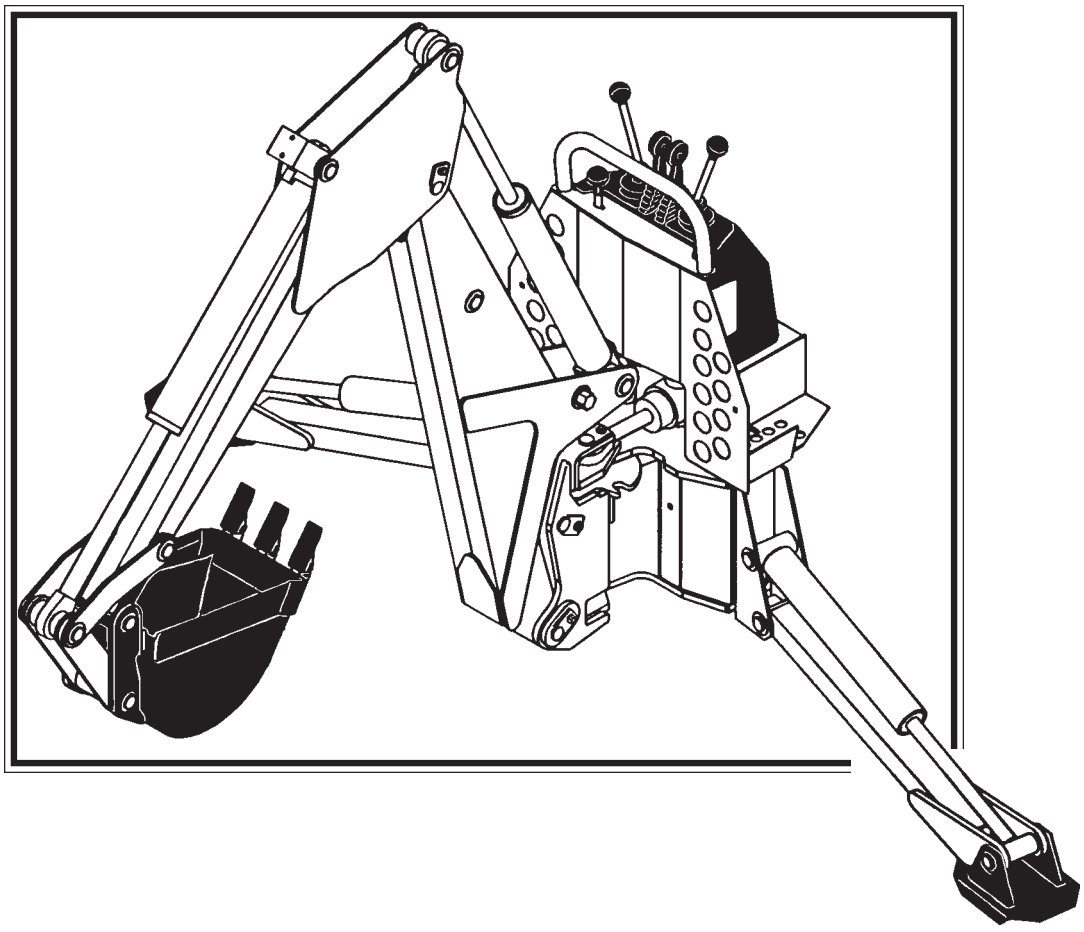
CONTRACTOR

408A

BACKHOE



OPERATOR'S & PARTS MANUAL

OM549 Rev. 5

6737

12-17-99-6

75449

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TABLE OF CONTENTS

408A BACKHOE

6752
12-15-95

TO THE OWNER

GENERAL COMMENTS

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

ABOUT THIS MANUAL

Read this manual before using your backhoe. This manual has been designed to help you to do a better, safer job. Read this manual carefully, and become familiar with the operating procedures before attempting to operate your new backhoe. **Remember, never let anyone operate this backhoe without them having read and completely understand the "Safety Precautions" and "Operating Instructions" section of this manual , or having them be fully trained by an experienced, qualified person who has read and completely understands the "Safety Precautions" and "Operating Instructions" (see sections B and G respectively).**

SERVICE

When servicing your backhoe, remember to use only original manufacturer replacement parts. Substitute parts may not meet the standards required for safe, dependable operation.

To facilitate parts ordering, record the model and serial number of your backhoe in the space provided on this page. This information may be obtained from the backhoe identification plate located on the left side of the backhoe console.

MODEL _____ **SERIAL NO.** _____

Your parts department needs this information to insure that you receive the correct parts or attachments for your specific backhoe.

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 around you.

SAFETY PRECAUTIONS

TAKE NOTE! THIS SAFETY ALERT SYMBOL FOUND THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY OR OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.

THIS SYMBOL MEANS:

ATTENTION!

BECOME ALERT!

YOUR SAFETY IS INVOLVED!

SIGNAL WORDS: Note the use of signal words DANGER, WARNING, and CAUTION with the safety messages. The appropriate signal word for each has been selected using the following guidelines:

DANGER: Indicates an imminently hazardous situation, which if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations, **typically for machine components which, for functional purposes, cannot be guarded.**

WARNING: Indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury, and **includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.**

CAUTION: Indicates a potentially hazardous situation, which if not avoided, **may result in minor or moderate injury. It may also be used to alert against unsafe practices.**

SAFETY PRECAUTIONS

THE OPERATOR

A careful operator is the best operator. Most accidents can be avoided by taking certain precautions. The following precautions are suggested here to help prevent accidents. Read and understand these safety precautions before operating the tractor and backhoe. Make sure that the equipment is operated only by responsible individuals with the proper instruction. The operator should be familiar with the controls, all safety precautions and all potential hazards.

This is the "Safety Alert Symbol" used by this industry.

Remember, when you see this symbol it means: ATTENTION BECOME ALERT! YOUR SAFETY IS INVOLVED! This symbol with it's appropriate warnings are throughout this book. Be sure all operator's read them before using the backhoe.

THE TRACTOR

1. READ THE ENTIRE TRACTOR AND BACKHOE OPERATOR'S SAFETY MANUALS BEFORE EVER ATTEMPTING TO USE THE TRACTOR. THIS KNOWLEDGE IS NECESSARY FOR SAFE OPERATION.

2. Follow all safety decals on the tractor. Keep them clean and replace them if they become worn and hard to read.

3. Pay attention to the job at hand. Do not let your mind lose concentration on what you are doing.

4. Know the limitations of your equipment. Do not use equipment for anything other than what it was originally designed.

5. Always use the seat belt if the tractor has a ROPS. Do not use it if there is no ROPS. Check the seat belt daily and replace if frayed or damaged.

SAFETY PRECAUTIONS

6. **Do not take passengers on the tractor or backhoe. There is no safe place for a passenger.**

7. **Use the handholds and step plates when getting on/off the tractor. Failure to do so could cause a fall.**

8. **Inspect the tractor before you try to operate the unit. Check for needed maintenance or repairs and be sure to have them done before using the equipment.**

9. **Before performing maintenance. Set the parking brake, place the gear shift lever in neutral, turn off the tractor and remove the key.**

10. **Wear appropriate clothing such as a hard hat, safety glasses, ear plugs, etc. Do not wear loose fitting clothing, it could get caught on the equipment.**

11. **Never operate or transport unit with covers or shields removed.**

12. **Never leave tractor running unattended. Follow tractor operator's manual for correct operation.**

13. **Reduce speed when driving over rough terrain, on a slope, or turning, to avoid overturning the tractor.**

14. **Do not smoke when refueling the tractor. Allow room in the gas tank for expansion. Wipe up any spilled fuel. Secure cap tightly when done.**

15. **Do not modify the backhoe in any way. Unauthorized modifications could result in equipment damage and/or personal injury.**

16. **Look before backing.**

WORKING WITH THE BACKHOE

1. **Never operate backhoe by standing up on, or beside the machine. Operate only from the backhoe seat.**

2. **Do not lift or carry people on the backhoe, they could fall and be crushed.**

3. **Do not adjust relief valve setting. This valve is factory set and should be adjusted only by a qualified service person. Incorrect valve setting could result in equipment damage and/or personal injury.**

4. **Check your work area. Avoid hitting overhead electrical wires, underground cables and pipes, fence post, gas lines, etc.**

5. **Block off work area from all bystanders, livestock, etc. Allow plenty of room for backhoe reach and swing.**

6. **When operating on slopes, dig with the backhoe uphill, and avoid full reach and swinging the backhoe bucket to the downhill side. Tipping could result.**

7. **Operate backhoe only from backhoe seat.**

8. **Use your backhoe only for digging. Do not use it to pull things, as a battering ram, or attach ropes, chains, etc., to the unit.**

9. **Never work under raised stabilizers or a raised bucket.**

10. **Lower stabilizers and bucket when removing backhoe. This will increase the stability of the unit.**

11. **Do not dig close to stabilizers, the ground could collapse from under the backhoe**

12. **Do not lift loads in excess of backhoe capacity.**

13. **Always lower the backhoe bucket and stabilizers to the ground, shut off engine, remove key, and apply the parking brake before leaving the unit unattended.**

TRANSPORTING THE BACKHOE

1. **Be sure to engage the boom lock and swing lock before transporting backhoe. Failure to do so could cause an unstable traveling condition.**

2. **Allow for height of backhoe when transporting backhoe so as not to catch unit on low overhangs or wires.**

3. **When driving on public roads use safety lights, reflectors, Slow Moving Vehicle signs, etc., to prevent accidents. Check with local governments for regulations that may affect you.**

4. **Do not drive close to ditches, excavations, etc., cave in could result. Drive slow over rough terrain.**

SAFETY PRECAUTIONS

MAINTENANCE

1. **<u>Never work on equipment while it is running.</u> Block up equipment, set hand brake, lower bucket and stabilizers, turn off the tractor and remove the key before performing repairs.**

2. **<u>Never make hydraulic repairs while the system is under pressure</u>, or the cylinders are under load. Serious personal injury or death could result.**

3. **<u>Observe proper maintenance</u> schedules and repairs to keep unit in safe working order.**

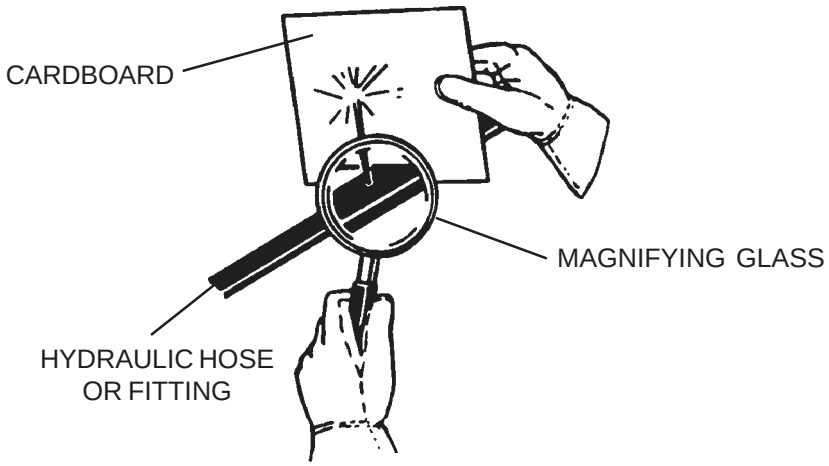
4. **<u>Always wear safety goggles</u> or glasses when working on equipment.**

5. **<u>Use a brass drift and hammer</u> when pressing out pins to prevent the pin from shattering.**

<u>WARNING!</u> **Escaping fluid under pressure can have sufficient force to penetrate the skin, causing serious personal injury. Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood, rather than hands to search for suspected leaks.**

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 immediately to determine proper treatment.



INTERNATIONAL SYMBOLS

As a guide to the operation of your equipment, various international symbols have been utilized on the instruments and controls. The symbols are shown below with an indication of their meaning.


Engine speed


Hours recorded


Engine water temperature


Lights


Horn


Engine oil pressure


Hazard warning


Axle connect


Axle disconnect


Continuously variable


Increase

Decrease

Diesel fuel


Creeper range


High range


Low range


Alternator charge


Power take-off (on)


Power take-off (off)


"Tortoise," slow or minimum setting


"Hare," fast or maximum setting


Caution


Control lever operating direction


Rock shaft (raised)


Rock shaft (lowered)


Remote cylinder (extended)


Remote cylinder (retracted)


Remote cylinder (FLOAT)


Differential lock


Read operators manual

Neutral


Forward


Reverse

GENERAL INFORMATION

The purpose of this manual is to assist in setting up, operating and maintaining your backhoe. Read it carefully. It furnishes information and instructions that will help you achieve years of dependable performance.

Right and left, when referred to in this manual, are determined from the operator's control position when facing the backhoe.

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 backhoes as may be necessary without notification.

PREPARING THE TRACTOR

WARNING! **Never let anyone operate this tractor and backhoe without understanding all of the "Safety Precautions" and "Operating Instructions" sections of this manual. (See Section B and G respectively.) Always choose hard, level ground to park the tractor on and set the brake so that the tractor cannot roll.**

BACKHOE

Basic backhoes are shipped complete with bucket. However, several bucket options are available for the backhoe. Refer to the table for proper identification of backhoe bucket options.

BUCKET ASSEMBLIES

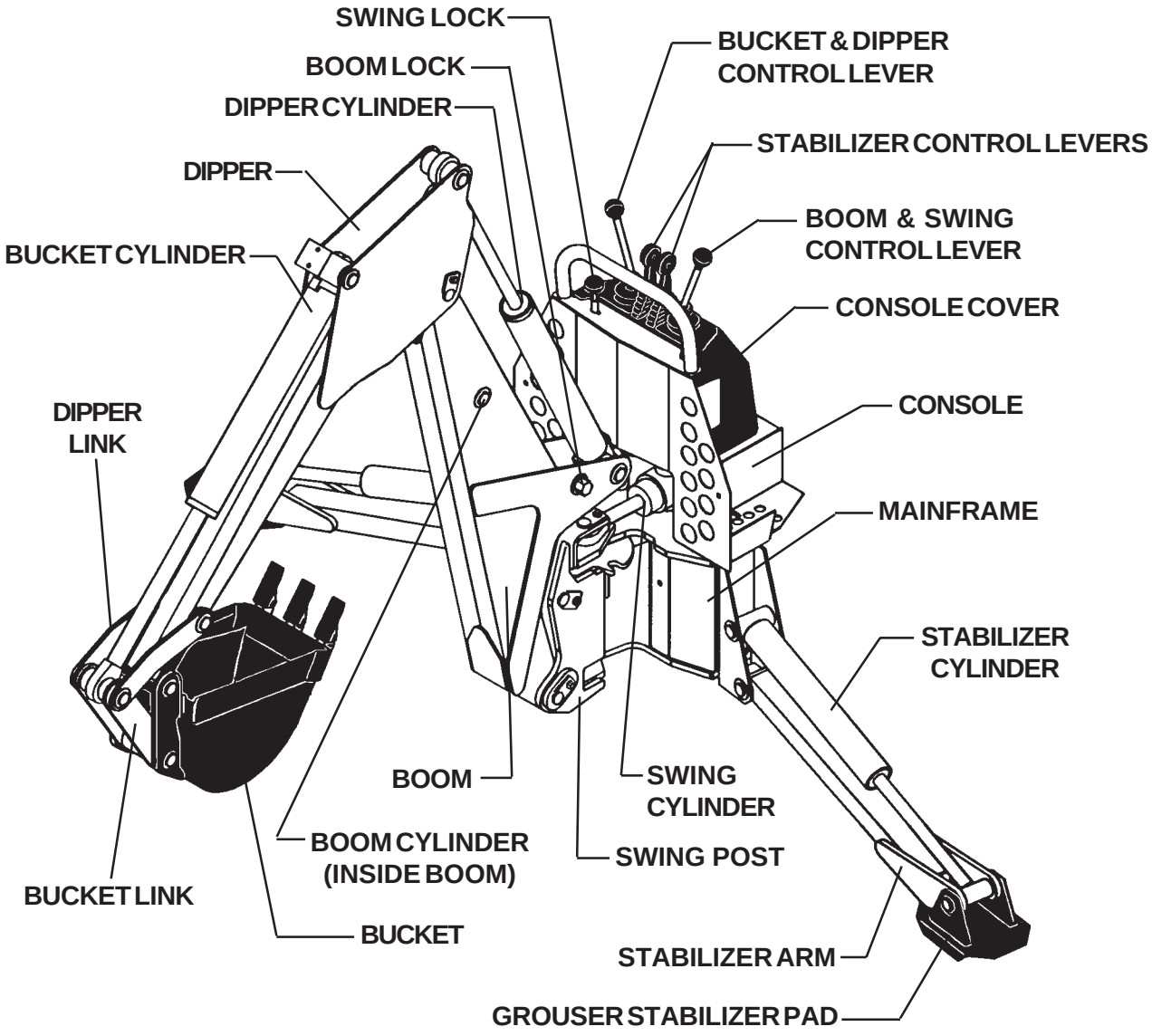
10"	#81710
12"	#81712
16"	#81716
18"	#81718
24"	#81724

PRE-OPERATION

BACKHOE MAJOR COMPONENT NOMENCLATURE
CONTRACTOR 408A BACKHOE

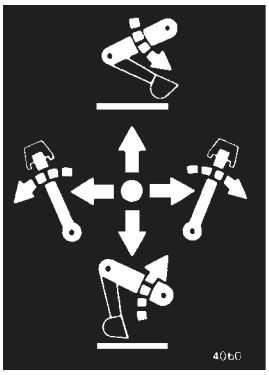
GENERAL INFORMATION

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.

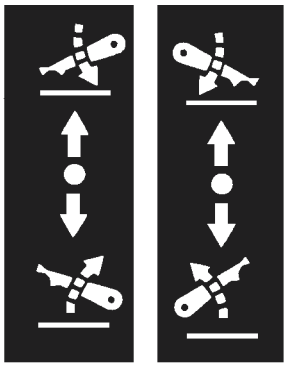


GENERAL INFORMATION

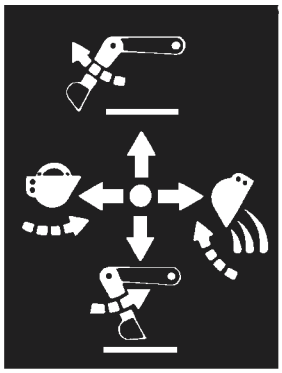
Your backhoe is operated by four different control levers. Two are for stabilizer operation and the other two operate the swing, boom, dipper, and bucket functions. The information contained below will help you become familiar with the operation of each control lever. Read the safety precautions (Section 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 CONTROL LEVER



LEFT RIGHT STABILIZERS



DIPPER/BUCKET CONTROL LEVER

BACKHOE STABILIZER LEVERS

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

BOOM/SWING LEVER (LEFT HAND LEVER)

Pushing the boom/swing lever forward will "Lower" the boom dipstick and bucket. Pulling the lever rearward will "Lift" the boom, dipstick, and bucket.

Pushing the boom/swing lever to the left will swing the boom and bucket to the "Left". Pushing the lever to the right will swing the boom, and bucket to the "Right".

DIPPER/BUCKET LEVER (RIGHT HAND LEVER)

Pushing the dipper/bucket lever forward will move the dipper "Out" or away from the operator. Pulling the lever rearward will move (crowd) the dipper "In" or toward the operator.

Pushing the dipper/bucket lever to the left will "Fill" or curl the bucket (move inward). Pushing the lever to the right will "Dump" the bucket (move outward).

OPERATING TECHNIQUES
ATTACHMENT TYPE BACKHOES

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.

Never attempt to drive the tractor when seated at the backhoe controls.

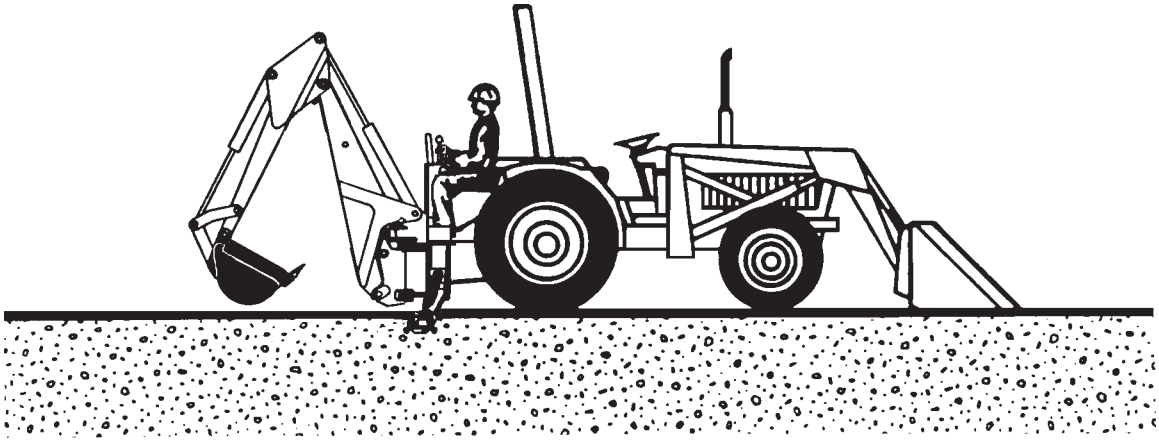
Check the prospective digging area for hidden utility lines before operating the backhoe or when in doubt of their location, contact the local utility companies. When operating the backhoe in an area where utilities are expected to be present, throttle the backhoe down and proceed with caution. If you 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

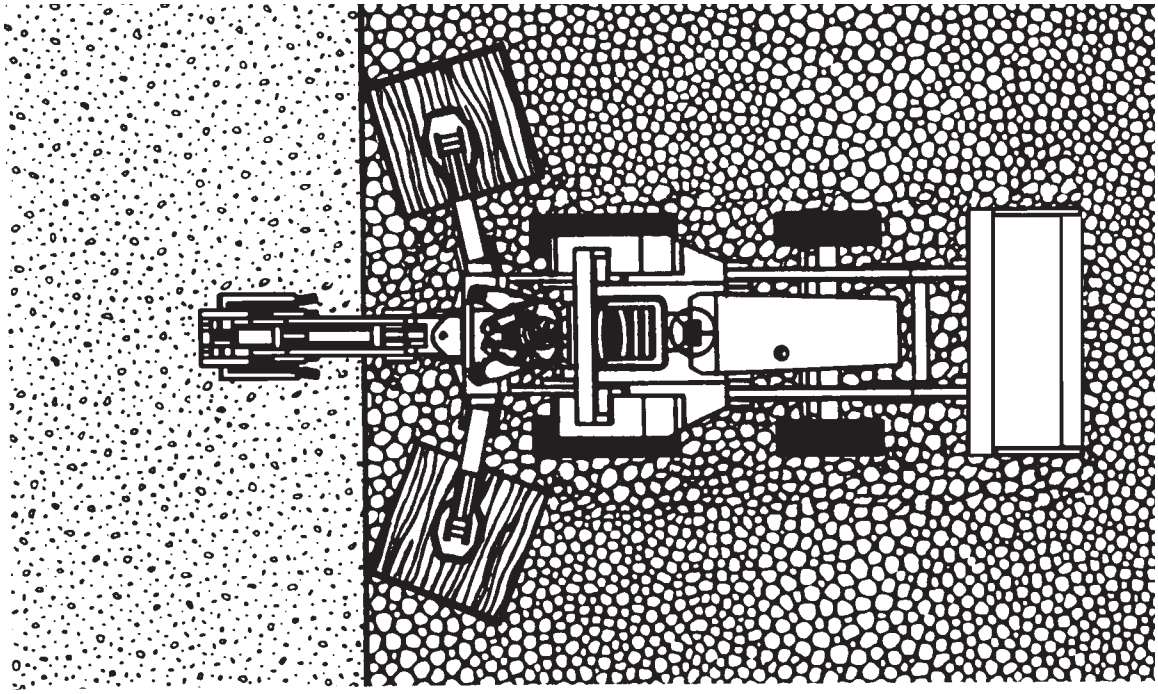
Before any excavating is started, it is always a good idea to plan out the job first. Various things need to be considered and taken into account prior to the actual digging. The operator should inspect the job site and take notice of any potential hazards in the area. He should have a complete understanding 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 you have become familiar with the job site and understand 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)



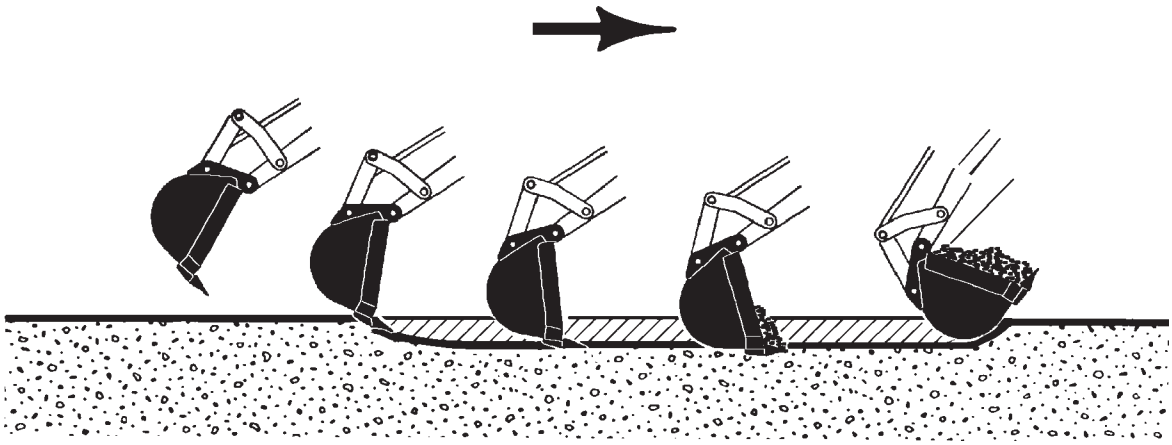
Once the unit is positioned, lower the stabilizers to the ground. The tires should still be supporting most of the vehicle weight with the stabilizers relieving only part of the weight, and mainly acting to give the unit a wider base for increased stability and to keep the unit from moving or bouncing with backhoe use. The front end loader should also be lowered if the unit is so equipped. The vehicle should at no time be supported by the stabilizers and loader 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.



OPERATING TECHNIQUES
ATTACHMENT TYPE BACKHOES

BASIC DIGGING TECHNIQUE

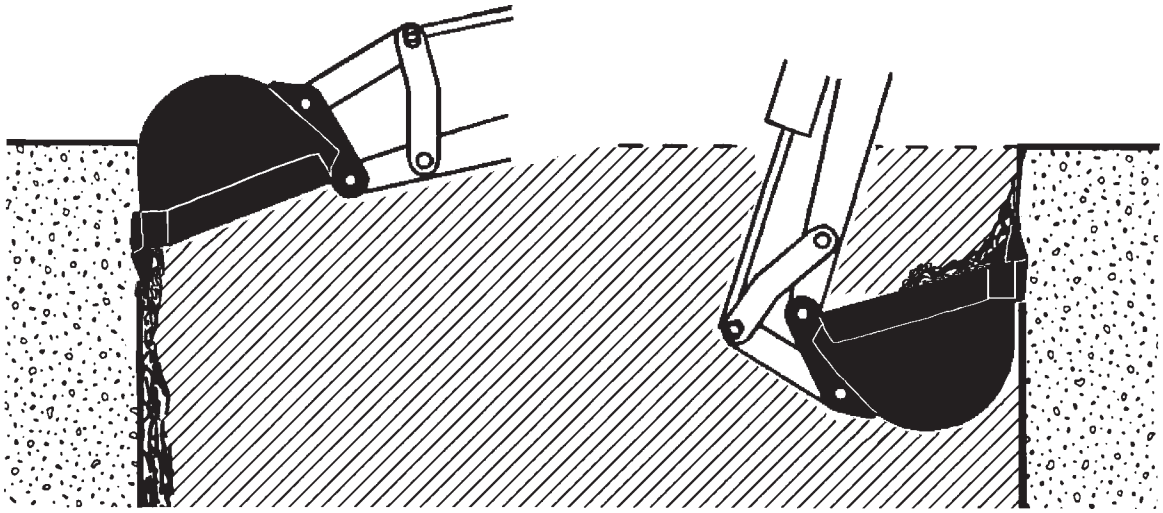
When starting an excavation, make the first cut of each section shallow, being careful to follow the exact layout of the excavation. The reason for the shallow cut is to minimize damage to the sod and to facilitate replacement. These first cuts are also important because they will act as guides for the 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)

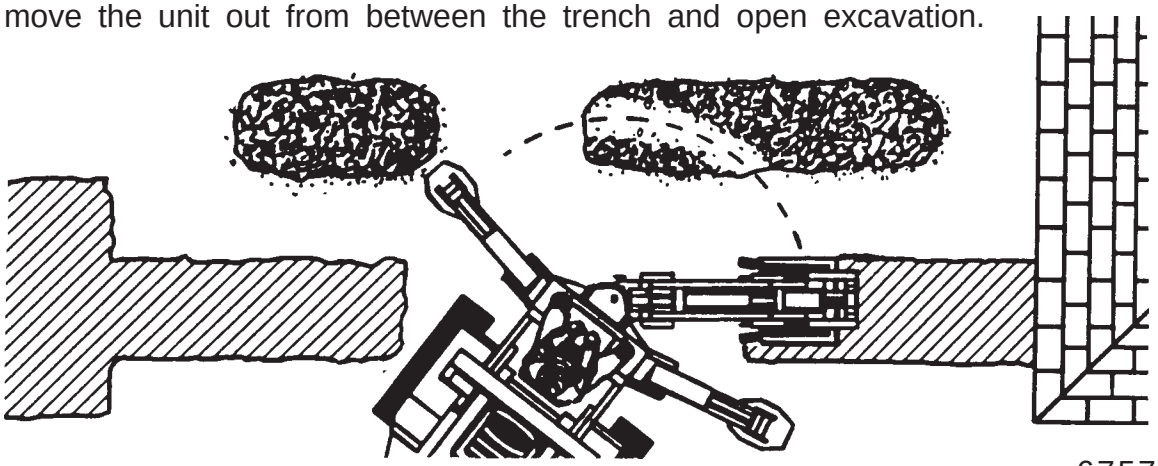


Once the sides are cleaned up, finish grading the bottom of the excavation. This is done by making the remaining cuts long and shallow, concentrating on making them level and smooth. Remove any remaining spoil. Check the excavation bottom for depth and levelness, making any adjusting cuts as needed.

The basic steps just listed at 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.

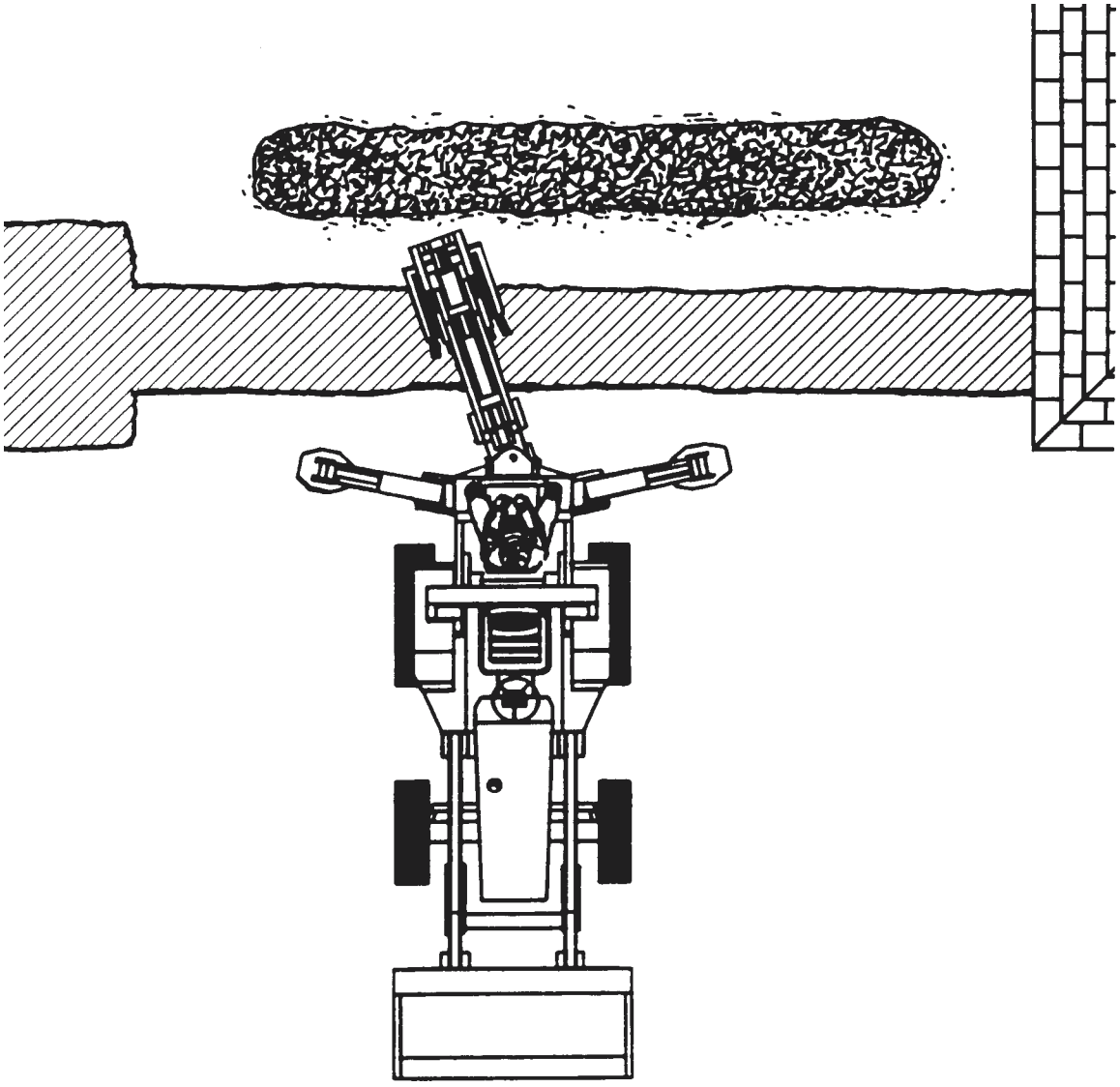


OPERATING INSTRUCTIONS

OPERATING TECHNIQUES
ATTACHMENT TYPE BACKHOES

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 soil on the opposite side of the trenches.

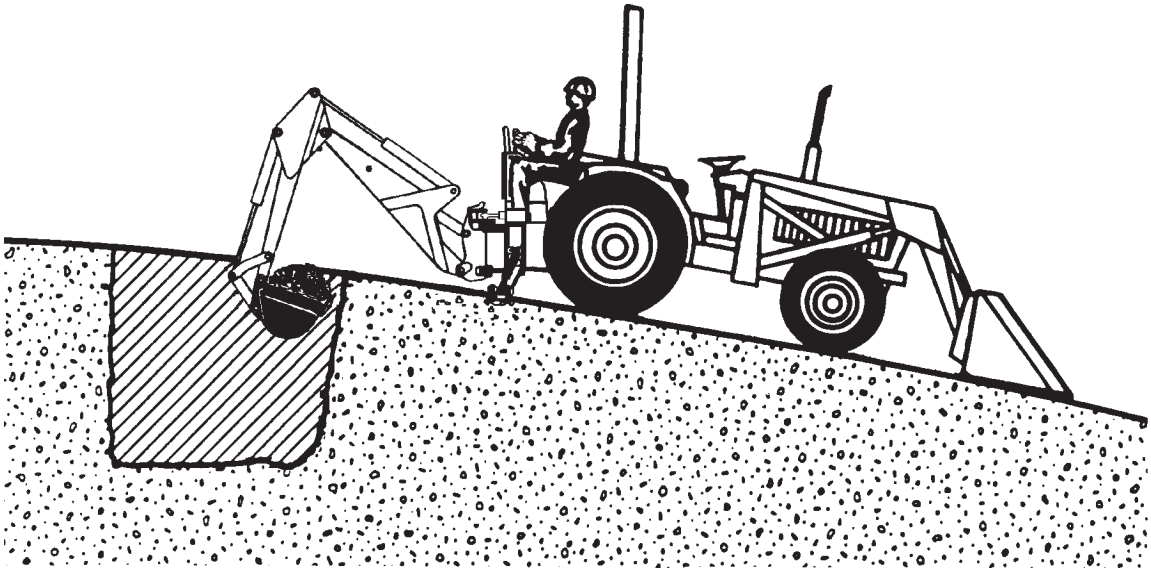


Position the unit forward so the two trenches can be connected. Pile the spoil on the opposite side of the trench.

