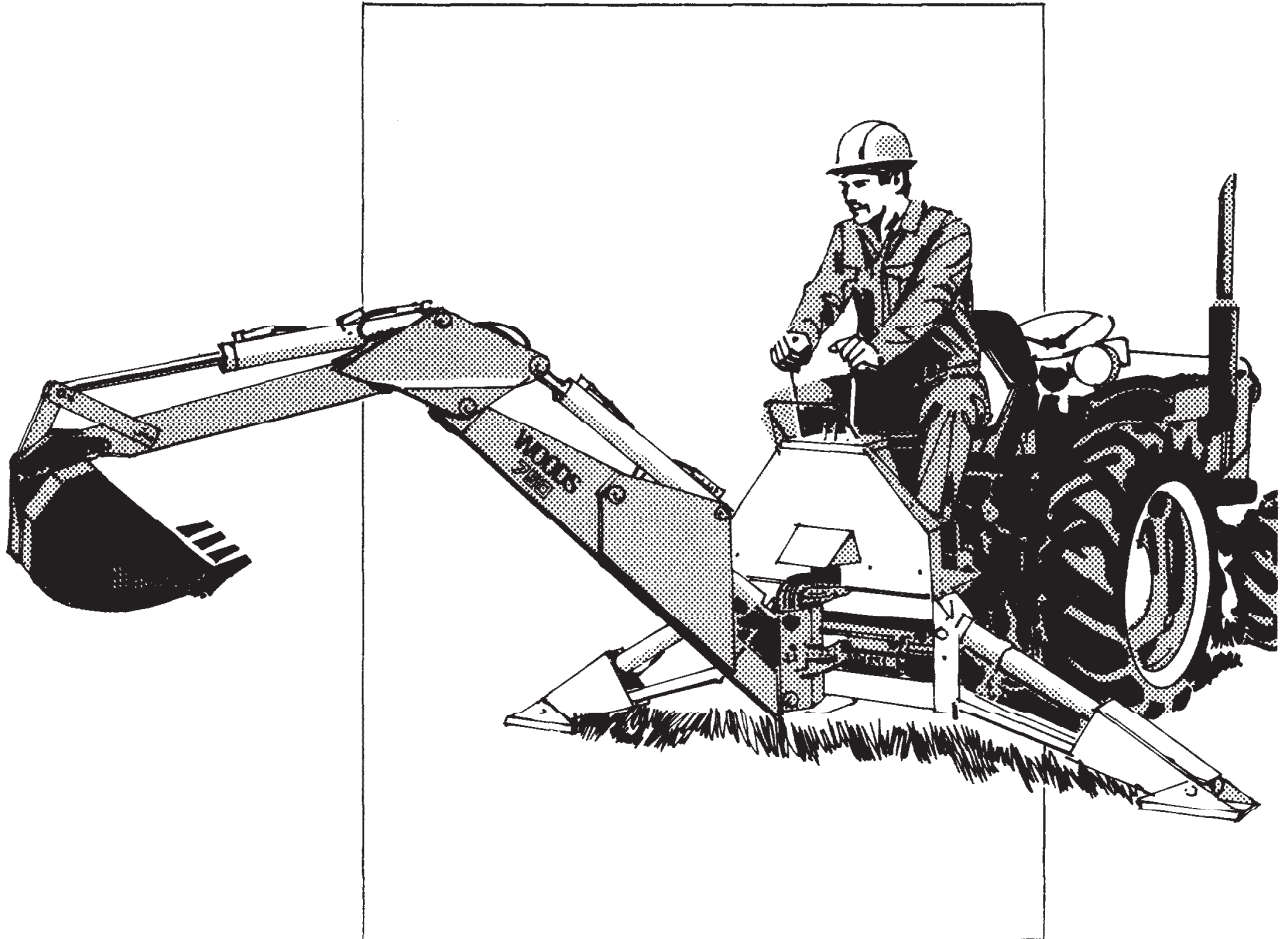


# MODELS BH650/750



## operator's manual

*INCLUDES SERVICE INFORMATION*



Division of Hesston Corporation

**TO THE OWNER:**

Read this manual before using your backhoe. The information presented will prepare you to do a better, safer job. Keep this manual handy for ready reference. Study this manual carefully and become acquainted with all the adjustments and operating procedures before attempting to operate your new equipment.

The backhoe you have purchased has been carefully engineered and manufactured to provide dependable and satisfactory use. Like all mechanical products, it will require cleaning and upkeep. Lubricate it as specified. Observe all safety information in this manual and safety decals on the backhoe and tractor.

For service, your authorized Woods dealer has trained mechanics, genuine Woods service parts, and the necessary tools and equipment to handle all your needs.

Use only genuine Woods service parts. Substitute parts will void the warranty and may not meet standards required for safe and satisfactory operation. Record the model and serial number of your backhoe:

**Model:** \_\_\_\_\_

**Serial Number (located below operator's right heel on main frame tube):** \_\_\_\_\_

Provide this information to your dealer to obtain correct repair parts.

Throughout this manual, the term **IMPORTANT** is used to indicate that failure to observe can cause damage to equipment. The terms **CAUTION**, **WARNING**, and **DANGER** are used in conjunction with the Safety-Alert Symbol, (a triangle with an exclamation mark), to indicate the degree of hazard for items of personal safety.



The Safety-Alert Symbol means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



**CAUTION**

Is used for general reminders of good safety practices or to direct attention to unsafe practices.



**WARNING**

Denotes a specific potential hazard.



**DANGER**

Denotes the most serious specific potential hazard.

# Accidents can be prevented with your help

No accident-prevention program can be successful without the wholehearted co-operation of the person who is directly responsible for the operation of equipment.

To read accident reports from all over the country is to be convinced that a large number of accidents can be prevented only by the operator anticipating the result before the accident is caused and doing something about it. No power-driven equipment, whether it be transportation or processing, whether it be on the highway, in the harvest field or in the industrial plant, can be safer than the man

who is at the controls. If accidents are to be prevented—and they can be prevented—it will be done by the operators who accept a full measure of their responsibility.

It is true that the designer, the manufacturer, the safety engineer can help; and they will help, but their combined efforts can be wiped out by a single careless act of the operator.

It is said that "*the best kind of a safety device is a careful operator*". We ask you to be that kind of an operator

## TABLE OF CONTENTS

GENERAL INFORMATION .....	2
CHECK LISTS.....	3
SAFETY INFORMATION .....	4
SAFETY DECALS .....	5 & 6
TORQUE CHART.....	7
ASSEMBLY INSTRUCTIONS.....	8
OPERATION.....	14
SERVICE & MAINTENANCE .....	17
PLUMBING SCHEMATICS .....	28 & 29
TROUBLE SHOOTING .....	30
PARTS INDEX.....	31
SPECIFICATIONS .....	47-52
INDEX .....	53

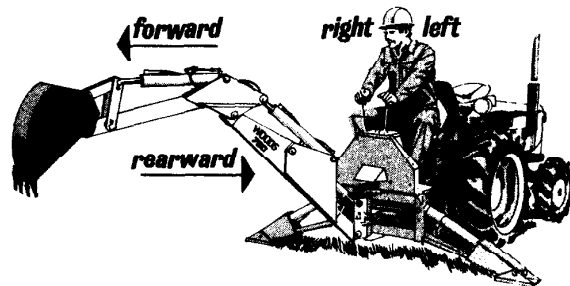
# GENERAL INFORMATION

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.

These instructions have been compiled from extensive field experience and engineering data. Some information may be general in nature due to unknown and varying conditions. However, through experience and these instructions, you should be able to develop procedures suitable to your particular situation.

The illustrations and data used in this manual were current at the time of printing, but due to possible in-line production changes, your machine may vary slightly in detail. We reserve the right to redesign and change the machines as may be necessary without notification.

**⚠ WARNING** Some illustrations in this manual show the backhoe with safety shields removed to provide a better view. The backhoe should never be operated with any safety shielding removed.



Throughout this manual, references are made to right, left, forward and rearward directions. These are determined from the position of the operator when seated in the operating position on the backhoe.

Nomenclature for backhoe components have some variations throughout the industry. We use SAE designations as shown in figure 1.

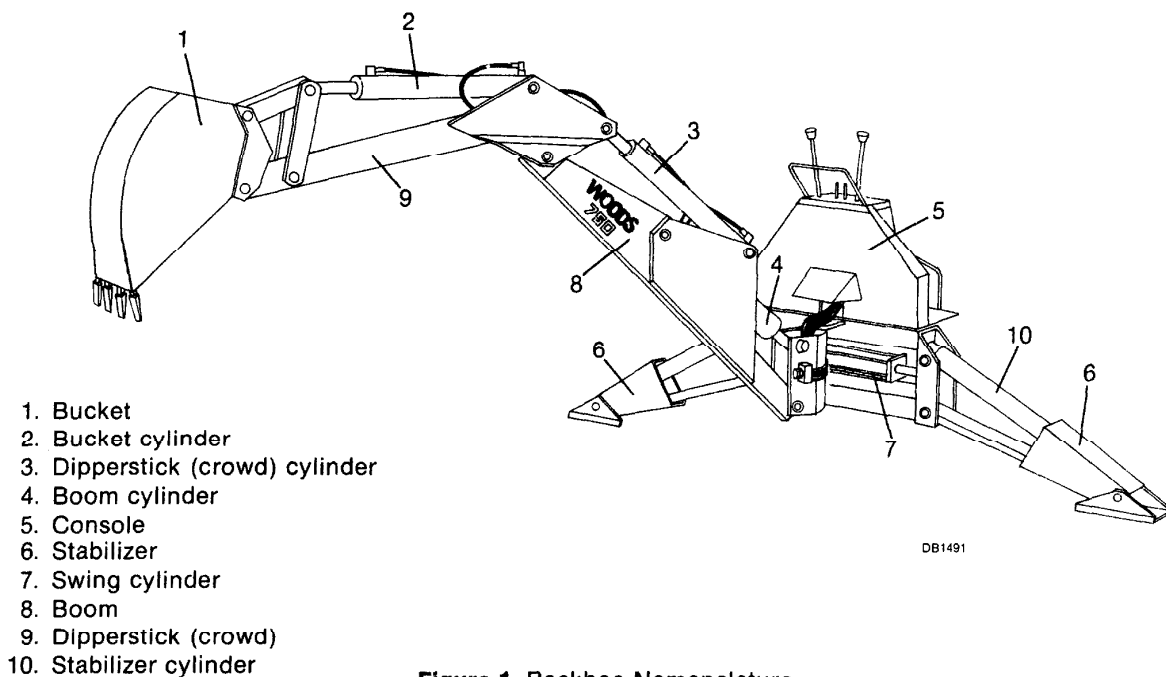


Figure 1. Backhoe Nomenclature

# CHECK LISTS

## PRE-DELIVERY CHECK LIST

Inspect the backhoe thoroughly after assembly to be certain it is set up properly before delivering it to the customer. The check lists are a reminder of points to inspect. Check off each item as it is found satisfactory or after proper adjustments are made.

- \_\_\_ Check all bolts to be sure they are tight.
- \_\_\_ Check that all lubrication points have been lubricated.
- \_\_\_ Check that all cotter pins and safety pins are properly installed.
- \_\_\_ Check that backhoe is properly attached to tractor.
- \_\_\_ Check that all adjustments have been made.
- \_\_\_ Check that hydraulic reservoir has been serviced and hydraulic system has been purged.
- \_\_\_ Make sure all hydraulic fittings are tight and there are no leaks in hydraulic system.



### CAUTION

Refer to safety instructions before checking for hydraulic leaks.

## DELIVERY CHECK LIST

- \_\_\_ Show customer how to make adjustments.
- \_\_\_ Explain importance of lubrication to customer and show lubrication points to customer.
- \_\_\_ Give operator's manual to the customer and ask him to become familiar with all sections, particularly the safety information.
- \_\_\_ Show customer manual storage compartment in bottom of seat support and recommend they place manual there for ready reference.

## DAILY CHECK LIST

- \_\_\_ Check that backhoe is properly and securely attached to tractor.
- \_\_\_ During inspection, check that all nuts and bolts are secure and clevis pins are properly cotter pinned.
- \_\_\_ Check for hydraulic leaks, frayed or worn hoses and general safety of hydraulic system.




### CAUTION

Refer to safety instructions before checking for leaks.

# WORK SAFELY — FOLLOW THESE RULES

## A Careful Operator Is The Best Insurance Against Accidents

 **CAUTION** Read manual before operating.

### TRAINING

- Know your controls and how to stop tractor and engine and backhoe quickly in an emergency. READ THIS MANUAL AND THE ONE PROVIDED WITH YOUR TRACTOR.
- To avoid accident and injury, do not allow anyone to operate this equipment without proper instructions. Any person who operates this equipment must be instructed in and be capable of the safe operation of the unit, its attachments and all controls.
- MAKE SURE THAT ALL OPERATING AND SERVICE PERSONNEL KNOW THAT IN THE EVENT HYDRAULIC FLUID PENETRATES THE SKIN IT MUST BE SURGICALLY REMOVED WITHIN A FEW HOURS BY A DOCTOR FAMILIAR WITH THIS FORM OF INJURY OR GANGRENE MAY RESULT.
- Carefully supervise inexperienced operators.

### PREPARATION

- Make sure all hydraulic connections are tight and all hydraulic lines and hoses are in good condition before engaging tractor PTO.
- Keep hands and body away from pressurized lines. Use paper or cardboard, not body parts, to check for leaks. Hydraulic (oil) fluid under pressure will penetrate skin causing serious injury. (Refer to note in Training above.)
- Always wear relatively tight and belted clothing to avoid entanglement in moving parts. Wear sturdy, rough-soled work shoes. Never operate tractor or backhoe in bare feet, sandals or sneakers.
- Place all controls in neutral position before starting tractor engine.
- Never use backhoe on tractor equipped with cab on ROPS unless 3 pt. hitch Saf-T-Lok™ diagonal bars are properly installed and adjusted.

- Always use special heavy-duty top link provided with backhoe and original equipment high strength top link pin provided with tractor. Use grade 5 bolt to attach top link to backhoe.
- When mounting backhoe on tractor without front end loader, front tractor weights and/or front tire ballast should be added for front end stability. Approximately 20% of tractor and equipment weight should be on the front wheels.
- Clean all dirt, trash and grease from operator's platform pedals and steps.

### OPERATIONAL SAFETY

- Disengage power takeoff and shift tractor into neutral before attempting to start engine.
- Never operate backhoe with bystanders in the maximum swing area of boom.
- Know digging area, avoid hitting underground cables and pipes, overhead wires or other hazards.
- Use extreme care when working close to fences, ditches or on hillsides.
- Be careful when swinging loaded bucket on a hillside; always dump spoil on uphill side of backhoe to minimize upset possibility.
- Always engage transport lock before transporting backhoe.
- Never leave equipment unattended with engine running or with bucket in raised position. Always rest bucket on ground and remove ignition key before leaving tractor.

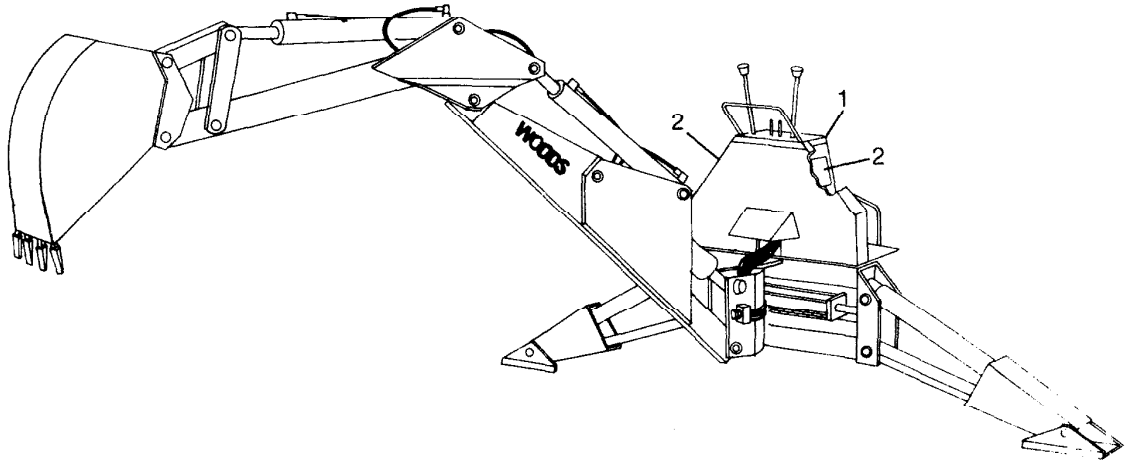
### MAINTENANCE

- Never perform service or maintenance with tractor engine running.
- Never work on backhoe unless boom dipperstick and bucket are extended and lowered.
- Do not attempt to repair or tighten hoses when under pressure, when boom is raised or with engine running.

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# SAFETY DECALS

Replace Immediately If Damaged



DB-1499



## WARNING

1. THE ENTIRE BACKHOE & OPERATOR CAN BE LIFTED OFF THE GROUND AND TRACTOR TURNED OVER WITH BACKHOE DIGGING FORCES. THEREFORE, TO AVOID SERIOUS INJURY OR DEATH:
  - A. NEVER USE BACKHOE ON TRACTOR EQUIPPED WITH CAB OR ROPS **UNLESS** 3-PT. HITCH "**SAF-T-LOK**"™ BARS HAVE BEEN PROPERLY INSTALLED & ADJUSTED. SEE MANUAL & DANGER DECAL.
  - B. DO NOT ATTEMPT TO DIG UNLESS STABILIZER PADS ARE ON FIRM GROUND.
2. ALWAYS USE THE SPECIAL HEAVY-DUTY TOP LINK PROVIDED WITH BACKHOE.
3. USE ONLY ORIGINAL EQUIPMENT HIGH STRENGTH TRACTOR TOP LINK **PIN**.
4. NEVER OPERATE BACKHOE WITH BYSTANDERS IN THE MAXIMUM SWING AREA.
5. FRONT WEIGHTS ARE REQUIRED IF BACKHOE IS MOUNTED ON TRACTOR WITHOUT LOADER.
6. DISENGAGE PTO AND ATTACH BOOM TRANSPORT LATCH BEFORE TRANSPORTING.
7. SHUT OFF ENGINE AND LOWER BUCKET TO GROUND BEFORE LEAVING BACKHOE UNATTENDED.
8. HIGH PRESSURE OIL LEAKS WILL PENETRATE SKIN CAUSING SERIOUS INJURY & GANGRENE. CONSULT A PHYSICIAN IMMEDIATELY. READ OPERATOR'S MANUAL.
9. KNOW DIGGING AREA & AVOID HITTING CABLES, PIPE LINES, OVERHEAD WIRES OR OTHER HAZARDS.


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1.

# SAFETY DECALS

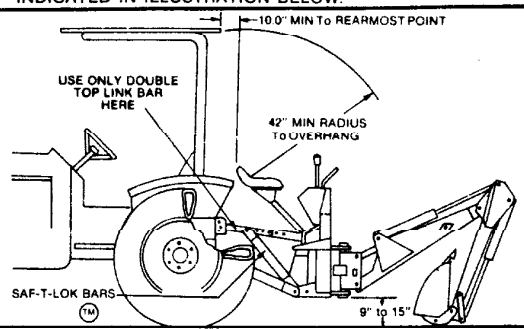
Replace Immediately If Damaged

 **DANGER**

 **CRUSHING HAZARD**

**FAILURE TO FOLLOW THESE STEPS MAY RESULT IN SERIOUS INJURY OR DEATH FROM BACKHOE BEING THRUST UPWARD, FORWARD OR REARWARD BY DIGGING FORCES.**

**\*NEVER OPERATE BACKHOE UNLESS 3-POINT SAF-T-LOK™ BARS HAVE BEEN INSTALLED & ADJUSTED TO PREVENT BACKHOE FROM MOVING CLOSER TO ROPS OR CAB THAN INDICATED IN ILLUSTRATION BELOW.**



**\*SEE MANUAL FOR PROPER ADJUSTMENT PROCEDURE.**  
**\*USE ONLY SPECIAL HEAVY TOP LINK PROVIDED W/BACKHOE.**  
**\*USE ONLY HIGH STRENGTH TOP LINK PINS.**

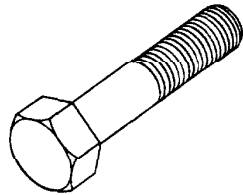
2.



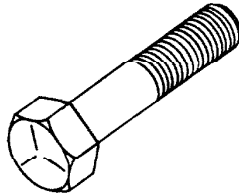
## PROPER TORQUE FOR FASTENERS

The chart lists the correct tightening torque for fasteners used on Woods equipment. When bolts are to be tightened or replaced, refer to this chart to determine the grade of bolts and the proper torque **except** when specific torque values are assigned in manual text.

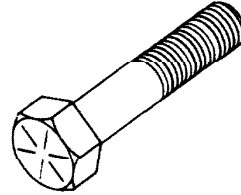
### Bolt Head Markings



**SAE Grade 2  
(No Dashes)**



**SAE Grade 5  
(3 radial dashes)**



**SAE Grade 8  
(6 radial dashes)**

### Recommended Torque in Foot Pounds (Newton-Meters)

Bolt Diameter (In.)	SAE Grade 2	SAE Grade 5	SAE Grade 8
1/4	6 (8)	11 (15)	14 (19)
5/16	13 (18)	21 (28)	25 (34)
3/8	23 (31)	38 (52)	55 (75)
7/16	37 (50)	55 (75)	80 (110)
1/2	57 (77)	85 (115)	120 (165)
9/16	82 (111)	125 (170)	180 (245)
5/8	111 (150)	175 (240)	230 (310)
3/4	200 (270)	300 (410)	440 (600)
7/8	280 (380)	450 (610)	720 (975)
1	350 (475)	680 (925)	1035 (1400)
1-1/8	450 (610)	885 (1200)	
1-1/4	600 (815)	1255 (1700)	
1-3/8	675 (915)	1620 (2200)	
1-1/2	920 (1250)	2200 (2990)	

### HARDWARE ABBREVIATIONS

GA ..... Gauge  
 GR(5 etc.) ..... Grade (5 etc.)  
 HT ..... Heat Treated  
 MM ..... Millimeter  
 NC ..... National Coarse  
 NF ..... National Fine  
 P ..... Pitch  
 SAE ..... Society of Automotive Engineers

# ASSEMBLY INSTRUCTIONS

## DEALER SET-UP INSTRUCTIONS

Backhoe assembly is the Woods dealer's responsibility. The backhoe should be delivered to the owner completely assembled, lubricated and adjusted for normal operating conditions.

Set backhoe up as received from the factory with these instructions and illustrations. Complete check lists on page 3 when it is set up.

Remove backhoe from crate. Open parts box and lay parts out to make location easy. Refer to parts lists and exploded view drawings on pages 30 through 44.

