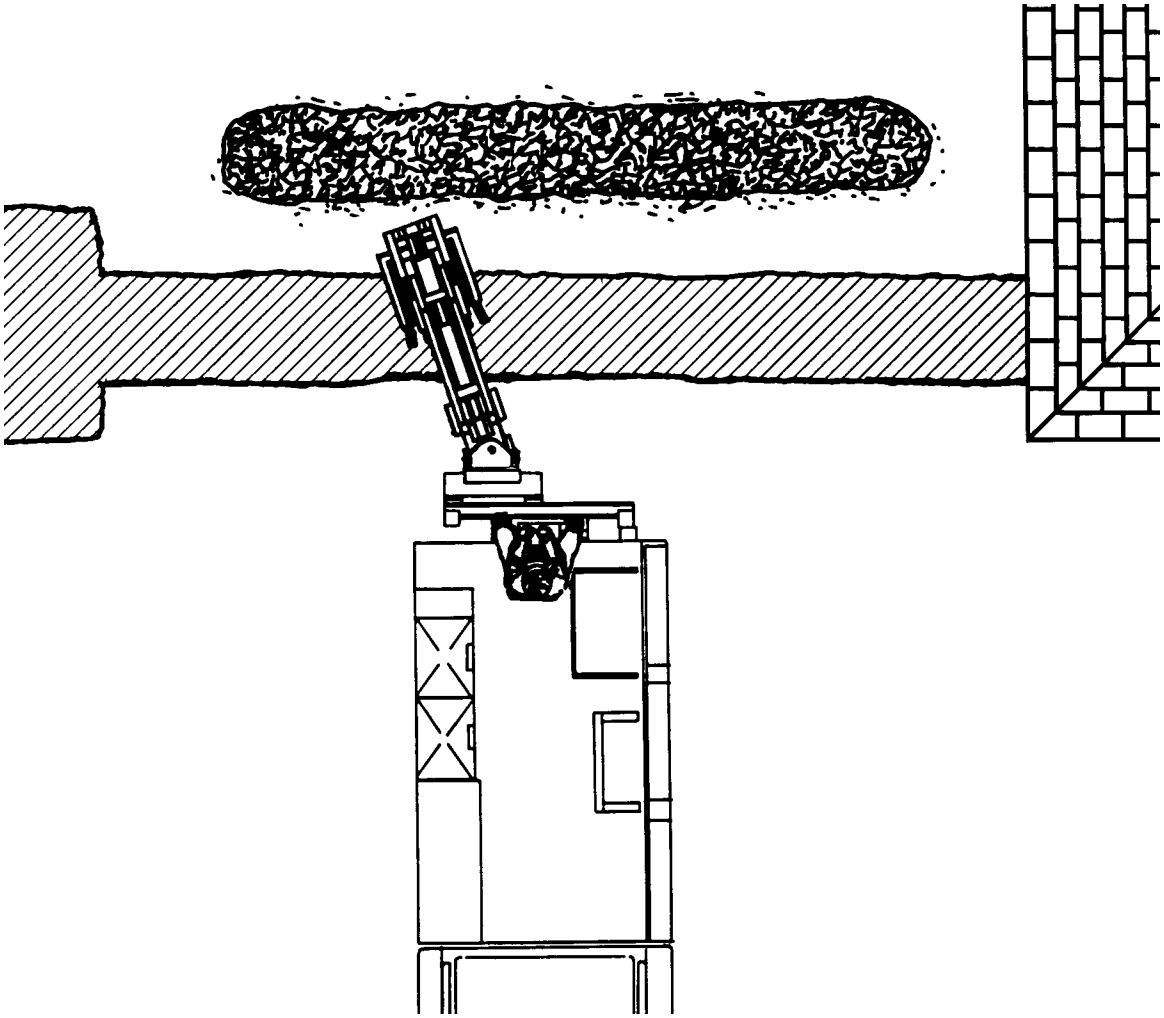
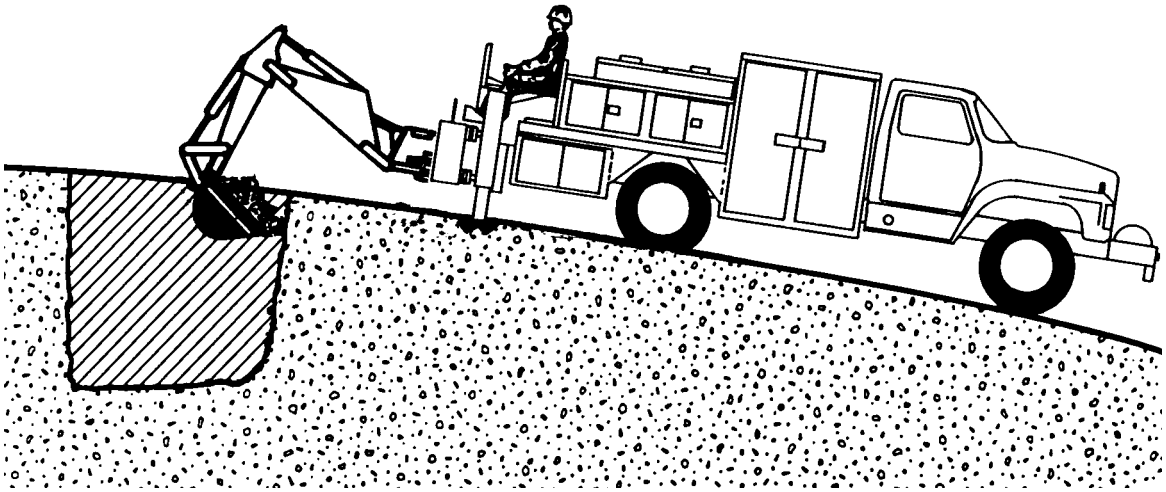
TRENCHING BETWEEN A BUILDING AND AN OPEN EXCAVATION (CONTINUED)

Position the unit so the backhoe swing post is over the centerline of the trench connection. Dig with the backhoe at extreme swing positions, and in as close to the stabilizers as possible. Pile the spoil on the opposite side of the trenches.

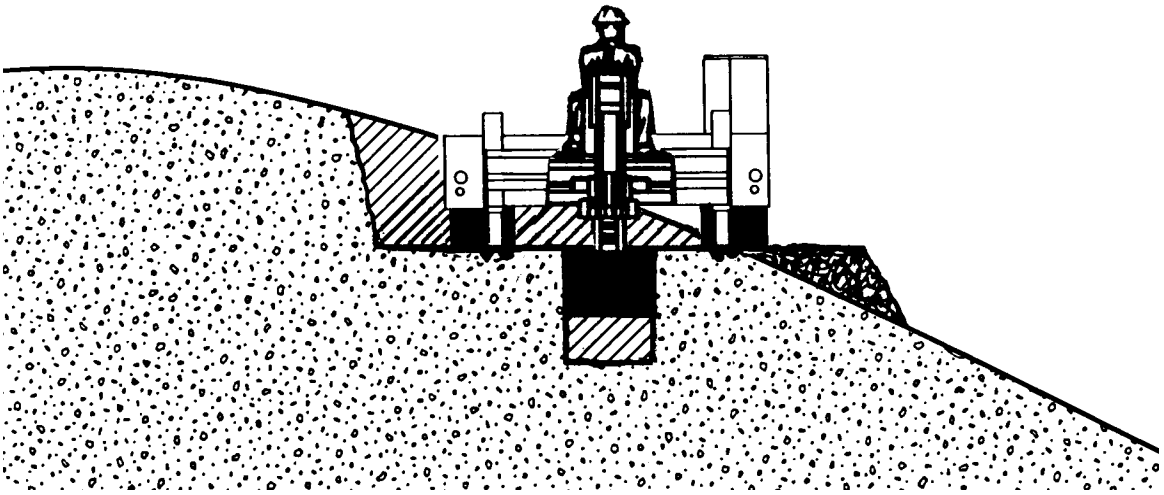


Position the unit forward so the two trenches can be connected. Pile the spoil on the opposite side of the trench.

EXCAVATING ON SLOPES



When digging on slopes, always face the backhoe upgrade whenever possible. It may be necessary to cut a level surface in the hill for the backhoe to sit in when operating on slopes. This will allow the backhoe to sit level for digging the main excavation. Pile the spoil from the surface downhill. When digging the main excavation, pile the spoil uphill.



