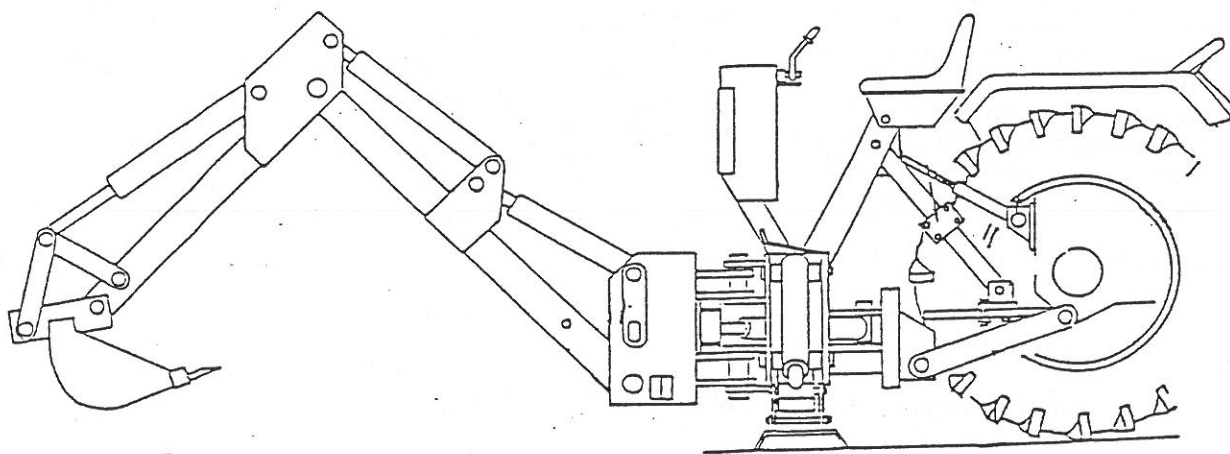




B 15

BACK-HOE

OWNER'S MANUAL



KELLEY MANUFACTURING CORPORATION

PO BOX 276 • 131 PROGRESSIVE DRIVE • OTTOVILLE, OHIO 45876 • PHONE 419-453-5539 • FAX 419-453-2278

READ THIS PAGE BEFORE OPERATING YOUR BACKHOE

DO NOT OPERATE YOUR BACKHOE UNTIL YOU DO THE FOLLOWING:

- 1. Read this operator's manual thoroughly.**
- 2. Have your dealer complete and return the Warranty Registration Card that accompanies this manual.**

If you did not receive a Warranty Registration Form, contact your dealer. He will be able to obtain one for you. It is important that you return your Warranty Registration Card. Your warranty is valid only if a signed Warranty Registration Card is returned to us within ten days after the delivery of your backhoe.

The warranty period is 180 days from the original date of purchase. To verify the warranty period, you should keep the sales slip or other proof of the purchase date.

This warranty does not cover damage caused by accident, misuse, or tampering with the product, and a charge will be made for such repairs.

Additional warranty information may be found in the back of this manual.



CAUTION










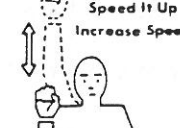
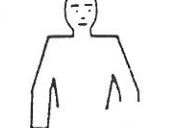
This manual is provided for you the operator to familiarize yourself with the operation, safety precautions and maintenance of this unit. This safety alert symbol (as shown above) is used throughout this manual to bring to your attention the safety precautions and potentially dangerous situations that can cause injury or machine malfunction. Read the warnings below carefully before operating the backhoe. It is extremely important that you the operator understand fully the mounting, hydraulic connections, and the operation of the backhoe. Understand thoroughly the proper method of trenching or digging. Do not use this backhoe for anything other than for what it is designed. Otherwise, injury and/or machine failure may result. Follow directions and methods carefully and instruct others that may operate this machine as to its proper use. Insist that they read this manual carefully. **LET NO ONE OPERATE THIS UNIT UNTIL THEY HAVE READ THIS MANUAL AND UNDERSTAND IT FULLY.**

- 1. Your backhoe must be mounted only on a tractor equipped with a Category I hitch. Failure to do so may result in serious injury.**
- 2. When servicing backhoe, make sure all moving parts are on the ground.**
- 3. To avoid injury from escaping pressurized hydraulic oil, move the control levers in all directions before disconnecting any hoses, steel lines, or couplers.**
- 4. Keep foot pads clean to prevent foot slipping when the operator mounts the backhoe.**
- 5. Do not transport your backhoe with the bucket fully raised.**

Introduction

6. Be sure your tractor has sufficient front end weight to operate and transport the backhoe.
7. When traveling on highways and roads, be sure the boom and stabilizers are in the fully raised position and transport chains are in the transport lock position.
8. When traveling on the road with your backhoe, use proper safety lights and warning signs. Check local regulations.
9. When traveling with your backhoe, do not make sudden starts, stops or turn at high speeds. Do not exceed safe speed limits on rough ground. Do not make sudden starts when climbing grades.
10. Always wear protective headgear while operating the backhoe.
11. Be sure to lower the stabilizers to the ground before operating the backhoe.
12. Watch overhead low hanging wires. Do not touch wires with any part of the backhoe.
13. Do not operate from any other position than the operator's seat.
14. Before swinging the backhoe for any reason, make sure you have room to swing and that all persons are clear of the backhoe.
15. Be extra careful when working on hillsides and close to ditches or any place where danger of tipping or sliding is possible.
16. Do not dig under the stabilizers or backhoe, as a cave-in could occur.
17. Be sure you are not digging over underground wiring or other underground obstructions.
18. When digging to either side and close to the tractor, be extremely careful that the backhoe does not contact the stabilizers as serious damage could occur.
19. Do not attempt to raise the tractor off the ground or move the tractor forward or backward using the boom or stabilizers.
20. When leaving the backhoe for any reason, lower the bucket to the ground for safety.
21. Never leave unit unattended with engine running.
22. To prevent injury during assembly, installation, operation, adjustment, or removal of the backhoe, it is recommended that gloves, safety glasses or face shield, and safety toe shoes be worn.
23. Do not wear loose clothing while operating or working near the backhoe. Keep hair and clothing away from all moving parts of the backhoe.
24. Only the operator should be near the backhoe during operation. Keep all others a minimum of fifty feet away from your work area.
25. Keep your work area clear of obstacles at all times.
26. Children should never be permitted to operate the backhoe.
27. Do not attempt any repairs, maintenance, or adjustments of your backhoe while it is in operation. Always turn off your tractor before making repairs or adjustments or performing maintenance procedures.

28. When the use of hand tools is required to perform any part of assembly, installation, removal or adjustment of the backhoe, be sure that the tools which are used are designed and recommended by the tool manufacturer for the specific task in which they are being used.
29. Keep all bolts and nuts tight. Replace any damaged or worn parts such as hydraulic hoses and fittings immediately. Always use replacement parts of equivalent strength and quality.
30. Perform all maintenance procedures as recommended.
31. Anytime hoses are disconnected from your backhoe, cover all open ports with protective caps or plugs in order to prevent contamination of the oil supply.
32. Use the hand signals shown below for safety during operation.

<p>HAND SIGNALS</p> <p>Use when noise or distance does not allow normal voice communication.</p>	 <p>Slow It Down- Decrease Speed</p>	 <p>This Far To Go</p>	 <p>Move Out- Take Off</p>	 <p>Raise Equipment</p>	 <p>Move Toward Me Follow Me</p>
 <p>Stop</p>	 <p>Stop The Engine</p>	 <p>Start The Engine</p>	 <p>Come To Me</p>	 <p>Speed It Up Increase Speed</p>	 <p>Lower Equipment</p>

GENERAL SPECIFICATIONS



CAUTION Your backhoe must be mounted only on a tractor equipped with a Category I hitch. Failure to do so voids all warranties associated with this equipment. This backhoe is not safe to operate unless it is mounted on a Category I hitch. Failure to do so may result in serious injury.



CAUTION The backhoe valve must be compatible with the hydraulic system that will power it. Make sure that if you are powering the backhoe with an open center hydraulic system, the backhoe is set for open center operation. If you are using a closed center hydraulic system, the valve must be set for closed center operation. If you are using a power beyond setup, the valve must be converted for this use. See the appropriate section of this manual on how to convert your valve. If you do not know how your valve is currently setup, check with your dealer.

Your backhoe unit has been filled with oil at the factory. The oil in the unit is compatible with most tractor manufacturers' oil. Do not move any control levers on the unit until after hydraulic connections to the tractor or the independent hydraulic system have been made.

HYDRAULIC SYSTEM REQUIREMENTS: The *KELLEY BACKHOE* has been designed to be operated at a flow rate of 4-6 GPM (15-23 liters per minute) at PSI 1400 (98.43 Kg/cm²). Any tractor hydraulic system used in connection with this backhoe must have a PSI rating of 1400 minimum.

Since many tractor systems exceed a flow rate of 6 GPM, the flow may have to be adjusted by throttling the engine RPM down to obtain an acceptable flow rate of 4 to 6 GPM. By adjusting the flow rate correctly, you will prevent sudden shock loads on the cylinders, pins, hoses, seals, etc. This results in a smooth operation and reduced maintenance costs and down time.

MOUNTING THE BACKHOE

- I. If you are **NOT** using a *KELLEY* independent hydraulic system, proceed to Step 2.

Install the independent hydraulic system onto the backhoe according to the following procedures. Refer to Figure 1 and page 35 of this manual for the identification of the parts. During assembly, use pipe compound on all pipe fittings. None is required on the O-ring fittings.

- A. Insert the filter into the **SUCTION PORT** of the reservoir. This is the port that is located on the left side of the reservoir.
- B. Attach the 1/2" street ell to the **RETURN PORT** on the reservoir. This is the port located on the right side of the reservoir.
- C. Attach the reservoir to the backhoe by bolting it through the two holes in the swing cylinder pivot pads. Use the 1/2" capscrews, lockwashers, and nuts.
- D. Bolt the torque bar to the flange mounting of the pump. Use the 7/16" capscrews, lockwashers, and nuts.
- E. Attach the O-Ring pressure fitting and the 1/2" street ell to the outlet port of the pump per the illustration on page 35.
- F. Attach the O-Ring suction fitting and the 3/4" street ell to the suction port of the pump per illustration in Figure 1.