The backhoe is shipped partially assembled. Assembly will be easier if components are aligned and loosely assembled before tightening hardware.

Recommended torque values for hardware are given on page 7.

## ASSEMBLY PROCEDURE

### Bucket & Dipperstick Installation (figure 2)

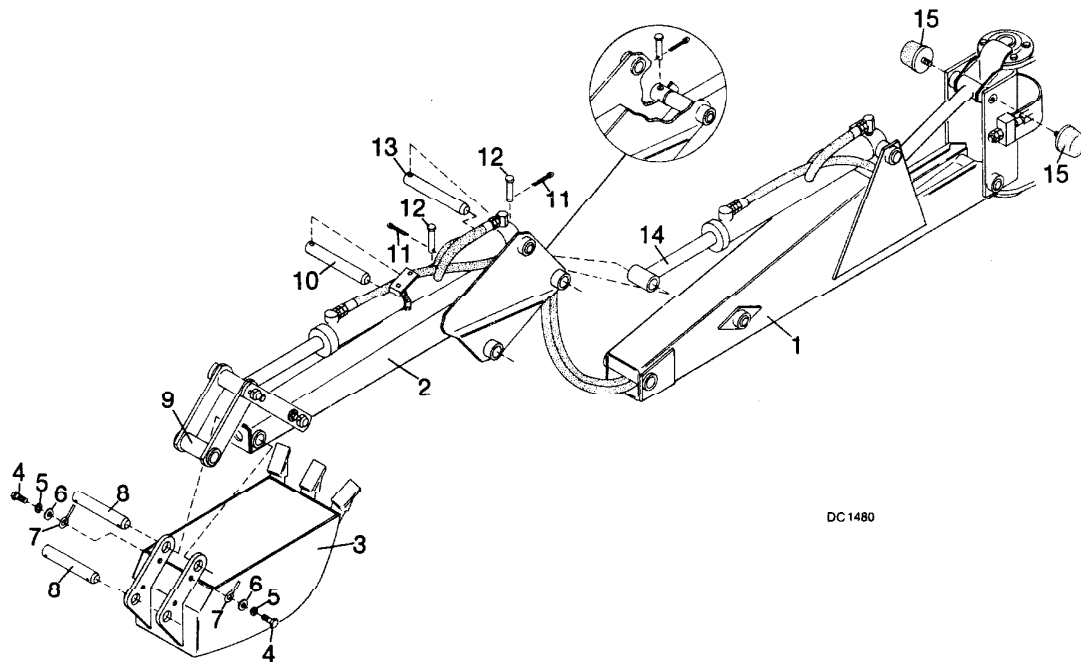
Align dipperstick with boom. Be sure bucket cylinder hoses are not twisted and install pivot pin. Line up pivot pin hole with hole in pivot bushing and secure with clevis pin and cotter pin.

Align dipperstick cylinder with dipper stick and install pivot pin. Line up pivot pin hole with hole in pivot bushing. Secure with clevis pin and cotter pin.

Align bucket with pivot bushings of bucket arm and dipperstick.

Install pivot pins and secure with retainer pin, flat washer, lock washer and bolt as shown.

Install pad assemblies to king post as shown.



- |                         |                            |
|-------------------------|----------------------------|
| 1. Boom                 | 9. Bucket arm              |
| 2. Dipperstick          | 10. 1 x 7-1/2 Pivot pin    |
| 3. Bucket               | 11. 1/16 Cotter pin        |
| 4. 5/16 x 3/4 Bolt      | 12. 1/4 x 1-7/8 Clevis pin |
| 5. 5/16 Lock washer     | 13. 1 x 4-7/8 Pivot pin    |
| 6. 5/16 Standard washer | 14. Dipperstick cylinder   |
| 7. Retainer pin         | 15. Bumper pad             |
| 8. 1 x 5-1/2 Pivot pin  |                            |

Figure 2. Dipperstick & Bucket Assembly

### Plumbing Installation (figure 3)

#### **CAUTION**

Make sure all hydraulic connections are tight and all hydraulic lines and hoses are in good condition before engaging tractor PTO.

#### **CAUTION**

Keep hands and body away from pressurized lines. Use paper or cardboard, not body parts, to check for leaks. Hydraulic (oil) fluid under pressure will penetrate skin causing serious injury.

#### **WARNING**

If fluid penetrates the skin it must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

#### **IMPORTANT**

Clean all hydraulic fittings and use care to prevent foreign material from entering hydraulic system.

On fittings using "O" rings, no additional sealant such as pipe dope or teflon thread tape should be used. We recommend the use of teflon thread tape on pipe threads. Use care when applying teflon tape to prevent it from entering the hydraulic system.

Apply teflon tape to the reservoir filter fitting. Position the filter base inlet port toward reservoir and install. Apply teflon tape to threads of 90° el (4) and install in outlet port of filter. Filter should be approximately vertical but may be moved to provide necessary clearance.

Proper installation of hydraulic fittings with "O" rings is very important. Loosen or back off lock nut completely, screw fitting in all the way, position and tighten lock nut.

Be sure reducers and elbows have "O" rings installed on them before installing them to pump.

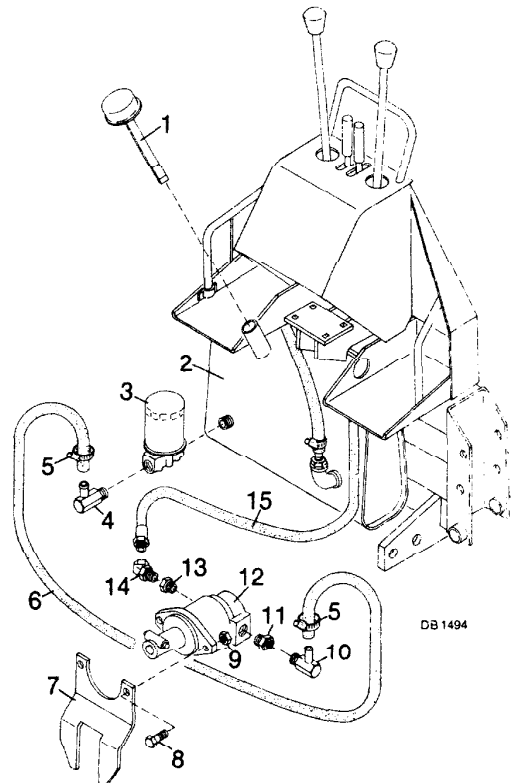
Install a reducer (11) in the suction port of the pump.

Install a 90° el (10) into reducer (11).

Install a reducer (13) in pump pressure port. Install a 45° swivel adapter (14) into reducer.

Attach suction hose (6) to fitting on filter and suction side of pump. Tighten hose clamps.

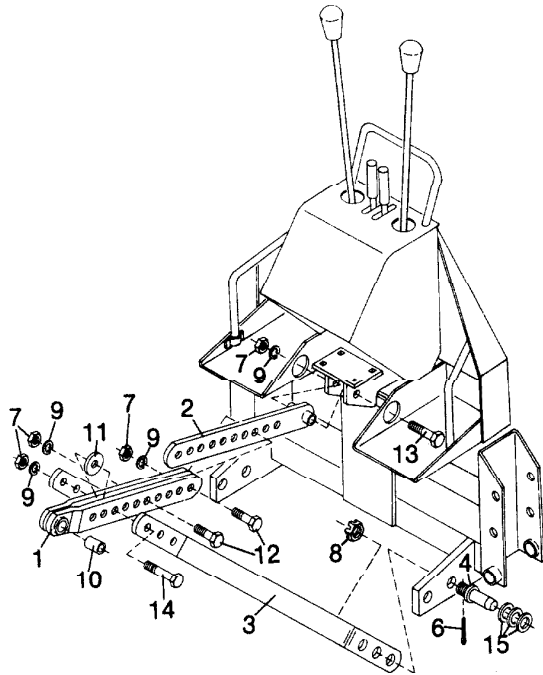
Attach hose (15) to swivel adapter (14). When these hoses are installed on tractor it may be necessary to reposition filter and hoses to prevent interference.



1. Dipstick & breather
2. Reservoir
3. Filter & housing
4. 3/4 Hose x 3/4 pipe 90° el
5. Hose clamp
6. 3/4 x 36 Low pressure hose
7. Pump mounting plate
8. 1/2 x 1 Bolt
9. 1/2 Lock nut
10. 1-1/16-12 x 3/4 Hose 90° el
11. 1-5/8-12 x 1-1/16-12 Reducer
12. Pump
13. 1-5/16-12 x 7/8-14 Reducer
14. 7/8-14 x 3/8 NPSM 45° Adapter
15. 3/8 Pipe x 47 high pressure hose assembly

**Figure 3. Pump Plumbing Installation**

## ATTACHING BACKHOE TO TRACTOR (figure 4)



DB1488

1. Double top link
2. Single top link
3. Saf-T-Lok™ diagonal bar
4. Mounting pin
6. 3/16 x 1-1/2 Cotter pin
7. 3/4 Nut
8. 3/4 NF Castle nut
9. 3/4 Lock washer
10. 3/4 x 1 x 1-11/16 Sleeve
11. 3/4 x 2 x 1/2 Spacer washer
12. 3/4 x 3 Bolt
13. 3/4 NC x 3-1/2 Bolt
14. 3/4 NC x 4 Bolt
15. 7/8 Standard flat washer

**Figure 4.** Backhoe Attachment

## RECOMMENDED OILS FOR HYDRAULIC SYSTEM

Use Type "A" or "F" Automatic Transmission Fluid, SAE 20W Motor Oil or #303 Hydraulic Fluid.

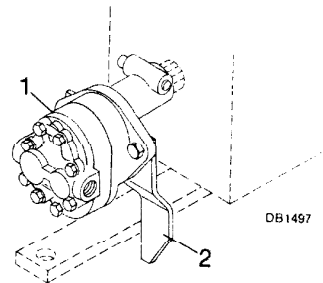
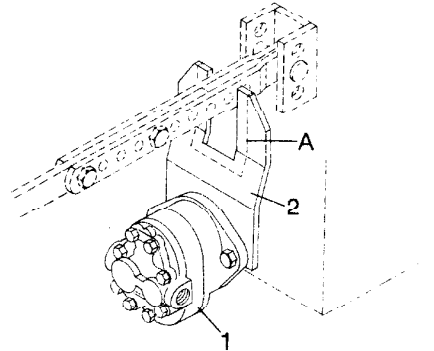
**IMPORTANT** Do not mix types of fluid in this system.

Service hydraulic reservoir by filling to the full mark on dipstick. When backhoe is mounted and cylinders are filled it will be necessary to add fluid to the reservoir.

Position backhoe on level surface. Back tractor up as near as possible to center of backhoe. Refer to figure 5 and select a pump mounting that will work on your specific tractor.

## Pump Mounting Bracket Installation (figure 5)

The pump mounting bracket is designed to slip over the tractor drawbar. The best installation is to place bracket offset toward the tractor and pump offset down; however, the offset may be reversed if interference occurs.



DB1497

1. Pump
2. Pump mounting bracket
- A. Pump mounting bracket modification

**Figure 5.** Pump Mounting Bracket Installation

On tractors with non-standard drawbars it may be necessary to modify the pump bracket by enlarging the opening. The bracket may also be inverted and retained on the top link bar. Whatever mounting is used, it is important that the pump be retained from rotating.

Check all hydraulic fittings and lines to be sure they are tight and free of kinks and twists.

## IMPORTANT

The backhoe hydraulic system will be used to make mounting on tractor. It is necessary this be done with tractor engine running. The operator or serviceman must be competent and use extreme care during this operation to prevent damage to equipment and personal injury.

Be sure backhoe controls are in centered neutral position.

With the backhoe hydraulic pump securely mounted and tractor PTO and transmission in neutral, start tractor engine idling. Engage PTO very carefully and allow pump to start smoothly.

Very little engine power is required to power hydraulic system in this mode. Should engine pull down excessively, check plumbing hookup for reversed lines or a control lever stuck in an operating position.

## ⚠ CAUTION

The only time the backhoe should be operated from a position other than the operator seat is during hook-up. When accomplishing this operation, always stand on the tractor side or rearward of the backhoe to avoid the possibility of being trapped should the boom swing control be accidentally activated.

Two holes are provided for hitch pin mounting. Use the forward hole if possible to provide better stability. It will be necessary to use the rear hole if use of forward hole causes interference problems. If there is enough clearance to use forward hole, but lift arms interfere with mounting frame, cut end of frame off.

Install hitch pin in hole selected. Position Saf-T-Lok™ diagonal bars on hitch pin and snug up with castle nut. Do not tighten nut at this time.

Attach tractor lower lift arms to backhoe hitch pins and secure with a heavy duty klik pin. Use spacer washers between lift arms and klik pin to remove any free play.

Raise backhoe with stabilizer controls to establish between 9 and 15" clearance from bottom side of boom pivot to ground. See figure 6. Level backhoe from side to side with stabilizer control.

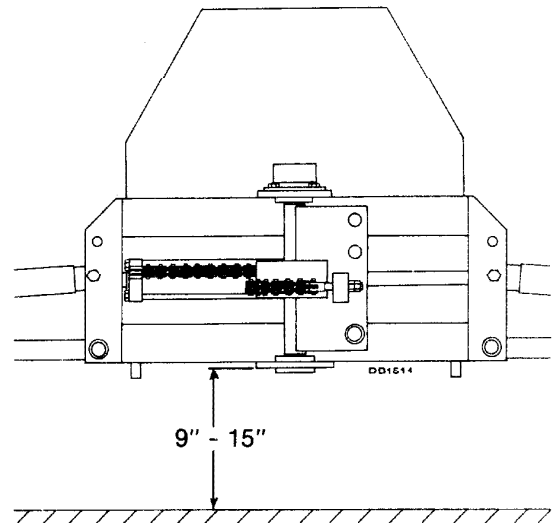


Figure 6. Ground Clearance

Attach the single top link bar to the backhoe with bolt, lock washer and nut. Attach the double top link bar to the tractor top link attachment point using only the original equipment **HIGH STRENGTH** tractor top link pin.

Trap top link bar in center of top link bracket. Add washers or spacers as required.

## ⚠ WARNING

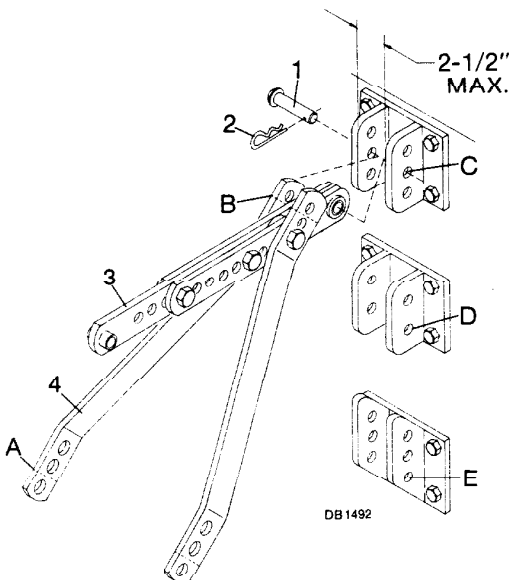
Do not substitute a bolt or soft pin for the tractor top link. It could shear and throw operator from backhoe or cause operator to be crushed.

## **⚠ WARNING**

To avoid hitch failure and possible operator injury, before mounting a BH650 or BH750 backhoe to tractor 3-point hitch, read and understand the maximum and minimum hitch dimensions.

## **IMPORTANT**

There may be more than one hole provided in the tractor top link attachment bracket; select the hole that most evenly distributes load between top link bracket top and bottom mounting bolts. See figure 7.



1. Original equipment high-strength tractor top link pin
2. Klik pin
3. Backhoe top link
4. Saf-T-Lok™ diagonal bars
- A. Cut off here if interference occurs
- B. Cut off here if interference occurs
- C. Preferred mounting hole
- D. Preferred mounting hole
- E. Preferred mounting hole

**Figure 7.** Top Link & Saf-T-Lok™ Hitch Installation

Note that the maximum width between tractor attachment plates must not exceed 2-1/2". This is to prevent excessive bending loads in the tractor top link pin. Pin must be located in one of the positions shown.

On tractors with draft control, select hole closest to supporting point of floating link. Block or lock draft control so it is inoperative. Lower manual 3-point lift control to the lowest position to deactivate draft sensing control.

### **Seat Installation (figure 8)**

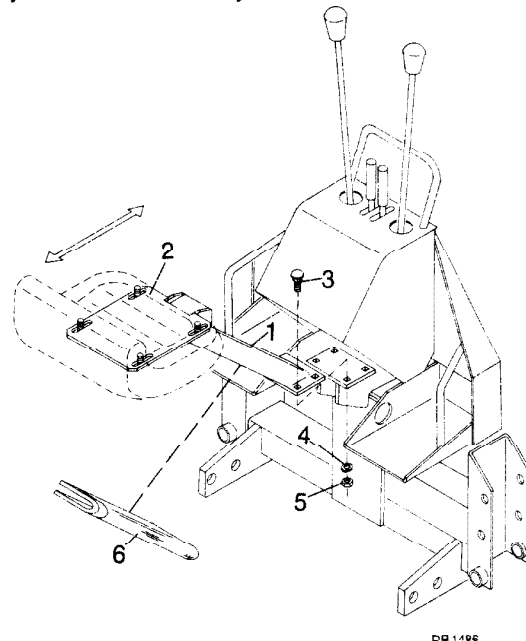
Attach seat support (1) to seat support bracket with 3/8 x 1 carriage bolt. Secure with lock washer and nut.

Place a lock washer on the four 5/16 x 3/4 bolts and secure seat to seat support.

Seat may be adjusted fore and aft for operator comfort.

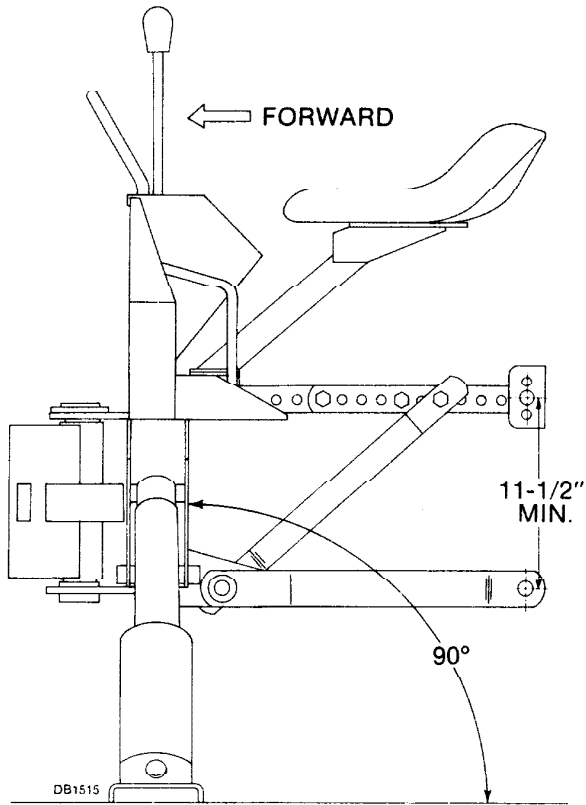
A storage compartment for the operator's manual is provided on bottom side of seat support. Place manual in compartment for ready reference.

Use boom cylinder control to position backhoe main frame vertically by extending or retracting cylinder as necessary.



1. Seat support
2. Seat bracket
3. 3/8 x 1 Carriage bolt
4. 3/8 Lock washer
5. 3/8 Nut
6. Operator's manual (store under seat support)

**Figure 8.** Seat Installation



**Figure 9. Main Frame Vertical Position**

With backhoe main frame vertical, see figure 9, align top link members and bolt together using widest spread between bolts as possible. It may be necessary to move main frame slightly off vertical plane to align holes on top link.

Align Saf-T-Lok™ diagonal bars with a hole in the top link bar as close to tractor as possible. Cut end off of Saf-T-Lok™ diagonal bars for clearance as shown in figure 7 if necessary. Insert a spacer washer between top link bars and bolt Saf-T-Lok™ diagonal bars to top link.

Check clearance between bottom of boom pivot and ground to be sure there is from 9 to 15". Check the vertical position of the console. It should be nearly perpendicular with the ground. Be sure you have clearance between ROPS or tractor cab (See danger decal on page 6.) Make any necessary adjustments.

- (1) The bolt center distance, attaching the diagonal brace to the top link **must not be more than 6-3/4"** from the tractor top link pin.
- (2) The bolts joining the two halves of the top link brace **must not be less than 2-1/2" apart**.
- (3) The vertical height from the top link pin to the tractor attachment point for the lift arms **must not be less than 11-1/2"**.

Tighten hitch pin nuts to 300 ft./lbs. and secure with cotter pin. It may be easier to remove backhoe from tractor to tighten hitch pin nuts.

Remount backhoe and tighten Saf-T-Lok™ diagonal bar attachment bolt and top link bolts to 300 ft./lbs. Be sure top link bolts are as far apart as possible.

Purge hydraulic system. Fully extend and retract all cylinders several times until all air is worked out of system. Check level of hydraulic reservoir and fill to full mark on dipstick with all cylinders fully retracted.

# OPERATION

## **WARNING**

**Do not operate backhoe on tractor equipped with a cab or ROPS unless 3-pt. hitch Saf-T-Lok™ diagonal bars have been properly installed and adjusted. Serious injury or death could occur. Refer to assembly instructions on pages 10 and 11.**

## **CAUTION**

**Make sure all hydraulic connections are tight and all hydraulic lines and hoses are in good condition before engaging tractor PTO.**

## **CAUTION**

**Keep hands and body away from pressurized lines. Use paper or cardboard, not body parts, to check for leaks. Hydraulic (oil) fluid under pressure will penetrate skin causing serious injury.**

## **WARNING**

**If fluid penetrates the skin, it must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.**

The safe operation of this machine is the responsibility of the operator. The operator should be familiar with the backhoe, tractor and all safety practices before starting operation.

Hydraulic pressure for backhoe operation is supplied by a pump attached to the tractor PTO. The pump is designed to operate at 540 rpm and may be operated up to but should never exceed 700 rpm. Operating the pump in excess of 700 rpm will cause overheating and damage to the equipment.

### **Pre-Operation Check List**

Be sure special heavy-duty top link provided with backhoe is installed.

Be sure only original equipment high strength top link pin provided with tractor is used to attach top link to tractor.

Be sure to use Grade 5 bolt to attach top link to backhoe.

Place all controls in neutral position before starting tractor engine.

Check to be sure hydraulic reservoir dipstick indicates full.

Check digging area. Avoid hitting buried cables and pipes or overhead wires and other hazards.