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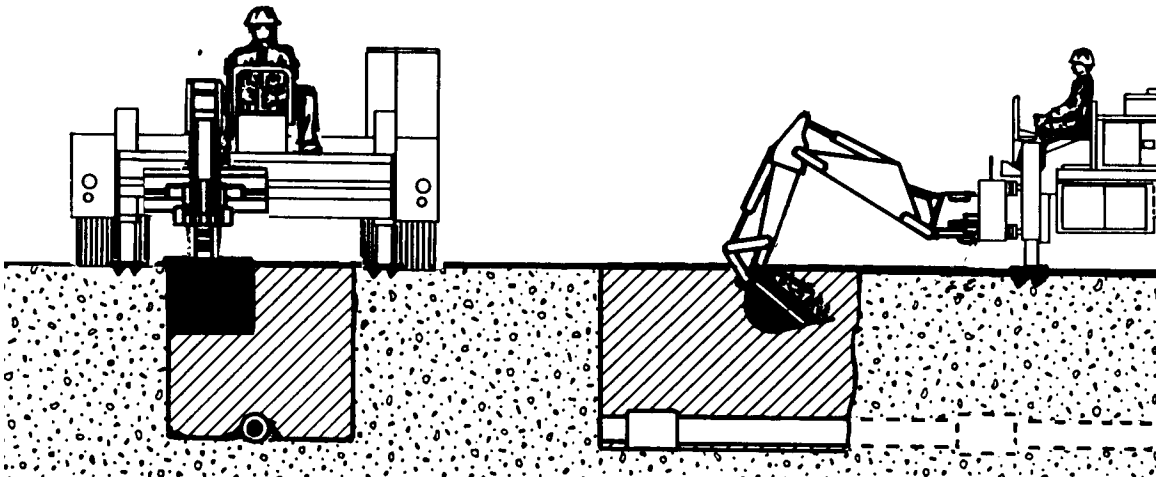
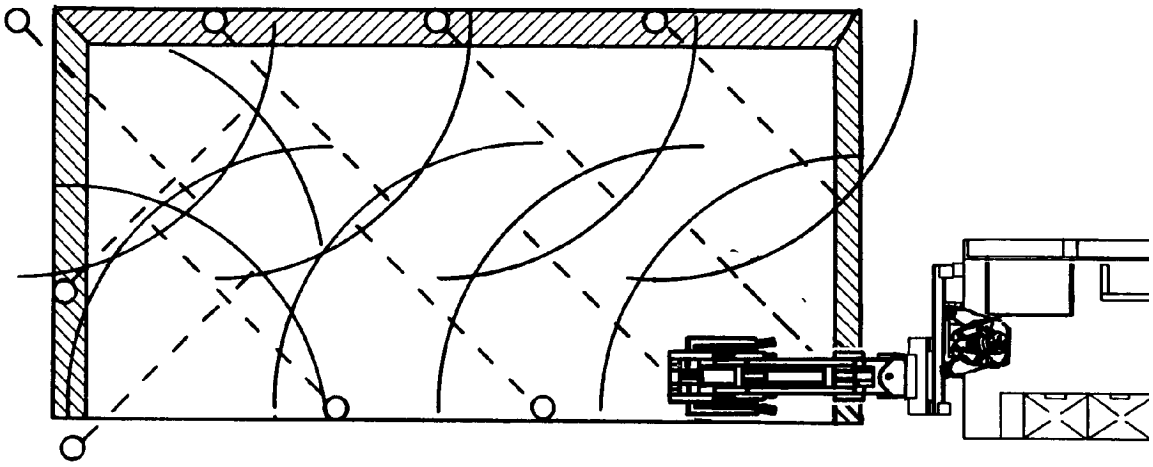
PIPELINE LEAK REPAIR



To check for pipeline leaks, start by digging a bellhole about six feet wide and ten feet long. Then, dig lengthwise along the pipeline to locate the leak. Once the leak is located, position the unit to dig at grade level on both sides of the pipeline. If a section of pipe is to be replaced, strip the soil from both ends of the bellhole. Enlarge the hole enough to allow the workmen adequate working space in the leak area.

DIGGING STRAIGHT WALL SHALLOW BASEMENTS

Begin at one corner, and remove as much material as possible to grade level. Reset the unit forward and continue digging to the grade level. Progress around the edge of the basement, finishing each corner as you come to it.



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MISCELLANEOUS - BACKFILLING

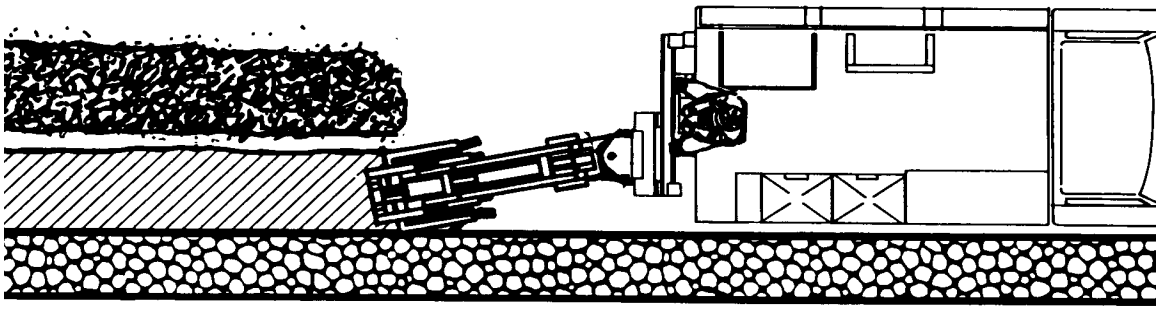
To backfill an excavation, lower the extended bucket into the spoil pile. Curl the bucket and lift it clear of the spoil pile. Swing the bucket to the excavation and extend the bucket. Return the bucket to the spoil pile and continue the cycle until the job is completed.

IMPORTANT: Do not backfill by using the swing circuit and dragging the bucket sideways. Doing so could cause damage to the dipper, boom, and swing cylinders or mainframe.

IMPORTANT: Avoid constant jarring or hammering contact between the spoil pile and the loaded bucket, as this may cause premature wear to the backhoe pins and bushings.

MISCELLANEOUS - EXCAVATING BY A WALL OR CURB

To excavate by a wall, move the backhoe in to the wall. Concentrate on getting the swing pin as close to the wall as possible while leaving enough swing arc left to dump the spoil.



MISCELLANEOUS - HARD GROUND OPERATION

When digging in hard ground, it may be necessary to decrease the bucket angle of entry to the point where the back of the bucket almost contacts the ground. It may also be necessary to apply downward pressure with the boom on the bucket.

OPERATING INSTRUCTIONS

TRANSPORTING

TRUCK MOUNTED HYDRAULIC SIDE SHIFT BACKHOE

GENERAL INFORMATION

Follow the simple steps listed below when preparing the backhoe for transportation between work sites. Read and follow the safety precautions for backhoe transporting listed in Safety Precautions section of this manual before moving the backhoe.

1. Before transporting the backhoe, position the boom lock as shown in Figure #1. Remove the snapper ring from its storage location and rotate the boom lock down into locking position. Roll the boom up into transport position which will engage the boom lock onto the boom cylinder pin as shown in Figure #2. Install snapper ring through hole in boom cylinder pin, therefore securing boom lock in place.

NOTE: TO PREVENT DAMAGE TO SNAPPER RING, DO NOT STORE IN CYLINDER PIN DURING OPERATION.

FIGURE #1

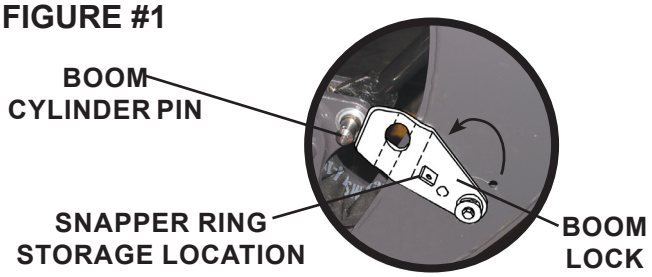
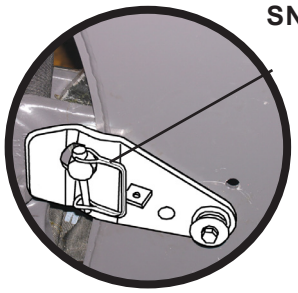


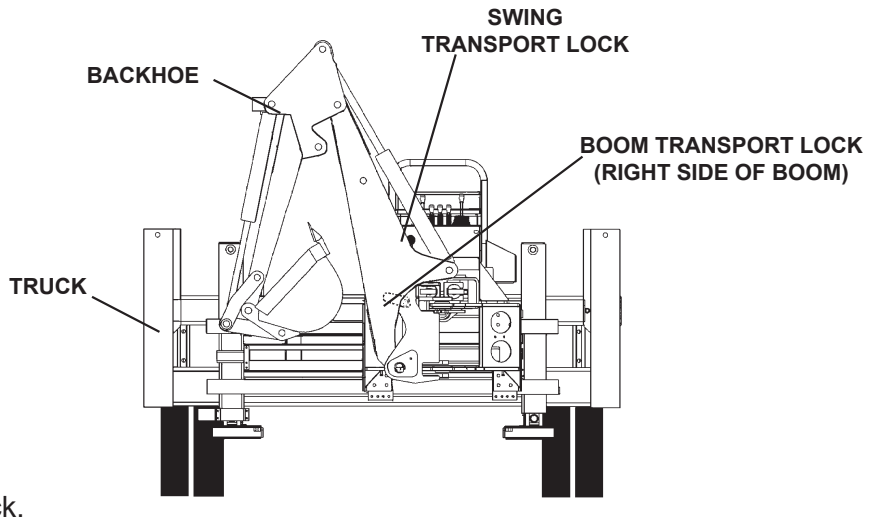
FIGURE #2



BOOM LOCK SECURED IN TRANSPORT POSITION

2. Position boom, dipper and bucket as shown in Figure #3 (Shift backhoe to one side and turn 90°).

FIGURE #3



3. Engage the swing lock.
4. Raise stabilizers and install locking pins.

CAUTION!