- G. Place the PTO adapter on the pump shaft and secure it with the two set screws. After tightening set screws take a small punch and place into set screw, set them and then retighten.
 - H. Attach the pump assembly to the PTO shaft of the tractor.
 - I. Attach one end of the torque chain to the hole in the torque bar. Use 3/8" hardware in this order: 3/8" X 2 1/4" capscrew, flatwasher, chain, flatwasher, torque bar, lockwasher and nut.
 - J. Attach the free end of the torque chain to either the chain tab on the backhoe frame (Figure 1) or a fixture of the tractor. Use the remaining 3/8" hardware in the same manner as above. Imagine a plane perpendicular to the ground that passes through the torque bar and separates the tractor from the backhoe. It is very important that the chain is attached to a point located **ON** this plane **OR** on the **TRACTOR** side of this plane. By attaching to such a point, the chain applies pressure on the pump so that it is not pulled off of the PTO adapter during operation.
 - K. Attach suction hose to the reservoir and pump using the 3/4" hose nipple and 1" hose clamps as per Figure 1.
- 2. Remove the seat from the seat and safety chain carton and install with the hardware supplied. The use of the safety chains is explained in Step 25.
 - 3. Remove the cap from the 3/8" pressure hose. This is the hose connected to the right hand inlet port of the valve.

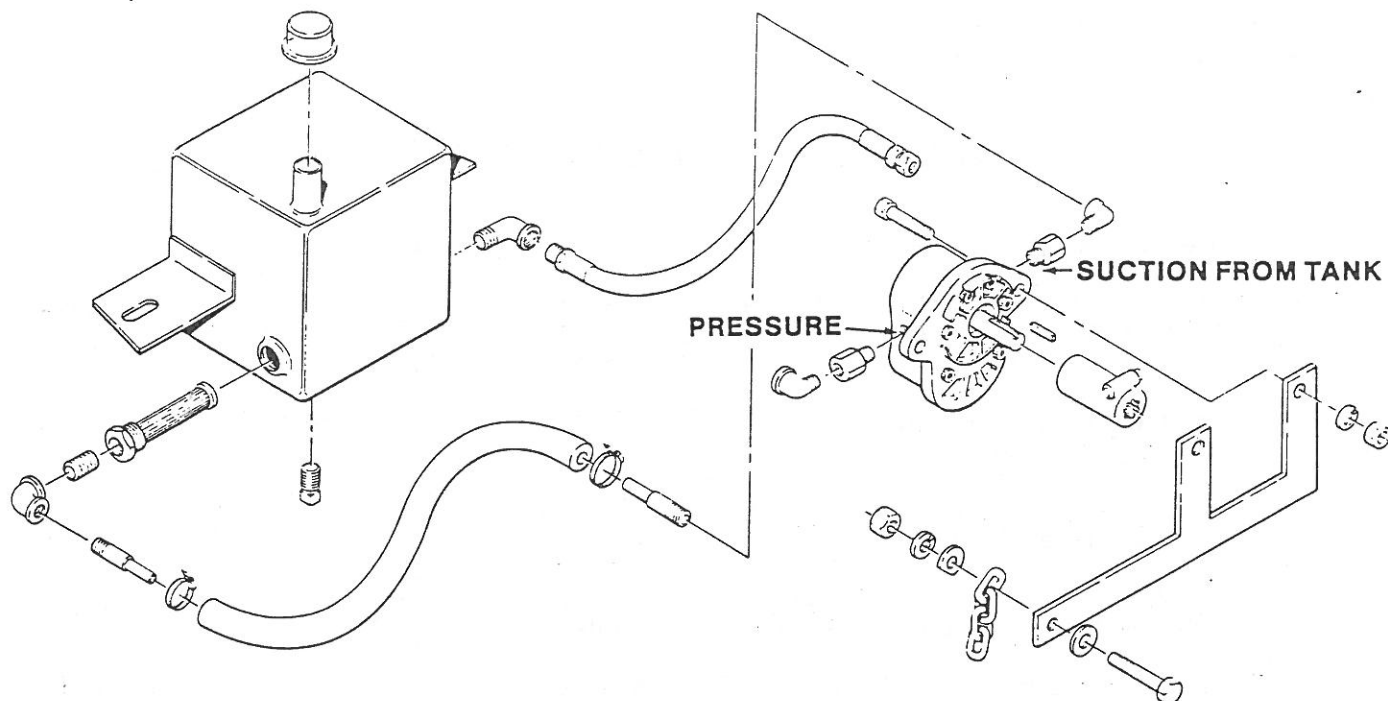


Figure 1

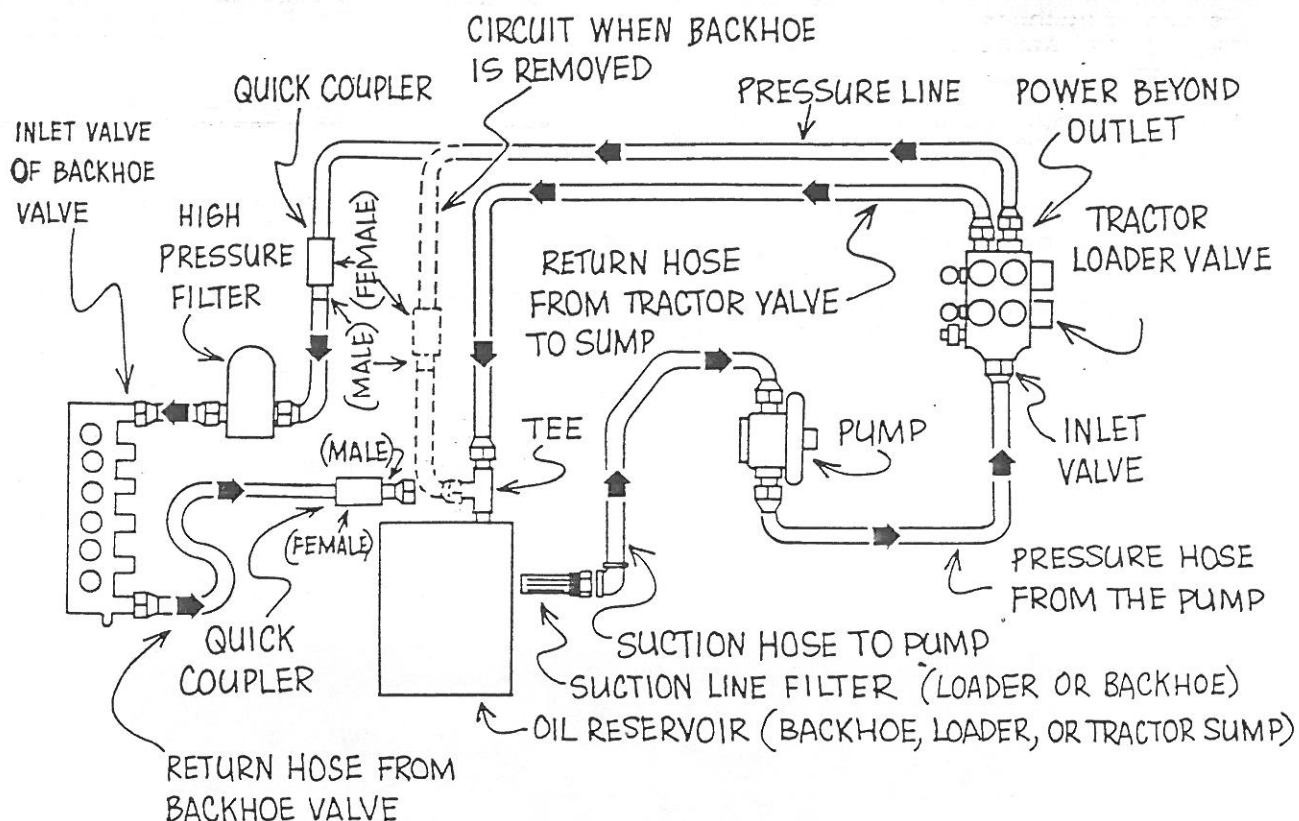


Figure 2 — Power Beyond Hosing

- A. If an open center tractor hydraulic system is being utilized, attach the hose to the tractor hydraulic outlet.
 - B. If the *KELLEY* independent hydraulic system is being utilized, attach the hose to the $\frac{1}{2}$ " street ell that is connected to the independent hydraulic system's pump.
 - C. If a closed center tractor hydraulic system is being utilized, refer to the section of this manual entitled **Closed Center Hydraulic Systems** — Figure 11.
 - D. If you wish to run both a loader and a backhoe off of the same hydraulic system, make your connection as illustrated in Figure 2 — Power Beyond Hosing. Also, refer to the section of this manual entitled **Power Beyond Hydraulic Systems** Figure 10. Since there are so many variations for this type of setup, we are showing only a generalized hosing scheme. If you have any questions concerning the specifics for your situation, please contact the factory before attempting operation.
4. Locate the return hose which is already connected to the left hand outlet port of the valve.
 5. Remove the cap from the free end of the hose.
 6. Attach the $\frac{3}{8}$ " return hose via its $\frac{1}{2}$ " male fitting to the oil reservoir inlet fitting or directly to the oil sump of the tractor according to the instructions below.



CAUTION Do not remove or discard the special return hose. This hose is designed to burst at 800 PSI. The hydraulic valve can be damaged by reverse flow of oil through the valve, disconnecting the return hose while the tractor is running, or by using more than 12 GPM while operating. **THE VALVE MANUFACTURER WILL NOT WARRANT THE VALVE WHEN DAMAGED IN THIS MANNER.**

- A. If an open center tractor hydraulic system is being utilized, attach the hose to the oil sump of the tractor.
- B. If the *KELLEY* independent hydraulic system is being utilized, attach the hose to the 1/2" 90° ell on the **RETURN PORT** of reservoir in lower right corner.
- C. If a closed center tractor hydraulic system is being utilized, refer to the section of this manual entitled **Closed Center Hydraulic Systems** — Figure 11.
- D. If you wish to run both a loader and a backhoe off the same hydraulic system, make your connection as illustrated in Figure 2 — Power Beyond Hosing.

