



OPERATOR'S & PARTS MANUAL FIXED AND SWING SKID HOES



PALADIN™
LIGHT CONSTRUCTION GROUP



The Power of Combined Excellence



SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: OM694
Part Number: 75594
Rev.

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PREFACE

GENERAL COMMENTS

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

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

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

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

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

BEFORE OPERATION

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

SAFETY ALERT SYMBOL



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

SERVICE

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

To facilitate parts ordering, record the model and serial number of your unit in the space provided on the cover of this manual. This information may be obtained from the identification plate located on the product.

The parts department needs this information to insure that you receive the correct parts for your specific model.

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SAFETY STATEMENTS



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



DANGER

THIS SIGNAL WORD IS USED WHERE SERIOUS INJURY OR DEATH WILL RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.



WARNING

THIS SIGNAL WORD IS USED WHERE SERIOUS INJURY OR DEATH COULD RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.



CAUTION

THIS SIGNAL WORD IS USED WHERE MINOR INJURY COULD RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.

NOTICE

NOTICE INDICATES A PROPERTY DAMAGE MESSAGE.

GENERAL SAFETY PRECAUTIONS

WARNING!

READ MANUAL PRIOR TO INSTALLATION



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



READ AND UNDERSTAND ALL SAFETY STATEMENTS

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



KNOW YOUR EQUIPMENT

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

GENERAL SAFETY PRECAUTIONS

WARNING!



PROTECT AGAINST FLYING DEBRIS

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

WARNING!



LOWER OR SUPPORT RAISED EQUIPMENT

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

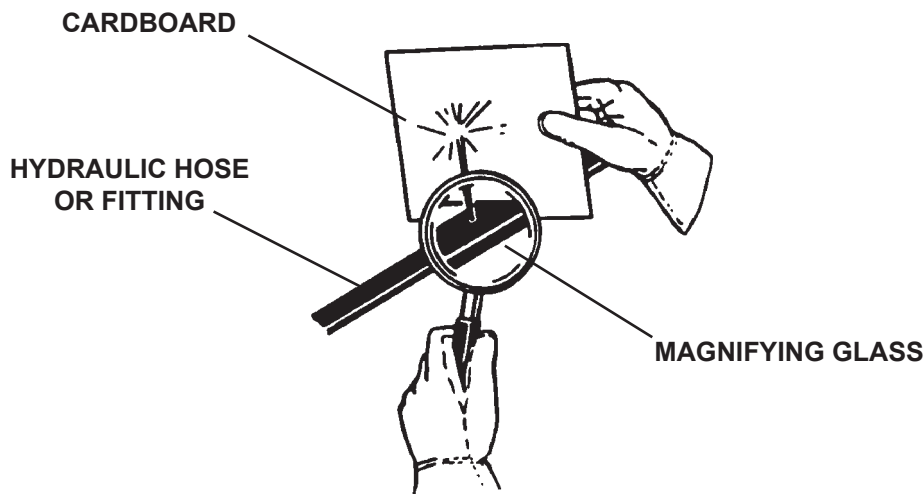
WARNING!



USE CARE WITH HYDRAULIC FLUID PRESSURE

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

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



GENERAL SAFETY PRECAUTIONS

WARNING!



DO NOT MODIFY MACHINE OR ATTACHMENTS

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

WARNING!



SAFELY MAINTAIN AND REPAIR EQUIPMENT

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



SAFELY OPERATE EQUIPMENT

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

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

EQUIPMENT SAFETY PRECAUTIONS

WARNING! KNOW WHERE UTILITIES ARE



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

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



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



OPERATING THE SKID HOE

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



TRANSPORTING THE SKID HOE

- Travel only with the attachment in a safe transport position to prevent uncontrolled movement. Drive slowly over rough ground and on slopes.
- When driving on public roads use safety lights, reflectors, Slow Moving Vehicle signs etc., to prevent accidents. Check local government regulations that may affect you.
- Do not drive close to ditches, excavations, etc., cave in could result.
- Do not smoke when refueling the prime mover. Allow room in the gas tank for expansion. Wipe up any spilled fuel. Secure cap tightly when done.



MAINTAINING THE SKID HOE

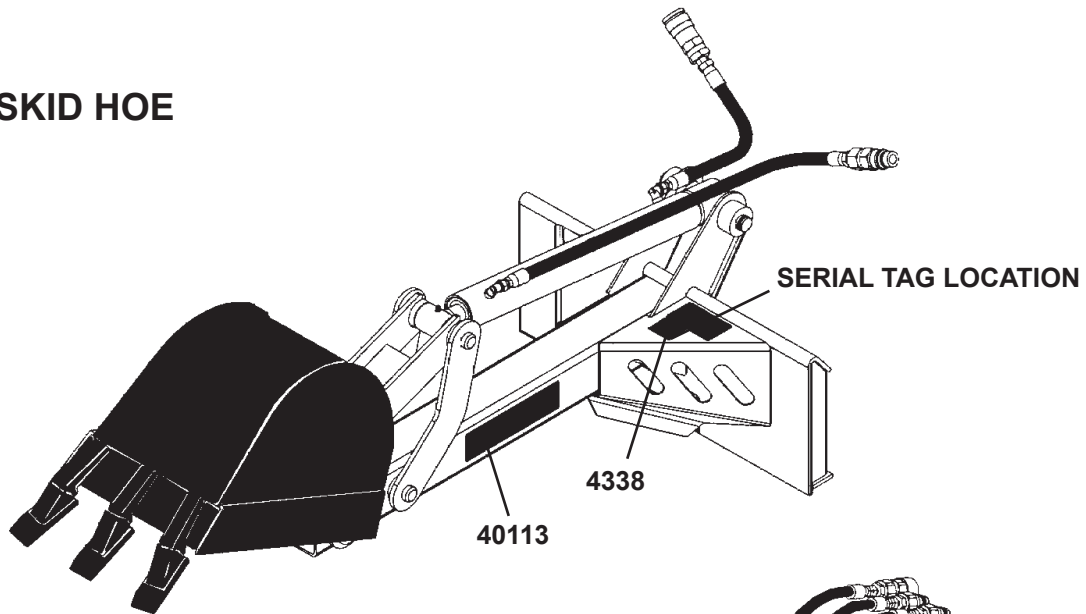
- Before performing maintenance, lower the attachment to the ground, turn off the engine, remove the key and apply the brakes.
- Never perform any work on the attachment unless you are authorized and qualified to do so. Always read the operator service manual's before any repair is made. After completing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

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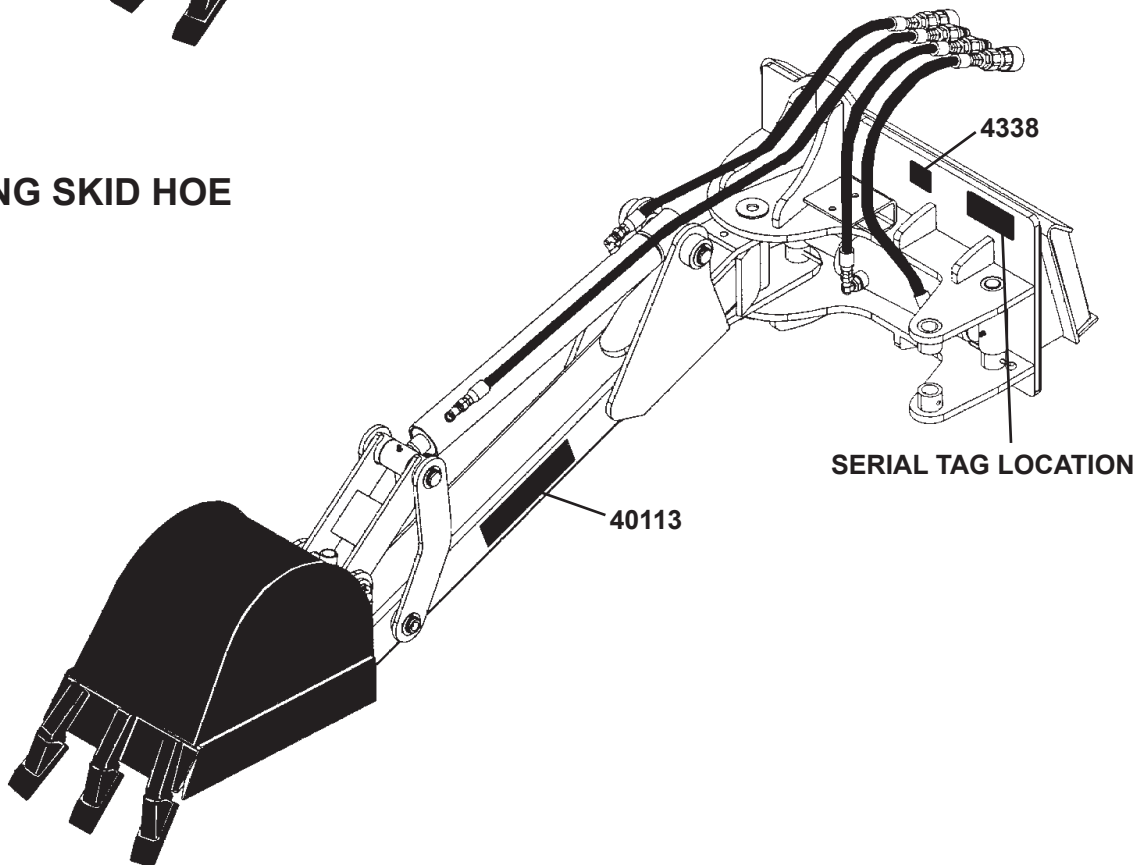
DECALS

DECAL PLACEMENT

FIXED SKID HOE



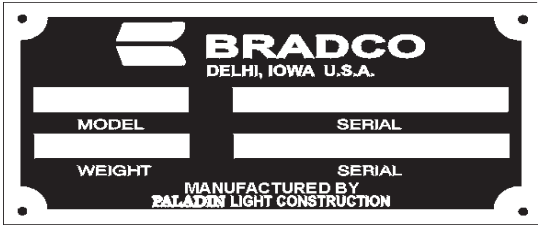
SWING SKID HOE



DECALS



PART #4338
MADE IN U.S.A.