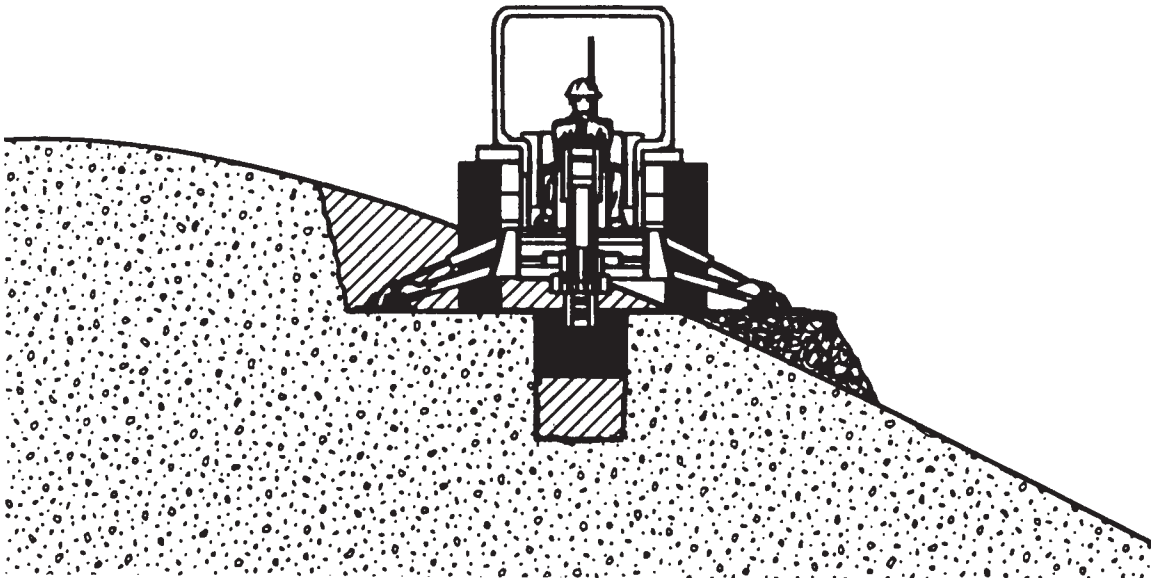
OPERATING INSTRUCTIONS

OPERATING TECHNIQUES
ATTACHMENT TYPE BACKHOES

EXCAVATING ON SLOPES



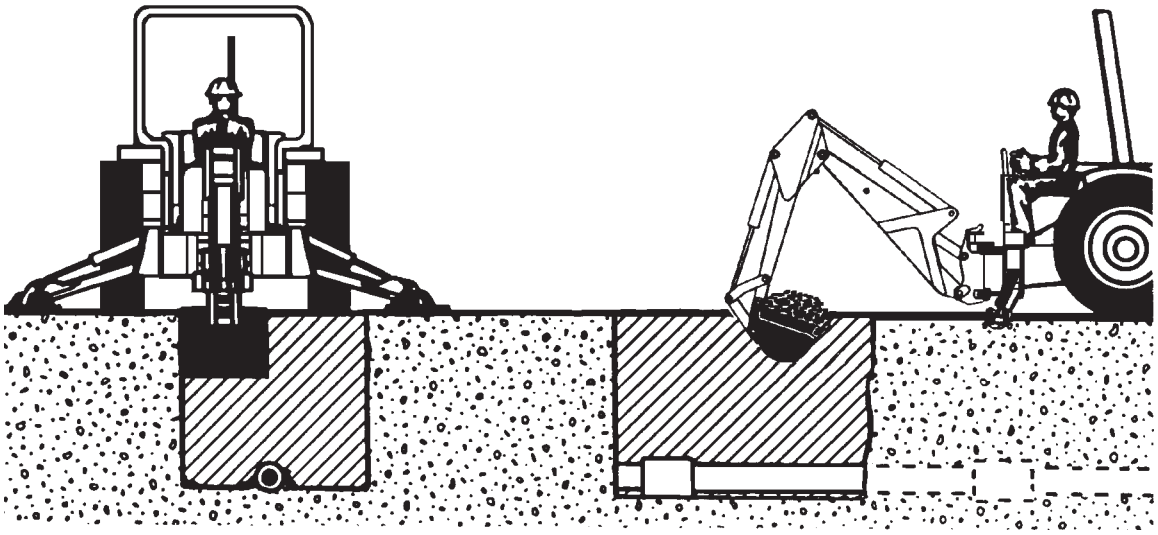
When digging on slopes always face the backhoe upgrade whenever possible. It may be necessary to cut a level surface in the hill for the backhoe to sit in when operating on slopes. This will allow the backhoe to sit level for digging the main excavation. Pile the spoil from the surface downhill. When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



OPERATING INSTRUCTIONS

OPERATING TECHNIQUES
ATTACHMENT TYPE BACKHOES

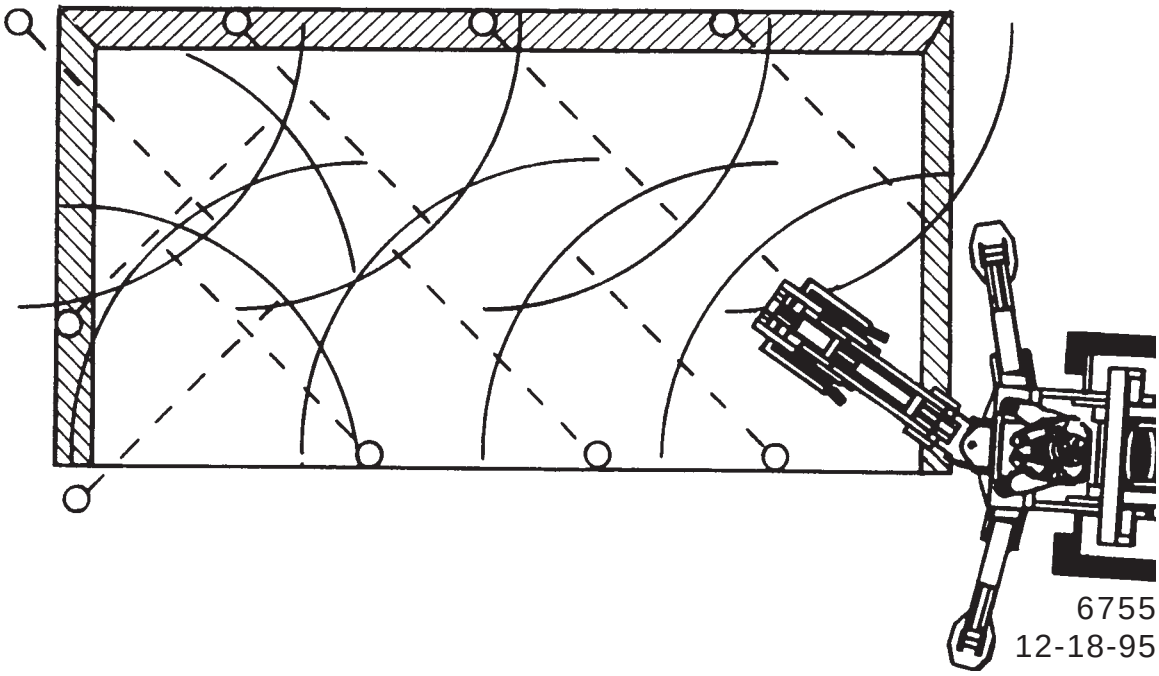
PIPELINE LEAK REPAIR



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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OPERATING INSTRUCTIONS

OPERATING TECHNIQUES
ATTACHMENT TYPE BACKHOES

MISCELLANEOUS - BACKFILLING

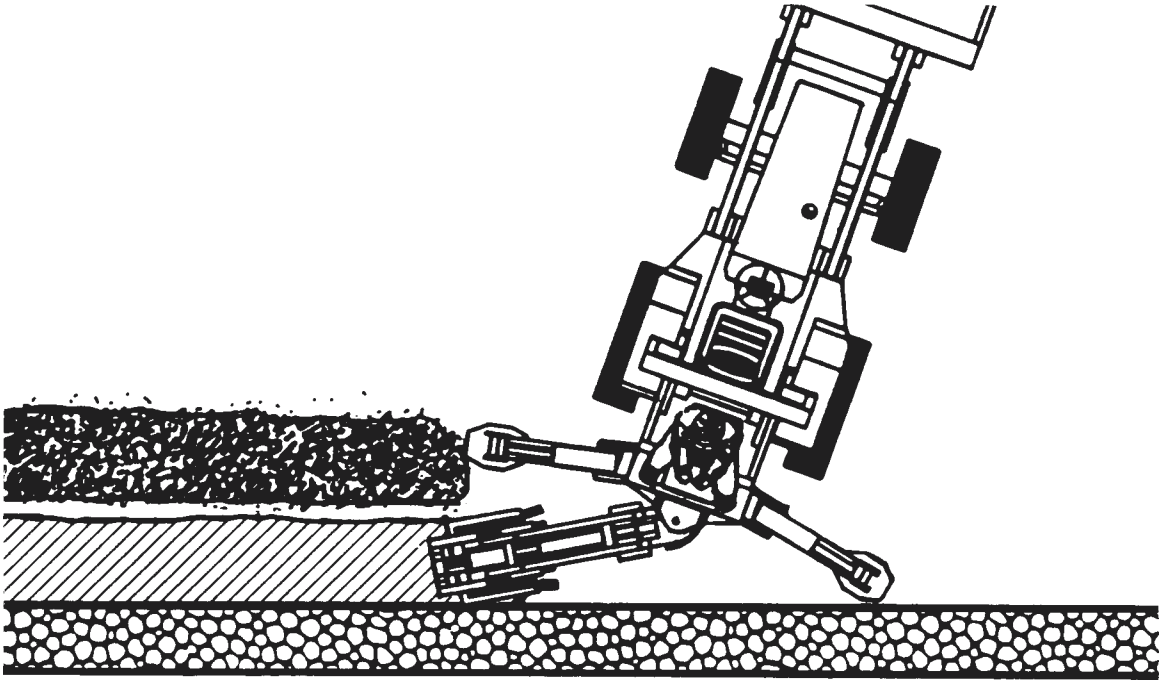
To backfill an excavation, lower the extended bucket into the spoil pile. Curl the bucket and lift it clear of the spoil pile. Swing the bucket to the excavation and extend the bucket. Return the bucket to the spoil pile and continue the cycle until the job is completed.

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

To excavate by a wall, where the wall will interfere with the stabilizer placement, move the backhoe in at an angle 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

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 Section B of this manual before moving the backhoe.

1. Before transporting the backhoe, raise the boom, dipper, and bucket to the transporting position.

2. Engage the swing lock (if so equipped) by pushing down and to the left on the red swing lock ball handle.

3. Engage the boom lock by moving the boom lock handle to the left/down therefore locking the boom to the swing post in the transporting position.

4. Raise all stabilizers.

CAUTION! **Be sure to install a SMV (Slow Moving Vehicle) sign on the backhoe dipper before attempting to transport the backhoe.**

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.

LUBRICATION

408A 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

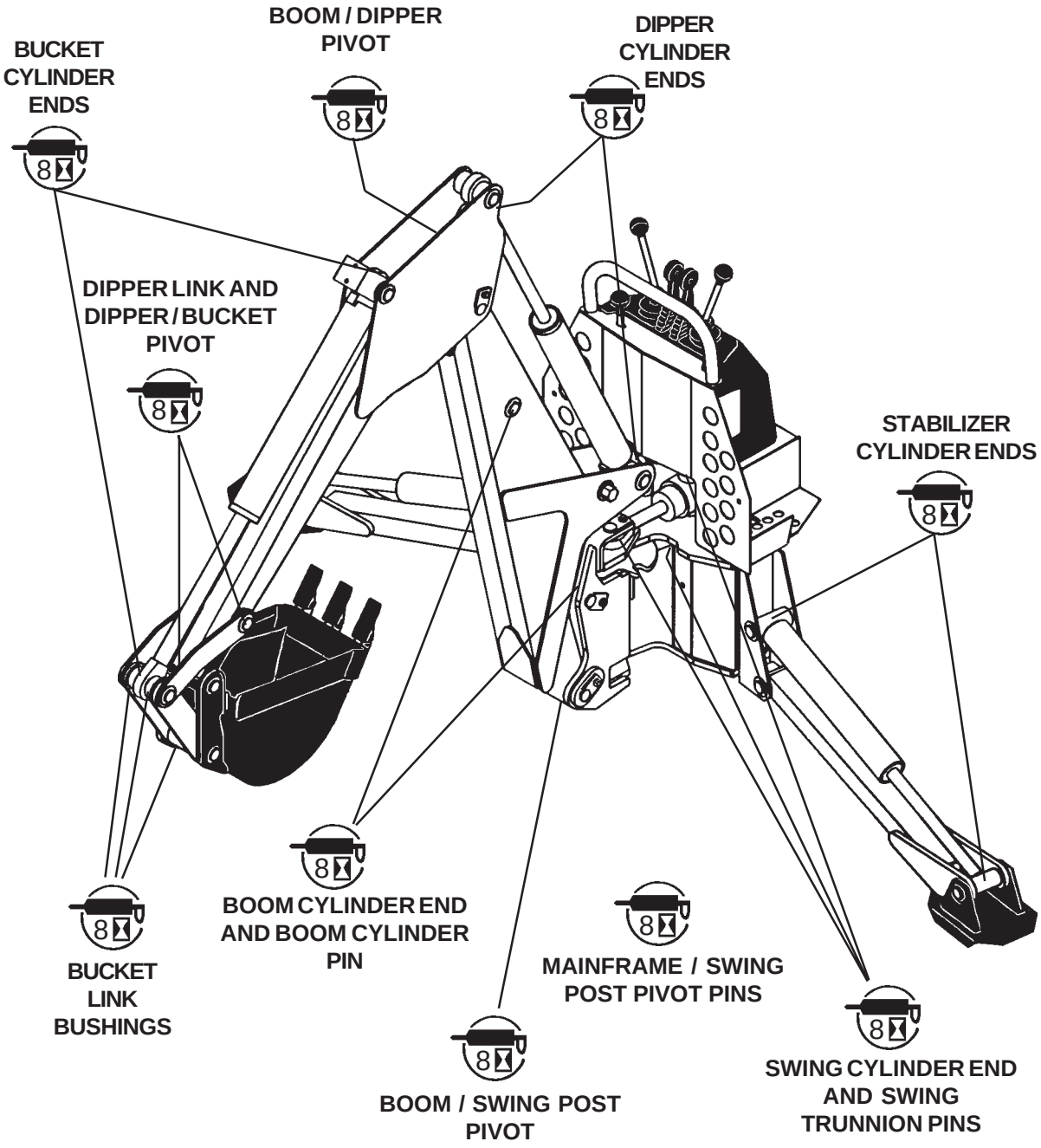
The following symbol is used on the lubrication diagram printed on the following page. It is reproduced here with its meaning for your convenience.

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

CAUTION! Shut off vehicle engine before lubricating equipment.

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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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.

EVERY 8 HOURS OF OPERATION

Grease all swivel points (ram and base end of all cylinders) thoroughly. Excessive wear and even mechanical damage to pins and cylinders can result from inadequate lubrication. Use a multi-purpose grease.

Lubricate all grease fittings with a multi-purpose grease. For grease locations, refer to the lubrication chart in Section H.

EVERY 40 HOURS OF OPERATION

Check hydraulic reservoir fluid level. If oil is low, check all lines, fittings, and control valve for signs of leakage.

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

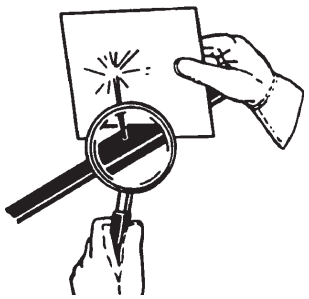
WARNING! **Escaping hydraulic/diesel fluid under pressure can penetrate the skin causing serious injury.**

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.



Physically check all pins, bushings, cotter pins, nuts, etc., for signs of wear or loose fit. Tighten as required, replacing where necessary. (Bolts and pins may vibrate loose during operation.) Clean equipment of all dirt, oil, and excess grease. This will assist you in making visual inspections and help avoid overlooking worn or damaged components.

CONTROL VALVE

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

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

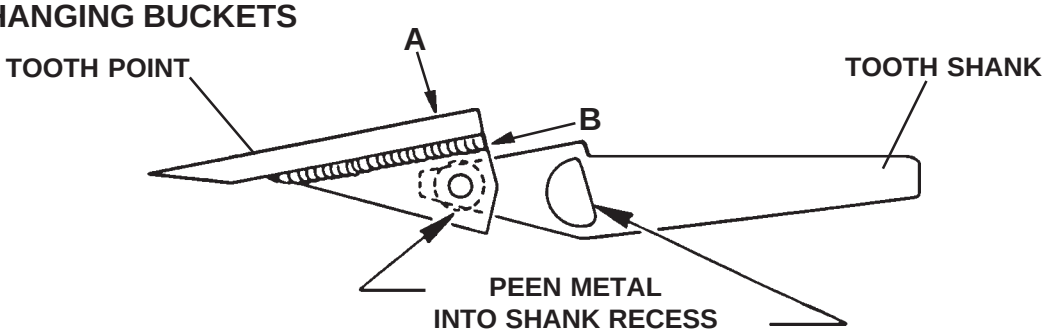
Observe a high standard of cleanliness when doing valve maintenance. Use clean oil and clean containers when adding oil for hydraulic purposes.

REPLACING BUCKET TOOTH POINTS

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

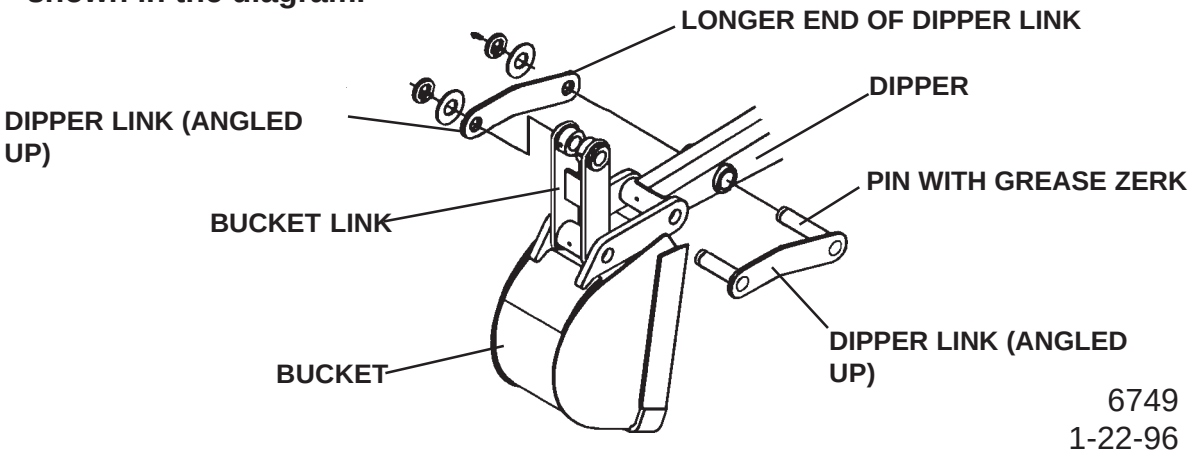
A tooth point can be removed from the welded tooth shank by hammering at "A" on the tooth point or by driving a chisel at "B" just between the tooth point box section and the tooth shank. Install the new point and anchor it to the tooth by peening at the location shown.

CHANGING BUCKETS



The bucket is connected to the dipper and bucket link with two cotter pin style pins. To change buckets, remove the cotter pins and washers and then remove the old bucket and position the new bucket in its place. Install the pivot pins and secure with washers and cotter pins. Lubricate all bucket and bucket link grease fittings before operating.

NOTE: Dipper Link must be installed with the longer end of the dipper link with the pin containing the grease zerk at the dipper end and angled as shown in the diagram.



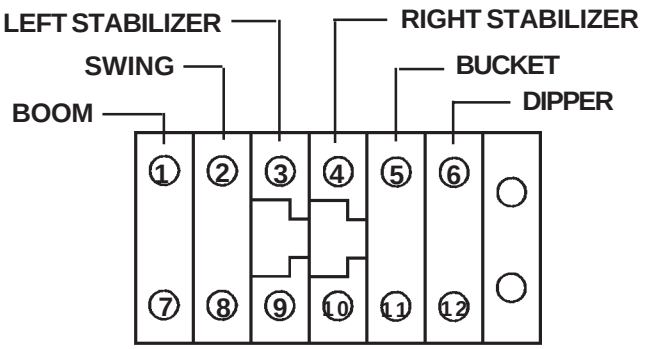
MAINTENANCE

408A BACKHOE HOSE ROUTING

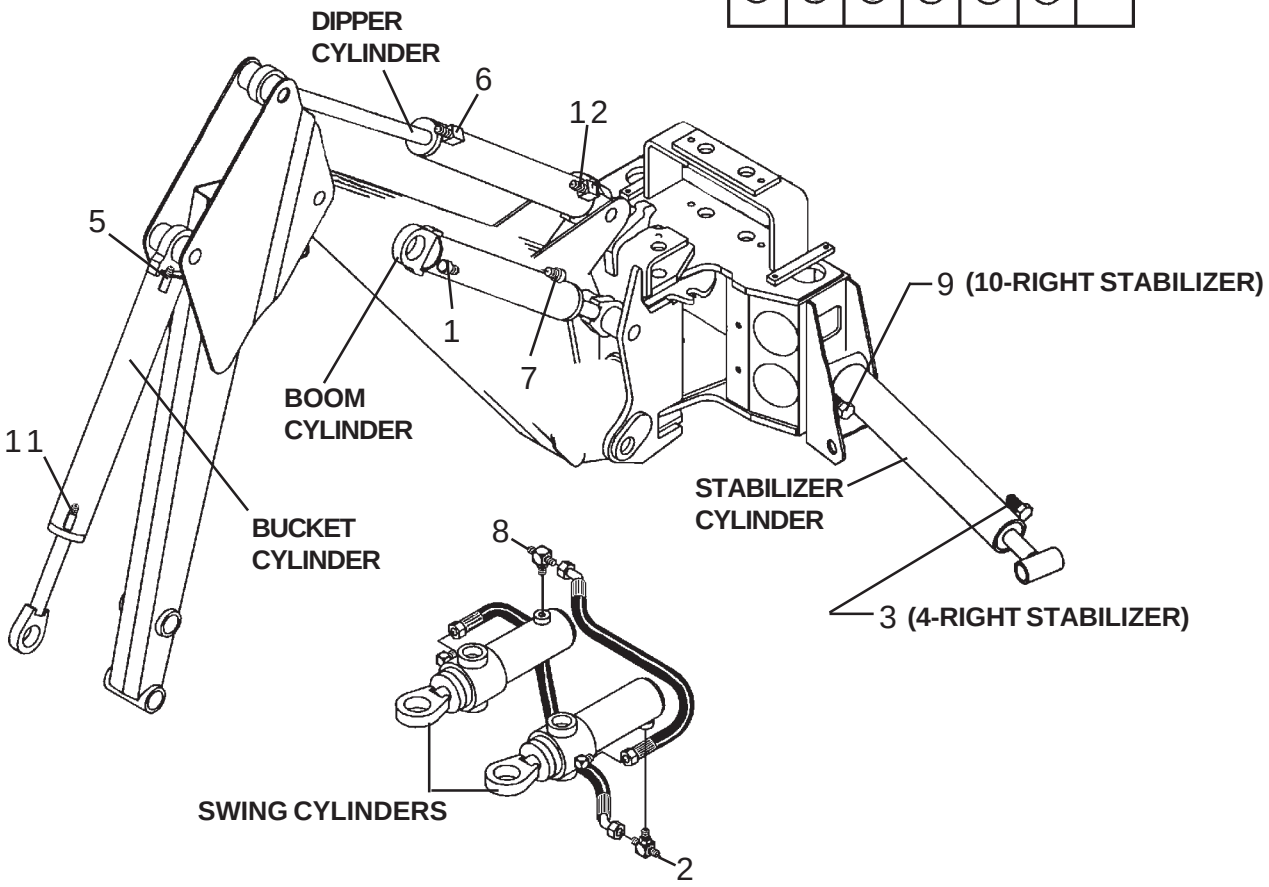
GENERAL INFORMATION

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 cylinder port (shown in the bottom diagram), to the corresponding number on the backhoe control valve (shown in the top diagram).

BACKHOE CONTROL VALVE



BACKHOE CYLINDERS



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12-14-95

MAINTENANCE INSTRUCTIONS

CYLINDER SEAL REPLACE

GENERAL INFORMATION

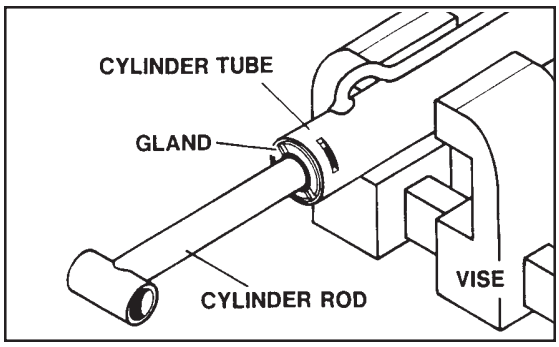
The following information is provided to assist you in the event you should need to repair or rebuild a hydraulic cylinder. When working on hydraulic cylinders, make sure that the work area and tools are clean and free of dirt to prevent contamination of the hydraulic system and damage to the hydraulic 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

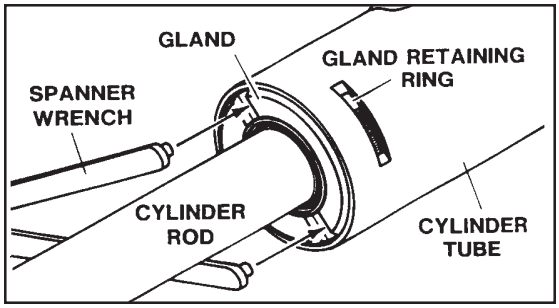
IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

RETAINING RING TYPE GLAND

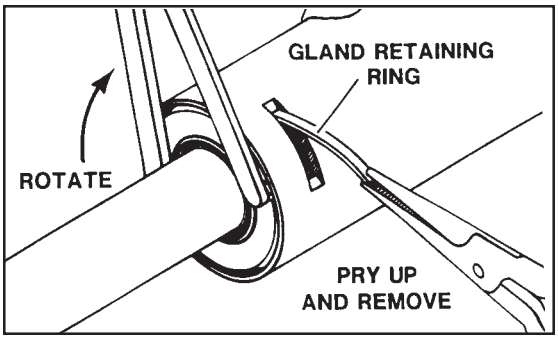
1. Mount the cylinder tube securely in a vise. **CAUTION:** Do not clamp too tight and distort the tube.



2. Rotate the gland with a spanner wrench (available from your dealer) until the gland retaining ring appears in the milled slot.

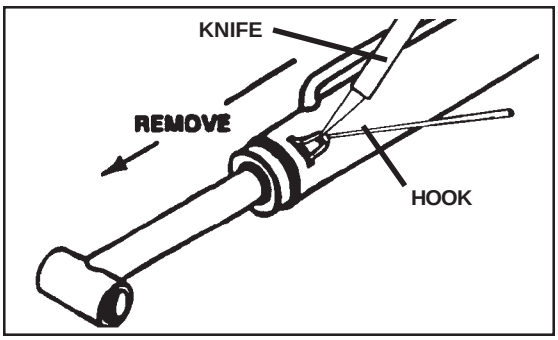


Pry up the end of the gland retaining ring with a pointed tool. Rotate the

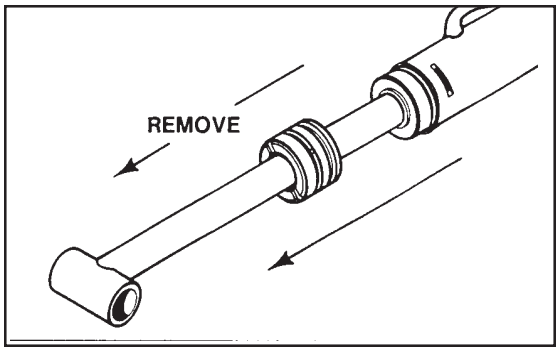


gland with a spanner wrench while removing the retaining ring.

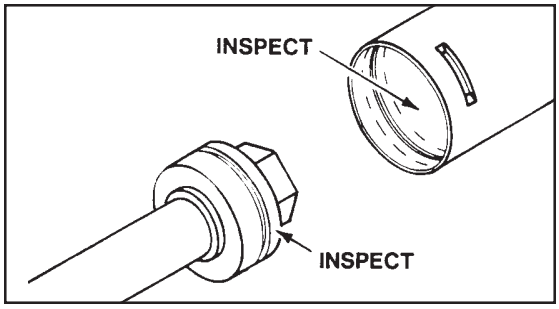
NOTE: On cylinders with gland retaining rings, the gland and piston seal(s) can be pulled out and cut as they appear in the milled slot during disassembly. After cutting, pull them on out through the milled slot.



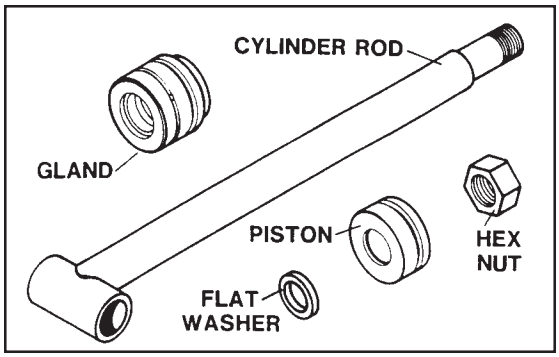
3. Pull the cylinder rod from the cylinder tube.



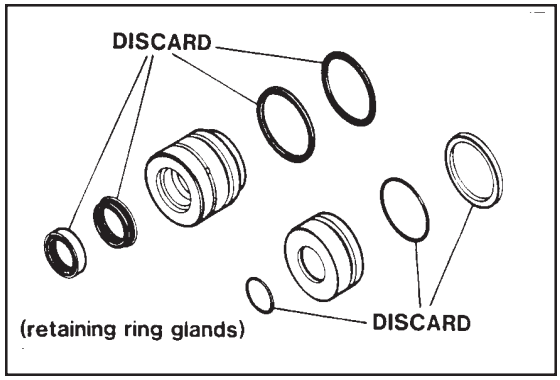
4. Inspect the piston and the bore of the cylinder tube for deep scratches or galling. If damaged, the piston and cylinder tube must be replaced.



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.

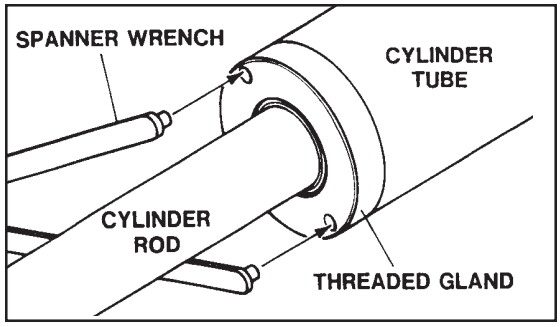


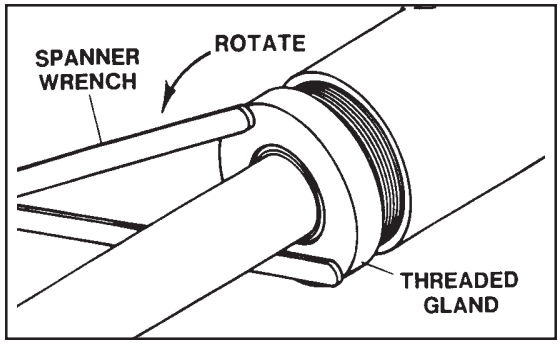
6. Remove and discard all old seals.



THREADED TYPE GLAND

1. Rotate the gland with a spanner wrench counter-clockwise until the gland is free of the cylinder tube.

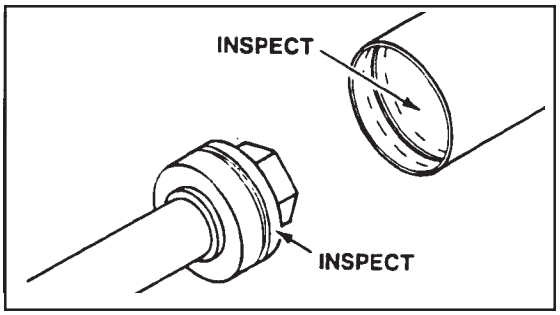




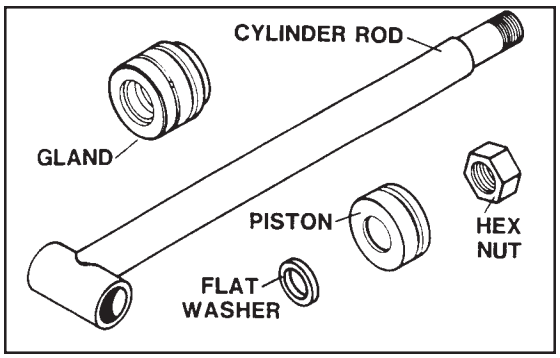
2. Pull the cylinder rod from the cylinder tube same as shown with the retaining ring type gland.

CYLINDER SEAL REPLACE

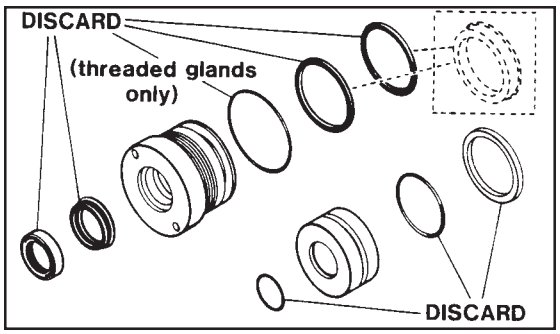
3. Inspect the piston and the bore of the cylinder tube for deep scratches or galling. If damaged, the piston and cylinder tube must be replaced.



4. 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.



5. Remove and discard all the old seals.

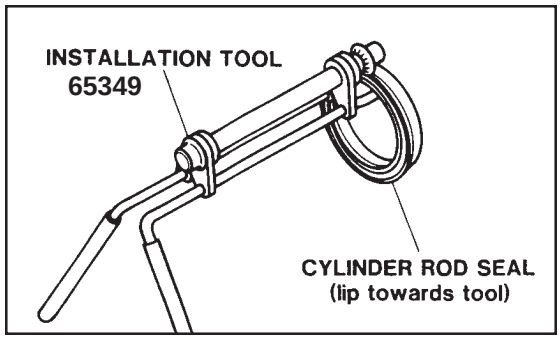


ASSEMBLY PROCEDURE

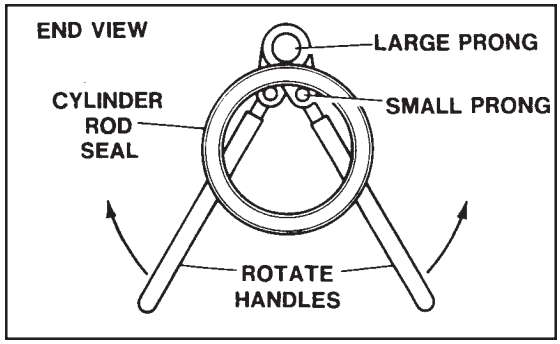
GENERAL

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.

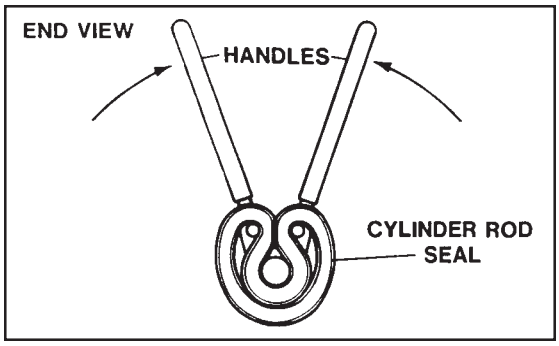


Rotate the handles on the tool around to wrap the seal around the end of the tool.

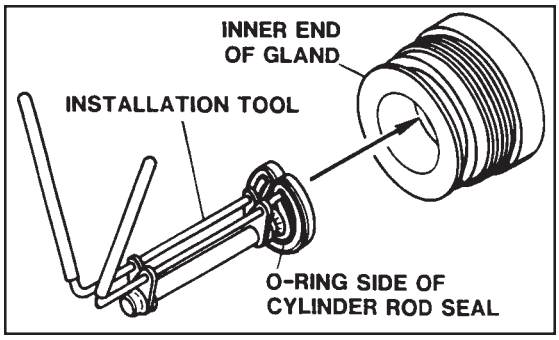


MAINTENANCE INSTRUCTIONS

CYLINDER SEAL REPLACE



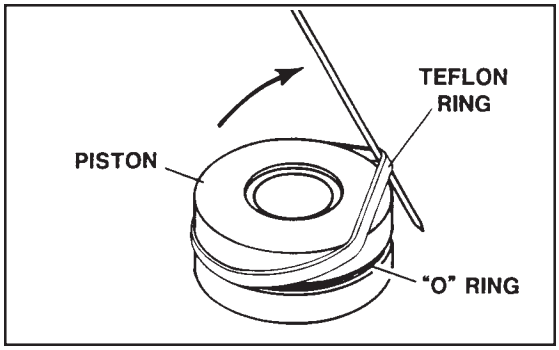
Now insert the seal into the gland from the inner end. Position the seal in it's groove, and release and remove the tool. Press the seal into its seat the rest of the way by hand.



NOTE: Threaded gland is shown above for reference.

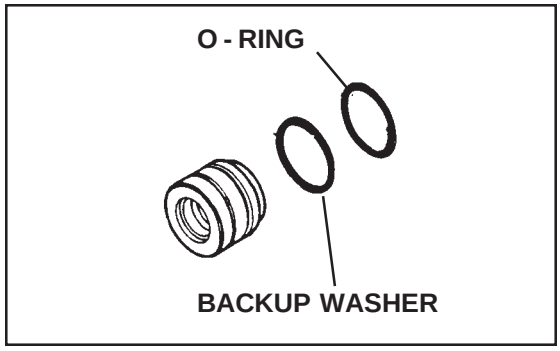
2. Install the new piston ring, rod wiper, O-rings, and backup washers, if applicable, on the piston.

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.

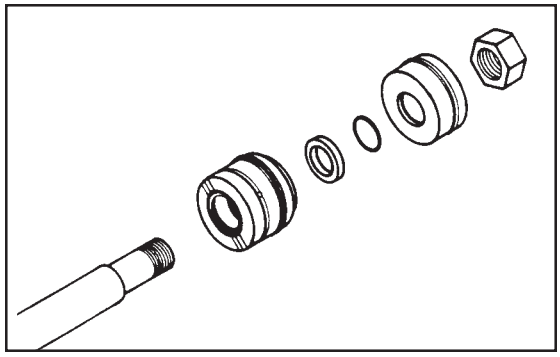


RETAINING RING TYPE GLAND

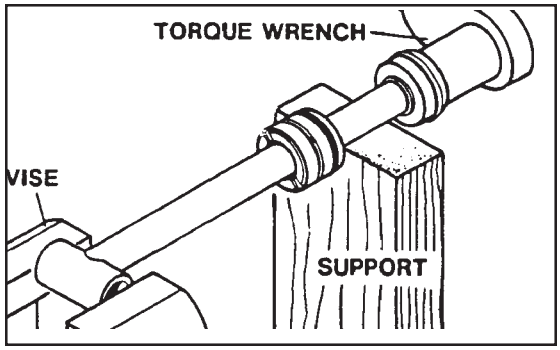
1. After installing the internal gland seal, install the external O-ring and backup washer.



2. 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.