Since there are so many variations for this type of setup, we are showing only a generalized hosing scheme. If you have any questions concerning the specifics for your situation, please contact the factory before attempting operation.

7. If you are not familiar with the operation of the *KELLEY BACKHOE*, **DO NOT PROCEED** until you have studied the operating instructions contained within this manual.

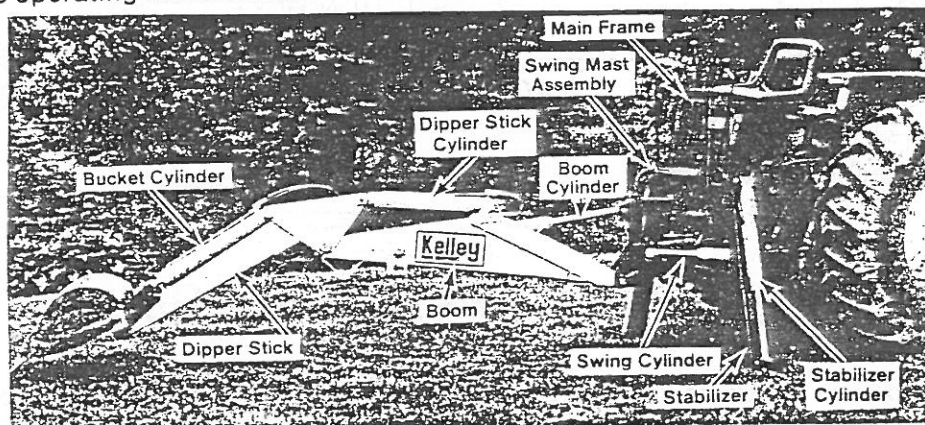


Figure 3 — Description of Major Backhoe Parts

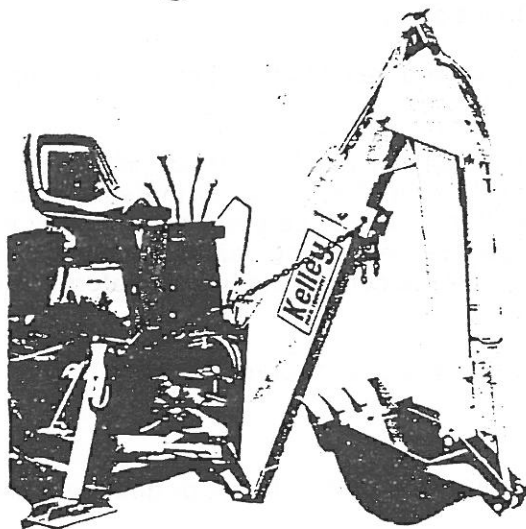


Figure 4

8. Familiarize yourself with all of the terms that will be employed in the following instructions by studying Figure 3 — Description of Major Backhoe Parts.
9. Apply power to the backhoe.
10. Raise the boom to take the tension off of the transport chains. Remove and place chains in chain carrier on front of the control panel as shown in Figure 4.
11. Lower the boom to the ground.
12. Remove the pin from Point A of Figure 5.
13. Disconnect the strapping and padding that attaches the dipper stick cylinder to the boom.

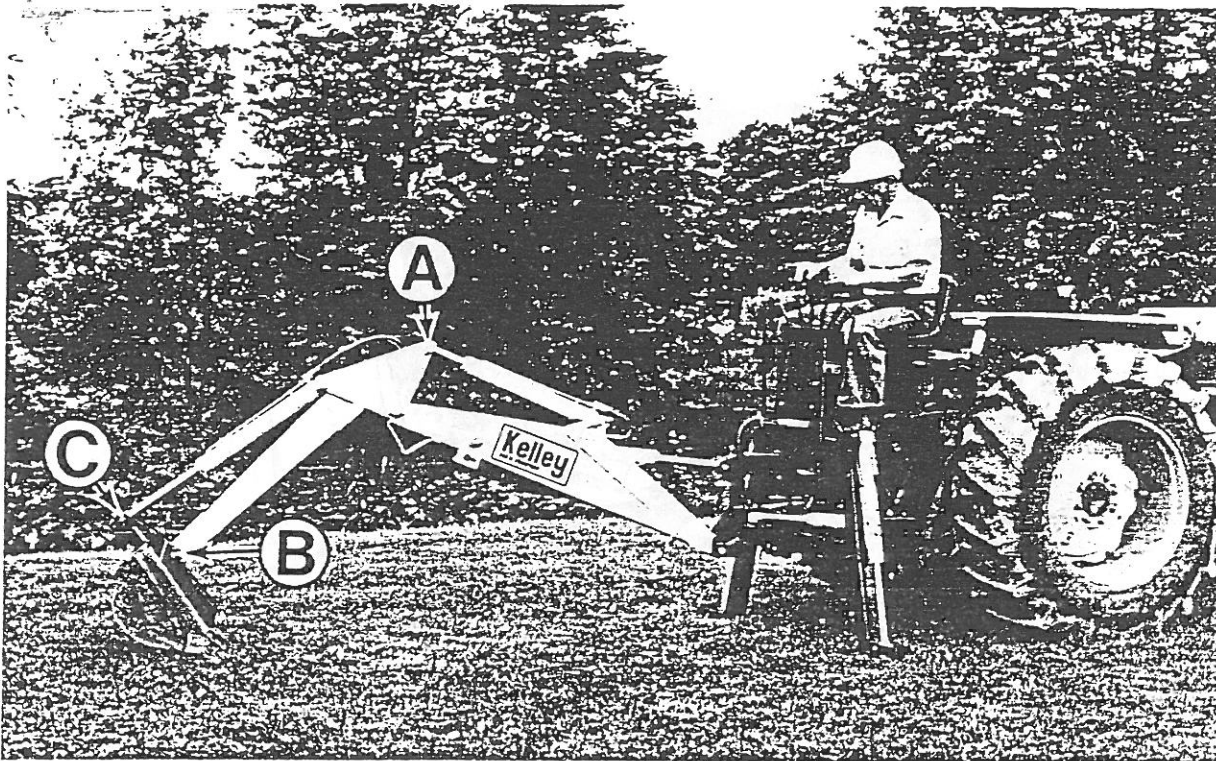


Figure 5

14. Extend the dipper stick cylinder until it is possible to align the rod bushing of the dipper stick cylinder with the bushings at Point A on the dipper stick.
15. Install the pin at Point A to secure the cylinder to the dipper stick. Use the 5/16" roll pin to lock the pin in place.



CAUTION

Keep all people clear of your work area during the next steps. Until the backhoe is securely mounted, the operator should make sure that no portion of his body is beneath any part of the backhoe.

16. Extend boom and dipper stick until they make contact with the ground.
17. Remove the two lower link pins.
18. By manipulating the cylinders and placing down pressure on the boom and stabilizers, lift the backhoe vertically for approximately 8" to 11" of ground clearance.
19. Attach the backhoe to the lower lift arms of the tractor using the pins removed from the pallet and secure the lower link.

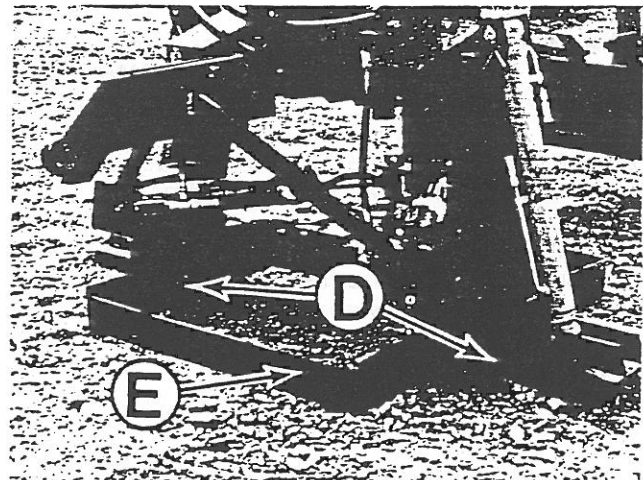


Figure 6

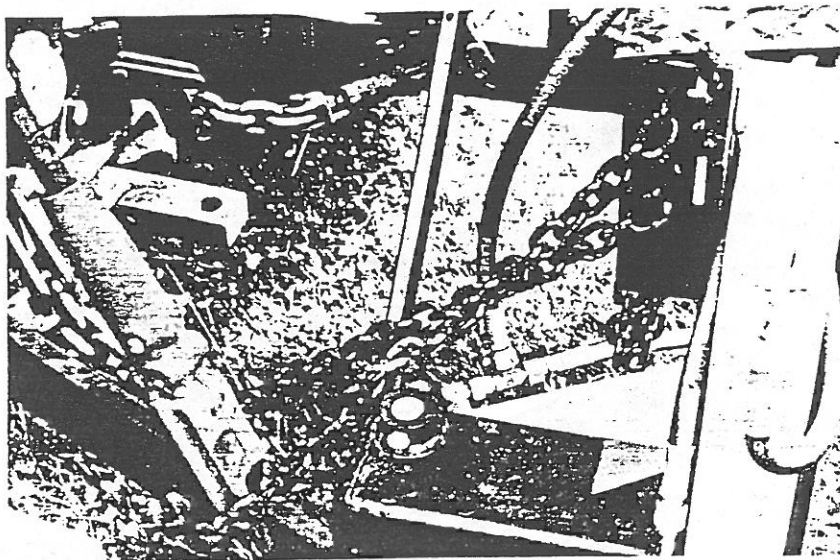


Figure 9

If you have to "cheat" in one direction, make it so that the backhoe tilts towards the tractor rather than away. If you cannot find a satisfactory set of holes, turn the top link upside down and try again. In some cases it may be necessary to drill additional holes in the top link or to shorten the top link.



CAUTION

For tractors with a top link draft control system, make sure the draft control is in its heavy position. It is very important to prevent the top link from exerting pressure that may activate the draft control system. Continued operation with the draft control system activated can cause overheating of the hydraulic fluid and can cause tractor hydraulic pump failure. Put the draft control lever to the bottom of the quadrant.