SERIAL NUMBER TAG



BRADCO

PART #40113
BRADCO LOGO

INSTALLATION

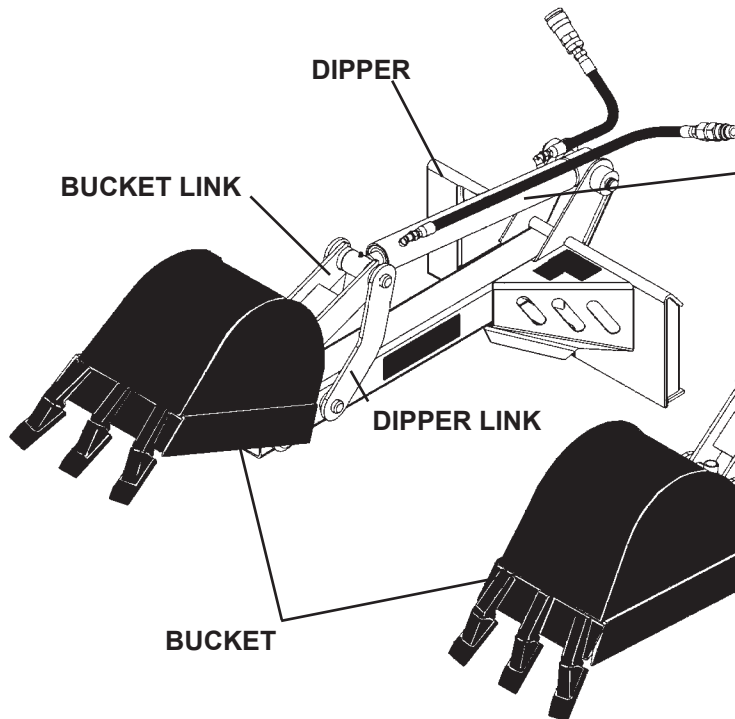
GENERAL INFORMATION

The BRADCO Mini Skid Hoes were designed to be easy to use and maintain. The swing hoe has three different hydraulic kit options available: a dual auxiliary hydraulic kit, a 2-spool valve hydraulic kit and an electrical solenoid valve hydraulic kit. They are all operated by the loaders auxiliary hydraulics along with the fixed skid hoe. Both skid hoes mount to the toolbar / quick attach mechanism for easy mounting. Your skid hoe was shipped complete with the appropriate mounting for your specific unit.

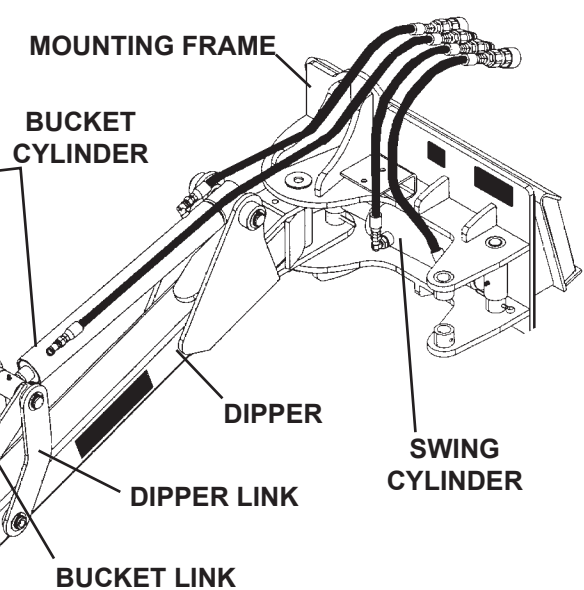
NOMENCLATURE

Throughout this manual, reference is made to various skid hoe components. Study the following diagrams to acquaint yourself with the various names of these components. This knowledge will be helpful when reading through this manual or when ordering service parts. There is a complete parts breakdown for each skid hoe at the back of this manual.

FIXED SKID HOE



SWING SKID HOE



ATTACHING

Install the skid hoe by following your power units operator's manual for installing an attachment.

WARNING! To Avoid Serious Personal Injury, make sure the skid hoe is securely latched to the attachment mechanism of your unit. Failure to do so could result in separation of the attachment from the unit.



INSTALLATION

FIXED SKID HOE HYDRAULICS

If installing a fixed skid hoe onto your unit, finish the installation by connecting the couplers on the bucket hoses to the auxiliary hydraulic couplers on your prime mover. Start the engine and slowly cycle the cylinder several times to purge system of air and check for proper hydraulic connection, hose routing and hose length. Check for any hydraulic leaks and correct if necessary.

SWING SKID HOE HYDRAULICS

If installing a swing skid hoe onto your unit, there are three different hydraulic kit options.

DUAL AUXILIARY HYDRAULIC KIT

If using the dual auxiliary hydraulic kit connect the couplers coming from the bucket cylinder and the swing cylinder to the auxiliary hydraulic couplers on your prime mover. Route the hoses in such a fashion as to prevent chafing and pinching. Start the engine and slowly cycle the cylinders several times to purge system of air and check for proper hydraulic connection, hose routing and hose length. Check for any hydraulic leaks and correct if necessary.

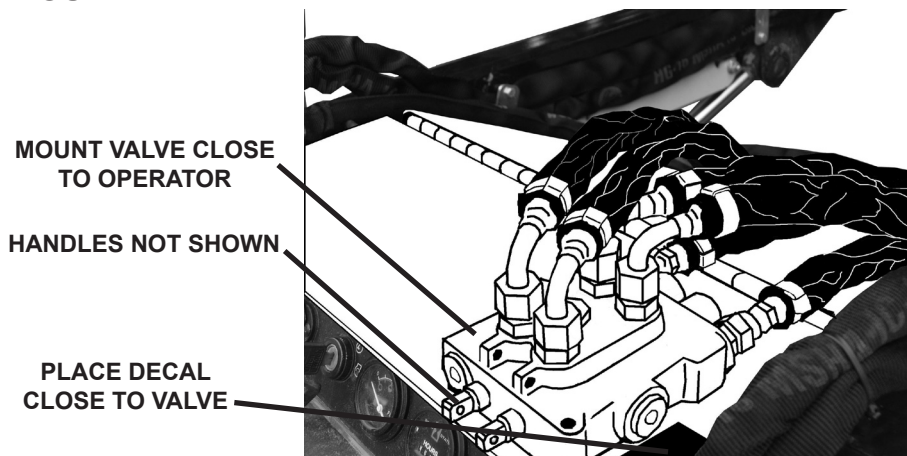
2-SPOOL VALVE HYDRAULIC KIT

If using the 2-spool valve kit, mount the valve to the power unit in such a fashion that the control handles are easily accessible for operation of the attachment. Apply the operation decal next to the valve, making sure you do not cover up any existing safety decals.

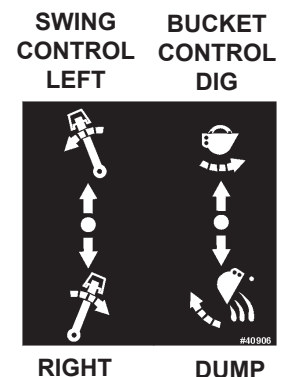
To Apply Decal: Clean area of application with nonflammable solvent, then wash the same area with soap and water. Allow the surface to fully dry. Remove the backing from the decal, exposing the adhesive surface. Apply the decal and smooth out any bubbles.

Connect the quick couplers to the auxiliary hydraulic couplers on your unit. Route the hoses in such a fashion as to prevent chafing and pinching. Start the engine and slowly cycle the cylinders several times to purge system of air and check for proper hydraulic connection, hose routing and hose length. Check for any hydraulic leaks and correct if necessary. Verify that the cylinders function according to the operational decal. (If cylinders do not function according to the decal, check for correct hose installation at the valve.)

FIGURE #1



OPERATION DECAL



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INSTALLATION

ELECTRIC SOLENOID VALVE HYDRAULIC KIT

If using the electrical solenoid valve kit, connect the electrical wire harness to the battery of your unit and position the control box in a location accessible by the operator. Connect the quick couplers to the auxiliary hydraulic couplers on your unit. Route the hoses in such a fashion as to prevent chafing and pinching. Start the engine and slowly cycle the cylinders several times to purge system of air and check for proper hydraulic connection, hose routing and hose length. Check for any hydraulic leaks and correct if necessary. Verify that the cylinders function according to the decal on the control box. (If cylinders do not function according to the decal, check for correct hose installation at the valve.)

NOTE: TO AVOID RUNNING DOWN THE BATTERY THE TOGGLE SWITCH MUST BE IN THE SWING POSITION BEFORE TURNING OFF THE ENGINE.

WARNING! When working around batteries, remember that all of the exposed metal parts are “live”. Never lay a metal object across the terminals, because a spark or short circuit may result.



DANGER! **BATTERY ACID CAUSES SEVERE BURNS.** Batteries contain sulfuric acid. Avoid contact with skin, eyes or clothing. Antidote: **EXTERNAL** - flush with water. **INTERNAL** - drink large quantities of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Call physician immediately. **EYES** - flush with water for 15 minutes and get prompt medical attention.



DETACHING

On firm level ground, lower the skid hoe to the ground. Turn off the engine.

NOTE: If your unit is equipped with electrical solenoid valve hydraulics, be sure the toggle switch is in the swing position before turning off the engine.

Move the control levers back and forth to relieve pressure in the line. Disconnect couplers.

NOTE: If using the electrical solenoid valve, disconnect the wire harness from the battery to the control box, and place the control box onto the skid hoe.

NOTE: Connect couplers together or install dust caps to prevent contaminants from entering the hydraulic system.

Follow your power unit operator's manual for detaching (removing) an attachment.

NOTE: Frequent lubrication of grease fittings at the end of the cylinders and/or pivot points with a multi-purpose grease will greatly increase the life of the product.

OPERATING INSTRUCTIONS

GENERAL INFORMATION

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

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

WARNING! Read and understand the **Safety Precautions** section of this manual before beginning any backhoe operation.



Operate the attachment only from the operator's station. Any other method could result in serious personal injury or death.

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

BEFORE YOU START DIGGING

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

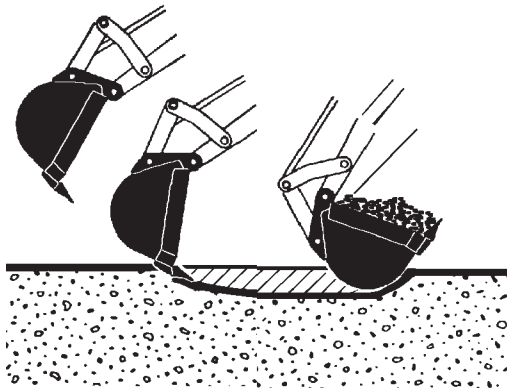
BASIC DIGGING TECHNIQUE

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

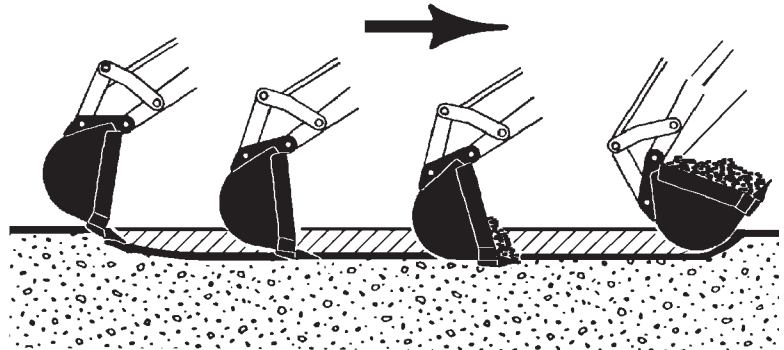
When digging with the skid hoe, the loader arms should be partially raised and the bucket out, away from the operator. Lower the dipper and start the digging process. The bucket teeth should be at a 30° to 45° entry angle. With the bucket on the ground, simultaneously curl the dipper toward the loader (using the loader arms) and roll the bucket until the bucket is full. (If the bucket stalls (wheels slide) raise the loader arms slightly and continue to dig until the bucket is full.) With the bucket full, raise the bucket out of the trench, and either rotate the skid steer and dump the spoil in the desired location or if you are digging with a swing skid hoe, swing the bucket to the side and dump the spoil in the desired location.