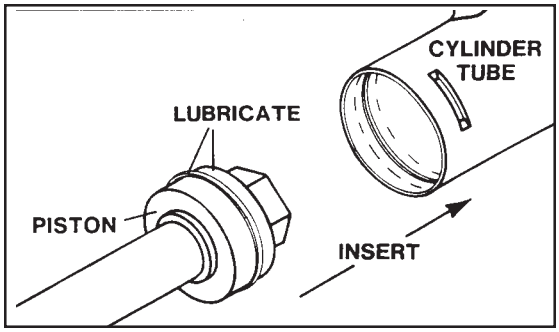


3. Secure the cylinder rod (mounting end) in a vise, with a support at its center. Torque the nut to the amount



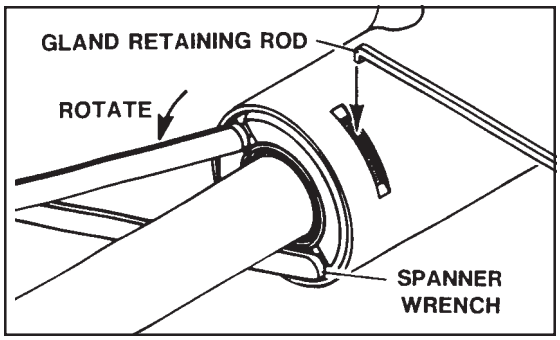
shown on the chart for the thread diameter of the cylinder rod.(see chart) **IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.**

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

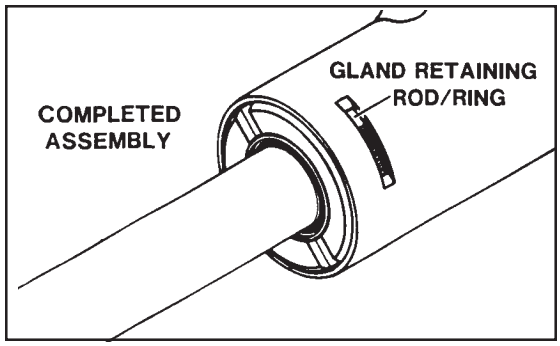


IMPORTANT: Ensure that the piston ring fits squarely into the cylinder tube and piston groove, otherwise the ring may be damaged and a leak will occur.

5. 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.



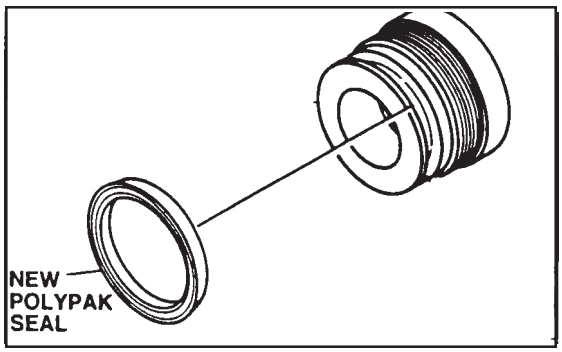
Rotate the gland until the gland retaining rod forms a ring between the gland and the cylinder tube.
When complete, the bent end of the gland retainer ring should be hidden (not turned so it is exposed in the slot) to prevent it from popping out.



THREADED TYPE GLAND

1. After installing the rod seal inside the gland as shown in the general instructions, install the external seal.

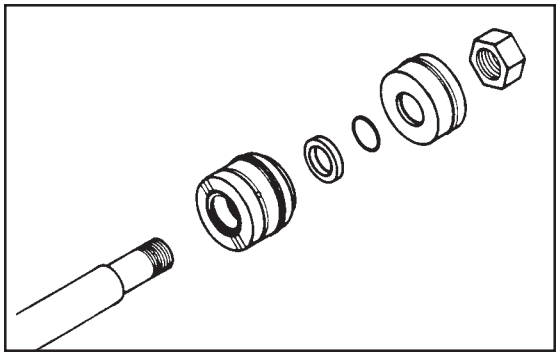
NOTE: Threaded glands may have been equipped with a separate O-ring and backup washer system or a polypak (all-in-one) type seal. Current seal kits contain a polypak (all-in-one) type seal to replace the discarded seal types on all threaded glands.



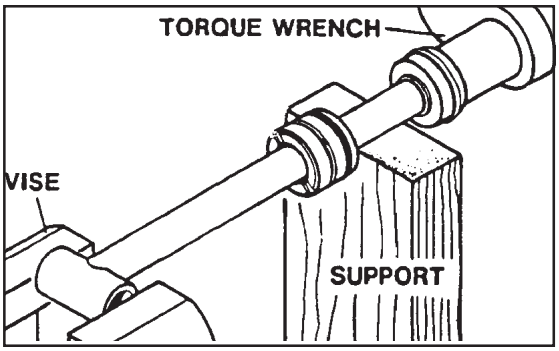
MAINTENANCE INSTRUCTIONS

CYLINDER SEAL REPLACE

2. 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.



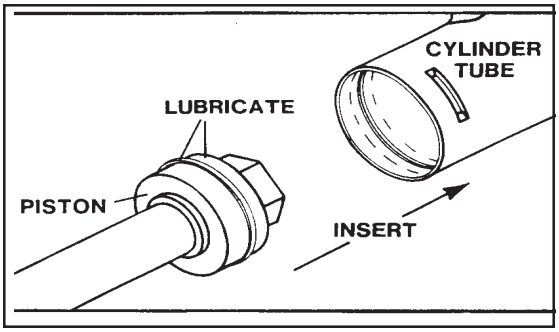
3. Secure the cylinder rod (mounting end) in a vise, with a support at it's center. Torque the nut to the amount shown for the thread diameter of the cylinder rod (see chart).



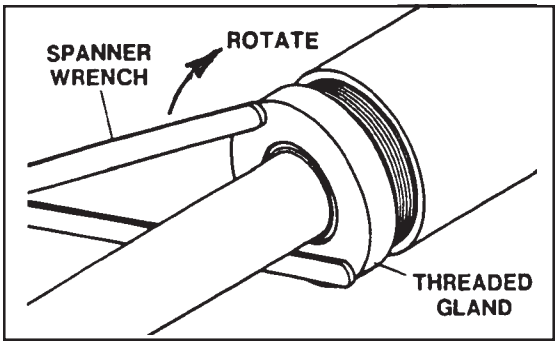
IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

4. 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.



5. 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.



NOTE: Seal kits will service all backhoe cylinders of similar bore size and rod diameter.

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

MAINTENANCE INSTRUCTIONS

CYLINDER SEAL REPLACE

TORQUE SPECIFICATION CHART

Use the following torque values when tightening the nuts on the cylinder rod threads.

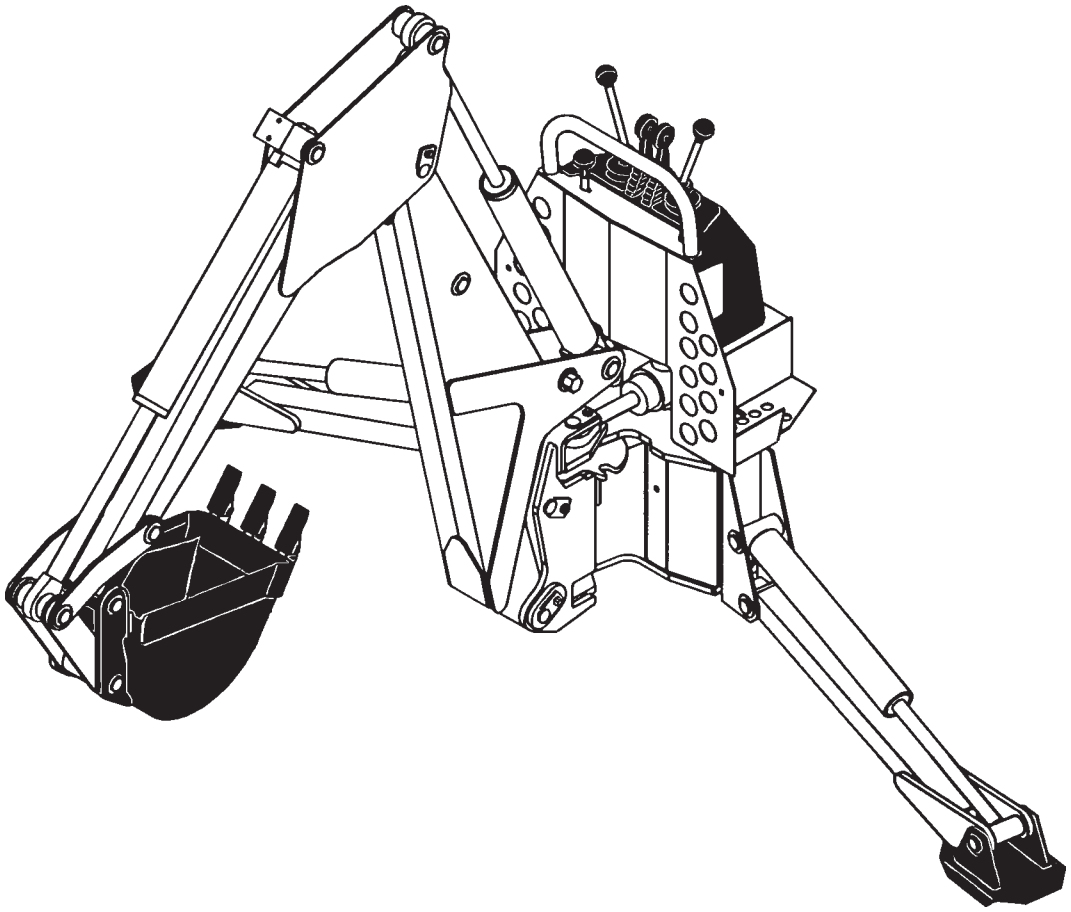
Thread Diameter	POUNDS - FEET	
	Minimum	Maximum
7/8 "	150	200
* 1 "	230	325
1-1/8 "	350	480
1-1/4 "	490	670
1-3/8 "	670	900

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

BACKHOE STORAGE

BACKHOE STORAGE

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



PROBLEM	POSSIBLE CAUSE	REMEDY
Backhoe fails to lift or swing	Low oil supply	Add oil
	Improper hose hookup	Check hydraulic diagram; reinstall properly
	Worn control valve section	Replace section
	Pump damaged or worn	Replace pump
	Broken hydraulic line	Check for leaks and replace line
	Jammed swing linkage	Remove interference
	Bent cylinder rod	Replace or repair cylinder
	Swing speed control completely closed	Open swing speed control valve
Backhoe lifting or swinging too slowly	Cold oil	Warm oil with engine at idle speed
	Engine speed too slow	Open throttle
	Oil leaking past control valve	Replace or repair worn section
	Oil too heavy	Use recommended oil
	Pump damaged or worn	Replace or repair pump
	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

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
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
	Oil leaking past control valve	Replace or repair worn section
	Faulty relief valve	Clean or replace
Oil heating	Dirty oil	Drain and refill oil, replace filter
	Air entering suction line to pump	Eliminate leaks
	Partially plugged inlet filter	Clean filter element
	Control valve held open too long	Return control to neutral position when not in use
	Worn pump	Replace pump
	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

PROBLEM	POSSIBLE CAUSE	REMEDY
External leakage	Control valve tie bolts loose	Torque bolts to 20 ft.lbs.
	Damaged O-rings between valve sections	Repair control valve
	Damaged O-rings on valve spools	Repair control valve
	Cylinder seals damaged	Repair cylinder
	Damaged O-rings on valve drop check	Repair control valve
	Broken oil lines	Replace hose and check for leaks
Swing cylinder malfunctioning	Oil leaking past packing or seals	Replace packing or seals
	Faulty relief valve	Clean or replace
Control valve sticking or working hard	Dirty valve	Clean valve
	Scored bore or bent spool	Replace valve section
	Control linkage misaligned	Correct misalignment
	Control valve tie bolts too tight	Tighten bolts only to 20 ft.lbs.
	Return spring binding or broken	Replace spring
	Foreign matter in spool bore	Clean valve

BOLT TORQUE

BOLT TORQUE SPECIFICATIONS

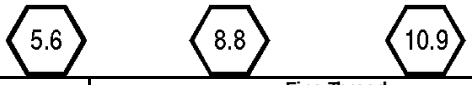
GENERAL TORQUE SPECIFICATION TABLE

Use the following torques when special torques are not given. These values apply to fasteners as received from suppliers, dry, or when lubricated with normal engine oil. They do not apply if special graphited or moly disulphide greases or other extreme pressure lubricants are used. This applies to both UNF and UNC threads. Remember to always use grade five or better when replacing bolts.

SAE Grade No.		2				5				8*			
Bolt head identification marks as per grade. NOTE: Manufacturing Marks Will Vary													
		TORQUE				TORQUE				TORQUE			
Bolt Size		Pounds Feet		Newton-Meters		Pounds Feet		Newton-Meters		Pounds Feet		Newton-Meters	
Inches	Millimeters	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/4	6.35	5	6	6.8	8.13	9	11	12.2	14.9	12	15	16.3	30.3
5/16	7.94	10	12	13.6	16.3	17	20.5	23.1	27.8	24	29	32.5	39.3
3/8	9.53	20	23	27.1	31.2	35	42	47.5	57.0	45	54	61.0	73.2
7/16	11.11	30	25	40.7	47.4	54	64	73.2	86.8	70	84	94.9	113.9
1/2	12.70	45	52	61.0	70.5	80	96	108.5	130.2	110	132	149.2	179.0
9/16	14.29	65	75	88.1	101.6	110	132	149.2	179.0	160	192	217.0	260.4
5/8	15.88	95	105	128.7	142.3	150	180	203.4	244.1	220	264	298.3	358.0
3/4	19.05	150	185	203.3	250.7	270	324	366.1	439.3	380	456	515.3	618.3
7/8	22.23	160	200	216.8	271.0	400	480	542.4	650.9	600	720	813.6	976.3
1	25.40	250	300	338.8	406.5	580	696	786.5	943.8	900	1080	1220.4	1464.5
1-1/8	25.58	-	-	-	-	800	880	1084.8	1193.3	1280	1440	1735.7	1952.6
1-1/4	31.75	-	-	-	-	1120	1240	1518.7	1681.4	1820	2000	2467.9	2712.0
1-3/8	34.93	-	-	-	-	1460	1680	1979.8	2278.1	2380	2720	3227.3	3688.3
1-1/2	38.10	-	-	-	-	1940	2200	2630.6	2983.2	3160	3560	4285.0	4827.4

* Thick Nuts must be used with Grade 8 bolts

METRIC BOLT TORQUE SPECIFICATIONS



Size of Screw	Grade No.	Coarse Thread			Fine Thread		
		Ptich (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		5.8-9.4	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

PRE-DELIVERY CHECKLIST

GENERAL INFORMATION

The following is a list of areas that should be inspected by the dealer prior to delivery of the backhoe to the customer. The customer should check the list and make sure that the dealer has completed the inspection. Completion of this check list will help insure that the customer receives the backhoe in complete working order, ready to install.

PRE-DELIVERY CHECKLIST - CHECK AND ADJUST AS NECESSARY

1. _____ Check the hydraulic system for correct hydraulic fluid level.
2. _____ Check and lubricate backhoe if necessary. See "Lubrication", Section H.
3. _____ Visually inspect the backhoe for bent, loose, cracked, damaged or missing parts. Check for any other irregularities.
4. _____ Remove paint from finished (chrome) surfaces of cylinders and valve spools.
5. _____ Backhoe control levers function and direction of operation are in accordance with the control lever decals.
6. _____ Run cylinders through their full cycle to purge any air from the system.
7. _____ Check all hydraulic connections for leaks and all hoses for proper positioning to reduce chafing and binding.
8. _____ Check backhoe attachment bolts for tightness. Retighten after the first eight working hours, and after every forty working hour interval thereafter. See "Bolt Torque", Section O.
9. _____ Make sure decals are not damaged or missing and are in their right location. See "Decals", Section Q.
10. _____ Complete and return the manufacturers "Warranty Validation Form" and sign your dealership pre-delivery checklist.
11. _____ Operator to read the E.M.I. Loader/Backhoe safety manual provided before operating backhoe.

LIMITED WARRANTY

EFFECTIVE ON PRODUCTS MANUFACTURED AFTER JANUARY 1, 2001

All new BRADCO products are warranted to be free from defects in materials or workmanship which may cause failure under normal usage and service when used for the purpose intended.

In the event of failure within twenty four (24) months from initial retail sale, lease or rental date (excluding cable, ground engaging parts such as sprockets, digging chain, bearings, teeth, tamping and demolition heads, blade cutting edges, pilot bits, auger teeth, auger heads & broom bristles), if after examination, BRADCO determines failure was due to defective material and/or workmanship, parts will be repaired or replaced. BRADCO may request defective part or parts be returned prepaid to them for inspection at their place of business at Delhi, Iowa, or to a location specified by BRADCO.

Any claims under this warranty must be made within fifteen (15) days after the Buyer learns of the facts upon which such claim is based. All claims not made in writing and received by BRADCO within the time period specified above shall be deemed waived.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED AND THERE ARE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL BRADCO BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGE.

BRADCO'S LIABILITY FOR ANY AND ALL LOSSES AND DAMAGES TO BUYER, RESULTING FROM ANY CAUSE WHATSOEVER, INCLUDING BRADCO'S NEGLIGENCE, IRRESPECTIVE OF WHETHER SUCH DEFECTS ARE DISCOVERABLE OR LATENT, SHALL IN NO EVENT EXCEED THE PURCHASE PRICE OF THE PARTICULAR PRODUCTS WITH RESPECT TO WHICH LOSSES OR DAMAGES ARE CLAIMED, OR, AT THE ELECTION OF BRADCO, THE REPAIR OR REPLACEMENT OF DEFECTIVE OR DAMAGED PRODUCTS.

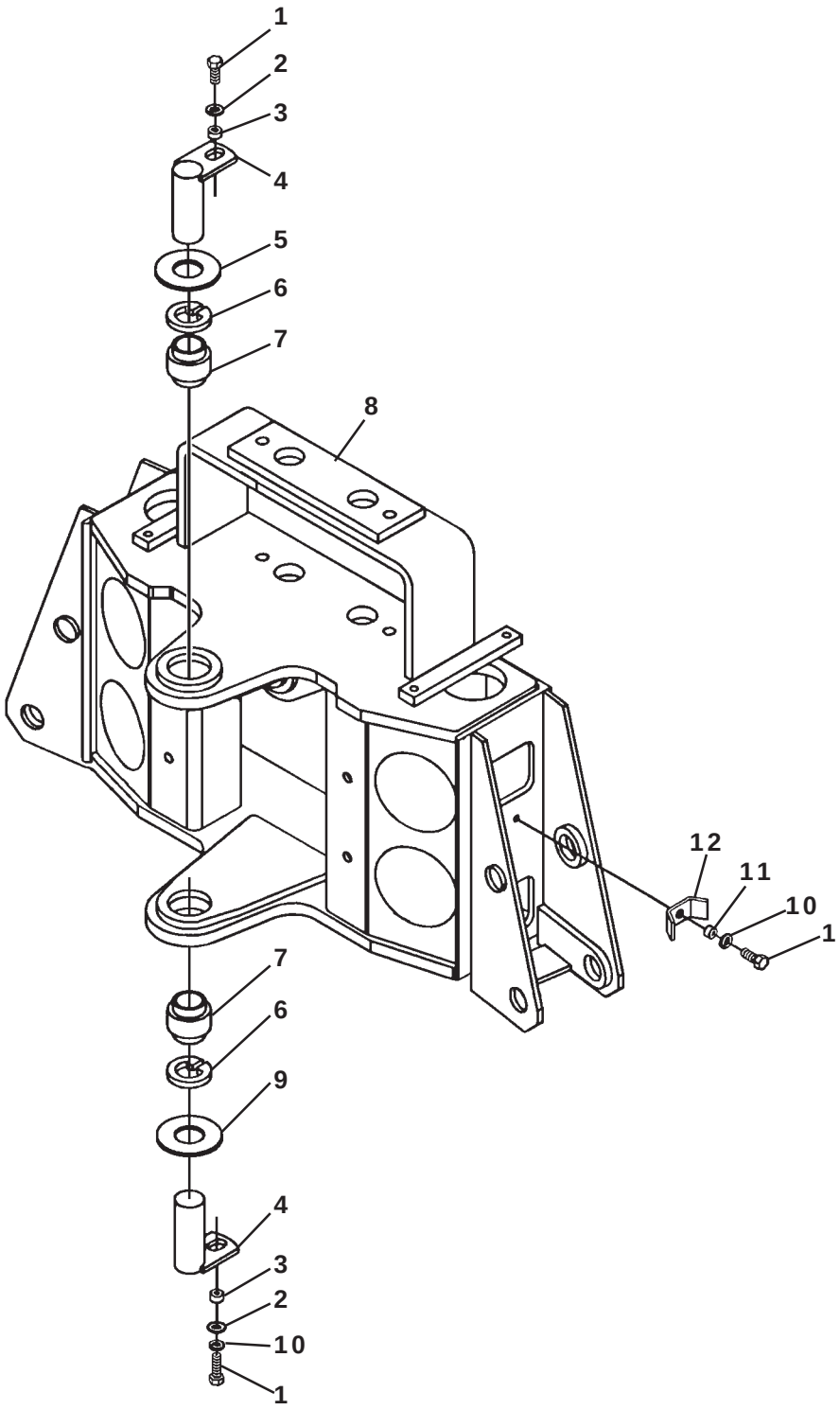
TABLE OF CONTENTS

SERVICE PARTS

MAINFRAME ASSEMBLY

ASSEMBLY #85700
MAINFRAME

SERIAL #8408AX973 AND UP



MAINFRAME ASSEMBLY

ASSEMBLY #85700
MAINFRAME

SERIAL #8408AX973 AND UP

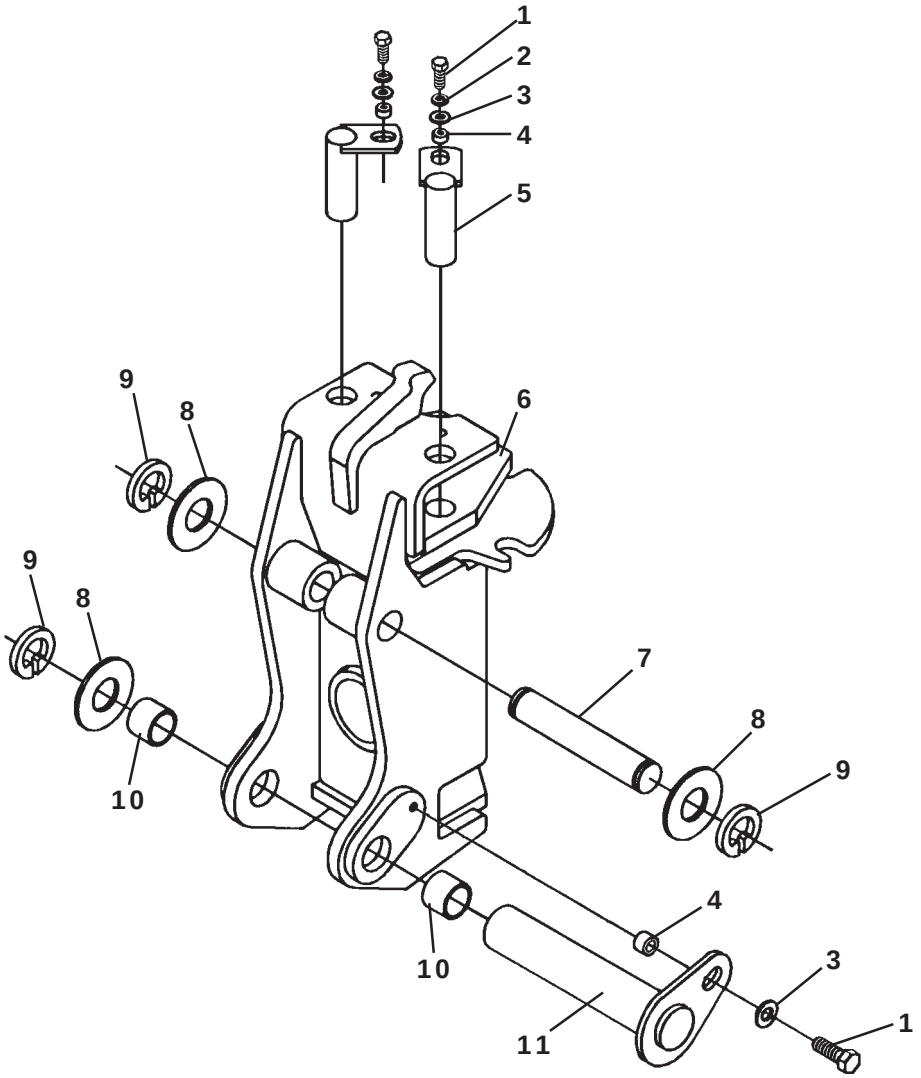
NO	REQ'D	PART NO.	DESCRIPTION
1	4	1043	.38" UNC X 1.00" Hex Capscrew (Two pin retaining capscrews installed with Locktite Grade 242)
2	2	1514	.38" Flat Washer
3	2	81807	Spacer Tube
4	2	81592	Pin
	2	6616	Grease Zerk
5	1	83977	Thrust Washer 1.38" X .125"
6	2	1929	Snap Ring
7	2	6615	Bearing
8	1	83392	Mainframe (Includes (4) #83815 Bushings - Installed with Locktite Grade 680)
9	As Req'd	83975	Thrust Washer 1.38" X .031"
	As Req'd	83976	Thrust Washer 1.38" X .090"
	As Req'd	83977	Thrust Washer 1.38" X .125"
10	3	1503	.38" Lock Washer
11	2	6799	Spacer
12	2	6186	Hose Clamp

NOTE: Use thrust washers (Item #9) to adjust mainframe / swing post to minimum free play.

MAINFRAME ASSEMBLY

ASSEMBLY #85700
SWING POST

SERIAL #8408AX973 AND UP



MAINFRAME ASSEMBLY

ASSEMBLY #85700
SWING POST

SERIAL #8408AX973 AND UP

NO	REQ'D	PART NO.	DESCRIPTION
1	3	1043	.38" UNC X 1.00" Hex Capscrew (Installed with Locktite Grade 242)
2	2	1503	.38" Lock Washer
3	3	1514	.38" Flat Washer
4	3	81807	Spacer Tube
5	2	81847	Pin
6	1	85720	Swing Post (Includes (2) 81828 Bushings Installed with Locktite Grade 680)
7	1	82534 (1)	Pin
8	As Req'd	83975	Thrust Washer 1.38" X .031"
	As Req'd	83976	Thrust Washer 1.38" X .090"
	As Req'd	83977	Thrust Washer 1.38" X .125"
9	3	1650	Snap Ring
10	-	81828	Bushing (Included in Swing Post) (Installed with Locktite Grade 680)
11	1	84753	Pin
	1	6616	Grease Zerk

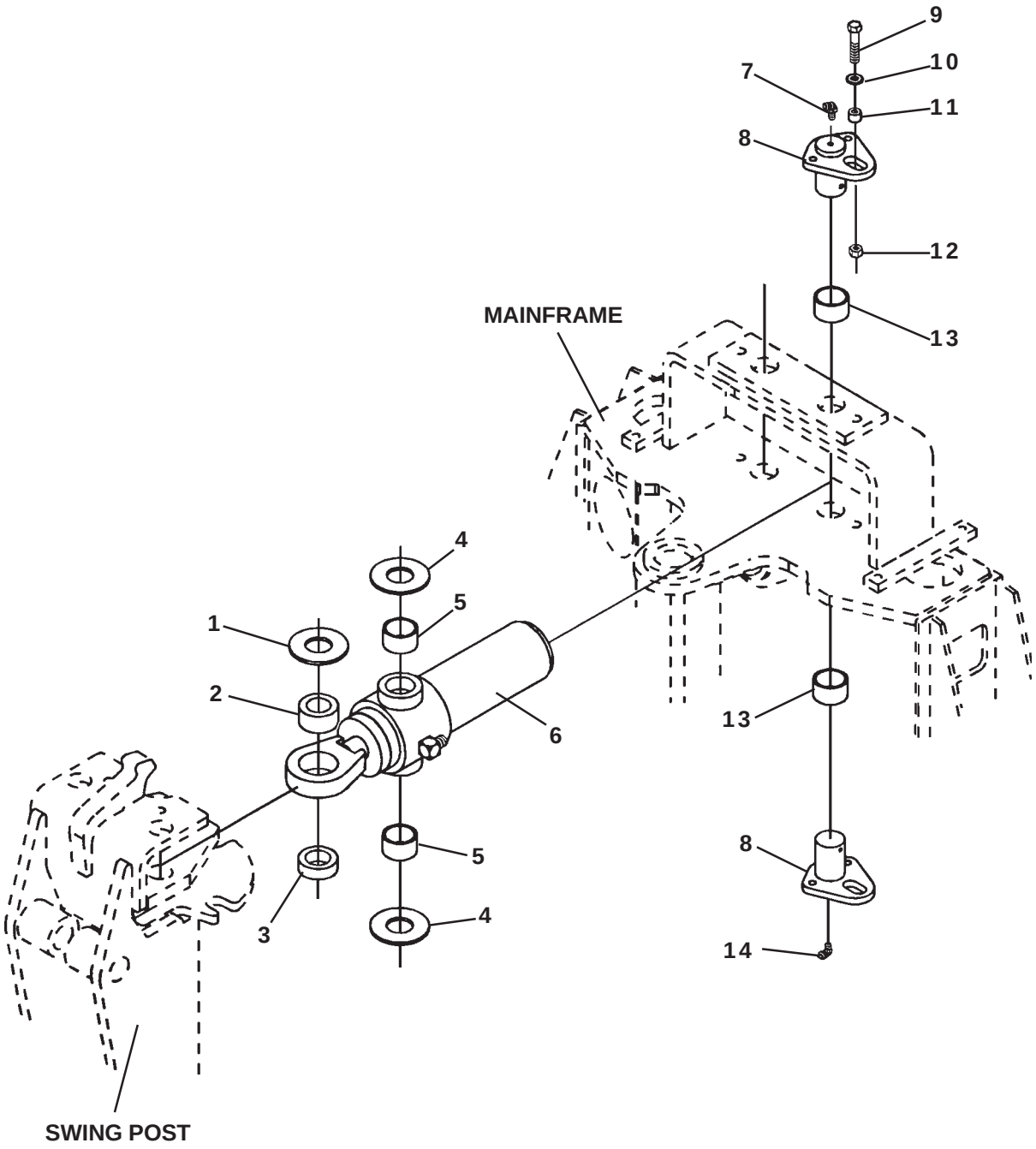
NOTE:

(1) Pivot Pin #82534 is sold only in Pin Kit #86309. Kit includes one pin #82534, two thrust washers #6623 and two snap rings #1650.

MAINFRAME ASSEMBLY

ASSEMBLY #85700
SWING CYLINDER

SERIAL #8408AX973 AND UP



7463
6-8-98

MAINFRAME ASSEMBLY

ASSEMBLY #85700
SWING CYLINDER

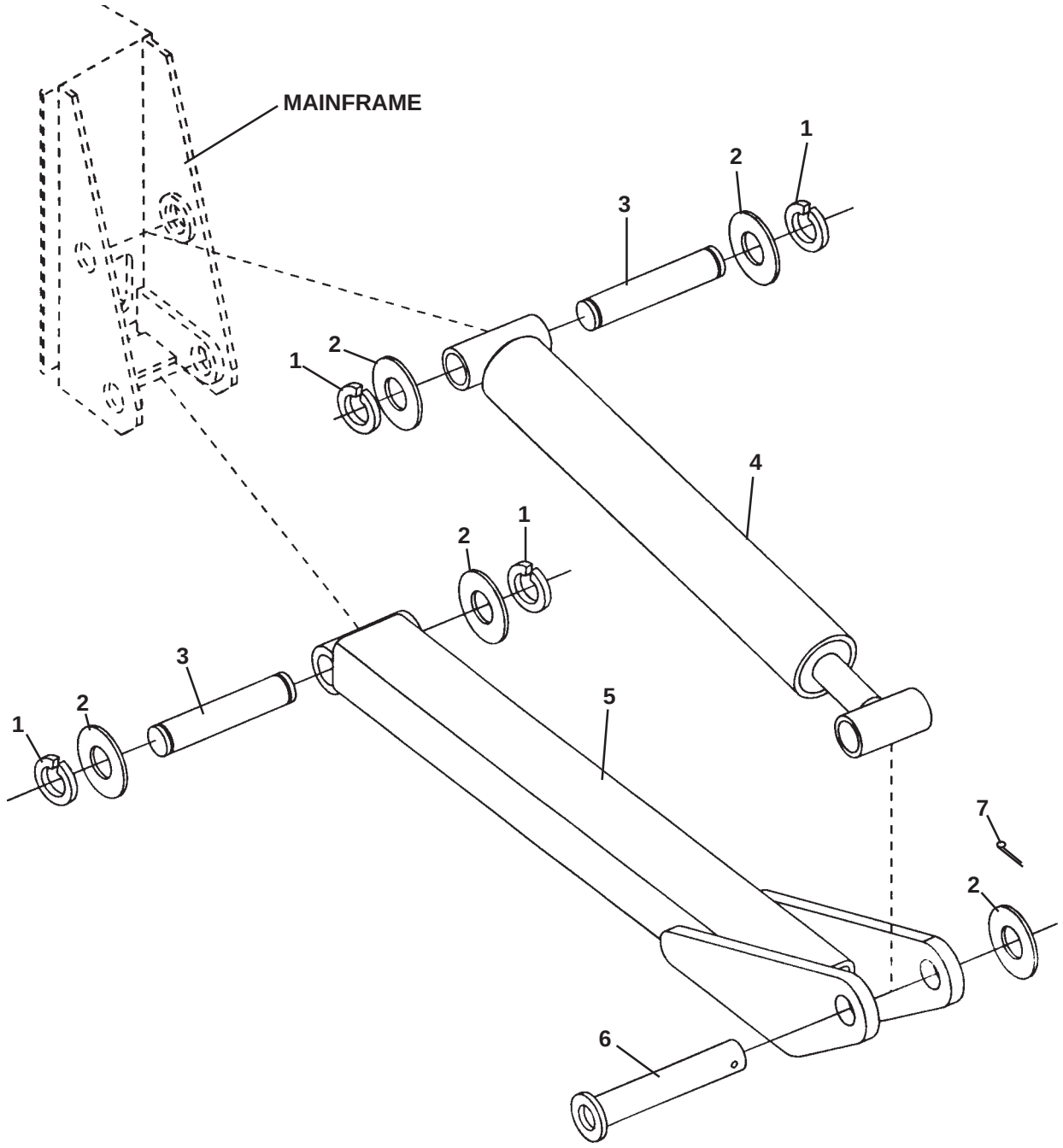
SERIAL #8408AX973 AND UP

NO	REQ'D	PART NO.	DESCRIPTION
1	As Req'd	57693	Thrust Washer 1.25" X .078"
	As Req'd	64727	Thrust Washer 1.25" X .145"
	As Req'd	64728	Thrust Washer 1.25" X .031"
2	-	62523	Self Aligning Bushing (Included in Swing Cylinder Assembly)
3	2	81585	Spacer
4	4	68057	Thrust Washer
5	-	82441	Needle Bearing (Included in Swing Cylinder Assembly)
6	2	81827	Swing Cylinder Assembly (Includes (2) #82441 Needle Bearings and (2) #62523 Bushings)
	2	6616	Grease Zerk
	2	30164	LH Lateral Tee
7	2	53031	90° Grease Zerk
8	4	82420	Pin
9	4	1047	.38" UNC X 2.00" Hex Capscrew
10	4	1514	.38" Flat Washer
11	4	81595	Spacer Tube
12	4	1837	.38" UNC Hex Lock Nut
13	-	83815	Bushing (Included in Mainframe - Installed with Locktite Grade 680)
14	2	53031	90° Grease Zerk

MAINFRAME ASSEMBLY

ASSEMBLY #85700
STABILIZERS

SERIAL #8408AX973 AND UP



MAINFRAME ASSEMBLY

ASSEMBLY #85700
STABILIZERS

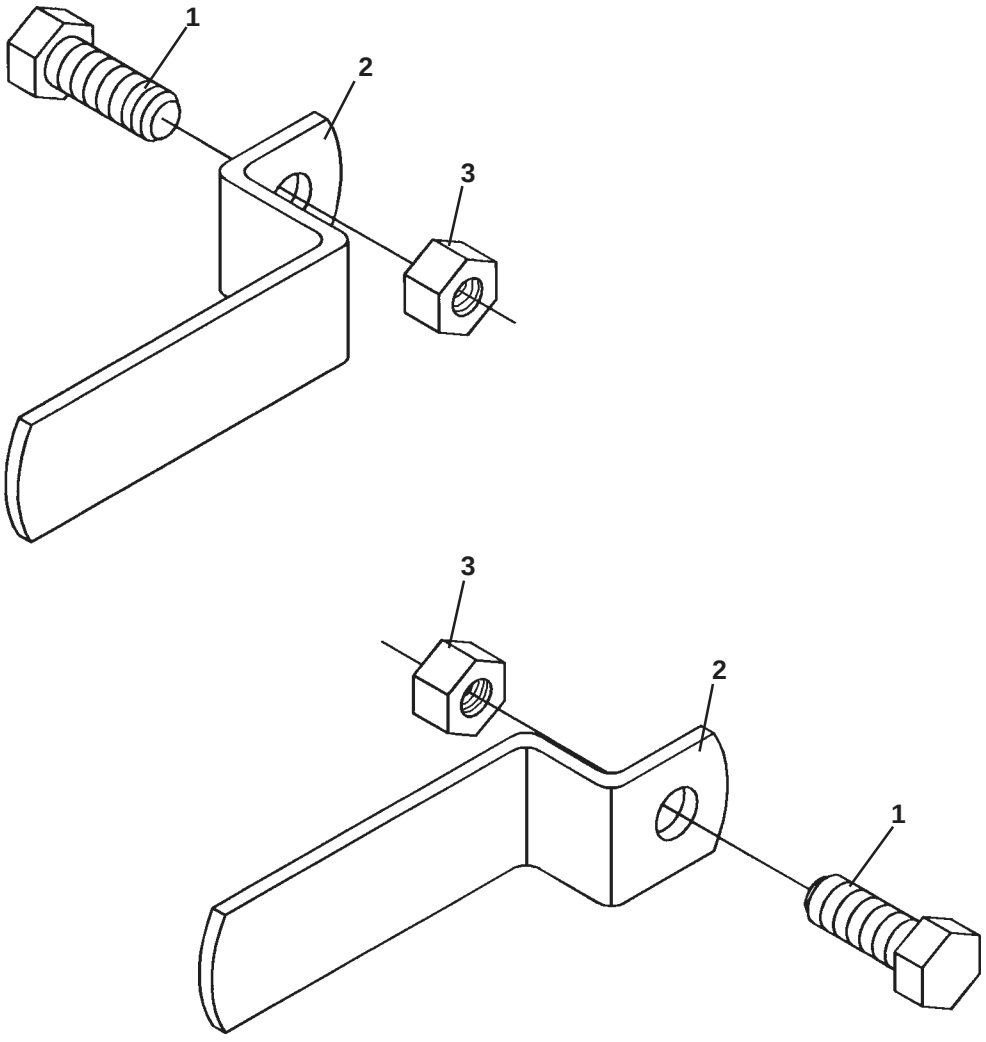
SERIAL #8408AX973 AND UP

NO	REQ'D	PART NO.	DESCRIPTION
1	8	1652	Snap Ring
2	As Req'd	57693	Thrust Washer 1.25" X .078"
	As Req'd	64727	Thrust Washer 1.25" X .145"
	As Req'd	64728	Thrust Washer 1.25" X .031"
3	4	81846 (1)	Pin
4	2	83397	Stabilizer Cylinder Assembly
	4	6616	Grease Zerk
5	2	83393	Stabilizer Arm
6	2	83257	Pin
7	2	1613	Cotter Pin .25" X 2.00"

NOTE:

(1) Pivot Pin #81846 is sold only in Pin Kit #86314. Kit includes one pin #81846, two thrust washers #64727 and two snap rings #1652.