## **WARNING**

**When using 3-point mounted equipment, use front wheel weights or ballast in tires or a front tractor weight to enhance front end stability. Approximately 20% of tractor and equipment weight should be on front wheels. Tractor could tip over causing personal injury or death.**

### **Starting & Stopping**

Power for operating backhoe hydraulic system is supplied by a hydraulic pump driven by the tractor PTO. Refer to your tractor manual for instructions for engaging and disengaging the PTO. Learn how to disengage PTO quickly in case of an emergency.

### **Commencing Operation**

When engaging power take off, the engine rpm should always be low. Once engaged, the engine rpm may be increased to the desirable operating condition.

Assume your position in the operator's seat.

Do not dig unless stabilizer pads are on firm ground.

To become familiar with the backhoe controls, start with a slower rpm. Operate the control levers, swinging boom several times to practice control. Do not operate the swing more than 45 degrees each way the first few times. Then gradually increase the arc.

Operate backhoe gently and smoothly. Avoid swinging boom into main frame. Sudden stopping or jerking could result in severe damage to tractor and backhoe.

Should you become confused or lose your control orientation during operation simply turn loose of controls and reorient yourself.



It is not difficult to become an efficient operator. A control lever operating decal is shown in figure 10 and is located behind the control levers on the backhoe. Study this decal, it will aid you in becoming familiar with the controls.

Digging near the center of the swing so material may be dumped on either side will produce good results. Never dig near stabilizers.

**CAUTION** When digging on a hillside, always dump the bucket on the uphill side of the digging. This will minimize the possibility of tipping, which could cause serious injury.

When opening a trench, maneuver the dipperstick into a vertical position, then move it forward two more feet. Position bucket to skim 3 to 4 inches off surface without dragging heel of bucket. Lower boom 4 to 6 inches on succeeding passes.

When spoil pile becomes too high, use boom swing or dipperstick and bucket to push dirt away from hole. Do not bang boom or bucket into spoil pile as damage to tractor or backhoe may result.

As you become familiar with operation of the backhoe, it will become common practice for you to operate two or more controls at the same time.

Example: With bucket and dipperstick extended, you can apply down pressure on the dipperstick as you pull bucket toward you. As the dipperstick approaches you, you can curl the bucket and extend the dipperstick to move bucket up and away saving time in clearing the hole.

Dual operation of controls will smooth and simplify digging operation. Normally, the two or more movements will not be equal or even simultaneous, but as pressure within a cylinder changes and the resistance on an operating member of the backhoe lessens, it will move. It is the balancing force of one member against the other. Actuating the dipperstick and bucket simultaneously will ensure full buckets preventing lost time and motion.

## Control Handle Operation (figure 10)

Pulling handle 1 toward you lowers left stabilizer. Pushing it forward raises it.

Pulling handle 2 toward you lowers right stabilizer. Pushing it forward raises it.

Pulling the left control back (toward A) raises the boom. Pushing it forward (toward C) lowers boom.

Moving left handle left (toward B) swings boom left. Moving it right (toward D) swings boom right.

Pulling right control back (toward E) curls dipperstick down and toward operator. Pushing it forward (toward G) moves it up and away from operator.

Pushing right handle left (toward F) curls bucket toward operator. Pushing it right (toward H) extends bucket out away from operator.

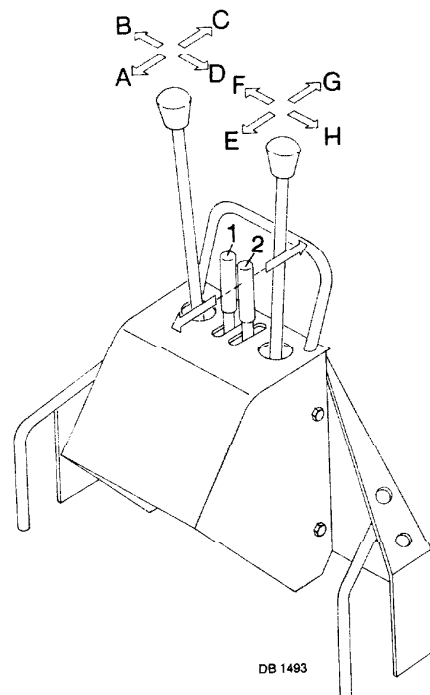
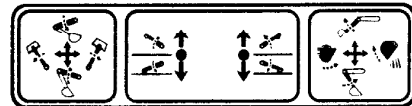


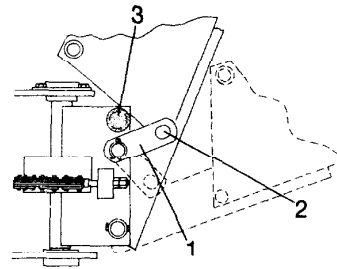
Figure 10. Operator's Console

### Transporting (figure 11)



### CAUTION

Always engage transport lock bar when transporting backhoe to prevent personal injury and damage to equipment.



DB1495

Engage transport lock by retracting boom and dipperstick. Position transport lock bar, located on left front side of main frame, over transport lock pin.

1. Transport lock bar
2. Transport lock pin
3. Bumper pad

**Figure 11.** Transport Lock

### IMPORTANT

Before operating backhoe, transport lock bar must be swung down against chain to prevent damage to transport lock or bumper pad.

Always retract stabilizers before transporting backhoe.

## NOTES

# SERVICE & MAINTENANCE INSTRUCTIONS

## **CAUTION**

Make sure all hydraulic connections are tight and all hydraulic lines and hoses are in good condition before engaging tractor PTO.

## **CAUTION**

Keep hands and body away from pressurized lines. Use paper or cardboard, not body parts, to check for leaks. Hydraulic (oil) fluid under pressure will penetrate skin causing serious injury.

## **WARNING**

If fluid penetrates the skin it must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

## **IMPORTANT**

Never attempt to perform service or maintenance on backhoe while it is in operation.

### **Hydraulic System**

Use type "A" or "F" automatic transmission fluid, SAE 20W weight motor oil or #303 hydraulic fluid in this system. Do not mix types of fluid. System capacity is approximately 5 - 5-1/2 gallons.

Check fluid level in filler cap with dipstick daily.

Replace hydraulic filter after the first 20 hours of operation and every 200 hours or annually thereafter. In extremely dusty or dry conditions more frequent changes may be necessary.

Change hydraulic fluid and filter annually.

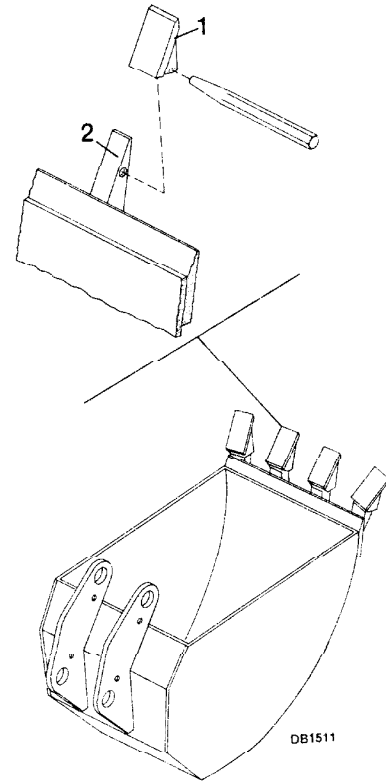
### **Relief Valve**

This valve is preset at the factory to prevent system from exceeding 2,000 psi. Do not attempt to reset valve. If it is malfunctioning, replace it with an authorized factory replacement part.

### **Bucket Tooth Replacement (figure 12)**

Remove worn tooth by driving a chisel between shank and tooth.

Install replacement tooth and use a punch topeen tooth to shank on both sides.



1. Replacement tooth
2. Tooth shank

**Figure 12.** Tooth Replacement

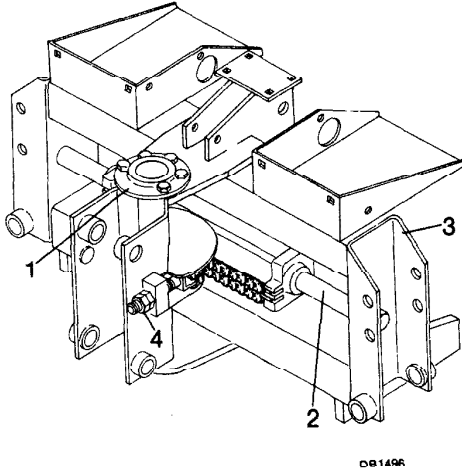
### **Swing Chain Adjustment (figure 13)**

Center boom to main frame. Loosen lock nuts on chain adjustment bolts and tighten nuts on adjustment rods until all slack is removed from chains.

## **IMPORTANT**

**Do not over-tighten chain. Over-tightening will cause excessive load and premature failure.**

Tighten lock nuts on chain adjustment bolts.



1. King post
2. Swing cylinder
3. Main frame
4. Chain adjustment

**Figure 13.** Chain Tightening & Bolt Torque

### King Post Bolt & Swing Cylinder Nut Inspection (figure 13)

The bolts on the king post and swing cylinder nuts were installed using Loctite® and should not loosen. However, they should be checked daily to be sure they are tight. Should any loosen, or when replacing them during a repair operation, clean bolts and nuts, apply Locquic® primer and Loctite. Tighten as outlined in torque chart.

### Hydraulic Hose & Fittings

Hydraulic hoses are severely worked on any backhoe. Examine them daily and replace if necessary.

Hose routing is very important. Make certain they can move freely, without kinking and cannot be damaged by pinching or cut by backhoe action.

Loctite & Locquic are registered trademarks of the Loctite Corporation.

When tightening hoses and fittings, always use two wrenches, one to hold hose and one to tighten fitting. This will prevent hose from twisting and kinking.

Always back lock nut off and screw fitting all the way in for fittings that must be positioned and that use "O" rings for sealing. Then hold in position and tighten lock nut.

### IMPORTANT

**Fittings with "O" rings and flange do not require additional sealant.**

- **Teflon tape should be used to seal pipe threads. Use care when applying teflon tape to prevent it from entering the hydraulic system.**

### Lubrication

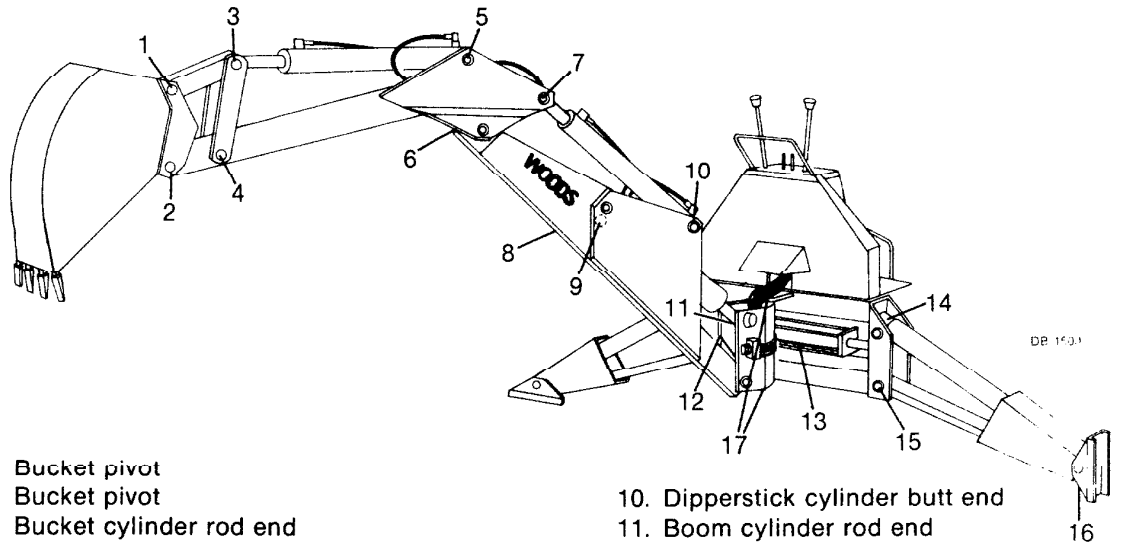
Do not let excess grease collect on or around parts, particularly when operating in sandy areas.

The accompanying illustration shows lubrication points for BH650 and BH750. Note that reference 8 is for BH650 only and reference 9 is for BH750 only.

It is recommended that all fittings be lubricated daily or every eight hours of operation. In very wet or dry conditions, lubricate every four hours of operation.

Extend boom, dipperstick and bucket and lower to ground for lubrication.

Periodically lubricate pivot points of control levers with oil.



- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>1. Bucket pivot</li> <li>2. Bucket pivot</li> <li>3. Bucket cylinder rod end</li> <li>4. Bucket pivot</li> <li>5. Bucket cylinder butt end</li> <li>6. Dipperstick pivot</li> <li>7. Dipperstick cylinder rod end</li> <li>8. Boom cylinder butt end BH650 only</li> <li>9. Boom cylinder butt end BH750 only</li> </ul> | <ul style="list-style-type: none"> <li>10. Dipperstick cylinder butt end</li> <li>11. Boom cylinder rod end</li> <li>12. Boom pivot</li> <li>13. Swing chain (oil)</li> <li>14. Stabilizer cylinder butt end (right &amp; left)</li> <li>15. Stabilizer pivot (right &amp; left)</li> <li>16. Stabilizer cylinder rod end (right &amp; left)</li> <li>17. Kingpost pivot (top &amp; bottom)</li> </ul> |
|---|--|

**Figure 14.** Lubrication Chart

## HYDRAULIC VALVE REPAIR (figure 15)

### Valve Repair Information

Before attempting backhoe valve repair, determine the configuration of the valve to obtain correct repair parts. Two valve configurations were used. Valves on backhoes with serial number 2000 and after have a special boom segment which incorporates a flapper check. This segment has the identification "10E" or "11" stamped on the face near fitting ports and also is machined to accept the flapper check as shown in figure 15 detail "Y". Valves on backhoes prior to serial number 2000 could have the special boom segment identified with "10E" or "11" installed as all repair valves are so equipped.

The special segment may be used as a repair in any Woods backhoe valve but you must make sure that a valve segment with the "10E" or "11" identification is only used in the boom segment position (see Plumbing Schematic figure 22).

When installing boom segment identified with "10E" or "11" which incorporates the flapper check, it is necessary to inspect the area around the second hole from the bottom of the segment (see detail "X" figure 15) that will be used adjacent to the boom segment to ensure it is flat and there are no scratches or other blemishes. Also inspect the flapper check (12), figure 15, to make sure all four

legs are in good condition and the sealing surface is free of imperfections. The flapper check (12) will not seat against imperfect surfaces or if the flapper check surface is imperfect.

Disconnect control rods from valve and leave in console. Be careful not to move adjustment.

Remove valve from backhoe and thoroughly clean exterior.

**NOTE:** The top tie rod hole (C) must be completely removed to remove valve from backhoe. Do not remove remaining tie rods.

Prepare a very clean work area. You will be wasting your time repairing a valve in a dirty area.

Remove nuts and lock washers from remaining tie rods.

**NOTE:** When removing inlet section with relief valve (6) be careful not to lose load check balls (5B) and load check retainer (5A). They will be used in reassembly.

Also use care when removing segment (13) retaining flapper check (12). It will be used in reassembly.

Remove inlet with relief valve (6). Remove and discard "O" rings (3A & 3B) and mylar shims (3C). This "O" ring arrangement will be the same between all segments except between tank section (2) and valve section (12) next to it which has five "O" rings (3A).

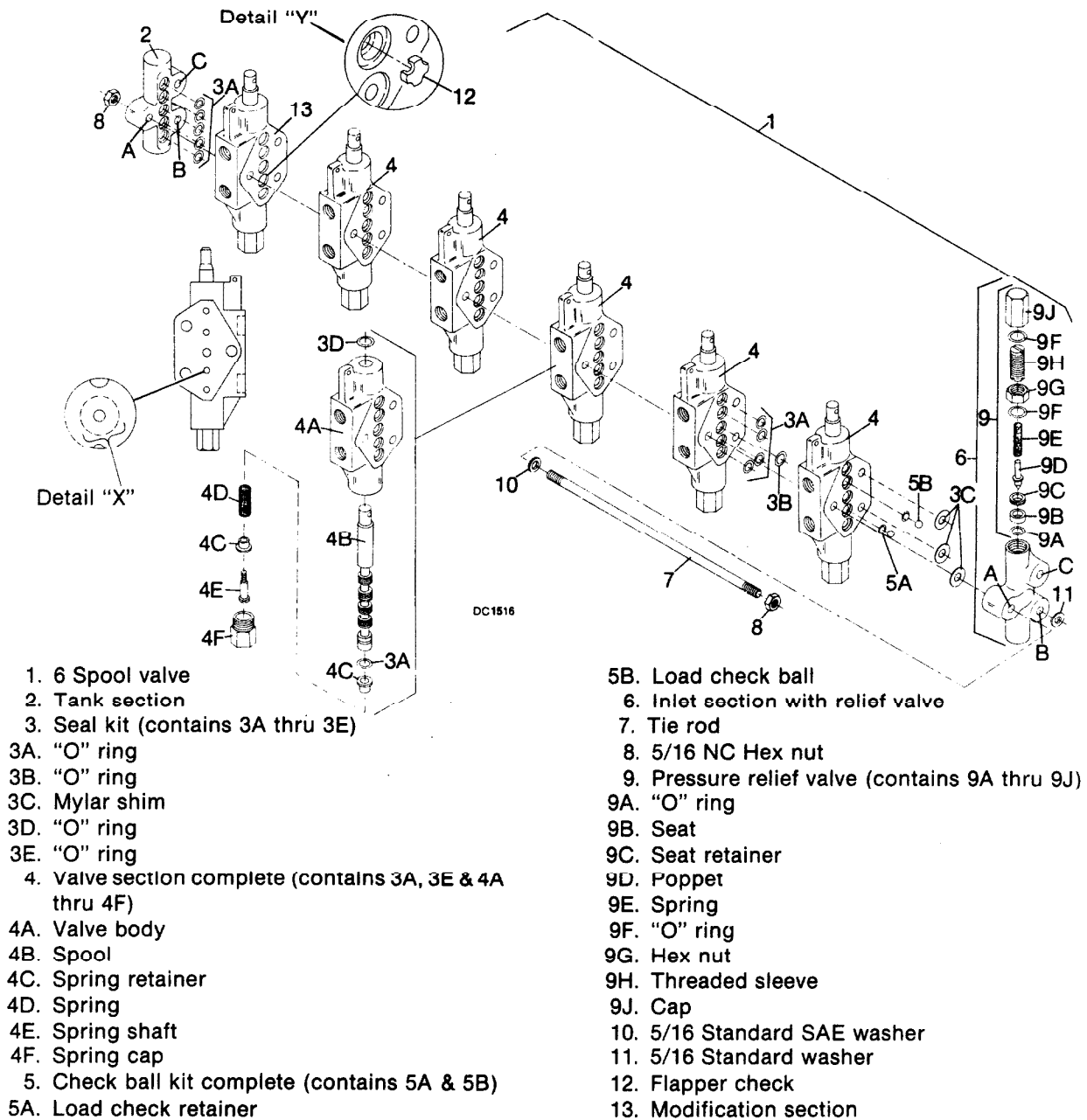


Figure 15. Valve Assembly

## IMPORTANT

All valve sections except (13) are interchangeable. Section (13) has a "10E" or "11" stamped on the face near the fitting ports and also has a machined area to accept the flapper check as shown. The internal parts of this section are identical to sections (4) and will be rebuilt as such.

Remove valve sections (4) one at a time, removing and discarding "O" rings and mylar shims.

Remove spring cap (4F) and push spool (4B) out through bottom of valve (4A). (Bottom is spring cap end.)

## IMPORTANT

Do not interchange spools from valve to valve. The valve and spool are a matched set.

Remove "O" ring (3E) from valve body (4A).

Remove spring, spring shaft and two spring retainers (4E, 4C & 4D) from spool (4B). Remove "O" ring (3A) from spool. (Spring shaft unscrews.)

Repeat on all valve sections.

**⚠ CAUTION** Always wear safety glasses when using air pressure to prevent damage to eyes and other injury.

### Valve Assembly (figure 15)

Inspect all valve components, removing any nicks or burrs from mating parts. Remove all sealant from ports. Replace any part that is worn or damaged.

Use a light grease or clean hydraulic oil on all "O" rings to hold them in place during assembly.

Install "O" ring (3E) in each valve section (4A). Make sure it is flat.

Install "O" ring (3A) on spool (4B). Be sure it is not twisted.

Install spring and spring retainer (4C & 4D) and secure in place with spring shaft (4E). Torque spring shaft to 30 in./lbs.

Be sure spools and valves remain in matched sets. Lubricate spool with clean hydraulic oil and insert spool into valve body with a twisting motion.

Install spring cap (4F) on valve body (4A).

Start a 5/16 nut on each tie rod. Install a 5/16 standard washer on rod A and a 5/16 SAE washer on rod B.

Insert rods through the holes in tank section (2). Be sure to place rods with washers in holes specified.

Place tank section in a vise or on a flat surface with rods vertical.

Place "O" rings (3A) in tank section seats. Place a mylar shim over each tie rod and push firmly against tank section.

Install complete valve section (13) over rods and against tank section. Use care not to disturb tank section "O" rings. Be careful when installing flapper check (12) to prevent it from dropping into valve.

Install the smaller "O" rings (3A) in the four outside seats of valve section (13) and a larger "O" ring (3B) in the center seat.

Install a mylar shim over each tie rod and repeat this procedure for the remaining valve sections. Do not install "O" rings in last valve section.

Before installing "O" rings in last valve section, install load check retainers (5A) in seats on either side of center seat where larger "O" rings is used, place center prongs up.

Install "O" rings (3A) in four outside seats and "O" ring (3B) in center seat. Place mylar shims over tie rods.

Install load check balls (5B) on top of load check retainers (5A).

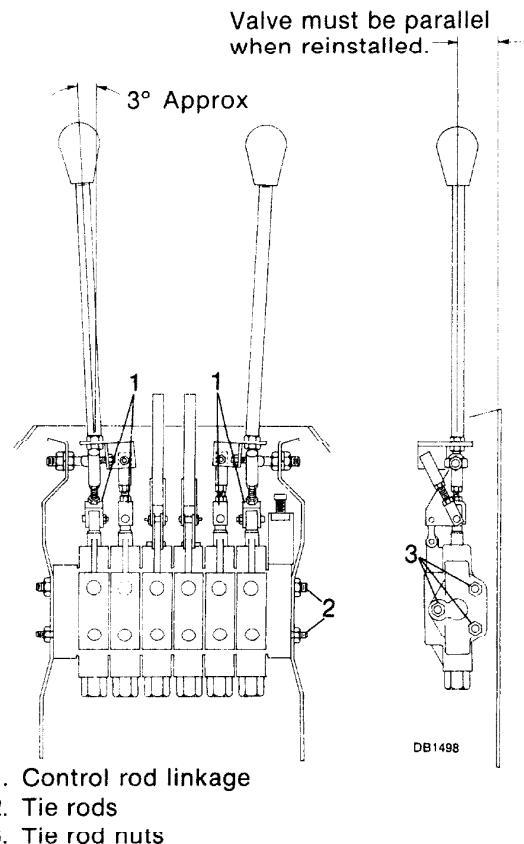
Install inlet section with relief valve (6) over tie rods. Install a 5/16 standard washer on rod A and a 5/16 SAE washer on rod B. Snug nuts on rod A but do not tighten nuts on rod B or C.

