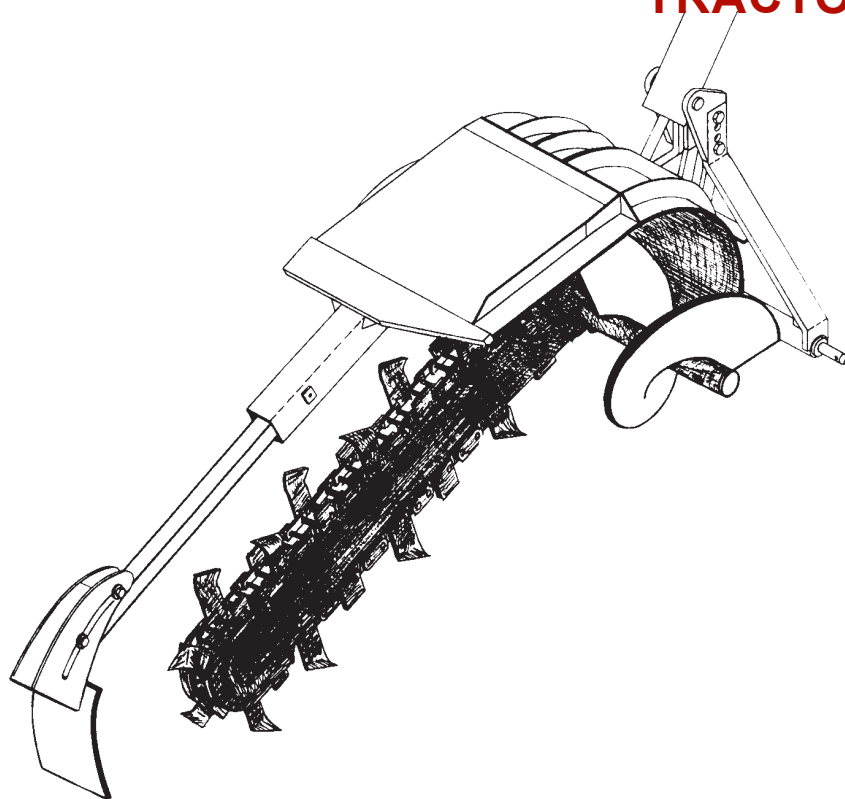




OPERATOR'S MANUAL

TRENCHER 612

**FOR
CAT. I 3-POINT HITCH
TRACTORS**



SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: OM521
Part Number: 75421
Rev. 7

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PREFACE

GENERAL COMMENTS

Congratulations on the purchase of your new 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 forward.

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 to obtain further assistance. Keep this manual available for reference. Provide the manual to any new owners and/or operators.

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

Use only manufacturer replacement parts. Substitute parts may not meet the required standards.

Record the model and serial number of your unit on the cover of this manual. The parts department needs this information to insure that you receive the correct parts.

SOUND AND VIBRATION

Sound pressure levels and vibration data for this attachment are influenced by many different parameters: some items are listed below (not inclusive):

- prime mover type, age, condition, with or without cab enclosure and configuration
- operator training, behavior, stress level
- job site organization, working material condition, environment

Based on the uncertainty of the prime mover, operator, and job site, it is not possible to get precise machine and operator sound pressure levels or vibration levels for this attachment.

NOTE: A list of all Paladin Patents can be found at <http://www.paladinattachments.com/patents.asp>.

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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 INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.



WARNING

THIS SIGNAL WORD INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.



CAUTION

THIS SIGNAL WORD INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN MINOR OR MODERATE INJURY.

NOTICE

NOTICE IS USED TO ADDRESS PRACTICES NOT RELATED TO PHYSICAL INJURY.

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.

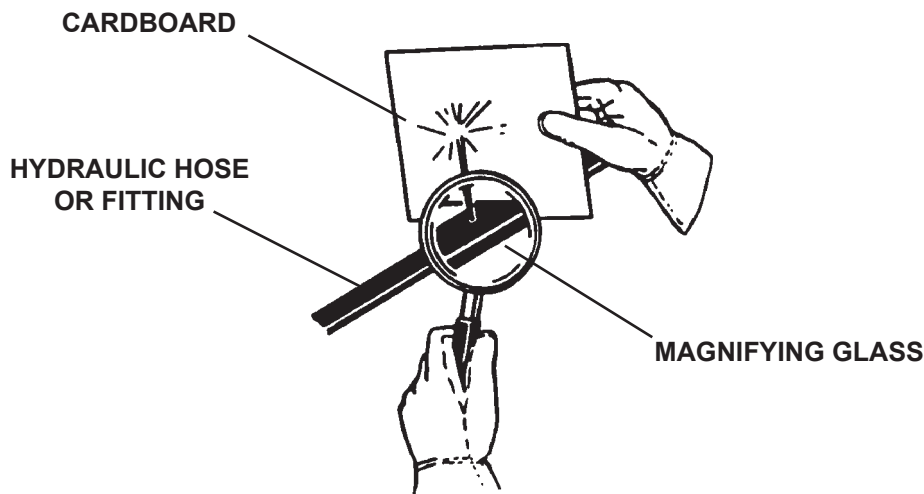
WARNING!



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 Protective 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.

WARNING!



CALIFORNIA PROPOSITION 65 WARNING

This product may contain a chemical known to the state of California to cause cancer, or birth defects or other reproductive harm. www.P65Warnings.ca.gov

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.

WARNING!



REMOVE PAINT BEFORE WELDING OR HEATING

Hazardous fumes/dust can be generated when paint is heated by welding, soldering or using a torch. Do all work outside or in a well ventilated area and dispose of paint and solvent properly. Remove paint before welding or heating.

When sanding or grinding paint, avoid breathing the dust. Wear an approved respirator. If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.



OPERATING THE TRENCHER

- PTO Operated Attachment: Rotating driveline contact can cause death. Do not operate without all driveline, tractor and equipment shields in place. Drivelines securely attached at both ends. Driveline shields that turn freely on driveline
- Block off work area from bystanders, livestock, etc. Stop operation if bystanders or livestock enter the work area.
- Operate only from the operator's station.
- Never drop a boom with a rapidly moving digging chain on the ground. The force of the trencher may cause the vehicle to move suddenly and unexpectedly.
- Use caution when operating on slopes. The natural vibration will cause the unit to creep sideways downhill. Try to dig with trencher in a level position.
- Do not adjust relief valve settings. Incorrect valve settings could result in equipment damage and/or personal injury.
- 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 unit to the ground, turn off the prime mover's engine, remove the key and apply the brakes.
- Do not use the trencher crumber bar or chain as a step when climbing in or out of the prime mover.
- Be alert to changes in the work area. Watch out for bystanders, changes in weather and soil conditions.
- Do not make sharp turns while trenching. Trencher could become wedged in the trench and damaged.
- Keep equipment and bystanders away from the trencher after it has been dug. The weight could cause a cave in.
- If chain becomes jammed, never attempt to free it while the unit is running. Stop the unit, shut off the engine and review the situation.

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EQUIPMENT SAFETY PRECAUTIONS



TRANSPORTING THE TRENCHER

- 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 fuel tank for expansion. Wipe up any spilled fuel. Secure cap tightly when done.
- When transporting keep the trencher as low as the terrain will allow.



MAINTAINING THE TRENCHER

- 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 manuals before any repair is made. After completing maintenance or repair, check for correct functioning of the backhoe. 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. Serious personal injury or death could result.
- Never work under a raised attachment.
- Replace all safety shields and guards when done performing maintenance. Do not operate trencher with protective equipment removed.