HOSE BUNDLE CLAMPS



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4-22-98

HOSE BUNDLE CLAMPS

UP TO SERIAL #---10065

NO	REQ'D	PART NO.	DESCRIPTION
1	2	1043	.38" UNC X 1.00" Hex Capscrew
2	1	84724	Right Hose Bundle Clamp
3	2	1837	.38" UNC Deformed Lock Nut
4	1	84718	Left Hose Bundle Clamp

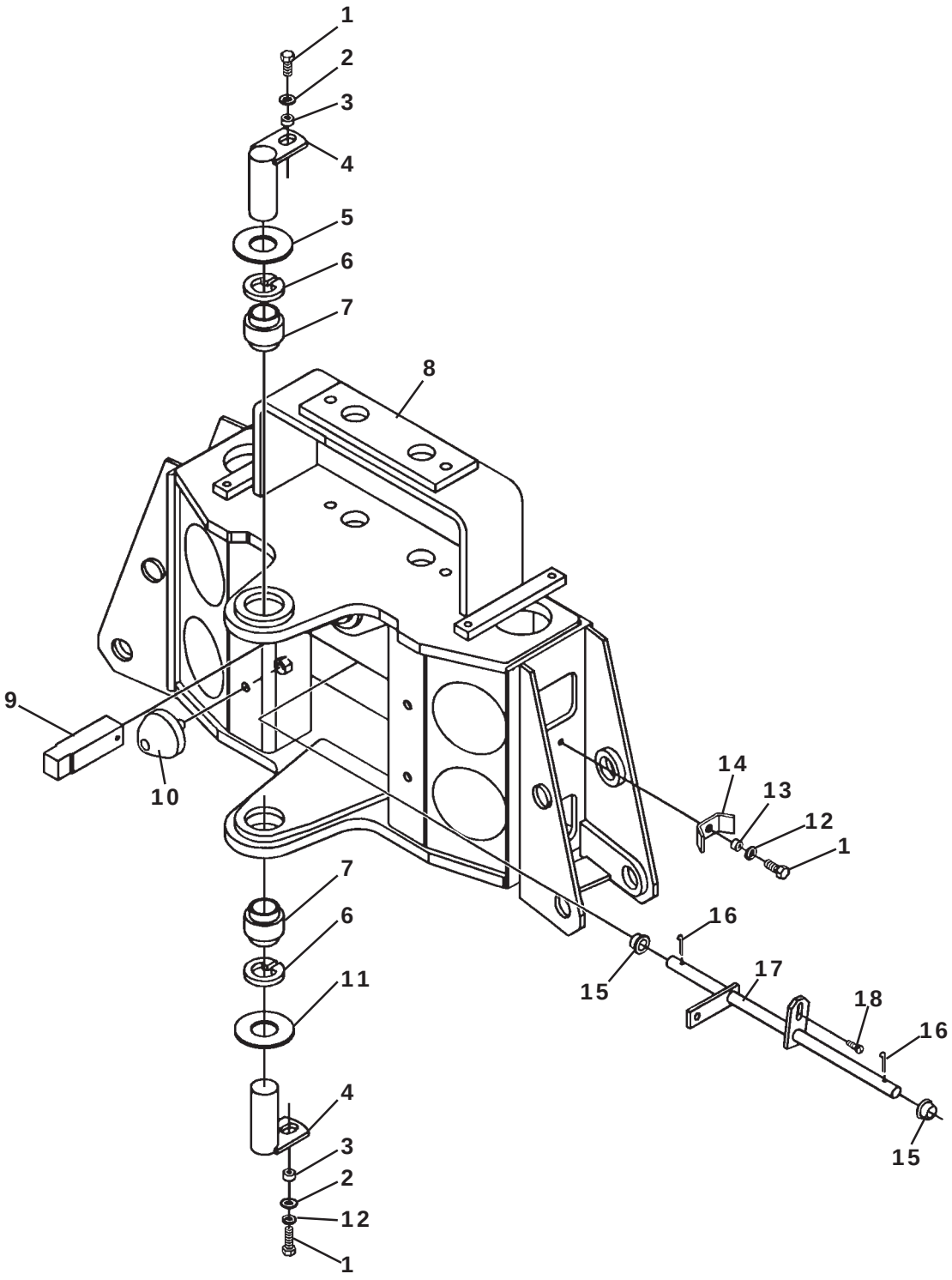
SERIAL #---10065 AND UP

NO	REQ'D	PART NO.	DESCRIPTION
1	2	1043	.38" UNC X 1.00" Hex Capscrew
2	1	84718	Right Hose Bundle Clamp
3	2	1837	.38" UNC Deformed Lock Nut
4	1	84718	Left Hose Bundle Clamp

MAINFRAME ASSEMBLY

ASSEMBLY #83371
MAINFRAME

UP TO SERIAL #8408AX972



MAINFRAME ASSEMBLY

ASSEMBLY #83371
MAINFRAME

UP TO SERIAL #8408AX972

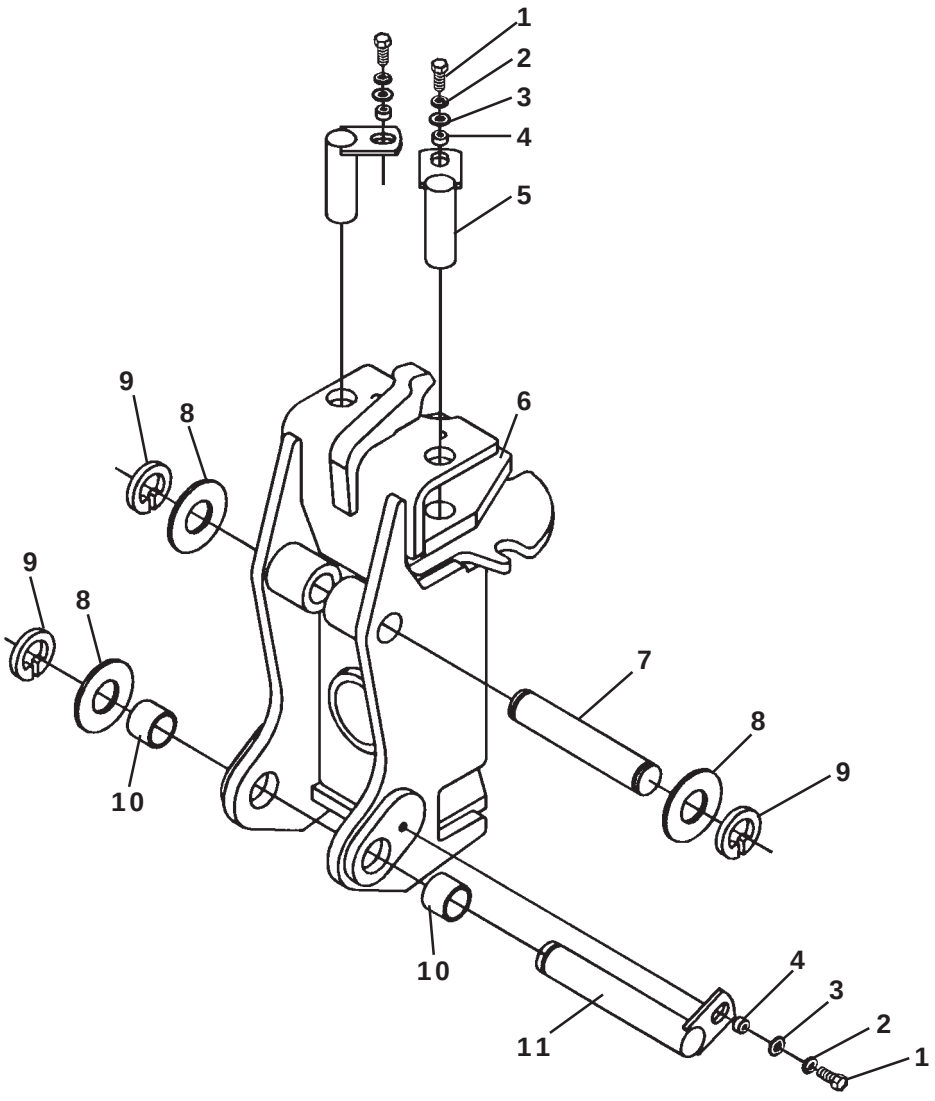
NO	REQ'D	PART NO.	DESCRIPTION
1	4	1043	.38" UNC X 1.00" Hex Capscrew (Two pin retaining capscrews installed with Locktite Grade 242)
2	2	1514	.38" Flat Washer
3	2	81807	Spacer Tube
4	2	81592	Pin
	2	6616	Grease Zerk
5	1	83977	Thrust Washer 1.38" X .125"
6	2	1929	Snap Ring
7	2	6615	Bearing
8	1	83392	Mainframe (Includes (4) #83815 Bushings - Installed with Locktite Grade 680)
9	1	82090	Swing Lock Pin
10	4	6886	Rubber Bumper
	4	1542	.50" UNC Lock Nut
11	As Req'd	83975	Thrust Washer 1.38" X .031"
	As Req'd	83976	Thrust Washer 1.38" X .090"
	As Req'd	83977	Thrust Washer 1.38" X .125"
12	3	1503	.38" Lock Washer
13	2	6799	Spacer
14	2	6186	Hose Clamp
15	2	82794	Bushing
16	2	1611	Cotter Pin .12 X 1.00"
17	1	82796	Linkage
18	1	1924	Shoulder Screw

NOTE: Use thrust washers (Item #11) to adjust mainframe / swing post to minimum free play.

MAINFRAME ASSEMBLY

ASSEMBLY #83371
SWING POST

UP TO SERIAL #8408AX972



MAINFRAME ASSEMBLY

ASSEMBLY #83371
SWING POST

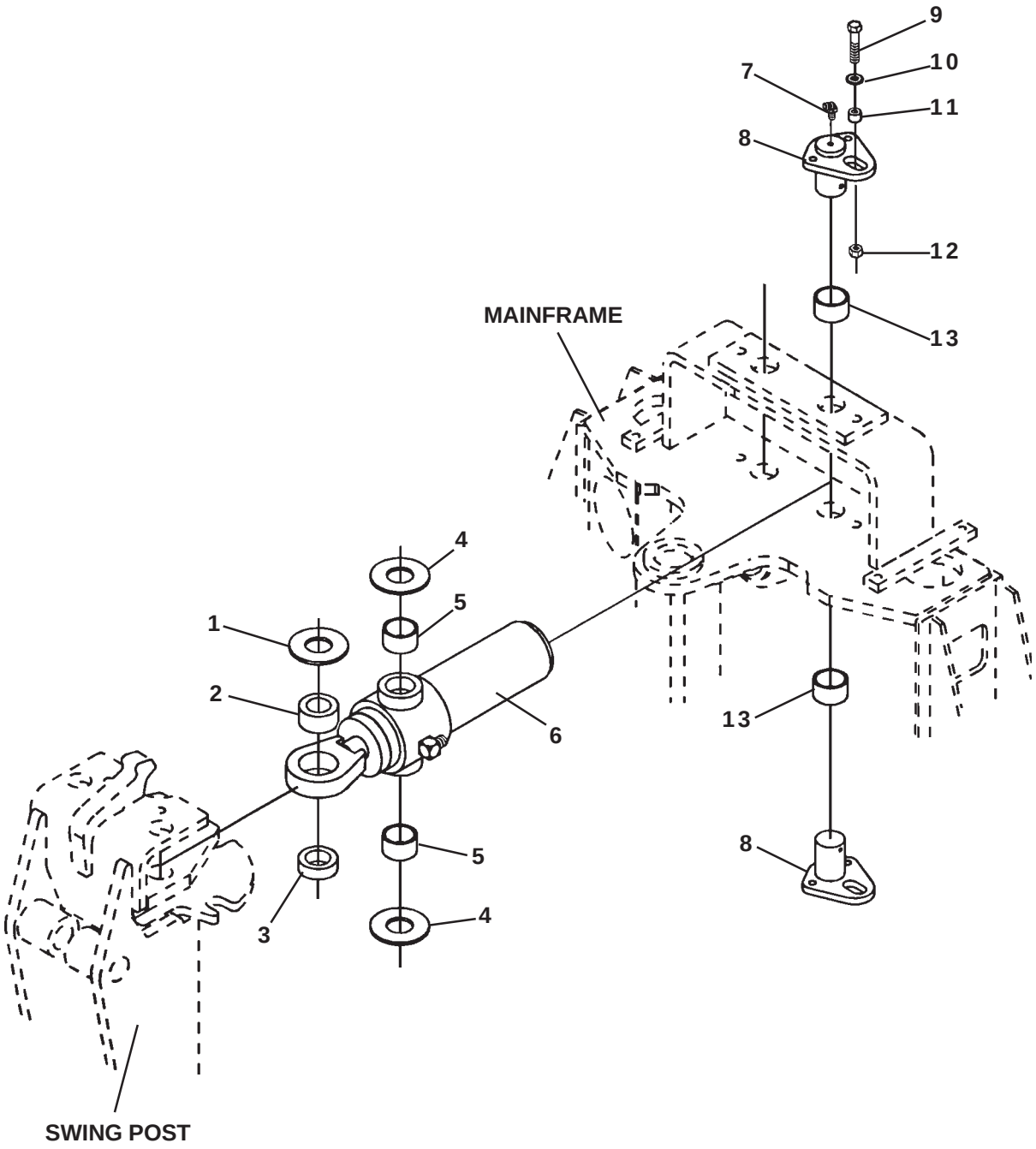
UP TO SERIAL #8408AX972

NO	REQ'D	PART NO.	DESCRIPTION
1	3	1043	.38" UNC X 1.00" Hex Capscrew (Installed with Locktite Grade 242)
2	3	1503	.38" Lock Washer
3	3	1514	.38" Flat Washer
4	3	81807	Spacer Tube
5	2	81847	Pin
6	1	83648	Swing Post (Includes (2) 81828 Bushings Installed with Locktite Grade 680)
7	1	82534	Pin
8	As Req'd	6623	Thrust Washer 1.38" X .031"
	As Req'd	64724	Thrust Washer 1.38" X .090"
	As Req'd	64725	Thrust Washer 1.38" X .125"
9	3	1650	Snap Ring
10	-	81828	Bushing (Included in Swing Post) (Installed with Locktite Grade 680)
11	1	82321	Pin

MAINFRAME ASSEMBLY

ASSEMBLY #83371
SWING CYLINDER

UP TO SERIAL #8408AX972



MAINFRAME ASSEMBLY

ASSEMBLY #83371
SWING CYLINDER

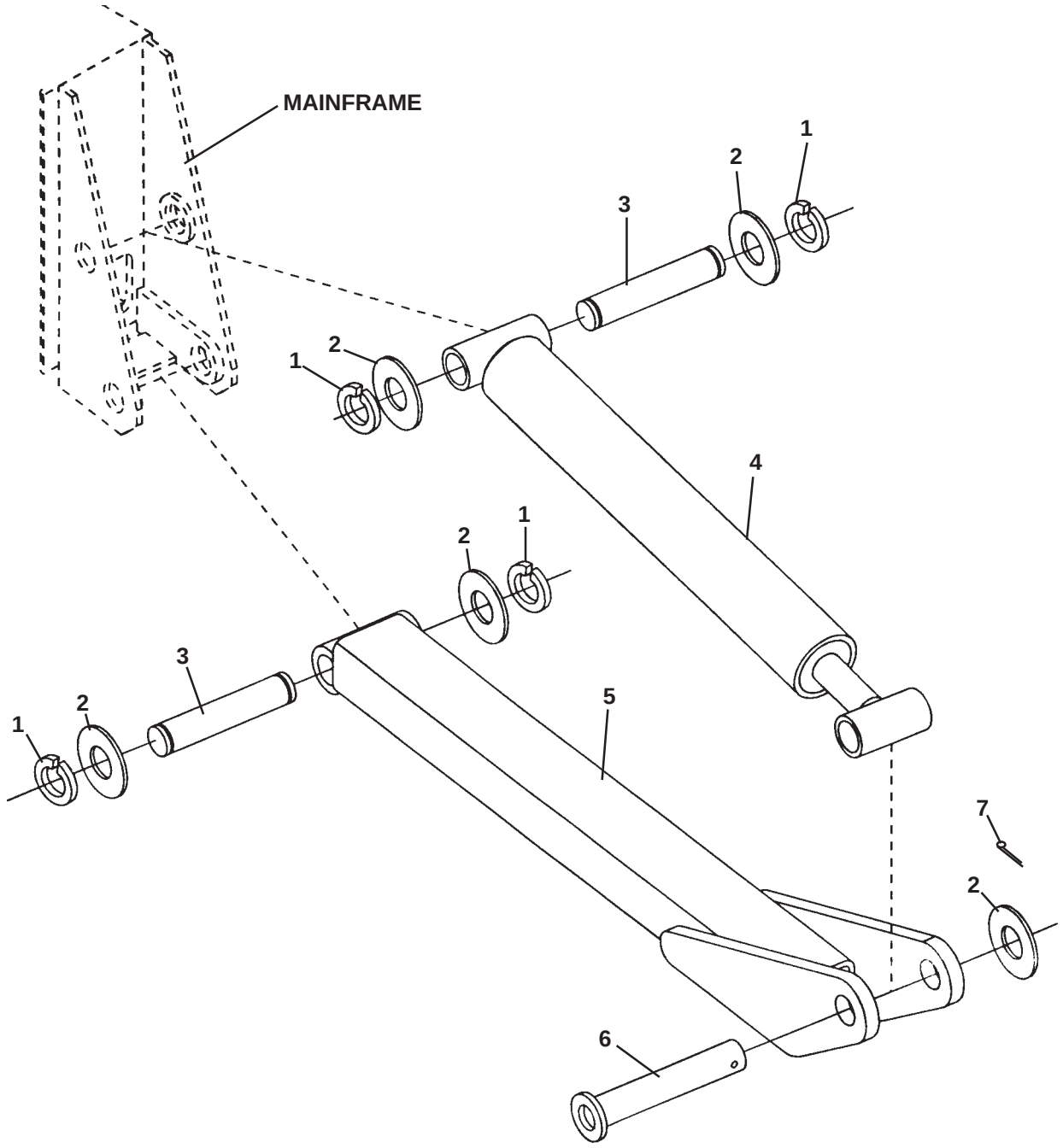
UP TO SERIAL #8408AX972

NO	REQ'D	PART NO.	DESCRIPTION
1	2	1521	1.25" Flat Washer
2	-	62523	Self Aligning Bushing (Included in Swing Cylinder Assembly)
3	2	81585	Spacer
4	4	68057	Thrust Washer
5	-	82441	Needle Bearing (Included in Swing Cylinder Assembly)
6	2	81827	Swing Cylinder Assembly (Includes (2) #82441 Needle Bearings and (2) #62523 Bushings)
	2	6616	Grease Zerk
	2	30137	Tee
7	4	53031	90° Grease Zerk
8	4	82420	Pin
9	4	1047	.38" UNC X 2.00" Hex Capscrew
10	4	1514	.38" Flat Washer
11	4	81595	Spacer Tube
12	4	1837	.38" UNC Hex Lock Nut
13	-	83815	Bushing (Included in Mainframe - Installed with Locktite Grade 680)

MAINFRAME ASSEMBLY

ASSEMBLY #83371
STABILIZERS

UP TO SERIAL #8408AX972



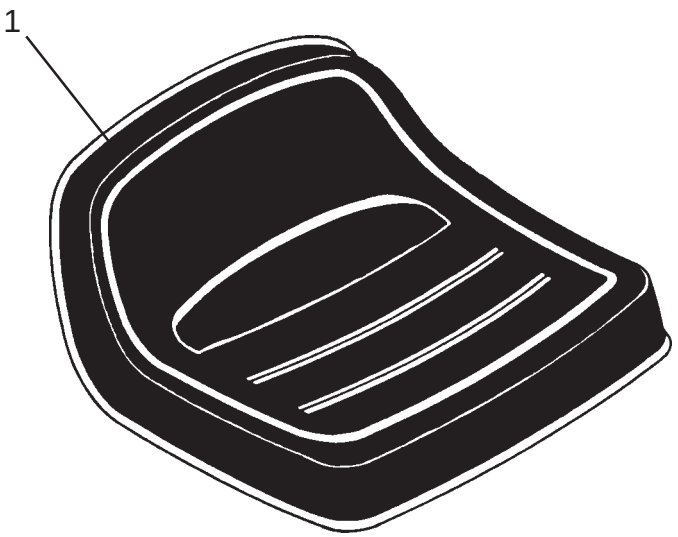
MAINFRAME ASSEMBLY

ASSEMBLY #83371
STABILIZERS

UP TO SERIAL #8408AX972

NO	REQ'D	PART NO.	DESCRIPTION
1	8	1652	Snap Ring
2	As Req'd	57693	Thrust Washer 1.25" X .078"
	As Req'd	64727	Thrust Washer 1.25" X .145"
	As Req'd	64728	Thrust Washer 1.25" X .031"
3	4	81846	Pin
4	2	83397	Stabilizer Cylinder Assembly
	4	6616	Grease Zerk
5	2	83393	Stabilizer Arm
6	2	83257	Pin
7	2	1613	Cotter Pin .25" X 2.00"

SEAT ASSEMBLY



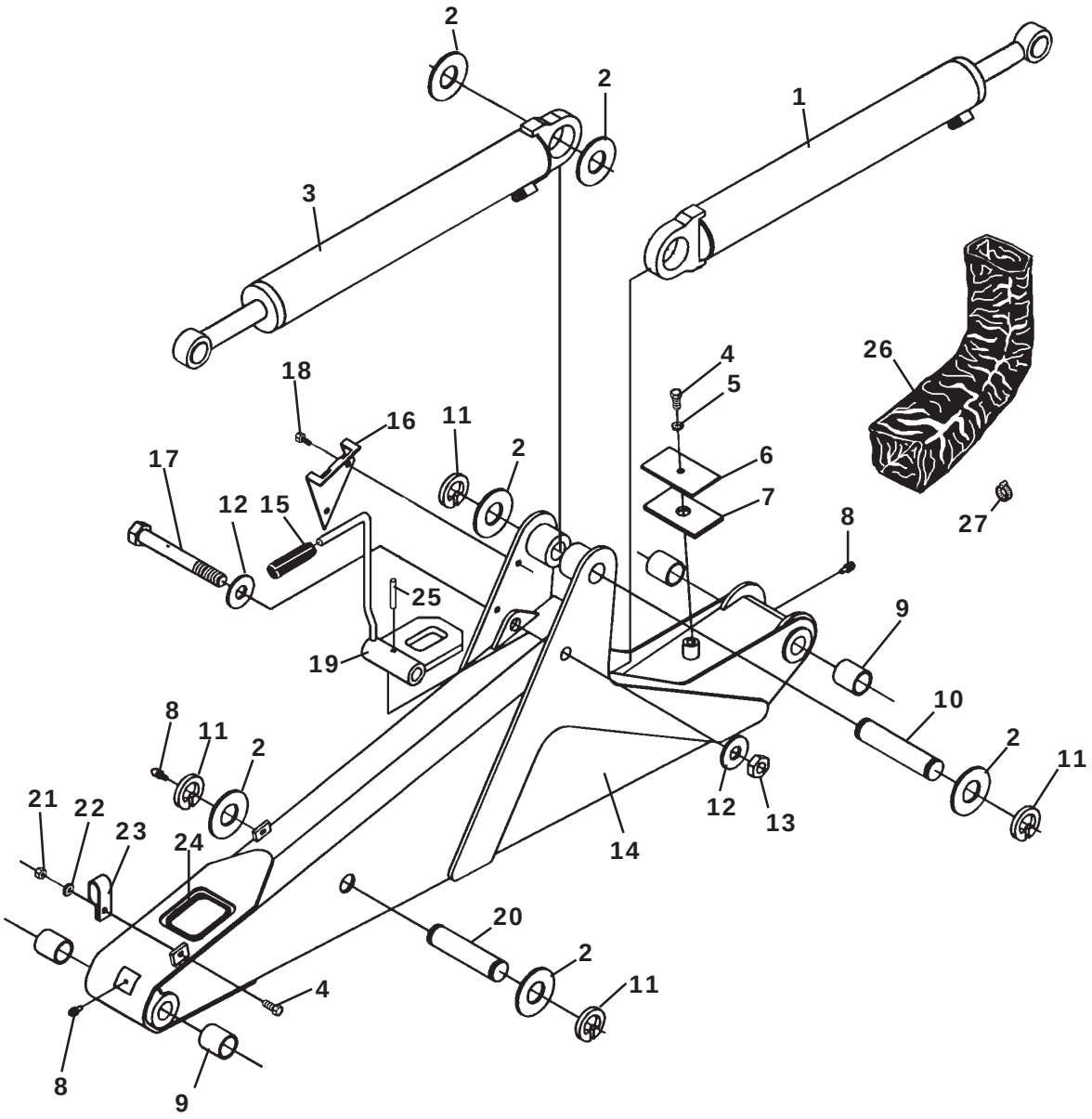
SEAT ASSEMBLY

NO	REQ'D	PART NO.	DESCRIPTION
1	1	6980	Seat

BOOM & DIPPER ASSEMBLY

ASSEMBLY #85699

SERIAL #8408AX973 AND UP



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6-10-98

BOOM & DIPPER ASSEMBLY

ASSEMBLY #85699

SERIAL #8408AX973 AND UP

NO	REQ'D	PART NO.	DESCRIPTION
1	1	85663	Boom Cylinder Assembly
	1	53031	90° Grease Zerk
2	As Req'd	6623	Thrust Washer 1.38" X .031"
	As Req'd	64724	Thrust Washer 1.38" X .090"
	As Req'd	64725	Thrust Washer 1.38" X .125"
3	1	85672	Dipper Cylinder Assembly
	2	6616	Grease Zerk
4	3	1043	.38" UNC X 1.00" Hex Capscrew
5	1	1503	.38" Lock Washer
6	1	81881	Clamp Plate
7	1	81882	Rubber Spacer
8	3	6616	Grease Zerk
9	-	81610	Bushing (Included in Boom) (Install with Locktite Grade 680)
10	1	81678 (1)	Pin
11	4	1650	Snap Ring
12	2	6562	Spring Washer
13	1	1959	.88" UNC Jam Lock Nut
14	1	82223	Boom (Includes (4) 81610 Bushings)
15	1	83656	Handle Grip
16	1	83606	Swing Lock Bracket
17	1	86897	.88" UNC Bolt
18	2	1961	.38" UNC X .50" Flange Head Hex Capscrew
19	1	86639	Boom Lock
20	1	86880 (3)	Pin 1.38" x 6.66" (Serial #---11168 and UP)
		81677 (2)	Pin 1.38" x 5.78" (UP to Serial #---11168)
21	2	1837	.38" UNC Lock Nut
22	2	1514	.38" Flat Washer
23	2	82859	Double Hose Clamp
24	1	34128	Rubber Edge - 12"
25	1	1972	Roll Pin
26	1	34125	Hose Sock
27	1	53167	Hose Clamp

NOTE:

(1) Pivot Pin #81678 is sold only in Pin Kit #86312. Kit includes one pin #81678, two thrust washers #6623 and two snap rings #1650.

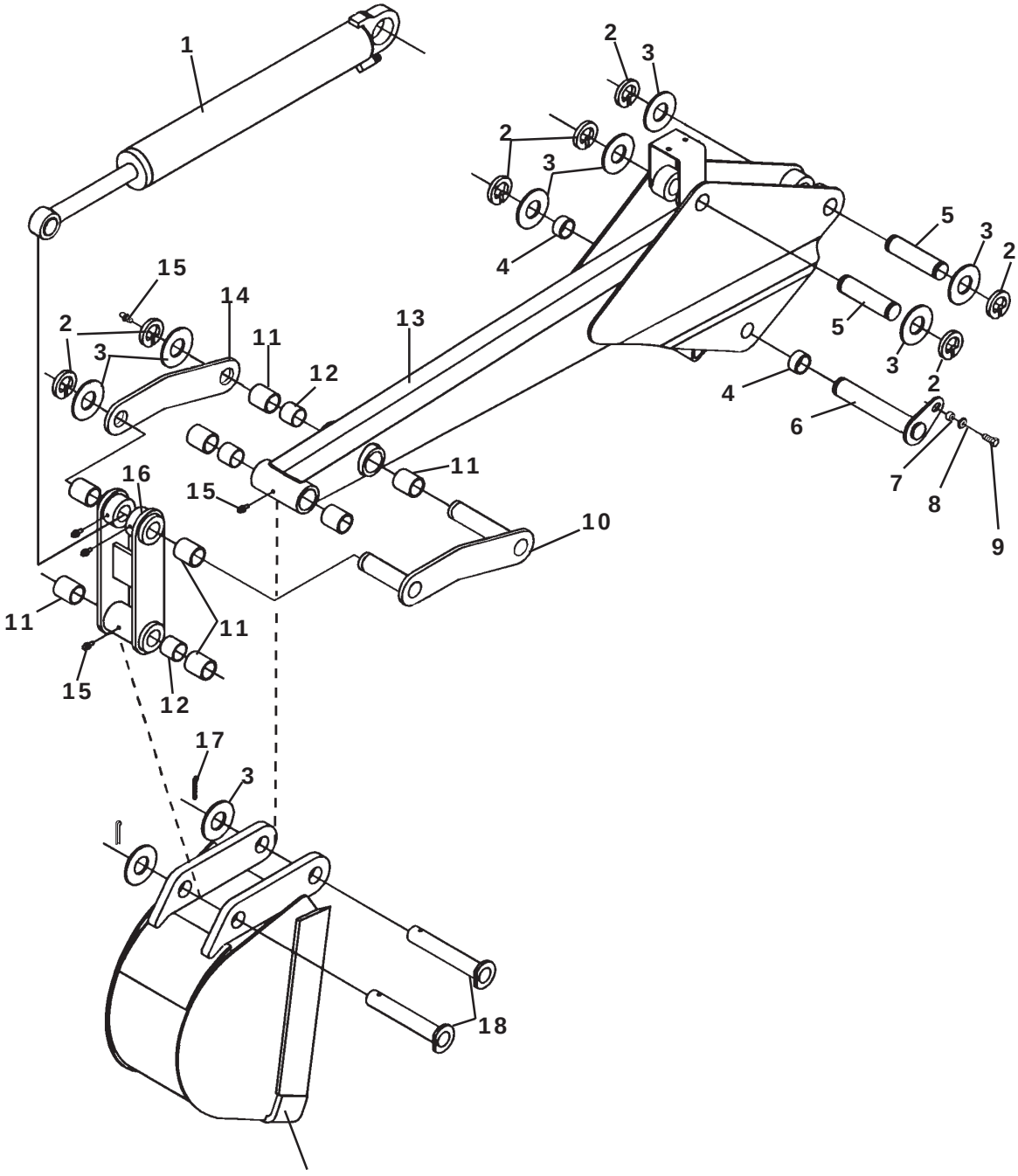
(2) Pivot Pin #81677 is sold only in Pin Kit #86313. Kit includes one pin #81677, two thrust washers #6623 and two snap rings #1650.

(3) Pivot Pin #86880 is sold only in Pin Kit #86881. Kit includes one pin #86880, two thrust washers #6623, two snap rings #1650 and one grease zerk #6616.

BOOM & DIPPER ASSEMBLY

ASSEMBLY #85699

SERIAL #8408AX973 AND UP



BUCKET
(NOT INCLUDED IN BOOM & DIPPER ASSEMBLY)

7457
6-10-98

BOOM & DIPPER ASSEMBLY

ASSEMBLY #85699

SERIAL #8408AX973 AND UP

NO	REQ'D	PART NO.	DESCRIPTION
1	1	85677	Bucket Cylinder Assembly
	1	53031	90° Grease Zerk
	1	6616	Grease Zerk
2	7	1650	Snap Ring
3	As Req'd	6623	Thrust Washer 1.38" X .031"
	As Req'd	64724	Thrust Washer 1.38" X .090"
	As Req'd	64725	Thrust Washer 1.38" X .125"
4	-	82443	Bushing (2)Included in Dipper (Installed with Locktite Grade 680)
5	2	81679 (1)	Pin
6	1	84754	Pin
	1	6616	Grease Zerk
7	1	81807	Spacer Tube
8	1	1514	.38" Flat Washer
9	1	1043	.38" UNC X 1.00" Hex Capscrew (Installed with Locktite Grade 242)
10	1	83411	Dipper Link
11	-	81610	Bushing (4) Included in Dipper (4) Included in Bucket Link (Installed with Locktite Grade 680)
12	-	83368	Spacer (2) Included in Dipper (1) Included in Bucket Link
13	1	85715	Dipper (Includes (4) 81610 Bushings, (2) 82443 Bushings and (2) 83368 Spacers (Bushings installed with Locktite Grade 680)
14	1	84913	Dipper Link
15	5	6616	Grease Zerk
16	1	85696	Bucket Link (Includes (4) 81610 Bushings and (1) 83368 Spacer) (Bushings installed with Locktite Grade 680)
17	2	1613	Cotter Pin
18	2	81672	Bucket Pin

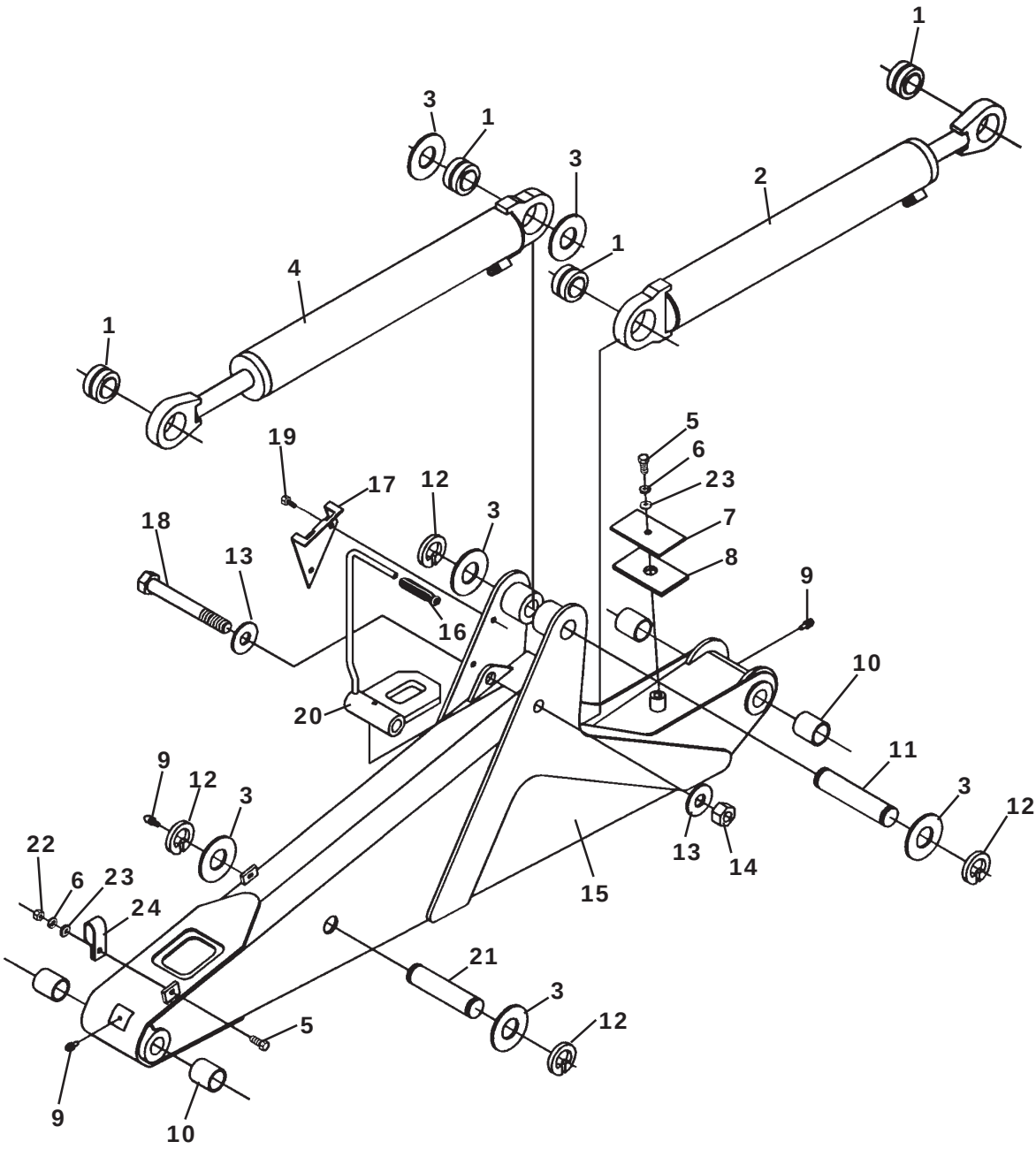
NOTE:

(1) Pivot Pin #81679 is sold only in Pin Kit #86311. Kit includes one pin #81679, two thrust washers #6623 and two snap rings #1650.

