

# Kelley



## Series B60 & B70 BACKHOE

### OWNER'S MANUAL OPERATING INSTRUCTIONS

**Kelley Manufacturing Corporation**

PO BOX 276, 131 PROGRESSIVE DRIVE  
OTTOVILLE, OHIO 45876  
Telephone 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 the Warranty Registration Card is returned to us within ten days after the delivery of your backhoe.

The warranty period is one year from the original date of purchase for parts and 6 months for labor. To verify the warranty period, you should keep the sales slip or other proof of purchase date.

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

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

**Attach your CUSTOMER COPY of the Warranty Registration Card or fill in the information below. This information will help you in ordering repair parts for your KELLEY SERIES 60 or 70 BACKHOE.**

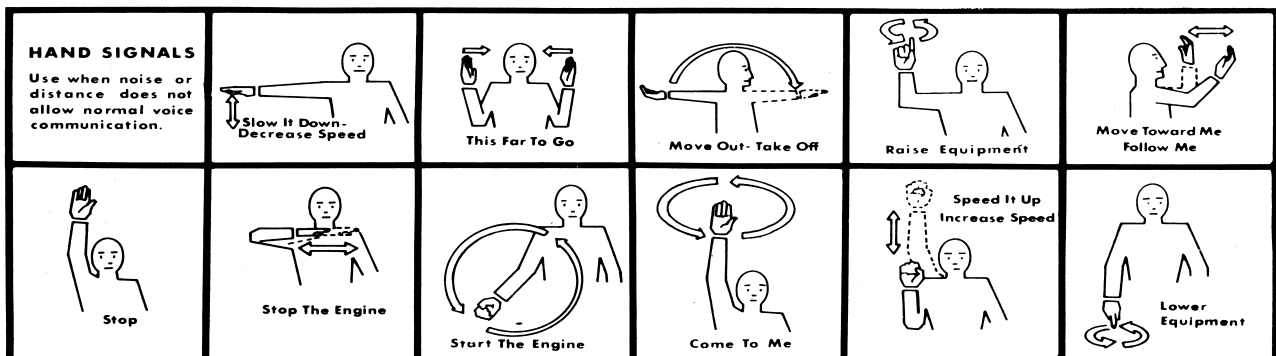
MODEL NUMBER	
SERIAL NUMBER	
DATE OF SALE	
DEALER	
ADDRESS	
CITY	
STATE	ZIP
KELLEY MANUFACTURING CORPORATION OTTOVILLE, OHIO	

# **WARNING**

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 the 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 2 or Category 3 three-point hitch, with the top link pin being at least on inch (1") in diameter. Failure to do so may result in serious injury.
2. Do not transport your backhoe with the bucket fully raised.
3. Make sure all parts are in good condition before operating the backhoe. Especially inspect the hydraulic hoses and fittings. If a leak is suspected, use a piece of cardboard to check. **UNDER NO CIRCUMSTANCES SHOULD YOU CHECK WITH YOUR HANDS OR BODY.**
4. Be sure your tractor has sufficient front-end weight to operate and transport the backhoe.
5. 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.
6. When traveling on the road with your backhoe, use proper safety lights and warning signs. Check local regulations.
7. When traveling with your backhoe, do not make sudden starts, stops, or turns at high speeds. Do not exceed safe speed limits on rough ground. Do not make sudden starts when climbing grades.
8. Keep footpads clean to prevent foot slipping when the operator mounts the backhoe.
9. Always wear protective headgear while operating the backhoe.
10. Be sure to lower the stabilizers to the ground before operating the backhoe.
11. Watch overhead for low hanging wires. Do not touch wires with any part of the backhoe.
12. Do not operate from any other position than the operator's seat.
13. Before swinging the backhoe for any reason, make sure you have room to swing and that all people are clear of the backhoe.
14. Be extra careful when working on hillsides and close to ditches or any place where danger of tipping or sliding is possible.
15. Do not dig under the stabilizers or backhoe, as a cave-in could occur.
16. 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.
17. Be sure you are not digging over underground wiring or other underground obstructions.

18. Do not attempt to raise the tractor off the ground or move the tractor forward or backward using the boom or stabilizers.
19. When leaving the backhoe for any reason, lower the bucket to the ground for safety.
20. Never leave unit unattended with engine running.
21. Do not wear loose clothing while operating or working near the backhoe. Keep hair and clothing away from all moving parts of the backhoe.
22. Only the operator should be near the backhoe during operation. Keep all others a minimum of fifty feet away from your work area.
23. Keep your work areas clear of obstacles at all times.
24. Children should never be permitted to operate the backhoe.
25. When servicing backhoe, make sure all moving parts are on the ground.
26. To avoid injury from escaping pressurized hydraulic oil, move the control levers in all directions before disconnecting any hoses, steel lines or couplers.
27. Keep away from pressurized lines. The hydraulic fluid can easily penetrate the skin and cause injury or death. If penetration occurs, CONTACT A PHYSICIAN IMMEDIATELY.
28. 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.
29. 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.
30. When the use of hand tools is required to perform any part of assembly, installation, removal, or adjustment of the backhoe is sure that the tools that are used are designed and recommended by the tool manufacturer for the specific task in which they are being used.
31. 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.
32. Check all bolts on the tractor's clutch and transmission housing for tightness after every twenty hours of use. These bolts have a tendency to loosen when the tractor has a mounted loader and backhoe.
33. Perform all maintenance procedures as recommended.
34. 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.
35. Use the hand signals show below for safety during operation:





## WARNING

Your backhoe must be mounted only on a tractor equipped with a Category 2 or Category 3 three-point hitch with at least a 1" pin on the top link. Failure to do so voids all warranties associated with this equipment. This backhoe not safe to operate unless it is mounted on a Category 2 or Category 3 three-point 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 backhoe must be set for closed center operation. Your backhoe must be mounted only on a tractor equipped with a Category 2 or Category 3 three-point hitch with at least a 1" pin on the top link. Failure to do so voids all warranties associated with this equipment. This backhoe not safe to operate unless it is mounted on a Category 2 or Category 3 three-point hitch. Failure to do so may result in serious injury.

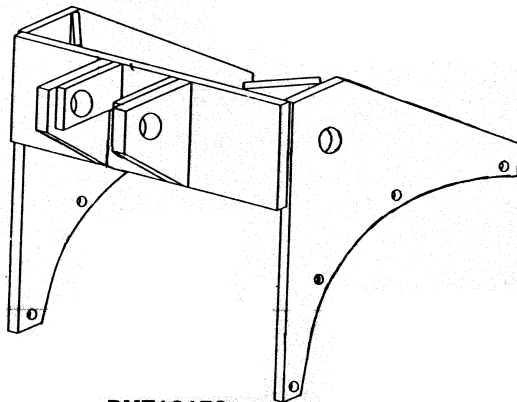
Your backhoe unit has been filled with oil at the factory. The oil in the unit is compatible with most tractor manufacturers' oil. Do not move any control levers on the unit until after hydraulic connections to the tractor or the independent hydraulic system have been made.

**HYDRAULIC SYSTEM REQUIREMENTS:** The *KELLEY BACKHOE* has been designed to be operated at a flow rate of 8 to 12 GPM, at 2250 PSI maximum. Any tractor hydraulic system used in connection with this backhoe must have a PSI rating of 2000 minimum.

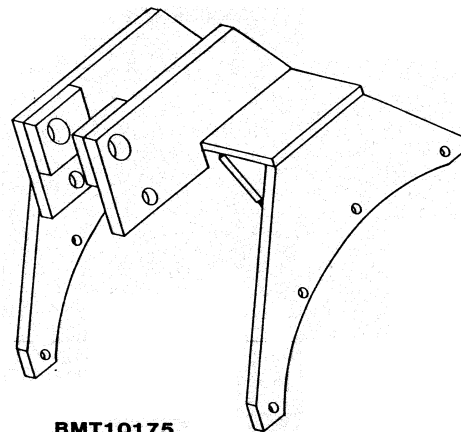
Since many tractor systems exceed a flow rate of 12 GPM, the flow may have to be adjusted by throttling the engine RPM down to obtain an acceptable flow rate of 8 to 12 GPM. By adjusting the flow rate correctly, you will prevent sudden shock loads on the cylinders, pins, hoses, seals, etc. This results in smooth operation with reduced maintenance costs and down time.

## BACKHOE MOUNTING AND ASSEMBLY

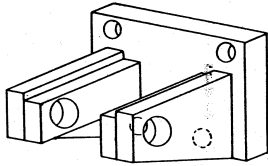
1. Some tractors do not have standard top link brackets which are compatible with the backhoe so it has been necessary to design special top link brackets for those tractors. Following are sketches, part numbers, and the models that special top link brackets will fit. Check your Kelley price list for correct prices and any additional tractors that may require a special top link bracket.