When transporting the backhoe on a road or highway at night or during the day, use accessory lights and devices for adequate warning to the operators of other vehicles. In this regard, check local government regulations.

Always drive slowly over uneven terrain to avoid tipping the backhoe.

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OPERATING INSTRUCTIONS

REMOVAL AND STORAGE
TRUCK MOUNTED HYDRAULIC SIDE SHIFT BACKHOE

BACKHOE REMOVAL

To remove the backhoe, just follow the simple procedure outlined below. Remember, always position the truck on hard, level ground when the backhoe is to be removed.

1. Side shift backhoe to the center of the side shift frame, and lower the stabilizers and bucket to the ground to support the weight of the backhoe.

2. Remove the two quick release pins from the backhoe mounting frames.

CAUTION! Do not operate the backhoe from the operator's seat after the quick release pins have been removed. The backhoe is no longer secured to the truck. Use care to avoid backhoe lowering or falling from the back of the truck.

3. Standing beside the backhoe, operate the boom, dipper, and stabilizer controls to raise the backhoe until all the mounting frame pins completely clear the support hooks on the truck.

4. Once the backhoe has cleared the hooks, pull the truck forward, out from under the backhoe.

   IMPORTANT: Do not pull the truck so far forward that you put a strain on the hydraulic lines, and risk damaging the lines.

5. Raise the stabilizers until the backhoe is resting on the ground. Level the backhoe using the boom control.

6. Stop the truck engine. Relieve the hydraulic pressure from the hoses by working the backhoe control levers.

   IMPORTANT: Do not restart the engine until Step 7 has been completed. The hydraulic circuits may be open, and oil loss could result if the engine is started.

7. Disconnect the backhoe power and return lines from the truck. Connect the truck power and return hose couplers together. This allows oil from the truck valve to circulate back to the reservoir. Connect the backhoe power and return hose couplers together to keep out foreign particles.

BACKHOE STORAGE

To prepare the backhoe for storage, wash off all dirt and grime from the unit. Coat the exposed portions of the cylinder rods with grease. Lubricate the grease fittings. Make sure the backhoe hydraulic system is sealed against contaminates entering the unit. Store the backhoe in a clean, dry place with a cover over it.

LUBRICATION

TRUCK MOUNTED SIDESHIFT BACKHOE

GENERAL INFORMATION

Economical and efficient operation of any machine is dependent upon regular and proper lubrication of all moving parts with a quality lubricant. Neglect leads to reduced efficiency, heavy draft, wear, breakdown, and needless replacement parts.

All parts provided with grease fittings should be lubricated as indicated. If any grease fittings are missing, replace them immediately. Clean all fittings thoroughly before using grease gun.

IMPORTANT: Avoid excessive greasing. Dirt collects on exposed grease and greatly increases wear. After greasing, wipe off excessive grease from fittings.

LUBRICATION SYMBOLS

The following symbols are used on the lubrication diagram printed on the following page. They are reproduced here with their meanings for your convenience.

Lubricate daily or every 8 hours of operation, whichever comes last, with SAE Multi-Purpose Lubricant or an equivalent SAE Multi Purpose type grease.

CAUTION! **Shut off vehicle engine , set the parking brake, and remove the key before lubricating equipment.**

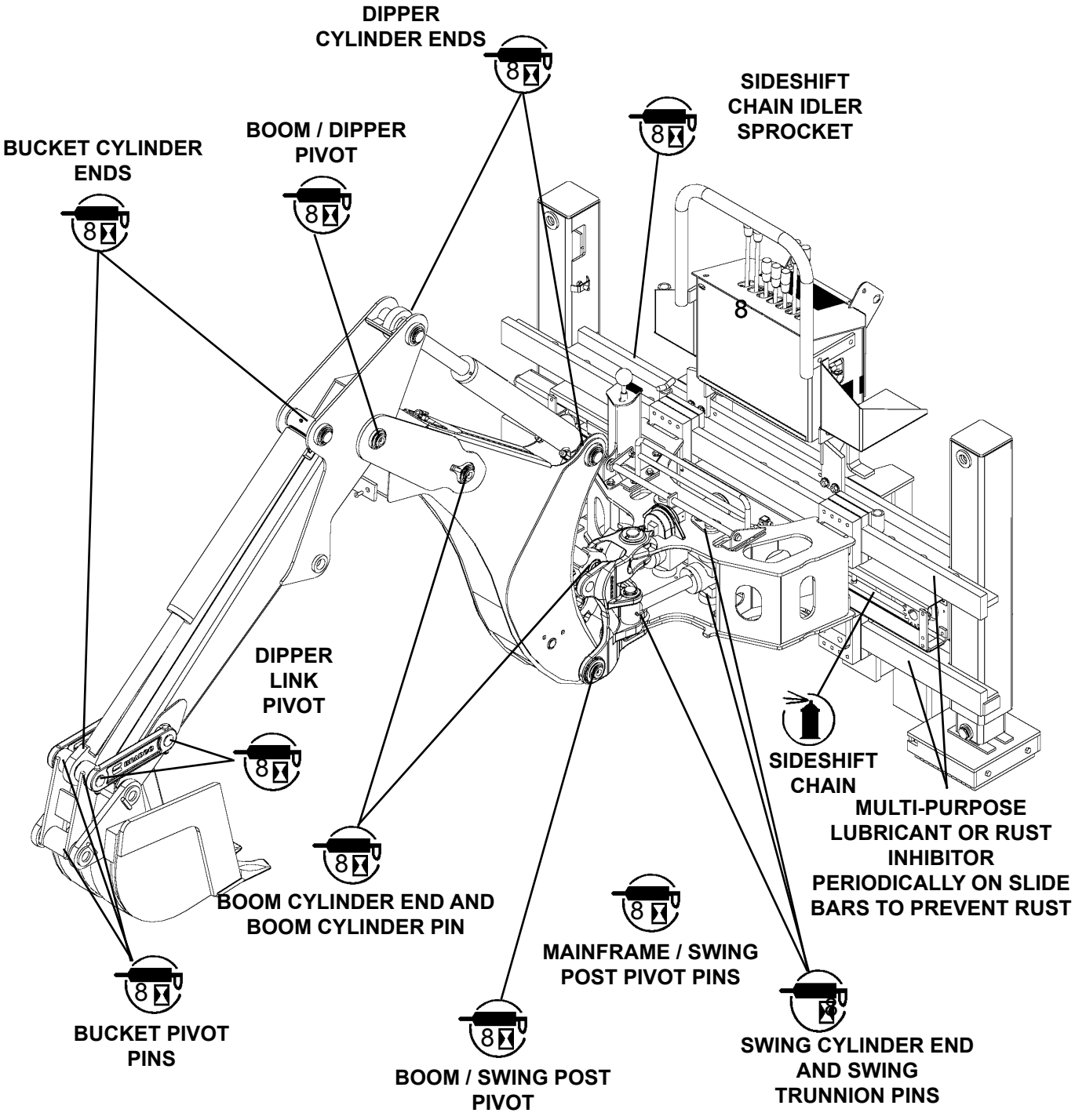
Lubricate chain periodically with a multi-purpose lubricant, or rust inhibitor, to prevent rusting.

LUBRICATION

485 TRUCK MOUNTED SIDESHIFT BACKHOE

BACKHOE LUBRICATION DIAGRAM

The following diagram is provided to help you locate all the points on your backhoe that need lubricating. Be sure to follow the lubrication intervals as noted by the lubrication symbols used on this page. Always replace any missing grease fittings as soon as possible.



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MAINTENANCE AND SERVICE

GENERAL INFORMATION

Regular maintenance is the key to long equipment life and safe operation. Maintenance requirements have been reduced to an absolute minimum. However, it is very important that these maintenance functions be performed as described below.