BOOM & DIPPER ASSEMBLY

ASSEMBLY #81813

UP TO SERIAL #8408AX972



BOOM & DIPPER ASSEMBLY

ASSEMBLY #81813

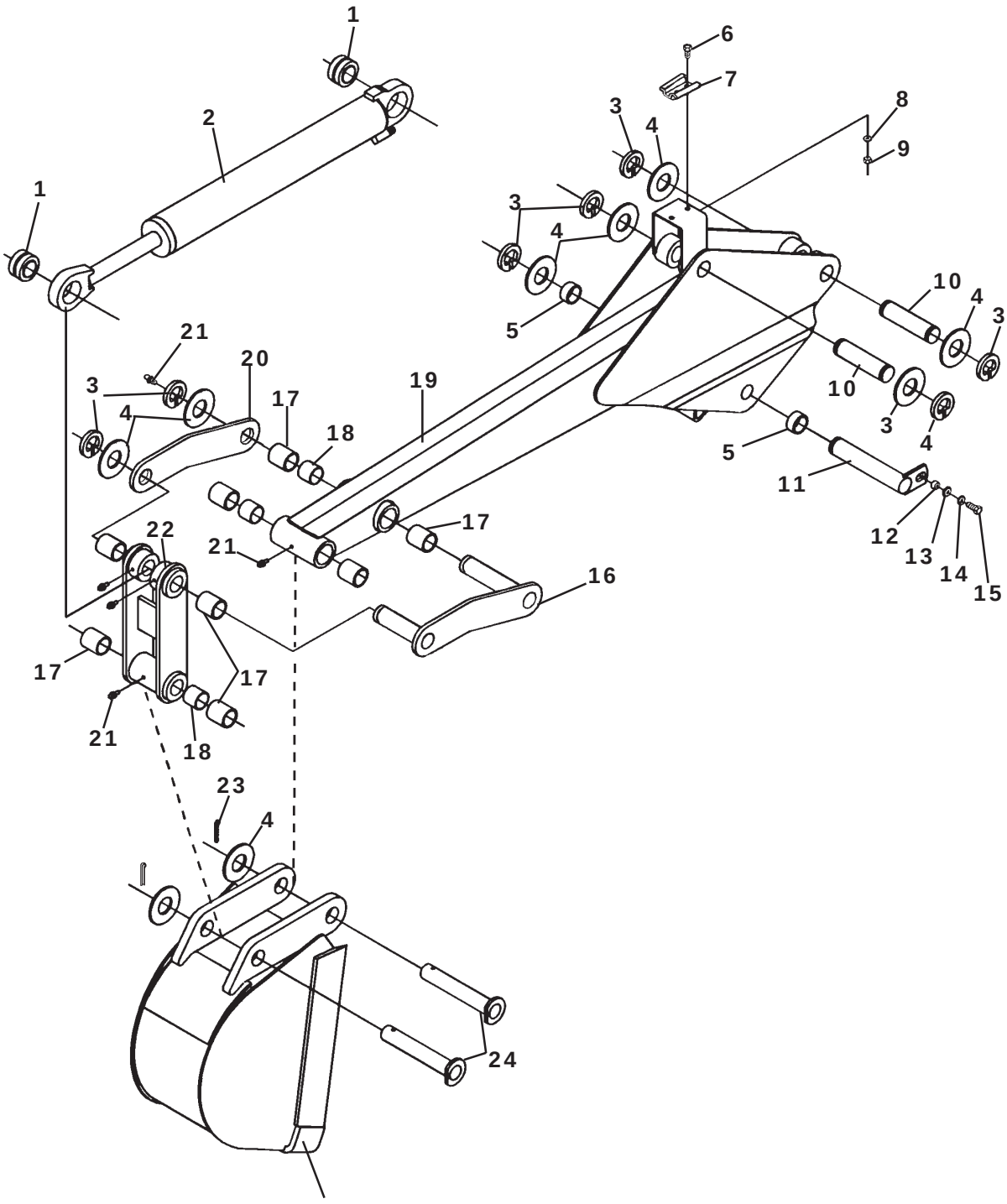
UP TO SERIAL #8408AX972

NO	REQ'D	PART NO.	DESCRIPTION
1	-	6615	Self Aligning Bushing (Included in Cylinder Assemblies)
2	1	81611	Boom Cylinder Assembly
	1	53031	90° Grease Zerk
3	As Req'd	6623	Thrust Washer 1.38" X .031"
	As Req'd	64724	Thrust Washer 1.38" X .090"
	As Req'd	64725	Thrust Washer 1.38" X .125"
4	1	81641	Dipper Cylinder Assembly
	2	6616	Grease Zerk
5	3	1043	.38" UNC X 1.00" Hex Capscrew
6	3	1503	.38" Lock Washer
7	1	81881	Clamp Plate
8	1	81882	Rubber Spacer
9	3	6616	Grease Zerk
10	-	81610	Bushing (Included in Boom) (Install with Locktite Grade 680)
11	1	81678	Pin
12	4	1650	Snap Ring
13	2	6562	Spring Washer
14	1	1739	.88" UNC Lock Nut
15	1	82223	Boom (Includes (4) 81610 Bushings)
16	1	83656	Handle Grip
17	1	83606	Swing Lock Bracket
18	1	1176	.88" UNC X 7.00" Hex Capscrew
19	2	1953	.38" UNC X .75" Flange Head Hex Capscrew
20	1	83410	Boom Lock
	1	1575	.38" X .50" Set Screw
21	1	81677	Pin
22	2	1226	.38" UNC Hex Nut
23	3	1514	.38" Flat Washer
24	2	82859	Double Hose Clamp

BOOM & DIPPER ASSEMBLY

ASSEMBLY #81813

UP TO SERIAL #8408AX972



BUCKET
(NOT INCLUDED IN BOOM & DIPPER ASSEMBLY)

7453
6-4-98

BOOM & DIPPER ASSEMBLY

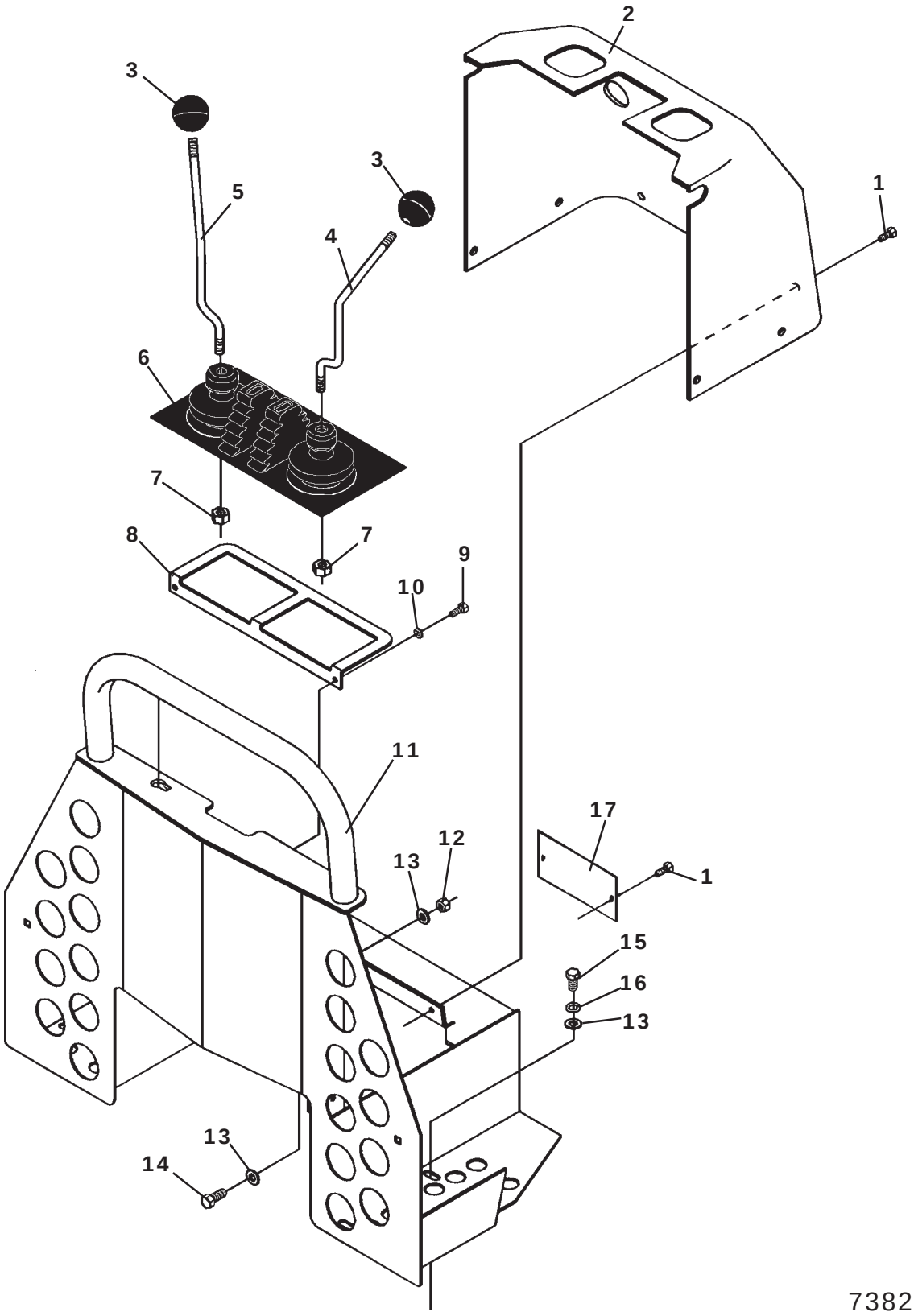
ASSEMBLY #81813

UP TO SERIAL #8408AX972

NO	REQ'D	PART NO.	DESCRIPTION
1	-	6615	Self Aligning Bushing (Included in Cylinder Assembly)
2	1	81634	Bucket Cylinder Assembly
	1	53031	90° Grease Zerk
	1	6616	Grease Zerk
3	7	1650	Snap Ring
4	As Req'd	6623	Thrust Washer 1.38" X .031"
	As Req'd	64724	Thrust Washer 1.38" X .090"
	As Req'd	64725	Thrust Washer 1.38" X .125"
5	-	82443	Bushing (2)Included in Dipper (Installed with Locktite Grade 680)
6	2	1021	.31" UNC X .75" Hex Capscrew
7	1	7448	SMV Clip
8	2	1502	.31" Lock Washer
9	2	1225	.31" UNC Hex Nut
10	2	81679	Pin
11	1	81855	Pin
12	1	81807	Spacer Tube
13	1	1514	.38" Flat Washer
14	1	1503	.38" Lock Washer
15	1	1043	.38" UNC X 1.00" Hex Capscrew (Installed with Locktite Grade 242)
16	1	83411	Dipper Link
17	-	81610	Bushing (4) Included in Dipper (4) Included in Bucket Link (Installed with Locktite Grade 680)
18	-	83368	Spacer (2) Included in Dipper (1) Included in Bucket Link
19	1	81825	Dipper (Includes (4) 81610 Bushings, (2) 82443 Bushings and (2) 83368 Spacers (Bushings installed with Locktite Grade 680)
20	1	83412	Dipper Link
21	5	6616	Grease Zerk
22	1	81824	Bucket Link (Includes (4) 81610 Bushings and (1) 83368 Spacer) (Bushings installed with Locktite Grade 680)
23	2	1613	Cotter Pin
24	2	81672	Bucket Pin

CONSOLE ASSEMBLY

ASSEMBLY #85701



7382
12-17-99-2

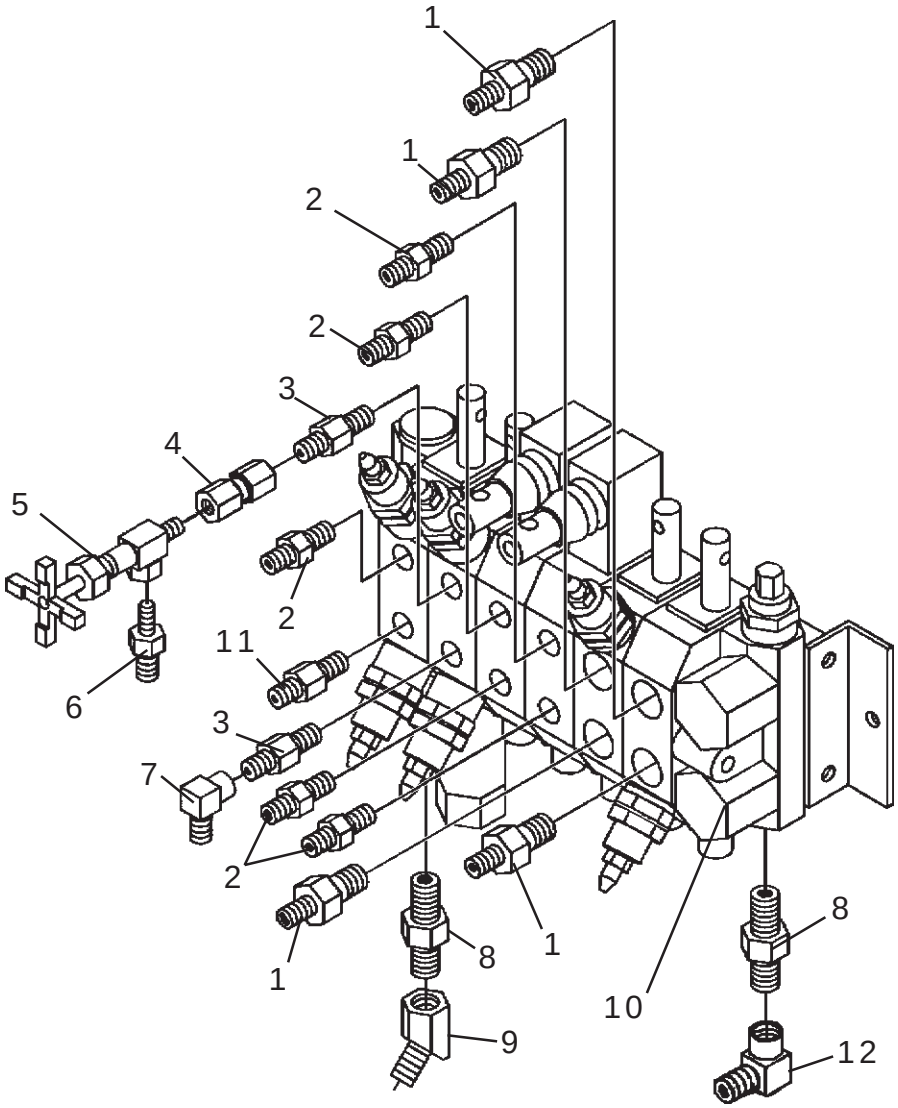
CONSOLE ASSEMBLY

ASSEMBLY #85701

NO	REQ'D	PART NO.	DESCRIPTION
1	8	1958	.25" UNC X .75" Hex Head Body Bolt
2	1	86649	Console Cover with Decals
3	2	85838	Ball Handle
4	1	85839	Control Handle - Left
5	1	85840	Control Handle - Right
6	1	83235	Control Lever Boot
7	2	2558	M10 Hex Nut
8	1	85826	Boot Support Plate
9	2	1001	.25" UNC X .50" Hex Capscrew
10	2	1501	.25" Lock Washer
11	1	83373	Console
12	2	1837	.38" UNC Deformed Lock Nut
13	8	1514	.38" Flat Washer
14	2	1043	.38" UNC X 1.00" Hex Capscrew
15	4	1042	.38" UNC X .75" Hex Capscrew
16	4	1503	.38" Lock Washer
17	1	87147	Cover Plate

VALVE ASSEMBLY

ASSEMBLY #2233



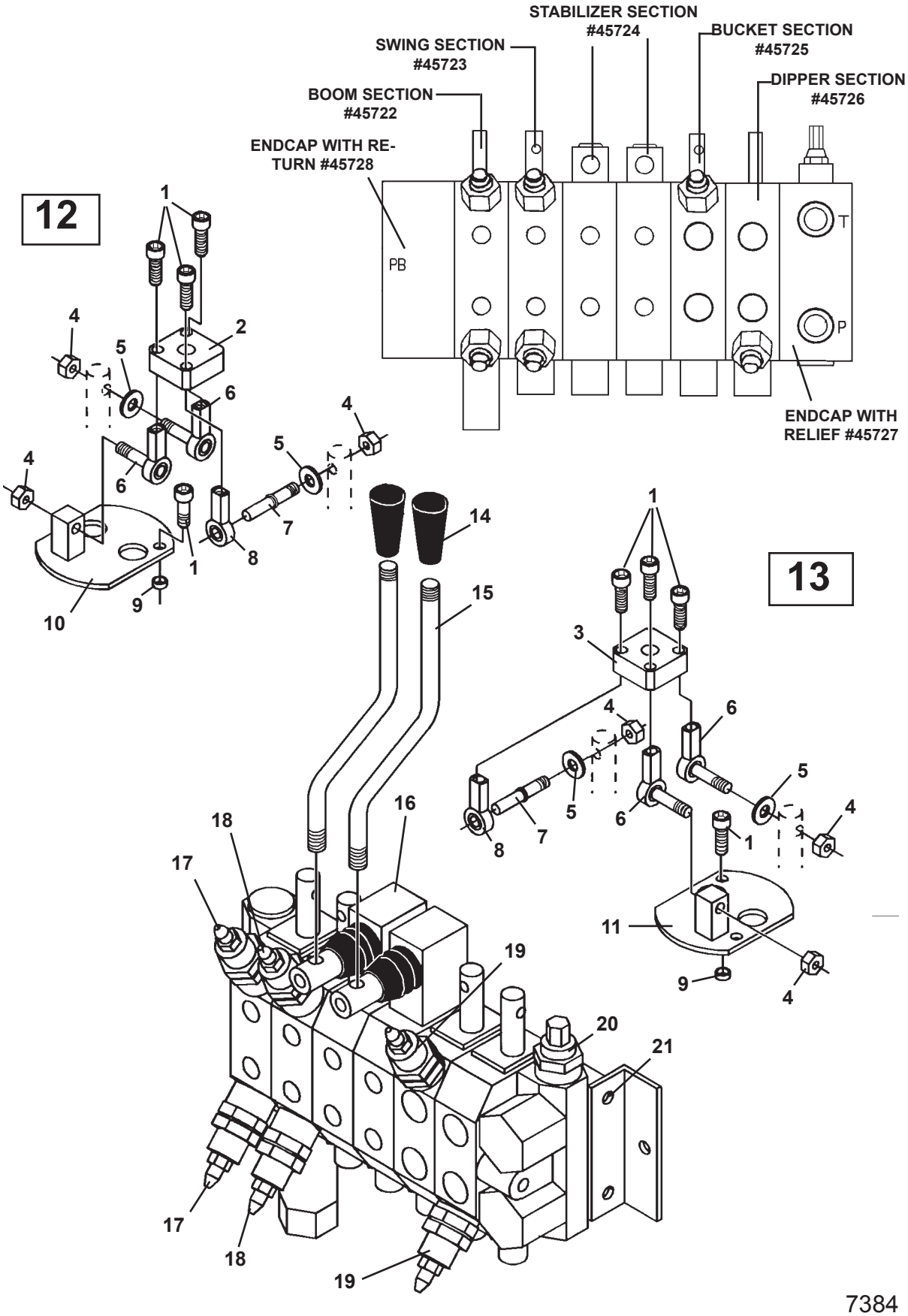
VALVE ASSEMBLY

ASSEMBLY #2233

NO	REQ'D	PART NO.	DESCRIPTION
1	4	3269	Straight Adapter 8MBo - 6MJ
2	5	3457	Straight Adapter 6MBo - 6MJ
3	2	30185	Adapter 6MBo - 6MJ (.076 Restrictor)
4	1	30187	Swivel Adapter 4FP - 6FJX
5	1	3185	Needle Valve (Speed Control)
6	1	3137	Straight Adapter 4MP - 6MJ
7	1	3430	90° Street Adapter 6FJX - 6MJ
8	2	3103	Straight Adapter 8MBo - 8MJ
9	1	30015	45° Street Adapter 8FJX - 8FJ
10	1	85511	6-Spool Hidroirma Valve
11	1	30184	Adapter 6MBo - 6MJ (.109 Restrictor)
12	1	3149	90° Street Elbow 8FJX 0 8MJ

VALVE ASSEMBLY

HIDROIRMA VALVE #85511



7384
12-16-99-2

VALVE ASSEMBLY

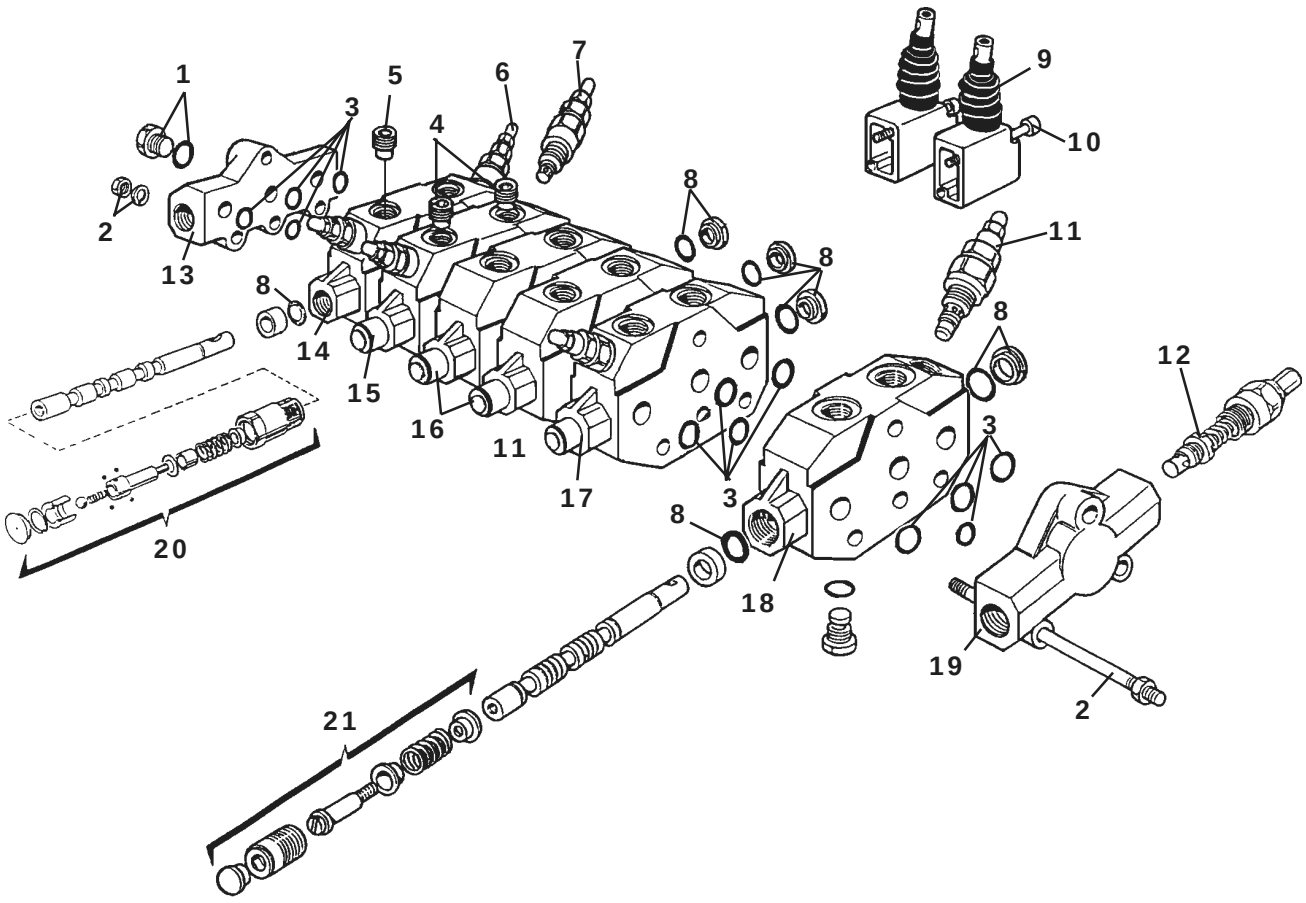
HIDROIRMA VALVE #85511

SERVICE PARTS

NO	REQ'D	PART NO.	DESCRIPTION
1	10	45702	Screw
2	1	45704	Joystick Plate - Left
3	1	45705	Joystick Plate - Right
4	6	45706	Nut
5	4	45707	Washer
6	4	45708	Terminal With Stud
7	2	45709	Joystick Spool Pin
8	2	45710	Terminal
9	4	45711	Bushing
10	1	45712	Left Joystick Support
11	1	45713	Right Joystick Support
12	-	45717	Left Joystick Assembly (Includes Items 1, 2, 4, 5, 6, 7, 8, 9, 10)
13	-	45718	Right Joystick Assembly (Includes Items 1, 3, 4, 5, 6, 7, 8, 9, 11)
14	2	86338	Knob
15	2	85837	Stabilizer Control Lever
16	-	85511	Complete Valve Assembly (Includes all Items on this Page)
17	2	45714	Circuit Relief With Anti-Cav. @ 2500 PSI
18	2	45715	Circuit Relief With Anti-Cav. @ 2250 PSI
19	2	45716	Circuit Relief @ 2500 PSI
20	1	45719	Main Relief @ 2250 PSI
21	3	45736	Tie Bolt Assembly (Includes Tie Bolt, Washer & Nut)

VALVE ASSEMBLY

REPLACEMENT PARTS - HYDROIRMA VALVE



VALVE ASSEMBLY

REPLACEMENT PARTS - HIDROIRMA VALVE

NO	REQ'D	PART NO.	DESCRIPTION
1	-	3341	Plug 8MBo
	-	3306	Replacement O'Ring
2	-	45736	Tie Rod Assembly (Includes Nuts & Washers)
3	-	45720	Section Seal Kit
4	-	45731	Restrictor .076
5	-	45732	Restrictor .109
6	-	45714	Circuit Relief With Anti-Cav. @ 2500 PSI
7	-	45715	Circuit Relief With Anti-Cav. @ 2250 PSI
8	-	45721	Spool Seal Kit
9	-	45733	Stabilizer Lever Assembly
10	-	45735	Single Slot Screw
11	-	45716	Circuit Relief @ 2500 PSI
12	-	45719	Main Relief @ 2250 PSI
13	-	45728	Endcap With Return
14	-	45722	Valve Section - Boom
15	-	45723	Valve Section - Swing
16	-	45724	Valve Section - Stabilizers
17	-	45725	Valve Section - Bucket
18	-	45726	Valve Section - Dipper
19	-	45727	Endcap With Relief
20	-	45730	Float Assembly (Spool NOT Included) (If Float Spool is damaged, it is recommended to purchase a complete Valve Section.)
21	-	45729	Positioner Assembly (Spool NOT Included) (If Positioner Spool is damaged, it is recommended to purchase a complete Valve Section.)

NOTES:

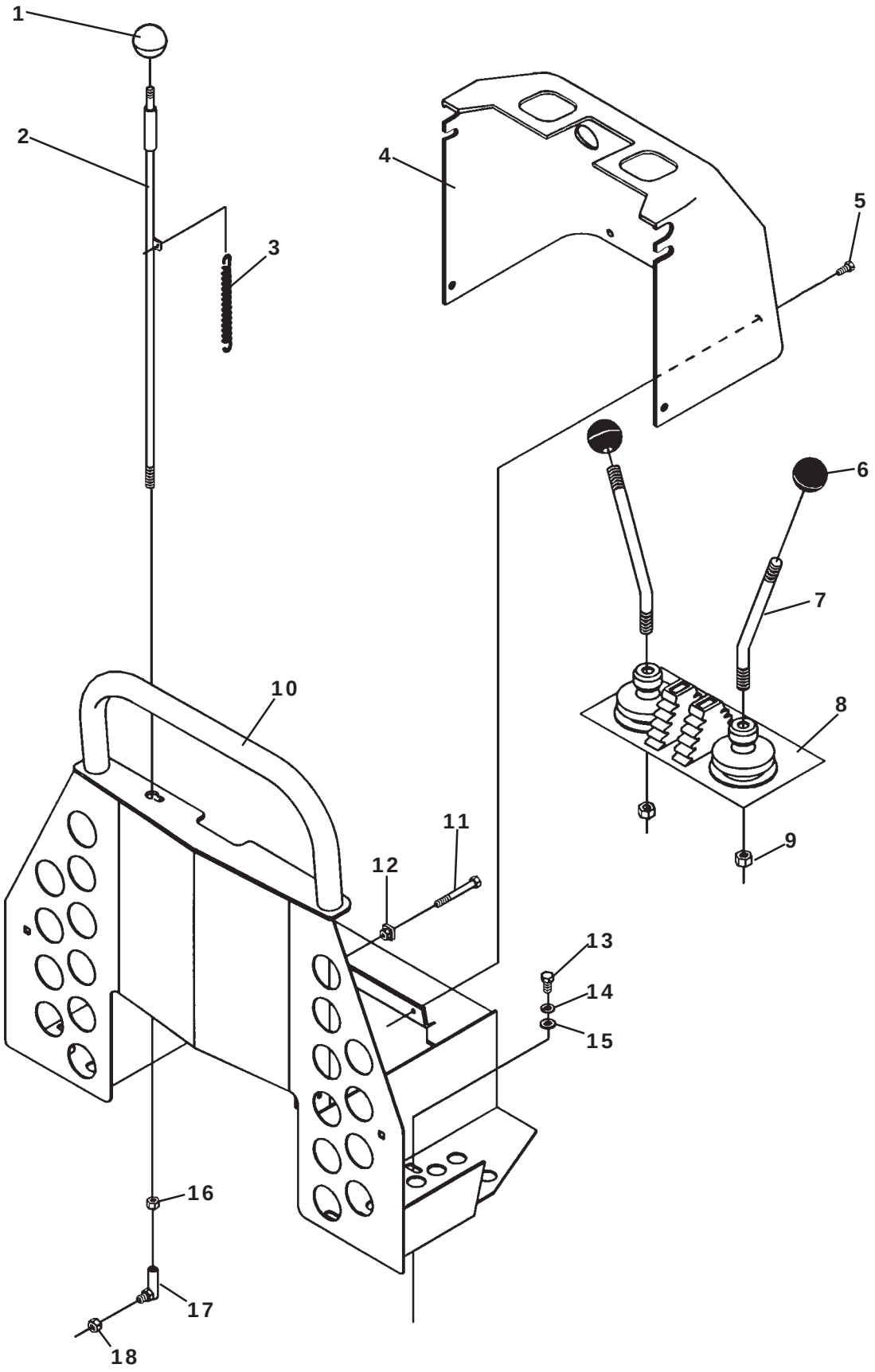
Items without part numbers are not sold separately.

Spool Seal Kit #45721 contains (2) O-Ring Seals and (1) Flanged Washer.

Section Seal Kit #45720 includes (4) O'Rings O'Ring Seals.

CONSOLE ASSEMBLY

ASSEMBLY #83372



6710
8-28-96-2

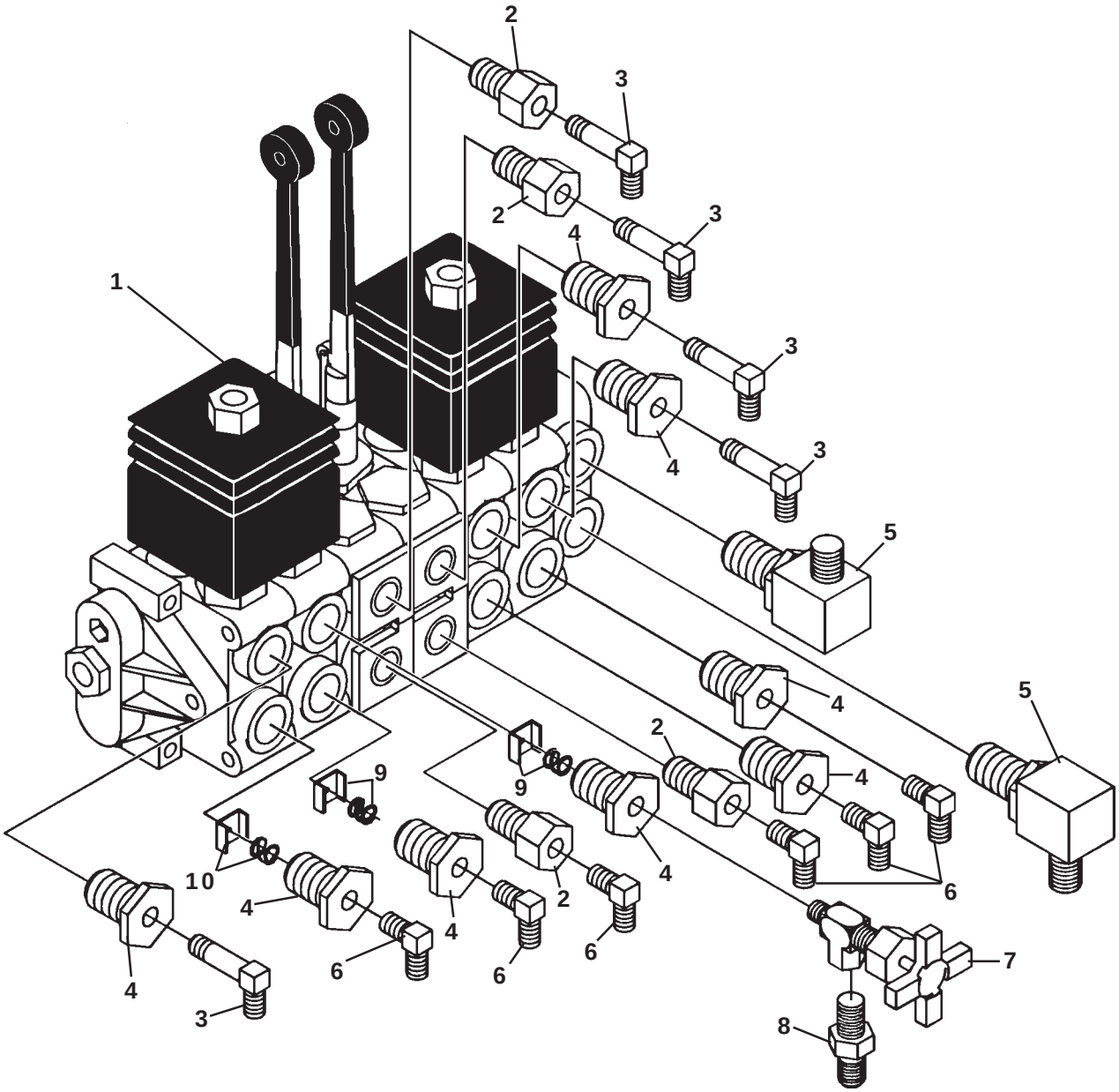
CONSOLE ASSEMBLY

ASSEMBLY #83372

NO	REQ'D	PART NO.	DESCRIPTION
1	1	83406	Ball Handle - RED
2	1	83273	Rod
3	1	82795	Spring
4	1	83409	Console Cover with Decals
5	6	1939	.25" UNC X .75" Flange Head Hex Capscrew
6	2	83063	Ball Handle
7	2	81871	Control Handle
8	1	83235	Control Lever Boot
9	2	1242	.50" UNC Jam Nut
10	1	83373	Console
11	3	1029	.31" UNC X 2.75" Hex Capscrew
12	3	1926	.31" UNC U-Nut
13	4	1042	.38" UNC X .75" Hex Capscrew
14	4	1503	.38" Lock Washer
15	4	1514	.38" Flat Washer
16	1	1476	.38-24" UNF Jam Nut
17	1	5545	Balljoint
18	1	1592	.38" UNF Lock Nut