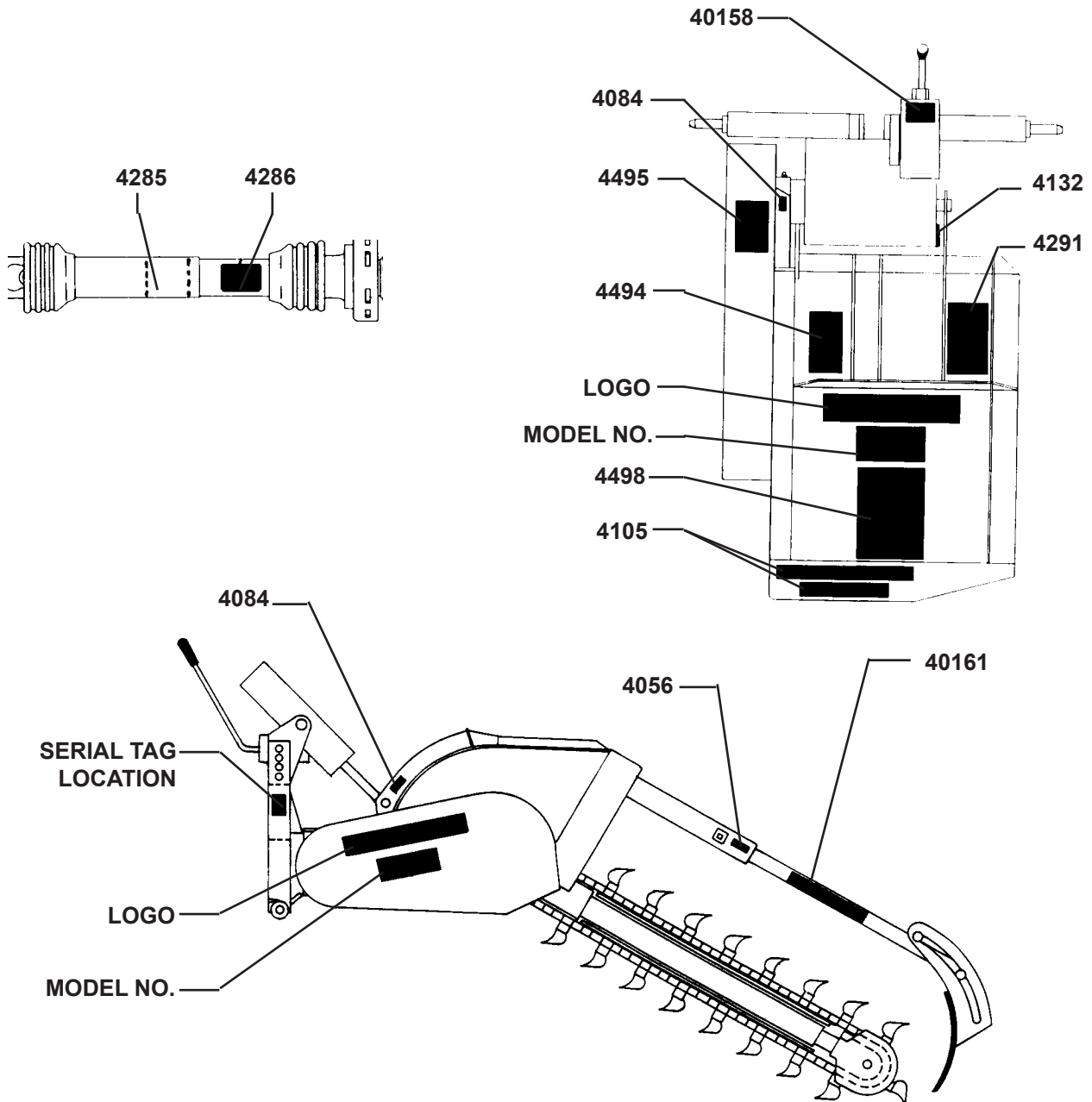
DECAL PLACEMENT

GENERAL INFORMATION

The following diagrams show the location of all the decals used on your attachment. The decals are identified by their part numbers, with the reductions of the actual decals shown on the following pages. Use this information to order replacements for lost or damaged decals. Be sure to read all decals before operating the attachment. They contain information you need to know for both safety and attachment longevity.

IMPORTANT: Keep all safety decals clean and legible. Replace all missing, illegible or damaged safety decals. When replacing parts with safety decals attached, the safety decals must also be replaced.

REPLACING SAFETY DECALS: Clean the area of application with a nonflammable solvent, then wash the same area with soap and water. Allow the surface to dry. Remove the backing from the safety decal, exposing the adhesive surface. Apply the safety decal to the position shown in the diagram, and smooth out any bubbles.



DECALS



DANGER! ROTATING DRIVELINE
PART #4286
(LOCATED ON PTO)



DANGER STAND CLEAR
PART #4498



DANGER STAND CLEAR
PART #4105



DANGER! SHIELD MISSING
PART #4285
(LOCATED ON INSIDE PTO SHAFT)

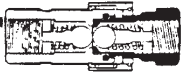


STAND CLEAR
PART #40161

DECALS

HYDRAULIC QUICK COUPLER HOOK-UP
RECOMMENDED PRACTICE AND DEFINITIONS.

1. Always install quick couplers so the oil flows out of the male tip and into the female coupler.

FEMALE SHOWN CLEAR  **FLOW DIRECTION**
MALE SHOWN SHADED

2. Quick couplers must be fully engaged to provide full freeflow. There are several reasons that may cause the coupler not to fully engage.

- A. Dirt may block the male tip from engaging.
- B. The coupler or male tip may be damaged or worn.
- C. The coupler halves may not be matched to fully open the valve when the coupler is engaged. (The dimension from the face of a male tip to the locking groove must match the corresponding coupler.)
- D. Some couplers with poppet style valve may not connect with ball type.

3. Coupler lock-up--Some quick couplers which may not have a "positive valve stop" or "Valve shield" feature may have a problem called "Lock Up" or "Flow Checking." This occurs when a valve closes during flow conditions, usually in return lines subjected to high surge flows, such as when quickly lowering a backhoe boom.

Surge flows -- A dramatic, almost instantaneous increase in fluid flow.

NOTE: All couplers or halves supplied with our units have positive valve stop feature. Both coupler and male tip must have the feature or lock up may occur.

SUGGESTED PRACTICE

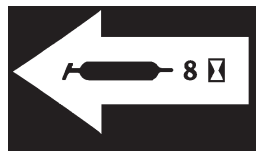
1. If possible, always use quick couplers, pairs or identical make (brand) and model or style numbers when coupling hoses.
2. Be sure the brand or model used does not include the design feature to prevent "flow checking", or "lock up" during surge flow conditions.
3. Always be scrupulously clean when coupling quick couplers.
4. After coupling, perform first backhoe operations at engine idle to ascertain proper flow exists. NOTE: Many of our models of backhoes include a relief valve vented to atmosphere (small tube down the back) which will vent excessive return flow oil pressure to the air. If you see oil squirting out of the vent, check for a restricted return flow coupling.

What if: **4291**
In the event the coupler is blocked, even for just a instant, causing excessive back pressure build up in the valve assembly, you may experience valve failure. This will usually show up as stretched tie bolts, leaking spool seals or a ruptured casting.

QUICK COUPLER HOOK-UP
PART #4291

STOP! **DO YOU HAVE THE CORRECT TOOTH SET-UP FOR YOUR DIGGING CONDITIONS**

TOOTH SET-UP WARNING
PART #4056



GREASE 8 HOURS
PART #4084

BOOM CONTROL
DOWN

UP
BRADCO
612
TRENCHER
#40158

BOOM CONTROL
PART #40158

CHECK PLUG
OIL LEVEL

4132

CHECK OIL LEVEL
PART #4132

! WARNING

THIS GUARD COVERS MOVING PARTS UNDERNEATH. REMOVE GUARD FOR SERVICE ONLY. SEE SERVICE MANUAL FOR SERVICE INSTRUCTIONS.

#4495

WARNING
PART #4495

! WARNING

- THIS MACHINE IS DESIGNED TO BE OPERATED BY ONE OPERATOR. DO NOT CARRY PASSENGERS ON THIS UNIT.
- DO NOT OPERATE THIS MACHINE WITH GUARDS AND COVERS REMOVED.
- ALL OPERATORS SHOULD READ OPERATORS INSTRUCTION MANUAL OR BE THOROUGHLY TRAINED BEFORE OPERATING MACHINE.

#4494

OPERATOR'S WARNING
PART #4494

NOTE: CONTACT YOUR LOCAL DEALER FOR MODEL NUMBER AND LOGO DECALS.

PREOPERATION

612 TRENCHER

GENERAL INFORMATION

The 612 trencher mounts directly to the 3-point hitch system on your tractor the same as any other 3-point hitch attachment.

HYDRAULICS

The 612 trenchers are shipped with two 50" long hoses for connecting to your tractor's rear remote hydraulic system. Contact your local dealer to purchase adapters and couplers to match up to your tractor's hydraulic system.

PREPARING THE TRACTOR

Bradco 612 trenchers are used on 3-point hitch (Category 1) hydrostatic tractors. Remote hydraulics between 4 and 7 GPM flow and a minimum working pressure of 1800/2250 PSI, 540 RPM, and rear PTO drive are also required.

A front counterweight (such as a loader or dozer blade) may be necessary to proper transportation and operation of the tractor and trencher. A minimum of 20% of the gross vehicle weight must be on the tractor's front axle. (See "Weight and Balance" in the Installation section of this manual.)

OPTIONS

Eventually you may wish to dig a trencher of a depth or width other than what your unit was originally equipped to dig. The trencher can be fitted with optional booms, digging chains, sprockets, and crumber assemblies to allow you to dig a variety of different sized trenches. The chart on the following page will give you an idea of the different trench depths and widths a properly equipped unit is capable of digging. For more detailed information on trencher options see Digging Chain Options section of this manual.

PREOPERATION

612 TRENCHER

TRENCH DEPTHS *		TRENCH WIDTHS				
30" Depth	4.25"	6.00"	8.00"	10.00"	12.00"	
36" Depth	4.25"	6.00"	8.00"	10.00"	-----	
48" Depth	4.25"	6.00"	8.00"	-----	-----	
60" Depth	4.25"	6.00"	-----	-----	-----	
* Trencher depths are given with the digging boom at an optimum 65° digging angle and the auger touching the ground. Trenches of various depths can be made by varying the digging angle and raising the trencher up higher. These methods are less efficient however.						

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 trenchers as may be necessary without notification.