Procedure	Daily	Every 40 Hours	2500 Hours or 12 Months
Lubricate all grease fittings with multi-purpose grease. See Lubrication diagram for locations.	✔		
Hardware - Check for tightness (see Bolt Torque Specifications)	✔		
Hydraulic System - Check for leaks and tighten as necessary. Check for damage and replace as needed.	✔		
Decals - Check for missing or damaged safety decals and replace as necessary.	✔		
Check all pins, bushings cotter pins, nuts, etc for signs of wear or loose fit. Tighten as required and replace where necessary.	✔		
Inspect attachment for any worn parts or cracked welds. Repair as required.	✔		
Hydraulic Oil - Check prime mover hydraulic system for adequate oil levels.		✔	

IMPORTANT: Hydraulic fluid level should be checked with backhoe in transport position.

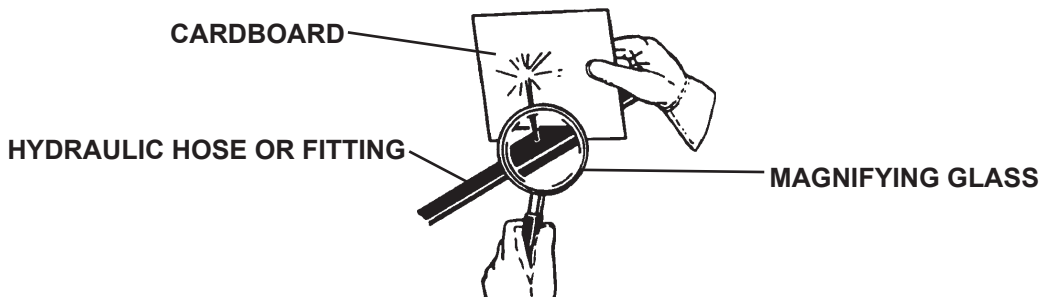
WARNING! **Escaping hydraulic/diesel fluid under pressure can penetrate the skin causing serious injury.**

DO NOT use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.

Stop engine and relieve pressure before connecting or disconnecting lines.

Tighten all connections before starting engine or pressurizing lines.

If any hydraulic/diesel fluid is injected into the skin, obtain medical attention immediately or gangrene or other serious injury will result.



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MAINTENANCE AND SERVICE

CONTROL VALVE

The hydraulic control valve maintenance in normally limited to replacement of O-ring seals, cleaning and the replacement of relief valve cartridges.

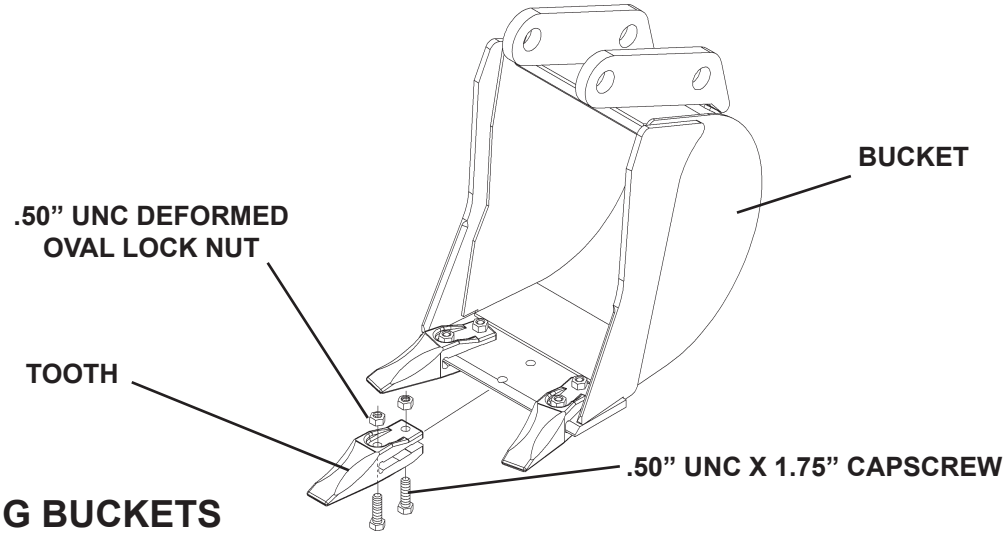
The most common cause of premature wear and malfunctioning of hydraulic system components is the ingress of contaminants and incorrect high pressure inlet and low pressure return connections (cavitation).

Observe a high standard of cleanliness when doing valve maintenance.

REPLACING BUCKET TEETH

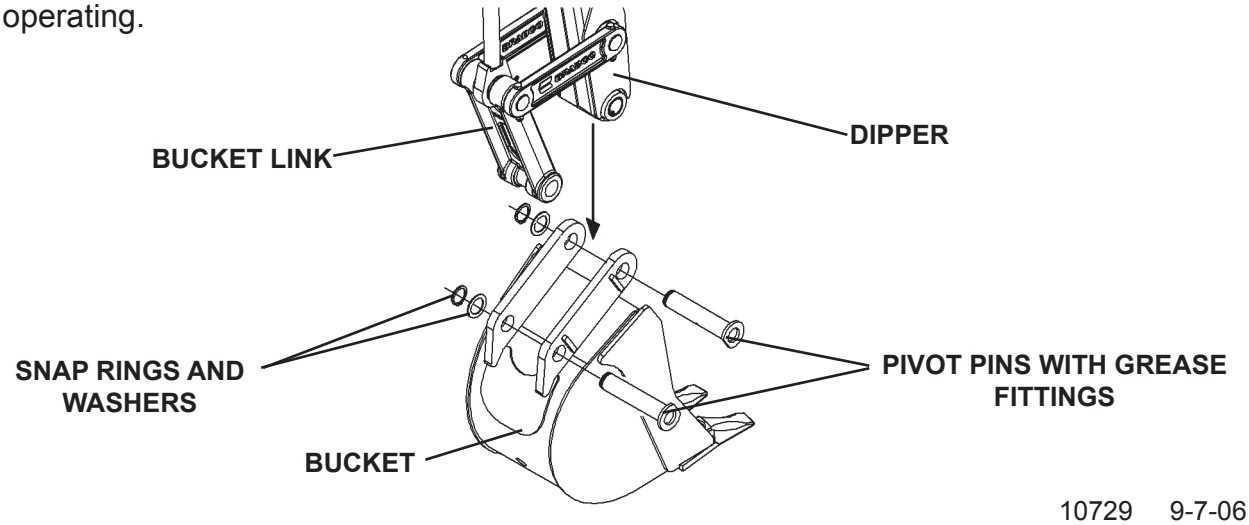
The bucket teeth are self-sharpening and require little attention: however, they can be replaced when they become worn or broken.

Remove the two capscrews and lock nuts securing the tooth to the bucket and replace with new bucket teeth and hardware.



CHANGING BUCKETS

The bucket is connected to the dipper and bucket link with snap ring style pins. To change buckets, remove the snap rings and washers from one side of the pivot pins, slide the pins out and then remove the old bucket. Position the new bucket in its place. Install the pivot pins and secure with snap rings and thrust washers. Lubricate both pivot pin grease fittings before operating.