OPERATING INSTRUCTIONS

To dig a shallow trench, reach the desired depth by following the basic digging techniques and then slowly back up the loader, keeping the bucket height constant.



BASIC DIGGING



DIGGING A SHALLOW TRENCH

WARNING! To prevent serious personal injury or death from cave-in or vehicle overturn;



Always back away from trenches before turning.

Do not dig close to the loader wheels or under the loader.

The depth of the hole or trench will be controlled by dipper extension and loader arm height.

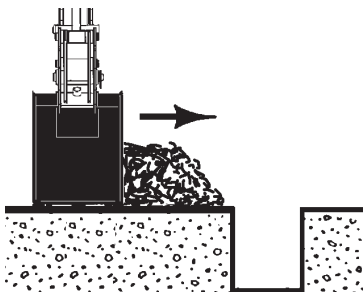
Use caution when working close to fences, ditches or on uneven ground and slopes. Always dump a loaded bucket on the uphill side of the hoe to minimize the possibility of turnover.

Use the flat sides of the bucket to scrape off any high spots on the sides of the excavation.

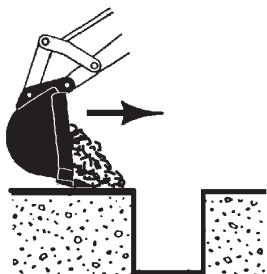
BACKFILLING

There are several options available for backfilling a hole or trench. The spoil location and job at hand will determine which procedure is best for your application.

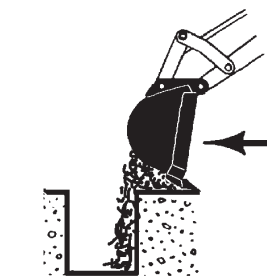
- Use the side of the bucket and pivot the loader toward the trench or hole or use the skid hoe swing (if equipped) to **PUSH** the spoil into the trench or hole.
- Use the bucket to reach beyond the trench and travel in reverse to **PULL** the spoil into the trench or hole.
- Use the back of the bucket and travel forward to **PUSH** the spoil into the trench or hole.



**USE SIDE OF BUCKET TO
PUSH SPOIL INTO TRENCH**




**USE BUCKET TO PULL
SPOIL INTO TRENCH**



**USE BUCKET TO PUSH
SPOIL INTO TRENCH**

OPERATING INSTRUCTIONS

WARNING!  **MAKE SURE THE TRENCH OR HOLE IS FULL BEFORE TRAVELING OVER IT WITH THE LOADER AND SKID HOE. MOVING OVER AN UNSTABLE SURFACE CAN RESULT IN TIPOVER.**

Always lower the bucket to the ground, set the parking brake, stop engine and remove the key before leaving the operator's station.

TRANSPORTING

Follow all transporting instructions in your power unit operator's manual.

Always keep the skid hoe close to the ground when transporting between sites on the loader. Keep the heavy end of the machine uphill. Avoid abrupt starts, stops and turns. Be sure skid hoe is securely tied down when transporting on a truck or trailer bed.

STORAGE

1. Clean the skid hoe thoroughly, removing all mud, dirt and grease.
2. Touch up all unpainted surfaces to prevent rust.
3. Lubricate all grease fittings and coat the exposed portions of the cylinder rods with grease.
4. Store the unit in a dry and protected place. Leaving the skid hoe outside, exposed to the elements, materially shortens the life of the unit.
5. Make sure the hydraulic system is properly sealed against contaminants entering the unit.

REMOVING FROM STORAGE

1. Remove all protective coverings.
2. Check hydraulic hoses for deterioration and replace if necessary.
3. Lubricate all grease fitting.
4. Tighten all loose bolts and fittings.
5. Inspect bucket teeth and replace if necessary.

MAINTENANCE AND SERVICE

GENERAL INFORMATION

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

WARNING! Read the Safety Precautions section of this manual before performing any maintenance procedure.



Follow any Safety Shutdown procedures outlined in the loader operator's manual before performing maintenance.

BEFORE EACH USE OR AFTER EVERY 8 HOURS OF OPERATION

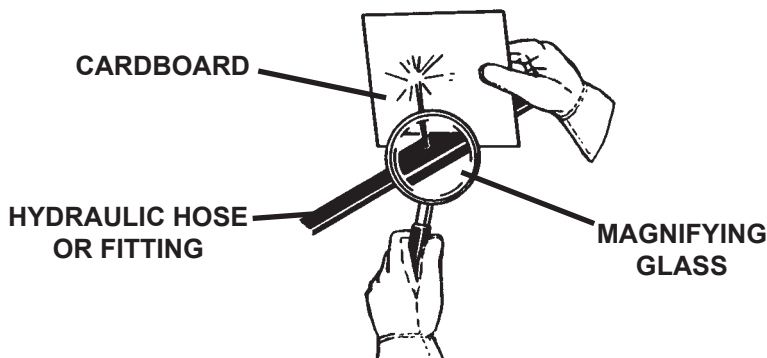
- Lubricate all grease fittings.
- Check all bolts are properly tightened and all pins are securely in place.
- Check hydraulic fittings for proper tightness and leaks.
- Check hydraulic hoses for leaks or deterioration.
- Check all safety signs are clean and legible.
- Replace any damaged or excessively worn parts.

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



Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities.

In injured by injected fluid see a doctor at once. If your doctor is not familiar with this type of injury, ask him to research it immediately to determine proper treatment.



MAINTENANCE AND SERVICE

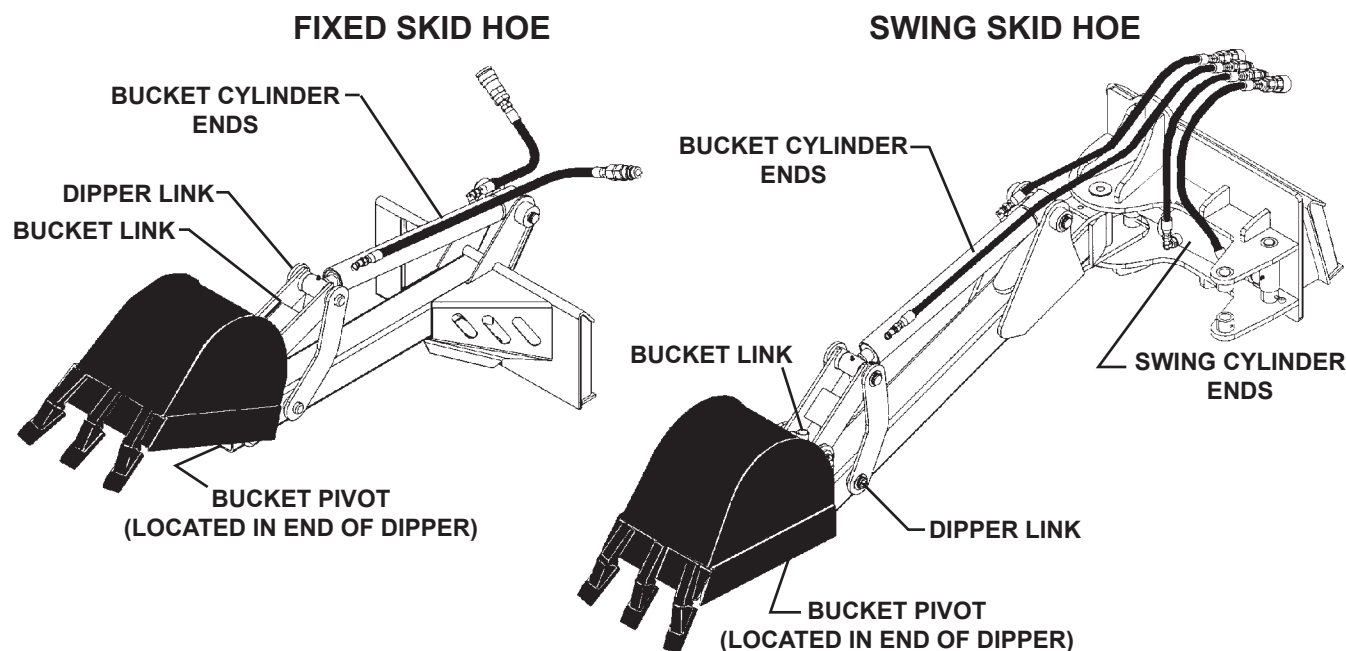
LUBRICATION

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

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

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

The following diagram is provided to help you locate all the points on your skid hoe that need lubricating. Always replace any missing grease fittings as soon as possible.



HYDRAULICS

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

Observe a high standard of cleanliness when replacing or connecting hydraulic components.

- Shut off the engine, set the parking brake and relieve hydraulic pressure before connecting or disconnecting hydraulic lines. Refer to the power unit operator's manual on how to relieve hydraulic pressure in lines.
- Be sure all connections are tight and check for damaged hoses, lines and fittings BEFORE applying pressure to the system.
- Wear safety glasses and use cardboard or wood when searching for hydraulic leaks. Refer to the Safety section of this manual and the WARNING at the front of this section.