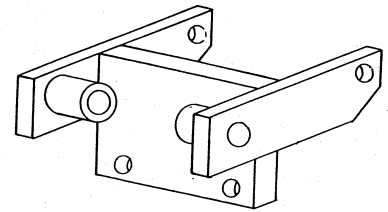
**BMT10176**  
Massey Ferguson 135 & 20C



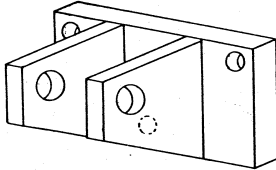
**BMT10175**  
Ford 3400, 4000 prior to 1965  
(Lower Links must be changed to 1-1/8" balls)



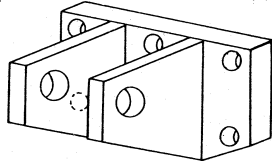
**BMT10098**  
John Deere 2510, 2520, 3020  
4020, 4030, 4040, 4230, 4240, 4320



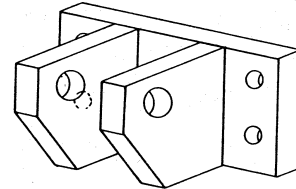
**BMT10183** - John Deere 3010 7/8" pin  
**BMT10338** - John Deere 4010 3/4" pin



**BMT10099**  
John Deere 2040, 2240, 2440, 2640,  
2150, 2350, 2550, 2750



**BMT10223**  
John Deere 2840, 2940



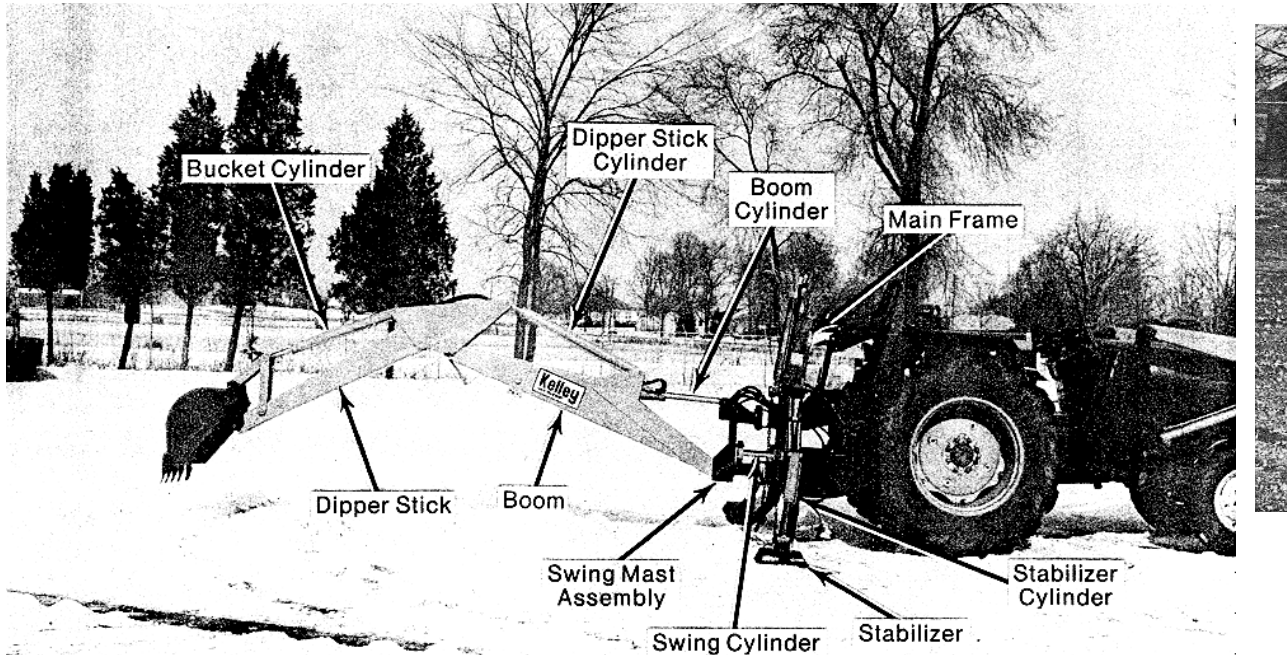
**BMT10260**  
International 574, 674, Hydra 84  
584, 684, 784, 2400A



**CAUTION** When using a loader in conjunction with a Kelley Backhoe, we recommend a loader that is mounted on the front of the tractor to the rear axle of the tractor. The operator must consider that the backhoe adds approximately 1800 lbs. of counterweight to the tractor. Careless use of the loader could cause damage to the tractor.

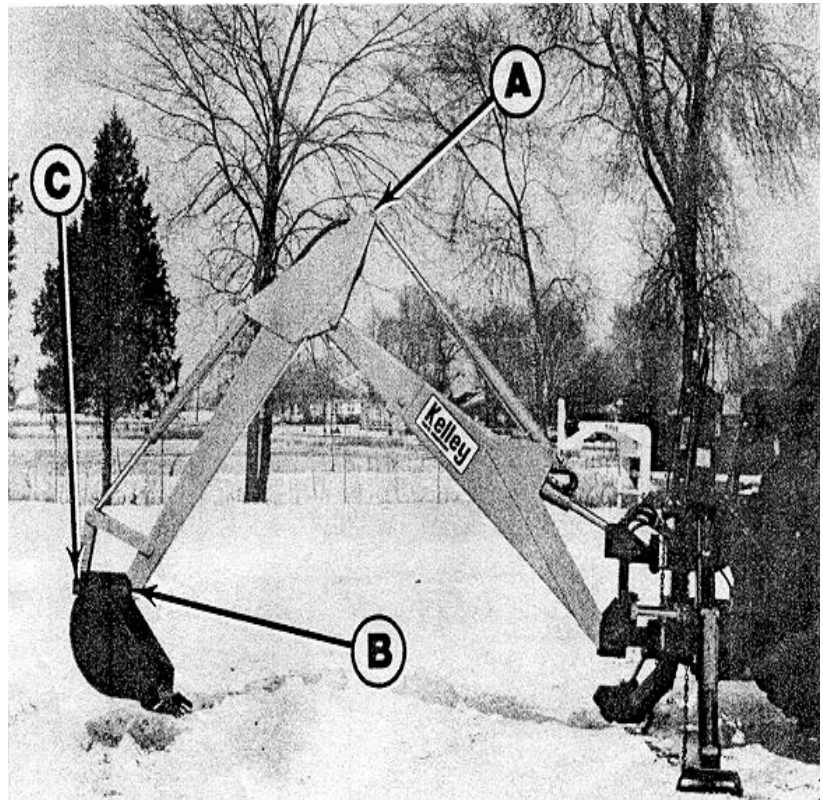
2. Remove the seat from the seat carton and install with hardware supplied.
3. Remove lower lock pins from the backhoe by unsnapping the 7/16" lynch pins and remove the 1-1/8" pin.
4. Back tractor up to the backhoe as closely as possible.
5. Remove the cap from the 3/8" pressure hose, which is attached to the right hand side of the backhoe valve. Also remove the cap from the return hose on the left-hand side of the valve.
6. Determine the type of hydraulic system that will be the most suitable for the installation of the backhoe on your tractor.
  - A. Tractor open center system (refer to page 13 in Hydraulic Section).
  - B. Tractor closed center system (refer to page 13 in Hydraulic Section).
  - C. Kelley Independent Hydraulic System (refer to page 11 in Hydraulic Section).
  - D. Power beyond system from a loader equipped with a power beyond valve (refer to page 14 in Hydraulic Section).
  - E. Power beyond system through backhoe valve (refer to page 15 in Hydraulic Section).
  - F. Closed center power beyond system (refer to page 17 in Hydraulic Section).
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.
8. Familiarize yourself with all of the terms that will be employed in the following instructions by studying DESCRIPTION OF MAJOR BACKHOE PARTS--Figure 1.

**Figure 1: Description of Major Backhoe Parts**



9. Apply power to the backhoe.
10. Raise the boom and stabilizers to take the tension off of the transport chains. This chain routing is used only for shipping. Refer to the OPERATION SECTION of this manual on how the chains are used in normal operation.

11. Lower the boom to the ground.
12. Remove the pin from Point A of figure 2
13. Disconnect the strapping and padding that attaches the dipper stick cylinder to the boom.
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 3/8" roll pin to lock the pin in place.



**Figure 2**

**CAUTION** Keep all

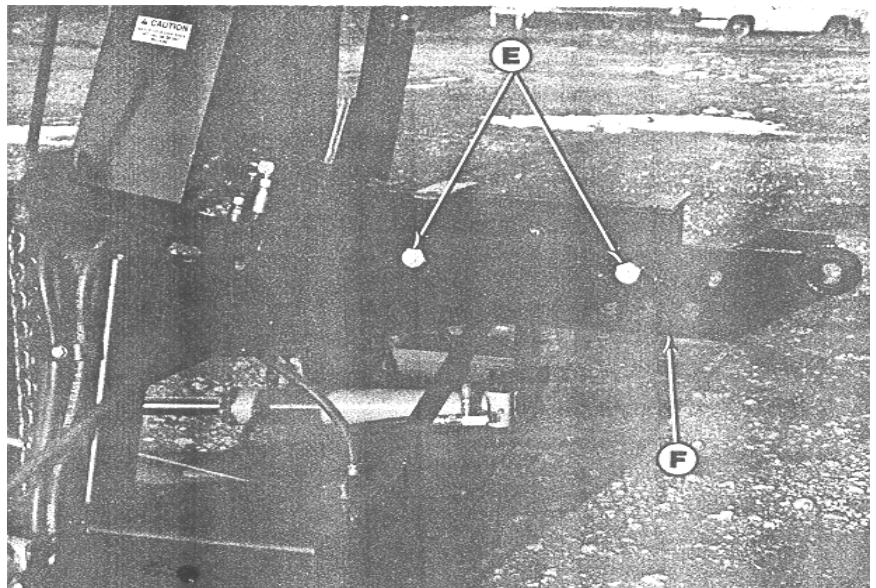
people clear of your work area during the next steps. Until the backhoe is securely mounted, the operator should make sure that no portion of his body is beneath any part of the backhoe.

16. Extend boom and dipper stick until they make contact with the ground.
17. Remove the two lower link pins from the pallet (Point D in Figure ).
18. By manipulating the cylinders and placing down pressure on the boom and stabilizers, lift the backhoe vertically for approximately 10" to 12" 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.
20. Remove the two 7/8" X 2-1/2" bolts and hardware at Point E in order to free the top link at Point F.
21. Mount the top link to the tractor third Point. NOTE: There is not a correct side up for the top link, it depends on your tractor. You may have to try the four positions illustrated in Figure 5, in order to find the best position for your backhoe.
22. Mount the top link of the backhoe to the main frame of the backhoe. To do this, maneuver the backhoe until you can align the holes in the backhoe frame at Point E of Figure 4 with a set of holes in the top link. It is important to pick a set of holes that places the backhoe in a vertical position in relationship to the ground with a 10" to 12" ground clearance. There are four possible positions.

**⚠ WARNING** Tractor roll bars and tractor cabs can present a danger in the operation of a three point mounted backhoe. We do not recommend the use of a three-point backhoe in conjunction with either a roll bar and/or a tractor cab.