Once an appropriate set of holes is found, secure the backhoe to the top link using the two (2) 7/8" X 2 1/2" bolts and hardware that were removed in Step 20.



CAUTION

You must secure the backhoe top link to the main backhoe frame with *TWO* (2) 7/8" X 2 1/2" bolts and hardware. **EXTREME DANGER** exists to the operator if this procedure is not properly followed.

23. Remove the pin attached to the rod bushing of the bucket cylinder. Also, remove the strapping and padding attached to the bucket cylinder.
24. Remove the pin on the dipper stick, Point B of Figure 5. Position the dipper stick and bucket cylinder in order to mount the bucket. Mount the bucket at Points B and C of Figure 5. Secure the bucket pin with the 3/8" set screw and lock with jam nut. Secure bucket cylinder pin with 5/16" cotter pin.



CAUTION

Safety chains are provided for the operators protection and the protection of the three point system of the tractor.

25. Safety chains must be securely wrapped around the lower hitch arms at the radius rod pivot point. Then secure to the chain anchor located below the foot pad as in Figure 9.

FOR POWER BEYOND HYDRAULIC SYSTEMS

Power Beyond and Closed Center Kit Part #BVV10107

For power beyond applications, a Power Beyond and Closed Center Kit (Part #BVV10107) must be purchased from your **KELLEY BACKHOE** Dealer, then perform the following steps:

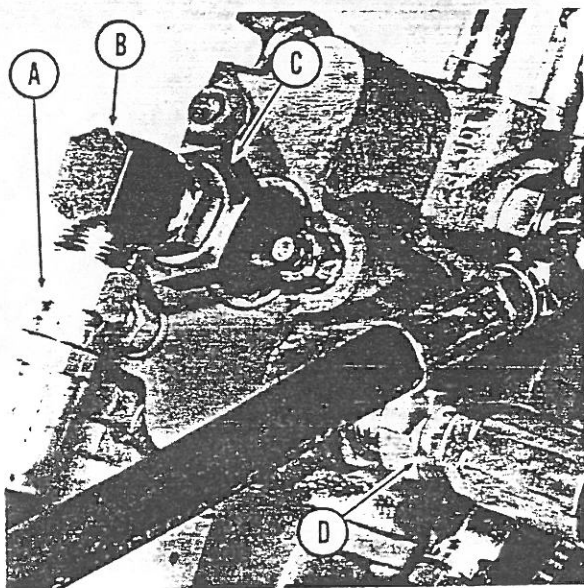


Figure 10

- A. Remove return hose and elbow, Points A and B in Figure 10, from valve.
- B. Install closed center sleeve in Figure 12 as seen at Point C — Figure 10. Remove O-ring plug from sleeve.
- C. Install a #8 O-ring ell (Part #SFT272) into closed center sleeve opening. This converts it to a power beyond sleeve.
- D. Install a high pressure hose going to the inlet of another valve. This hose is not furnished (Point A — Figure 10).
- E. Remove O-ring plug from front of the outlet section of valve (Point D — Figure 10) and replace with 850B-8X10 adapter (Part #SFT10079). Connect return line that was removed from Point A to this adapter. Connect the other end of the return hose to the tractor oil sump.

F. Refer to Figure 2 for hosing.

CLOSED CENTER HYDRAULIC SYSTEMS

Power Beyond and Closed Center Kit Part #BVV10107

CAUTION If you are going to use a closed center tractor hydraulic system to power your **KELLEY BACKHOE**, a Power Beyond and Closed Center Kit (Part #BVV10107) must be purchased from your **KELLEY BACKHOE** Dealer, then you must follow carefully the directions below. Failure to do so may cause extensive damage to your tractor and/or **KELLEY BACKHOE**.

1. Adjust the Valve Bypass

- A. Remove the cover nut, Point A of Figure 11, from the valve bypass. This exposes a socket head screw.
- B. Loosen locknut and turn socket head screw **IN** approximately four complete turns, then tighten locknut.
- C. Replace cover nut. Be sure to replace the washer with the cover nut as it acts as a gasket.

2. Installing the Closed Center Sleeve

- A. Remove return hose and O-ring ell at outlet end of valve, Point B of Figure 13.
- B. Replace with closed center sleeve (Part #785022 — Figure 12) as shown in Point B of Figure 13.

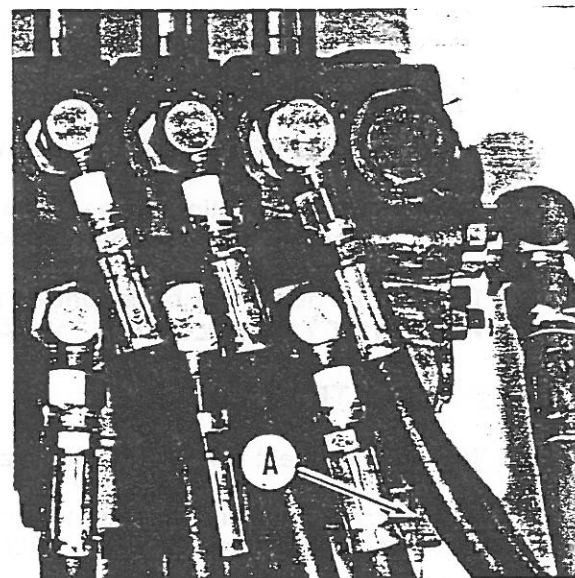


Figure 11

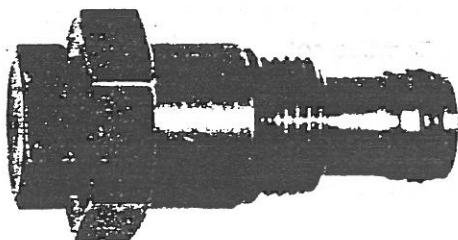


Figure 12

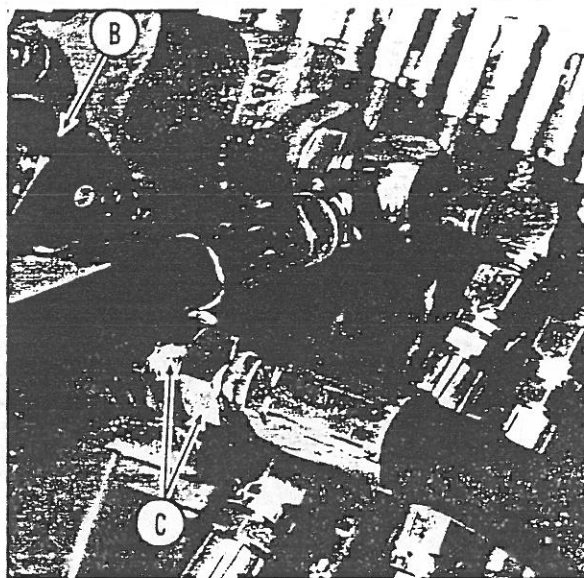



Figure 13

- C. Remove O-ring plug from the front of outlet section of the valve Point C of Figure 13 and replace with a 850B-8X10 adapter (Part #SFT10079). Connect return line to the adapter and return to oil sump of the tractor.

This procedure converts the valve to a closed center operation. If the valve is set for closed center operation, it may be converted back to open center by reversing the above procedure.

3. CHOOSE THE APPROPRIATE HOISING

 **CAUTION** Do not remove or discard the special return hose. This hose is designed to burst at 800 PSI. The hydraulic valve can be damaged by:

1. Reversing the flow of oil through the valve.
2. Hydraulic lines disconnected during transport.
3. Disconnecting the return line while the tractor is running.
4. A faulty quick coupler.
5. More than 12 GPM of oil flow while operating the backhoe.
6. By connecting the backhoe to a two-way tractor valve and actuating the valve in the wrong direction causing a reverse flow through the backhoe valve.

The return hose will burst under these conditions. **THE VALVE MANUFACTURER WILL NOT WARRANT THE VALVE WHEN DAMAGED UNDER THESE CIRCUMSTANCES.**

FOR ALL TRACTORS

We highly suggest that you purchase a *KELLEY INDEPENDENT HYDRAULIC SYSTEM* for your backhoe.

However, if you wish to use the tractor hydraulic system, consult the dealer of your tractor for a safe and proper method of connecting the *KELLEY BACKHOE* to your tractor.

FOR JOHN DEERE TRACTORS

The return hose supplied with your *KELLEY BACKHOE* will not be long enough. You will have to purchase a ½" return hose with a length suitable for the following procedure.

Purchase a Port Filter Cover (JOHN DEERE Part Number AT301970) from your dealer. Install it on your tractor.

Attach the backhoe's pressure hose to the tractor quick coupler. Attach the backhoe's return hose to the port filter cover that you installed. Move the control lever on the tractor so that it starts a flow to the backhoe valve, and secure it in full open position.

The above procedure results in a direct connection to the JOHN DEERE master pump, and eliminates a return into the rear transfer pump chamber. The problem with returning oil into the rear transfer pump chamber is that if the tractor engine RPM is throttled down to a point at which the oil transfer pump cannot supply sufficient oil to the main system pump, the main pump runs out of oil in its sump and starts chattering.

TRANSPORTING THE BACKHOE



CAUTION While traveling with the backhoe, the tractor must have at least 20% of the combined tractor and backhoe weight on its front wheels. Add additional front end weight, if necessary, to meet this requirement. This is necessary in order to maintain complete control of the tractor during travel.