Be very careful when installing valve. Prevent valve segments from rotating around the one snug bolt and shift "O" rings out of position. Valve could leak if "O" rings are not properly seated.

### Installing Valve (figures 15 & 16)

Remove rod C from valve and slip nuts and washers of rod B outside of console when positioning valve in console. Insert rod C through console and valve and install 5/16 nut.

Position valve parallel with console and tighten nuts evenly. Torque to 125 in./lbs.



1. Control rod linkage
2. Tie rods
3. Tie rod nuts

Figure 16. Valve Installation

Reconnect control rods to valve. Adjustment of control rod linkage should not be necessary unless it was disturbed. Control handles should be parallel with console and tilt out approximately 3° as shown.

## HYDRAULIC CYLINDER REPAIR

A clean working area is necessary for any hydraulic repair. Repairing hydraulic components in a dirty area is a waste of time.



### CAUTION

Always wear safety glasses when using air pressure to prevent damage to eyes and other injury.

### Threaded Collar Style Cylinder (Figure 17)

#### Disassembly

Unscrew threaded collar (2) from barrel (9). Pull on rod (4) to remove piston from barrel.

Use protective jaws on a bench vise and clamp cross pin end of rod assembly (4) in vise. Remove lock nut (6) from rod assembly. Remove piston (7) and gland (8) from rod.

Remove and discard all seals, wear rings and "O" rings.

Clean all components in solvent and blow dry with low pressure air.

#### Assembly

Lubricate "O" rings and seals with clean hydraulic fluid.

Install "O" ring (3E) in exterior "O" ring groove of gland (8).

Install rod seal (3F) into inner groove of gland with V-groove toward piston.

Install rod wiper (3G) in outer gland groove.

Slide gland assembly (8) onto rod.

Place wear ring (3B) in wide groove of piston. Place "O" ring (3C) and piston seal (3D) in narrow piston groove.

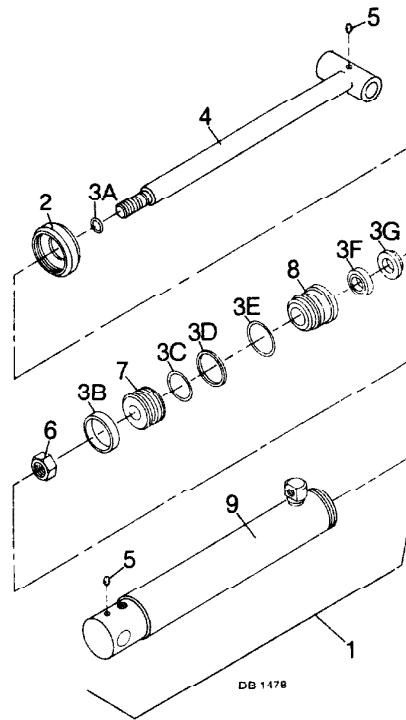
Apply a light coat of clean grease on rod threads and install "O" ring (3A) over threads into groove.

Install piston onto rod with wear ring on side away from gland.

Install nut (6) and torque to 175 ft./lbs.

Carefully insert piston and rod into barrel. It will be necessary to compress wear ring and piston seal to avoid damage during installation.

Screw threaded collar onto barrel and tighten.



1. 2 x 16-3/4 Hydraulic cylinder
2. Collar
3. Seal kit (contains 3A - 3G)
- 3A. Rod static seal
- 3B. Wear ring
- 3C. "O" ring
- 3D. Piston seal
- 3E. Gland static seal
- 3F. Rod seal
- 3G. Rod wiper
4. Rod assembly
5. 1/4-28 Grease fitting
6. 7/8 NC Self lock hex nut
7. Piston
8. Gland
9. Barrel assembly

**Figure 17.** Hydraulic Cylinder Threaded Collar Style



**Lock Wire or Threaded Plug Style Cylinder (figure 18)**

Cylinders used in the same application are provided from two suppliers.

One uses a lock wire and one uses a threaded plug for locking devices.

Lock wire cylinders can be identified by the "L" stamped on butt end of cylinder or no markings on the butt end.

All threaded plug cylinders have an "E" stamped on butt end of cylinder.

Be sure to make proper manufacturer identification before ordering repair parts.

**Lock Wire Removal**

Insert a screwdriver into slot in barrel. Pry up on end of lock wire and turn gland until lock wire feeds out through slot.

**Threaded Plug Removal**

Unscrew threaded plug using a spanner wrench or carefully use punch and hammer to remove.

**Disassembly**

Remove piston and rod assembly from barrel.

Clamp cross pin end of rod assembly in vise with protective jaws. Remove locknut from rod.

Remove and discard all seals, wear rings and "O" rings.

Clean all components in solvent and blow dry with low pressure air.

**Assembly**

Lubricate "O" rings and seals with clean hydraulic fluid.

Assemble, using exploded view. Note that items (4B) and (4H) are used with lock wire cylinder only. Note that items (4J) and (9) are used with threaded plug cylinder only.

Torque locknut to 175 ft. lbs.

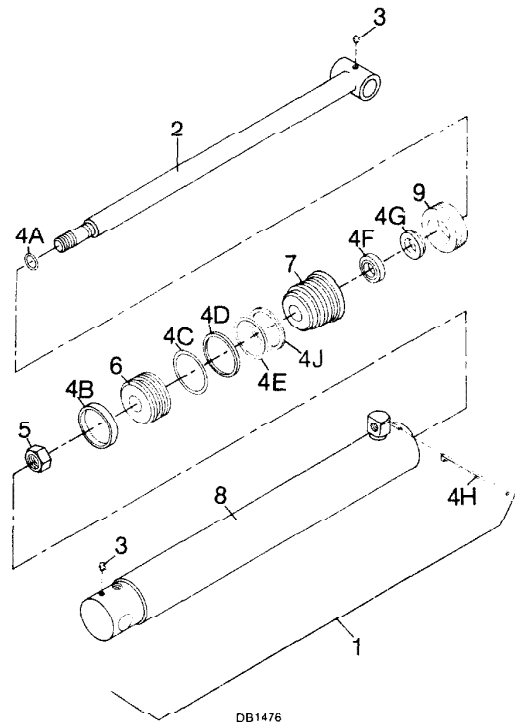
Carefully insert piston and rod into barrel. It will be necessary to compress wear ring and piston seal to avoid damage during insertion.

**Lock Wire Installation**

Rotate gland until lock wire starting hole in gland is visible through slot in barrel. Insert lock wire hook into hole and pull into groove by rotating gland until wire is completely seated.

**Threaded Plug Installation**

Screw threaded plug into cylinder using a spanner wrench or carefully use a punch and hammer.



DB1476

- 1. 2-1/2 x 16-3/4 Hydraulic cylinder
- 2. Rod assembly
- 3. 1/4-28 Grease fitting
- 4. Seal kit (contains 4A - 4J)
- 4A. Rod static seal
- \*4B. Wear strip
- 4C. "O" Ring
- 4D. Piston seal
- 4E. Gland static seal
- 4F. Rod seal
- 4G. Rod wiper
- \*4H. Lock wire
- \*\*4J. Back-up washer
- 5. 7/8 NC Self lock hex nut
- 6. Piston
- 7. Gland
- 8. Barrel assembly
- 9. Threaded retainer

\* Lock wire cylinders only  
 \*\* Threaded plug cylinders only

**Figure 18. Hydraulic Cylinder**

## Swing Cylinder (figure 19)

### Disassembly

Remove hex nuts (4) from tie rods (2).

Remove both piston rod guides (5) from barrel (6). Remove and discard rod wiper and seal (3A & 3B) from each piston rod guide.

Remove rod assembly (7) from barrel (6). Remove and discard seals.

Clean all components in solvent and blow dry with low pressure air.

### Assembly

## IMPORTANT

Be sure to make proper manufacturer identification, then refer to either the "E" or "L" column when ordering parts.

Lubricate seals and wipers with hydraulic fluid.

Install "O" ring (3D) in groove on piston and piston seal (3E) on top of "O" ring in piston groove.

Carefully insert piston and rod into barrel. Piston seal must be compressed to insert.

Swing cylinders are obtained from two suppliers. All items except the barrel (6) and rod assembly (7) are interchangeable between the cylinders. When ordering either of these items, make sure of the manufacturer identification. "Energy" barrels have an "E" stamped into the barrel. "Lantex" barrels with either have an "L" stamped in the barrel or will be unmarked. An "Energy" barrel will not work with a "Lantex" rod assembly. A "Lantex" barrel will not work with an "Energy" rod assembly.

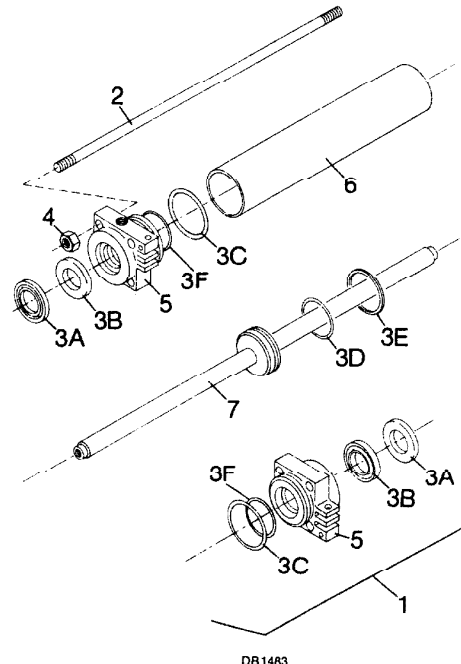
The seal kit contains repairs for both cylinders. Item (3F) backup ring is not used on item (5) piston rod guide with the word "Lantex" in the casting.

Place backup ring (3F) **if required** into groove on piston rod guide (5) then install "O" ring (3C) into groove. Install rod seal (3B) with V-groove toward piston into each piston rod guide inner groove.

Install rod wiper seal (3A) into each piston rod guide outer groove.

When installing piston rod guides to barrel, make sure chain fastening lugs are positioned properly. With cylinder in front of you, place right rod guide with chain lugs on top and left rod guide with chain lugs on bottom as illustrated.

Insert the four tie rods (2) with rod guide chain lug hole centerlines parallel. Torque nuts to 20 ft./lbs.

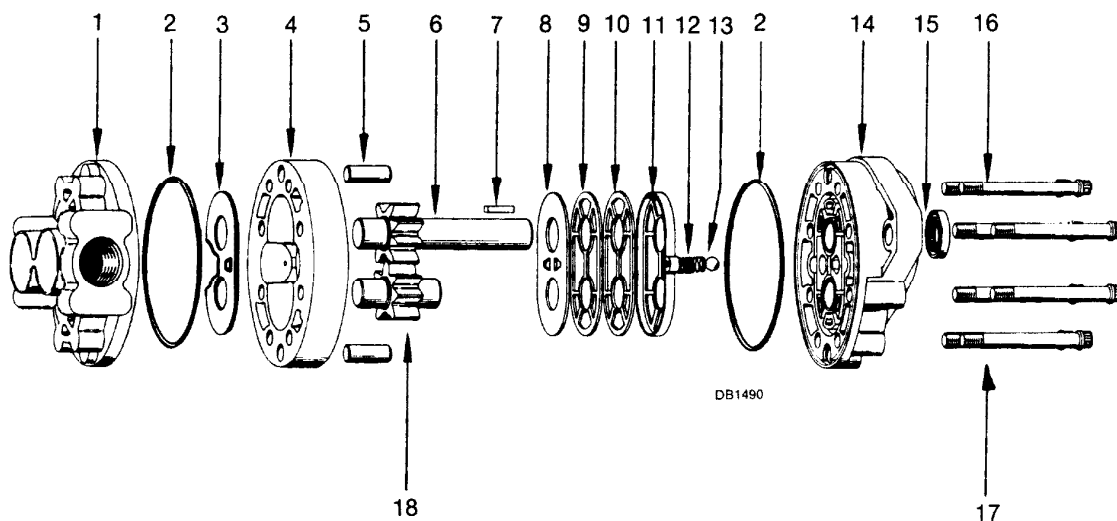


1. Hydraulic swing cylinder complete
2. 7/16 NF x 16 Tie rod
3. Seal kit (contains 3A - 3F)
- 3A. Rod wiper
- 3B. Rod seal
- 3C. Gland static seal
- 3D. "O" Ring
- 3E. Piston seal
- 3F. Backup ring\*\*
4. 7/16 NF Hex nut
5. Piston rod guide
6. Barrel
7. Rod assembly

\*\* (3F) not used on Lantex

Figure 19. Hydraulic Swing Cylinder

# SEAL KIT INSTRUCTIONS



- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Back plate assembly</li> <li>2. "O" ring</li> <li>3. Thrust plate</li> <li>4. Body</li> <li>5. Dowel pin</li> <li>6. Drive gear assembly</li> <li>7. Key - .250 x .969 special</li> <li>8. Diaphragm</li> <li>9. Backup gasket</li> </ol> | <ol style="list-style-type: none"> <li>10. Protector gasket</li> <li>11. Diaphragm seal</li> <li>12. Spring</li> <li>13. Steel ball</li> <li>14. Front plate assembly</li> <li>15. Shaft seal</li> <li>16. Tie bolt</li> <li>17. Tie bolt</li> <li>18. Idler gear assembly</li> </ol> |
|---|---|

**Figure 20. Pump Assembly**

## DISASSEMBLY

- (1) Remove key (7) from shaft.
- (2) Clean outside of pump thoroughly.
- (3) Clamp pump in vise, shaft up.
- (4) Remove tie bolts (16) four each.
- (5) Remove tie bolts (17) four each.
- (6) Use sharp tool to mark across front plate, body and back plate. This will assure proper reassembly.
- (7) Remove pump from vise — hold pump in hands and bump shaft against a wooden block to separate front plate (14) from back plate (1). Body (4) will remain with either front plate or back plate.
- (8) To separate body from section it remains with, place drive gear (6) in bearing and tap protruding end with plastic hammer.
- (9) Remove thrust plate (3) from back plate.
- (10) Remove "O" ring (2) from back plate.
- (11) Remove "O" ring (2) from front plate.
- (12) Remove diaphragm (8) from front plate by prying with sharp tool.
- (13) Lift springs (12) two each and steel balls (13) two each, from front plate.

- (14) Lift back-up gasket (9) and protector gasket (10) from front plate.
- (15) Lift diaphragm seal (11) from front plate.
- (16) Remove shaft seal (15) from plate.

## Inspect Parts For Wear

### General

- (1) Clean and dry all parts.
- (2) Remove nicks and burrs from all parts with emery cloth.

### Gear Assembly

- (1) Inspect drive gear shaft (6) for broken keyway.
- (2) Inspect both the drive gear and idler gear shafts at bearing points and seal area for rough surfaces and excessive wear.
- (3) If shafts measure less than .873" in bearing area, the gear assembly should be replaced. (One gear assembly may be replaced separately; shafts and gears are available as assemblies only.)
- (4) Inspect gear face for scoring and excessive wear.

- (5) If gear width is below the following figures — gear assembly should be replaced.

Pump Disp. - 2.10      Gear Width - 1.067

- (6) Assure that snap rings are in grooves on either side of drive and idler gears.  
(7) If edge of gear teeth are sharp — break edge with emery cloth.

#### Front & Back Plates

- (1) Oil grooves in bearings in both front and back plate should be in line with dowel pin holes and 180° apart. This positions the oil grooves closest to the respective pin holes.  
(2) If I.D. of bearings in front plate or back plate exceed .879" — front or back plate should be replaced. (Bearings are not available as separate items.)  
(3) Bearings in front plate should be flush with islands in groove pattern.

#### Body

- (1) Check inside gear pockets for excessive scoring or wear.  
(2) Body should be replaced if I.D. of gear pocket exceeds 2.107".

#### REASSEMBLY

- (1) The thrust plate, diaphragm, back-up gasket, protector gasket, diaphragm seal, shaft seal and "O" rings should be replaced as new parts.  
(2) Install "O" ring (2) in groove in front plate (14).  
(3) Tuck diaphragm seal (11) into grooves in front plate with open part of "V" section down. (Use dull tool.)  
(4) Press protector gasket (10) and back-up gasket (9) into diaphragm seal.  
(5) Drop steel balls (13) into respective seats and place springs (12) over balls.  
(6) Place diaphragm (8) on top of back-up gasket, bronze face up.  
(7) Entire diaphragm must fit inside the raised rim of the diaphragm seal.  
(8) Dip gear assemblies into oil and slip into front plate bearings.  
(9) Install dowel pins (5) in body (4).  
(10) Apply a thin coat of heavy grease to both milled faces of body. Slip body over gears onto front plate — half moon port cavities in body must face away from front plate. Note small drilled hole in one of cavities. This hole must be on pressure side of pump.  
(11) Install thrust plate (3) — bronze face toward gears — side with mid-section cut away must be on suction side of pump. Thrust plate must fit inside gear pockets.  
(12) Install "O" ring (2) in groove in back plate (1).  
(13) Slide back plate over gear shafts until dowel pins are engaged.

- (14) Install bolts (16) and (17) and tighten evenly to 40 ft./lbs. torque.  
(15) Work shaft seal over drive gear shaft taking care not to cut rubber sealing lip. (Oil seal liberally before installing.)  
(16) Place 1-5/16" OD sleeve over shaft and seat shaft seal by driving with plastic hammer.  
(17) Rotate pump shaft by hand or with pliers. Pump will have small amount of drag, but should turn freely after short period of use.

#### General Information

Direction of rotation on all "L" Series Pumps with two ball checks in the front plate may be reversed by removing the tie bolts and rotating **back plate, thrust plate and body** 180°.

It is important that the relationship of the back plate, thrust plate, body and front plate is correct. You will note two half moon cavities in the body which must face away from the front plate. Note also a small drilled hole in one of these cavities. This hole must be on the pressure side of the pump. Side of thrust plate with mid-section cut away must be on suction side of pump.

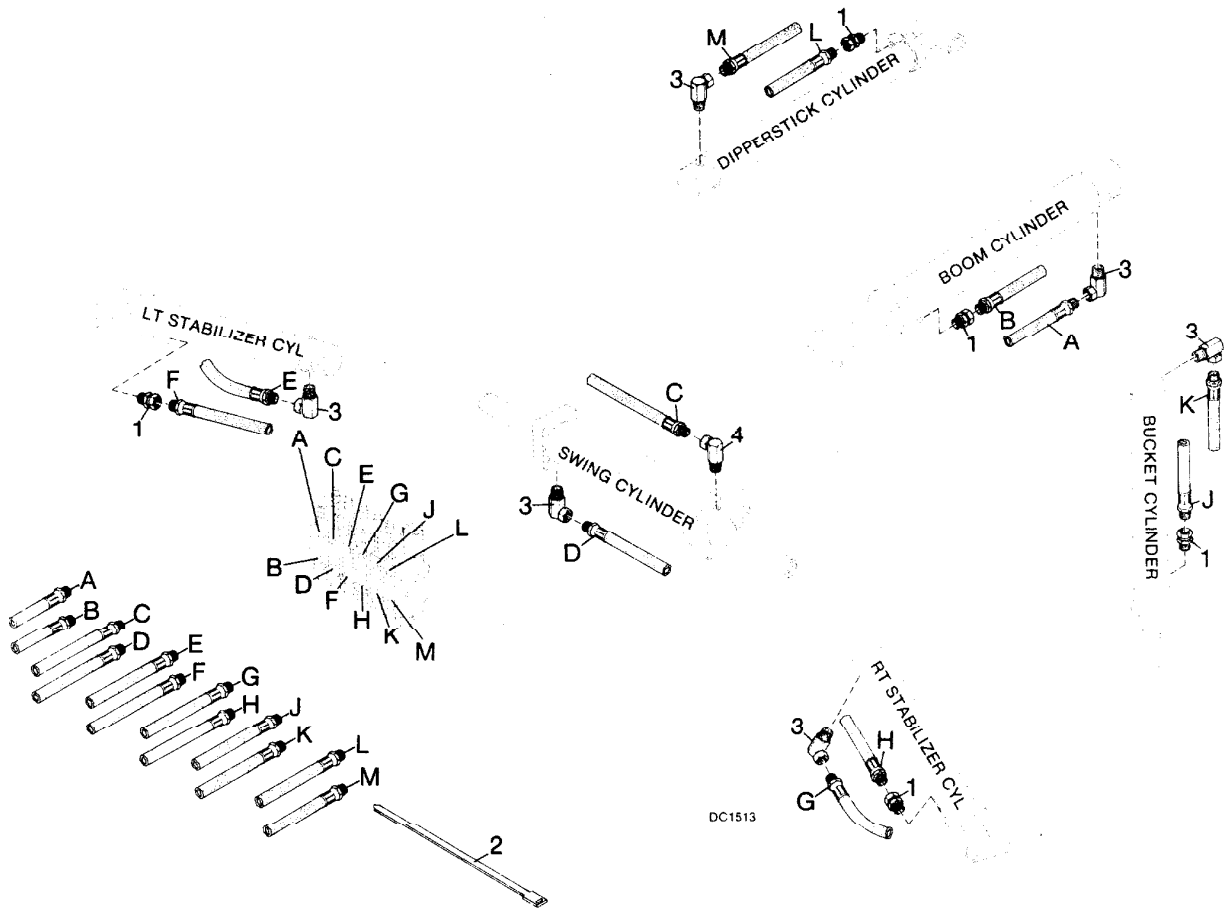
Suction side of back plate is always side with larger port boss. Pumps using only one ball check in the front plate cannot be reversed.

#### Placing Pump Back Into Service

- (1) If shop test stand is available the following procedure for testing rebuilt pumps is recommended:
- Mount pump on test stand making sure that the proper level of clean oil is available in the reservoir. Check suction line for leaks and obstructions.
  - Start pump and run for three minutes at zero pressure.
  - Intermittently load pump to 500 psi for three minutes.
  - Intermittently load pump to 1000 psi for three minutes.
  - Intermittently load pump to 2000 psi for three minutes.
  - Remove pump from test stand and check for freeness of drive shaft. Check for leaks.
- (2) If shop test stand is not available, the following procedure for testing rebuilt pumps is recommended:
- Mount pump on equipment and run pump at ½ engine speed at zero pressure.
  - By operating control valve, build pressure intermittently for three minutes.
  - Increase engine speed to full throttle and build pressure intermittently for three minutes.
  - Idle engine and check for leaks.