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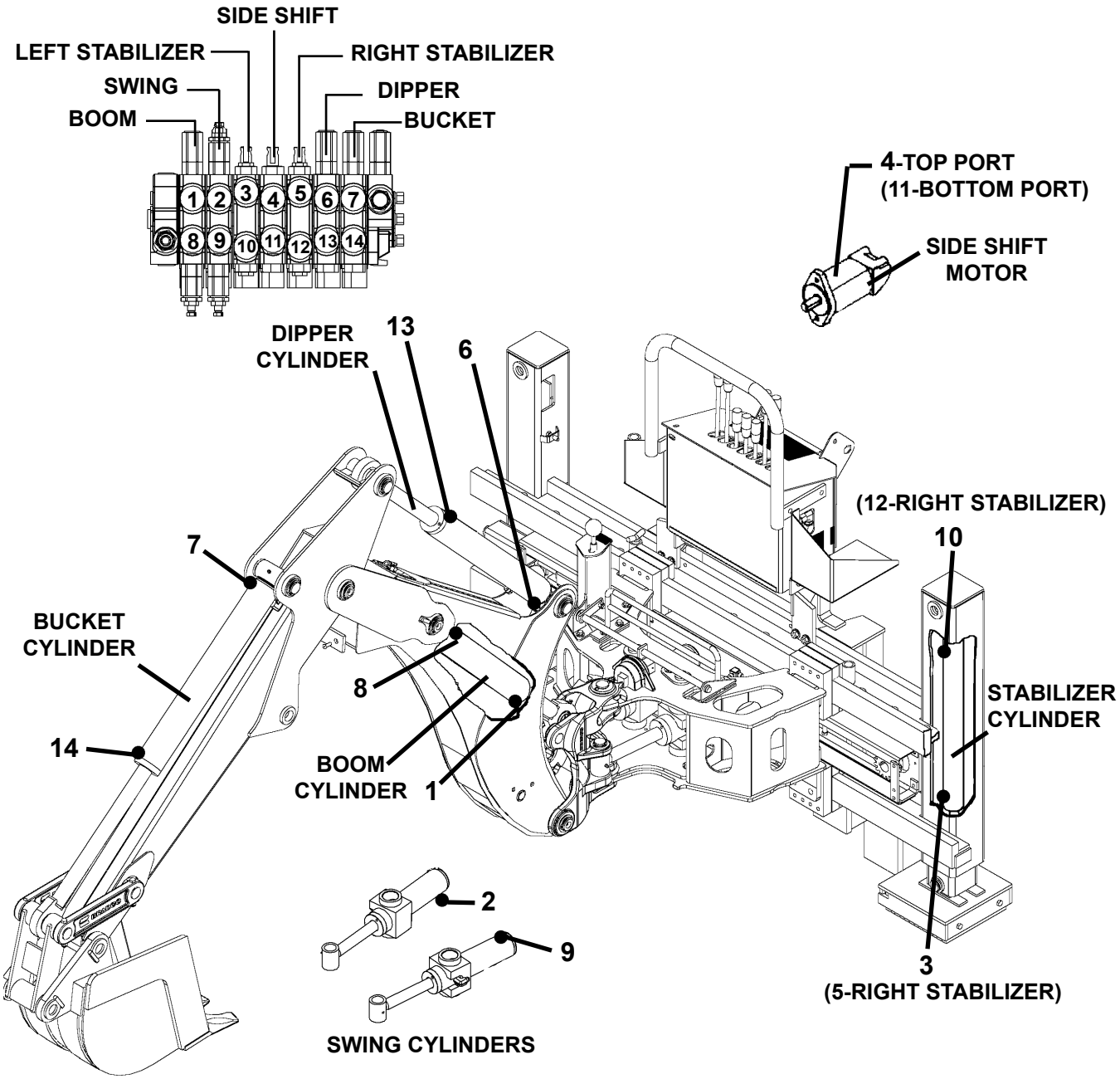
MAINTENANCE

485 SIDESHIFT BACKHOE HOSE ROUTING

GENERAL INFORMATION

The purpose of this page is to show the hydraulic hose routing between the backhoe control valve and the various backhoe hydraulic cylinders. This information is helpful when trouble shooting cylinder and control valve related problems. Simply match the number of the hydraulic port to the corresponding number on the backhoe control valve.

BACKHOE CONTROL VALVE



NOTE: The fittings on the hydraulic cylinders have been altered for clarity purposes. This will assist you in distinguishing between the rod end and the barrel end of the various hydraulic cylinders.

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CYLINDER SEAL REPLACEMENT

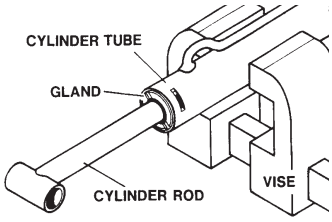
The following information is provided to assist you in the event you should need to repair or rebuild a hydraulic cylinder. When working on hydraulic cylinders, make sure that the work area and tools are clean and free of dirt to prevent contamination of the hydraulic system and damage to the hydraulic cylinders. Always protect the active part of the cylinder rod (the chrome section). Nicks or scratches on the surface of the rod could result in cylinder failure. Clean all parts thoroughly with a cleaning solvent before reassembly.

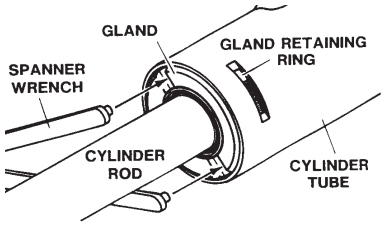
DISASSEMBLY PROCEDURE

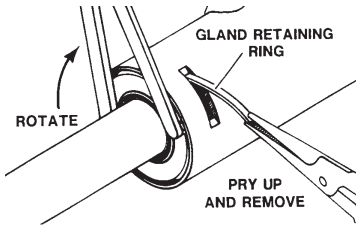
IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

RETAINING RING TYPE GLAND

1. Mount the cylinder tube securely in a vise. **NOTICE:** Do not clamp too tight and distort the tube.
2. Rotate the gland with a spanner wrench (available from your dealer), until the gland retaining ring appears in the milled slot.

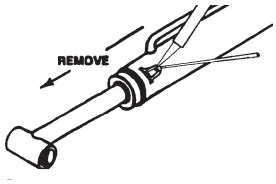


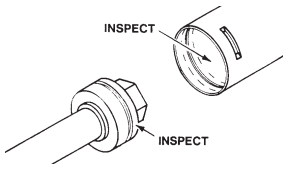


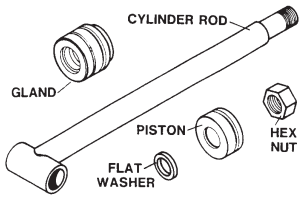


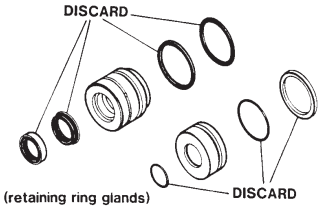
Pry up the end of the gland retaining ring with a pointed tool. Rotate the gland with a spanner wrench while removing the retaining ring. **NOTE: The gland and piston seal(s) can be pulled out and cut as they appear in the milled slot during disassembly. After cutting, pull them on out through the milled slot.**

3. Pull the cylinder rod from the cylinder tube.







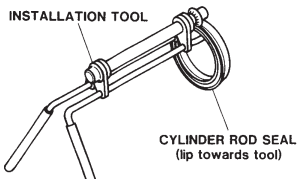


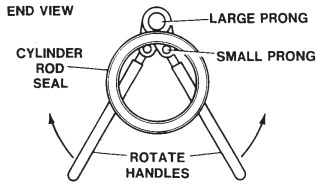
4. Inspect the piston and the bore of the cylinder tube for deep scratches or galling. If damaged, the piston and cylinder tube must be replaced.
5. Remove the hex nut, piston, flat washer or spacer tube (if so equipped), and gland from the cylinder rod. If the cylinder rod is rusty, scratched, or bent, it must be replaced.
6. Remove and discard all old seals.

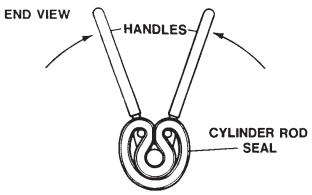
ASSEMBLY PROCEDURE

IMPORTANT: Replace all seals even if they do not appear to be damaged. Failure to replace all seals may result in premature cylinder failure.

1. Install the cylinder rod seal in the gland first. Be carefull not to damage the seal in the process as it is somewhat difficult to install. A special installation tool is available to help with installing the seal. Simply fit the end of the tool over the seal so that the large prong of the tool is on the outside of the seal, and the two smaller prongs on the inside. The lip of the seal should be facing towards the tool. Rotate the handles on the tool around to wrap the seal around the end of the tool.







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MAINTENANCE AND SERVICE

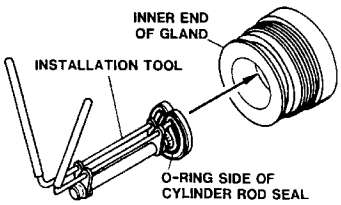
Now insert the seal into the gland from the inner end. Position the seal in its groove, and release and remove the tool. Press the seal into its seat the rest of the way by hand.

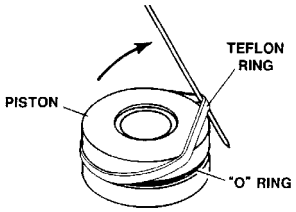
NOTE: Threaded gland is shown in diagram for reference only.

2. Install the new piston ring, rod wiper, O-rings, and backup washers, if applicable, on the piston. Be careful not to damage the seals. Caution must be used when installing the piston ring. The ring must be stretched carefully over the piston with a smooth, round, pointed tool.

3. Slide the gland onto the cylinder rod being careful not to damage the rod wiper. Then install the spacer, or flat washer (if so equipped), small O-ring, piston, and hex nut onto the end of the cylinder rod.

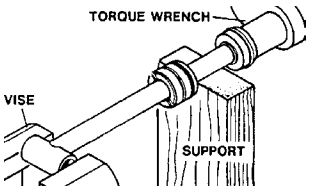
4. Secure the cylinder rod (mounting end) in a vise, with a support at its center. Torque the nut to the value shown on the chart for the thread diameter of the cylinder rod.