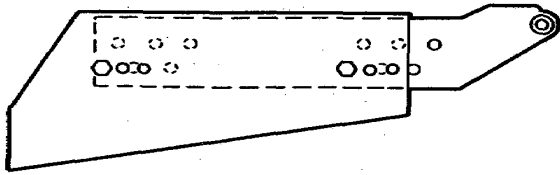
**⚠ WARNING** Tractors with cabs must have at least 32" minimum clearance between the end of lower links and tractor cab. Operator must have at least 12" clearance between his back and tractor cab.

**⚠ WARNING** Tractor should be equipped with a front end loader or equivalent front-end weight for safe and stable operation.

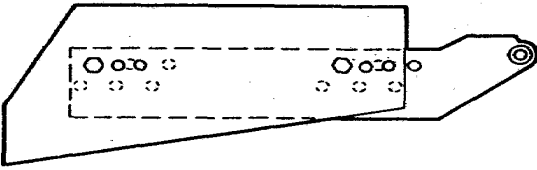


**Figure 4**

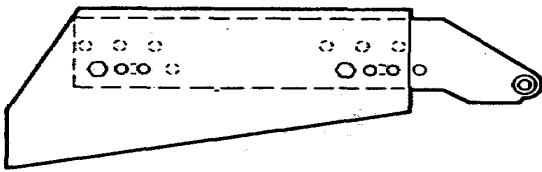




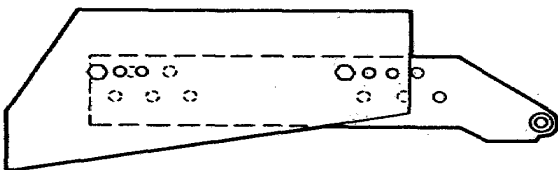
**Third Point — Highest Position**



**2¼" Lower**



**4½" Lower**



**Third Point — Lowest Position**

**▲ CAUTION** No warranty shall be allowed as to the attachment of the backhoe to specific tractors. It is beyond our control that tractor manufacturers make changes which may require minor alterations of the KELLEY SERIES 60 AND 70 BACKHOE MOUNT.

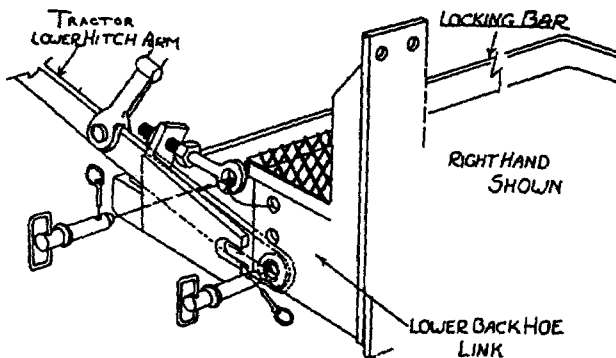
23. If you have to “cheat” in one direction, make it so that the backhoe tilts towards the tractor rather than away. If you cannot find a satisfactory set of holes, turn the top link upside down and try again. In some cases it may be necessary to drill additional holes in the top link or to shorten the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

24. 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 the procedure is not properly followed.


25. Remove the pin attached to the link bushing of the bucket cylinder Point C of Figure 2.
  26. Remove the pin on the dipper stick Point B of Figure 2. Position the dipper stick and bucket link in order to mount the bucket. Mount the bucket at Points B and C. Secure the bucket pin (B) with the 3/8" roll pin. Secure bucket link pin (C) with 5/16" roll pin.
- ▲ WARNING** Failure to use the lower drawbar link locks could cause serious injury to the operator and could also cause damage to the tractor's third-point.
27. After the backhoe is attached to the tractor in working position proceed with the following steps to install the lower drawbar link locks in Figure 6.
  28. Install pins (G) through eyebolt (H) with the eyebolts being located on each side of backhoe lower link sockets. Lock pins in place with lynch pins (I).
  29. Install lower link lock angles right (J) and left (K) as indicated in the drawing. Place lockwashers (L) and install nuts (M) on eyebolts and snug nuts in place.
  30. Adjust the 3/4" capscrew against the tractor drawbar link. Lock adjustment screw (N) with locknut (O).
  31. Tighten eyebolt (H) using lockwashers (L) and nuts (M).




**Optional:  
BMT12977 Locking Bar Mount Kit**

**Figure 6 –Lower Drawbar Link Locks**

# BACKHOE HYDRAULIC SYSTEMS


 **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 hose 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.

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

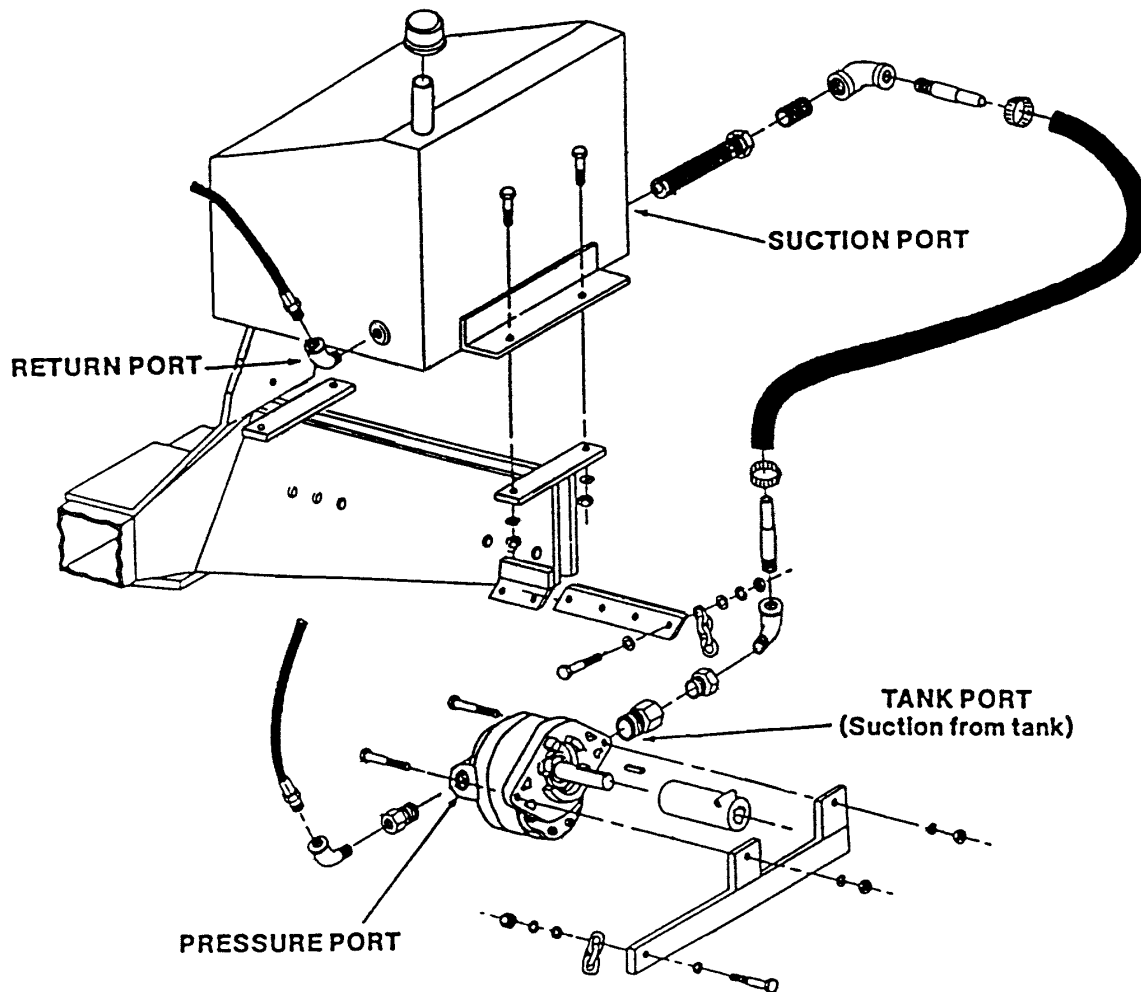
WE HIGHLY SUGGEST THAT YOU PURCHASE A KELLEY INDEPENDENT HYDRAULIC SYSTEM FOR YOUR BACKHOE.

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

 **CAUTION** Use type A transmission fluid or standard hydraulic oil in the independent hydraulic system. DO NOT use multi-viscosity transmission fluid that is used in most tractor transmissions.

## HYDRAULICS FOR KELLEY INDEPENDENT PUMP SYSTEM

1. Attach the reservoir to the backhoe by bolting it to the reservoir mounts on the three points. Use the four ½" X 1-1/2" capscrews, nuts, and lockwashers.
2. Suction to reservoir tank hose fittings:
  - A. Insert the internal suction filter into the suction port located on the right side of the reservoir tank.
  - B. Insert 1" close nipple into filter, connect 1" X ¾" reducer elbow to 1" close nipple. Turn elbow to approximately 45° upward angle toward the rear of backhoe.
  - C. Insert ¾" hose nipple into reducer elbow.
  - D. After the pump is installed, connect the suction hose to the TANK port marked on the pump. Allow enough suction hose so the backhoe can be dismantled before the pump has to be removed from the tractor PTO.
3. Valve return to reservoir tank hose fittings:
  - A. Insert ½" street ell into RETURN PORT on the left side of the reservoir tank.
  - B. Connect the O-ring pressure fitting and ½" street ell to the PRESSURE PORTS (the word PRESSURE is indicated on the pump).