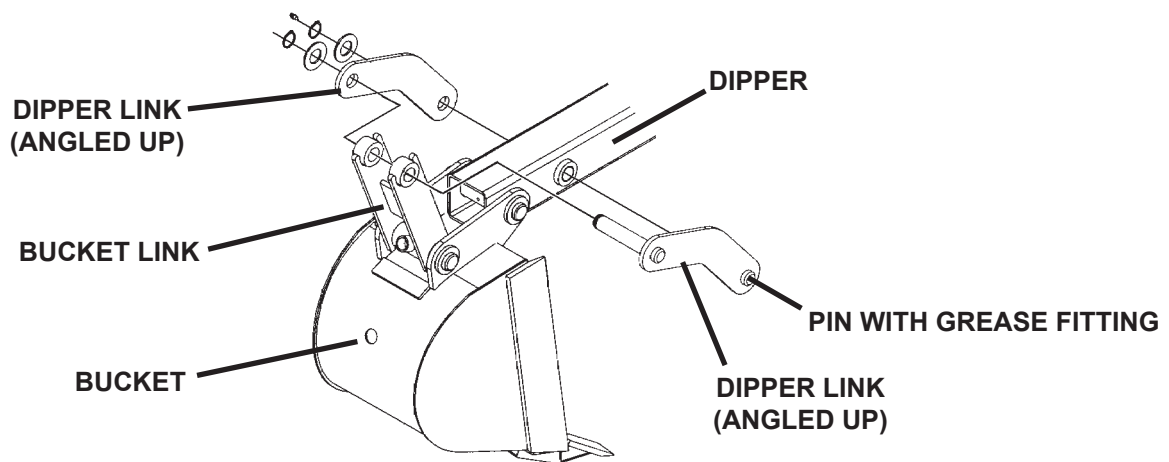
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MAINTENANCE AND SERVICE

CHANGING BUCKETS

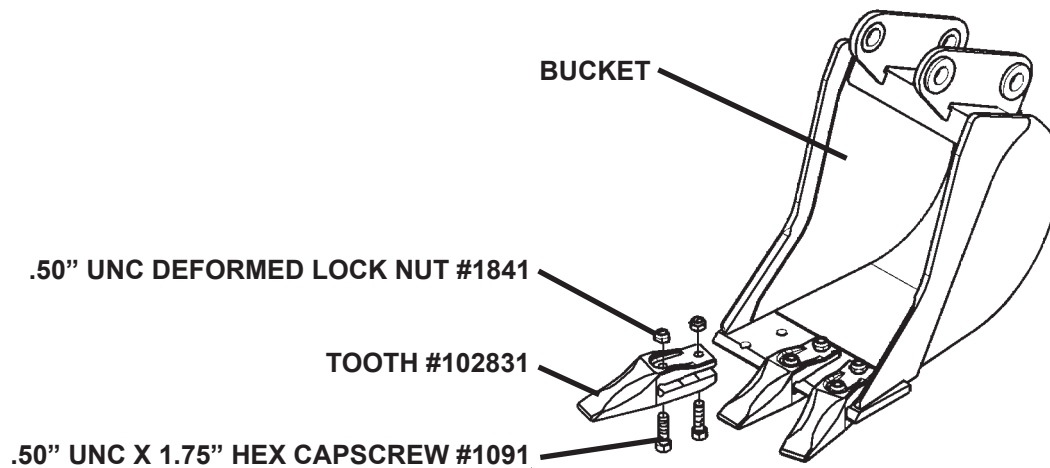
The bucket is connected to the dipper and bucket link with two cotter pin style pins. To change buckets, remove the cotter pins and washers and then remove the old bucket and position the new bucket in its place. Install the pivot pins and secure with washers and cotter pins. Lubricate all bucket and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

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



REPLACING BUCKET TEETH

The backhoe buckets have bolt-on teeth for easy replacement. Although all of the buckets are equipped with the same tooth and hardware, the quantity of teeth per bucket does vary. It is recommended that when you replace worn or broken teeth you replace the hardware at the same time.



MAINTENANCE AND SERVICE

CYLINDER SEAL REPLACEMENT

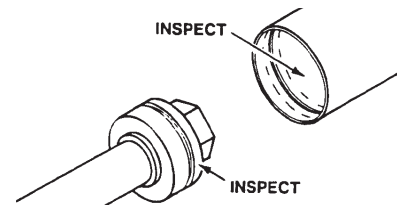
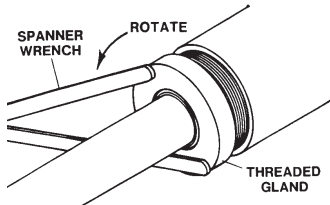
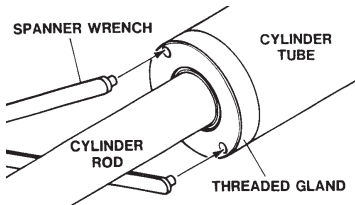
The following information is provided to assist you in the event you should need to repair or rebuild a hydraulic cylinder. When working on hydraulic cylinders, make sure that the work area and tools are clean and free of dirt to prevent contamination of the hydraulic system and damage to the hydraulic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

DISASSEMBLY PROCEDURE

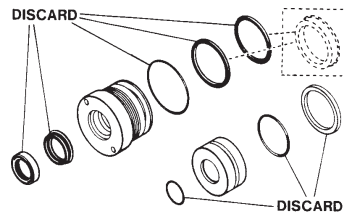
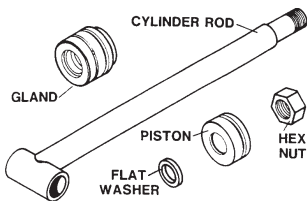
IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

THREADED TYPE GLAND

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



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

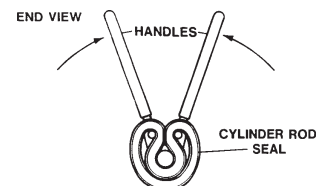
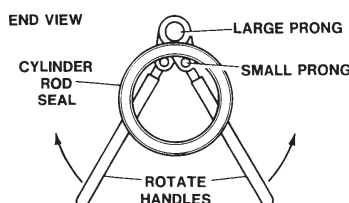
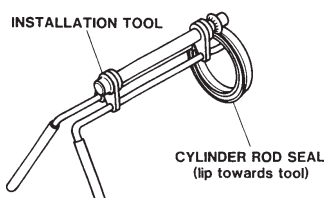


ASSEMBLY PROCEDURE

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

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

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



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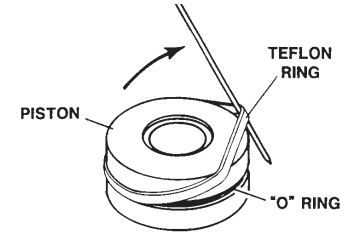
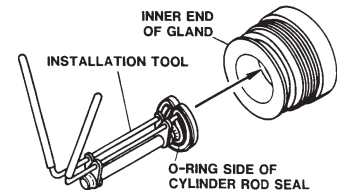
MAINTENANCE AND SERVICE

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

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

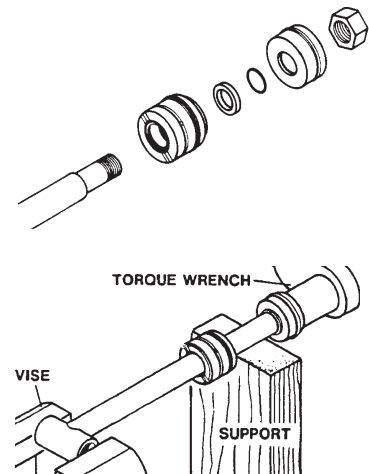
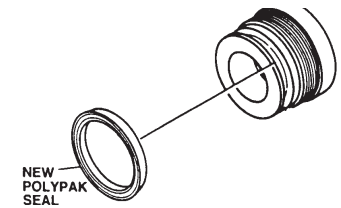
Be careful not to damage the seals. Caution must be used when installing the piston ring. The ring must be stretched carefully over the piston with a smooth, round, pointed tool.

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



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

4. Slide the gland onto the cylinder rod, being careful not to damage the rod wiper. Then install the spacer, or flat washer (if so equipped), small o-ring, piston, and hex nut onto the end of the cylinder rod.
5. Secure the cylinder rod (mounting end) in a vise with a support at its center. Torque the nut to the amount shown for the thread diameter of the cylinder rod (see chart).



Thread Diameter	POUNDS - FEET
7/8"	150-200
*1"	230-325
1-1/8"	350-480
1-1/4"	490-670
1-3/8"	670-900
* 1" Thread Diameter WITH 1.25" Rod Diameter	
Min. 230 ft. lbs. Max. 250 ft. lbs.	

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

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

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

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

WARNING!



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

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
Bucket fails to curl or swing hoe fails to swing	Low oil supply	Add oil
	Obstruction in hydraulic line	Remove obstruction or replace
	Bent cylinder rod	Replace
	Damaged hydraulic cylinder	Replace
	Hydraulic couplers malfunctioning or non compatible.	Replace
	Hydraulic couplers not completely engaged	Check and tighten couplers
Bucket fails to maintain curl	Oil leaking past cylinder seals	Replace cylinder seals
	Broken or leaking hydraulic lines	Replace and check for leaks
	Malfunctioning valve	Replace
Bucket or swing operating too slowly	Malfunctioning Valve	Replace
	Oil leaking past cylinder seals	Replace cylinder seals
	Hydraulic couplers not completely engaged	Check and tighten couplers
	Obstruction in hydraulic line	Remove obstruction or replace
External leaking	Cylinder seals damaged	Replace and repair
	Broken or loose hydraulic lines or fittings	Check for leaks and repair or replace
Swing hoe functions in one circuit only	No electrical power to solenoid valve	Check for proper connection in control box and power from loader

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
Swing hoe functions in one circuit only WITH power to solenoid valve	Valve malfunctioning	Replace
Skid hoe not functioning according to operation decals	Incorrect hose routing	Check appropriate hydraulic diagram: reinstall properly Check power and return lines correct installation
Skid hoe equipped with electrical solenoid valve not functioning	Electrical circuit incorrect or not complete	Check electrical circuit for proper installation








BOLT TORQUE

BOLT TORQUE SPECIFICATIONS

GENERAL TORQUE SPECIFICATION TABLE

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

IMPORTANT: On all PLATED GRADE 8 bolts, reduce torque 15% from listed bolt torque specification.