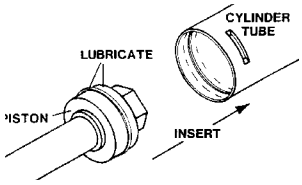


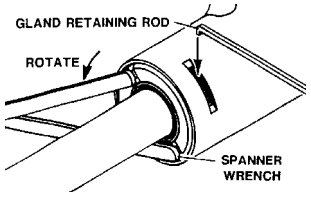


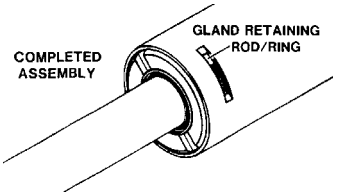
Thread Diameter	POUNDS - FEET
7/8"	150-200
*1"	230-325
1-1/8"	350-480
1-1/4"	490-670
1-3/8"	670-900

*** 1" Thread Diameter WITH 1.25" Rod Diameter**
Min. 230 ft. lbs. Max. 250 ft. lbs.









IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

IMPORTANT: Ensure that the piston ring fits squarely into the cylinder tube and piston groove, otherwise the ring may be damaged and a leak will occur.

5. Apply a lubricant (such as Lubriplate #105) to the piston and teflon ring. Insert the cylinder rod assembly into the cylinder tube.

6. Rotate the gland with a spanner wrench until the hole (drilled into the retaining slot of the gland) appears in the milled slot of the cylinder tube. Insert the hooked end of the gland retaining rod into the hole.

Rotate the gland until the gland retaining rod forms a ring between the gland and the cylinder tube. When complete, the bent end of the gland retainer ring should be hidden (not turned so it is exposed in the slot) to prevent it from popping out.

WARNING! **Cylinders serviced in the field are to be tested for leakage prior to the attachment being placed in work. Failure to test rebuilt cylinders could result in damage to the cylinder and/or the attachment, causing severe personal injury or even death.**

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MAINTENANCE AND SERVICE

CYLINDER SEAL REPLACEMENT

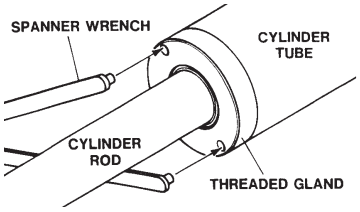
The following information is provided to assist you in the event you should need to repair or rebuild a hydraulic cylinder. When working on hydraulic cylinders, make sure that the work area and tools are clean and free of dirt to prevent contamination of the hydraulic system and damage to the hydraulic cylinders. Always protect the active part of the cylinder rod (the chrome section). Nicks or scratches on the surface of the rod could result in cylinder failure. Clean all parts thoroughly with a cleaning solvent before reassembly.

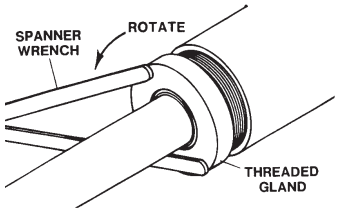
DISASSEMBLY PROCEDURE

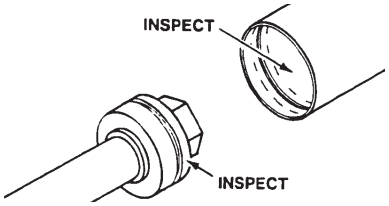
IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

THREADED TYPE GLAND

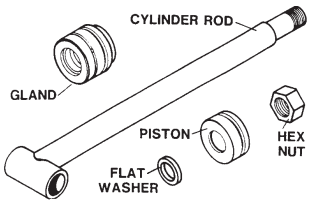
1. Rotate the gland with a spanner wrench counterclockwise until the gland is free of the cylinder tube.
2. Pull the cylinder rod from the cylinder tube and inspect the piston and the bore of the cylinder tube for deep scratches or galling. If damaged, the piston AND the cylinder tube must be replaced.

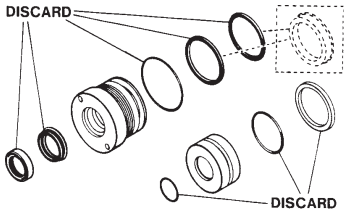






3. Remove the hex nut, piston, flat washer or spacer tube (if so equipped), and gland from the cylinder rod. If the cylinder rod is rusty, scratched, or bent, it must be replaced.
4. Remove and discard all the old seals.



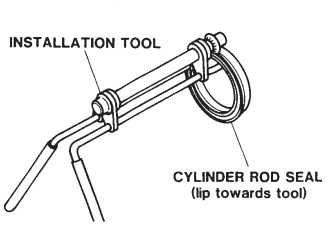


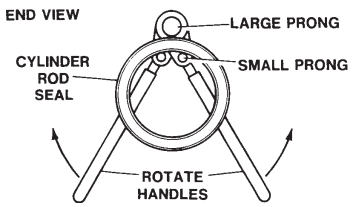
ASSEMBLY PROCEDURE

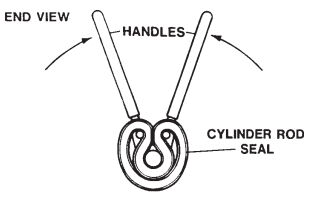
IMPORTANT: Replace all seals even if they do not appear to be damaged. Failure to replace all seals may result in premature cylinder failure. NOTE: Seal kits will service most cylinders of similar bore size and rod diameter.

1. Install the cylinder rod seal in the gland first. Be careful not to damage the seal in the process, as it is somewhat difficult to install.

NOTE: A special installation tool (Part #65349) is available to help with installing the seal. Simply fit the end of the tool over the seal so that the large prong of the tool is on the outside of the seal, and the two smaller prongs on the inside. The lip of the seal should be facing towards the tool. Rotate the handles on the tool around to wrap the seal around the end of the tool.







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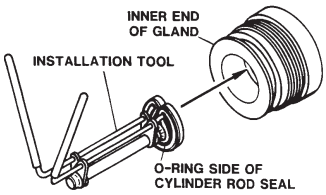
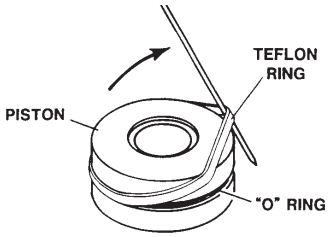
Now insert the seal into the gland from the inner end. Position the seal in its groove, and release and remove the tool. Press the seal into its seat the rest of the way by hand.



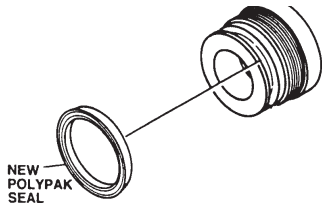
2. Install the new piston ring, rod wiper, O-rings and backup washers, if applicable, on the piston.

   Be careful not to damage the seals. Caution must be used when installing the piston ring. The ring must be stretched carefully over the piston with a smooth, round, pointed tool.



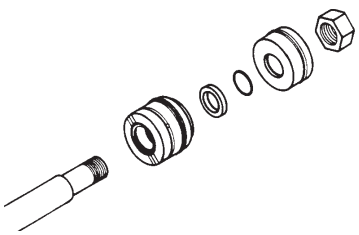
3. After installing the rod seal inside the gland, as shown in step #1, install the external seal.

NOTE: Threaded glands may have been equipped with a separate O-ring and backup washer system or a polypak (all in one) type seal. Current seal kits contain a polypak (all in one) type seal to replace the discarded seal types on ALL THREADED GLANDS.



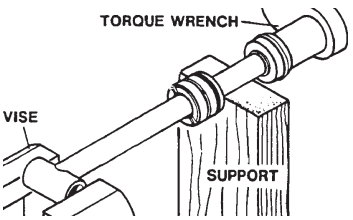
4. Slide the gland onto the cylinder rod, being careful not to damage the rod wiper. Then install the spacer, or flat washer (if so equipped), small o-ring, piston, and hex nut onto the end of the cylinder rod.

5. Secure the cylinder rod (mounting end) in a vise with a support at its center. Torque the nut to the amount shown for the thread diameter of the cylinder rod (see chart).



Thread Diameter	POUNDS - FEET
7/8"	150-200
*1"	230-325
1-1/8"	350-480
1-1/4"	490-670
1-3/8"	670-900

*** 1" Thread Diameter WITH 1.25" Rod Diameter**
Min. 230 ft. lbs. Max. 250 ft. lbs.



IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

6. Apply a lubricant (such as Lubriplate #105) to the piston and teflon ring. Insert the cylinder rod assembly into the cylinder tube.

IMPORTANT: Ensure that the piston ring fits squarely into the cylinder tube and piston groove, otherwise the ring may be damaged and a leak will occur.

7. Use a spanner wrench to rotate the gland clockwise into the cylinder. Continue to rotate the gland with the spanner wrench until it is tight.