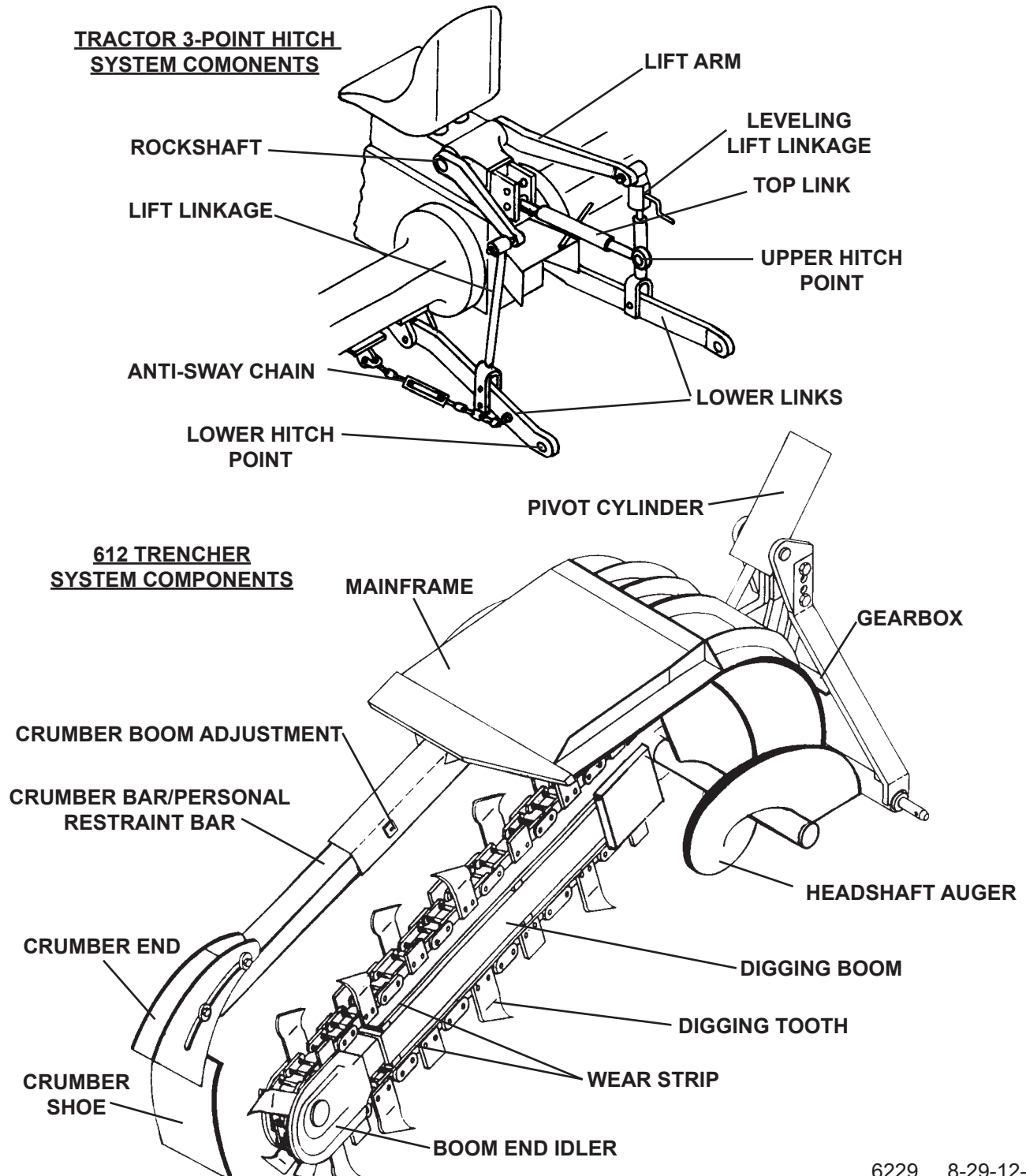
PREOPERATION

612 TRENCHER

MAJOR COMPONENT NOMENCLATURE

GENERAL INFORMATION

The purpose of this page is to acquaint you with the 3-point hitch system, the trencher, and the names of the various components. This knowledge will be helpful when reading through this manual or when ordering service parts. (NOTE: Crumber Ends have been changed on trenchers with SN#204939 and UP.)



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INSTALLATION

GENERAL INFORMATION

The following instructions will help you to mount the trencher onto your tractor. The trencher uses the 3-point hitch system for ease of installation, therefore if you have ever installed 3-point hitch equipment before, installing the trencher should prove no problem.

Your tractor must be equipped with rear remote auxiliary hydraulics for trencher operation. Prior to installing the trencher you must install the appropriate hydraulic couplers onto the trencher hoses for your application. Remember to read all safety warnings, decals, and operating instructions before operating the tractor or trencher.

IMPORTANT: A front counterweight may be necessary for proper transportation and operation of the tractor and trencher. A minimum of 20% of the gross vehicle weight must be on the tractor's front axle. (Refer to the information on Weight and Balance at the end of this section.)

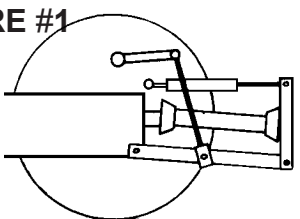
MOUNTING INSTRUCTIONS

1. If you have not done so already, remove the steel shipping banding from around the trencher and skid.
2. Install the PTO drive assembly to the trencher by installing the key #5661 in the input shaft #89331 of the trencher gear box and sliding the clutch end of the PTO drive assembly onto the shaft. Secure drive assembly to input shaft with set screw.
3. Following the proper start up and backing procedures as noted in your tractor operator's manual, back the tractor up to the rear of the trencher and skid.
4. Adjust the tractor's 3-point hitch system to accept the trencher. Continue backing the tractor up to the trencher and then attach the trencher by positioning the lower links onto the trencher's hitch pins. Secure with klik pins #57496.

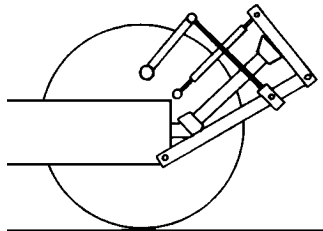
NOTE: Since the trencher is fairly heavy, we recommend you position the lift links of the lower links in the position offering the greatest lift capabilities. If there is more than one hole in the lower link, position the lift link in the rear most hole.

5. Position the top link of the tractor in place between the ears of the gear box assemblies top linkage.. Use the mounting hole in the linkage that will allow **ALL THREE 3-POINT LINKS TO RUN PARALLEL**. Secure the top link using the hitch pin #82963 and klik pin #21169 provided. Adjust the top link so the **3-POINT MOUNTING BRACKET REMAINS VERTICAL**, (perpendicular to the ground). See Figure #1

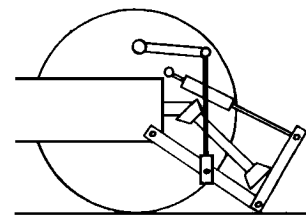
FIGURE #1



Okay for digging.



Okay for transport. Too much bend for PTO operation.



Too low. Too much bend for PTO operation.

6. Adjust the lower link anti-sway chains and center the trencher.
7. Complete the hydraulic plumbing by connecting the hydraulic couplers together.

INSTALLATION

NOTE: The auxiliary hydraulics on your tractor operates the trencher cylinder and is used to lower the trencher into the ground or raise it up for transport.

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



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

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

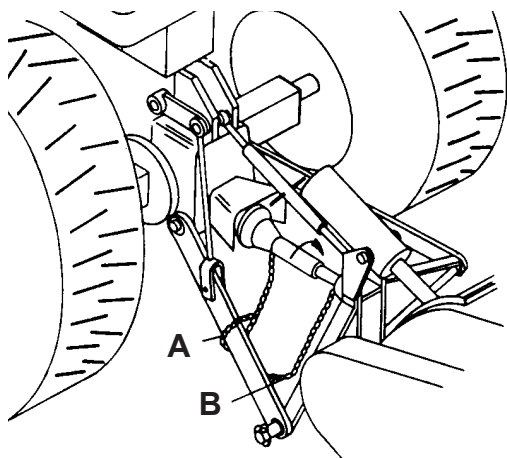
NOTE: When connecting trencher to tractor, route the hydraulic hoses as far away as possible from the operator. Also use care to route away from sharp corners and from dragging on the ground. (When disconnecting trencher from tractor either plug, cap or connect hose ends to keep system free from contaminants and store hoses off the ground.)

8. With the hydraulics hooked up, raise the trencher and remove the skid.
9. Lower the trencher to the ground. Disconnect the top link from the tractor and tilt the trencher away from the tractor. (It may also be necessary to raise the trencher into the extreme UP position to gain sufficient clearance to connect PTO drive assembly to tractor.)
10. Turn the tractor engine off and set the parking brake.

NOTE: To protect PTO shaft and operator, the up travel must be limited to keep at least 3" of the two halves of the PTO shaft together. To assist the operator in maintaining this limitation measure in 3" from the telescopic tube on the trencher half of the PTO shield and make a permanent mark around the diameter. (Refer to PTO shaft adjustment.)

11. Connect the PTO drive assembly to the tractor.
12. Attach PTO shield and safety chains as shown in Figure #2.

FIGURE #2



CAUTION!



Always install PTO drive guard safety chains before operating trencher.

Safety chains are used to hold the PTO drive guard from spinning. There are two chains to hold both halves of the PTO drive.

To mount chains:

- A. Wrap chain around left 3-point hitch arm and clip it back to it leaving some slack for free movement when raising and lowering trencher.
- B. It may be necessary if the chain is too short to clip the chain to a loop on the side of the 3-point arm. Care should be taken not to have too much loop in the chain so it does not wrap around the PTO drive when it is rotating.

INSTALLATION

13. Adjust 3-point lever upper stop to limit the travel to a point where trencher will clear the ground sufficient for transport and still keep at least 3" of shaft telescoped together.
14. Start the tractor and raise the trencher boom UP. Operate the 3-point hitch lifts to determine if its capacity is sufficient and all points work properly. Observe hydraulic hoses for correct routing as 3-point moves up and down. Adjust tractor (see tractor operator's manual) to limit rate of drop of 3-point to a safe speed.

Trencher installation is now complete. Read all safety warnings, decals, and operating instructions before operating the trencher.

WEIGHT AND BALANCE

After you have completed the mounting procedures, a very important item to complete before releasing for use is weight distribution for steering control. Tractor front attachments such as a loader or blade may be sufficient, however, you must know. Industry recommended practice states that 20% of the gross vehicle weight should remain on the front axle during transport conditions.

To perform this check, weigh the entire machine with attachments, both front and rear in transport position. Record results. Next weigh each axle separately and record results.

<u>Example A:</u>	GVW	2650	lbs
	Front	600	lbs
	Rear	2050	lbs

2650 X 20% = 530 lbs - recommended front axle weight

You have 600 lbs which exceeds the 530 necessary to meet industry recommended practice.

<u>Example B:</u>	GVW	3275	lbs
	Front	595	lbs
	Rear	2860	lbs

3275 X 20% = 655 lbs - recommended front axle weight

You have 595 which is 60 lbs less than the recommended 655 lbs. You will need to add 75 lbs to the front axle to attain the industry recommended practice weight distribution.

This is calculated as follows:

Old GVW = 3275 lbs New GVW add 75 lbs = 3350

3350 X 20% = 670 lbs - recommended front axle weight

You may use weights or tire ballast to accomplish you goal.