SAE Grade No.		2				5				8*			
Bolt head identification marks as per grade. NOTE: Manufacturing Marks Will Vary						  				  			
		TORQUE				TORQUE				TORQUE			
Bolt Size		Pounds Feet		Newton-Meters		Pounds Feet		Newton-Meters		Pounds Feet		Newton-Meters	
Inches	Millimeters	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/4	6.35	5	6	7	8	9	11	12	15	12	15	16	20
5/16	7.94	10	12	14	16	17	20.5	23	28	24	29	33	39
3/8	9.53	20	23	27	31	35	42	48	57	45	54	61	73
7/16	11.11	30	35	41	47	54	64	73	87	70	84	95	114
1/2	12.70	45	52	61	70	80	96	109	130	110	132	149	179
9/16	14.29	65	75	88	102	110	132	149	179	160	192	217	260
5/8	15.88	95	105	129	142	150	180	203	244	220	264	298	358
3/4	19.05	150	185	203	251	270	324	366	439	380	456	515	618
7/8	22.23	160	200	217	271	400	480	542	651	600	720	814	976
1	25.40	250	300	339	406	580	696	787	944	900	1080	1220	1464
1-1/8	25.58	-	-	-	-	800	880	1085	1193	1280	1440	1736	1953
1-1/4	31.75	-	-	-	-	1120	1240	1519	1681	1820	2000	2468	2712
1-3/8	34.93	-	-	-	-	1460	1680	1980	2278	2380	2720	3227	3688
1-1/2	38.10	-	-	-	-	1940	2200	2631	2983	3160	3560	4285	4827

* Thick Nuts must be used with Grade 8 bolts

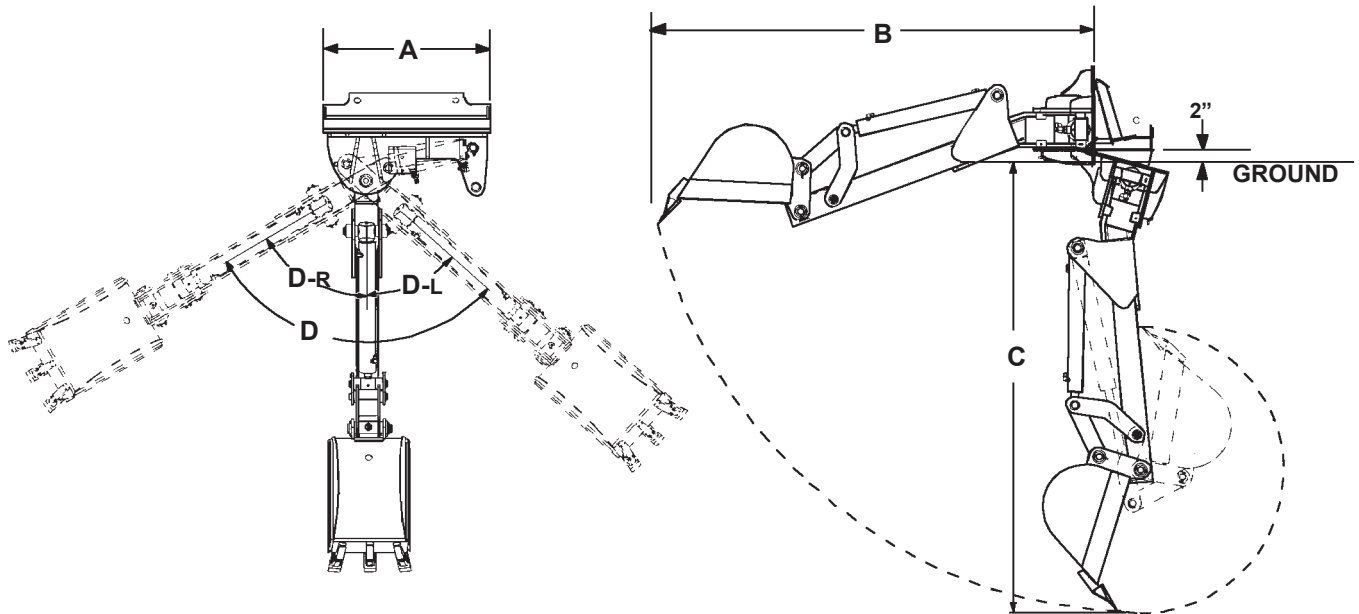
METRIC BOLT TORQUE SPECIFICATIONS

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

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SPECIFICATIONS

FIXED AND SWING SKID HOE



DESCRIPTION		FIXED HOE	SWING HOE
A.	OVERALL WIDTH	24 .75"	24.75"
B.	OVERALL REACH (From Mounting Plate)	50.8"	68"
C.	DIGGING DEPTH (With Mounting Plate 2" Above Ground.)	49.5"	67"
D.	OVERALL SWING ARC	NA	108°
	(D-R) SWING RIGHT	NA	60°
	(D-L) SWING LEFT	NA	48°
	DIGGING FORCE (Bucket Cylinder)	2000#	2000#
	WEIGHT (Approx. with 12" bucket)	155#	312#

BUCKET CYLINDER

Cylinder #.....88430
 Bore2.00"
 Stroke15.38"
 Rod Diameter.....1.12"

SWING CYLINDER

Cylinder #.....17362
 Bore2.50"
 Stroke6.00"
 Rod Diameter.....1.25"

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Limited Warranty

Except for the Excluded Products as described below, all new products are warranted to be free from defects in material and/or workmanship during the Warranty Period, in accordance with and subject to the terms and conditions of this Limited Warranty.

1. Excluded Products. The following products are excluded from this Limited Warranty:

(a) Any cable, part that engages with the ground (i.e. sprockets), digging chain, bearing, teeth, tamping and/or demolition head, blade cutting edge, pilot bit, auger teeth and broom brush that either constitutes or is part of a product.

(b) Any product, merchandise or component that, in the opinion of Paladin Light Construction¹, has been (i) misused; (ii) modified in any unauthorized manner; (iii) altered; (iv) damaged; (v) involved in an accident; or (vi) repaired using parts not obtained through Paladin Light Construction.

2. Warranty Period. The Limited Warranty is provided only to those defects that occur during the Warranty Period, which is the period that begins on the first to occur of: (i) the date of initial purchase by an end-user, (ii) the date the product is first leased or rented, or (iii) the date that is six (6) months after the date of shipment by Paladin Light Construction as evidenced by the invoiced shipment date (the "Commencement Date") and ends on the date that is twelve (12) months after the Commencement Date.

3. Terms and Conditions of Limited Warranty. The following terms and conditions apply to the Limited Warranty hereby provided:

(a) Option to Repair or Replace. Paladin Light Construction shall have the option to repair or replace the product.

(b) Timely Repair and Notice. In order to obtain the Limited Warranty, (i) the product must be repaired within thirty (30) days from the date of failure, and (ii) a claim under the warranty must be submitted to Paladin Light Construction in writing within thirty (30) days from the date of repair.

(c) Return of Defective Part or Product. If requested by Paladin Light Construction, the alleged defective part or product shall be shipped to Paladin Light Construction at its manufacturing facility or other location specified by Paladin Light Construction, with freight PRE-PAID by the claimant, to allow Paladin Light Construction to inspect the part or product.

Claims that fail to comply with any of the above terms and conditions shall be denied.

LIMITATIONS AND EXCLUSIONS.

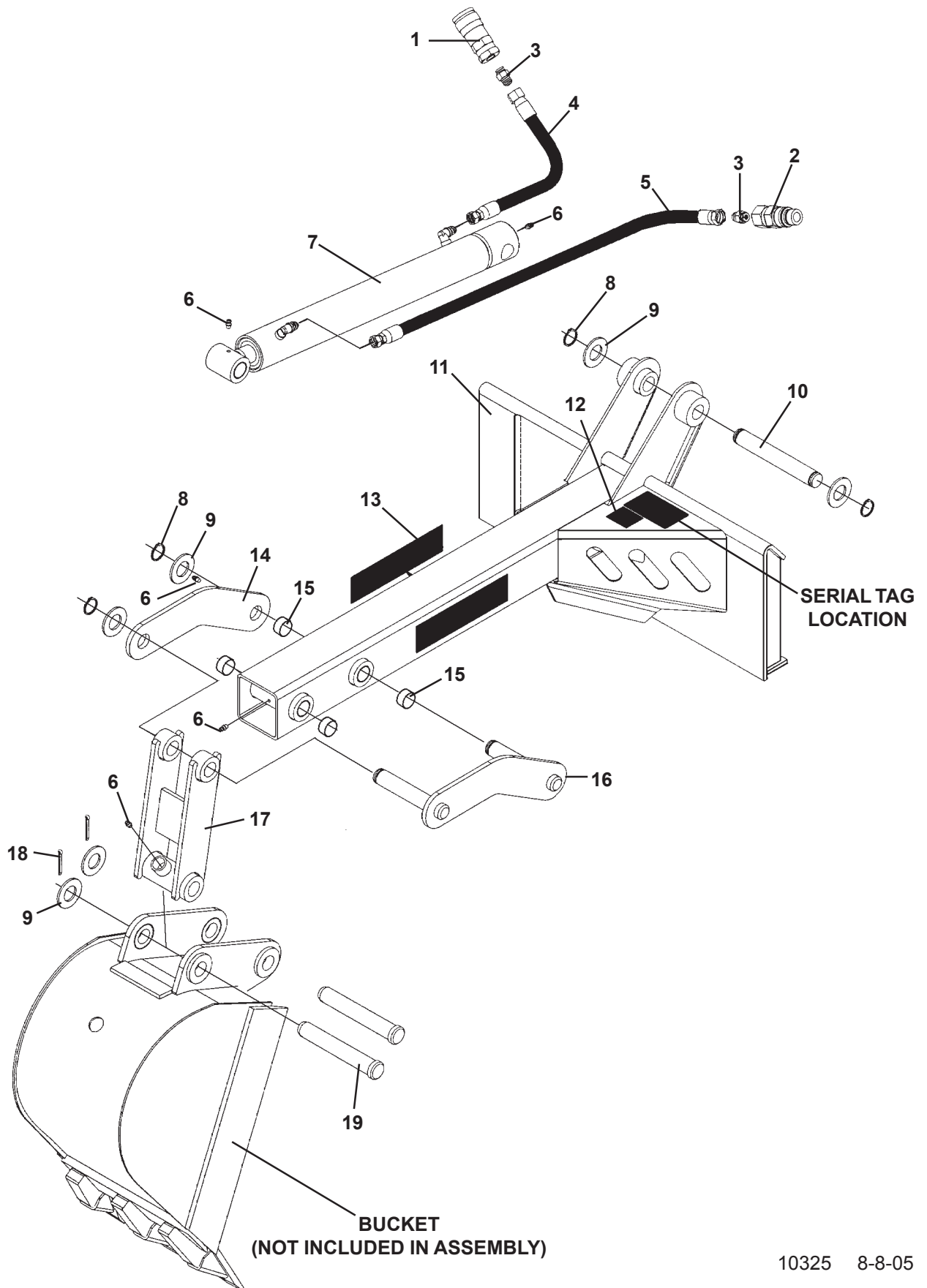
THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY BASED ON A COURSE OF DEALING OR USAGE OF TRADE.

IN NO EVENT SHALL PALADIN LIGHT CONSTRUCTION BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGES.

IN NO EVENT SHALL PALADIN LIGHT CONSTRUCTION BE LIABLE FOR ANY LOSS OR CLAIM IN AN AMOUNT IN EXCESS OF THE PURCHASE PRICE, OR, AT THE OPTION OF PALADIN LIGHT CONSTRUCTION, THE REPAIR OR REPLACEMENT, OF THE PARTICULAR PRODUCT ON WHICH ANY CLAIM OF LOSS OR DAMAGE IS BASED. THIS LIMITATION OF LIABILITY APPLIES IRRESPECTIVE OF WHETHER THE CLAIM IS BASED ON BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE OR OTHER CAUSE AND WHETHER THE ALLEGED DEFECT IS DISCOVERABLE OR LATENT.

¹Attachment Technologies Inc., a subsidiary of Paladin Brands Holding, Inc. (PBHI) is referred to herein as Paladin Light Construction.