Your backhoe comes equipped with transport chains. These should be put into proper position anytime you are transporting your backhoe. To ready your backhoe for transport, perform the following:

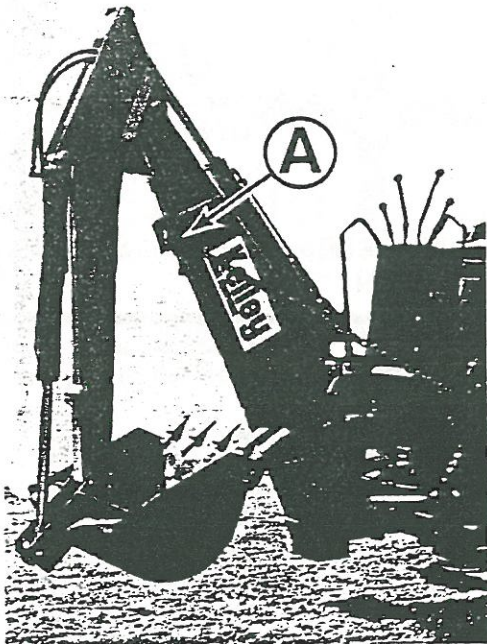


Figure 14

Raise both stabilizers completely. Raise the boom as high as possible. Curl the bucket completely in. Close the dipper stick in towards the boom as far as possible. Your backhoe should now appear similar to Figure 14.

Locate the loose end of the transport chain. Thread this end through the hole on the plate that is welded to the boom, Point A of Figure 14. Pull the chain taut and lock it in place by slipping it into the slot in the plate. Repeat this procedure with the transport chain on the other side of the backhoe.

Observe the following precautions while transporting the backhoe:

1. When traveling on roads, use the proper safety lights and warning signs. (Check your local regulations.)
2. When traveling over rough ground, do not exceed safe speed limits.
3. Do not make sudden starts or stops.
4. Do not make turns at high speeds.
5. When climbing grades, be particularly careful not to make sudden starts.

PREPARING FOR OPERATION

PREPARING THE BACKHOE

You must first place the transport chains in their operating position. To do this, disconnect the transport chains from the boom. You may have to raise the boom in order to relax the tension on the chains. Connect the free ends of the transport chains to the storage rack on the front of the console (B of Figure 15). Secure the chains by pushing a link into the slot in each of the racks.

PREPARING THE TRACTOR

Move the tractor's gear shift lever to a neutral position. Set the engine throttle to the correct RPM. For added stability, lower the front end loader or blade to the ground (if so equipped). Move the draft control lever to the bottom-most position.

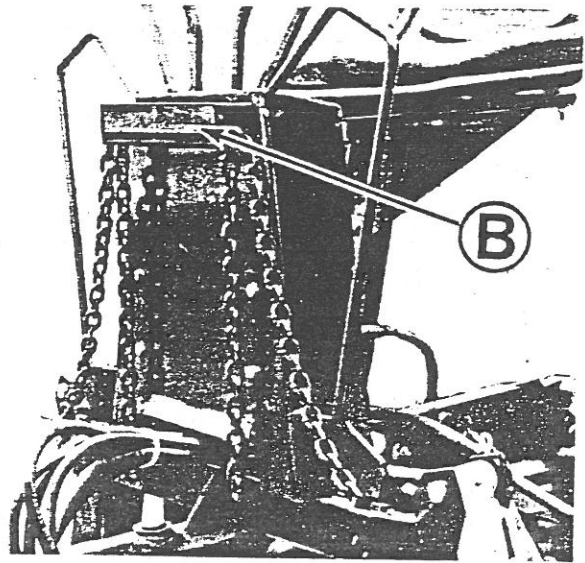


Figure 15

OPERATING THE BACKHOE



CAUTION

Operate the backhoe only from the operator's seat. Be sure to place your feet on the foot pads during operation. This protects them from injury that could result from moving parts.

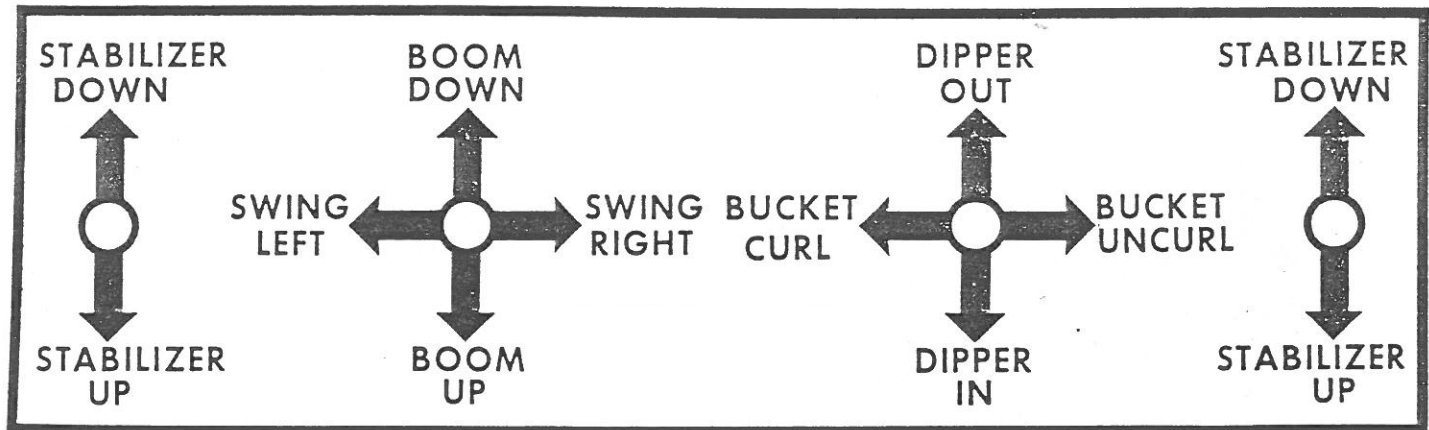


Figure 16

To operate your backhoe, mount yourself on the operator's seat. In front of you there are four control levers. Beneath the control levers is a decal that instructs you on the proper operation of the levers. Figure 16 above shows this control diagram as it appears on your backhoe. Refer to it for interpreting the following instructions. All directions such as *Right* or *Left* are determined from a seated position in the operator's seat.

STABILIZERS — The levers on the extreme right and extreme left of the operator's console control the stabilizers. The left lever is for the left stabilizer, and the right lever is for the right stabilizer. To raise the stabilizers, pull the levers towards yourself. To lower the stabilizers, push the levers forward (that is away from yourself).

The two levers in the center of the console control the operation of the backhoe. The left-hand lever controls the boom and the swing. The right-hand lever controls the dipper stick and the bucket.

BOOM — The second lever from the left controls the boom. Pulling the lever towards yourself raises the boom; pushing the lever forward lowers the boom.


Moving the lever to the left swings the boom to the left; moving the lever to the right swings the boom to the right.

DIPPER STICK AND BUCKET — The second lever from the right controls the dipper stick and the bucket. Pulling the lever towards yourself moves the dipper stick in; pushing the lever forward moves the dipper stick out.

Moving the lever to the left curls the bucket; moving the lever to the right uncurls the bucket.

Familiarize yourself with these controls before beginning to operate the backhoe. After a little experience, you will be able to operate the unit with a smooth steady motion.

DIGGING SUGGESTIONS

 **CAUTION** Always make sure that the stabilizers maintain contact with the ground during digging operations. Take the time to readjust the stabilizers when necessary during digging.


Before you begin digging, extend the stabilizers so that they make a firm contact with the ground. This is essential in order to gain the necessary stability and weight transfer to insure safe digging.


Observe the following cautions while digging.

 **CAUTION** Before swinging the backhoe, make sure you have room to swing and that all people are clear of the backhoe. For added protection, place a barricade around the swing area before commencing operation.

 **CAUTION** Be sure that you are not digging over any underground wiring, pipes, or other obstructions. If there is any doubt, call your public service agency.

 **CAUTION** When digging to either side and/or close to the tractor, be extremely careful that the bucket does not contact the stabilizers, as serious damage may occur.

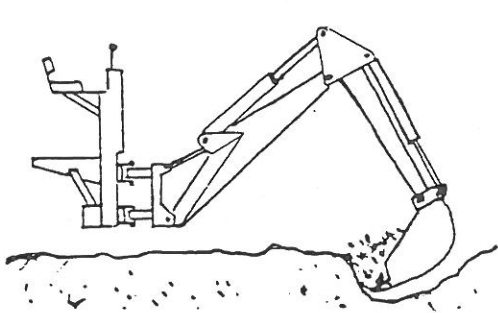
 **CAUTION** Be extra careful when working on hillsides and/or close to ditches. It is always extremely dangerous to work in a position where the danger of tipping or sliding exists.

 **CAUTION** Digging on a slope should be done from the top down. When digging across a slope, use the stabilizers to keep the backhoe level and **ALWAYS** dump uphill. Use caution when digging under these conditions. Move the unit carefully and at a safe ground speed.

The following suggestions should aid you in gaining maximum efficiency with your backhoe.

Operation

Digging at the correct angle is essential. To obtain the best penetration, the dipper stick should be at an angle. Do not extend the boom and the dipper stick out into a straight line. See Figure 17.



Correct

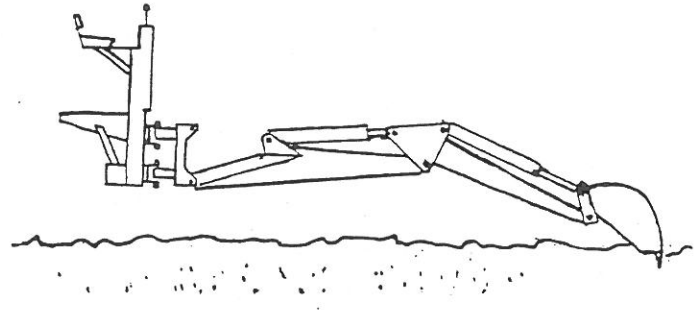
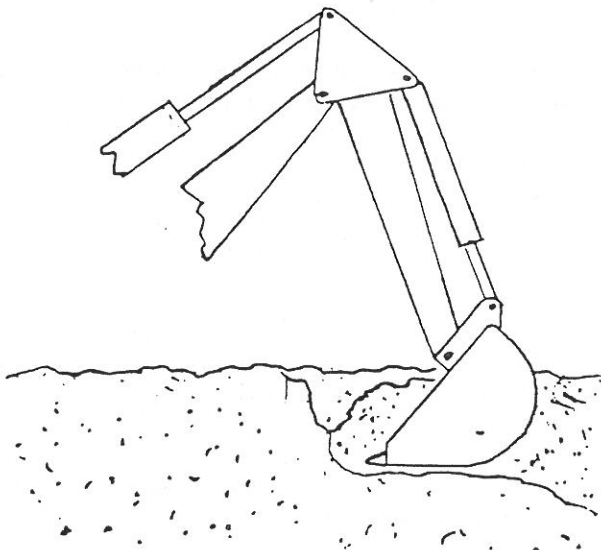


Figure 17

Wrong

Figure 18 shows the correct angle of the bucket for digging. After you have filled the bucket, do not pull the dipper stick any closer to the boom than is necessary in order to clear the hole. When the bucket is clear, swing it to the side to dump. Always start dumping far enough to the side so as not to run out of dumping room. It is desirable while swinging to the side to make contact with the already removed material in order to lessen shock on the machine. This also aids the operator in pushing the material away from the working area.