DISCONNECTING TRENCHER

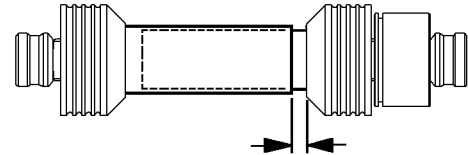
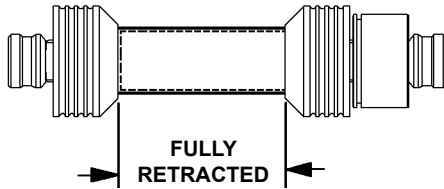
1. Lower the trencher boom to the ground and the three point arms.
2. Once the trencher is resting on the ground, shut off the tractor, set the brake and remove the key. Disconnect the power and return hoses at the tractor rear remote hydraulic couplers. Connect the couplers together to prevent contaminants from entering the hydraulic system.
3. After making sure the PTO has come to a complete stop, disconnect the PTO drive shaft and remove the pins securing the trencher to the three point hitch arms. Remove the lower link arms and top link.
4. Return to the tractor, and following all tractor safety procedures, start the tractor and slowly pull away from the trencher.

TRENCHER INSTALLATION

612 TRENCHER

POWER (PTO) SHAFT ADJUSTMENT

The power (PTO) shaft assembly may need to be shortened to fit up to your tractor correctly and to prevent the drive assembly from "bottoming out" and causing extensive damage to the tractor PTO drive assembly.

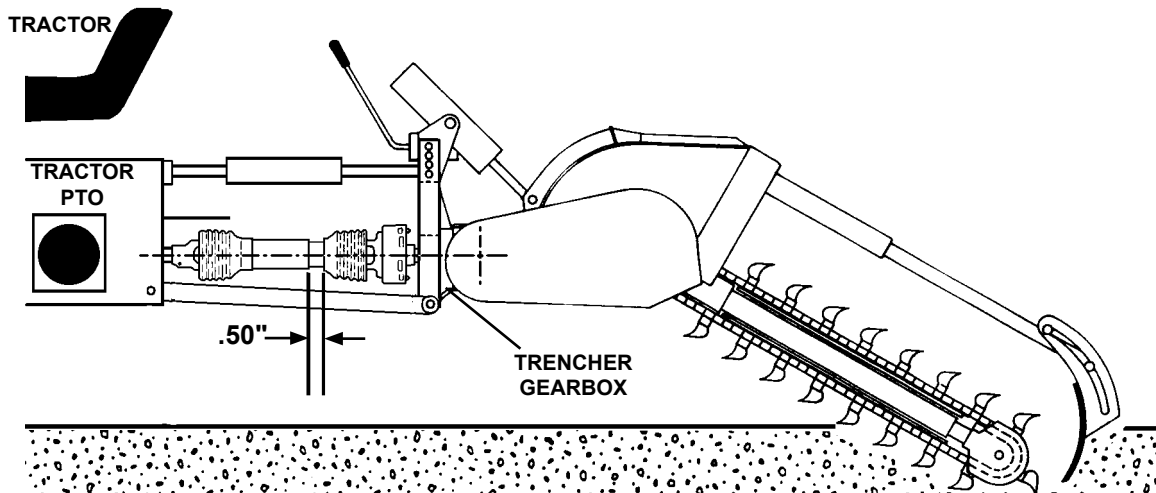


.50" (13MM) FREE TRAVEL

The shaft assembly is shortest when the trencher is engaged into the ground and the shaft is straight inline with the trencher gearbox. There should be a minimum of .50" of free travel before the shaft is fully retracted. To check:

- Lower the trencher until the shaft is parallel to the ground and is straight inline with the trencher gearbox.
- Check to see if there is a minimum of .50" free travel.

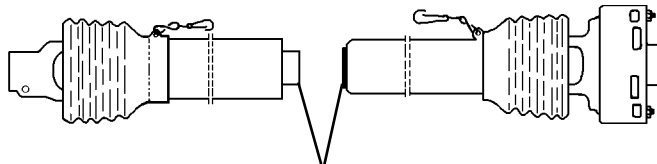
If there is not at least .50" of free travel the shaft must be shortened.



CAUTION FAILURE TO HAVE THE REQUIRED DISTANCE OF CLEARANCE WILL DAMAGE THE POWER TAKE OFF (PTO) OF YOUR TRACTOR.



TO SHORTEN THE POWER SHAFT:



CUT EQUAL AMOUNTS OFF OF EACH SHAFT HALF TO ACQUIRE A MINIMUM OF .50" OF FREE TRAVEL WHEN THE SHAFT IS FULLY RETRACTED.

OPERATING INSTRUCTIONS

CONTROLS 612 TRENCHER

GENERAL INFORMATION

Simplicity of operation is one of the key features of the 612 trencher. There is only one control on the trencher itself, and just a few adjustments to check. It is important however to be familiar with, and know the controls and adjustments on both the trencher and the tractor. Such knowledge is crucial for safe, efficient operation of equipment. Take the time to learn how they operate now.

THE TRACTOR

Your trencher mount to the 3-point hitch system of the tractor. Due to this arrangement, thorough knowledge of the tractor and hitch controls is necessary for trencher operation. Read your tractor owner's manual for information regarding tractor operation before attempting to use the trencher.

RAISING / LOWERING THE TRENCHER

Raise / lower the trencher unit by raising / lowering the tractor 3-point hitch arms through their appropriate tractor controls.

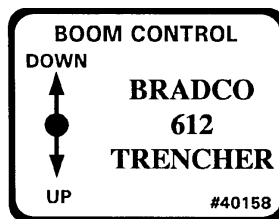
CAUTION! Become aware of any overhead power or telephone lines, tree limbs, etc. that the raised trencher could come into contact with. Contact with electrical lines could cause electrocution and death.



TILTING THE TRENCHER

Tilt the trencher unit up or down by operating the rear auxiliary hydraulic controls located on the tractor to activate the trencher cylinder. See Figure #1

FIGURE #1



CONTROL VALVE DECAL

STARTING AND STOPPING THE TRENCHER

Power to the trencher is supplied by the tractor's PTO. Power is transferred from the PTO shaft, through the trencher's PTO drive shaft, through the trencher's PTO drive shaft and gear box, and finally to the trencher's auger, drive sprocket, and digging chain. Start the digging chain by engaging the tractor PTO. Stop the digging chain by disengaging the tractor PTO.

OPERATING INSTRUCTIONS

CONTROLS 612 TRENCHER

TRENCHER SPEED CONTROL

Again it may be noted that power to the trencher is supplied by the tractor PTO. To increase trencher speed, increase the tractor PTO shaft speed. To decrease trencher speed, decrease PTO speed.

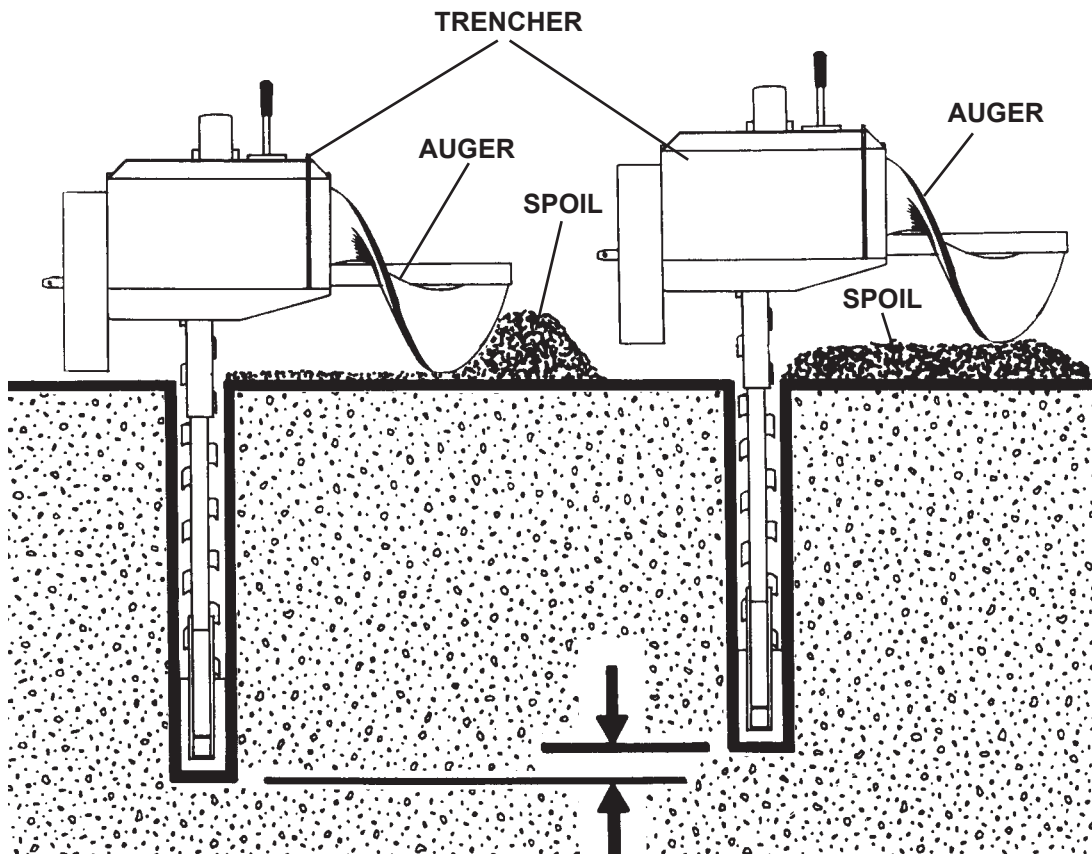
AUGER HEIGHT

The auger is fixed to the trencher mainframe and has no separate adjustment. To raise the auger, raise the trencher as previously described. This will raise the auger and thus leave the dirt or spoil closer to the trench.

Lowering the trencher will cause the auger to lower, moving the spoil away from the trench. The auger should NOT be lowered to the extent that the auger itself starts to dig in the ground. This will greatly reduce efficiency.