#### 4. Pump Mounting:

- A. Bolt the torque bar to the flange mount of the pump using  $\frac{1}{2}$ " X 2" capscrews, lockwashers, and nuts as shown.
- B. Connect the O-ring pressure fitting and the  $\frac{1}{2}$ " street ell to the pressure ports (the word PRESSURE is indicated on the pump).
- C. Connect O-ring suction fitting, 1" X  $\frac{3}{4}$ " reducer bushing,  $\frac{3}{4}$ " street ell, and  $\frac{3}{4}$ " hose nipple into the TANK PORT of the pump (the work TANK is indicated on the pump).
- D. Place PTO adapter on the pump shaft and secure it with two (2) allen screws. After tightening allen screws take a small punch and place it into the allen screws and set them, then re-tighten.
- E. Attach the pump assembly to the PTO shaft of the tractor.
- F. Attach one end of the torque chain to the hole in the torque bar with  $\frac{3}{8}$ " X 2-1/4" capscrew, flat washer, and nut.
- G. Attach torque chain to the adjustable bar on the backhoe third point. (Note: The torque chain anchor is adjustable.) The torque chain must angle toward the front of the tractor to prevent pulling the pump off the PTO shaft. This adjustment should be made after the backhoe is mounted on the tractor.

#### 5. Pressure and return hoses:

- A. Remove the cap from the 1/2" pressure hose, which is attached to the right hand side of the backhoe valve. Connect this hose from the right side of the backhoe valve to the pressure port of the pump (the word PRESSURE is indicated on pump).
- B. Remove the cap from the return hose, which is attached to the left-hand side of the backhoe valve. Connect return hose from the valve to the return port located on the left-hand side of reservoir.

## Hydraulics for Tractors with Open Center System

1. Remove cap from the 1/2" high pressure hose connected to the right hand side of backhoe valve (stand behind the backhoe and face the direction that the backhoe is facing in order to designate right and left hand). The high-pressure hose may be connected to any high-pressure outlet in the tractor system. A tractor remote hydraulic valve is usually the preferable source. An oil quick coupler that is compatible to the oil coupler on the tractor valve is permissible.
2. The return hose must be connected so that the oil returns directly to the tractor oil sump. DO NOT connect the return hose directly to the tractor remote valve. If the operator would operate the tractor remote valve in the wrong manner, the oil flow would be reversed. This could result in damage to the return hose or the backhoe's hydraulic valve.

**⚠ 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, and by using more than 12 GPM of oil flow while operating. THE VALVE MANUFACTURER WILL NOT WARRANT THE VALVE WHEN DAMAGED UNDER THESE CIRCUMSTANCES.

## HYDRAULICS FOR TRACTORS WITH CLOSED CENTER SYSTEM

Some tractors have closed center hydraulic systems (most John Deere tractors have a closed center hydraulic system). If you are not sure what type system your tractor has, ask your dealer.

When using a tractor that has a closed center hydraulic system, the backhoe valve must be converted to a closed center valve by using the following procedure:

**⚠ 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. Installing the Closed Center Sleeve (Figure 8)
  - A. Remove the return hose and the 853X10X8 elbow on the left-hand return side of the valve. Refer to, Point F.
  - B. Replace it with the closed center sleeve fitting as illustrated in, Point F.
  - C. Remove the left front plug cap (Point G) and install it into the closed center sleeve (Point F).
  - D. Install the 850BX8X10 O-ring adapter (Refer to Point G) and connect the return hose to this fitting.

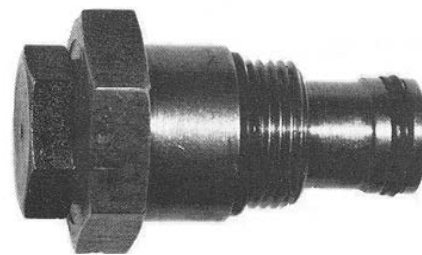
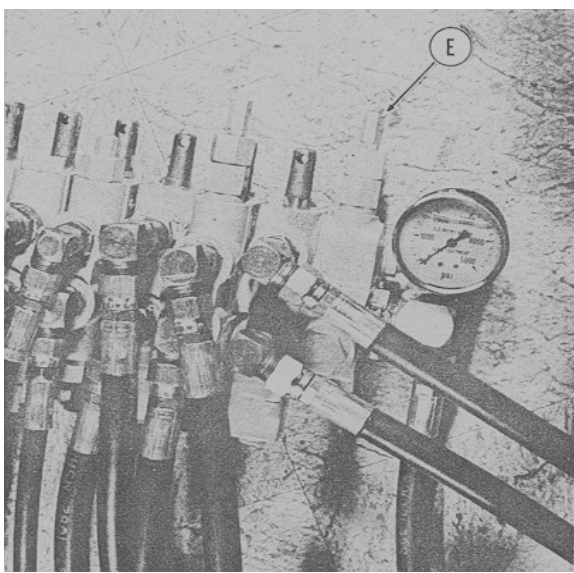
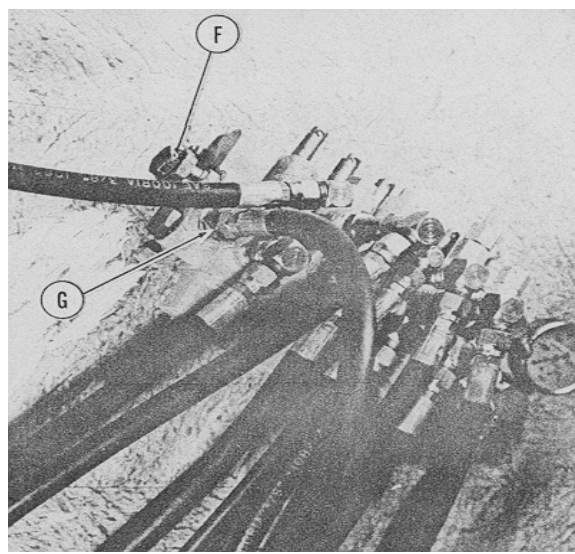


Figure 8



**Figure 9**



**Figure 2**

To adjust the Valve Bypass:

- A. Remove the cover nut, Point E of, from the valve bypass. This exposes an allen head screw.
- B. Turn the allen 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.

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.

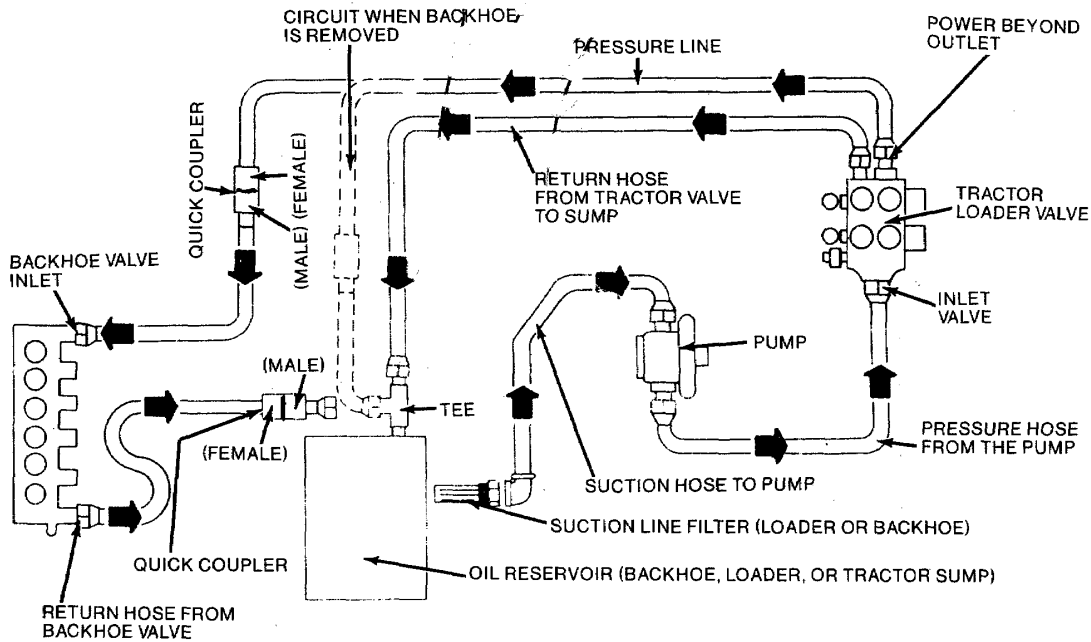
2. After the backhoe valve is converted to closed center. Connect the 3/8" high-pressure hose to a tractor outlet.
3. Connect the return hose to the tractor oil sump (Special instructions for John Deere tractors are listed below).

## **SPECIAL INSTRUCTIONS FOR JOHN DEERE TRACTORS**

The return hose supplied with your *KELLEY BACKHOE* will not be long enough. You will have to purchase a 1/2" return hose with a length suitable for the following procedure.

1. Purchase a Port Filter Cover if your John Deere tractor is not equipped with a "ported" filter over cap(older JOHN DEERE Part Number AT30197) from your dealer. Install it on your tractor.
2. 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.



**Figure 11**

### **HYDRAULICS FOR POWER BEYOND HOSEING FROM LOADER VALVE TO BACKHOE VALVE**

**NOTE:** The loader must have a power beyond valve.

1. 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. When the backhoe is removed from the tractor connect the two-backhoe hydraulic lines together as shown in Figure before starting the tractor.