# NOTES

# PLUMBING SCHEMATIC

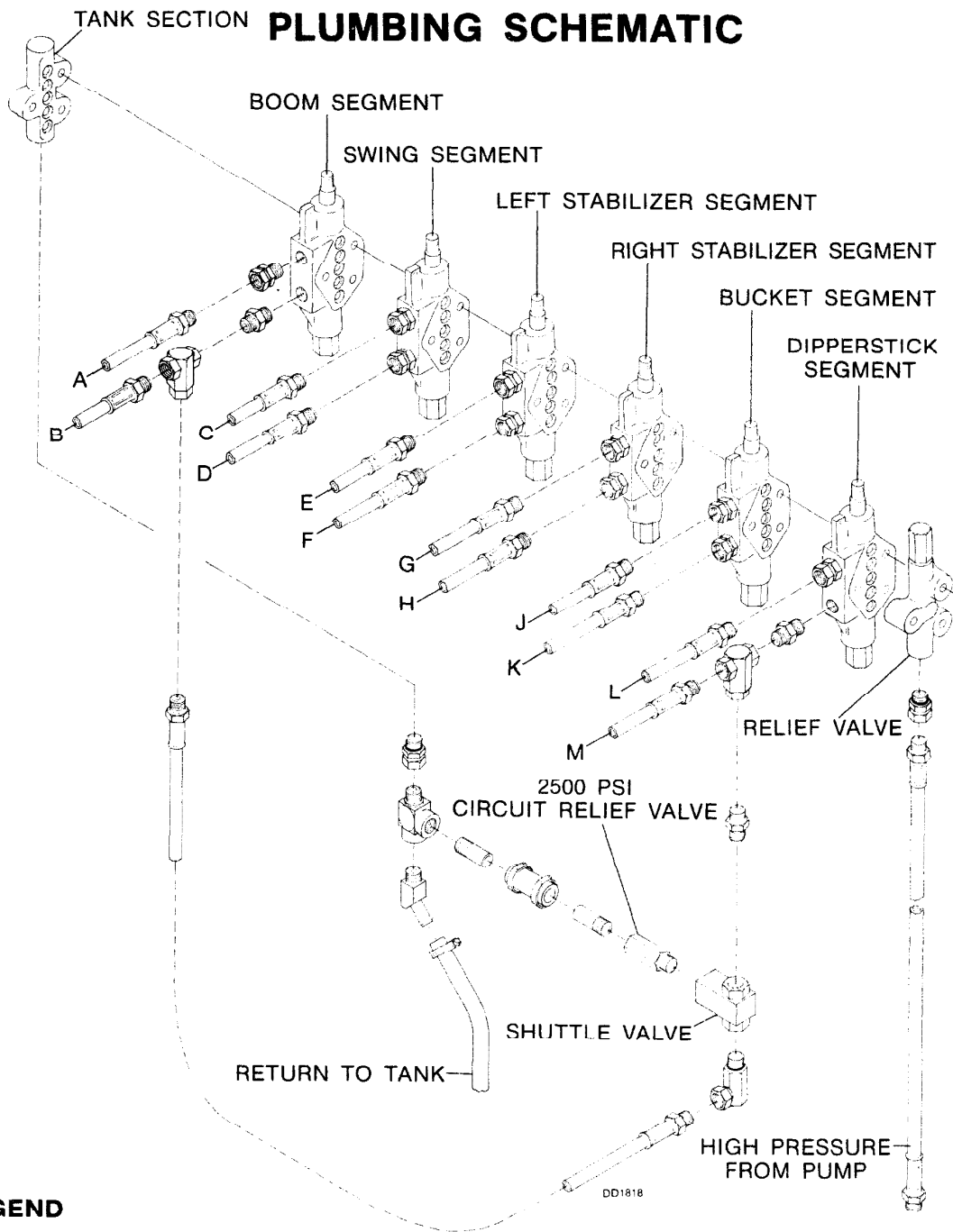


Letters are for hose connection location (see page 29 for legend).  
Use this figure and figure 22 for plumbing schematics.

1. 1/4 x 1/4 Straight adapter union
2. 7" Hose tie
3. 1/4 x 1/4 90° Adapter union
4. 1/4 x 1/4 90° Adapter union with 1/16 restrictor

This drawing is for the BH650. The BH750 has the same routing but uses a 1/4 x 1/4 straight adapter union with 3/32 restrictor in the rod end of the boom cylinder.

**Figure 21. Plumbing Schematic**



**Figure 22.** Plumbing Schematic

# TROUBLE SHOOTING

Problem	Causes	Remedies
1. Noisy pump caused by cavitation	<ul style="list-style-type: none"> <li>a. Oil too heavy</li> <li>b. Oil filter plugged</li> <li>c. Suction line plugged or too small</li> </ul>	<ul style="list-style-type: none"> <li>a. Change to proper viscosity.</li> <li>b. Clean filters.</li> <li>c. Clean line and check for size.</li> </ul>
2. Oil heating	<ul style="list-style-type: none"> <li>a. Oil supply low</li> <li>b. Contaminated oil</li> <li>c. Setting of relief valve too high or too low.</li> <li>d. Oil in system too light</li> <li>e. Pump operating too fast</li> </ul>	<ul style="list-style-type: none"> <li>a. Fill reservoir.</li> <li>b. Drain reservoir, change filter and refill with clean oil.</li> <li>c. Set to correct pressure.</li> <li>d. Drain reservoir and refill with proper viscosity oil.</li> <li>e. Use 540 rpm PTO speed. Never exceed 700 rpm PTO speed.</li> </ul>
3. Shaft seal leakage	<ul style="list-style-type: none"> <li>a. Worn shaft seal</li> <li>b. Broken diaphragm seal or back-up gasket</li> <li>c. Bearings out of position</li> <li>d. Excessive internal wear</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace shaft seal.</li> <li>b., c. &amp; d. If replacing the shaft seal does not stop leakage the pump should be disassembled &amp; checked for items b., c. &amp; d.</li> </ul>
4. Foaming oil	<ul style="list-style-type: none"> <li>a. Low oil level</li> <li>b. Air leaking into suction line</li> <li>c. Wrong kind of oil</li> <li>d. Moisture in oil</li> </ul>	<ul style="list-style-type: none"> <li>a. Fill reservoir.</li> <li>b. Tighten fittings.</li> <li>c. Drain and fill reservoir with non-foaming oil.</li> <li>d. Keep oil temperature below 180° and continue to operate as oil dries out, or replace oil and purge system if foaming is excessive.</li> </ul>
5. Boom drops as dipperstick or bucket cylinder lever is activated while boom control is in raised position.	<ul style="list-style-type: none"> <li>a. Pump speed too slow</li> <li>b. Restrictor not in system (750 only)</li> <li>c. Oil too light</li> <li>d. System hot</li> <li>e. Attempting to run with all controls fully actuated</li> <li>f. Flapper check not seating properly</li> </ul>	<ul style="list-style-type: none"> <li>a. Use 540 rpm PTO speed. Never exceed 700 rpm PTO speed.</li> <li>b. Check fitting in rod end of boom cylinder to make sure there is a 3/32 restrictor fitting installed (750 only).</li> <li>c. Drain reservoir and refill with proper viscosity oil.</li> <li>d. See problem 2 above.</li> <li>e. Proper operation requires feathering of various functions to obtain desired results</li> <li>f. Check boom valve segment. If it incorporates a flapper check it will be identified with a "10E" or "11" stamped in the face of the valve near the fitting ports. See Maintenance section for repair and seating information. A repair segment is available to be installed in valves that do not have the flapper check incorporated (see Maintenance section of this manual).</li> </ul>



# INDEX TO PARTS LISTS

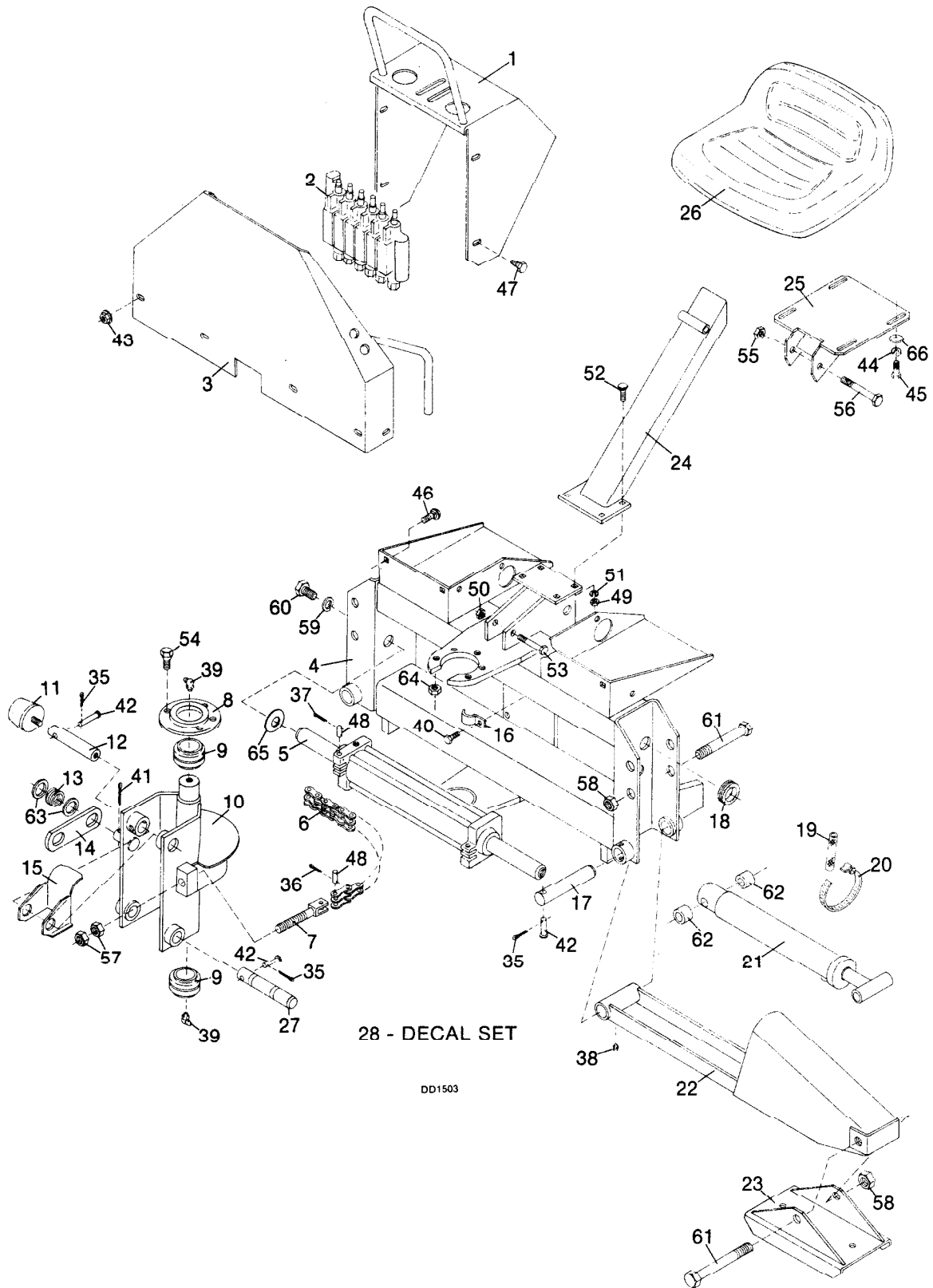
## BH650 PARTS INDEX

Main Frame .....	32 & 33
Boom Assembly .....	34
Dipperstick .....	34
Bucket .....	34
Hoses & Fittings .....	35
Tank & Pump .....	40
Pump .....	41
Valve .....	42
Valve Controls & Hardware .....	43
Saf-T-Lok™ Hitch .....	44
Swing Cylinder .....	44
Dipperstick & Bucket Cylinder .....	45
Stabilizer Cylinder .....	45
Boom Cylinder .....	46

## BH750 PARTS INDEX

Main Frame .....	36 & 37
Boom Assembly .....	38
Dipperstick .....	38
Bucket .....	38
Hoses & Fittings .....	39
Tank & Pump .....	40
Pump .....	41
Valve .....	42
Valve Controls & Hardware .....	43
Saf-T-Lok™ Hitch .....	44
Swing Cylinder .....	44
Bucket Cylinder .....	45
Stabilizer Cylinder .....	46
Boom & Dipperstick Cylinder .....	46

# BH650 MAIN FRAME ASSEMBLY



28 - DECAL SET

DD1503

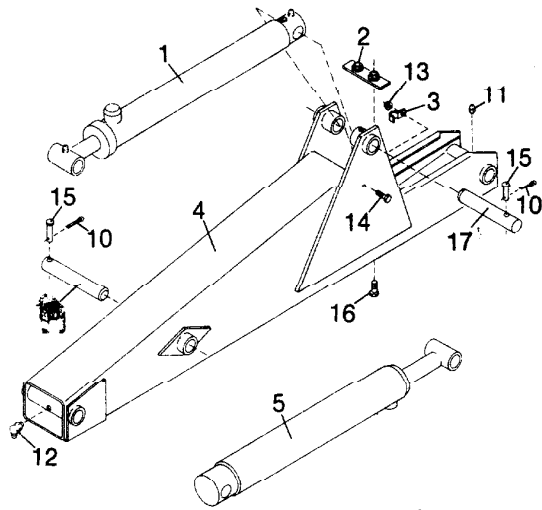
## BH650 MAIN FRAME ASSEMBLY

Main Frame ..... 32 & 33

Ref. No.	Part No.	No Used	Description	Ref. No.	Part No.	Description
1	31220	1	Console cover	35	OL*	1/16 x 1/2 Cotter pin
2	31900	1	6 Spool valve complete (see page 42 for breakdown)	36	OL*	3/32 x 1/2 Cotter pin
3	31215	1	Valve console assembly	37	OL*	3/32 x 1-1/2 Cotter pin
4	62354	1	Main frame assembly	38	OL*	1/4-28 Grease fitting
5	62402	1	Swing cylinder (see page 44 for breakdown)	39	OL*	1/4-28 90° Grease fitting
6	62405	2	Swing chain	40	OL*	1/4 NC x 3/4 Hex head cap screw GR5
7	62404	2	Chain tension bolt	41	OL*	1/4 x 1-1/2 Cotter pin
8	62327	1	Kingpost cap	42	62425	1/4 x 1-7/8 Clevis pin
9	62383	2	1-1/2 ID Ball bearing	43	14139	5/16 NC Flange lock nut
10	62342	1	Kingpost assembly	44	OL*	5/16 Lock washer
11	62440	2	Bumper pad assembly	45	OL*	5/16 NC x 3/4 Hex head cap screw GR5
12	62504	1	1 x 5-7/8 Pivot pin	46	OL*	5/16 NC x 3/4 Carriage bolt
13	62072	1	Compression spring	47	27610	5/16 x 3/4 Sheet metal screw
14	62407	1	Transport latch	48	62399	5/16 x 1-1/4 Chain pin
15	62400	1	Hose guide	49	OL*	3/8 NC Hex nut
16	62269	2	Hose clamp	50	OL*	3/8 NC Lock nut
17	62295	2	1 x 6-1/4 Pivot pin	51	OL*	3/8 Lock washer
18	62384	2	Rubber grommet	52	OL*	3/8 NC x 1 Carriage bolt
19	62321	2	Hose clamp protector	53	OL*	3/8 NC x 3 Hex head cap screw GR5
20	62319	2	Adjustment hose clamp	54	OL*	7/16 NF x 1-1/4 Wheel bolt
21	62339	2	Stabilizer cylinder (see page 45 for breakdown)	55	OL*	1/2 NC Lock nut
22	62331	2	Stabilizer assembly	56	OL*	1/2 NC x 4 Hex head cap screw GR5
23	62312	2	Stabilizer pad assembly	57	OL*	5/8 NC Hex nut
24	62248	1	Seat support	58	OL*	3/4 NC Lock nut
25	62244	1	Seat bracket	59	OL*	3/4 Lock washer
26	30039	1	Seat	60	4616	3/4 NC x 1-1/2 Hex head cap screw GR5
27	62266	1	1 x 7-1/2 Pivot pin	61	2377	3/4 NC x 6 Hex head cap screw GR5
28	31406	1	Decal Set	62	62512	13/16 x 1-1/4 x 1 Bushing
				63	62075	1 x 10 GA Washer
				64	62528	7/16 NF Hex locknut
				65	11204	13/16 x .010 Shim washer
				66	4378	5/16 Standard flat washer

\*Obtain Locally

## BH650 BOOM ASSEMBLY



Ref. No.	Part No.	No. Used	Description
1	62261	1	2 x 16-3/4 Dipperstick hydraulic cylinder (see page 45 for breakdown)
2	31271	1	Hose retainer assembly
3	62269	2	Hose clamp
4	62290	1	Boom assembly
5	62290	1	2-1/2 x 16-3/4 Boom hydraulic cylinder (see page 46 for breakdown)

### HARDWARE

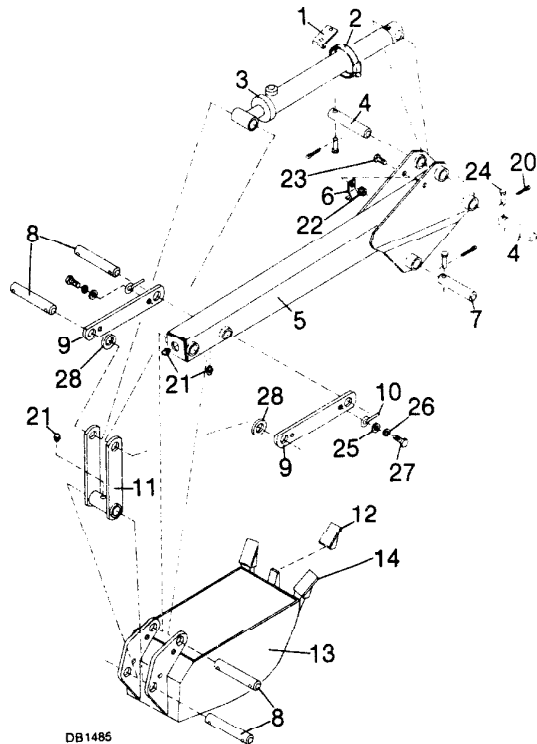
Ref. No.	Part No.	Description
10	62523	1/16 x 1/2 Cotter pin
11	1972	1/4-28 Grease fitting
12	2985	1/4-28 90° Grease fitting
13	62521	1/4 NC Flange lock nut
14	2457	1/4 NC x 3/4 Hex head cap screw GR5
15	62425	1/4 x 1-7/8 Clevis pin
16	6250	5/16 NC x 1-1/4 Hex head cap screw GR5
17	62292	1 x 5-13/16 Pivot pin
18	62295	1 x 6-1/4 Pivot pin

## BH650 DIPPERSTICK & BUCKET ASSEMBLY

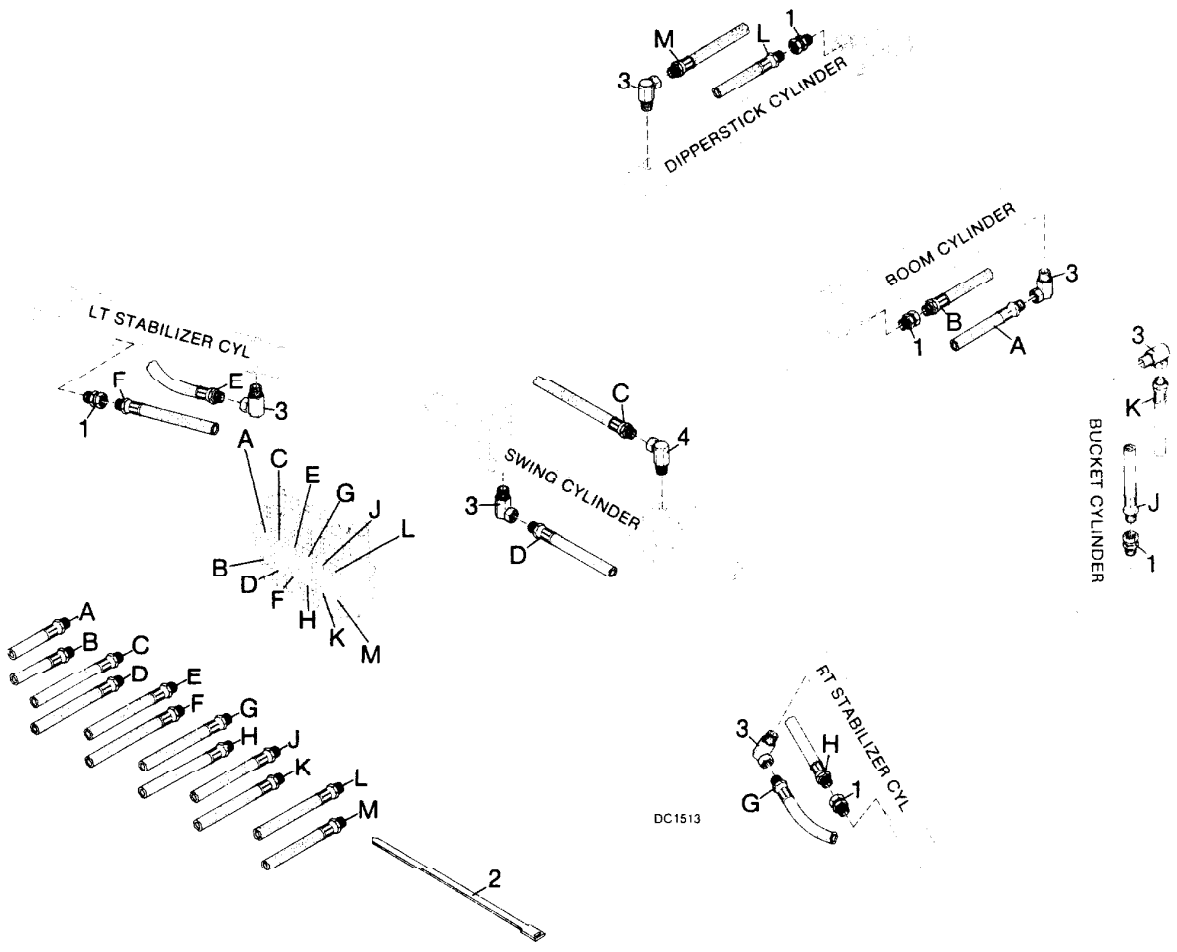
Ref. No.	Part No.	No. Used	Description
1	62263	1	Slow moving vehicle bracket
2	62259	1	Hose clamp
3	62261	1	2 x 16-3/4 Hydraulic cylinder (Bucket) (see page 45 for breakdown)
4	62267	2	1 x 4-7/8 Pivot pin
5	62274	1	Dipperstick assembly
6	62269	2	Hose clamp
7	62266	1	1 x 7-1/2 Pivot pin
8	62265	4	1 x 5-1/2 Pivot pin
9	62270	2	Link arm
10	62264	8	Retainer pin
11	62271	1	Bucket arm assembly
12	62668	AR	Bucket tooth
13	8850	1	Bucket - 10"
	-or-		
13	8851	1	Bucket - 12"
	-or-		
13	8852	1	Bucket - 16"
	-or-		
13	8853	1	Bucket - 24"
14	62660	AR	Tooth and shank assembly