It should be noted that raising or lowering the trencher to change the auger height will also change the trencher depth. You will need to compensate for this by changing the tilt of the trencher down or up accordingly. See Figure #2

FIGURE #2



OPERATING INSTRUCTIONS

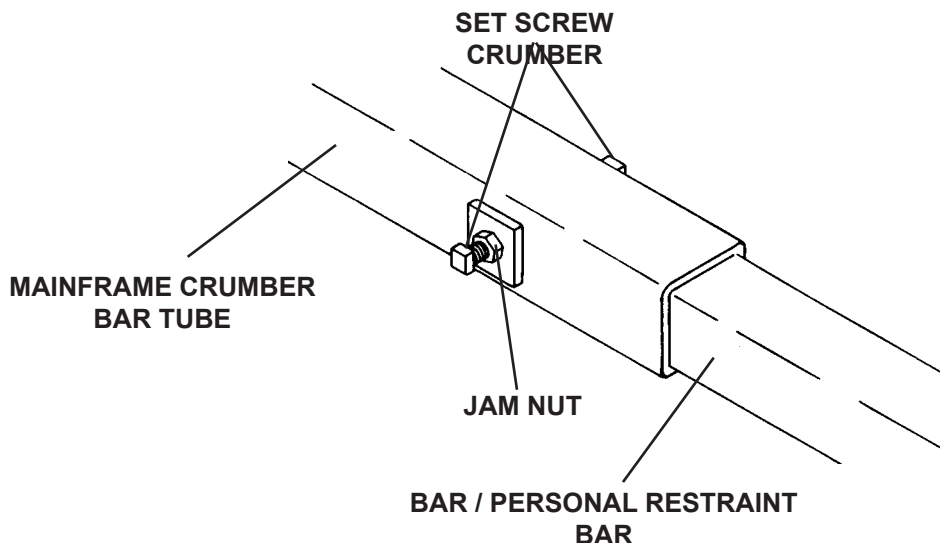
CONTROLS 612 TRENCHER

CRUMBER SHOE / BAR ADJUSTMENT

The purpose of the crumber shoe is to keep any loose dirt in the trencher close enough to the digging chain so that the digging teeth can grab it and remove it. This will give you a cleaner finished trench. Your trencher has an adjustable crumber bar / restraint bar that can be lengthened or shortened to bring the crumber shoe closer to or farther away from the digging chain.

To adjust the crumber bar length, loosen the two jam nuts found at the end of the main-frame crumber bar tube. With the jam nuts loose, loosen the set screws on the tube. Slide the bar in or out to achieve the desired spacing (we suggest a distance of about 4" between crumber shoe and digging teeth for best overall results). Tighten the set screws and jam nuts when finished. See Figure #3

FIGURE #3



CHAIN TENSION ADJUSTMENT

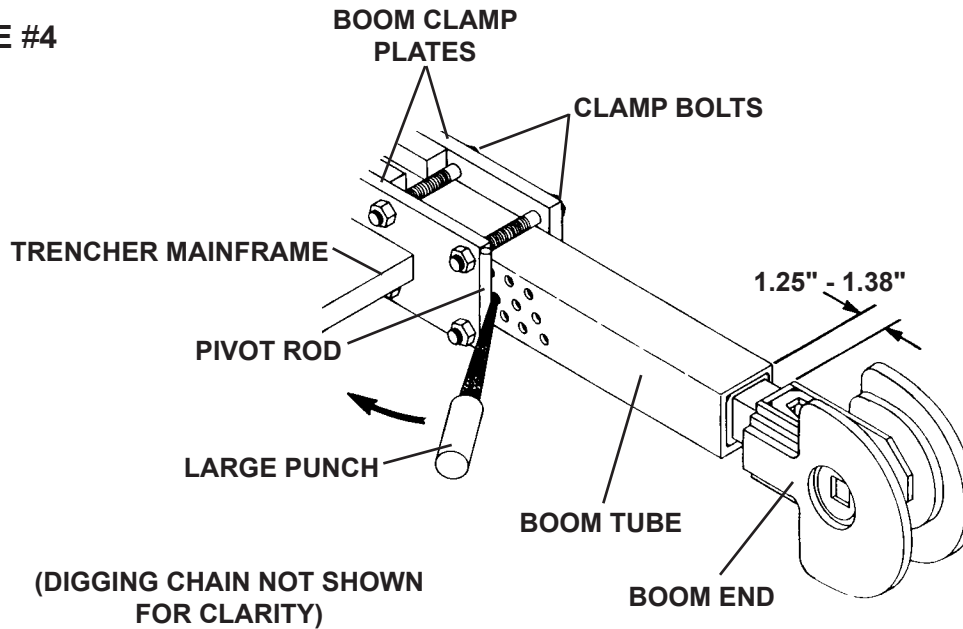
Chain tension is maintained by a large spring located inside the boom and adjusted by moving the boom in or out of the boom clamp plates located at the trencher end of the boom.

On the shorter booms (30" & 36") loosen the four clamp plate bolts. Tighten the chain by using a prying action over the pivot rod, located on the boom clamp plate, and through the holes in the side of the boom with a large punch, until the boom end is approximately 1.25" - 1.38" from the boom tube. Tighten the four clamp plate bolts to secure boom in place. Torque to 80 ft. lbs. See Figure #4

OPERATING INSTRUCTIONS

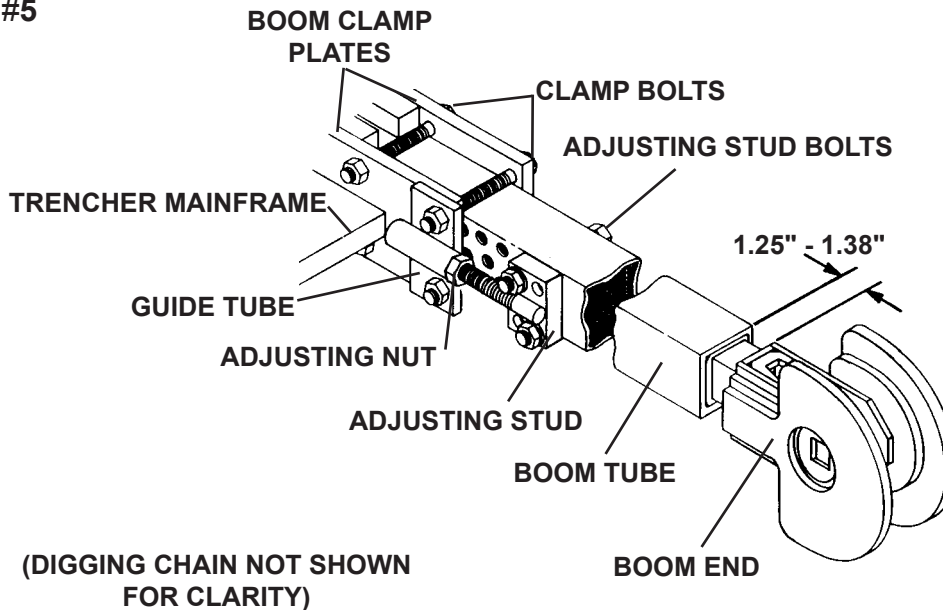
CONTROLS 612 TRENCHER

FIGURE #4



For the longer booms (48\" & 60\") a chain tightener kit is included in the boom assemblies. To tighten chain loosen the four clamp plate bolts. Turn the adjusting nut clockwise until proper tension is obtained, the boom end should be approximately 1.25\" - 1.38\" from the boom tube. Tighten the four clamp plate bolts to secure boom in place. Torque to 80 ft. lbs. See Figure #5

FIGURE #5



OPERATING INSTRUCTIONS

CONTROLS 612 TRENCHER

If the adjusting stud is too short to obtain proper chain tension tighten the four clamp plate bolts. Remove the two adjusting stub bolts which hold the adjusting stud in place. Reposition the adjusting stud to a position closer to the guide tube. Reinstall the adjusting stud bolts and then repeat the original procedure until proper tension is obtained.

If chain runs off in rocky ground or large roots, tighten further. Chain tension is important to monitor since excessive tension will cause high wear rates on the chain and sprockets and less than enough tension will cause run off problems.

CAUTION! Never work on, or make adjustments to any part of the trencher while the unit is running. You could get caught in the digging teeth and be severely injured or killed.



It is common for your trencher to need it's digging chain tightened after the first 10 to 20 minutes of operation as the chain and sprocket seat themselves.

OPERATING INSTRUCTIONS

OPERATING TECHNIQUES 3-POINT HITCH TRENCHERS

GENERAL INFORMATION

The design of your trencher makes it relatively simple to use. With the help of the information in this section and a little practice you should become proficient in its operation in no time. Observe the following points to obtain the best results with the least amount of wear on the machine. Read the "Safety Precautions" Section of this manual before you begin.

CAUTION! Operate the trencher only when seated at the tractor controls.



Do Not operate the tractor without proper ROPS (Roll-Over-Protective-Structure), seat belt, and hard hat.

Pay attention to the job at hand. Be alert to the possibilities of others in the work area.

Never let anyone work around, or perform maintenance on the trencher while it is running.

BEFORE YOU START TRENCHING

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 trenching. The operator should inspect the job site and take notice of any potential hazards in the area. He should have a complete understanding of the tasks he is expected to perform. Figure out what will be done with the spoil (excavated soil), will it be used to backfill or be trucked out? What are the soil conditions like? Will you have to work around others? Etc.

WARNING! Check the prospective trenching area for hidden utility lines before operating the trencher. Contacting a utility line with the trencher could cause electrocution or possible explosion resulting in death. Call all utility companies and have them plot out all their lines first. If you damage a utility line, shut off the equipment at once and contact the affected utility immediately.



Once you have become familiar with the job site and understand the job requirements it is time to set up for the actual trenching. Check the soil type (hard, soft, rocky, etc.) and the trenching requirements (how deep, wide, etc.). Install the proper digging chain, boom, crumb boom and shoe for the job at hand.

OPERATING INSTRUCTIONS

OPERATING TECHNIQUES 3-POINT HITCH TRENCHERS

Mark off the area to be trenched out. This can be done with powdered line, chalk, or a guide string and stakes. Block off the area from others if possible.