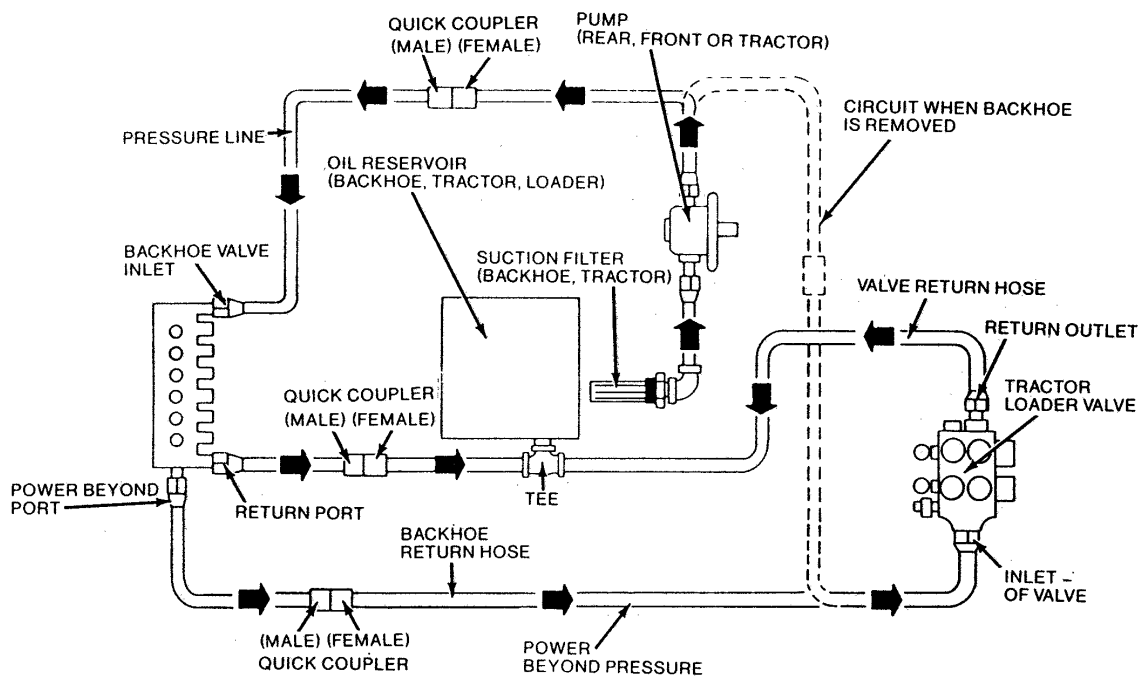
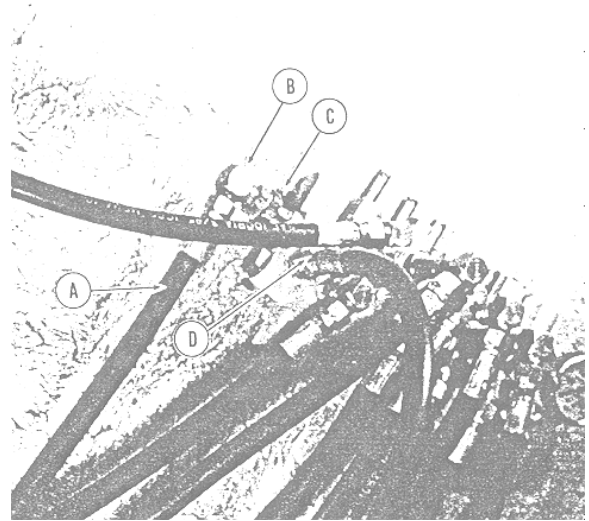
### **HYDRAULICS FOR POWER BEYOND HOSEING FROM BACKHOE VALVE TO LOADER VALVE**

For power beyond applications a Power Beyond and Closed Center Kit (Part #BCV10107) must be purchased from your *KELLEY BACKHOE* Dealer. Next perform the following steps:

1. Remove return hose and elbow from the left side of backhoe valve, refer to Point C in figure 12.
2. Install closed center sleeve in Figure 12 as seen at Point C.
3. Install the elbow which was removed in Step 1, above into closed center sleeve opening. This converts it to a power beyond sleeve.
4. Install a high-pressure hose going to the inlet of the loader valve. This hose is not furnished (Point A – Figure 12).
5. Remove O-ring plug from front of the outlet section of valve (Point D –Figure 12) and replace with 850BX8X10 adapter (*KELLEY* Part #SFT10079). Connect return hydraulic line that was removed from point A to this adapter. Connect the other end of the return hose to the tractor oil sump.
6. Make all hydraulic connections as illustrated in Figure e 13.

- When the backhoe is removed from the tractor, connect the two-backhoe hydraulic lines as shown in Figure before starting the tractor.

**CAUTION** This power beyond circuit should be used only when powering your tractor and backhoe from a tractor internal system where you have relief valve protection of the pump. If it is used on an external pump disconnection of any quick-coupler with the engine running will result in almost certain pump damage.



**Figure 13**

## HYDRAULICS FOR POWER BEYONDING CLOSED CENTER SYSTEMS

- Power Beyond in a closed center system is accomplished by teeing into the high-pressure hydraulic line of the closed center system and running the line into the inlet side of a closed center valve.
- The return side of the valve must be returned to the tractor's oil sump (see instructions for CLOSED CENTER HYDRAULIC SYSTEM).



# TESTING PROCEDURE FOR HYDRAULIC CIRCUITS

Identification of terminology:

1. PSI (Pounds per square inch)—Represents Power
2. GPM (Gallons per minute)—Represents Speed

A glycerin filled hydraulic pressure gauge is factory installed on your KELLEY BACKHOE for your convenience in testing and diagnosing any problem that may arise in the backhoe hydraulic system.

The gauge indicates only PSI, but with proper use, one can diagnose almost any hydraulic problem in a backhoe's hydraulic system. The first thing to remember is the backhoe hydraulic valve is made of six individual valves, each doing a single function. The only thing that is common to the valve bank is the hydraulic valve and the master relief valve.

## TESTING OPEN CENTER SYSTEM

**CHECKING THE PUMP AND MASTER RELIEF:** If a problem exists on all hydraulic circuits, the pump or master relief usually causes it. To check these, operate the tractor at a very low speed while actuating the stabilizer control in the UP position until the cylinder is entirely collapsed, continue holding the control lever and read the PSI on the gauge. Next, speed the tractor up. If the PSI increases as the speed increases, this indicates a worn pump. If the PSI remains steady, but less than 2250 lbs., then the backhoe's master relief is set too low (See HOW TO SET PRESSURE ON MAIN RELIEF VALVE section).



**CAUTION** Never attempt to adjust any relief valve without a gauge in a pressure line.

**CHECKING A SINGLE CIRCUIT:** If the power or speed goes down on one function the problem is in that valve section, circuit relief, cylinder, or a restriction in the hoses (The boom and stick are restricted to prevent sudden drop). To check the individual circuit, move the cylinder to the end of its stroke, and continue holding the valve, then take a pressure reading and compare the readings, they should be the same. If they are not the same it could be a faulty circuit relief. Circuit reliefs are on the down stroke of the boom, the crowd side of the stick, and both sides of the swing. If the circuit relief is faulty, it could be caused by dirt. This could be rectified by removing and cleaning the circuit relief (See instructions for CIRCUIT RELIEF VALVE).

**CHECKING THE CYLINDERS:** Take a reading at idle speed, with cylinder at end of stroke. Next take another reading at high speed. If the pressure increases with speed, it would indicate a faulty cylinder.

**RETURN HOSE:** The return hose is made of material that will burst at 800 lbs. If this hose bursts, check to see if the high-pressure line is connected to pressure port of the backhoe, or if the return hose is restricted (usually by an oil coupler).

## TESTING CLOSED CENTER SYSTEM

On a closed center system the gauge will read the same as the tractor's system pressure rating.

**CHECKING THE PUMP:** If the tractor's PSI is rated at 2250 lbs., and the gauge reads less, the tractor's hydraulic system is faulty or the backhoe's valve is improperly set for closed center operation (see CLOSED CENTER HYDRAULIC SYSTEM section).

**CHECKING A SINGLE CIRCUIT:** If there is a loss of power on one circuit, it may be checked by actuating the valve. The pressure should drop until the end of cylinder stroke, if the pressure does not return to the original reading, this would indicate a faulty cylinder or circuit relief. Circuit reliefs are on the down stroke of the boom, the crowd side of the stick, and both sides of the swing. If the circuit relief is faulty, it could be caused by dirt. This could be rectified by removing and cleaning the circuit relief (See instructions for CIRCUIT RELIEF VALVE).

CHECKING THE CYLINDERS: Take a reading at idle speed, with cylinder at end of stroke. Next take another reading at high speed. If the pressure increases with speed it would indicate a faulty cylinder.

FOR OTHER HYDRAULIC PROBLEMS REFER TO TROUBLESHOOTING SECTION.

## HYDRAULIC TESTING CHART

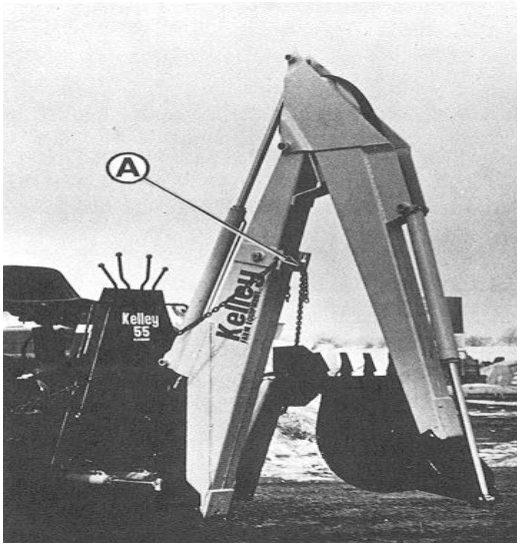
Before calling your dealer or factory service department, fill in the following chart. This chart will enable the service man to diagnose nearly all-hydraulic problems you may be having with your backhoe. Be certain that the cylinder is at the end of the stroke when the readings are taken.

Function	PSI Idle Speed	PSI Full Speed
Stabilizer - Up R.H.		
Stabilizer – Down R.H.		
Stabilizer – Up L.H.		
Stabilizer – Down L.H.		
Crowd – In		
Crowd – Out		
Swing – Left		
Swing – Right		
Bucket – Open		
Bucket – Closed		
Boom – Up		
Boom - Down		

# TRANSPORTING THE BACKHOE

**⚠ WARNING** 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 for the older backhoes, prior to Jan 1, 2000. These should be put into proper position anytime you are transporting your backhoe. To ready you backhoe for transport, perform the following:



**FIGURE 1**

Raise both stabilizers completely. Raise the boom as high as possible. Curl the bucket completely in. Close the dipper stick in towards the boom assembly as far as possible. Your backhoe should now appear similar to Figure 1.

Locate the end of the transport chain, which is not bolted to the stabilizer. Thread this end through the hole on the plate that is welded to the boom A of Figure 1. 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.