Correct

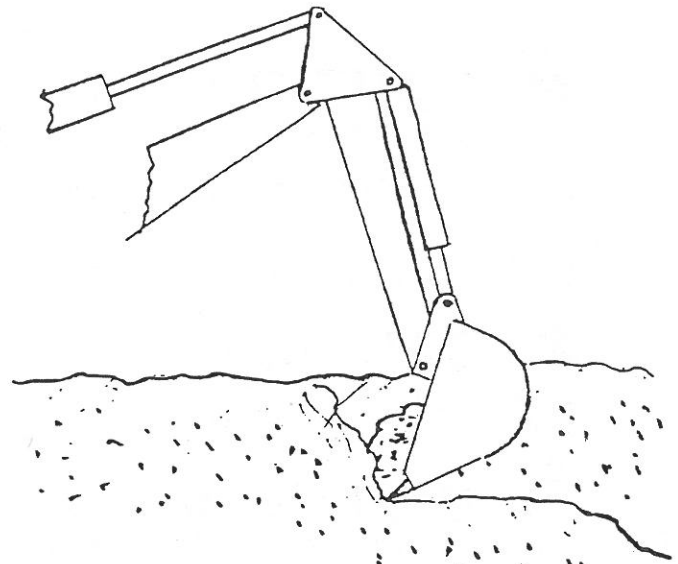


Figure 18

Wrong

The length of the pass should be just long enough so that the bucket will be full at the end of the pass. The depth of the pass will depend upon the type of soil. Do not drag a full bucket of dirt. After making a pass you will be able to determine how deep you will be able to dig. To control the depth of the pass, work the bucket and dipper stick controls alternately. In this way you can take an even bite each time you make a pass and obtain a full bucket. See Figure 19.

When loading trucks, curling the bucket close to the dipper stick will prevent undue spillage when the bucket is raised so that it can be dumped in the truck bed.

To obtain a level bottom, set the bucket teeth at a slight angle. Keep this angle as you drag the bucket with the dipper stick by gradually uncurling the bucket. Intermittently pull the boom lever at the same time to maintain a level bottom.

When digging for pipe leaks or underground cables, dig parallel to the pipe or cable run — never across it.

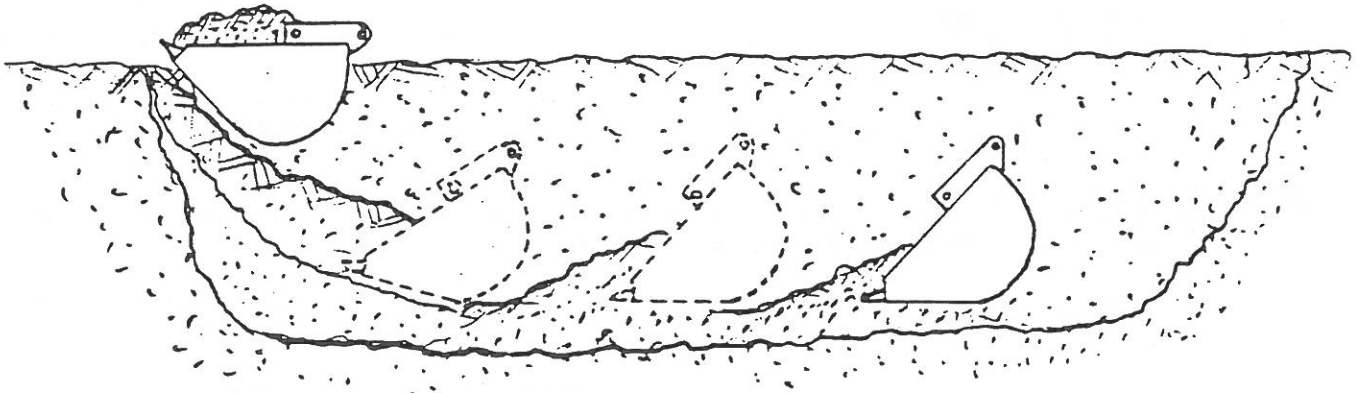


Figure 19

MAINTENANCE AND LUBRICATION

CAUTION Failure to perform the routine maintenance procedures outlined below may cause your backhoe to operate improperly. Such operation could lead to personal injury. Your *KELLEY BACKHOE* requires only a few minutes of maintenance before each use. For your own safety, follow the procedures suggested below.

CAUTION When servicing the backhoe, make sure all moving parts are resting on the ground.

CAUTION Do not service, adjust, or work on the backhoe while it is operating. Remove all power from both the backhoe and the tractor while servicing the backhoe.

CAUTION To avoid injury from escaping pressurized hydraulic oil, move the control levers in all directions before disconnecting any hoses, steel lines, or couplers.

DAILY

1. Check all hardware and hoses in order to be sure that they are secure. Check particularly the 3-point bolts, the lower link pins and locking pins, and the snap lock pins in the 3-point mounting top link. Check all retaining bolts in pins.

Maintenance

2. Check the hoses for cracks, cuts, or leaks. If a hose is defective, replace it.



CAUTION Under no circumstances should you attempt to repair a defective hose. Always **REPLACE** defective hoses.

3. Check for defective parts. If any are found, repair or replace them before operating the backhoe.



CAUTION Whenever you replace a part, make sure it is replaced with a part having a strength rating equivalent to or greater than that of the original part.

4. If you are using the *KELLEY INDEPENDENT HYDRAULIC SYSTEM*, make sure that the oil level is at the proper height. Add a Type A non-foaming hydraulic fluid if necessary.
5. Remove all dirt from the machine. Particularly remove any dirt on the swing mast or on the top side of the stabilizers around the stabilizer cylinders. Clogged dirt can damage cylinders and hoses.
6. Check for any hoses that may be rubbing against sharp edges. If you find any such hoses, try to reposition them to a safer place.
7. Lubricate all zerks as indicated by the arrows on the drawing Figure 20 — LUBRICATION POINTS.

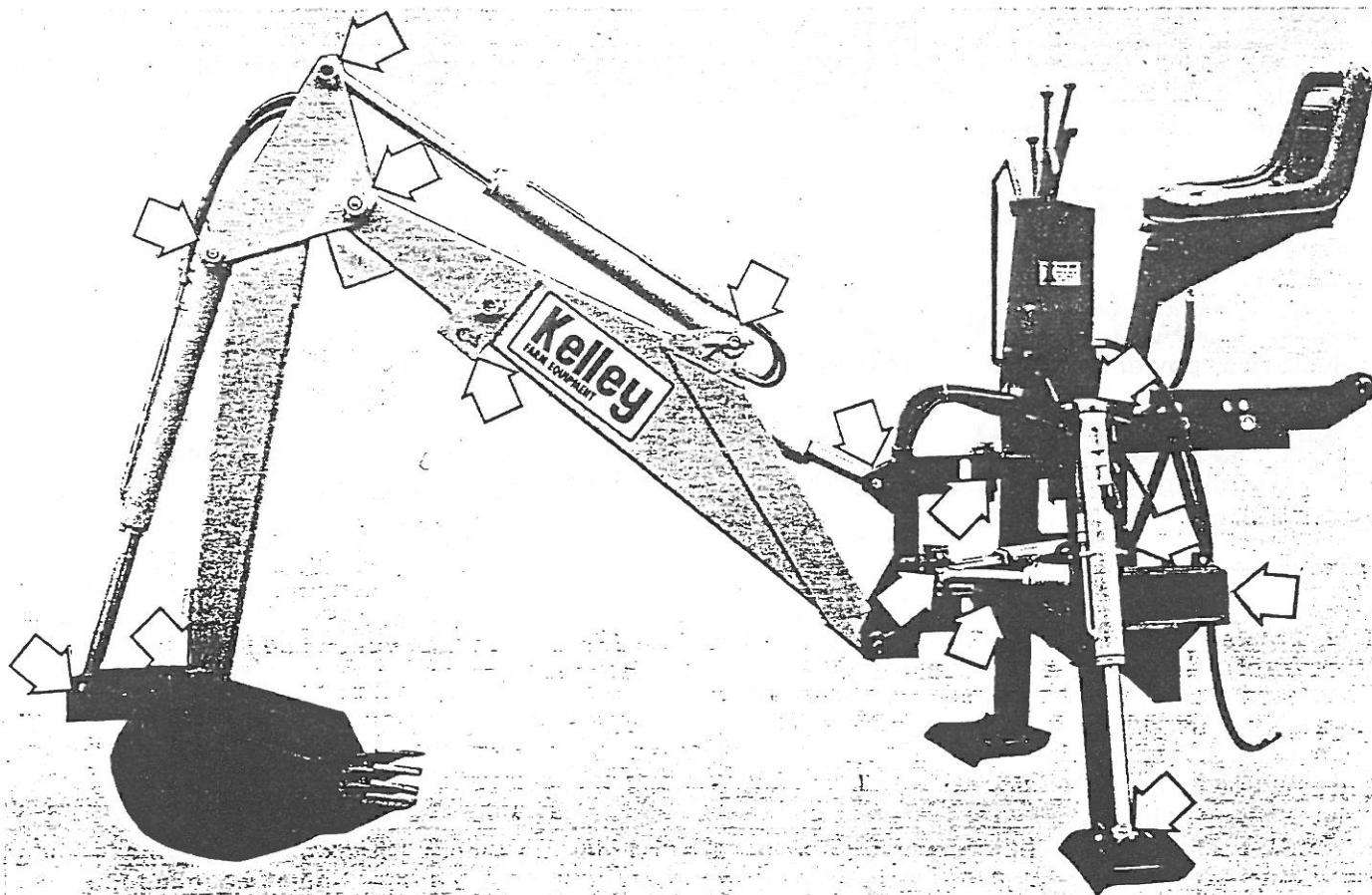


Figure 20 — LUBRICATION POINTS

EVERY 50 HOURS OF OPERATION

If you are using a *KELLEY INDEPENDENT HYDRAULIC SYSTEM*, clean the suction line filter as outlined in the section entitled **SUCTION LINE FILTER CLEANING**.