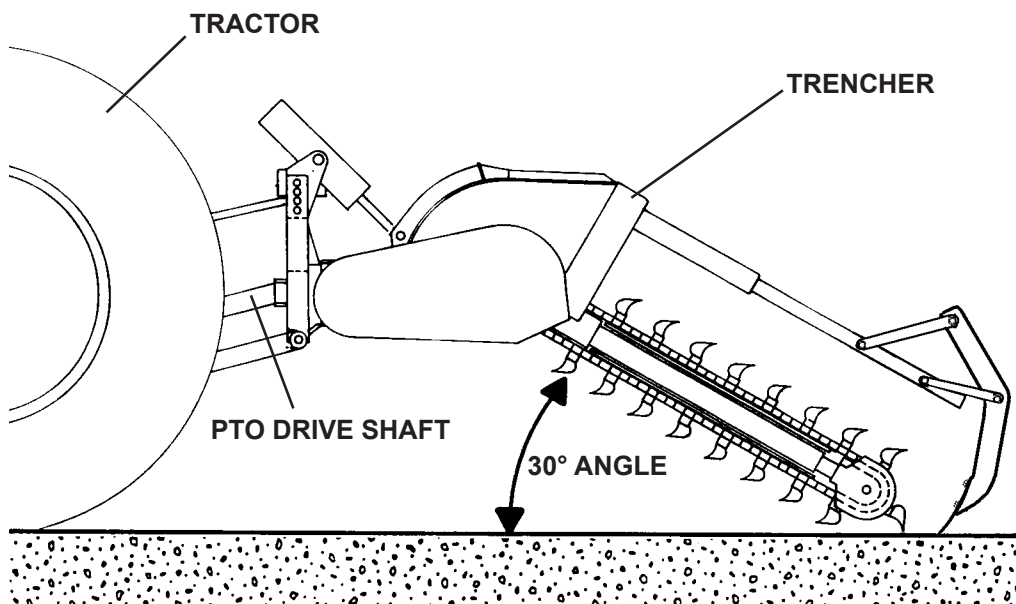
STARTING THE TRENCH

Position the tractor with the trencher boom directly over the center of the trench layout. It will take about 4' of trenching before the trencher will be able to operate at the desired level, so plan for this and position the trencher about 4' behind where you want the actual trench to start. Apply the tractor foot brake. This will prevent the tractor from being pulled backward when the digging teeth contact the ground.

NOTE: The tractor is driven forward when trenching. You cannot trench driving the tractor in reverse.

Raise the trencher with the 3-point hitch arms and tilt the trencher down at a 30° angle. See Figure #6. Position the unit so that the digging teeth are just above ground level. The PTO drive shaft should be approximately level.

FIGURE #6



Set the tractor engine speed at half throttle. Engage the tractor PTO to 540 RPM to start the digging chain in motion.

CAUTION! When lowering a moving digging chain to the ground the force of the teeth grabbing the ground will try to pull the tractor suddenly backwards. **BE PREPARED.** Have the brake on the tractor set to help counteract the force.



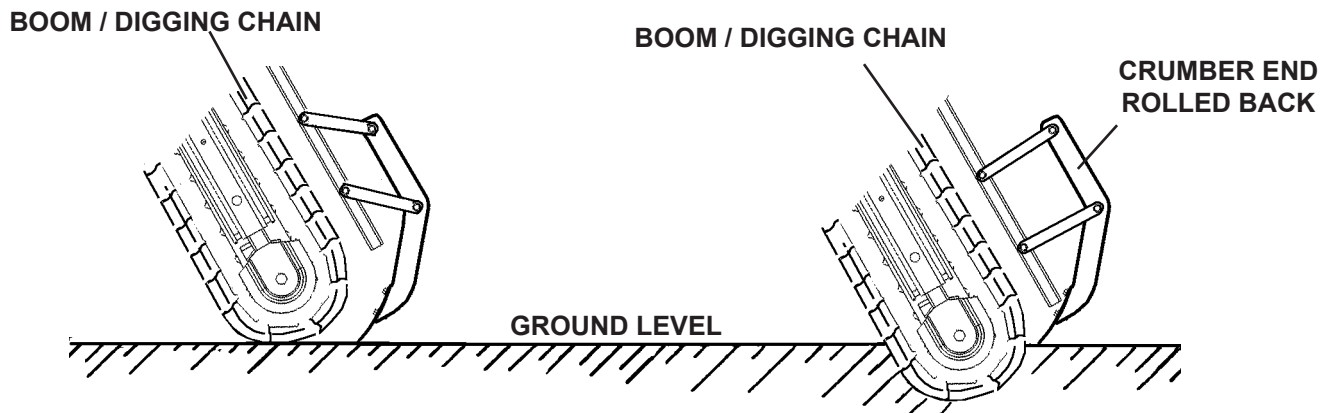
OPERATING INSTRUCTIONS

OPERATING TECHNIQUES 3-POINT HITCH TRENCHERS

Slowly lower the digging chain into the ground to start the trench. Do this by lowering the trencher with the 3-point hitch arms. To begin trenching, always lower the 3-point hitch first, followed by the trencher boom using the trencher controls. A combination of the 3-point hitch and trencher boom position will give the desired trench depth and spoil placement. Operate the PTO driveline at the correct boom approach angle. Greater angles may cause premature component failure. Continue lowering the unit until the crumber end rolls all the way back on the crumber bar. See Figure #7.

IMPORTANT: After the crumber end has rolled all the way back, do not lower the trencher any farther without engaging the tractor forward drive. Failure to do so could result in bending of the crumber bar, which is NOT covered by the warranty.

FIGURE #7



Once the crumber end has "bottomed out", engage the tractor's forward drive and begin slowly creeping the tractor forward while continuing to lower the trencher boom to the desired depth. When nearing the required depth, stop lowering and tilt the trencher to a 60° - 65° angle. A 60° - 65° angle works best for general trenching.

WARNING! Be alert to what is happening around you. Look ahead before moving the tractor to trench. Be aware of any person or thing in the path of the tractor. Observe any terrain changes such as drop-offs or soft ground.



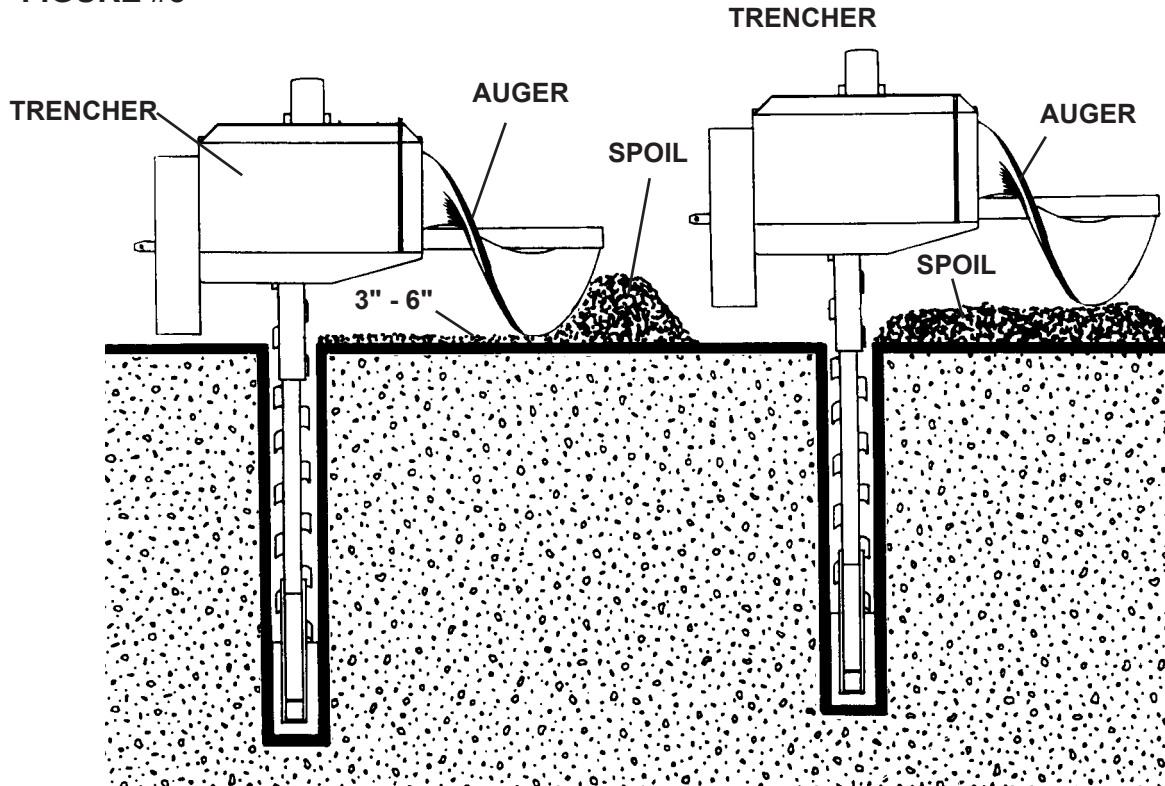
When trenching, remember to keep in mind the spoil placement. Position the trencher so that the auger floats at ground level to move spoil away from the trench.

OPERATING INSTRUCTIONS

OPERATING TECHNIQUES 3-POINT HITCH TRENCHERS

Raise the trencher so that the auger rides above ground level to leave the spoil beside the trench. The higher the auger the closer to the trench the spoil will be placed. See Figure #8.

FIGURE #8



You may find that it generally takes less power to run the digging chain if the auger runs 3" - 6" (inches) off the ground, and thus increasing the potential footage of trench produced per hour. The higher you want the auger, the more vertical you will have to tilt the trencher to achieve the same trench depth.

With the desired trench depth reached, advance the tractor throttle to the desired engine RPM. Continue creeping the tractor forward.

STALLING THE TRENCHER

If the trencher stalls while digging, move the tractor backwards slightly to free the trencher.

TURNING WHILE TRENCHING

Gradual turns can be made while trenching. However the tightness of the turn is directly proportional to the angle and length of the boom. In other words, the greater the angle of the trencher boom to the ground level, the sharper the turn that can be trenched, See Figures #9 and #10.