FIXED SKID HOE ASSEMBLY



FIXED SKID HOE ASSEMBLY

<u>ITEM</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	31886*	Female Coupler - Poppet Style
	1	24002*	Female Coupler - Flat Face Style
2	1	15512*	Male Coupler - Poppet Style
	1	24001*	Male Coupler - Flat Face Style
3	2	3362	Straight Connector 6MJ-10MBo
4	1	35695	Hose .25" x 36" 6FJX-6FJX
5	1	37580	Hose .25" x 54" 6FJX-6FJX
6	5	6616	Grease Fitting
7	1	88430	Cylinder Assembly
8	4	6612	Snap Ring
9	6	57462	Thrust Washer
10	1	88482	Pivot Pin
11	1	89350*	Dipper (Universal Hitch) (Includes (4) 88380 Bushings)
12	1	4338	Made In U.S.A. Decal
13	2	40113	BRADCO Logo Decal
14	1	88427	Dipper Link
15	4	88380	Bushing (Included Skid Hoe)
16	1	88426	Dipper Link
17	1	88421	Bucket Link
18	2	1614	Cotter Pin
19	2	88485	Clevis Pin

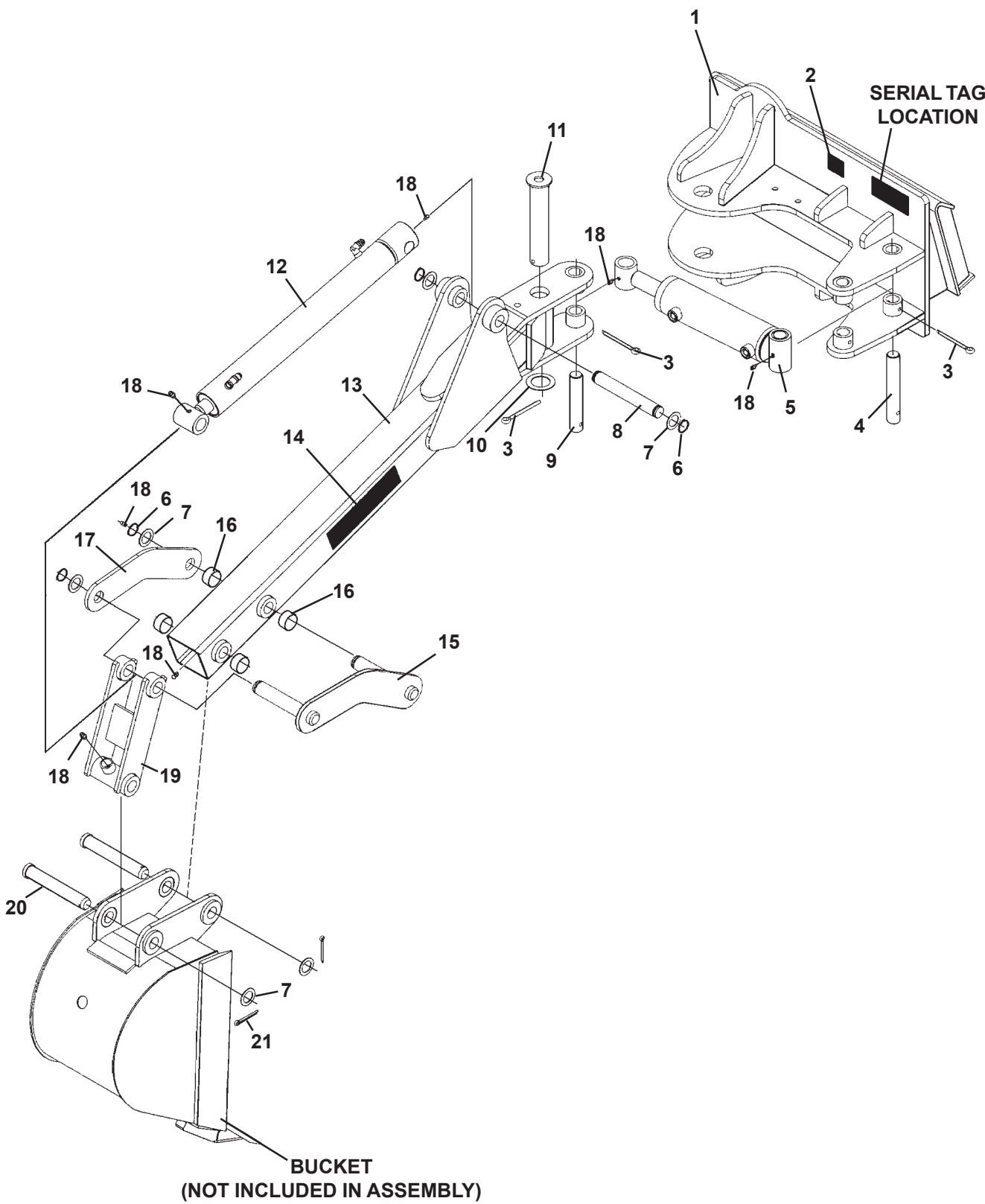
BUCKET OPTIONS

<u>PART NO.</u>	<u>DESCRIPTION</u>
88508	8" Standard (2 teeth)
88510	10" Standard (3 teeth)
88512	12" Standard (3 teeth)
88516	16" Standard (4 teeth)
88518	18" Standard (4 teeth)

* Hydraulic Couplers and Dipper (with mounting) are specific to your loader application. Contact factory or your local BRADCO dealer to order couplers or mounting for any application other than universal hitch.

10326 8-31-05

SWING SKID HOE ASSEMBLY



SWING SKID HOE ASSEMBLY

<u>ITEM</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	17361*	Mounting Frame (Universal Hitch)
2	1	4338	Made In U.S.A. Decal
3	3	1729	Cotter Pin
4	1	2007195	Cylinder Pin
5	1	17362	Swing Cylinder Assembly
6	4	6612	Snap Ring
7	6	57462	Thrust Washer
8	1	88482	Cylinder Pin
9	1	2007350	Cylinder Pin
10	1	68057	Thrust Washer
11	1	2007345	Pivot Pin
12	1	88430	Bucket Cylinder Assembly
13	1	17354	Dipper (Includes (4) 88380 Bushings)
14	2	40113	Bradco Logo Decal
15	1	88426	Dipper Link
16	4	88380	Bushing (Included in Dipper)
17	1	88427	Dipper Link
18	8	6616	Grease Fitting
19	1	88421	Bucket Link
20	2	88485	Clevis Pin
21	2	1614	Cotter Pin

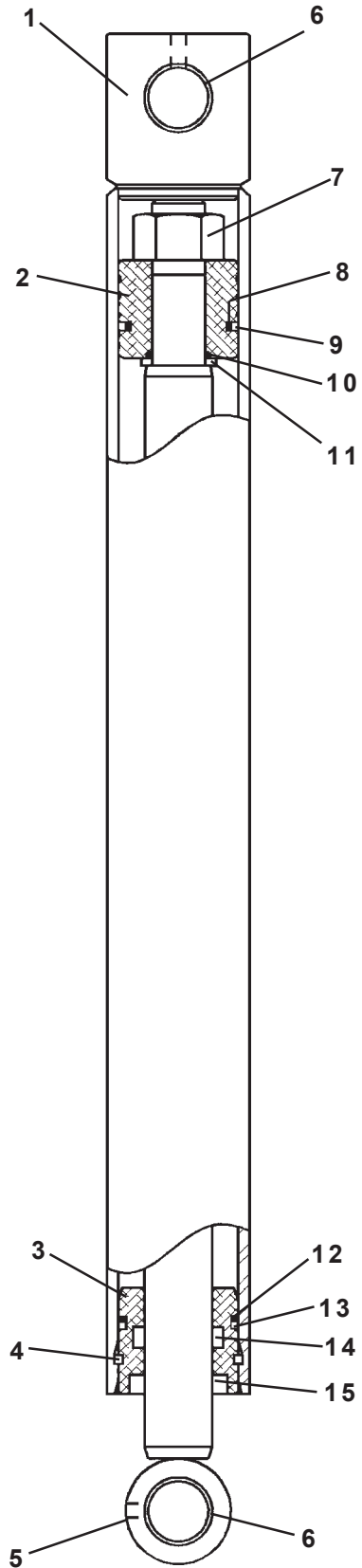
BUCKET OPTIONS

<u>PART NO.</u>	<u>DESCRIPTION</u>
88508	8" Standard (2 teeth)
88510	10" Standard (3 teeth)
88512	12" Standard (3 teeth)
88516	16" Standard (4 teeth)
88518	18" Standard (4 teeth)

* Mounting Frame is specific to your loader application. Contact factory or your local BRADCO dealer to order a mounting frame for any application other than universal hitch.

CYLINDER ASSEMBLY

BUCKET CYLINDER ASSEMBLY #88430



8129 5-31-00

CYLINDER ASSEMBLY

BUCKET CYLINDER ASSEMBLY #88430

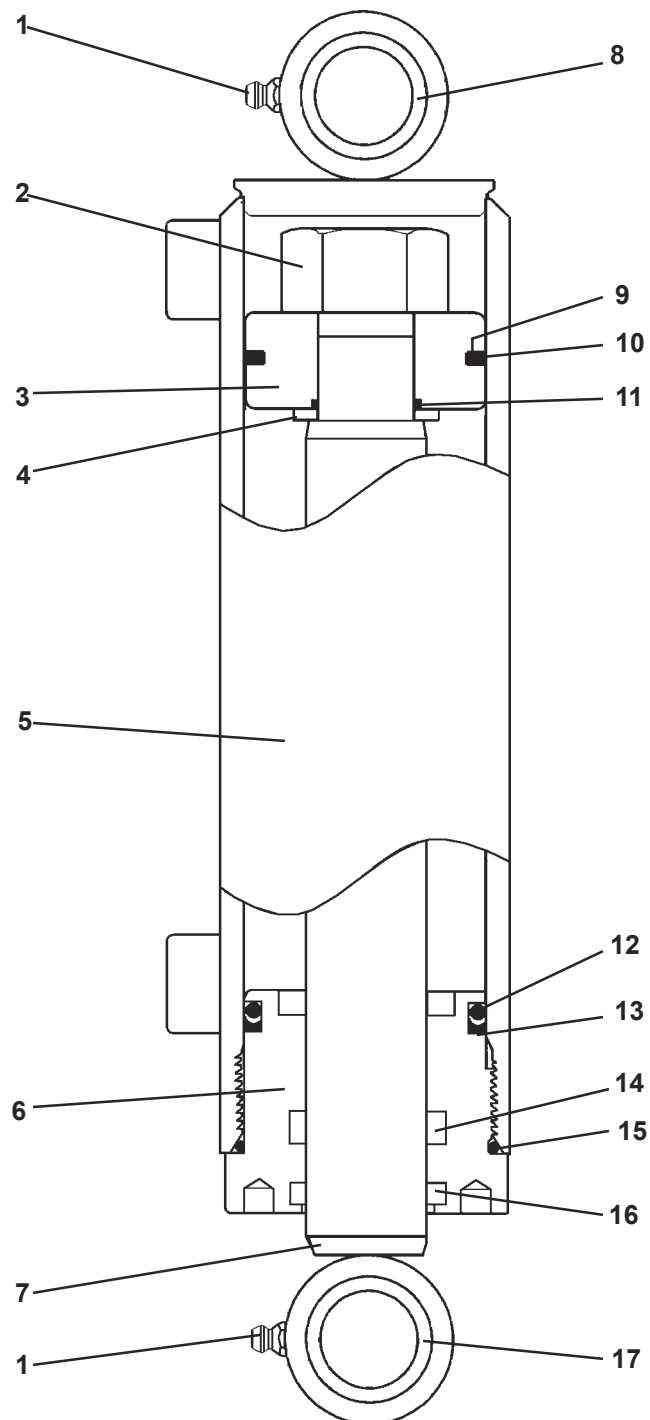
<u>NO</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	88432	Cylinder Tube
2	1	88431	Piston
3	1	64891	Gland
4	1	7164*	Gland Retainer Ring
5	1	88435	Cylinder Rod
6	4	88380	Bushing
7	1	1482	.88" UNF Lock Nut
8	1	4637*	O'Ring
9	1	4636*	Piston Ring
10	1	4635*	O-Ring
11	1	52644	Washer
12	1	4633*	O-Ring
13	1	4634*	Back-Up Washer
14	1	45262*	Poly Pak Seal
15	1	4981*	Rod Wiper

NOTE: Seal Kit #45581 includes all parts marked with an asterisk (*). Parts are not sold separately.