WARNING! **Cylinders serviced in the field are to be tested for leakage prior to the attachment being placed in work. Failure to test rebuilt cylinders could result in damage to the cylinder and/or the attachment, cause severe personal injury or even death.**

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TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Backhoe fails to lift or swing	Low oil supply	Add oil
	Improper hose hookup	Check hydraulic diagram; reinstall properly
	Broken hydraulic line	Check for leaks and replace line
	Jammed swing linkage	Remove interference
	Bent cylinder rod	Replace or repair cylinder
Backhoe lifting or swinging too slowly	Cold oil	Warm oil with engine at idle speed
	Engine speed too slow	Open throttle
	Oil too heavy	Use recommended oil
	Oil leaking past cylinder packings	Replace packings
	Dirty oil filter	Replace filter
	Faulty relief valve	Clean or replace
	Incorrect restrictors in valve	Check restrictor orifice size with those shown on valve assembly page
Backhoe fails to hold up load	Broken or leaking lines	Replace broken hose and check for leaks
	Dirty oil	Drain and refill oil, replace filter
	Oil leaking past cylinder packings	Replace packings
	Faulty relief valve	Clean or replace

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TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Oil heating	Dirty oil	Drain and refill oil, replace filter
	Partially plugged inlet filter	Clean filter element
	Control valve held open too long	Return control to neutral position when not in use
	Relief valve set too low	Set valve correctly
	Oil too light in hot weather	Use recommended oil
	Engine running too fast	Reduce throttle
	Damaged oil lines	Replace damaged lines
	Poor operating technique causing excessive oil flow over relief valve	Learn smooth operating methods
External leakage	Damaged O-rings on valve spools	Repair control valve
	Cylinder seals damaged	Repair cylinder
	Broken oil lines	Replace hose and check for leaks
	Control valve tie bolts loose	Torque bolts to 13 - 14.5 ft. lbs.
	Damaged O’rings between valve sections	Repair control valve.
Swing cylinder malfunctioning	Oil leaking past packing or seals	Replace packing or seals
	Faulty relief valve	Clean or replace

11225 8-2-18-2

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Control valve sticking or working hard	Dirty valve	Clean valve
	Scored bore or bent spool	Inspect and replace spool, or entire valve
	Control linkage misaligned	Correct misalignment
	Return spring binding broken	Replace spring
	Foreign matter in spool bore	Clean valve
	Displaced O'Rings in valve	Replace O'Rings
	Control valve tie bolts too tight	Tighten bolts only to 13 - 14.5 ft. lbs.
	Excessive oil flow	Check flow rate. If over 12 GPM Contact Factory

BOLT TORQUE SPECIFICATIONS

GENERAL TORQUE SPECIFICATION TABLES

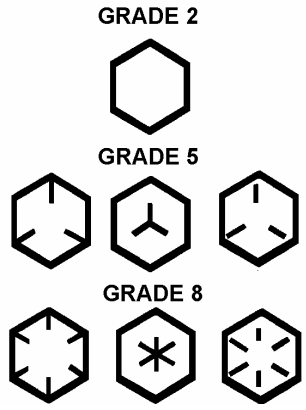
Use the following charts when determining bolt torque specifications when special torques are not given. Always use grade 5 or better when replacing bolts.

SAE BOLT TORQUE SPECIFICATIONS

NOTE: The following torque values are for use with extreme pressure lubricants, plating or hard washer applications Increase torque 15% when using hardware that is unplated and either dry or lubricated with engine oil.

Bolt Size		SAE GRADE 5 TORQUE Pounds Feet		SAE GRADE 5 TORQUE Newton-Meters		SAE GRADE 8 TORQUE Pounds Feet		SAE GRADE 8 TORQUE Newton-Meters	
Inches	Millimeters	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF
1/4	6.35	8	9	11	12	10	13	14	18
5/16	7.94	14	17	19	23	20	25	27	34
3/8	9.53	30	36	41	49	38	46	52	62
7/16	11.11	46	54	62	73	60	71	81	96
1/2	12.70	68	82	92	111	94	112	127	152
9/16	14.29	94	112	127	152	136	163	184	221
5/8	15.88	128	153	174	207	187	224	254	304
3/4	19.05	230	275	312	373	323	395	438	536
7/8	22.23	340	408	461	553	510	612	691	830
1	25.40	493	592	668	803	765	918	1037	1245
1-1/8	25.58	680	748	922	1014	1088	1224	1475	1660
1-1/4	31.75	952	1054	1291	1429	1547	1700	2097	2305
1-3/8	34.93	1241	1428	1683	1936	2023	2312	2743	3135
1-1/2	38.10	1649	1870	2236	2535	2686	3026	3642	4103

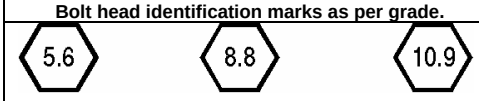
Bolt head identification marks as per grade. NOTE: Manufacturing Marks Will Vary



METRIC BOLT TORQUE SPECIFICATIONS

NOTE: The following torque values are for use with metric hardware that is unplated and either dry or lubricated with engine oil. Reduce torque 15% when using hardware that has extreme pressure lubricants, plating or hard washer applications.

Bolt head identification marks as per grade.



Size of Bolt	Grade No.	Pitch (mm)	Pounds Feet	Newton-Meters	Pitch (mm)	Pounds Feet	Newton-Meters
M6	5.6	1.0	3.6-5.8	4.9-7.9	-	-	-
	8.8		5.8-.4	7.9-12.7		-	-
	10.9		7.2-10	9.8-13.6		-	-
M8	5.6	1.25	7.2-14	9.8-19	1.0	12-17	16.3-23
	8.8		17-22	23-29.8		19-27	25.7-36.6
	10.9		20-26	27.1-35.2		22-31	29.8-42
M10	5.6	1.5	20-25	27.1-33.9	1.25	20-29	27.1-39.3
	8.8		34-40	46.1-54.2		35-47	47.4-63.7
	10.9		38-46	51.5-62.3		40-52	54.2-70.5
M12	5.6	1.75	28-34	37.9-46.1	1.25	31-41	42-55.6
	8.8		51-59	69.1-79.9		56-68	75.9-92.1
	10.9		57-66	77.2-89.4		62-75	84-101.6
M14	5.6	2.0	49-56	66.4-75.9	1.5	52-64	70.5-86.7
	8.8		81-93	109.8-126		90-106	122-143.6
	10.9		96-109	130.1-147.7		107-124	145-168
M16	5.6	2.0	67-77	90.8-104.3	1.5	69-83	93.5-112.5
	8.8		116-130	157.2-176.2		120-138	162.6-187
	10.9		129-145	174.8-196.5		140-158	189.7-214.1
M18	5.6	2.0	88-100	119.2-136	1.5	100-117	136-158.5
	8.8		150-168	203.3-227.6		177-199	239.8-269.6
	10.9		175-194	237.1-262.9		202-231	273.7-313
M20	5.6	2.5	108-130	146.3-176.2	1.5	132-150	178.9-203.3
	8.8		186-205	252-277.8		206-242	279.1-327.9
	10.9		213-249	288.6-337.4		246-289	333.3-391.6