### HARDWARE

Ref. No.	Part No.	Description
20	62523	1/16 x 1/2 Cotter pin
21	6270	1/4-28 Tapered thread grease fitting
22	62521	1/4 NC Flange lock nut
23	5337	1/4 NC x 1/2 Hex head cap screw GR5
24	62425	1/4 x 1-7/8 Clevis pin
25	4378	5/16 Standard washer
26	2472	5/16 Lock washer
27	6096	5/16 NC x 3/4 Hex head cap screw GR5
28	1863	1" SAE Washer

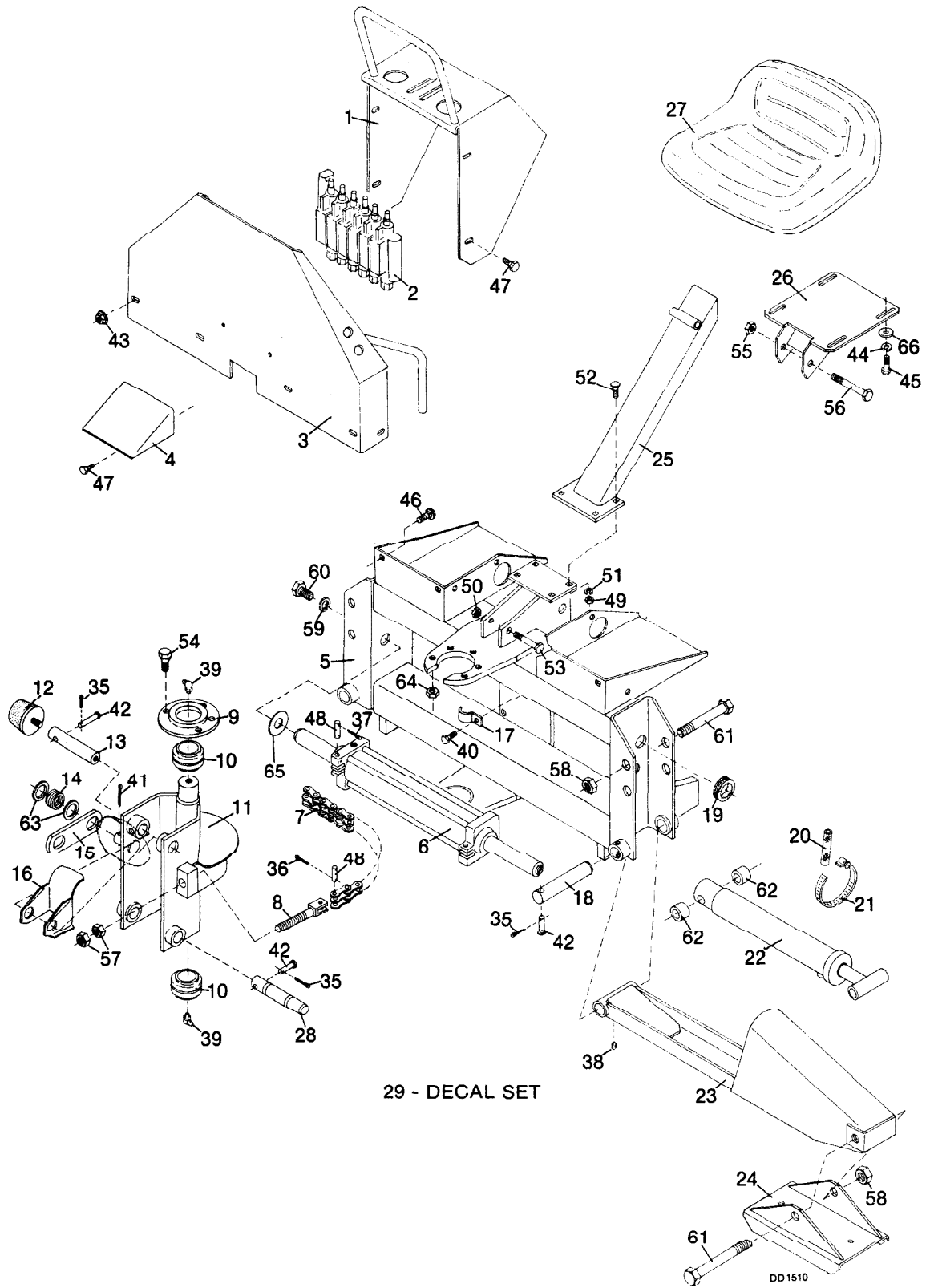


## BH650 HOSES & FITTINGS



Ref. No.	Part No.	No. Used	Description
1	31240	5	1/4 x 1/4 Straight adapter union
2	31407	2	1/4" Hose tie
3	8572	6	1/4 x 1/4 90° Adapter union
4	10290	1	1/4 x 1/4 90° Adapter union with 1/16 restrictor
A	8551	2	1/4 x 72 High pressure hose asy
B	8551	2	1/4 x 72 High pressure hose asy
C	31237	-	1/4 x 45 High pressure hose asy
D	31237	-	1/4 x 45 High pressure hose asy
E	31237	-	1/4 x 45 High pressure hose asy
F	31237	-	1/4 x 45 High pressure hose asy
G	31237	-	1/4 x 45 High pressure hose asy
H	31237	-	1/4 x 45 High pressure hose asy
J	31208	-	1/4 x 122 High pressure hose asy
K	31208	-	1/4 x 122 High pressure hose asy
L	31206	-	1/4 x 85 High pressure hose asy

# BH750 MAIN FRAME ASSEMBLY



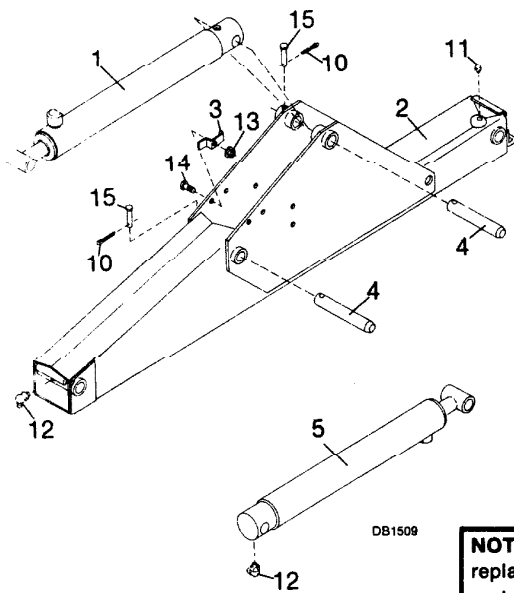
## BH750 MAIN FRAME ASSEMBLY

### HARDWARE

Ref. No.	Part No.	No. Used	Description	Ref. No.	Part No.	Description
1	31220	1	Console cover	35	OL*	1/16 x 1/2 Cotter pin
2	31900	1	6 Spool valve complete (see page 42 for breakdown)	36	OL*	3/32 x 1/2 Cotter pin
3	31215	1	Valve console assembly	37	OL*	3/32 x 1-1/2 Cotter pin
4	31244	1	Front shield	38	OL*	1/4-28 Grease fitting
5	62354	1	Main frame assembly	39	OL*	1/4-28 90° Grease fitting
6	62402	1	Swing cylinder (see page 44 for breakdown)	40	OL*	1/4 NC x 3/4 Hex head cap screw GR5
7	62405	2	Swing chain	41	OL*	1/4 x 1-1/2 Cotter pin
8	62404	2	Chain tension bolt	42	62425	1/4 x 1-7/8 Clevis pin
9	62327	1	King post cap	43	14139	5/16 NC Flange lock nut
10	62383	2	1-1/2 ID Ball bearing	44	OL*	5/16 Lock washer
11	62342	1	King post assembly	45	OL*	5/16 NC x 3/4 Hex head cap screw GR5
12	62440	2	Bumper pad assembly	46	OL*	5/16 NC x 3/4 Carriage bolt
13	62504	1	1 x 5-7/8 Pivot pin	47	27610	5/16 x 3/4 Sheet metal screw
14	62072	1	Compression spring	48	62399	5/16 x 1-1/4 Chain pin
15	62407	1	Transport latch	49	OL*	3/8 NC Hex nut
16	62400	1	Hose guide	50	OL*	3/8 NC Lock nut
17	62269	2	Hose clamp	51	OL*	3/8 Lock washer
18	62295	2	1 x 6-1/4 Pivot pin	52	OL*	3/8 NC x 1 Carriage bolt
19	62384	2	Rubber grommet	53	OL*	3/8 NC x 3 Hex head cap screw GR5
20	62321	2	Hose clamp protector	54	OL*	7/16 NF x 1-1/4 Wheel bolt
21	62319	2	Adjustment hose clamp	55	OL*	1/2 NC Lock nut
22	62498	2	Stabilizer cylinder (see page 46 for breakdown)	56	OL*	1/2 NC x 4 Hex head cap screw GR5
23	62488	2	Stabilizer assembly	57	OL*	5/8 NC Hex nut
24	62312	2	Stabilizer pad assembly	58	OL*	3/4 NC Lock nut
25	62248	1	Seat support	59	OL*	3/4 Lock washer
26	62244	1	Seat bracket	60	4616	3/4 NC x 1-1/2 Hex head cap screw GR5
27	30039	1	Seat	61	2377	3/4 NC x 6 Hex head cap screw GR5
28	62266	1	1 x 7-1/2 Pivot pin	62	62512	13/16 x 1-1/4 x 1 Bushing
29	31406	1	Decal Set	63	62075	1 x 10 GA Washer
				64	OL*	7/16 NF Hex locknut
				65	11204	13/16 x .010 Shim washer
				66	4378	5/16 Standard flat washer

\*Obtain Locally

## BH750 BOOM ASSEMBLY



Ref. No.	Part No.	No. Used	Description
1	62290	1	2-1/2 x 16-3/4 Hydraulic cylinder (Dipperstick) (see page 46 for breakdown)
2	62468	1	Boom assembly
3	31223	2	Hose clamp
4	62295	2	1 x 6-1/4 Pivot pin
5	62290	1	2-1/2 x 10-3/4 Hydraulic cylinder (boom) (see page 46 for breakdown)

### HARDWARE

Ref. No.	Part No.	Description
10	62523	1/16 x 1/2 Cotter pin
11	1972	1/4-28 Tapered thread grease fitting
12	2985	1/4-28 90° Grease fitting
13	62521	1/4 NC Flange lock nut
14	3184	1/4 NC x 1-1/4 Hex head cap screw
15	62425	1/4 x 1-7/8 Clevis pin

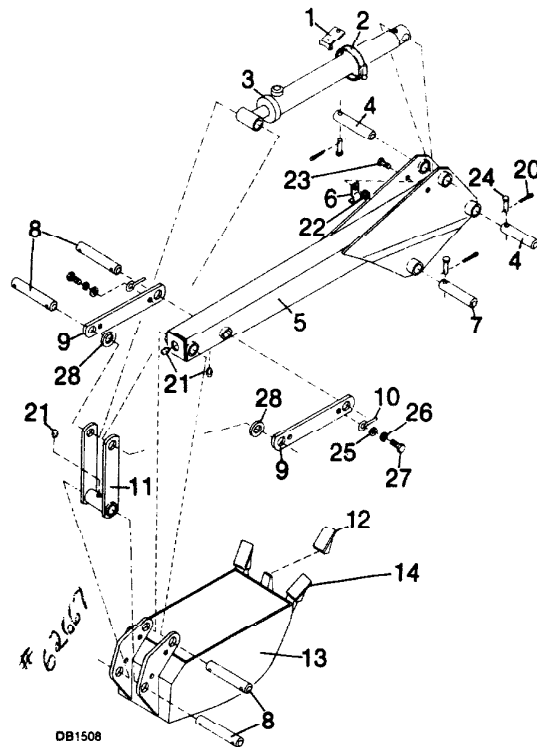
**NOTE:** Repair cylinder is shipped with two straight grease fittings. When it is used to replace the 750 boom cylinder, the straight grease fitting in the butt end must be replaced with a 90° fitting.

## BH750 DIPPERSTICK & BUCKET ASSEMBLY

Ref. No.	Part No.	No. Used	Description
1	62263	1	Slow moving vehicle bracket
2	62259	1	Hose clamp
3	62261	1	2 x 16-3/4 Hydraulic cylinder (Bucket) see page 45 for breakdown)
4	62267	2	1 x 4-7/8 Pivot pin
5	62456	1	Dipperstick assembly
6	62269	2	Hose clamp
7	62266	1	1 x 7-1/2 Pivot pin
8	62265	4	1 x 5-1/2 Pivot pin
9	62270	2	Link arm
10	62264	8	Retainer pin
11	62271	1	Bucket arm assembly
12	62668	AR	Bucket tooth
13	8850	1	Bucket - 10"
	-or-		
13	8851	1	Bucket - 12"
	-or-		
13	8852	1	Bucket - 16"
	-or-		
13	8853	1	Bucket - 24"
14	62660	AR	Tooth and shank assembly

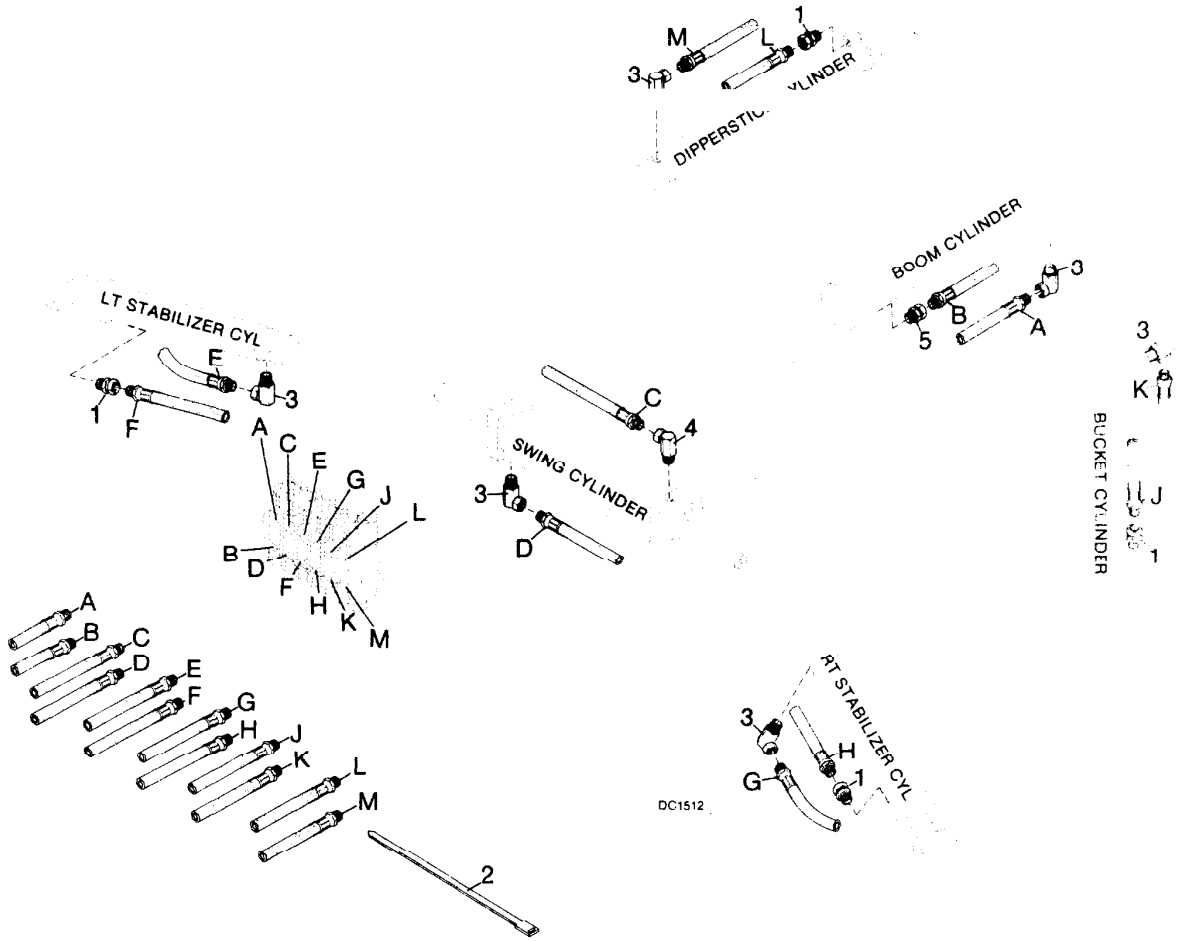
### HARDWARE

Ref. No.	Part No.	Description
20	62523	1/16 x 1/2 Cotter pin
21	6270	1/4-28 Tapered thread grease fitting
22	62521	1/4 NC Flange lock nut
23	5337	1/4 NC x 1/2 Hex head cap screw GR5
24	62425	1/4 x 1-7/8 Clevis pin
25	4378	5/16 Standard washer
26	2472	5/16 Lock washer
27	6096	5/16 NC x 3/4 Hex head cap screw GR5
28	1863	1" SAE Washer



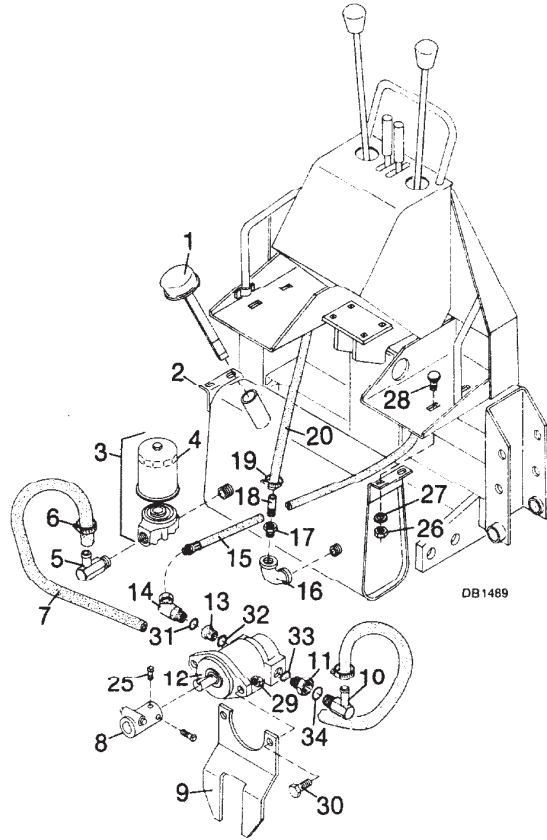


## BH750 HOSES & FITTINGS



Ref. No.	Part No.	No. Used	Description
1	31240	4	1/4 x 1/4 Straight adapter union
2	31407	2	7" Hose tie
3	8572	6	1/4 x 1/4 90° Adapter union
4	10290	1	1/4 x 1/4 90° Adapter union with 1/16 restrictor
5	31241	1	1/4 x 1/4 Straight adapter union with 3/32 restrictor
A	31261	-	1/4 x 102 High pressure hose asy
B	31261	-	1/4 x 102 High pressure hose asy
C	31237	-	1/4 x 45 High pressure hose asy
D	31237	-	1/4 x 45 High pressure hose asy
E	31237	-	1/4 x 45 High pressure hose asy
F	31408	-	1/4 x 50 High pressure hose asy
G	31237	-	1/4 x 45 High pressure hose asy
H	31408	-	1/4 x 50 High pressure hose asy
J	31264	-	1/4 x 142 High pressure hose asy
K	31264	-	1/4 x 142 High pressure hose asy
L	31260	-	1/4 x 95 High pressure hose asy
M	31260	-	1/4 x 95 High pressure hose asy

# BH650/750 TANK & PUMP ASSEMBLY

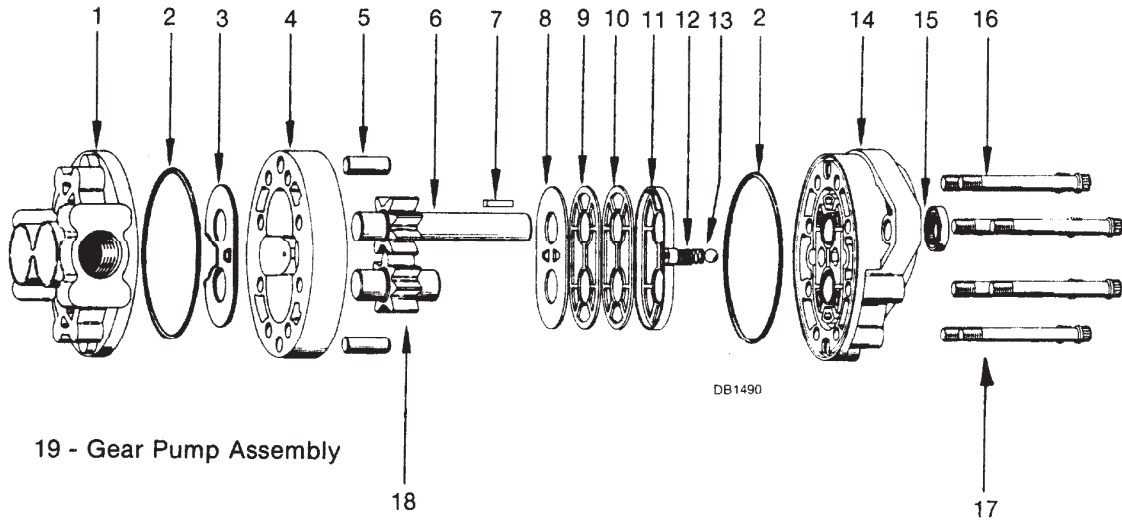


REF	PART	QTY	DESCRIPTION
1	31414	1	Tank breather with dipstick
2	62323	1	Tank assembly
3	62420	1	Filter & housing asy complete
4	62421	1	Filter element
5	62431	1	3/4 Hose x 3/4 pipe 90° el
6	62412	2	Clamp for 3/4 hose
7	31210	1	3/4 x 36 Low pressure hose
8	62436	1	Pump drive coupler
9	31234	1	Pump mounting bracket
10	62429	1	1-1/16-12 x 3/4 Hose 90° el
11	62428	1	1-5/8-12 x 1-1/16-12 Reducer
12	62437	-	Pump assembly complete (see page 41 for breakdown)
13	62432	1	1-5/16-12 x 7/8-14 Reducer -or-
	1009079	1	1-1/16-12 x 7/8-14 Reducer
14	28644	1	7/8-14 x 3/8 NPSM 45° Adapter
15	31209	1	3/8 Pipe x 47 high pressure hose assembly
16	62393	1	1/2 x 1/2 90° Pipe el
17	11893	1	1/2 x 1/4 Pipe reducer bushing
18	28510	1	1/2 Hose x 1/4 x 1-1/2 Pipe nipple
19	26927	2	Clamp for 1/2 hose
20	31270	1	1/2 x 22 Low pressure hose