VALVE ASSEMBLY

ASSEMBLY #2230



6718
8-28-96-2

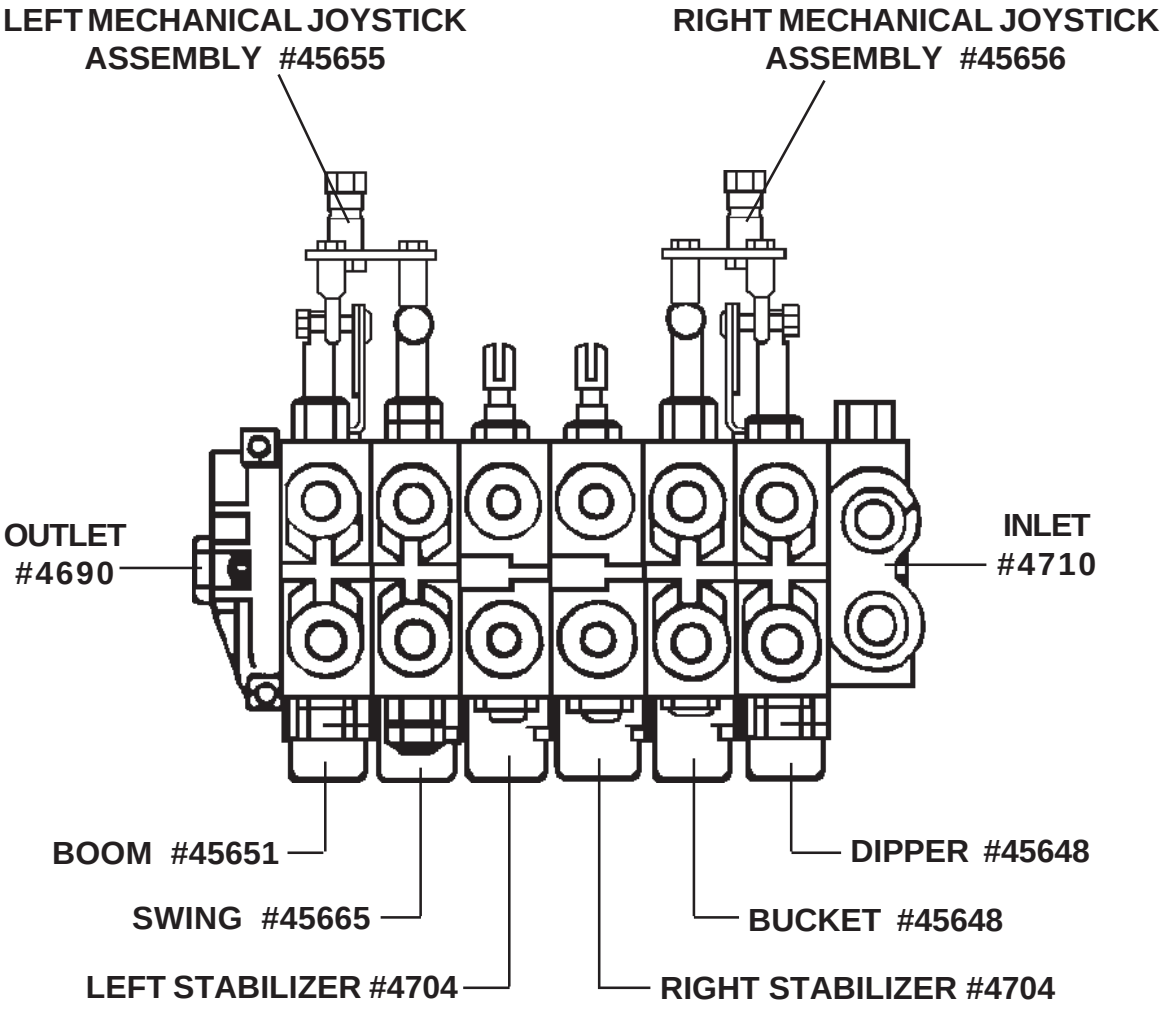
VALVE ASSEMBLY

ASSEMBLY #2230

NO	REQ'D	PART NO.	DESCRIPTION
1	1	81517	Valve - 6 Spool - Gresen
2	4	3368	O'Ring Adapter 8MBo-4FP
3	5	3088	90° Adapter 4MP-6MJ
4	8	3336	O'Ring Adapter 10MBo-4FP
5	2	3283	90° Adapter 10MBo-8MJ
6	6	3001	90° Adapter 4MP-6MJ
7	1	3185	Needle Valve
8	1	3137	Male Connector 4MP-6MJ
9	-	45633	Restrictor with Spring - .076 Dia. Orifice (Included in Valve)
10	-	45643	Restrictor with Spring - .109 Dia. Orifice (Included in Valve)

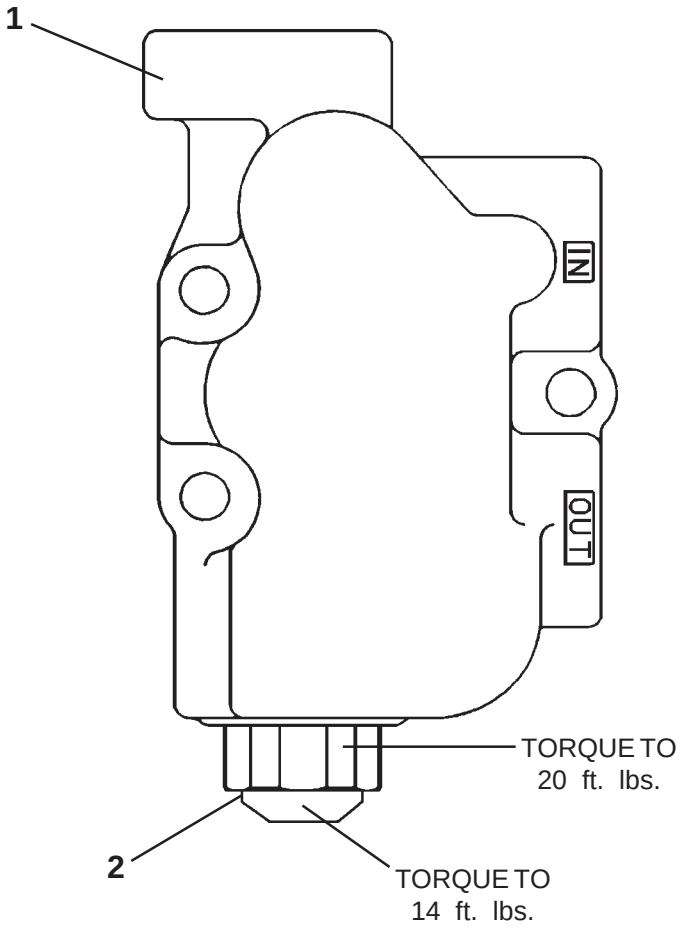
VALVE ASSEMBLY

408 BACKHOE VALVE ASSEMBLY



VALVE ASSEMBLY

GRESEN INLET COVER



6967
5-22-96

VALVE ASSEMBLY

GRESEN INLET COVER

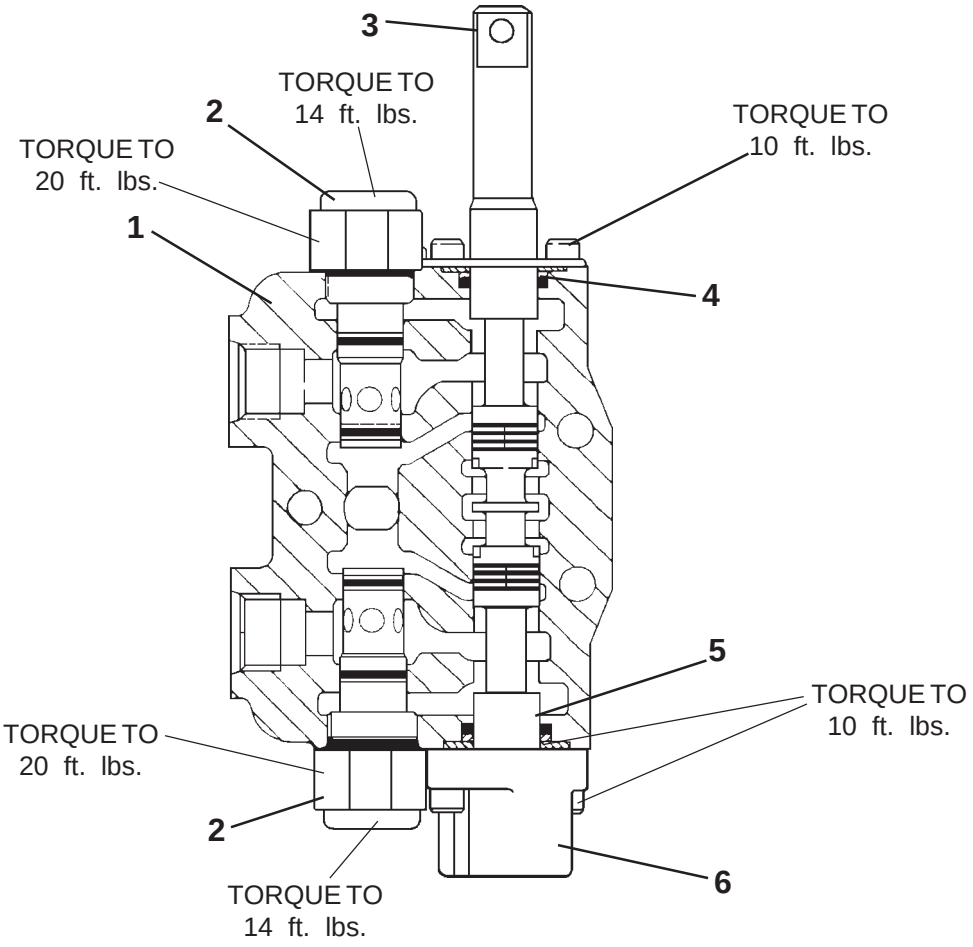
NO	REQ'D	PART NO.	DESCRIPTION
1	1	4710	Inlet Cover #10 Ports
2	1	45148	WH Main Relief Valve Assembly @ 2250 PSI

NOTES:

Valve Section Seal Kit #4653 contains (3) Exhaust Passage O-Ring Seals and (2) Pressure Passage O-Ring Seals

VALVE ASSEMBLY

GRESEN VALVE SECTION ASSEMBLY #45648
408 Dipper & Bucket Section
509, 511, 609 & 611 Dipper Section



VALVE ASSEMBLY

GRESEN VALVE SECTION ASSEMBLY #45648
408 Dipper & Bucket Section
509, 511, 609 & 611 Dipper Section

NO	REQ'D	PART NO.	DESCRIPTION
1	1		Valve Section Housing
2	2	45667	Cylinder Port Relief Assembly @ 2500 PSI
3	1	45653	Spool Clevis Adapter
4	2	45652	Spool Seal Kit
5	1		Spool
6	1	45282	Spool Positioner Assembly

INCLUDED IN VALVE ASSEMBLY BUT NOT IN VALVE SECTION

1	45546	Restrictor with Spring - .095 Dia. Orifice (Used in 408 Dipper Section - Top Port)
1	45633	Restrictor with Spring - .076 Dia. Orifice (Used in 408 Bucket Section - Bottom Port)

NOTES:

Items without part numbers are not sold separately.

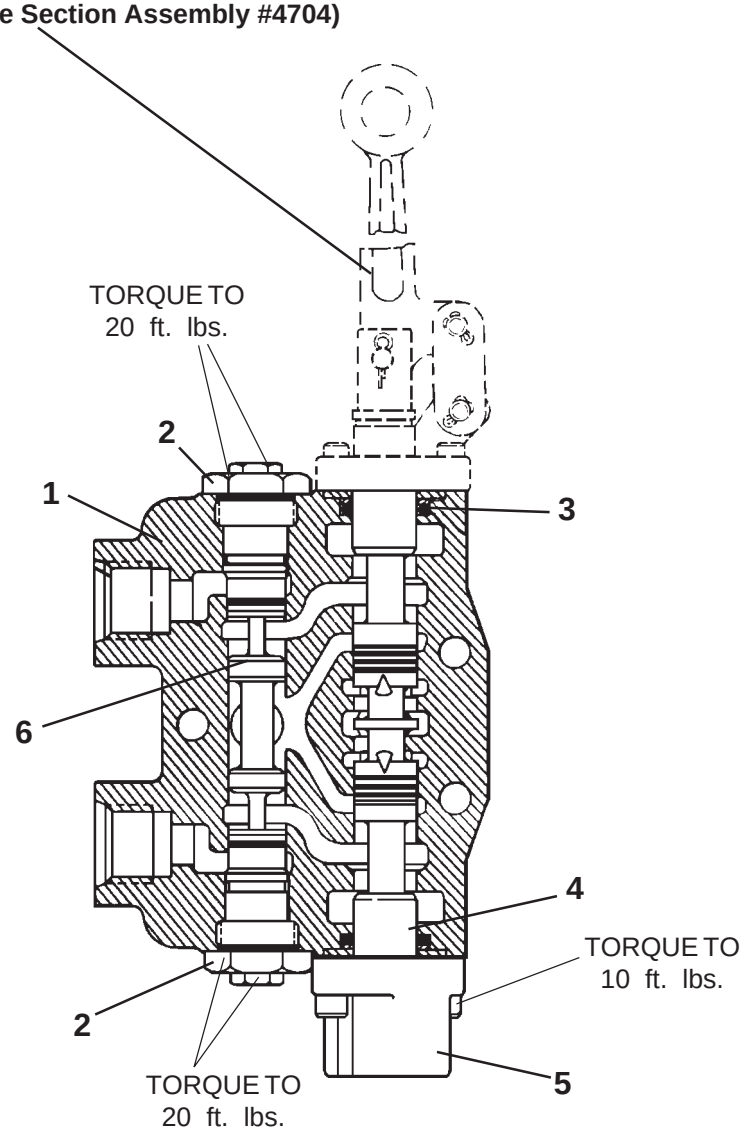
Valve Section Seal Kit #4653 contains (3) Exhaust Passage O-Ring Seals and (2) Pressure Passage O-Ring Seals.

Complete Section Service Seal Kit #4719 includes ALL seals needed to service one complete valve section.

VALVE ASSEMBLY

GRESEN VALVE STABILIZER SECTION
ASSEMBLY #4704

Horizontal Handle Assembly #45586
(Not included in Valve Section Assembly #4704)



VALVE ASSEMBLY

GRESEN VALVE STABILIZER SECTION
ASSEMBLY #4704

NO	REQ'D	PART NO.	DESCRIPTION
1	1		Valve Section Housing
2	2	4819	Lockout Check Assembly
3	2	45652	Spool Seal Kit
4	1		Spool
5	1	45282	Spool Positioner Assembly
6	1	45654	Unlocking Piston

NOTES:

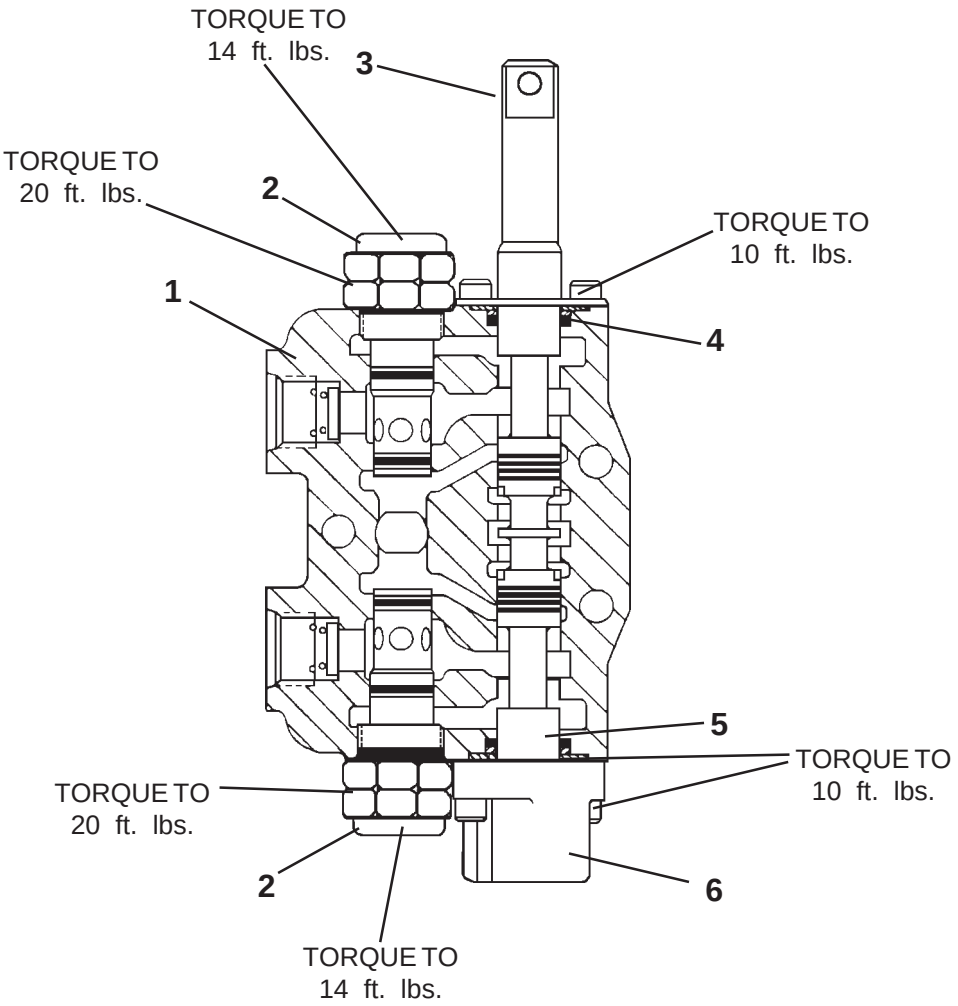
Items without part numbers are not sold separately.

Valve Section Seal Kit #4653 contains (3) Exhaust Passage O-Ring Seals and (2) Pressure Passage O-Ring Seals.

Complete Section Service Seal Kit #4719 includes ALL seals needed to service one complete valve section.

VALVE ASSEMBLY

GRESEN VALVE SECTION ASSEMBLY #45665
408 Swing Section



VALVE ASSEMBLY

GRESEN VALVE SECTION ASSEMBLY #45665
408 Swing Section

NO	REQ'D	PART NO.	DESCRIPTION
1	1		Valve Section Housing
2	2	45139	Cylinder Port Relief / Anti-Cav. Check Assembly @ 2250 PSI
3	1	45653	Spool Clevis Adapter
4	2	45652	Spool Seal Kit
5	1		Spool
6	1	45282	Spool Positioner Assembly

INCLUDED IN VALVE ASSEMBLY BUT NOT IN VALVE SECTION

	2	45633	Restrictor with Spring - .076 Dia. Orifice

NOTES:

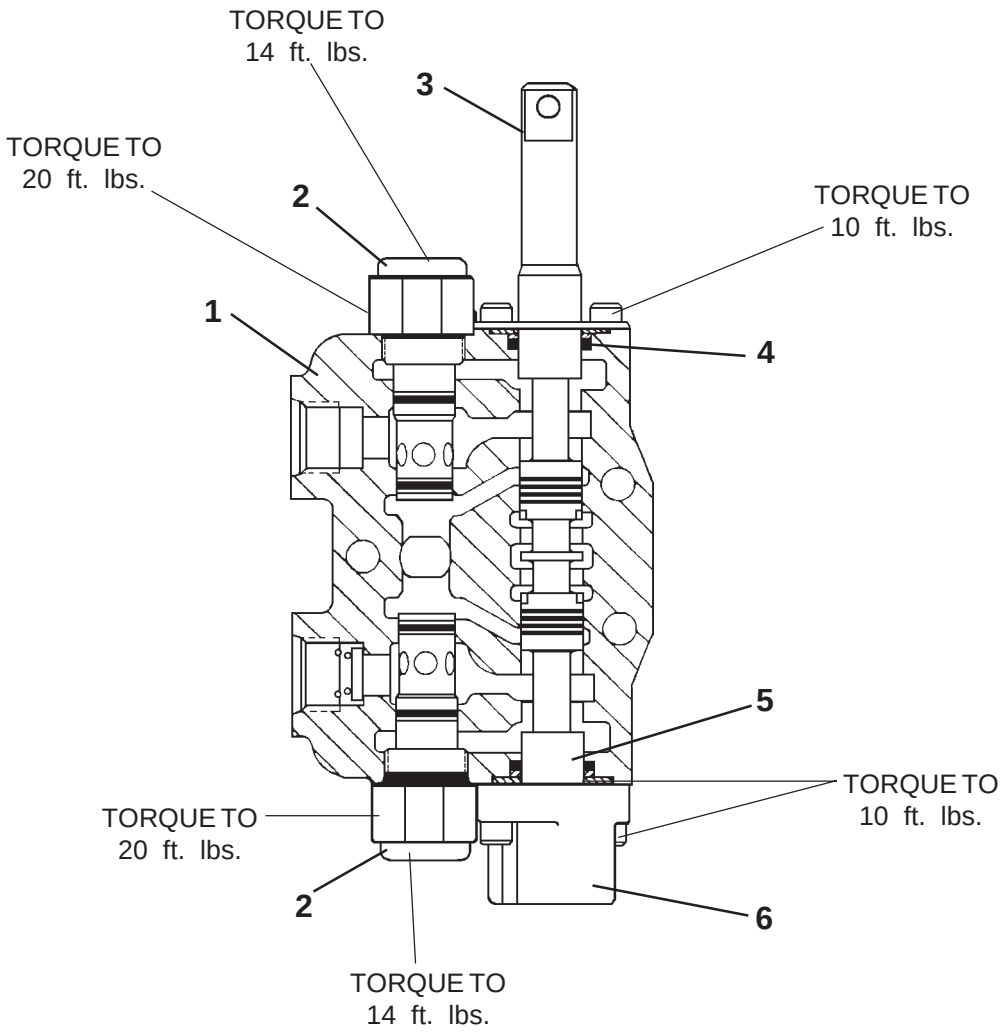
Items without part numbers are not sold separately.

Valve Section Seal Kit #4653 contains (3) Exhaust Passage O-Ring Seals and (2) Pressure Passage O-Ring Seals.

Complete Section Service Seal Kit #4719 includes ALL seals needed to service one complete valve section.

VALVE ASSEMBLY

GRESEN VALVE SECTION ASSEMBLY #45651
408 Boom Section



VALVE ASSEMBLY

GRESEN VALVE SECTION ASSEMBLY #45651
408 Boom Section

NO	REQ'D	PART NO.	DESCRIPTION
1	1		Valve Section Housing
2	2	45667	Cylinder Port Relief Assembly @ 2500 PSI
3	1	45653	Spool Clevis Adapter
4	2	45652	Spool Seal Kit
5	1		Spool
6	1	45282	Spool Positioner Assembly

INCLUDED IN VALVE ASSEMBLY BUT NOT IN VALVE SECTION

1	45546	Restrictor with Spring - .095 Dia. Orifice (Used in 408 Boom Section - Top Port)
1	45643	Restrictor with Spring - .109 Dia. Orifice (Used in 408 Boom Section - Bottom Port)

NOTES:

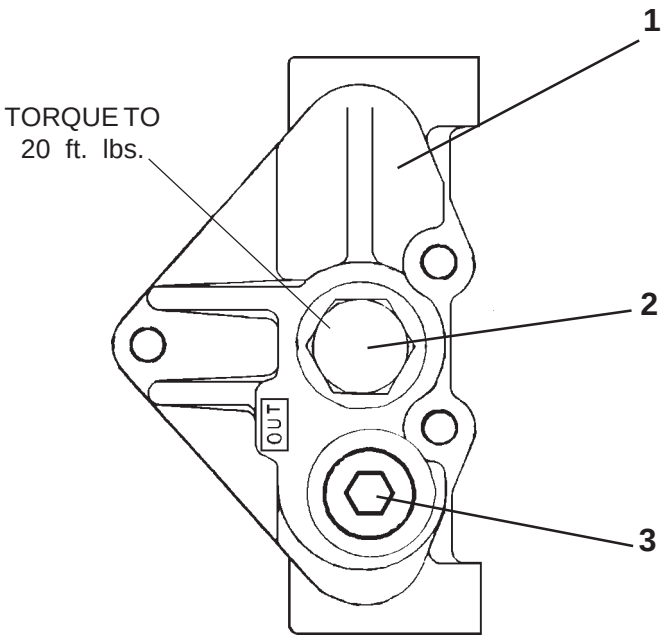
Items without part numbers are not sold separately.

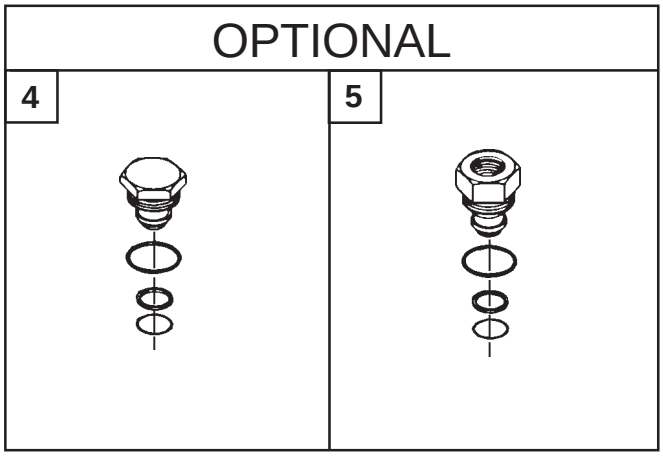
Valve Section Seal Kit #4653 contains (3) Exhaust Passage O-Ring Seals and (2) Pressure Passage O-Ring Seals.

Complete Section Service Seal Kit #4719 includes ALL seals needed to service one complete valve section7

VALVE ASSEMBLY

GRESEN OUTLET COVER





TORQUE TO 20 ft. lbs.

6955
5-20-96

VALVE ASSEMBLY

GRESEN OUTLET COVER

NO	REQ'D	PART NO.	DESCRIPTION
1	1	4690	Outlet Cover
2	1	4691	Open Center Plug Assembly (Includes Open Center Plug & Main O-Ring Seal #4693)
3	1	3234	Plug

OPTIONAL

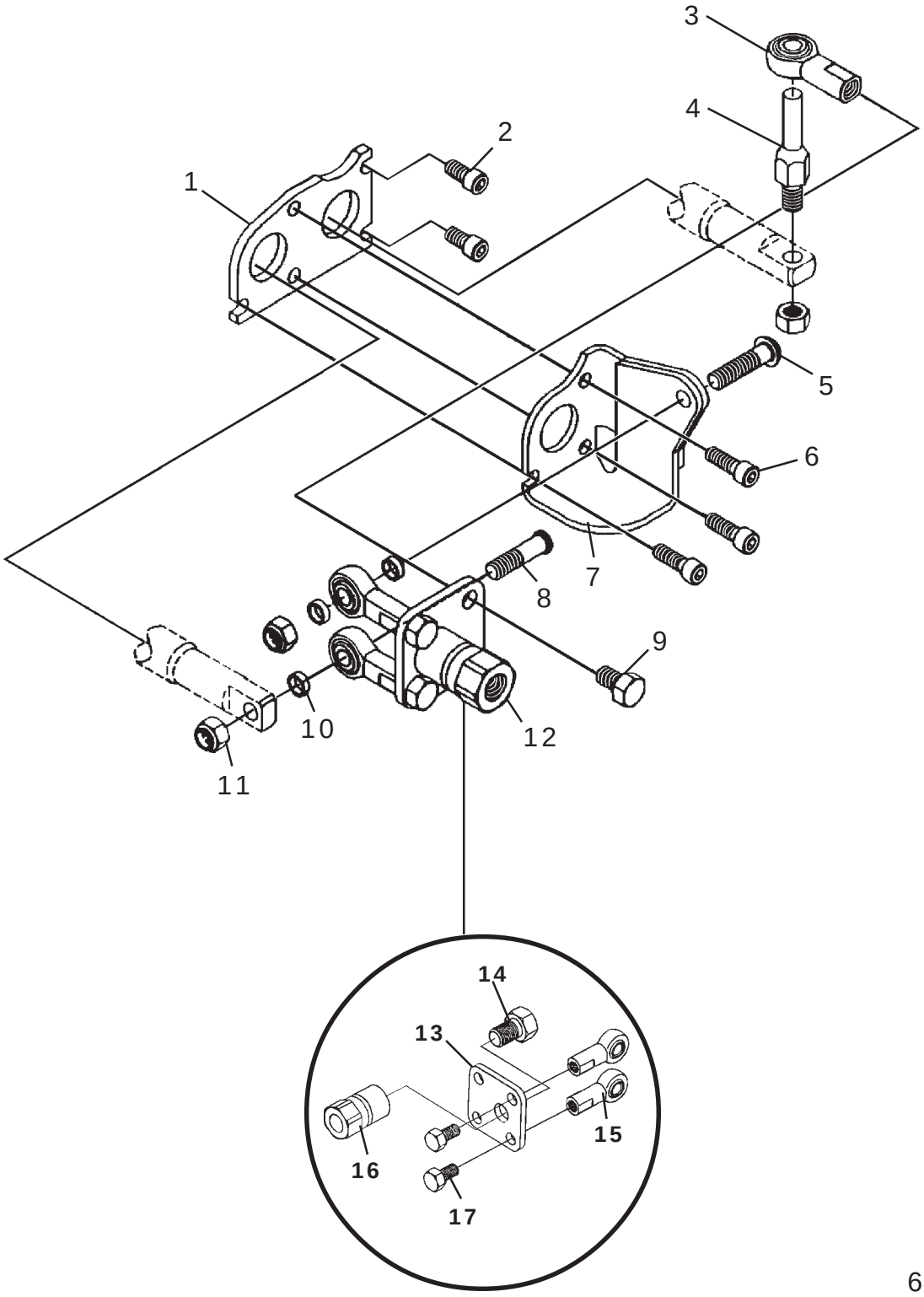
4	-	6977	Closed Center Plug Assembly (Includes Main O-Ring Seal #4693)
5	-	4698	Power Beyond Sleeve Assembly (Includes Main O-Ring Seal #4693)

NOTES:

Valve Section Seal Kit #4653 contains (3) Exhaust Passage O-Ring Seals and (2) Pressure Passage O-Ring Seals.

VALVE ASSEMBLY

LEFT MECHANICAL JOYSTICK ASSEMBLY #45655
RIGHT MECHANICAL JOYSTICK ASSEMBLY #45656



6959
5-16-96

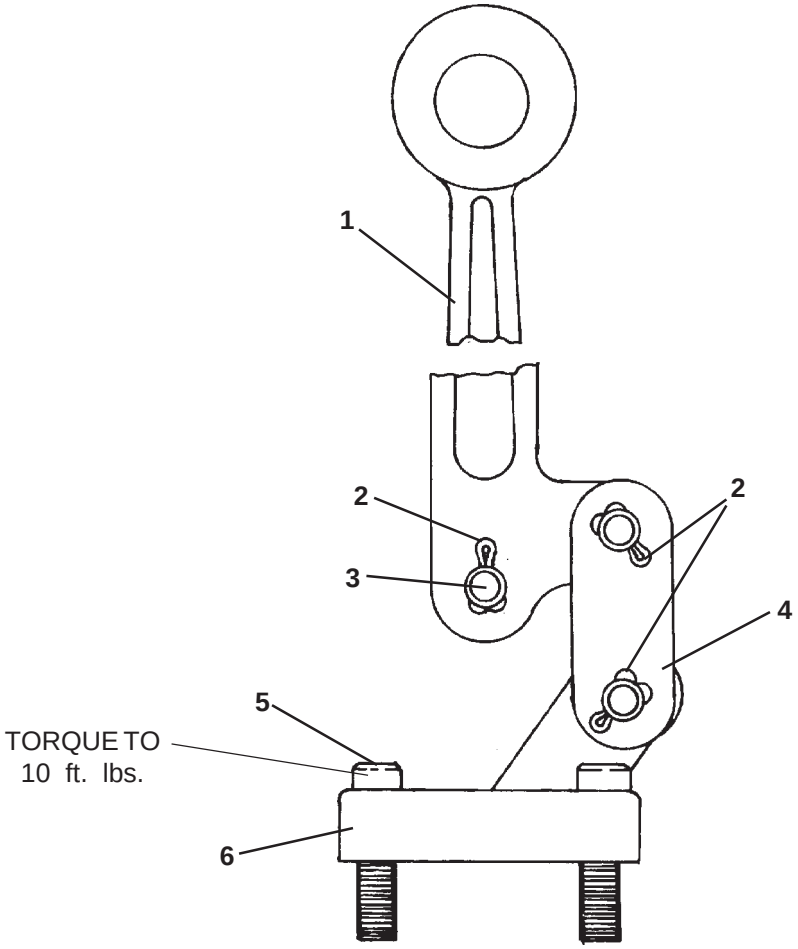
VALVE ASSEMBLY

LEFT MECHANICAL JOYSTICK ASSEMBLY #45655
RIGHT MECHANICAL JOYSTICK ASSEMBLY #45656

NO	REQ'D	PART NO.	DESCRIPTION
1	1	45657	Mounting Plate
2	2	1943	Screw
3	1	45664	Rod End
4	1	45662	Mechanical Slide
5	1	1945	Screw
6	3	1944	Screw
7	1	45658	Bracket - Left
	1	45659	Bracket - Right
8	1	45661	Rod End Stud
9	1	1271	Screw
10	3	45660	Spacer
11	3	1942	Lock Nut
12	1	45663	Handle Plate Assembly (Includes Items #13 through #17)
13	1	45671	Mechanical Joystick Plate
14	1	1087	Screw
15	2	45664	Female Rod End
16	1	45672	Handle Adapter
17	2	1271	Screw

VALVE ASSEMBLY

Horizontal Handle and Bracket
Assembly #45586



VALVE ASSEMBLY

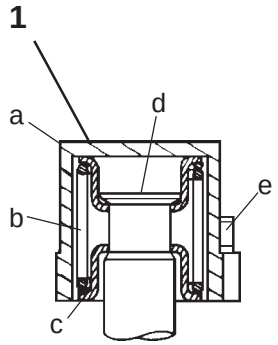
Horizontal Handle and Bracket
Assembly #45586

NO	REQ'D	PART NO.	DESCRIPTION
1	1	*	Handle
2	3	*	Cotter Pin
3	1	*	Pin
4	1	*	Link
	1	*	Link Plate
5	2	*	Screw
6	1	*	Bracket

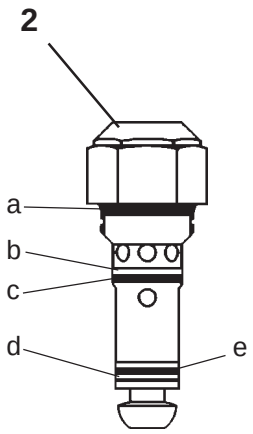
*** NOTE: All parts marked with an asterisk (*) are included in Horizontal Handle and Bracket Assembly #45586. Parts are not sold separately.**

VALVE ASSEMBLY

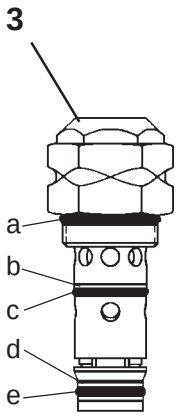
GRESEN VALVE SERVICE PARTS



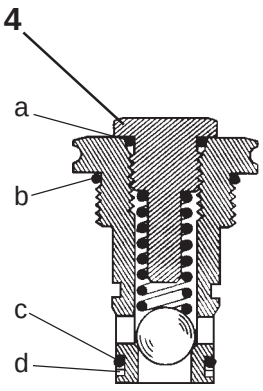
Spool Positioner Assembly



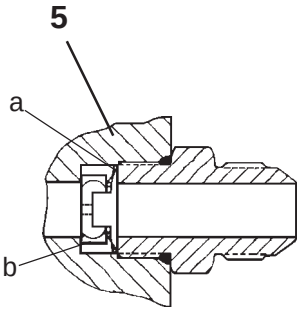
Cylinder Port Relief Assembly



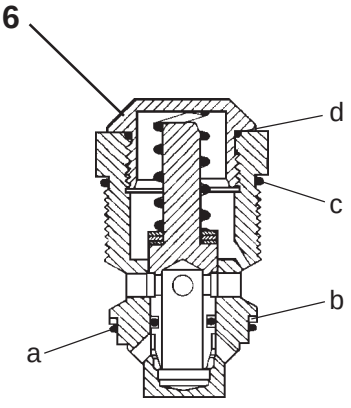
Cylinder Port Relief/Anti Cav. Check Assembly



Lockout Check Assembly



Port Restrictor and Spring Assembly



WH Main Relief Valve Assembly

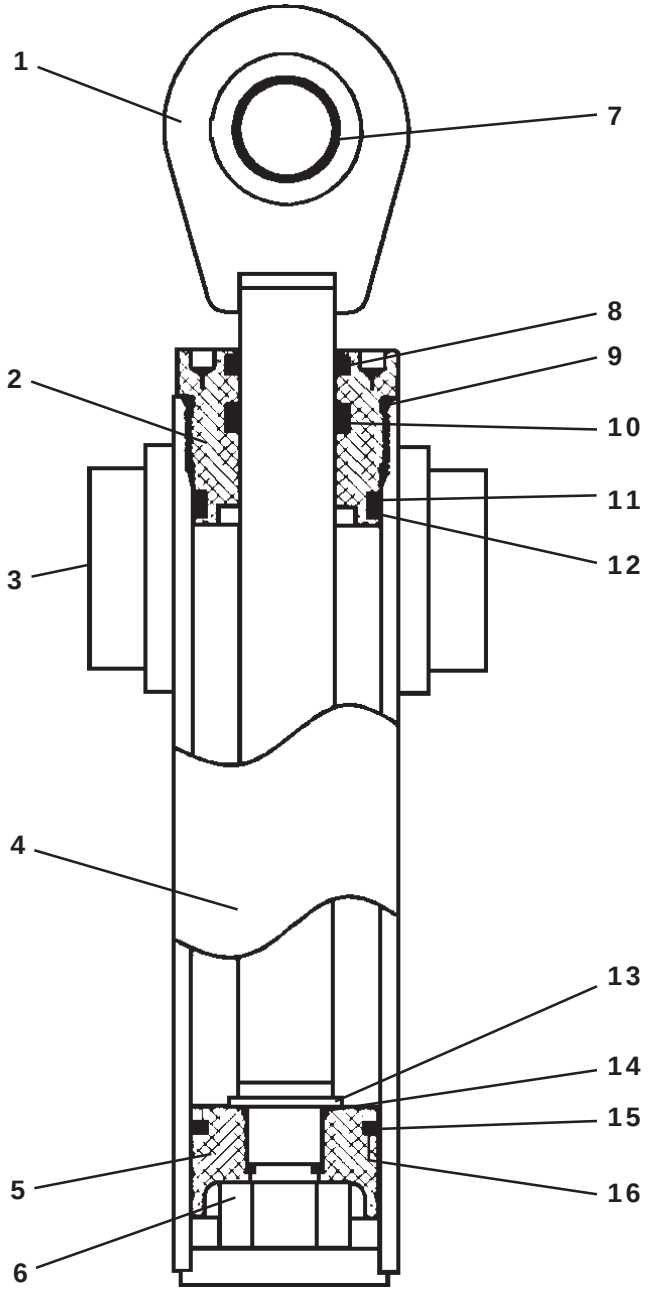
VALVE ASSEMBLY

GRESEN VALVE SERVICE PARTS

NO	PART NO.	DESCRIPTION
1	45282	Spool Positioner Assembly
		a Bonnet
		b Spring
		c Spring Collar
		d Spool Spud
		e Screw
2	45667	Cylinder Port Relief Assembly @ 2500 PSI
		(Due to close tolerances only the seals may be serviced in the field.)
	4822	**Seal Kit**
		a O-Ring Seal
		b Backup Ring
		c O-Ring Seal
		d Backup Ring
		e O-Ring Seal
3	45139	Relief/Anti-Cav. Check Assembly @ 2250 PSI
		(Due to close tolerances only the seals may be serviced in the field.)
	4822	**Seal Kit**
		a O-Ring Seal
		b Backup Ring
		c O-Ring Seal
		d Backup Ring
		e O-Ring Seal
4	4819	Lockout Check Assembly
		(Due to close tolerances only the seals may be serviced in the field.)
	4829	**Seal Kit**
		a O-Ring Seal
		b Backup Ring
		c O-Ring Seal
		d Backup Ring
5	45633	Port Restrictor Assembly .076 Dia. Orifice
	45643	Port Restrictor Assembly .109 Dia. Orifice
		a Spring
		b Orifice Plate
6	45148	WH Main Relief Valve Assembly @ 2250 PSI
		(Due to close tolerances only the seals may be serviced in the field.)
	45142	**Seal Kit**
		a O-Ring Seal
		b Backup Ring
		c O-Ring Seal
		d O-Ring Seal

CYLINDER ASSEMBLY

SWING CYLINDER ASSEMBLY #81827



CYLINDER ASSEMBLY

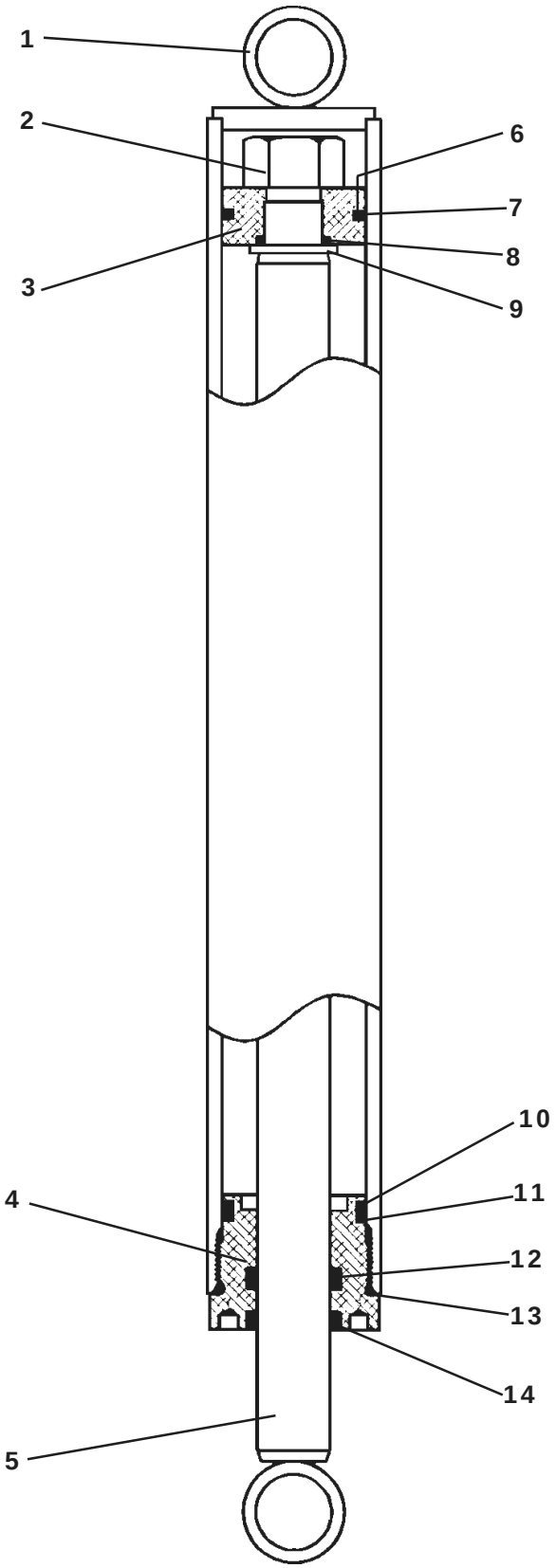
SWING CYLINDER ASSEMBLY #81827

NO	REQ'D	PART NO.	DESCRIPTION
1	1	81024	Cylinder Rod
2	1	77458	Cylinder Gland
3	2	82441	Needle Bearing
4	1	81960	Cylinder Tube
5	1	81963	Piston
6	1	1483	Hex Nut
7	1	62523	Self Aligning Bushing
8	1	45389*	Rod Wiper
9	1	45250*	O'Ring
10	1	45219*	Poly Pak Seal
11	1	4510*	Back-Up Ring
12	1	4509*	O'Ring
13	1	5421	Washer
14	1	4641*	O'Ring
15	1	4644*	Piston Ring
16	1	4645*	O'Ring

NOTE: Seal Kit #45617 Includes all parts marked with an asterisk (*). Parts are not sold separately.