**NOTE 1:** The chains should connect directly from the stabilizers to the boom. They should *not* be threaded through the hole beneath the foot pads.

**NOTE 2:** The B60 and B70 Model Backhoes, built since Jan 1, 2000, the new flip over transport boom lock bracket is applicable to secure a safety locking device for the protection of the boom during transport.

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

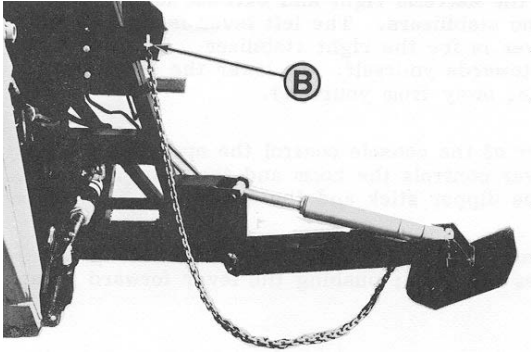


FIGURE 2

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.) Then lower both stabilizers to the ground. Connect the free ends of the transport chains to the storage holes in the plates beneath the footpads (B of Figure 2). Secure the chains by pushing a link into the slot in each of the plates. **It is essential that you leave enough slack in the chains so that the stabilizers can be extended freely.**

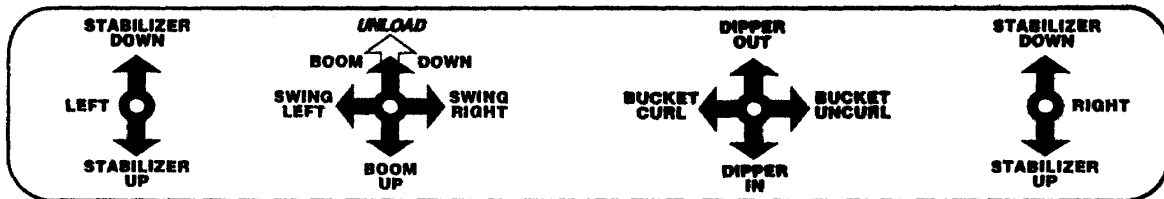
## PREPARING THE TRACTOR

Move the tractor's gearshift 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. If you are using an independent hydraulic system, engage the PTO.

# OPERATING THE BACKHOE

## ▲ CAUTION

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



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. This control diagram as it appears on your backhoe. Refer to it for interpreting the following instructions. All directions such as **Right** and **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 (i.e. away from you).

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 you 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 you 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 be 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.

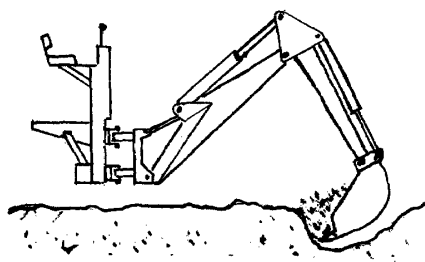
**⚠ CAUTION** When swinging the backhoe to either side, do not slam the swing mast into the stops.

**⚠ 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.

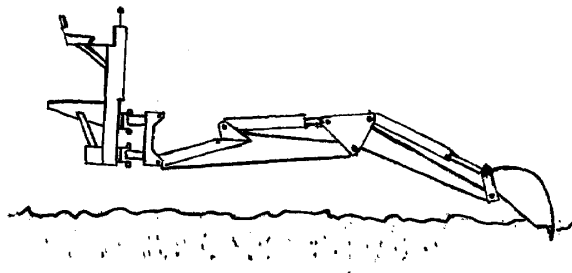
**⚠ CAUTION** Digging on a slope should be done from the top down. When digging across a slope, use the stabilizers to keep the backhoe level and *ALWAYS* dump uphill. Use caution when digging under these conditions. Move the unit carefully and at a safe ground speed.

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

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 4.



**Correct**



**Wrong**

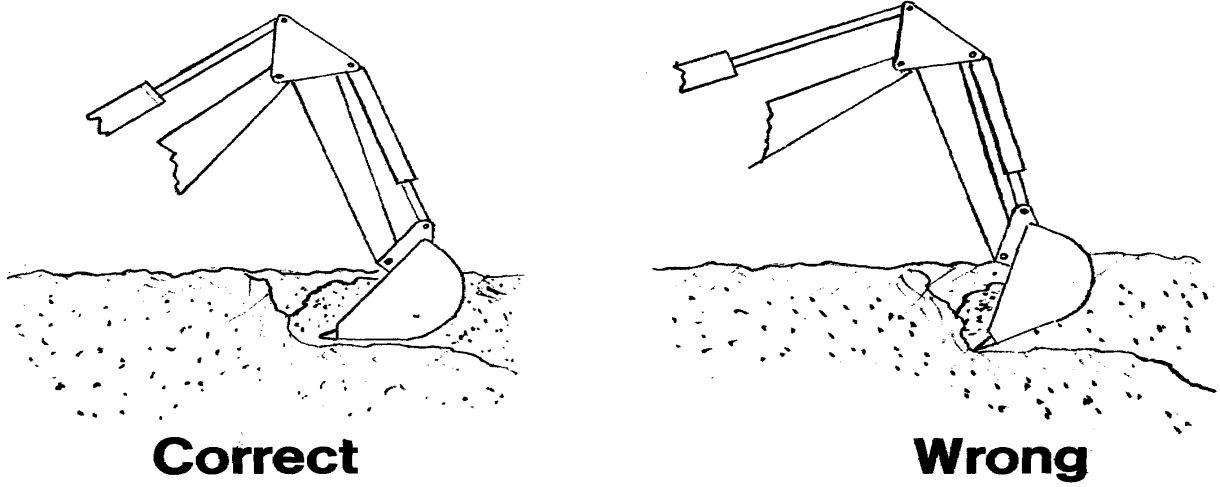
Figure 5 shows the correct angle of the bucket for digging. After you have filled the bucket, do not pull the dipper stick any closer to the boom than is necessary in order to clear the hole. When the bucket is clear, swing it to the side to dump. Always start dumping far enough to the side so as not 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.

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 6.

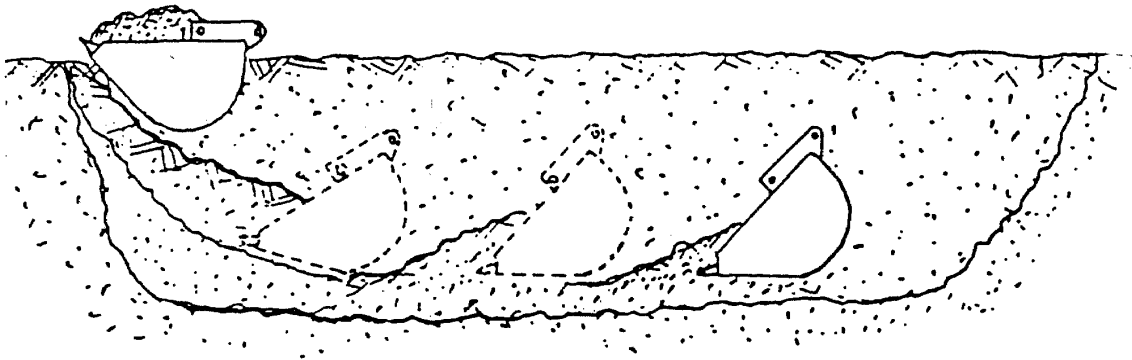
When loading trucks, curling the bucket close to the dipper arm will prevent undue spillage when the bucket is raised so that it can be dumped in the truck bed.

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 5**





**FIGURE 6**

## 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.

### INITIAL BREAK-IN PERIOD


1. If your backhoe is equipped with a optional high pressure in line filter, Replace the high-pressure filter element after the first 25 hours of operation. See OIL FILTER REPLACEMENT in this section of the manual.
2. If you are using a *KELLEY INDEPENDENT HYDRAULIC SYSTEM*, clean the suction line filter after the first 10 hours of operation. See the section entitled SUCTION LINE FILTER CLEANING.

### 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.

 **CAUTION** Check to make sure that the *two* 7/8" X 2-1/2" bolts that attach the backhoe top link to the backhoe main frame are tightened securely.

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.

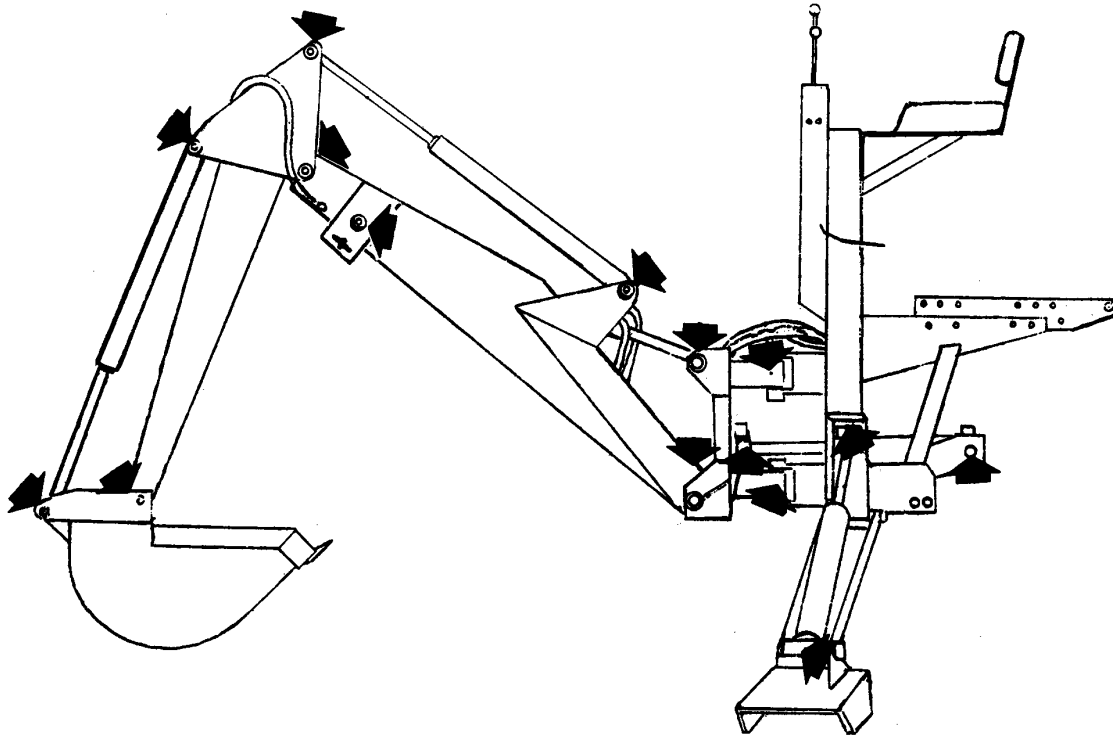
3. Check for defective parts. If any are found, repair and replace them before operating the backhoe.