Ref. No.	Part No.	Description
25	62147	5/16 NC x 1 Cup point square head set screw
26	835	3/8 NC Hex nut
27	838	3/8 Lock washer
28	24597	3/8 NC x 3/4 Carriage bolt
29	765	1/2 NC Lock nut
30	3379	1/2 NC x 1-1/2 Hex head cap screw GR5
31	*	-10 O-ring 3/4 ID x 3/32 wall
32	*	-16 O-ring 1-5/32 ID x 7/64 wall
33	*	-20 O-ring 1-15/32 ID x 1/8 wall
34	*	-12 O-ring 15/16 ID x 7/64 wall

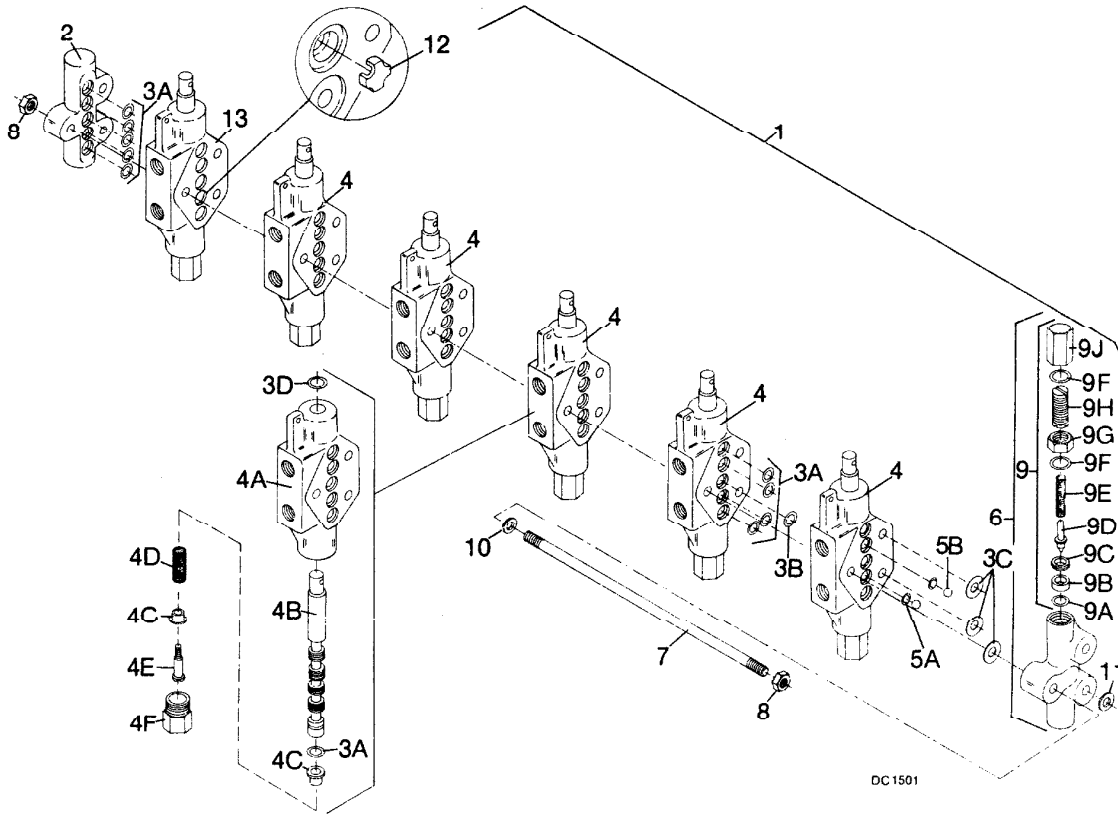
\*Purchase locally

## BH650/750 GEAR PUMP ASSEMBLY 2.10 Cubic Inch



REF	PART	QTY	DESCRIPTION
1	----	*	1 Back plate assembly
2	----	**	2 O-ring
3	----	**	1 Thrust plate
4	----	*	1 Body
5	----	*	2 Dowel pin
6	----	*	1 Drive gear assembly
7	62536	1	Key - .250 x .969 special
8	----	**	1 Diaphragm
9	----	**	1 Backup gasket
10	----	**	1 Protector gasket
11	----	**	1 Diaphragm seal
12	----	*	2 Spring
13	----	*	2 Steel ball
14	----	*	1 Front plate assembly
15	10409	1	Shaft seal
16	----	*	4 Tie bolt
17	----	*	4 Tie bolt
18	----	*	1 Idler gear assembly
NS	62438	1	Seal kit complete (incl. 2, 3, 8, 9) (for pumps with 1-5/16 - 12 SAE pressure port only) -or-
	1019621	1	Seal kit complete (for pumps with 1-1/16 - 12 SAE pressure port only)
19	62437	1	Gear pump assembly
		*	Not serviceable
		**	Not sold separately

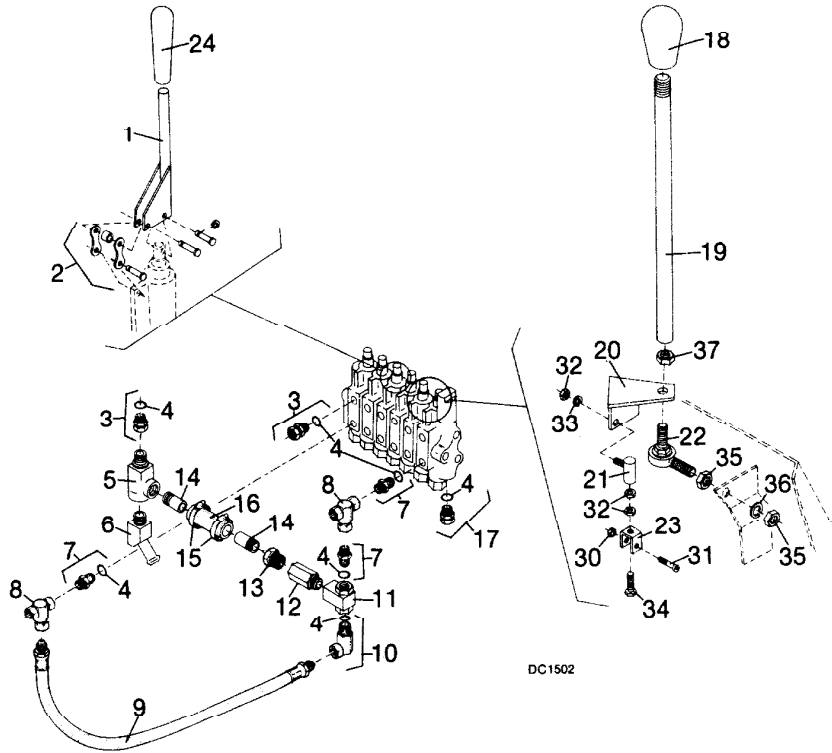
# BH650/750 VALVE ASSEMBLY



Ref. No.	Part No.	No. Used	Description	Ref. No.	Part No.	No. Used	Description
1	31900	1	Valve with load check	6	62380	1	Inlet section with relief valve
2	62372	1	Tank section	7	62375	3	Tie rod
3	62379	1	Seal kit (contains 3A thru 3D)	8	-----	6	5/16 NC Hex nut
3A	-----*	35	"O" ring	9	31415	1	Pressure relief valve (contains 9A - 9J)
3B	-----*	6	"O" ring	9A	-----*	1	"O" ring
3C	-----*	21	Mylar shim	9B	-----*	1	Seat
3D	-----*	6	"O" ring	9C	-----*	1	Seat retainer
4	62373	5	Valve section complete (contains 3A, 3D, & 4A thru 4F)	9D	-----*	1	Poppet
4A	-----*	6	Valve body	9E	-----*	1	Spring
4B	-----*	6	Spool	9F	-----*	2	"O" ring
4C	-----*	12	Spring retainer	9G	-----*	1	Hex nut
4D	-----*	6	Spring	9H	-----*	1	Threaded sleeve
4E	-----*	6	Spring shaft	9J	-----*	1	Cap
4F	-----*	6	Spring cap	10	-----	2	5/16 Standard SAE washer
5	62378	1	Check ball kit complete (contains 5A & 5B)	11	4378	2	5/16 Standard washer
5A	-----*	2	Load check retainer	12	64997	1	Flapper check
5B	-----*	2	Load check ball	13	64998	1	Modified valve section

\*Not sold separately

## BH650/750 VALVE CONTROLS & HARDWARE

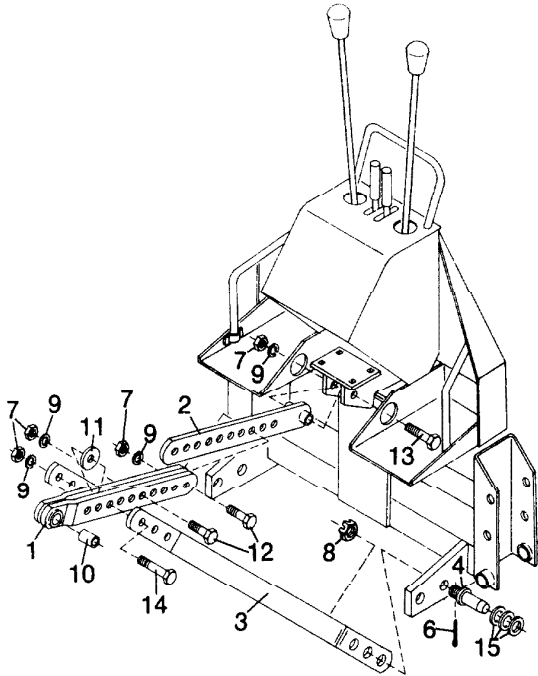


Ref. No.	Part No.	No. Used	Description
1	31225	2	Stabilizer control handle
2	62377	2	Link assembly
3	14396	11	9/16-18 x 1/4 "O" ring union
4	-----	15	#111 "O" ring 7/16 ID x 3/32 wall
5	31274	1	1/4 NPT Run tee
6	31243	1	1/4 Pipe x 5/8 hose nipple 45°
7	31242	3	1/4 NPT Male x 9/16-18 straight coupler
8	31239	2	1/4 Female swivel union tee
9	31205	1	1/4 Synthetic x 22 hose & fitting
10	14398	1	9/16-18 x 1/4 90° "O" ring fitting
11	62395	1	Shuttle valve
12	62394	1	Relief valve
13	31273	1	3/8 NPT to 1/4 NPT Reducer
14	28510	2	1/4 Schedule 40 x 1-1/2 threaded pipe
15	26927	2	1/2 Hose clamp
16	31267	1	1/2 ID x 3-1/4 Hydraulic hose
17	31275	1	9/16-18 x 3/8 "O" ring union
18	31246	2	Knob handle
19	31235	2	Control handle
20	62388	2	Control arm assembly
21	62381	4	Ball joint
22	62391	2	Ball joint
23	62359	4	Clip
24	31416	2	Control lever grip

### HARDWARE

Ref. No.	Part No.	Description
30	62529	#8-32 NC Lock nut
31	62530	#8 x 1 Socket head cap screw
32	62524	1/4 NF Hex nut
33	1985	1/4 Lock washer
34	62525	1/4 NF x 1-1/4 Full thread hex head cap screw GR5
35	1271	3/8 NF Hex nut
36	838	3/8 Lock washer
37	7286	3/8 NF Jam hex nut

## BH650/750 SAF-T-LOK™ HITCH



DB1488

Ref No	Part No	No Used	Description
1	31228	1	Double link
2	62625	1	Single link
3	31230	2	Saf-T-Lok™ diagonal bar half
4	23900	2	Category 1 mounting pin

### HARDWARE

Ref No	Part No	Description
6	1266	3/16 x 1-1/2 Cotter pin
7	1450	3/4 NC Hex nut
8	5849	3/4 NF Slotted hex nut
9	2522	3/4 Lock washer
10	30067	3/4 x 1 x 1-11/16 Sleeve
11	10440	3/4 x 2 x 1/2 Washer
12	14334	3/4 NC x 3 Hex head cap screw GR5
13	15007	3/4 NC x 3-1/2 Hex head cap screw GR5
14	31207	3/4 NC x 4 Hex head cap screw GR5
15	28539	7/8 Standard SAE washer

## BH650/750 SWING CYLINDER

### IMPORTANT

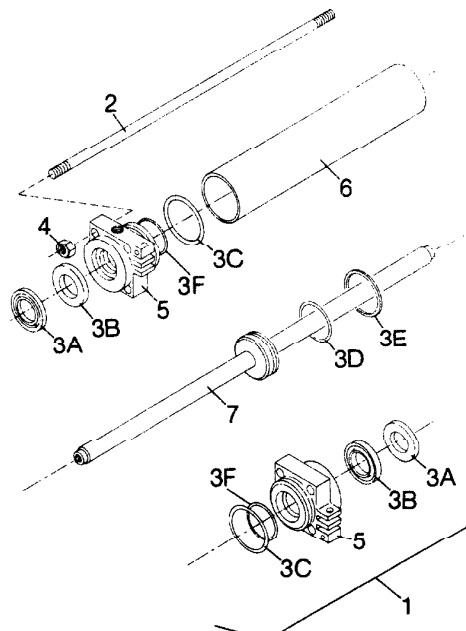
**Be sure to make proper manufacturer identification, then refer to either the "E" or "L" column when ordering parts.**

Swing cylinders are obtained from two suppliers. All items except the barrel (6) and rod assembly (7) are interchangeable between the cylinders. When ordering either of these items, make sure of the manufacturer identification. "Energy" barrels have an "E" stamped into the barrel. "Lantex" barrels will either have an "L" stamped in the barrel or will be unmarked. An "Energy" barrel will not work with a "Lantex" rod assembly. A "Lantex" barrel will not work with an "Energy" rod assembly.

The seal kit contains repairs for both cylinders. Item (3F) backup ring is not used on item (5) piston rod guide with the word "Lantex" in the casting.

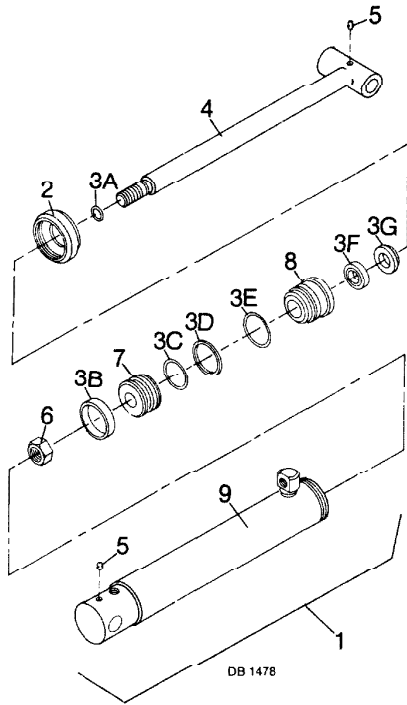
"E" Part No	Ref No	"L" Part No	No Used	Description
62402	1	62402	1	Hydraulic swing cylinder complete
64873	2	64873	4	7/16 NF x 16 Tie rod
65651	3	65651	1	Seal kit (contains 3A thru 3F)
-----	3A	-----	2	Rod wiper
-----	3B	-----	2	Rod seal
-----	3C	-----	2	Gland static seal
-----	3D	-----	1	"O" ring
-----	3E	-----	1	Piston seal
-----	3F	**	2	Backup ring
29685	4	29685	8	7/16 NF Hex nut
65650	5	65650	2	Piston rod guide
65654	6	64870	1	Barrel
65653	7	64871	1	Rod assembly

\*\* (3F) not used on Lantex



DB1483

## BH650 DIPPERSTICK & BUCKET CYLINDER BH750 BUCKET CYLINDER



**Cylinders are obtained from two suppliers. They may be identified by an "E" or "L" stamped into the cylinder butt end. Be sure to make proper manufacturer identification, then refer to either the "E" or "L" column when ordering parts.**

"E" Part No	Ref No	"L" Part No	No Used	Description
62261	1	62261	1	2 x 16-3/4 Hydraulic cylinder asy
65581	2	63639	1	Collar
65586	3	65586	1	Seal kit (contains 3A thru 3G)
-----	3A	-----	1	Rod static seal
-----	3B	-----	1	Wear ring
-----	3C	-----	1	"O" Ring
-----	3D	-----	1	Piston seal
-----	3E	-----	1	Gland static seal
-----	3F	-----	1	Rod seal
-----	3G	-----	1	Rod wiper
65583	4	64862	1	Rod assembly
OL*	5	OL*	2	1/4-28 Taper thread grease fitting
64874	6	64874	1	7/8 NC Self lock hex nut
65580	7	64860	1	Piston
65582	8	64859	1	Gland
-----	9	-----	1	Barrel asy (not sold separately)

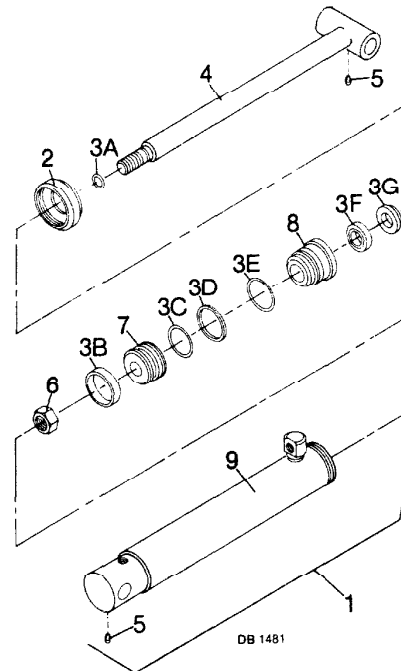
\*Obtain Locally

## BH650 STABILIZER CYLINDER

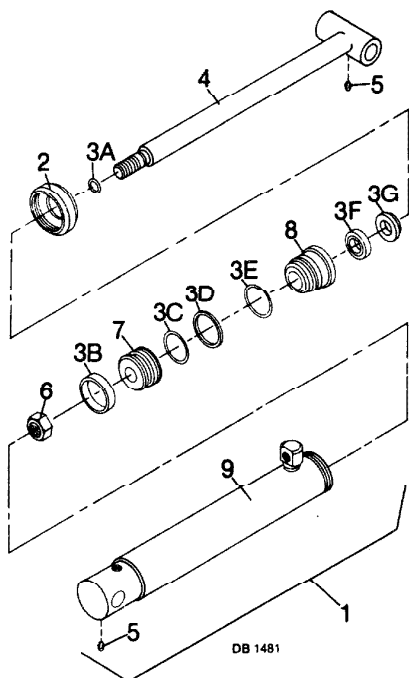
**Cylinders are obtained from two suppliers. They may be identified by an "E" or "L" stamped into the cylinder butt end. Be sure to make proper manufacturer identification, then refer to either the "E" or "L" column when ordering parts.**

"E" Part No	Ref No	"L" Part No	No Used	Description
62339	1	62339	1	2 x 10 Hydraulic cylinder
65581	2	63639	1	Collar
65586	3	65586	1	Seal kit (contains 3A thru 3G)
-----	3A	-----	1	Rod static seal
-----	3B	-----	1	Wear ring
-----	3C	-----	1	"O" Ring
-----	3D	-----	1	Piston seal
-----	3E	-----	1	Gland static seal
-----	3F	-----	1	Rod seal
-----	3G	-----	1	Rod wiper
65657	4	65657	1	Rod assembly
OL*	5	OL*	2	1/4-28 Taper thread grease fitting
64874	6	64874	1	7/8 NC Self lock hex nut
65580	7	64867	1	Piston
65582	8	64859	1	Gland
-----	9	-----	1	Barrel asy (not sold separately)

\*Obtain Locally



## BH750 STABILIZER CYLINDER



**Cylinders are obtained from two suppliers. They may be identified by an "E" or "L" stamped into the cylinder butt end. Be sure to make proper manufacturer identification, then refer to either the "E" or "L" column when ordering parts.**

"E" Part No	Ref No	"L" Part No	No Used	Description
62498	1	62498	1	2 x 14-1/2 Hydraulic cylinder
65581	2	63639	1	Collar
65586	3	65586	1	Seal kit (contains 3A thru 3G)
-----	3A	-----	1	Rod static seal
-----	3B	-----	1	Wear ring
-----	3C	-----	1	"O" Ring
-----	3D	-----	1	Piston seal
-----	3E	-----	1	Gland static seal
-----	3F	-----	1	Rod seal
-----	3G	-----	1	Rod wiper
65656	4	64699	1	Rod assembly
OL*	5	OL*	2	1/4-28 Taper thread grease fitting
64874	6	64874	1	7/8 NC Self lock hex nut
65580	7	64867	1	Piston
65582	8	64659	1	Gland
-----	9	-----	1	Barrel asy (not sold separately)

\*Obtain Locally

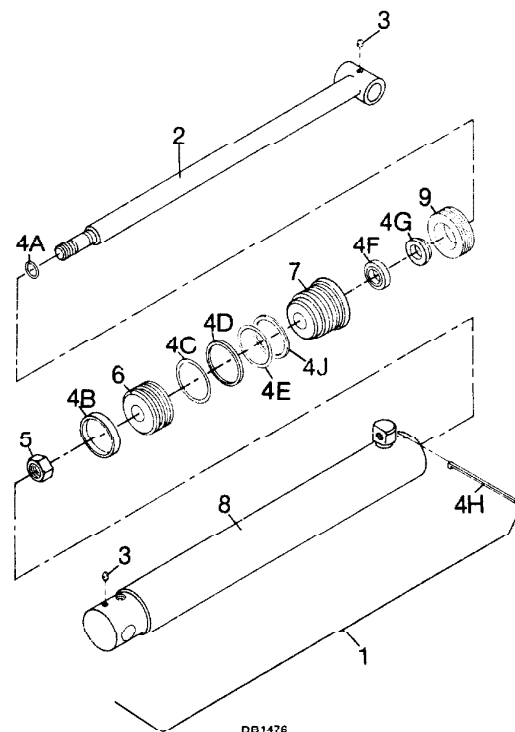
## BH750 BOOM & DIPPERSTICK CYLINDER BH650 BOOM CYLINDER

### Lock Wire or Threaded Plug Style Cylinder

**Cylinders used in the same application are provided from two suppliers. One uses a lock wire and one uses a threaded plug for locking devices. Lock wire cylinders can be identified by the "L" stamped on butt end of cylinder or no markings on the butt end. All threaded plug cylinders have an "E" stamped on butt end of cylinder. Be sure to make proper manufacturer identification before ordering repair parts.**

"E" Part No	Ref No	"L" Part No	No Used	Description
62290	1	62290	1	2-1/2 x 16-3/4 Hydraulic cylinder
65593	2	64866	1	Rod assembly
OL*	3	OL*	2	1/4-28 Taper thread grease fitting
65587	4	65587	1	Seal kit (contains 4A thru 4J)
-----	4A	-----	1	Rod static seal
N/A	4B	-----	1	Wear strip
-----	4C	-----	1	"O" Ring
-----	4D	-----	1	Piston seal
-----	4E	-----	1	Gland static seal
-----	4F	-----	1	Rod seal
-----	4G	-----	1	Rod wiper
N/A	4H	-----	1	Lock wire
-----	4J	N/A	1	Back-up washer
64874	5	64874	1	7/8 NC Self lock hex nut
65592	6	64863	1	Piston
65590	7	64864	1	Gland
-----	8	-----	1	Barrel asy (not sold separately)
65591	9	N/A	1	Threaded retainer

\*Obtain Locally



**NOTE:** Repair cylinder is shipped with two straight grease fittings. When it is used to replace the 750 boom cylinder the straight grease fitting in the butt end must be replaced with a 90° fitting.