CYLINDER ASSEMBLY

STABILIZER CYLINDER ASSEMBLY #83397



6698
12-4-95

CYLINDER ASSEMBLY

STABILIZER CYLINDER ASSEMBLY #83397
(1.25" DIAMETER CYLINDER ROD)

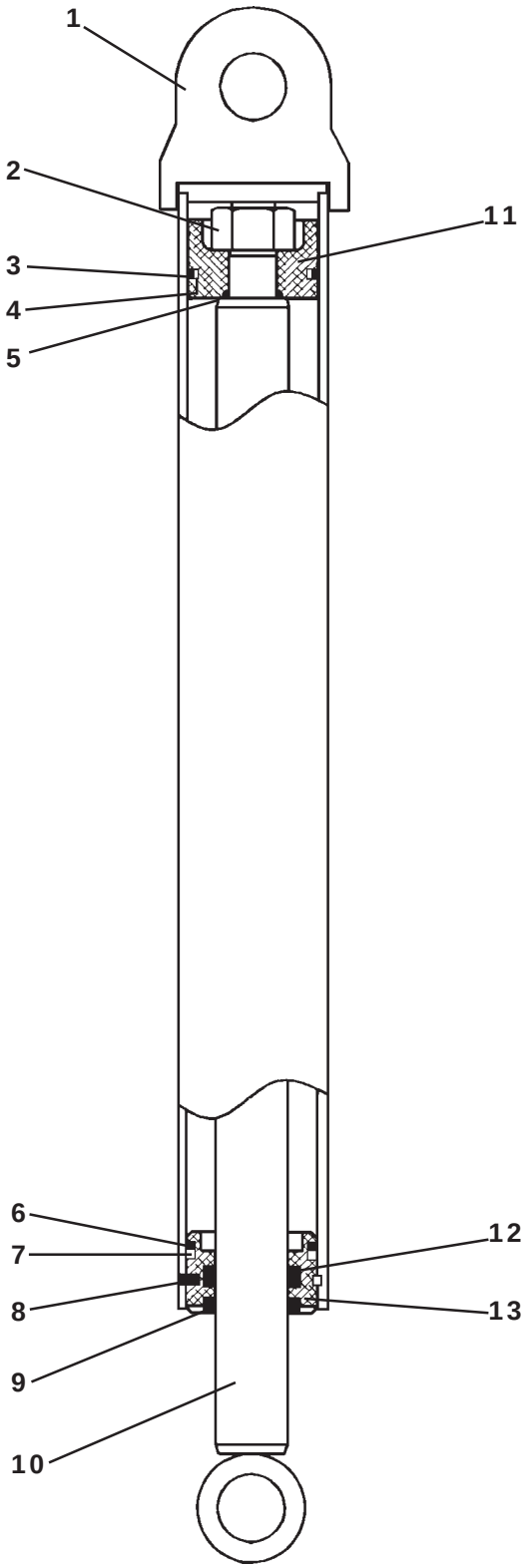
NO	REQ'D	PART NO.	DESCRIPTION
1	1	83398	Cylinder Tube
2	1	1483	Hex Nut
3	1	50252	Piston
4	1	77458	Cylinder Gland
5	1	83399	Cylinder Rod
6	1	4645*	O'Ring
7	1	4644*	Piston Ring
8	1	4641*	O'Ring
9	1	5421	Washer
10	1	4509*	O'Ring
11	1	4510*	Back-Up Ring
12	1	45219*	Poly Pak Seal
13	1	45250*	O'Ring
14	1	45389*	Rod Wiper

NOTE: Seal Kit #45617 includes all parts marked with an asterisk (*). Parts are not sold separately.

CYLINDER ASSEMBLY

BOOM CYLINDER ASSEMBLY #85663

SERIAL #8408AX973 AND UP



CYLINDER ASSEMBLY

BOOM CYLINDER ASSEMBLY #85663

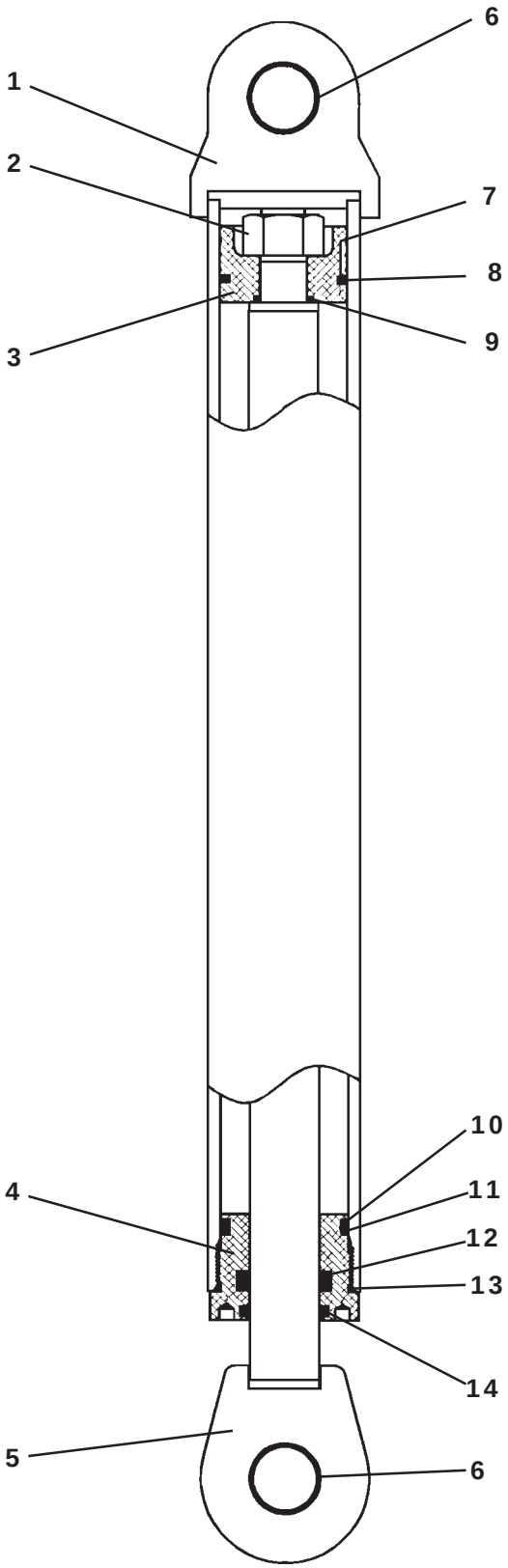
SERIAL #8408AX973 AND UP

NO	REQ'D	PART NO.	DESCRIPTION
1	1	85664	Cylinder Tube
2	1	1483	Hex Nut
3	1	45250*	O'Ring
4	1	45251*	Piston Ring
5	1	4641*	O'Ring
6	1	45248*	O'Ring
7	1	45249*	Back-Up Washer
8	1	65465*	Gland Retaining Rod
9	1	4914*	Rod Wiper
10	1	85666	Cylinder Rod
11	1	82857	Piston
12	1	45225*	Poly-Pak Seal
13	1	85645	Cylinder Gland

NOTE: Seal Kit #45747 includes all parts marked with an asterisk (*). Parts are not sold separately.

CYLINDER ASSEMBLY

BOOM CYLINDER ASSEMBLY #81611



6694
12-4-95

CYLINDER ASSEMBLY

BOOM CYLINDER ASSEMBLY #81611

NO	REQ'D	PART NO.	DESCRIPTION
1	1	81612	Cylinder Tube
2	1	1483	Hex Nut
3	1	82857	Piston
4	1	82449	Cylinder Gland
5	1	82450	Cylinder Rod
6	2	6615	Self Aligning Bushing
7	1	45250*	O'Ring
8	1	45251*	Piston Ring
9	1	4641*	O'Ring
10	1	45557*	O'Ring
11	1	45249*	Back-Up Ring
12	1	45225*	Poly Pak Seal
13	1	4570*	O'Ring
14	1	45372*	Rod Wiper

NOTE: Seal Kit #45618 includes all parts marked with an asterisk (*). Parts are not sold separately.

CYLINDER ASSEMBLY

DIPPER CYLINDER ASSEMBLY #85672

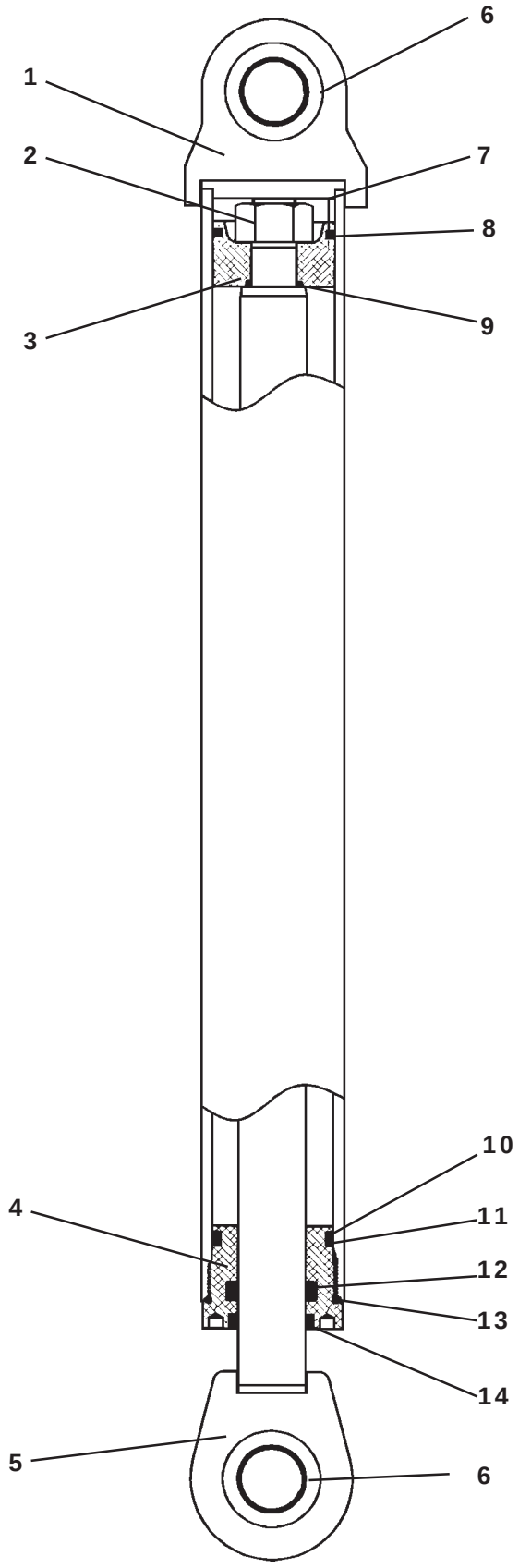
SERIAL #8408AX973 AND UP

NO	REQ'D	PART NO.	DESCRIPTION
1	1	85673	Cylinder Tube
2	1	1483	Hex Nut
3	1	45250*	O'Ring
4	1	45251*	Piston Ring
5	1	4641*	O'Ring
6	1	45248*	O'Ring
7	1	45249*	Back-Up Washer
8	1	65465*	Gland Retaining Rod
9	1	4914*	Rod Wiper
10	1	85675	Cylinder Rod
11	1	83113	Piston
12	1	45225*	Poly-Pak Seal
13	1	85645	Cylinder Gland

NOTE: Seal Kit #45747 includes all parts marked with an asterisk (*). Parts are not sold separately.

CYLINDER ASSEMBLY

DIPPER CYLINDER ASSEMBLY #81641



6696
12-4-95

CYLINDER ASSEMBLY

DIPPER CYLINDER ASSEMBLY #81641

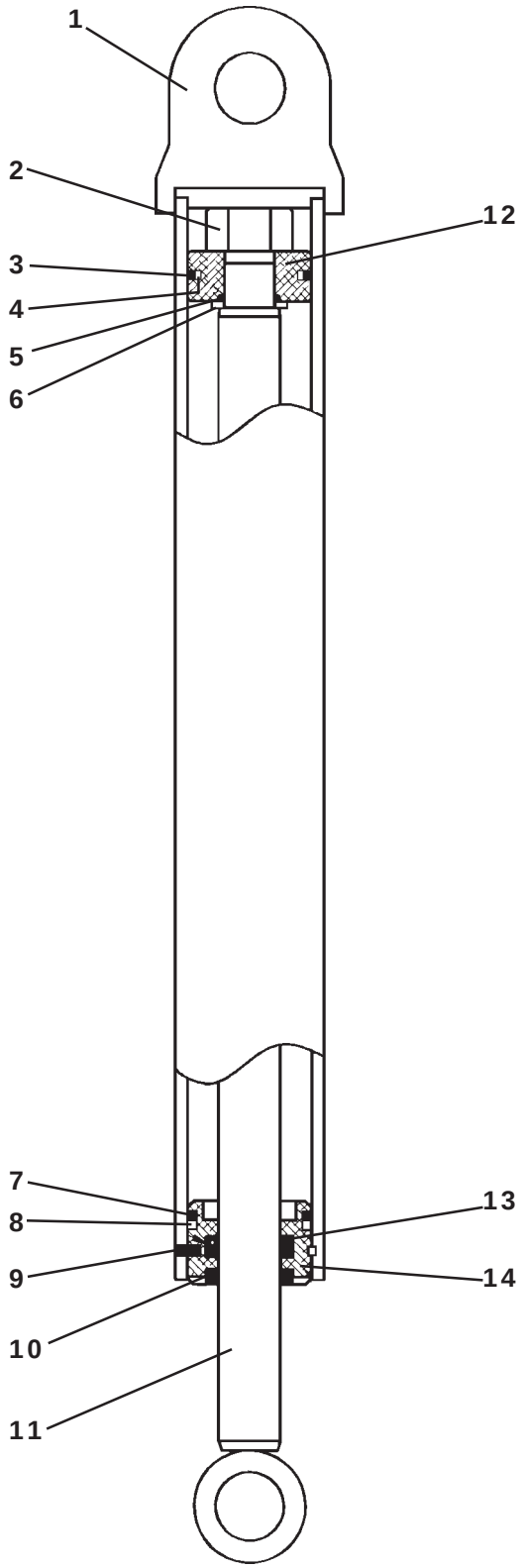
NO	REQ'D	PART NO.	DESCRIPTION
1	1	81642	Cylinder Tube
2	1	1483	Hex Nut
3	1	83113	Piston
4	1	82449	Cylinder Gland
5	1	81643	Cylinder Rod
6	2	6615	Self Aligning Bushing
7	1	45250*	O'Ring
8	1	45251*	Piston Ring
9	1	4641*	O'Ring
10	1	45557*	O'Ring
11	1	45249*	Back-Up Ring
12	1	45225*	Poly Pak Seal
13	1	4570*	O'Ring
14	1	45372*	Rod Wiper

NOTE: Seal Kit #45618 includes all parts marked with an asterisk (*). Parts are not sold separately.

CYLINDER ASSEMBLY

BUCKET CYLINDER ASSEMBLY #85677

SERIAL #8408AX973 AND UP



7473
6-9-98

CYLINDER ASSEMBLY

BUCKET CYLINDER ASSEMBLY #85677

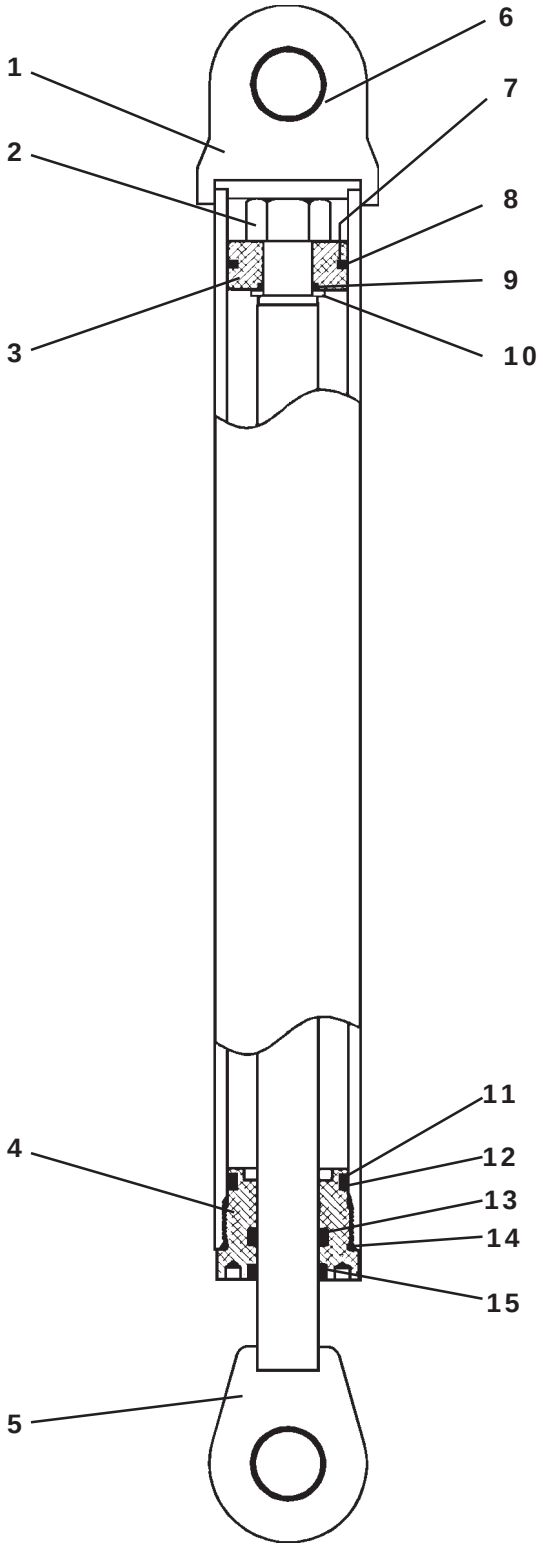
SERIAL #8408AX973 AND UP

NO	REQ'D	PART NO.	DESCRIPTION
1	1	85678	Cylinder Tube
2	1	1483	Hex Nut
3	1	4644*	Piston Ring
4	1	4645*	O'Ring
5	1	4641*	O'Ring
6	1	5421	Spacer
7	1	4509*	O'Ring
8	1	4510*	Back-Up Washer
9	1	7165*	Gland Retaining Rod
10	1	4974*	Rod Wiper
11	1	85680	Cylinder Rod
12	1	50252	Piston
13	1	45219*	Poly-Pak Seal
14	1	62770	Cylinder Gland

NOTE: Seal Kit #45258 includes all parts marked with as asterisk (*). Parts are not sold separately.

CYLINDER ASSEMBLY

BUCKET CYLINDER ASSEMBLY #81634



6690
12-4-95

CYLINDER ASSEMBLY

BUCKET CYLINDER ASSEMBLY #81634

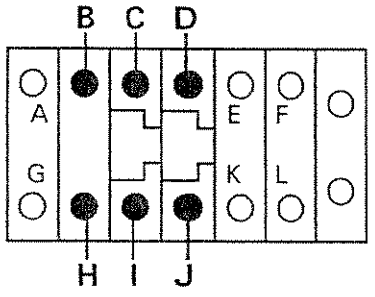
NO	REQ'D	PART NO.	DESCRIPTION
1	1	81635	Cylinder Tube
2	1	1483	Hex Nut
3	1	50252	Piston
4	1	77458	Cylinder Gland
5	1	81636	Cylinder Rod
6	2	6615	Self Aligning Bushing
7	1	4645*	O'Ring
8	1	4644*	Piston Ring
9	1	4641*	O'Ring
10	1	5421	Washer
11	1	4509*	O'Ring
12	1	4510*	Back-Up Ring
13	1	45219*	Poly Pak Seal
14	1	45250*	O'Ring
15	1	45389*	Rod Wiper

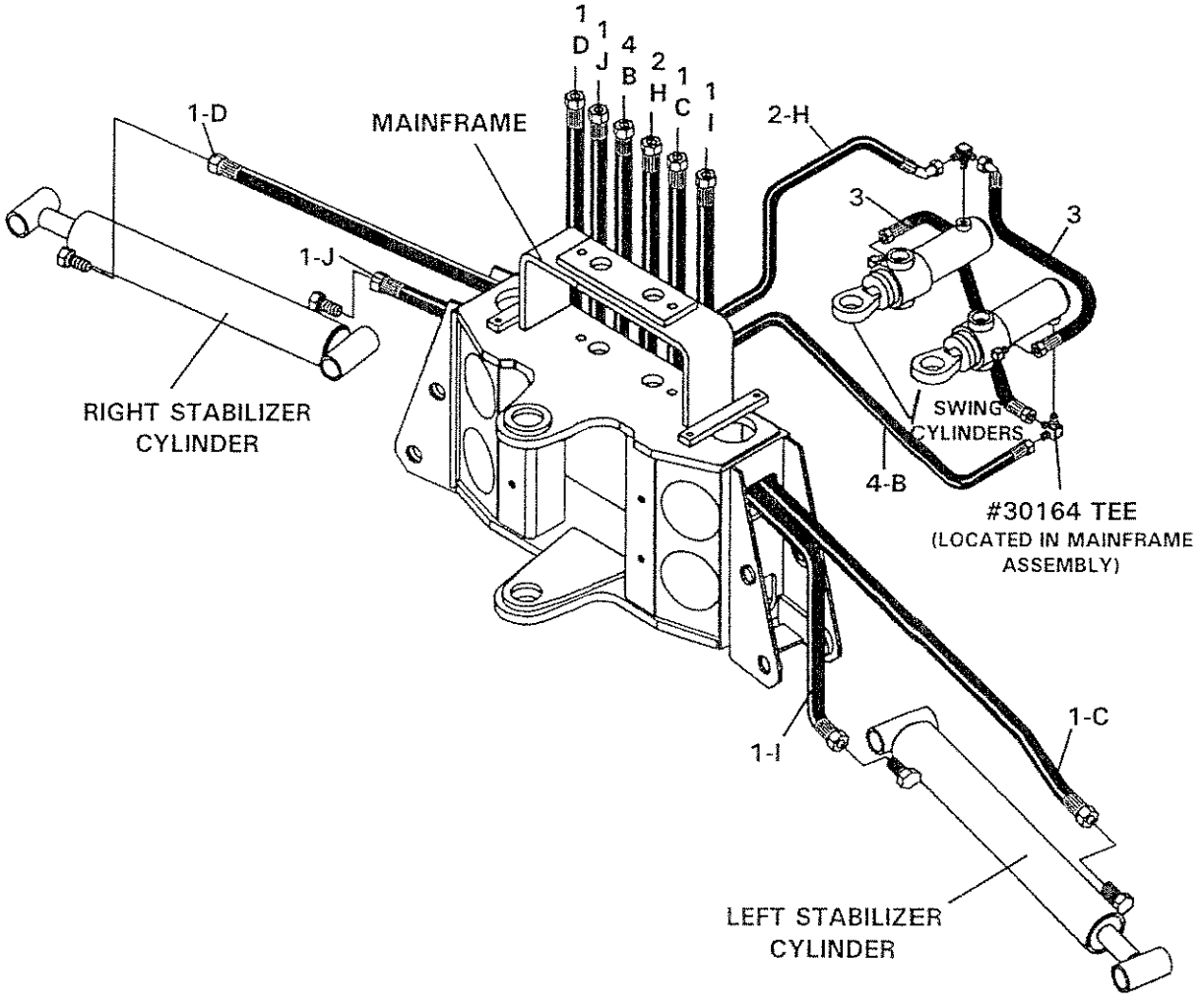
NOTE: Seal Kit #45617 includes all parts marked with an asterisk (*). Parts are not sold separately.

MAINFRAME HOSE SET

ASSEMBLY #83408
408A BACKHOE SN #11870 & UP
509A BACKHOE SN #11640 & UP

HYDRAULIC CONTROL VALVE





7960
12-17-99

MAINFRAME HOSE SET

ASSEMBLY #83408
408A BACKHOE SN #11870 & UP
509A BACKHOE SN #11640 & UP

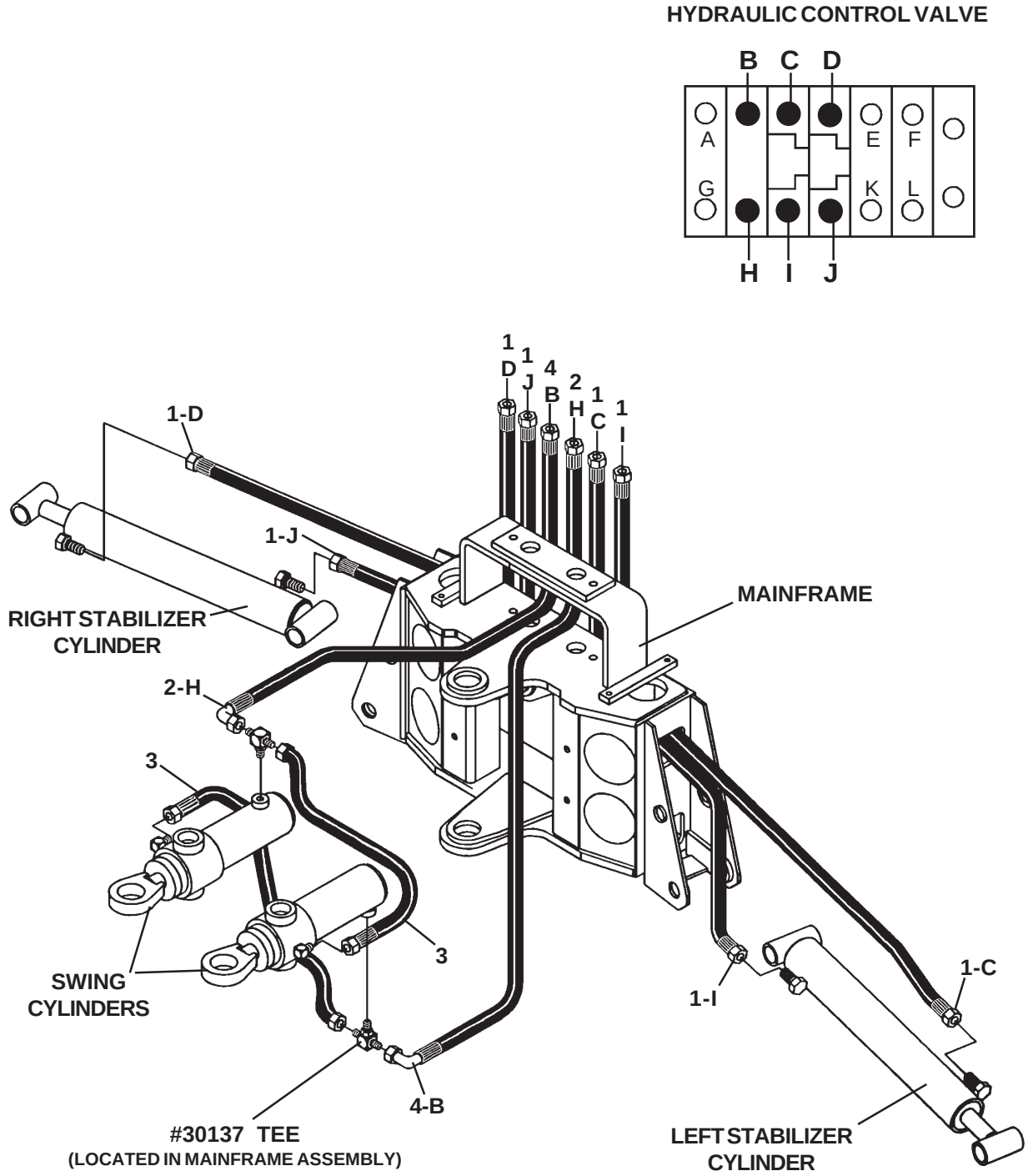
NO	REQ'D	PART NO.	DESCRIPTION
1	4	37675	Hose Assembly .25" X 56" 6FJX-6FJX
2	1	37700	Hose Assembly .25" X 12" 6FJX-6FJX 45° Gooseneck
3	2	37552	Hose Assembly .25" X 14.50" 6FJX-6FJX
4	1	37699	Hose Assembly .25" X 17" 6FJX-6FJX

NOTE: Letters on the hose set diagram show the hydaulic hose routing between the backhoe control valve and the various hydraulic cylinders. Simply match the letter on the control valve port to the same letter on the hydraulic hose ends. Example: Hose Assembly labeled "C" runs from the upper Left Stabilizer port on the hydraulic control valve - through the main-frame and to the barrel end fitting on the left stabilizer cylinder.

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.

MAINFRAME HOSE SET

ASSEMBLY #83408
408A BACKHOE UP TO SERIAL #11870
509A BACKHOE UP TO SERIAL #11640



MAINFRAME HOSE SET

ASSEMBLY #83408
408A BACKHOE UP TO SERIAL #11870
509A BACKHOE UP TO SERIAL #11640

NO	REQ'D	PART NO.	DESCRIPTION
1	4	37675	Hose Assembly .25" X 56" 6FJX-6FJX
2	1	37522	Hose Assembly .25" X 16.35" 6FJX-6FJX 90° Gooseneck
3	2	37552	Hose Assembly .25" X 14.50" 6FJX-6FJX
4	1	37644	Hose Assembly .25" X 17.50" 6FJX-6FJX 90° Gooseneck

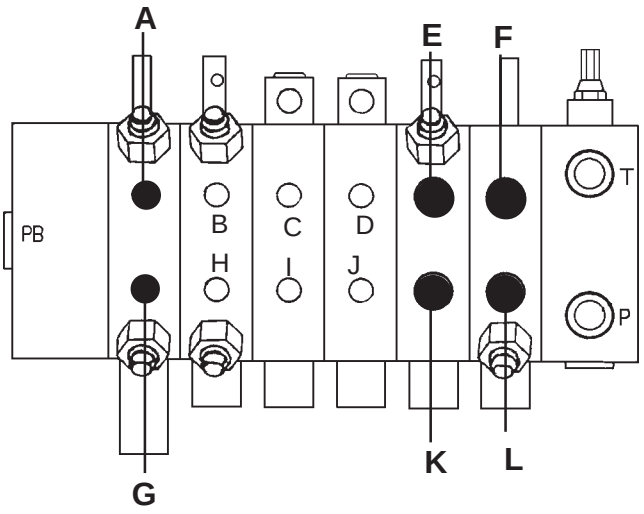
NOTE: Letters on the hose set diagram show the hydaulic hose routing between the backhoe control valve and the various hydraulic cylinders. Simply match the letter on the control valve port to the same letter on the hydraulic hose ends. Example: Hose Assembly labeled "C" runs from the upper Left Stabilizer port on the hydraulic control valve - through the mainframe and to the barrel end fitting on the left stabilizer cylinder.

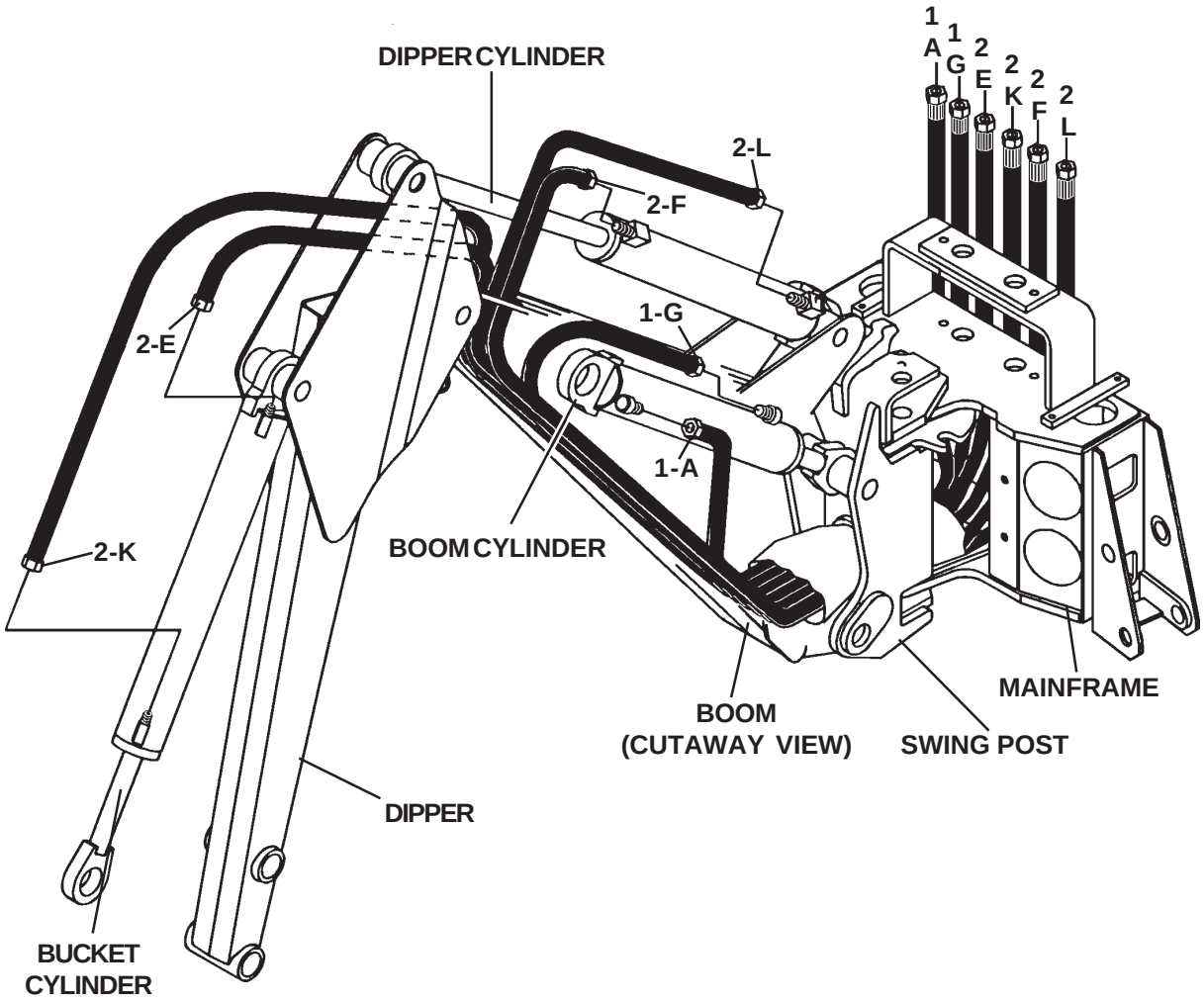
NOTE: The fittings on the hydraulic cylinders have been altered for clarity purposes. This will assist you in distinguishing between the rod end and the barrel end of the various hydraulic cylinders.