8130 5-31-00

CYLINDER ASSEMBLY

SWING CYLINDER ASSEMBLY #17362

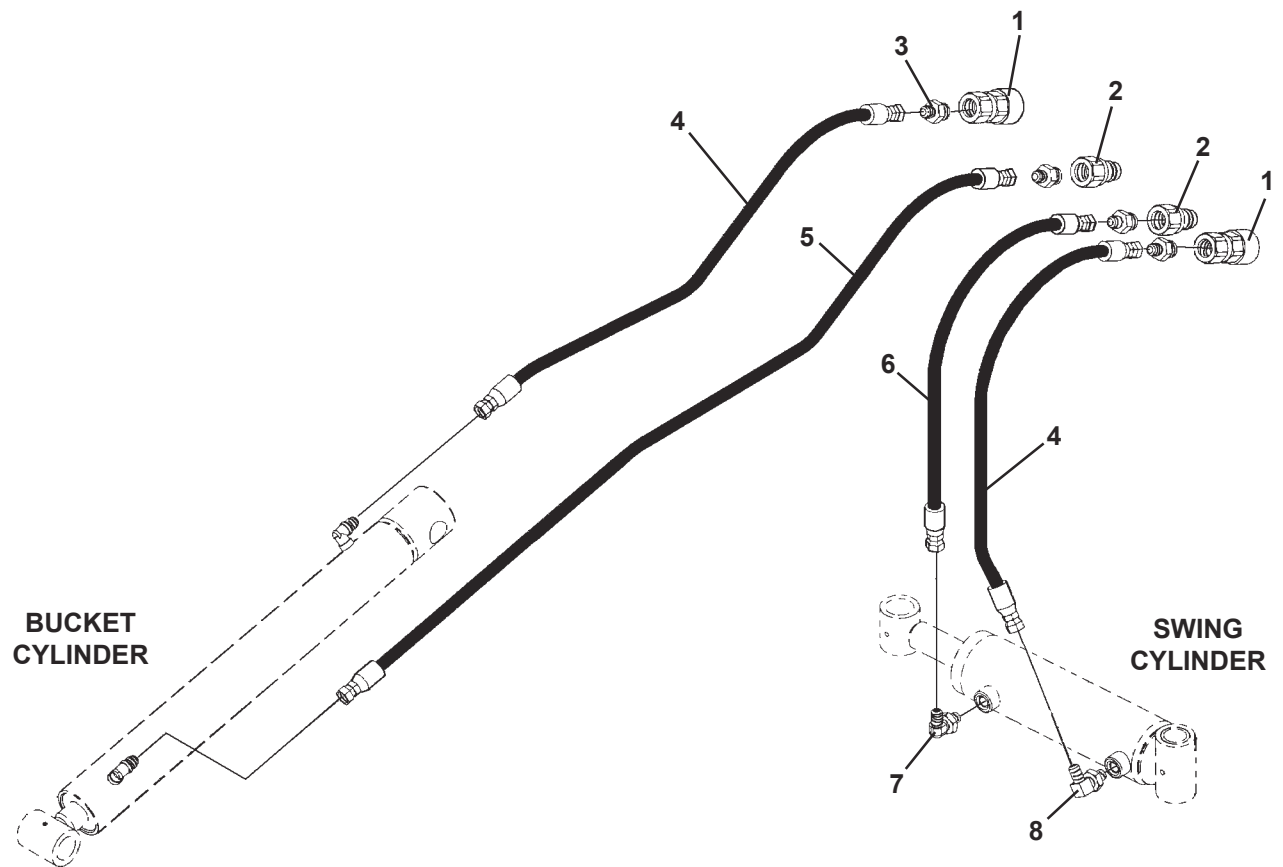


CYLINDER ASSEMBLY

SWING CYLINDER ASSEMBLY #17362

<u>ITEM</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	2	6616	Grease Fitting
2	1	1483	Hex Nut
3	1	50252	Piston
4	1	5421	Washer
5	1	17363	Cylinder Tube
6	1	77458	Cylinder Gland
7	1	17365	Cylinder Rod
8	2	88919	Bushing 1.25" x 1.00" x 1.25"
9	1	4645*	O'Ring
10	1	4644*	Piston Ring
11	1	4641*	O'Ring
12	1	4509*	O'Ring
13	1	4510*	Back-Up Washer
14	1	45219*	Poly Pak Seal
15	1	45250*	O'Ring
16	1	45389*	Rod Wiper
17	2	5403	Bushing 1.25" x 1.00" x 1.00"

DUAL AUXILIARY HYDRAULIC KIT

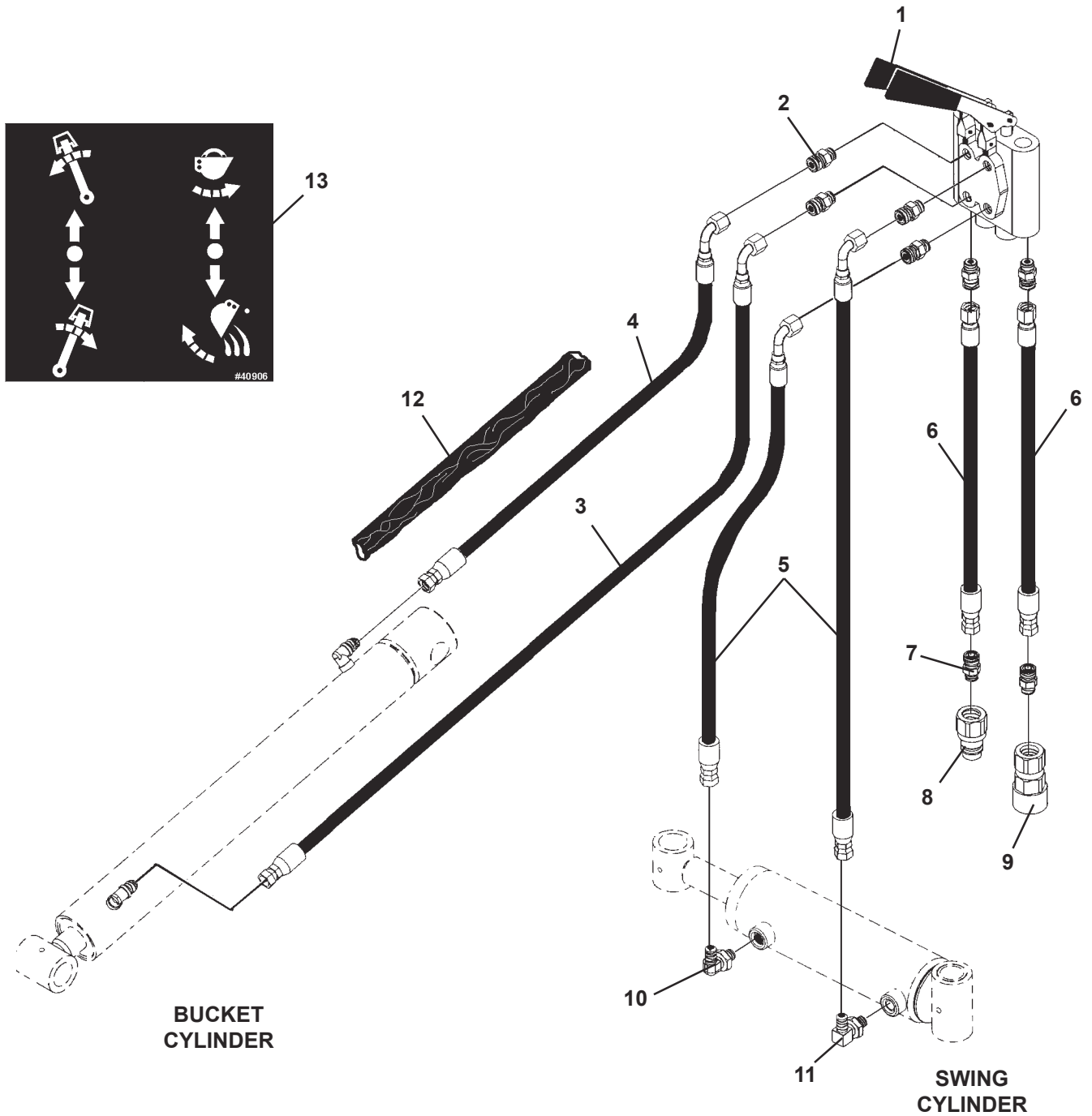


DUAL AUXILIARY HYDRAULIC KIT

<u>ITEM</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	2	17140*	Female Coupler - Poppet Style
	2	14175*	Female Coupler - Flat Face Style
2	2	17139*	Male Coupler - Poppet Style
	2	14176*	Male Coupler - Flat Face Style
3	4	3269	Straight Connector 8MBo-6MJ
4	2	37438	Hose .25" x 76"
5	1	37275	Hose .25" x 94"
6	1	35876	Hose .25" x 72"
7	1	30259	90° Elbow 6Mbo-6MJ with .06 Orifice
8	1	3434	90° Elbow 6MBo-6MJ

* Hydraulic Couplers are specific to your loader application. Contact factory or your local BRADCO dealer to order couplers not listed.