 **CAUTION** Whenever you replace a part, make sure it is replaced with a part having 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 dirt from the machine. Particularly remove any dirt on the swing mast or on the topside 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 "Lubrication Points".



## LUBRICATION POINTS

### EVERY 50 HOURS OF OPERATION

1. Replace the high-pressure oil filter element. See OIL FILTER REPLACEMENT in this section of the manual.

**NOTE:** If the oil filter is plugged, a built-in bypass is activated. It is *not* obvious to the user when the filter is not working. Periodic replacement of the filter element is necessary to avoid this situation.

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

## OIL FILTER REPLACEMENT

You will need a Filter Element Replacement Kit (Part Number SPP11977).

Change filter element after first 25 hours. From then on, change the filter element every 175 to 200 hours. Change the filter element sooner if working in extreme dusty conditions.

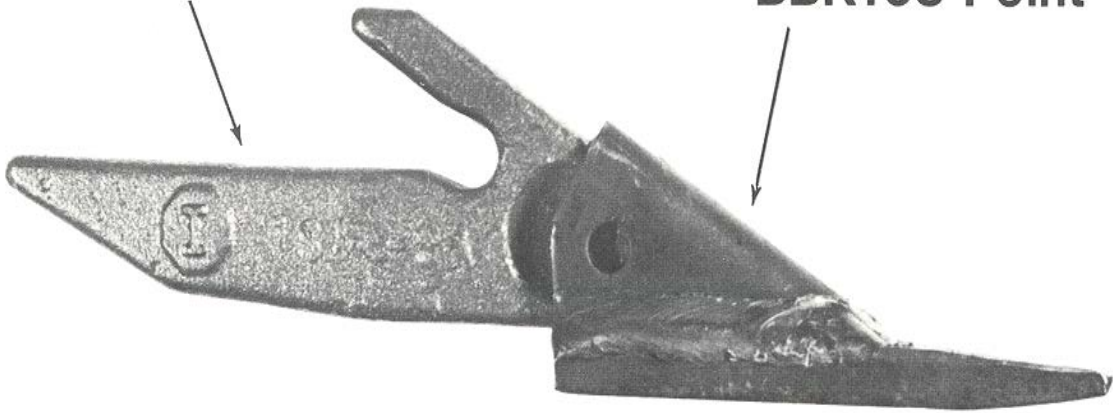
## SUCTION LINE FILTER CLEANING

Drain the reservoir tank and unthread the suction line filter from its position on the lower side of the tank. Wash it and examine it. Reinstall it back into its suction line position in the tank.

## BUCKET TOOTH REPLACEMENT

BBK167 Shank

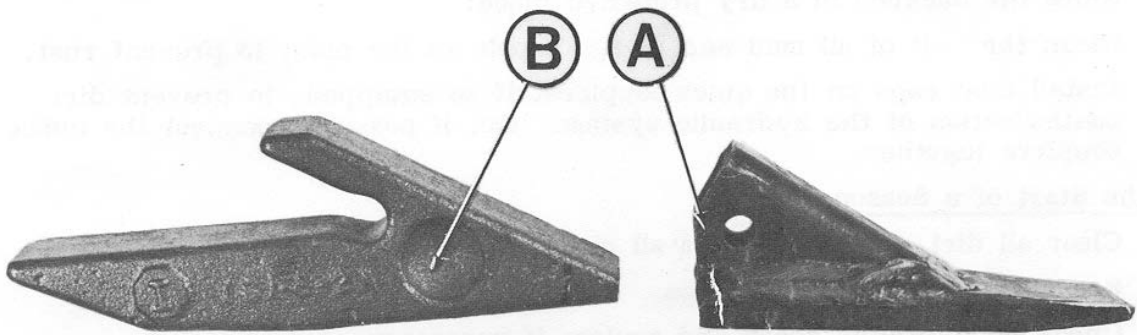
BBK168 Point




## BBK192 TOOTH ASSEMBLY


To remove a tooth point, heat the point with a torch at A in (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.

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 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 corrosion preventive.

Store the backhoe in a dry protected 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.

## PRESSURE MEASUREMENTS

The Model 60 and 70 backhoes have a pressure gauge installed in the main pressure line.

### Main Relief Valve

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

1. Apply power to the backhoe, and raise one of the stabilizers as high as it will go.
2. Continue holding the stabilizer control lever back (in the *raise* position). Read the pressure gauge.

The normal reading should be approximately 2200 PSI. If you need to make an adjustment, follow the procedure outlined under HOW TO SET PRESSURE ON MAIN RELIEF VALVE.

The main relief valve measurement procedure outlined above uses the stabilizer cylinders because the stabilizer cylinders do not contain circuit reliefs. This enables a true reading of the main relief valve pressure setting.

### Circuit Relief Valves

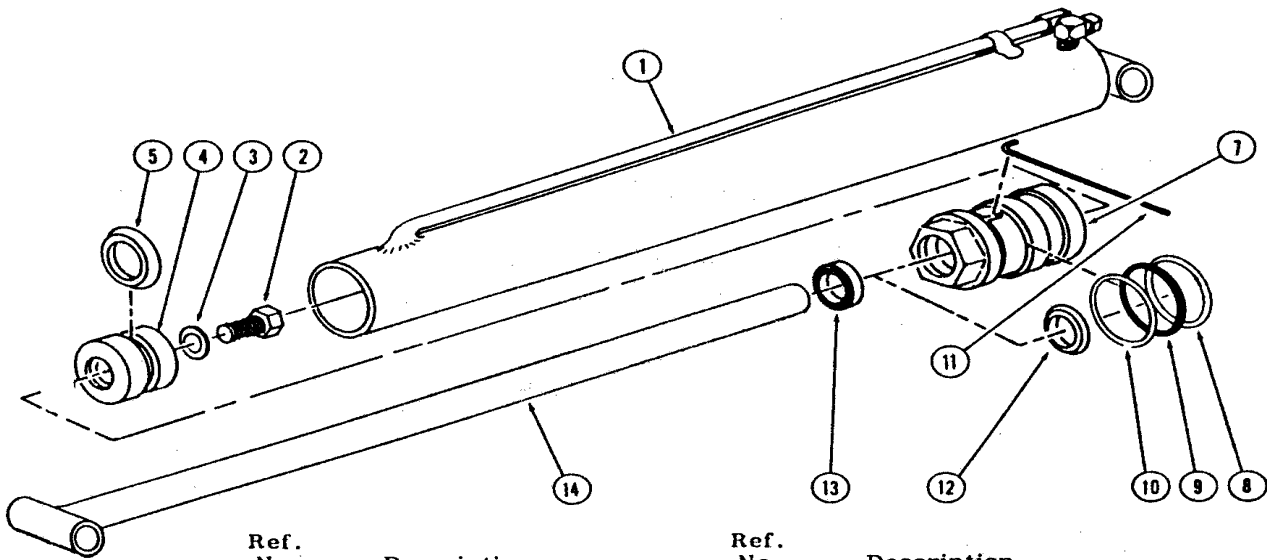
Whether the circuit relief valves are functioning correctly can be determined *indirectly* by measuring the main relief valve pressure. (The true setting of a circuit relief valve can only be measured by isolating it from the effects of the main relief valve. The circuit relief valves are set at the factory at 2500 PSI).

To test a circuit relief for a cylinder, do the following:

1. Apply power to the backhoe, and extend the troublesome cylinder as far as it will go.
2. While still holding the control lever for the cylinder in the *extend* position, take a pressure reading.
3. Now retract the same cylinder as far as it will go.
4. While still holding the control lever for the cylinder in the *retract* position, take a pressure reading.

If both readings are approximately 2200 PSI, the circuit relief is functioning properly. If the readings are approximately the same, but lower than 2200 PSI, the circuit relief may not be set at the proper pressure setting. Refer to HOW TO SET PRESSURE ON CIRCUIT RELIEF. If one reading equals 2200 PSI, but the other reading is less than 2200 PSI, the circuit relief is sticking open. Remove the circuit relief and clean it. If the readings do not correspond to any of the above situations, this may indicate that the cylinder needs to be repaired with a piston seal kit.

# FIELD SERVICE INFORMATION FOR KELLEY CYLINDERS



<u>Ref. No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Description</u>
1	Barrel Assembly	8	Back up Ring
2	7/8" Capscrew	9	O'ring
3	7/8" Dyna Seal	10	Back up Ring
4	Piston	11	Lockwire
5	Piston Seal	12	Rod Seal
7	Ram Head	13	Rod Wiper
		14	Rod Assembly Seal Kit

1. You will find enclosed in the current Kelley cylinder "service seal kits"—a set of "backup" rings not found in previously manufactured Kelley cylinders prior to January 1, 1980.
2. Simply by rotating the cast ram head clockwise the lockwire will easily roll out of its slot and groove. Ram head and piston bearing may easily be removed from the barrel assembly.
3. Check the direction of the original piston seal so replacement piston seal is positioned correctly for its best sealing abilities. The rod seal is always positioned with the larger o-ring side facing the piston end of the rod shaft. Piston and rod seals should be heated in water or oil for easiest installation.
4. Shown above is a general schematic of a Kelley cylinder. Notice on the cast ram head the location of these new "backup" rings surrounding and protecting the ram head o-ring from movement in the groove provided for it. (Ill. #8,9,10) For the older previously manufactured cylinders prior to January 1, 1980, the groove only has enough room for one backup, place it against the o-ring toward the lockwire groove side.
5. One important procedure to be done during reassembly of piston bearing and ram head back into barrel assembly should be to apply a heavy coat of grease around the o-ring and backup ring to prevent *shearing* the o-ring and backup ring when installing into barrel assembly.