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OPERATING INSTRUCTIONS

OPERATING TECHNIQUES 3-POINT HITCH TRENCHERS

Also the shorter the boom length the sharper the possible turn. Remember, the greater the increase in boom angle the higher the unit will have to be raised out of the trench to keep a unified trench depth. Shallow boom angles will severely limit turning ability.

IMPORTANT: Turning to tightly while trenching will cause the trencher to jam in the trench and stall. Turning to tightly can also cause the trencher boom to bend. Take it easy when turning. Proceed slowly with caution.

FIGURE #9

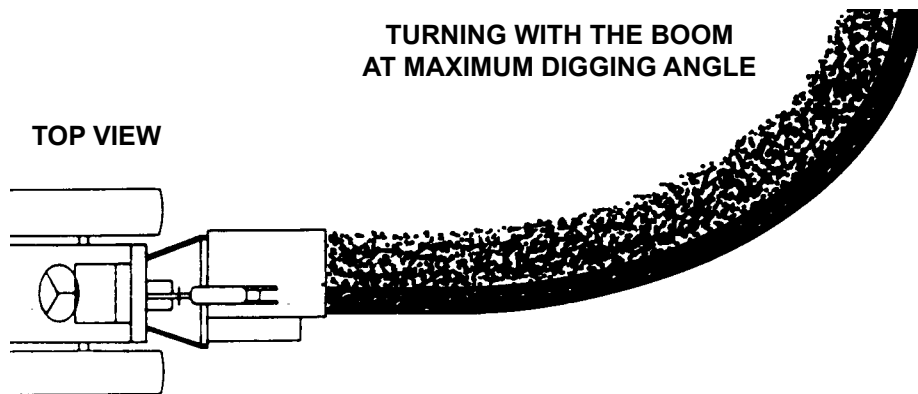
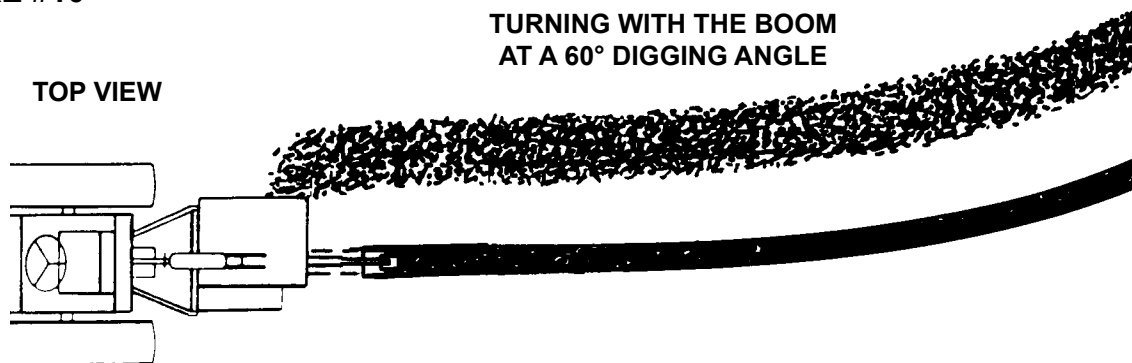


FIGURE #10



MAKING SHARP TURNS

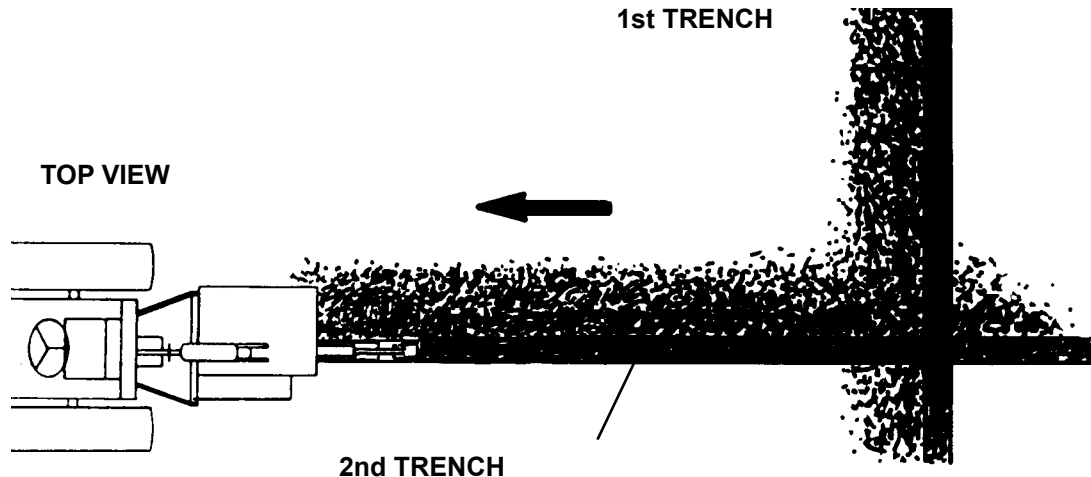
To make sharp turns and 90° angle you will have to dig two trenches. Dig the first trench as you normally would. Then reposition the unit and dig the second trench at the appropriate angle. Be sure to take into account the extra lead-in space needed for the trencher to get down to the desired trench depth. See Figure #11.

OPERATING INSTRUCTIONS

OPERATING TECHNIQUES

3-POINT HITCH TRENCHERS

FIGURE #11



RECOMMENDED DIGGING ANGLES

A 90° digging angle is recommended for use in rock and frost conditions, and when trenching sharp corners. The 90° angle reduces excessive side pressure on the boom and digging chain when trenching corners.

A 60° - 65° digging angle is recommended for normal trenching. At this angle there will be less carryover, and a cleaner trench bottom than can be maintained at a 90° angle.

TRENCHING WITHOUT THE CRUMBER BAR / PERSONAL RESTRAINT BAR

WARNING! The crumber bar / personal restraint bar and crumber assembly are there for a reason, **YOUR SAFETY!** There are a few instances however, where removal may be necessary. In these cases operate with extreme caution. Reinstall the crumber bar / personal restraint bar and crumber assembly as soon as possible.



You can use your trencher to dig under obstacles such as sidewalks. To do so, remove the crumber bar / personal restraint bar and crumber assembly and start your trench as before within a foot of the sidewalk. With the crumber bar / personal restraint bar removed you can start the trench vertically without any lead-in space.

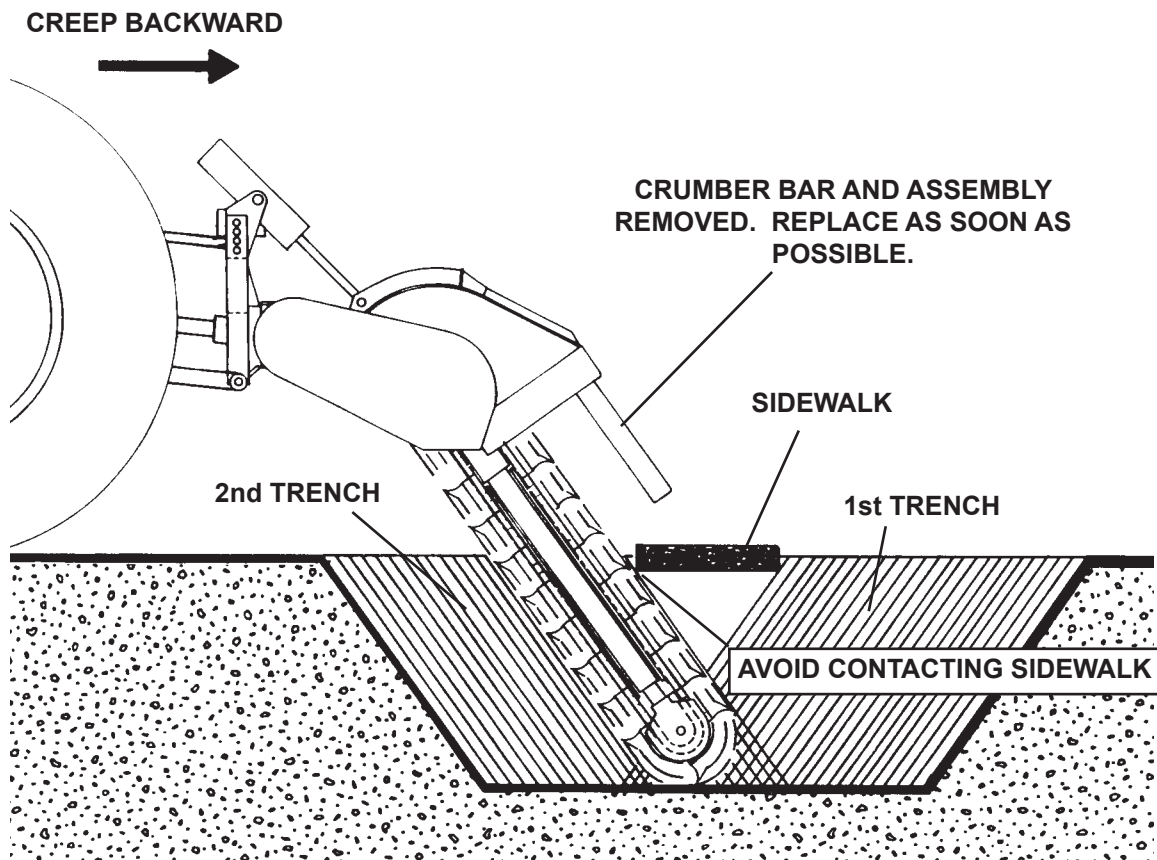
When the desired depth has been reached, tilt the trencher at 60° angle while digging, then creep the tractor backward and trench under the side walk. Be careful not to contact the edge of the sidewalk with the digging teeth.

OPERATING INSTRUCTIONS

OPERATING TECHNIQUES 3-POINT HITCH TRENCHERS

After you have gone as far as you can without contacting the sidewalk, drive the tractor forward to clear the sidewalk and remove the trencher from the trench. Line up the unit on the other side of the walk and continue to trench as described above until the two trenches are connected. See Figure #12.