BOOM & DIPPER HOSE SET

(HIDROIRMA VALVE) ASSEMBLY #85918

HIIDROIRMA HYDRAULIC CONTROL VALVE





7467
6-8-98

BOOM & DIPPER HOSE SET

(HIDROIRMA VALVE) ASSEMBLY #85918

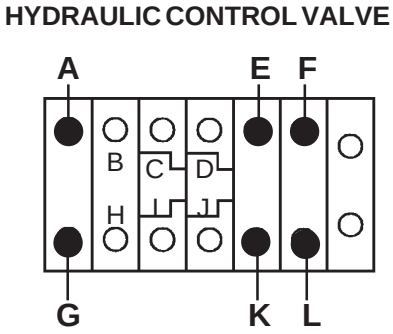
NO	REQ'D	PART NO.	DESCRIPTION
1	2	37669	Hose Assembly .38" X 82" 6FJX-6FJX
2	4	37670	Hose Assembly .38" X 131" 6FJX-6FJX

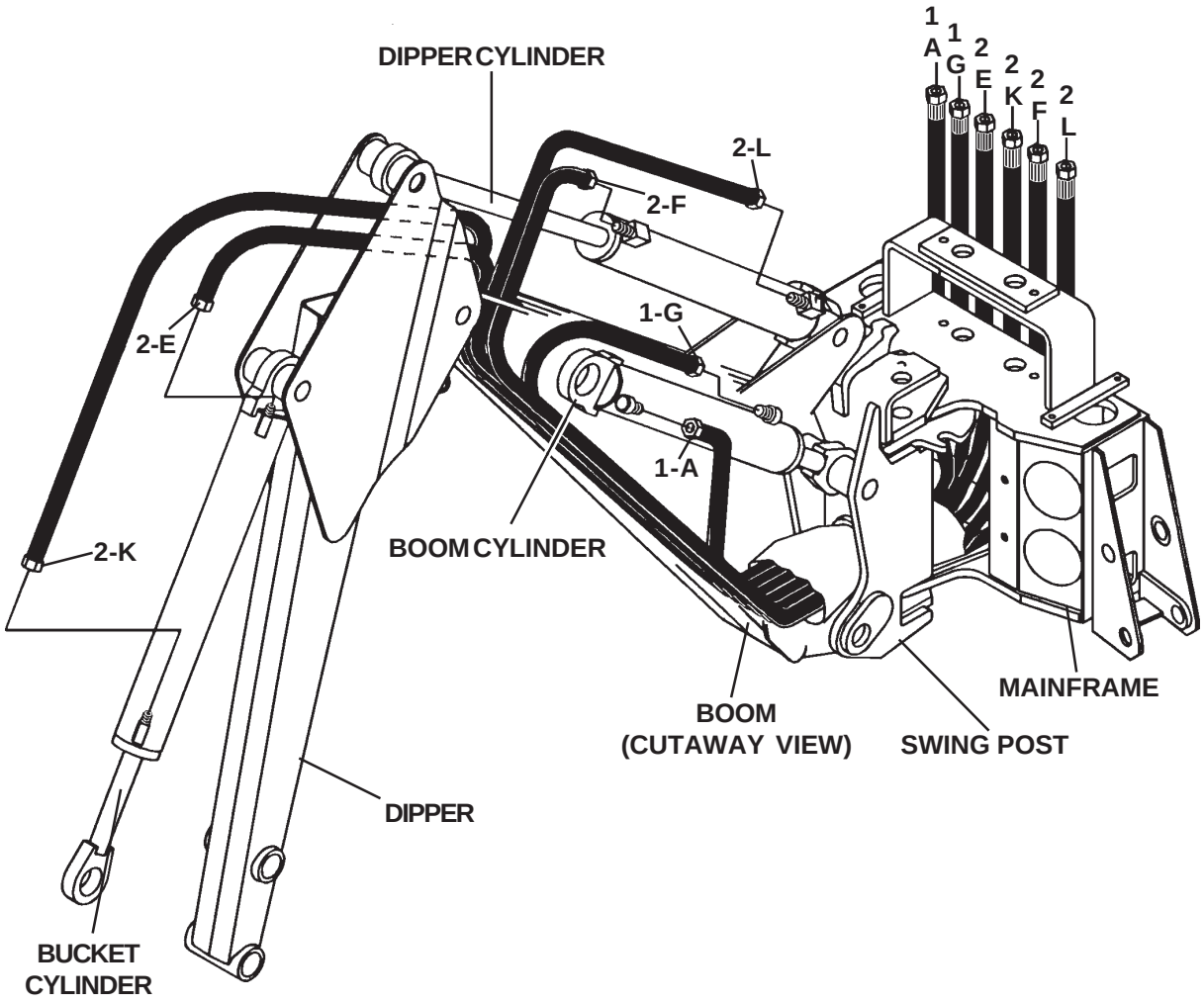
NOTE: Letters on the hose set diagram show the hydaulic hose routing between the backhoe control valve and the various hydraulic cylinders. Simply match the letter on the control valve port to the same letter on the hydraulic hose ends. Example: Hose Assembly labeled "G" runs from the lower Boom port on the hydraulic control valve - through the mainframe and swing post and to the rod end of the boom cylinder.

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.

BOOM & DIPPER HOSE SET

ASSEMBLY #81877





6708
9-21-98-2

BOOM & DIPPER HOSE SET

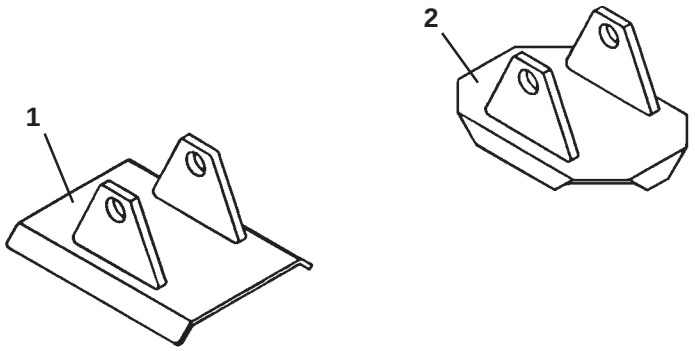
ASSEMBLY #81877

NO	REQ'D	PART NO.	DESCRIPTION
1	2	37523	Hose Assembly .38" X 80" 6FJX-6FJX
2	4	37524	Hose Assembly .38" X 129" 6FJX-6FJX

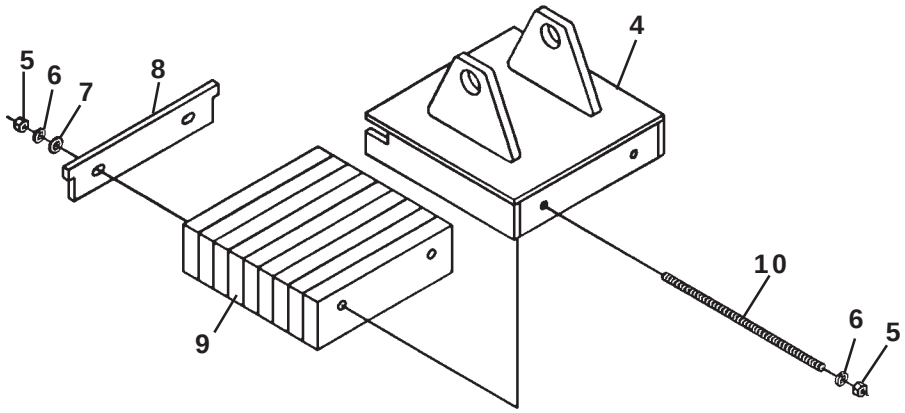
NOTE: Letters on the hose set diagram show the hydaulic hose routing between the backhoe control valve and the various hydraulic cylinders. Simply match the letter on the control valve port to the same letter on the hydraulic hose ends. Example: Hose Assembly labeled "G" runs from the lower Boom port on the hydraulic control valve - through the mainframe and swing post and to the rod end of the boom cylinder.

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.

STABILIZER PADS



3

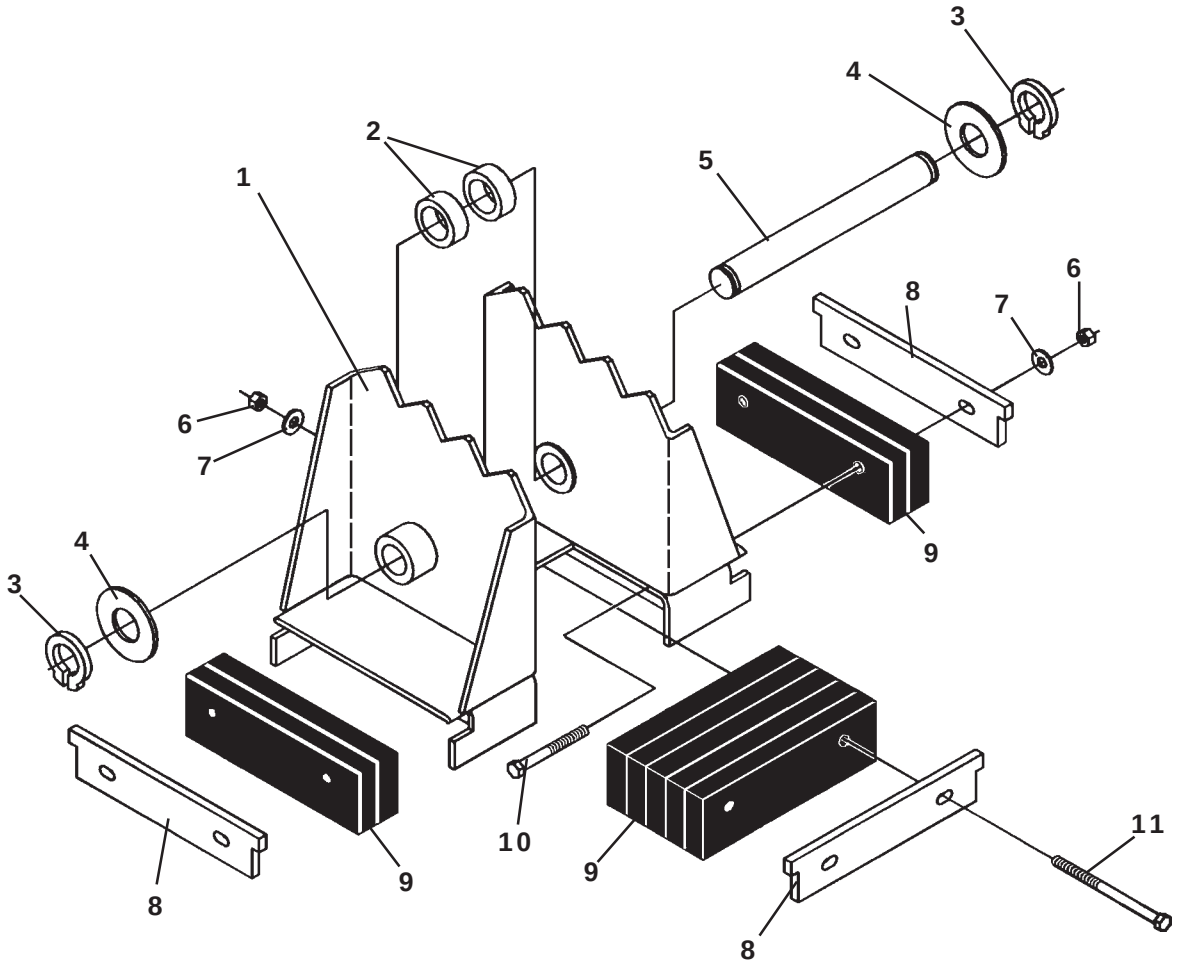


STABILIZER PADS

NO	REQ'D	PART NO.	DESCRIPTION
			FLAT STABILIZER PAD ASSEMBLY - #81861
1	2	81865	Flat Stabilizer Pad
			GROUSER STABILIZER PAD ASSEMBLY - #81860
2	2	83421	Grouser Stabilizer Pad
			RUBBER STABILIZER PAD ASSEMBLY - #81862
3	2	83418	Rubber Stabilizer Pad Assembly (Includes Items 4 through 10)
4	1	83419	Stabilizer Pad
5	4	1226	.38" UNC Hex Nut
6	4	1503	.38" Lock Washer
7	2	1514	.38" Flat Washer
8	1	51190	Slide Plate
9	1	64412	Rubber Strip Bundle
10	2	1661	.38" UNC X 11.50" Readi Bolt

STABILIZER PADS

FLIP-OVER STABILIZER PAD ASSEMBLY #83091
(COMPLETE SET OF (2) FLIP-OVER PADS - ASSEMBLY #83058)



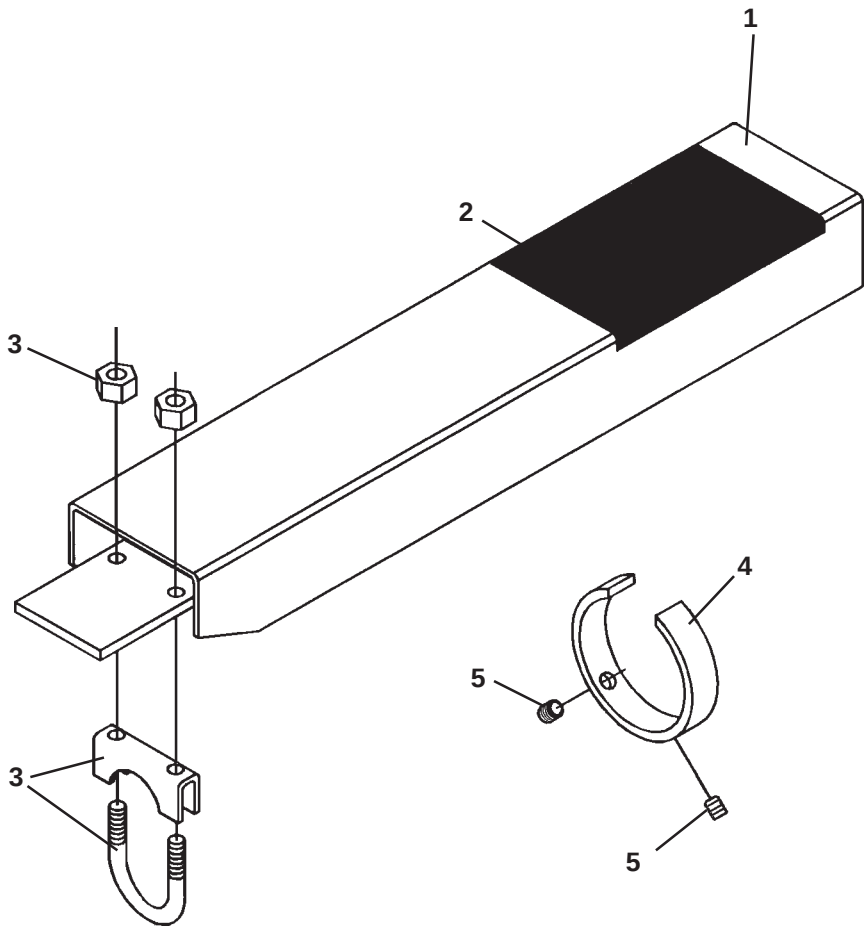
STABILIZER PADS

FLIP-OVER STABILIZER PAD ASSEMBLY #83091
(COMPLETE SET OF (2) FLIP-OVER PADS - ASSEMBLY #83058)

NO	REQ'D	PART NO.	DESCRIPTION
1	1	84496	Flip-Over Pad
2	2	84495	Spacer
3	2	1652	1.25" Snap Ring
4	VARIES	57693	Thrust Washer 1.25" X .078"
	VARIES	64727	Thrust Washer 1.25" X .125"
5	1	83096	Pin
6	6	1837	.38" UNC Hex Deformed Lock Nut
7	6	1514	.38" Flat Washer
8	3	51190	Slide Plate
9	1	64412	Rubber Strip Bundle
10	4	1053	.38" UNC X 3.50" Hex Capscrew
11	2	1057	.38" UNC X 5.00" Hex Capscrew

OPTIONAL STABILIZER CYLINDER COVER

STABILIZER CYLINDER COVER ASSEMBLY #83850

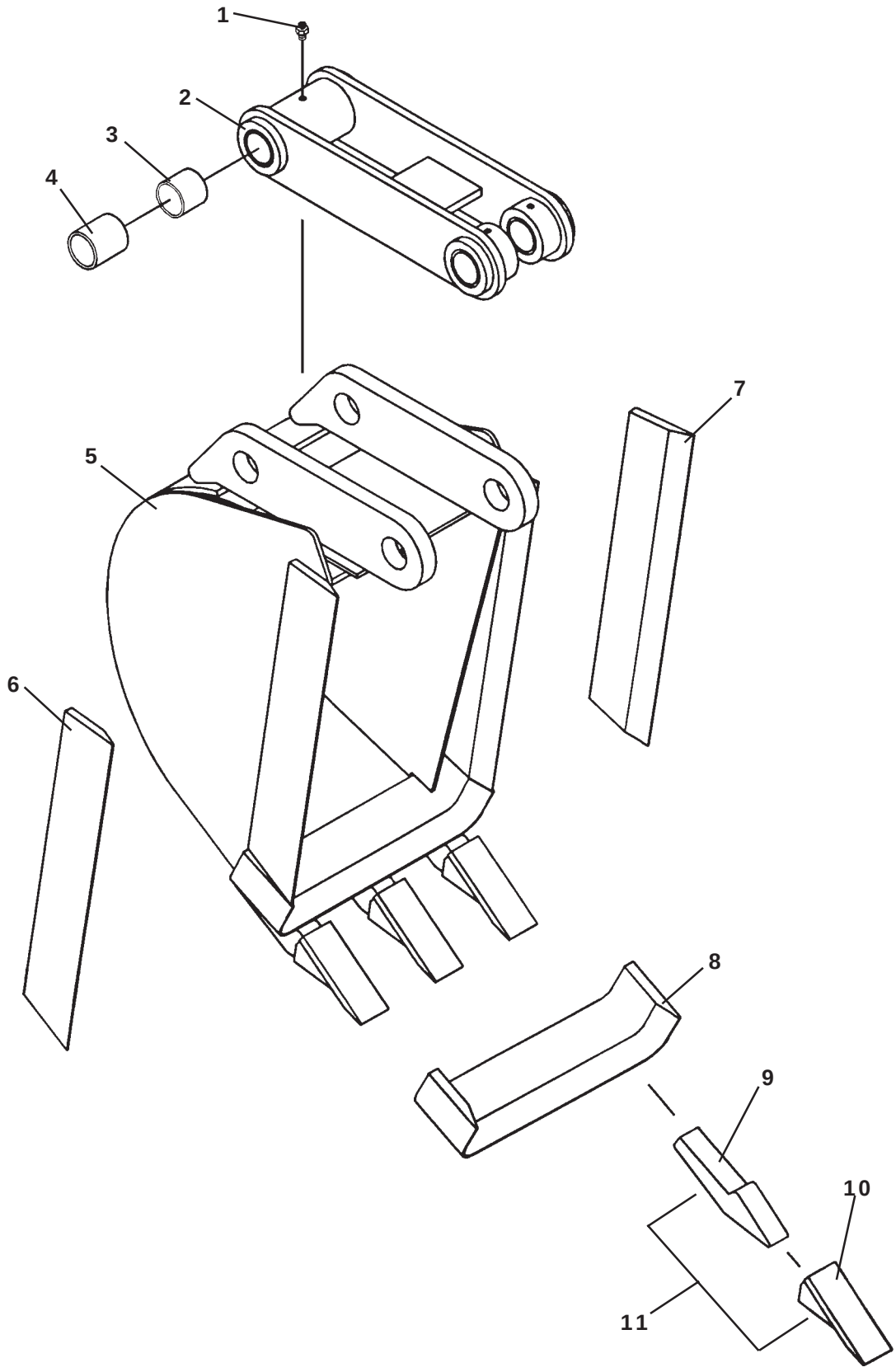


OPTIONAL STABILIZER CYLINDER COVER

STABILIZER CYLINDER COVER ASSEMBLY #83850

NO	REQ'D	PART NO.	DESCRIPTION
1	2	83915	Stabilizer Cylinder Cover with Decal
2	2	4167	No Step Decal
3	2	83910	1.25" Clamp Assembly
4	2	83911	Guide Ring
5	4	1575	.38" UNC X .50" Set Screw

BUCKET ASSEMBLIES



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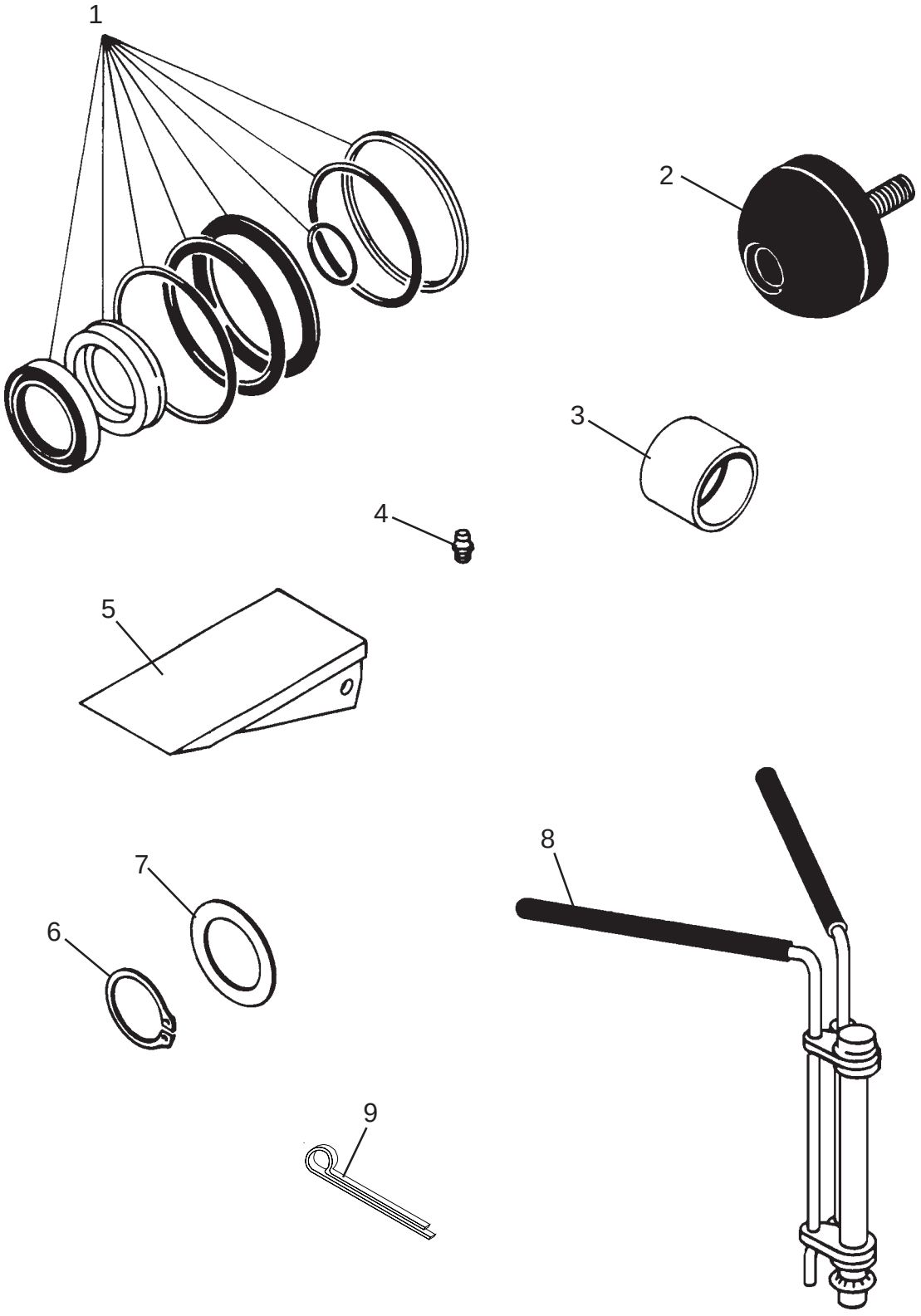
12-12-95

BUCKET ASSEMBLIES

NO	PART NO.	DESCRIPTION
1	6616	Replacement Grease Zerk
2	81824	Replacement Bucket Link (Requires (3) #6616 Grease Zerks, (4) #81610 Bushings, (1) #83368 Spacer)
3	83368	Replacement Spacer
4	81610	Replacement Bushing
5	81710	10" Bucket Weldment
	81712	12" Bucket Weldment
	81716	16" Bucket Weldment
	81718	18" Bucket Weldment
	81724	24" Bucket Weldment
6	81667	Replacement Right Side Cutter
7	81668	Replacement Left Side Cutter
8	81906	10" Replacement Front Cutter Edge
	81902	12" Replacement Front Cutter Edge
	81898	16" Replacement Front Cutter Edge
	81894	18" Replacement Front Cutter Edge
	81666	24" Replacement Front Cutter Edge
9	6398	Replacement Tooth Shank
10	6397	Replace Tooth Point
11	8274	Replacement Tooth Point & Shank

FIRST LINE REPAIR KIT

ASSEMBLY #83649



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12-8-95

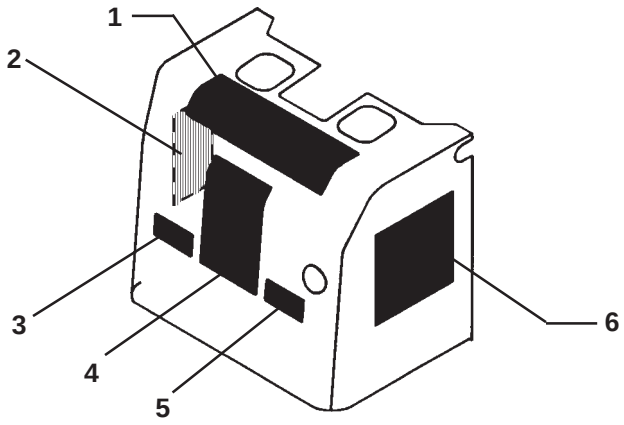
FIRST LINE REPAIR KIT

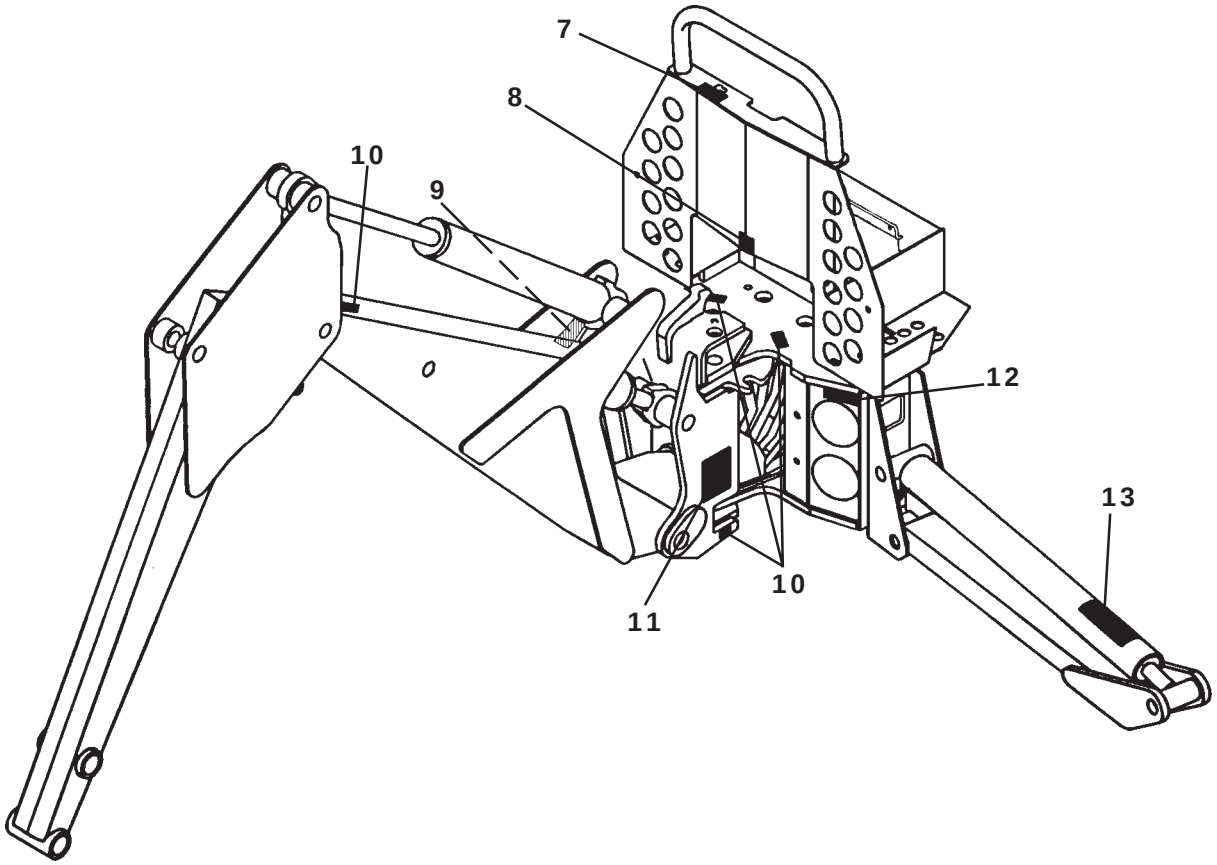
ASSEMBLY #83649

NO	REQ'D	PART NO.	DESCRIPTION
1	2	45617	Seal Kit (Swing/Stabilizer/Bucket Cylinders)
	2	45618	Seal Kit (Boom/Dipper Cylinders)
2	1	6886	Rubber Bumper
3	4	81610	Bushing
4	4	6616	Grease Zerk
5	4	6397	Bucket Tooth
6	4	1650	Snap Ring 1.38"
7	4	6623	Thrust Washer 1.38" X .031"
8	1	65349	Cylinder Seal Install Tool
9	2	1613	Cotter Pin

DECAL ASSEMBLY

ASSEMBLY #40253





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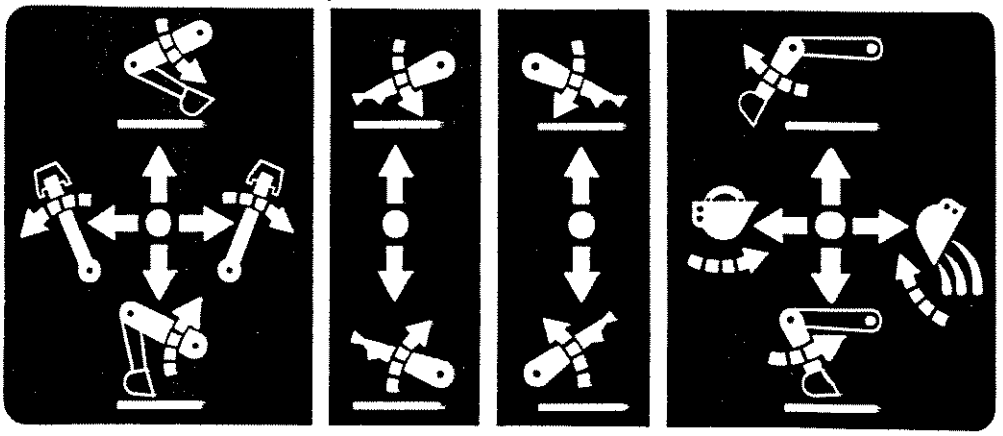
DECAL ASSEMBLY

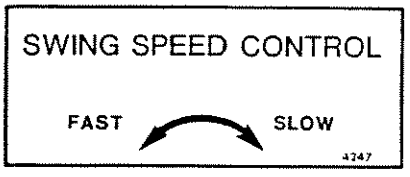
ASSEMBLY #40253

NO	REQ'D	PART NO.	DESCRIPTION
1	1	4368	Operating Controls Decal
2	1	40257	Important Decal
3	1	4247	Swing Speed Decal
4	1	40255	Operational Warning Decal
5	1	4170	Petcock Operation Decal
6	1	40151	High Pressure Fluid Decal
7	1	40249	Swing Lock Decal
8	1	4338	Made In U.S.A.
9	1	40219	Boom Lock Decal
10	5	4084	Grease 8 Hour Decal
11	2	40149	Danger! Pinch Point Decal
12	1	4350	ATI Serial No. Tag
13	2	4140	Bucket Contact Warning Decal

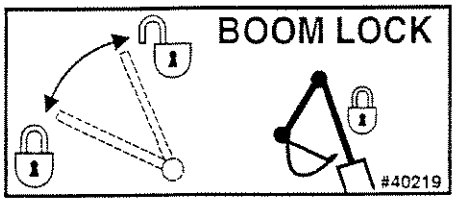
DECAL ASSEMBLY



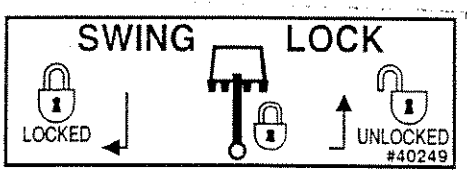
PART #4368
OPERATING CONTROLS DECAL



PART #4247
SWING SPEED CONTROL DECAL



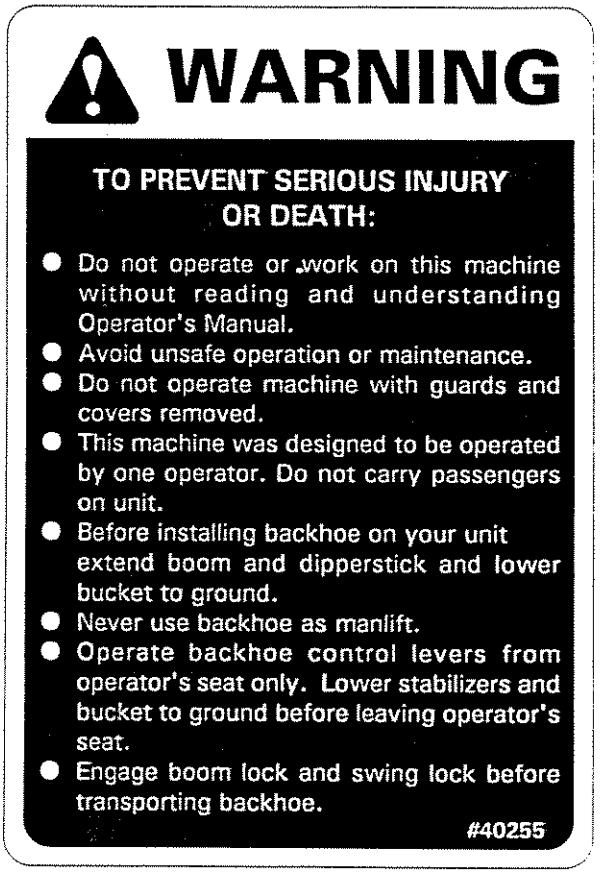
PART #40219
BOOM LOCK DECAL



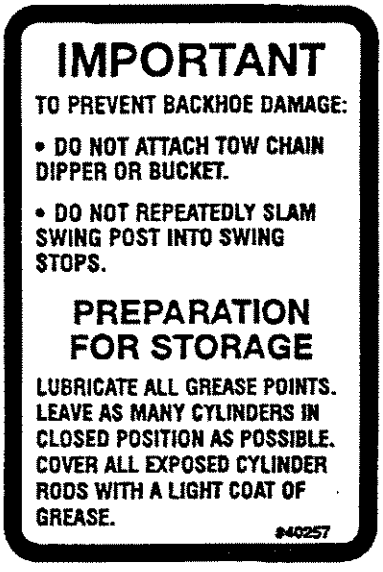
PART #40249
SWING LOCK DECAL

DECAL ASSEMBLY

PART #40151
HIGH PRESSURE FLUID DECAL



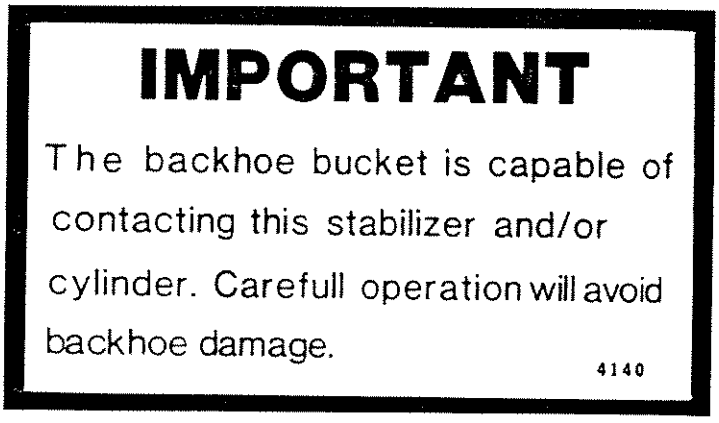
PART #40255
OPERATIONAL WARNING DECAL



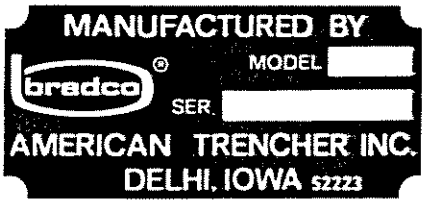
PART #40257
IMPORTANT! DECAL

PART #40149
DANGER! PINCH POINTS

DECAL ASSEMBLY



PART #4140
BUCKET CONTACT WARNING DECAL



PART # 4350
ATI SERIAL NUMBER TAG

PART #4084
GREASE 8 HOURS

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