2-SPOOL VALVE HYDRAULIC KIT



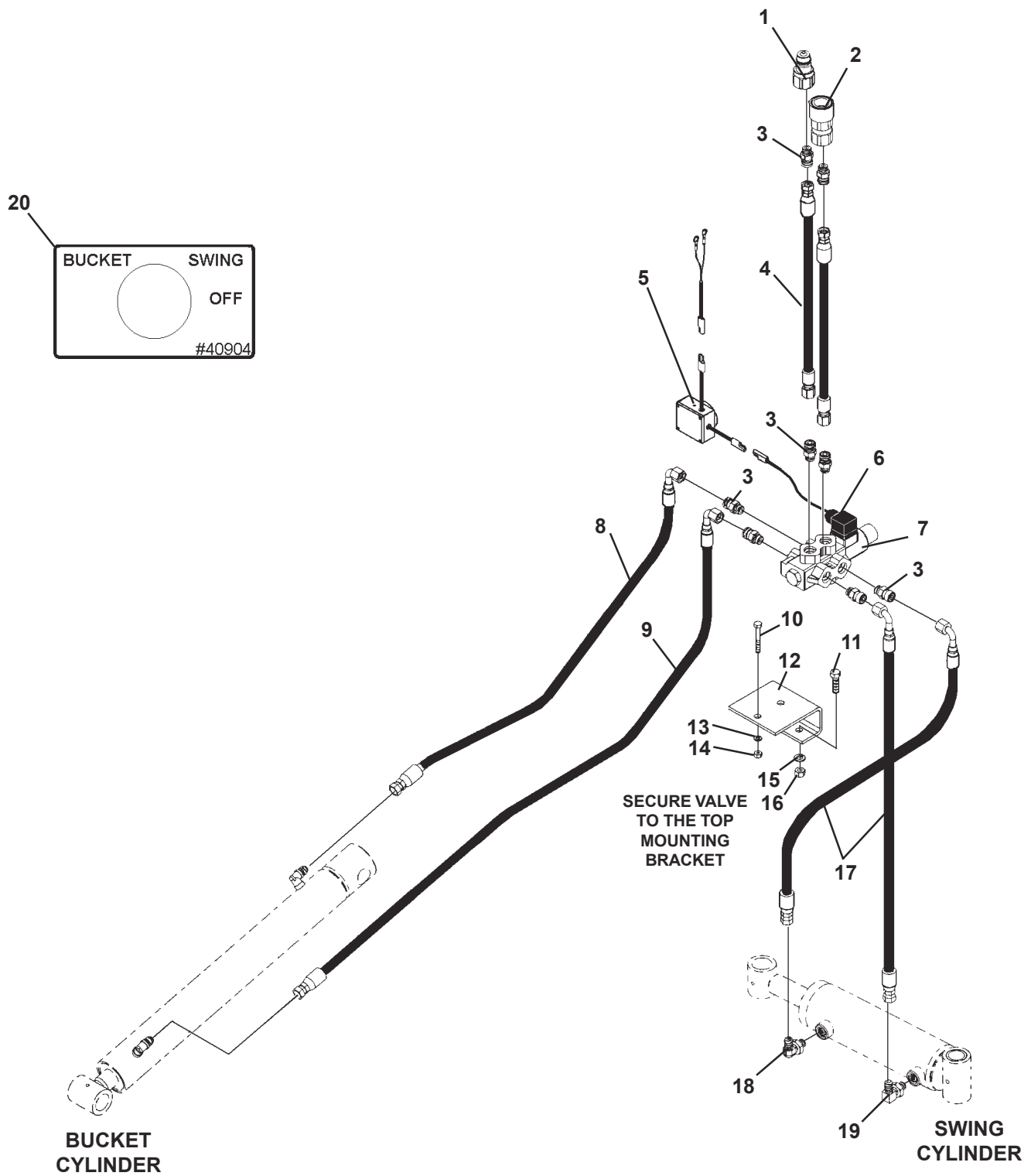
2-SPOOL VALVE HYDRAULIC KIT

<u>ITEM</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	45819	2-Spool Valve with Handles
2	6	30208	Straight Connector 6MBo-6MFS
3	1	38371	Hose Assembly .25" X 100" 6FFS-6FFS 90°
4	1	38372	Hose Assembly .25" X 108" 6FFS-6FFS 90°
5	2	38373	Hose Assembly .25" X 117" 6FFS-6FFS 90°
6	2	38374	Hose Assembly .25" X 72" 6FFS-6FFS
7	2	30324	Straight Connector 8MBo-6MFS
8	1	17139*	Male Coupler - Poppet Style
	1	14176*	Male Coupler - Flat Face Style
9	1	17140*	Female Coupler - Poppet Style
	1	14175*	Female Coupler - Flat Face Style
10	1	30323	90° Elbow 6MBo-6MFS with .060 Orifice
11	1	30204	90° Elbow 6MBo-6MFS
12	6'	34052	Hose Sock
13	1	40906**	Operation Decal

*** Hydraulic Couplers are specific to your loader application. Contact factory or your local BRADCO dealer to order couplers not listed.**

**** To Apply Decal:** Clean area of application with nonflammable solvent, then wash the same area with soap and water. Allow the surface to fully dry. Remove the backing from the operational decal, exposing the adhesive surface. Apply the decal and smooth out any bubbles.

ELECTRIC SOLENOID VALVE HYDRAULIC KIT



ELECTRIC SOLENOID VALVE HYDRAULIC KIT

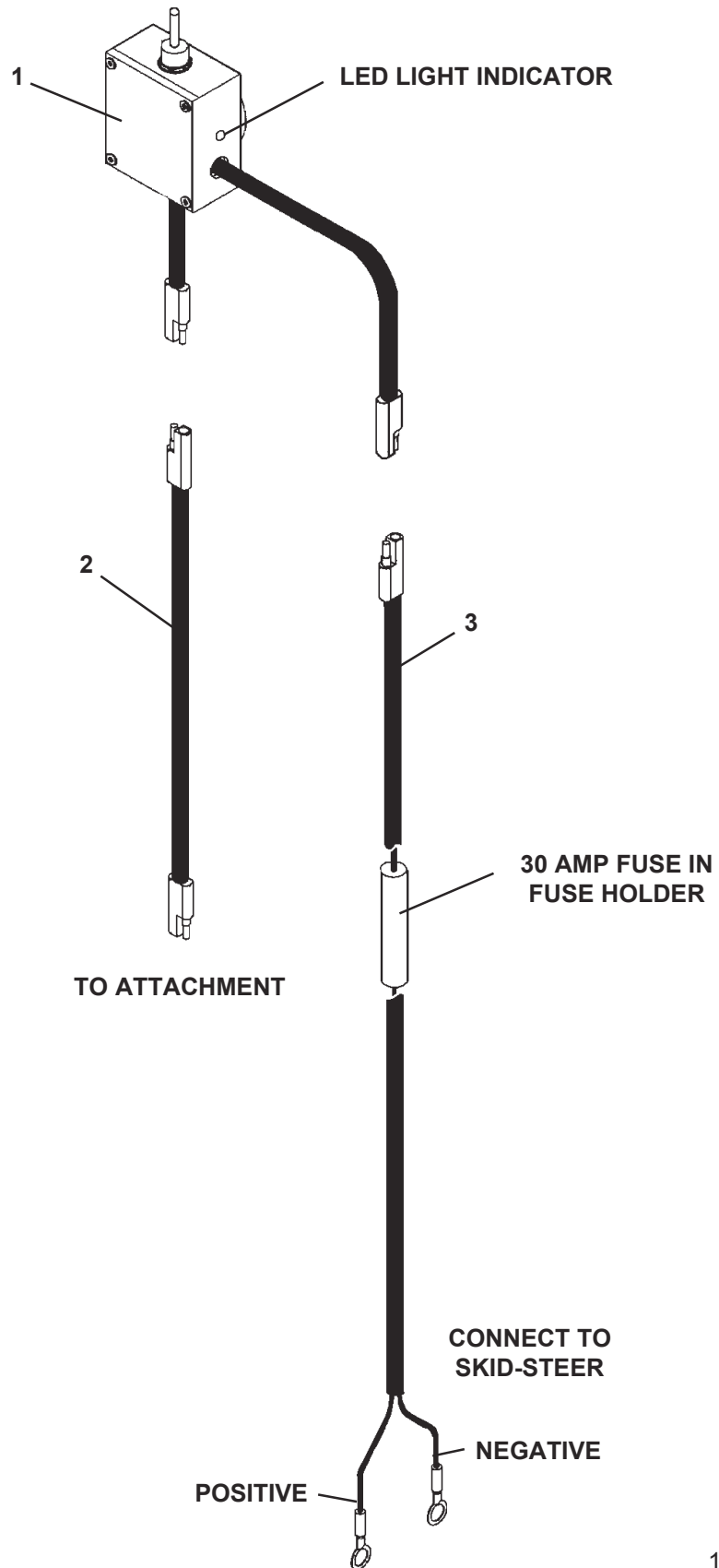
<u>ITEM</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	17139*	Male Coupler - Poppet Style
	1	14176*	Male Coupler - Flat Face Style
2	1	17140*	Female Coupler - Poppet Style
		14175*	Female Coupler - Flat Face Style
3	8	30324	Straight Connector 8MBo-6MFS
4	2	38132	Hose .25" x 48" 6FFS-6FFS
5	1	15757	Electrical Wire Control Harness
6	1	85386	DIN Connector
7	1	19687	Solenoid Valve
8	1	38193	Hose .25" x 22" 6JFX - 6FFS 90°
9	1	38194	Hose .25" x 38" 6JFX - 6FFS 90°
10	2	1007	.25" UNC X 2.00" Hex Capscrew
11	2	1044	.38" UNC X 1.25" Hex Capscrew
12	1	100867	Valve Mounting Bracket
13	2	1501	.25" Lock Washer
14	2	1224	.25" UNC Hex Nut
15	2	1503	.38" Lock Washer
16	2	1226	.38" UNC Hex Nut
17	2	38192	Hose .25" x 19" 6FFS - 6FFS 90°
18	1	30323	90° Elbow 6MBo-6MFS with .060 Orifice
19	1	30204	90° Elbow 6MBo-6MFS
20	1	40904	Decal (Located on control box.)

NOTE: To avoid running down the battery, the toggle switch must be in the swing position before turning off the engine.

* Hydraulic Couplers are specific to your loader application. Contact factory or your local BRADCO dealer to order couplers not listed.

ELECTRICAL CONTROL BOX

ASSEMBLY #15757



10350 8-29-05

ELECTRICAL CONTROL BOX

ASSEMBLY #15757

<u>NO</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	17710	Control Box Assembly (Includes one single pole, single throw, normally open, maintained closed, toggle switch and LED to light when closed.)
2	1	17712	Wire Assembly (To Attachment)
3	1	17173	Wire Assembly (To Skid-Steer Power Supply)

DANGER! ELECTROCUTION HAZARD



Provide electrical power to the control box by following your skid-steer manufacturer's recommended procedures.

The electrical circuit must be fused to prevent machine damage and serious personal injury or death.

10351 8-29-05