SUCTION LINE FILTER CLEANING

Remove suction line from tank outlet. Screw the filter out of the tank. Clean or replace filter screen. Reinstall filter.

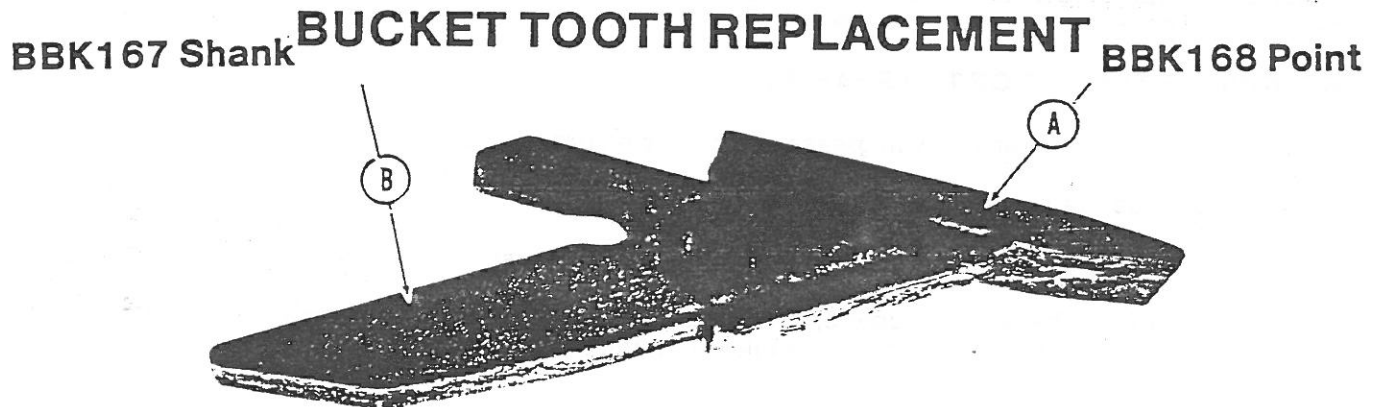


Figure 21 — BBK192 Tooth Assembly

To remove a tooth point, heat the point with a torch at A (the peened section that overlaps B). Then hammer at the top of the point until the point comes free from the shank.

To replace a tooth point, hammer the point onto the shank. Heat at A and hammer the heated section into recess B.

STORING THE BACKHOE



CAUTION

To avoid injury while disconnecting the backhoe from a tractor, slow the tractor RPM down to avoid sudden and quick reactions from the hydraulic cylinders.



CAUTION

To avoid injury from escaping pressurized hydraulic oil, move the control levers in all directions before disconnecting any hoses, steel lines, or couplers.

The first step in removing your *KELLEY BACKHOE* from your tractor is to lower the hydraulic stabilizers to the ground. Then lower the bucket to the ground. This will provide a third position point for stability.

Now by maneuvering the stabilizers and the boom cylinder, position the backhoe so that the weight load is removed from the pins connecting the backhoe to the 3-Point of the tractor. Be sure that the backhoe maintains a stable position that will not shift once the pins are removed.

Remove the lower hitch pins. Then remove the top link pin (you may have to reposition the backhoe to do so). While removing pins, make sure you keep your body above the frame of the backhoe in case it shifts its position.

Maintenance

At this point the backhoe can be removed from its hydraulic source. It is advisable to block the base of the backhoe if you wish to prevent the stabilizer cylinders from settling down and letting the backhoe sit directly on the ground.

Once the backhoe is removed, perform the recommended procedures below.

STORING FOR SHORT PERIODS

Coat all exposed cylinder shafts with grease or a corrosion preventive. (Remove before operating again.)

Install dust caps on the quick couplers, if so equipped, to prevent dirt contamination of the hydraulic system. Or, if possible, connect the quick couplers together.

STORING AT THE END OF THE SEASON

Coat all exposed cylinder shafts with grease or a corrosion preventive.

Store the backhoe in a dry protective place.

Clean the unit of all mud and dirt. Touch up the paint to prevent rust.

Install dust caps on the quick couplers, if so equipped, to prevent dirt contamination of the hydraulic system. Or, if possible, connect the quick couplers together.

AT THE START OF A SEASON

1. Clear all dirt and debris from all quick couplers, if so equipped.
2. Remove the protective coatings.
3. Check all hydraulic hoses and replace if necessary.
4. Tighten loose bolts and nuts.
5. Lubricate the unit.
6. Check bucket teeth. Sharpen or replace if required.
7. Run the unit slowly and check the operating controls before starting to dig.

BACKHOE VALVE RELIEF

To measure the setting of the relief valve, perform the following steps:

1. Remove O-ring plug (Point A — Figure 22) and install a hydraulic gauge and adapter at this point. *A gauge and adapter kit can be ordered from the factory.*
2. Start tractor engine and set R.P.M. at operating speed.
3. Raise stabilizer to top position, continue to hold lever until a reading can be taken. The pressure should be 2000 PSI.

Adjusting the main relief to the desired pressure:

To adjust the main relief (Point B — Figure 22) remove cap, loosen locknut, hold stabilizer in top position as described in item number 3 above. Screw clockwise to increase pressure or counter clockwise to decrease pressure. When the correct pressure is reached 2000 PSI lock nut and replace cap.

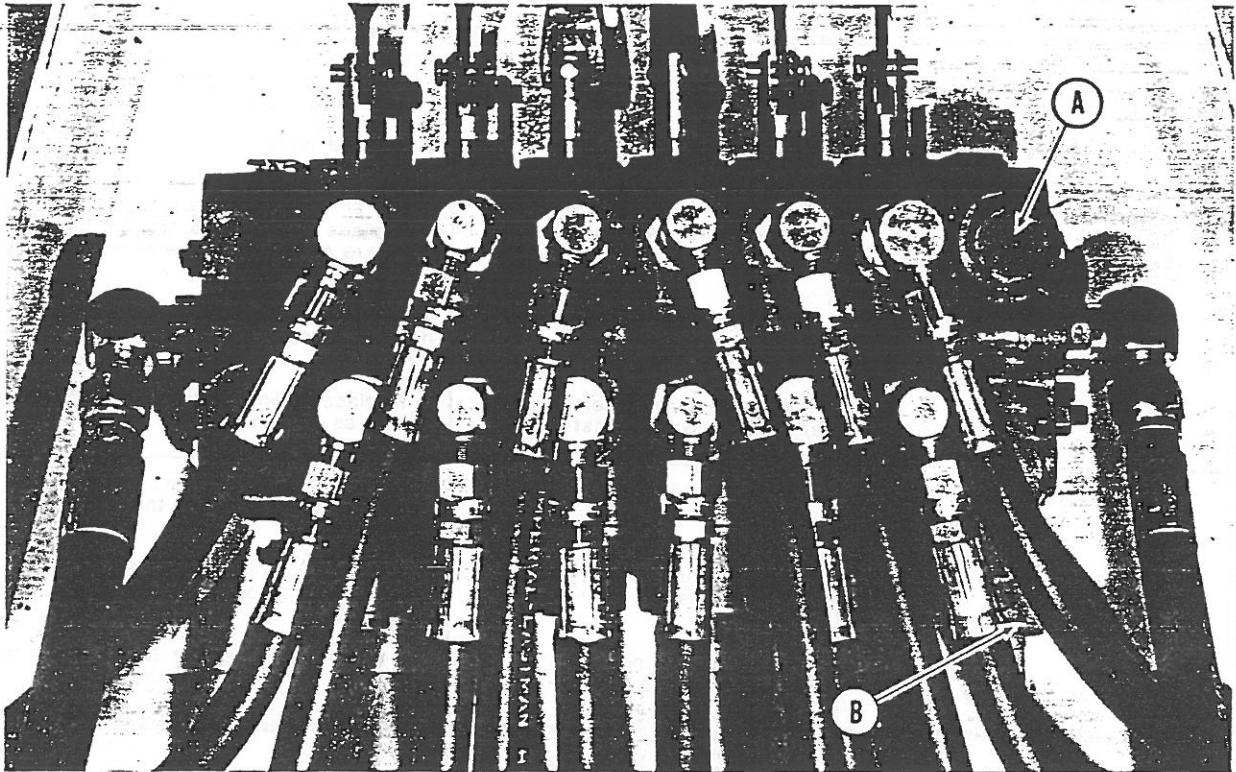


Figure 22
HYDRAULIC VALVE TROUBLESHOOTING

In the disassembly and servicing of the valve it should be noted that plungers if removed must be replaced in the same bore.

PROBLEM	POSSIBLE CAUSE	POSSIBLE REMEDY
Sticking Plungers	<ol style="list-style-type: none"> 1. Excessively high oil temperature. 2. Dirt in oil. 3. Pipe fittings too tight. 4. Valve warped from mounting. 5. Excessively high pressure in valve. 6. Handle or linkage binding. 7. Plunger bent. 8. Return spring damaged. 9. Spring or detent cap binding. 10. Valve not at thermal equilibrium. 	<ol style="list-style-type: none"> 1. Eliminate restrictions in pipe lines and filtering system. 2. Change oil — clean system. 3. Check torque. 4. Loosen valve and check. 5. Check with gauge on inlet and cylinder lines. 6. Free up linkage. 7. Replace valve or section. 8. Replace faulty parts. 9. Loosen cap, re-center and re-tighten. 10. Let system warm up.
Leaking Seals	<ol style="list-style-type: none"> 1. Paint on or under seal. 2. Excessive back pressure. 3. Dirt under seal. 4. Scored plunger. 5. Loose seal plates. 6. Cut or scored seal. 	<ol style="list-style-type: none"> 1. Remove and clean. 2. Open or enlarge line to reservoir. 3. Remove and clean. 4. Replace valve or section. 5. Clean and tighten. 6. Replace faulty parts.