## RACINE VALVE

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

## RELIEF VALVE

PROBLEM	POSSIBLE CAUSE	POSSIBLE REMEDY
<b>Can't Get Pressure</b>	Poppet D, E, or K stuck open or dirt under seat.	Check for foreign matter between poppets D, E, or K and their mating members. Members must slide freely.
<b>Erratic Pressure</b>	Pilot poppet seat damaged. Poppet C sticking in D.	Clean dirt. If parts are damaged, replace complete relief valve.
<b>Pressure Setting Not Correct</b>	Wear due to dirt. Locknut and adjustment screw loose.	<ol style="list-style-type: none"> <li>1. See "How to Set Pressure".</li> <li>2. Check seats for scratches, nicks or other marks. Replace relief valves if damaged.</li> </ol>
<b>Leaks</b>	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. Replace complete relief if metal parts are damaged.

## ANTI-VOID

<b>Malfunctions</b>	Foreign matter plugging the sensing hole or preventing free movement of poppet.	<ol style="list-style-type: none"> <li>1. Clean.</li> <li>2. Check seat for scratches, nicks, or other marks.</li> </ol>
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# General Troubleshooting

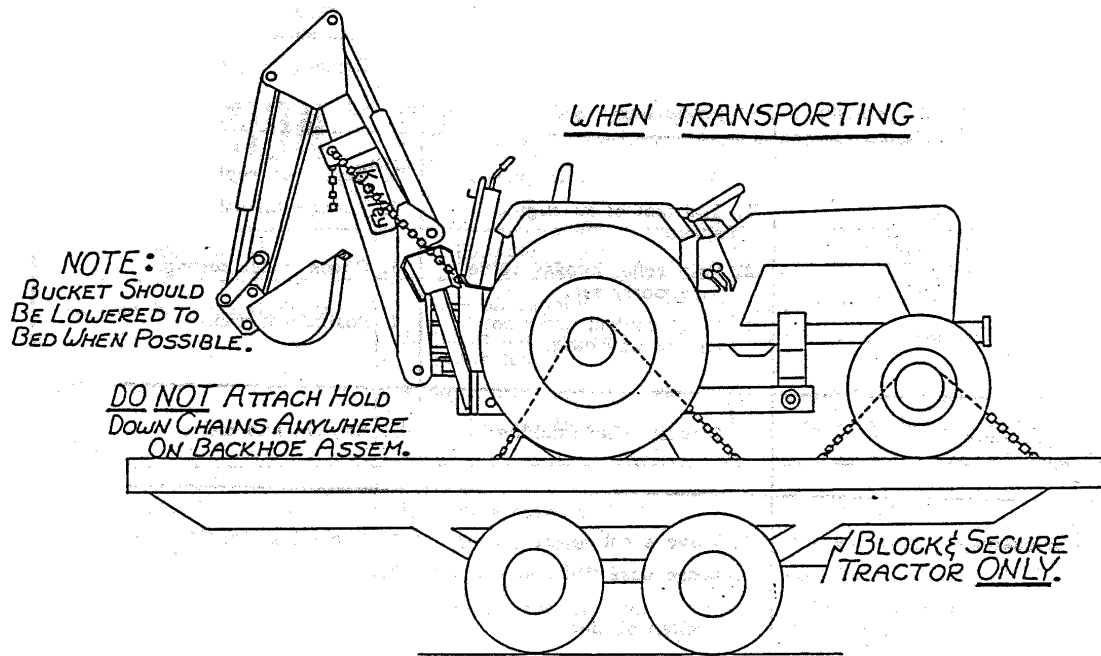
** CAUTION** Do not attempt any repairs on the backhoe until you have studied all the Cautions in the *Maintenance* section of this manual.

PROBLEM	POSSIBLE CAUSE	POSSIBLE REMEDY
<b>Backhoe Does Not Operate</b>	<ol style="list-style-type: none"> <li>1. Low oil supply.</li> <li>2. Hoses not properly connected.</li> <li>3. Worn or damaged pump.</li> <li>4. Broken oil line.</li> </ol>	<ol style="list-style-type: none"> <li>1. Add oil.</li> <li>2. Check hose connections.</li> <li>3. Replace or repair pump.</li> <li>4. Check for leaks. Replace line.</li> </ol>
<b>Slow Operation and Poor Hydraulic System Performance</b>	<ol style="list-style-type: none"> <li>1. Engine speed too low.</li> <li>2. Defective pump.</li> <li>3. Dirty oil filter.</li> <li>4. Circuit relief not holding.</li> <li>5. Load too heavy.</li> <li>6. Faulty main relief valve.</li> <li>7. Internal valve crack.</li> <li>8. Suction line filter plugged.</li> <li>9. Oil too heavy for cold weather use.</li> <li>10. Power supply may not be pumping enough oil.</li> <li>11. Low oil level.</li> <li>12. Pressure line restricted.</li> <li>13. Collapsed suction line.</li> <li>14. Valve spool not at full stroke.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust RPM's.</li> <li>2. Check pressure or replace.</li> <li>3. Replace.</li> <li>4. Remove and clean. See maintenance topic "Circuit Relief Cleaning".</li> <li>5. Check line pressure.</li> <li>6. Clean or replace.</li> <li>7. Replace valve section.</li> <li>8. Clean.</li> <li>9. Replace with lighter oil.</li> <li>10. Use a flow meter to check out whether a 8-12 GPM flow rate is being achieved.</li> <li>11. Add oil.</li> <li>12. Check for obstruction.</li> <li>13. Check for damage.</li> <li>14. Check movement and linkage.</li> </ol>
<b>Backhoe Does Not Hold Up Load</b>	<ol style="list-style-type: none"> <li>1. Cylinder seals leaking.</li> <li>2. Valve spool leaking.</li> <li>3. Oil bypassing valve spool.</li> <li>4. Faulty circuit relief.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace seals.</li> <li>2. Replace seals.</li> <li>3. Replace valve bank.</li> <li>4. Replace circuit relief.</li> </ol>
<b>Load Drops When Valve Spool Moved From Neutral</b>	<ol style="list-style-type: none"> <li>1. Dirt in check valve.</li> <li>2. Scored circuit relief valve poppet not seating properly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Disassemble and clean.</li> <li>2. Replace poppet or lap poppet.</li> </ol>
<b>Excess Oil Heat</b>	<ol style="list-style-type: none"> <li>1. Damaged or worn pump.</li> <li>2. Too fast of an engine speed.</li> <li>3. Main relief bypass valve improperly set.</li> <li>4. Draft control lever not all the way down.</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair or replace.</li> <li>2. Reduce throttle.</li> <li>3. Check relief setting.</li> <li>4. Position correctly.</li> </ol>
<b>Loss of Power on a Single Cylinder</b>	Circuit relief sticking.	Remove and clean.

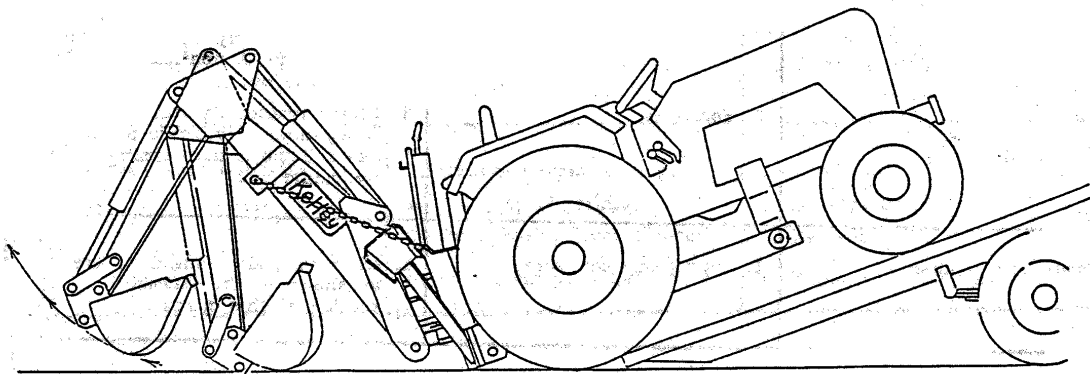
<b>Oil Leakage</b>	<ol style="list-style-type: none"> <li>1. Valve spool seals.</li> <li>2. Loose hose fittings.</li> <li>3. Broken oil line.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace seals.</li> <li>2. Tighten just enough to stop leakage.</li> <li>3. Replace hose or line.</li> </ol>
<b>Independent Hydraulic System Pump Failure</b>	Improperly set relief valve.	Set relief at 2200 PSI.
<b>Independent Hydraulic System Pump Noisy</b>	<ol style="list-style-type: none"> <li>1. Suction line filter plugged.</li> <li>2. Oil too heavy.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean filter.</li> <li>2. Use a lighter oil.</li> </ol>
<b>Jerky or Erratic Action</b>	<ol style="list-style-type: none"> <li>1. Air in system.</li> <li>2. Wrong type of oil.</li> <li>3. Foamy oil.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for loose connections and/or cycle all valves to remove air.</li> <li>2. Check tractor manual. For Independent Hydraulic System use Type A non-foaming hydraulic oil.</li> <li>3. Check tractor manual. For Independent Hydraulic System, use a Type A non-foaming hydraulic oil.</li> </ol>
<b>Blown Return Line</b>	Improperly connected.	Make sure all connections are as shown in the assembly section of this manual.



**⚠ 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.



## NOTES:

## NOTES:

# **Kelley**

**EQUIPMENT**