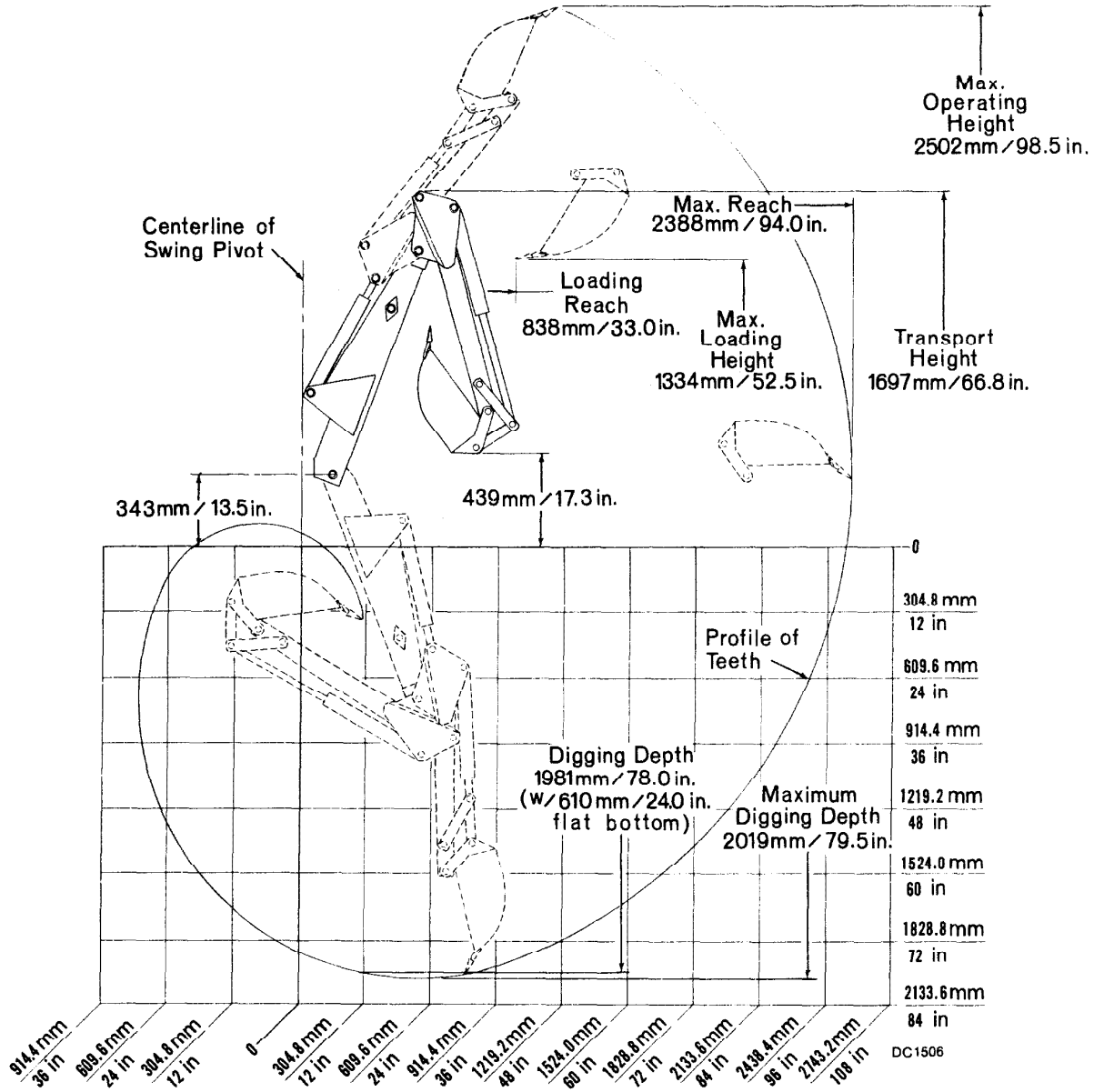


# BH650 SPECIFICATIONS

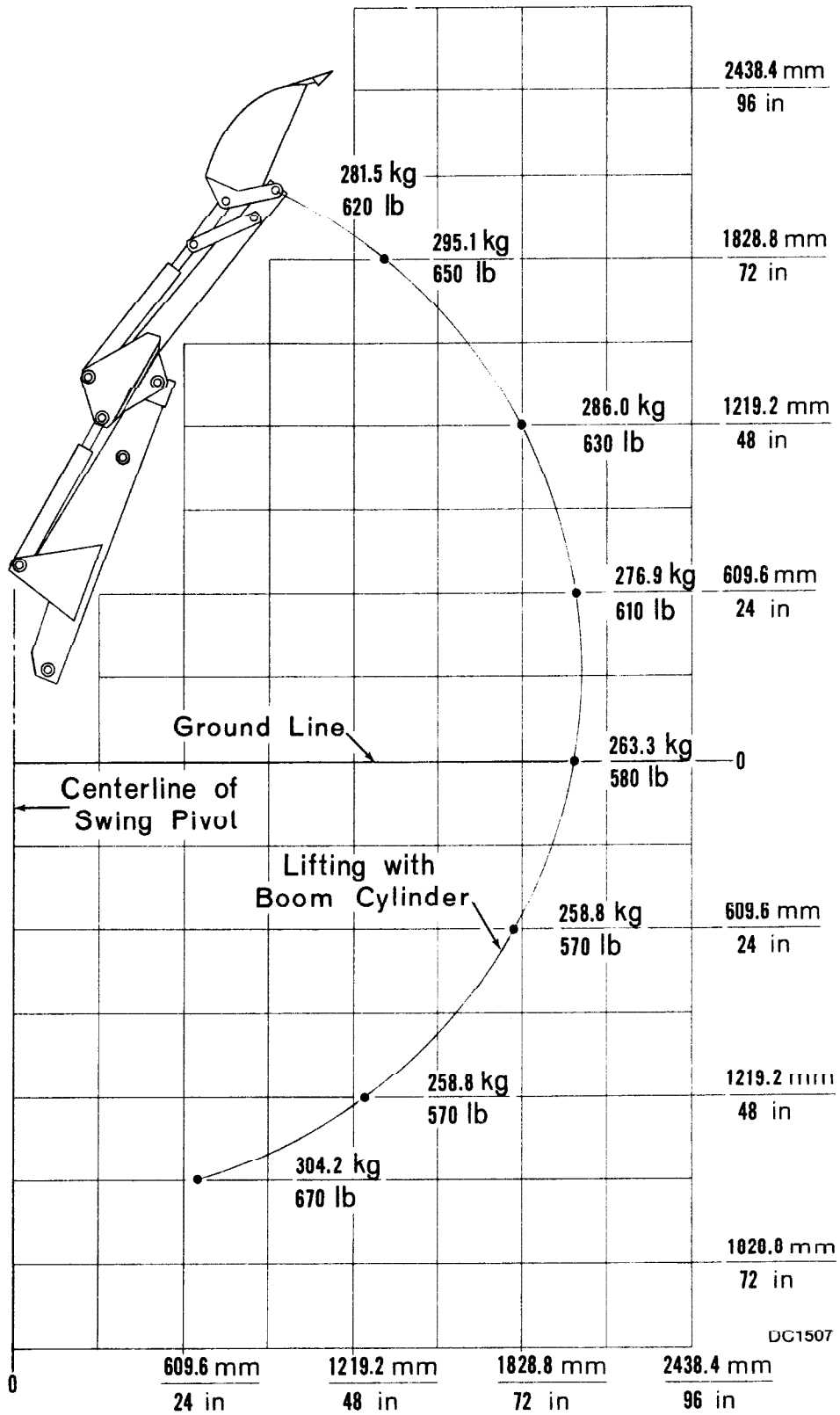
<b>REACH BELOW GRADE (STANDARD BUCKET)</b>		
Maximum .....	79.5"	2019mm
With two foot flat bottom trench* .....	78"	1981mm
<b>LOADING HEIGHT*</b> .....	52.5"	1334mm
<b>REACH</b>		
From center of swing mast pivot point* .....	94"	2388mm
<b>BUCKET ARC</b> .....	162°	
<b>SWING WORKING ARC</b> .....	180°	
<b>OPERATING PRESSURE</b>		
Digging* .....	2000 psi	13.8 MPa
Swing* .....	2000 psi	13.8 MPa
<b>STABILIZER SPREAD</b> .....	56.5" - 75"	1435 - 1905mm
<b>LIFT CYLINDER</b>		
Bore .....	2.5"	63.5mm
Stroke .....	16.75"	425.5mm
<b>DIPPERSTICK CYLINDER</b>		
Bore .....	2.0"	50.8mm
Stroke .....	16.75"	425.5mm
Digging Force* .....	1170 lbs.	531.8 kg
<b>BUCKET CYLINDER</b>		
Bore .....	2.0"	50.8mm
Stroke .....	16.75"	425.5mm
Digging Force* .....	2890 lbs.	1312.1 kg
<b>SWING CYLINDER</b>		
Bore .....	2.5"	63.5mm
Stroke .....	10.62"	269.7mm
<b>BUCKET CAPACITY</b>	<b>HEAPED</b>	<b>STRUCK</b>
10 Inches. . . .	1.00 ft. <sup>3</sup> .020 m <sup>3</sup>	.83 ft. <sup>3</sup> .024 m <sup>3</sup>
12 Inches. . . .	1.23 ft. <sup>3</sup> .035 m <sup>3</sup>	1.00 ft. <sup>3</sup> .028 m <sup>3</sup>
16 Inches. . . .	1.71 ft. <sup>3</sup> .048 m <sup>3</sup>	1.37 ft. <sup>3</sup> .039 m <sup>3</sup>
24 Inches. . . .	3.32 ft. <sup>3</sup> .094 m <sup>3</sup>	2.10 ft. <sup>3</sup> .060 m <sup>3</sup>

\*Per I.C.E.D. Definition as found in "A" dictionary terms and definitions of industrial tractors and construction equipment.

# BH650



# BH650

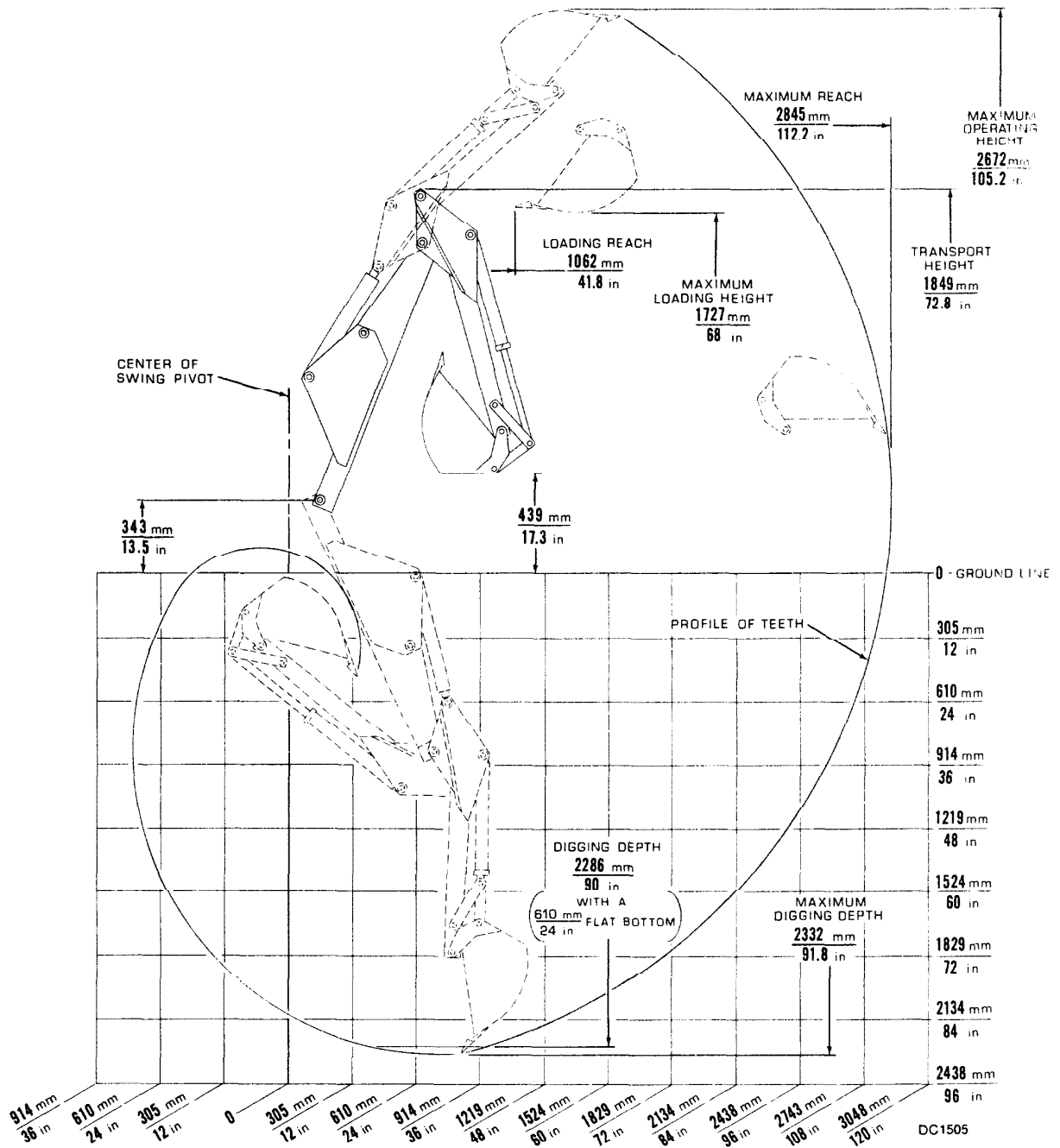


# BH750 SPECIFICATIONS

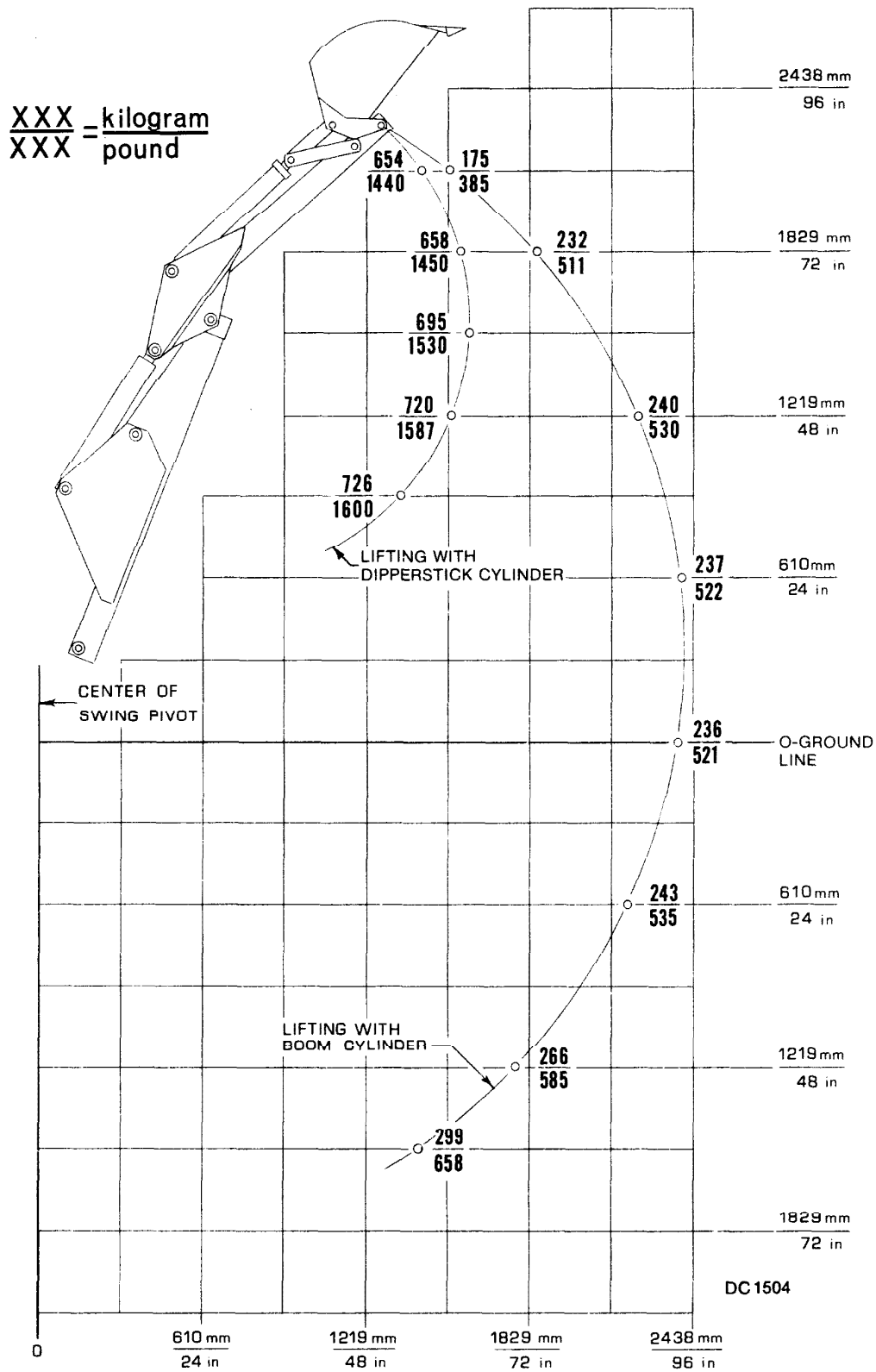
REACH BELOW GRADE (STANDARD BUCKET)		
Maximum .....	91.8"	2332mm
With two foot flat bottom trench* .....	90.0"	2286mm
LOADING HEIGHT* .....	68.0"	1727mm
REACH		
From center of swing mast pivot point* .....	112.2"	2845mm
BUCKET ARC .....	162°	
SWING WORKING ARC .....	180°	
OPERATING PRESSURE		
Digging* .....	2000 psi	13.8 MPa
Swing* .....	2000 psi	13.8 MPa
STABILIZER SPREAD .....	52.5" - 89.5"	1333 - 2273mm
LIFT CYLINDER		
Bore .....	2.5"	63.5mm
Stroke .....	16.75"	425.5mm
DIPPERSTICK CYLINDER		
Bore .....	2.5"	50.8mm
Stroke .....	16.75"	425.5mm
Digging Force* .....	1645 lbs.	747 kg
BUCKET CYLINDER		
Bore .....	2.0"	50.8mm
Stroke .....	16.75"	425.5mm
Digging Force* .....	2890 lbs.	1312.1 kg
SWING CYLINDER		
Bore .....	2.5"	63.5mm
Stroke .....	10.62"	269.7mm
BUCKET CAPACITY		
	HEAPED	STRUCK
10 Inches. . . .	1.00 ft. <sup>3</sup> .028 m <sup>3</sup>	.83 ft. <sup>3</sup> .024 m <sup>3</sup>
12 Inches. . . .	1.23 ft. <sup>3</sup> .035 m <sup>3</sup>	1.00 ft. <sup>3</sup> .028 m <sup>3</sup>
16 Inches. . . .	1.71 ft. <sup>3</sup> .048 m <sup>3</sup>	1.37 ft. <sup>3</sup> .039 m <sup>3</sup>
24 Inches. . . .	3.32 ft. <sup>3</sup> .094 m <sup>3</sup>	2.10 ft. <sup>3</sup> .060 m <sup>3</sup>

\*Per I.C.E.D. Definition as found in "A" dictionary of terms and definitions of industrial tractors and construction equipment.

# BH750



# BH750



Please enter information below and

## SAVE FOR FUTURE REFERENCE

Date Purchased: \_\_\_\_\_

From (Dealer): \_\_\_\_\_

Model Number: \_\_\_\_\_

Serial Number: \_\_\_\_\_

### WARRANTY

Woods Division of Hesston Corporation warrants each new Woods product to be free from defects in material and workmanship. This warranty is applicable only for the normal service life expectancy of the machine or components, not to exceed twelve consecutive months from the date of delivery of the new Woods product to the original purchaser.

Under no circumstances will it cover any merchandise or components thereof, which, in the opinion of the company, has been subjected to negligent handling, misuse, alteration, an accident, or if repairs have been made with parts other than those obtainable through Woods Division of Hesston Corporation.

The company in no way warrants engines, batteries, tires or other trade accessories since these items are warranted separately by their respective manufacturers.

Our obligation under this warranty shall be limited to repairing or replacing, free of charge to the original purchaser, any part that in our judgement shall show evidence of such defect, provided further that such part shall be returned within thirty (30) days from date of failure to Woods Division, routed through the dealer and distributor from whom the purchase was made, transportation charges prepaid.

This warranty shall not be interpreted to render us liable for injury or damages of any kind or nature, direct, consequential, or contingent, to person or property. This warranty does not extend to loss of crops, loss because of delay in harvesting, or any expense or loss incurred for labor, supplies, substitute machinery, rental or for any other reason.

THERE ARE NO WARRANTIES, EITHER EXPRESSED OR IMPLIED, OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE INTENDED OR FITNESS FOR ANY OTHER REASON.

This warranty is subject to any existing conditions of supply which may directly affect our ability to obtain materials or manufacture replacement parts.

Woods Division of Hesston Corporation reserves the right to make improvements in design or changes in specifications at any time, without incurring any obligations to owners of units previously sold.

No one is authorized to alter, modify, or enlarge this warranty nor the exclusions, limitations and reservations.





Division of Hesston Corporation  
OREGON, ILLINOIS 61061

LITHO IN USA