Troubleshooting

PROBLEM	POSSIBLE CAUSE	POSSIBLE REMEDY
Unable to Move Plunger	1. Dirt in valve. 2. Plunger cap full of oil. 3. Bind in linkage.	1. Clean and flush out. 2. Replace seals. 3. Free up linkage.
Blown or Leaking O-ring Seals Between Valve Sections	1. Improperly connected. 2. Return line was replaced with high pressure hose. 3. Valve used in power beyond application without installation of power beyond sleeve.	1. Replace O-ring seals. Make sure all connections are as shown in the assembly section of this manual. 2. Replace O-ring seals. Remove highpressure hose and replace with correct low pressure hose. 3. Replace O-ring seals. Install power beyond sleeve as shown in assembly section of this manual.
Blown Hydraulic Valve Section	1. Improperly connected. 2. Return line was replaced with high pressure hose. 3. Valve used in power beyond application without installation of power beyond sleeve.	1. Replace Valve Section. Make sure all connections are as shown in the assembly section of this manual. 2. Replace Valve Section. Remove highpressure hose and replace with correct low pressure hose. 3. Replace Valve Section. Install power beyond sleeve as shown in assembly section of this manual.

RELIEF VALVE

PROBLEM	POSSIBLE CAUSE	POSSIBLE REMEDY
Can't Get Pressure	Poppet stuck open or dirt under seat.	Check for foreign matter between poppets and their mating members. Members must slide freely.
Erratic Pressure	Pilot poppet seat damaged. Poppet sticking in relief valve housing.	Remove and clean dirt out. If parts are damaged, replace complete relief valve.
Pressure Setting Not Correct	Wear due to dirt. Locknut and adjustment screw loose.	1. See "How to Set Pressure". 2. Check seats for scratches, nicks or other marks, replace relief valve if damaged.
Leaks	Damaged seats, worn O-rings, parts sticking due to dirt.	Replace worn or damaged O-rings and back up rings, inspect for free movement of components, check seat for scratches, nicks or other marks. Replace complete relief if metal parts are damaged.

GENERAL TROUBLESHOOTING



CAUTION

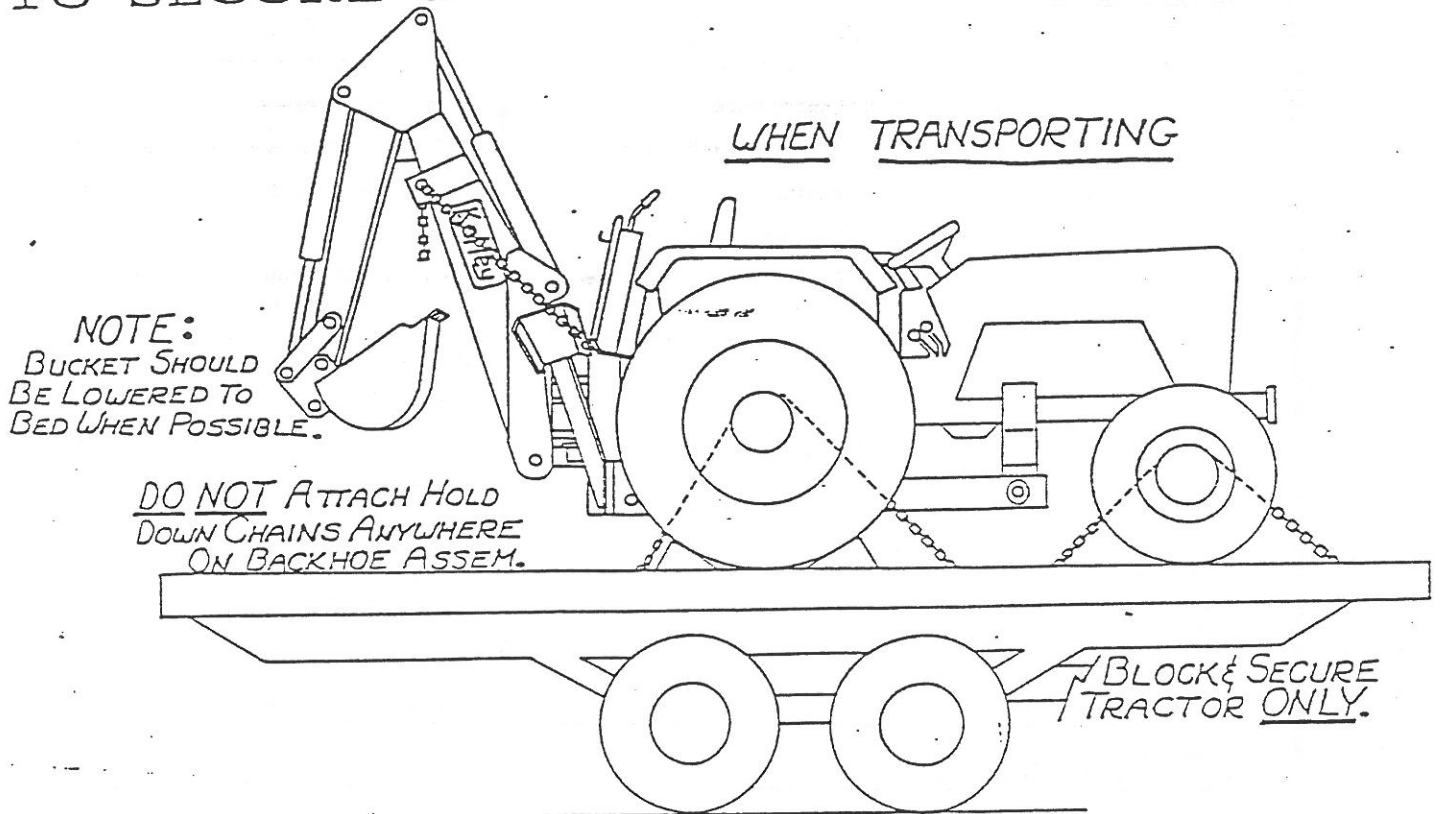
Do not attempt any repairs on the backhoe until you have studied all the CAUTIONS in the *Maintenance Section* of this manual.

PROBLEM	POSSIBLE CAUSE	POSSIBLE REMEDY
Backhoe Does Not Operate	1. Low oil supply. 2. Hoses not properly connected. 3. Worn or damaged pump. 4. Broken oil line.	1. Add oil. 2. Check hose connections. 3. Replace or repair pump. 4. Check for leaks. Replace line.

PROBLEM	POSSIBLE CAUSE	POSSIBLE REMEDY
Slow Operation and Poor Hydraulic System Performance	<ol style="list-style-type: none"> 1. Engine speed too low. 2. Defective pump. 3. Load too heavy. 4. Faulty main relief valve. 5. Internal valve crack. 6. Suction line filter plugged. 7. Oil too heavy for cold weather use. 8. Power supply may not be pumping enough oil. 9. Low oil level. 10. Pressure line restricted. 11. Collapsed suction line. 12. Valve spool not at full stroke. 	<ol style="list-style-type: none"> 1. Adjust RPM's. 2. Check pressure or replace. 3. Check line pressure. 4. Clean or replace main relief valve. 5. Replace valve section. 6. Clean. 7. Replace with lighter oil. 8. Use a flow meter to check out whether a 4-6 GPM flow rate is being achieved. 9. Add oil. 10. Check for obstruction. 11. Check for damage. 12. Check movement and linkage.
Backhoe Does Not Hold Up Load	<ol style="list-style-type: none"> 1. Cylinder seals leaking. 2. Valve spool leaking. 3. Oil bypassing valve spool. 	<ol style="list-style-type: none"> 1. Replace seals. 2. Replace seals. 3. Replace valve bank.
Load Drops When Valve Spool Moved From Neutral	Dirt in load check valve.	Disassemble and clean
Excess Oil Heat	<ol style="list-style-type: none"> 1. Damaged or worn pump. 2. Too fast of an engine speed. 3. Main relief bypass valve improperly set. 4. Draft control lever not all the way down. 	<ol style="list-style-type: none"> 1. Repair or replace. 2. Reduce throttle. 3. Check relief setting. 4. Position correctly.
Oil Leakage	<ol style="list-style-type: none"> 1. Valve spool seals. 2. Loose hose fittings. 3. Broken oil line. 	<ol style="list-style-type: none"> 1. Replace seals. 2. Tighten just enough to stop leakage. 3. Replace hose or line.
Independent Hydraulic System Pump Failure	Improperly set relief valve.	Set relief at 2000 PSI.
Independent Hydraulic System Pump Noisy	<ol style="list-style-type: none"> 1. Suction line filter plugged. 2. Oil too heavy. 	<ol style="list-style-type: none"> 1. Clean filter. 2. Use a lighter oil.
Jerky or Erratic Action	<ol style="list-style-type: none"> 1. Air in system. 2. Wrong type oil. 3. Foamy oil. 	<ol style="list-style-type: none"> 1. Check for loose connections. and/or cycle all valves to remove air. 2. Check tractor manual. For Independent Hydraulic System, use a Type A non-foaming hydraulic oil. 3. Check tractor manual. For Independent Hydraulic System, use a Type A non-foaming hydraulic oil.
Blown Return Line	Improperly connected.	Make sure all connections are as shown in the assembly section of this manual.

!!CAUTION!! !!CAUTION!! !!CAUTION!!

DO NOT CHAIN BACKHOE DOWN IN ORDER
TO SECURE TRACTOR TO TRAILER.



NOTE: WHEN LOADING OR UNLOADING.
WITH SAFETY CHAINS STILL SECURED TO BOOM, STICK MUST BE
EXTENDED (AS SHOWN) TO AVOID CONTACT WITH GROUND. FAILURE TO DO
SO, MAY RESULT IN SERIOUS DAMAGE TO BACKHOE ASSEM.