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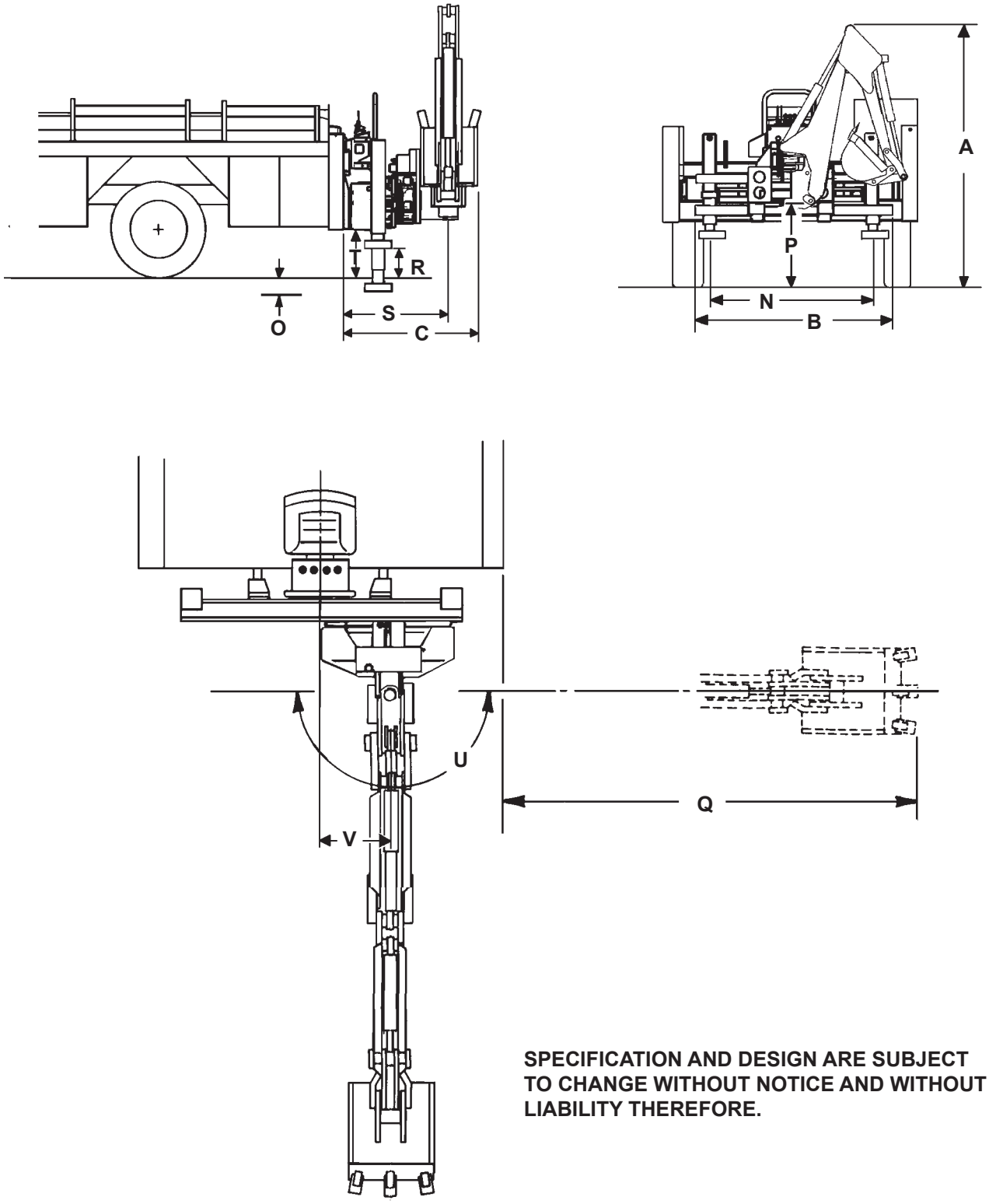
SPECIFICATIONS

TRUCK MOUNTED SIDESHIFT BACKHOE



SPECIFICATION AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE AND WITHOUT LIABILITY THEREFORE.

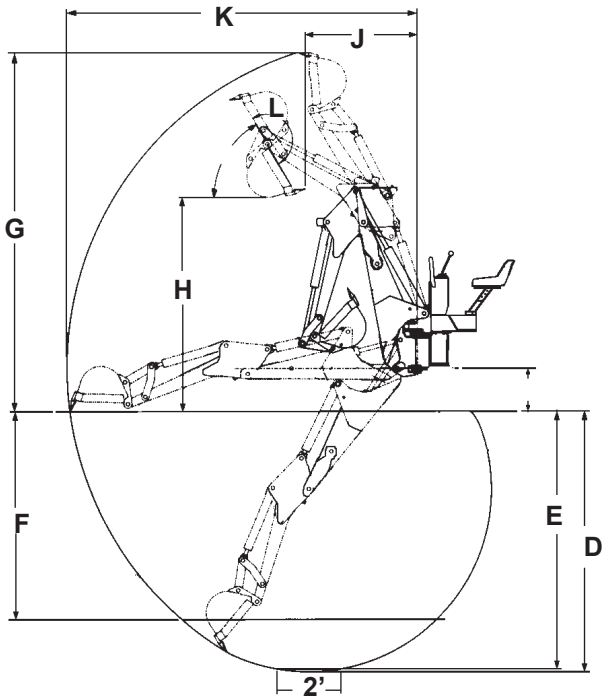
11228 7-2-08

SPECIFICATIONS

TRUCK MOUNTED SIDESHIFT BACKHOE

SPECIFICATION AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE AND WITHOUT LIABILITY THEREFORE.

* **SPECIFICATIONS ARE BASED ON A 41" TRUCK BED WITH BUCKET #19439 AND BOOM PIVOT HEIGHT OF 26".**



SPECIFICATIONS

TRANSPORT

A. Transport Height (with boom fully retracted) ..... 95"
B. Transport Width ..... 73"
C. Overall Length (Distance Rear of Truck to Rear of Backhoe) ..... 43"

OPERATIONAL

D. Digging Depth Maximum ..... 87"
E. Digging Depth (2 ft.) Flat Bottom ..... 86"
F. Digging Depth (8 ft.) Flat Bottom ..... 38"
G. Overall Operating Height - Fully Raised ..... 135"
H. Loading Height ..... 77"
J. Loading Reach ..... 58"
K. Reach From Swing Post ..... 127"
L. Bucket Rotation ..... 180°
N. Stabilizer Spread ..... 62"
O. Stabilizer Down Below Grade ..... 12"
P. Swing Post Pivot Height ..... 26"
Q. Reach from Street Curb ..... 99"
R. Ground Clearance ..... 12"
S. Distance Rear of Truck to Centerline of Swing Post ..... 33"
T. Clearance Below Backhoe Mainframe ..... 17"
U. Swing Arc ..... 180°
V. Side Shift Travel (Left and Right) From Centerline ..... 21"

System Relief Valve Setting ..... 2750 PSI
Digging Force - Bucket Cylinder ..... 4081#
Digging Force - Dipper Cylinder ..... 2358#
Operating Weight w/12" Bucket ..... 1905#

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SPECIFICATIONS

TRUCK MOUNTED SIDESHIFT BACKHOE

CYLINDER SPECIFICATION TABLE

CYLINDER	SPECIFICATION
BUCKET CYLINDER	
Cylinder #	**105392**
Bore	2.50"
Stroke	18.87"
Rod Diameter	1.50"
DIPPER CYLINDER	
Cylinder #	**115153**
Bore	2.50"
Stroke	19.75"
Rod Diameter	1.50"
BOOM CYLINDER	
Cylinder #	**105322**
Bore	2.75"
Stroke	16.80"
Rod Diameter	1.50"
SWING CYLINDER	
Cylinder #	**105328**
Bore	2.50"
Stroke	7.09"
Rod Diameter	1.50"
STABILIZER CYLINDER	
Cylinder #	**79897**
Bore	2.00"
Stroke	24.00"
Rod Diameter	1.12"

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BACKHOE CHECKLIST

FOR USE WITH BACKHOES AND BACKHOE MOUNTING KITS

DEALER RESPONSIBILITY:

The following check list is to be completed by the equipment dealer. This checklist is to be completed by the dealer at time of delivery. When purchasing a mounting kit for an existing backhoe it is the equipment dealers responsibility to review this checklist with the customer and instruct them to check each item at time of installation onto their prime mover.

BACKHOE:

1. _____ Check and lubricate backhoe. See “Lubrication Section” in Operator’s Manual.
2. _____ Visually inspect the backhoe for bent, loose, cracked, damaged or missing parts or any other irregularities prior to operation.
3. _____ Verify backhoe control lever function and direction of operation are in accordance with the control lever decals.
4. _____ Run cylinders through their full cycle to purge any air from the system. Recheck hydraulic system for correct hydraulic fluid levels.
5. _____ Check all hydraulic connections for leaks and all hoses for proper positioning to reduce chafing and binding.
6. _____ Check prime mover system relief valve pressure and compare and adjust to recommended operating pressure listed in the “Specifications Section” of the Operator’s Manual.
7. _____ Make sure decals are not damaged or missing and are in their right location. See “Decals Section” of the Operator’s Manual.
8. _____ Customer instructed to read and understand Operator’s Manual before operating backhoe.
9. _____ Complete and return the manufacturers “Warranty Validation Form”.

MOUNTING:

1. _____ Check backhoe, mounting, and prime mover to ensure they are all compatible.
2. _____ Check backhoe mounting bolts for tightness. Instruct owner to retighten after the first eight working hours, and after every forty working hour interval thereafter. See “Bolt Torque Specifications” in Operator’s Manual.
3. _____ If customer is installing the mounts and mounting the backhoe to the prime mover, the dealer must review the proper mounting procedure and possible consequences of improper installation.
4. _____ Verify the owner is in possession of an operator’s manual and instruct them to read and understand all safety and operating techniques.

OWNERS RESPONSIBILITY:

It is the owner’s responsibility to make sure that the dealer has completed this checklist and instructed him/her on safe and proper operation of the backhoe. If installation instructions are unclear, bring backhoe, mounting and prime mover to the equipment dealership for proper installation.

_____ _____

Owner’s Signature *Date*

_____ _____

Dealership Signature *Date*

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LIMITED WARRANTY

In order to provide you with the most UP-TO-DATE Warranty information, Paladin Warranty Statement and Warranty Procedures along with Warranty Registration and Claim Forms have been moved to our website at ***www.paladinattachments.com***.