FIGURE #12



Reinstall the crumber bar / personal restraint bar and crumber assembly immediately. Some spoil will be left in the trench since the crumber was removed during the operation.

ENDING THE TRENCH

When you have dug your trench, remember that the trencher boom is at an angle, and that you must continue trenching until the end of the boom has dug past the proposed end of the trench. Once the end of the trench has been dug, keep the trencher running and lift the unit clear of the trench. When the trencher has cleared the trench, disengage the PTO to stop the trencher. Drive the tractor away from the trench.

OPERATING INSTRUCTIONS

OPERATING TECHNIQUES 3-POINT HITCH TRENCHERS

TRENCHER REMOVAL

When disconnecting the trencher from the tractor it is recommended that you follow the storage procedures below to keep your trencher in top condition and also help you get off to a good start the next time your trencher is needed.

STORAGE

1. Clean the trencher exterior thoroughly, removing all mud, dirt, and grease.
2. Tighten all loose bolts, nuts, and set screws.
3. Touch up unpainted and exposed areas with paint to prevent rust.
4. Coat the digging chain with a thin covering of oil. Operate chain for a short period to work the oil into the pins.
5. Coat exposed portions of the cylinder rod with grease.
6. Check gearbox oil level and condition. If contaminated, drain and refill. (See Gearbox service.)
7. Store the trencher in a dry and protected place. Leaving the trencher outside, exposed to the elements will materially shorten its life.
8. Inspect trencher for visible signs of wear, breakage or damage. Order any parts required and make necessary repairs to avoid delays when starting next season.
9. Replace decals if damaged or in unreadable condition.

REMOVING FROM STORAGE

1. Remove all protective coverings.
2. Check hydraulic hoses for deterioration and if necessary, replace.
3. Check gearbox oil level.
4. Tighten all loose bolts, nuts and set screws.
5. During cold weather, operate the trencher slowly for a short time before placing the unit under full load.

TRANSPORTING THE TRENCHER

When transporting the trencher, remember to keep the trencher as low to the ground as is practical. The lower the trencher rides, the more stable the tractor will be. You do not want the trencher so low that the digging teeth touch ground in rough terrain. Shut off the trencher before moving it away from the trench. Never transport the trencher around the job site or anywhere else while the digging chain is moving.

TRENCHER PERFORMANCE

Trencher performance is related to how well it's maintained, digging tooth wear, and type and size of digging chain, crumbler boom and shoe used. If problems arise see "Trouble Shooting" Section.

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING CHAIN ASSEMBLIES

GENERAL INFORMATION

This page contains a listing of all of the 2.00" pitch digging chain assemblies offered for your trencher. Each chain assembly comes with all necessary teeth and spacers already installed. Just thread the chain onto the trencher and fasten the two ends together with the pin and keeper pin included in the assembly. A crumber shoe of the appropriate width is also included in the chain assembly.

Before you order a new chain, be sure to check for compatibility with corresponding components. You may need to order more than just a chain assembly. You must use a digging boom of the same digging depth as the chain. The crumber bar must also be of the same digging depth. The digging sprocket must also be of the same pitch as the chain. All of these components must match for the trencher to function properly.

Bare 2.00" pitch digging chain (without teeth, spacers, or hardware) can be ordered in any desired length under the part number 79018. Just use this number and then specify the length desired in pitches (example, 52 pitches of chain would be needed for a 36" boom).

2.00" PITCH DIGGING CHAIN ASSEMBLIES				
Complete chain assemblies. Includes chain with all teeth and spacers attached. Also includes appropriate width crumber shoe.				
CHAIN ASSEMBLIES WITH A TOOTH EVERY STATION				
DESCRIPTION (boom used X trench width)		LENGTH OF CHAIN (in 2.00" pitches)	TENSILE STRENGTH	PART NO.
For 30" Boom	6" Wide	48 Pitch	50,000#	80044
For 30" Boom	8" Wide	46 Pitch	50,000#	80045
For 30" Boom	10" Wide	46 Pitch	50,000#	80046
For 30" Boom	12" Wide	46 Pitch	50,000#	80047
For 36" Boom	6" Wide	52 Pitch	50,000#	80048
For 36" Boom	8" Wide	52 Pitch	50,000#	80049
For 36" Boom	10" Wide	52 Pitch	50,000#	80050
For 48" Boom	6" Wide	66 Pitch	50,000#	80051
For 48" Boom	8" Wide	66 Pitch	50,000#	80052
For 60" Boom	6" Wide	80 Pitch	50,000#	80053

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING CHAIN ASSEMBLIES				
Complete chain assemblies. Includes chain with all teeth and spacers attached. Also includes appropriate width crumber shoe.				
CHAIN ASSEMBLIES WITH A TOOTH EVERY OTHER STATION				
DESCRIPTION (boom used X trench width)		LENGTH OF CHAIN (in 2.00" pitches)	TENSILE STRENGTH	PART NO.
For 30" Boom	6" Wide	46 Pitch	50,000#	80034
For 30" Boom	8" Wide	46 Pitch	50,000#	80035
For 30" Boom	10" Wide	46 Pitch	50,000#	80036
For 30" Boom	12" Wide	46 Pitch	50,000#	80037
For 36" Boom	6" Wide	52 Pitch	50,000#	80038
For 36" Boom	8" Wide	52 Pitch	50,000#	80039
For 36" Boom	10" Wide	52 Pitch	50,000#	80040
For 48" Boom	6" Wide	66 Pitch	50,000#	80041
For 48" Boom	8" Wide	66 Pitch	50,000#	80042
For 60" Boom	6" Wide	80 Pitch	50,000#	80043

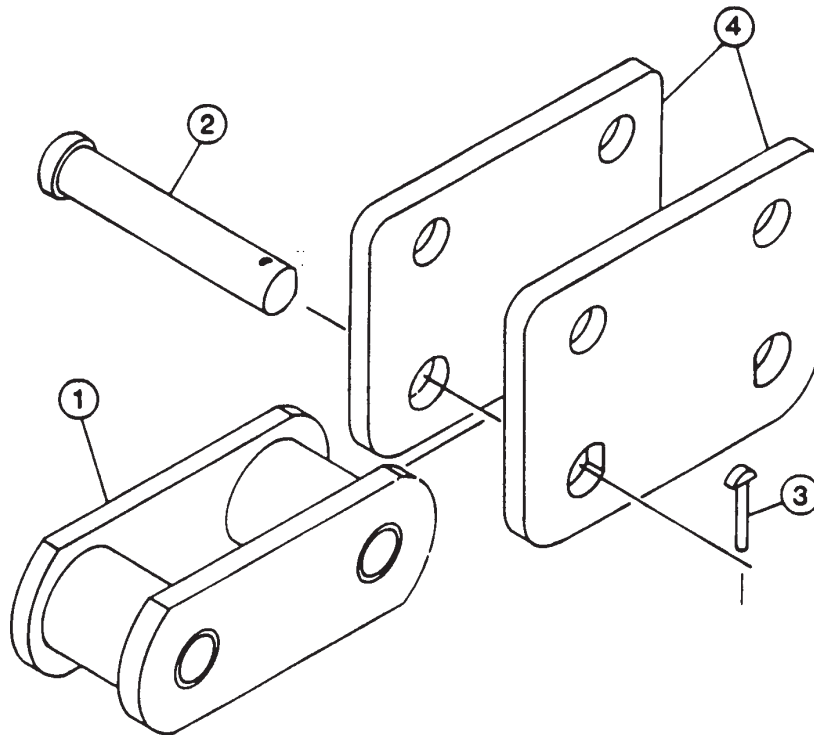
DIGGING CHAIN OPTIONS

2.00" PITCH CHAIN REPLACEMENT PARTS

GENERAL INFORMATION

You can purchase individual chain links and pins for your trencher. These can be used to repair a damaged chain, or lengthen and modify an existing chain. Below is a diagram of the chain's basic components with their descriptions and corresponding part numbers. Use these numbers when ordering. You can also order a complete bare chain (without teeth and spacers) in any length desired. The chain is ordered under part number 79018 for 2.00" Pitch. Just specify the length you want in pitches. (See "2.00" PITCH DIGGING CHAIN ASSEMBLIES" chart located in this section.)

When pinning links of chain together, first tap the pin through the connector link with the perfectly round holes and then on through the inner link. Place the second connector link in position, you will note that the end of the pin has one side flattened. Rotate the pin until its flat side lines up with the corresponding flat side of the connector link hole and tap the pin on through. Place the chain keeper pin into the hole at the end of the main pin and tap down tight. Finally, bend the end of the keeper pin over to secure it in place.



<u>NO.</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	Varies	54757	Inner Link
2	Varies	54731	Pin
3	Varies	54732	Chain Keeper Pin
4	Varies	54730	Connector Link includes (2) Pins #54731 and (2) Chain Keeper Pins #54732

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING TOOTH STATION SEQUENCE

GENERAL INFORMATION

Every second link on a digging chain is a special link called a digging station. These digging station links are designed so that digging teeth can be bolted onto them in a variety of configurations. It is the number and the make up of these different digging stations that make each chain unique.

The following tables show the number of digging stations there are in each available 2.00" pitch digging chain. The digging tooth make up of each digging station is given in code. The key to the code is located at the below. Thus these charts will tell you what kind of digging tooth arrangement is at each digging station on each digging chain assembly. The actual parts break down on each digging tooth arrangement is shown on the "Digging Tooth Station Break Down" diagrams located in this section following the charts.

DIGGING TOOTH STATION KEY		
CR - CENTER CUTTER, RIGHT	6R - 6" RIGHT STATION	8R - 8" RIGHT STATION
CL - CENTER CUTTER, LEFT	6L - 6" LEFT STATION	8L - 8" LEFT STATION
10 - 10" STATION	12 - 12" STATION	B - BLANK STATION

TOOTH EVERY STATION

TRENCH WIDTH

30" BOOM DIGGING TOOTH STATIONS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
6"	CR	6L	6R	6L	6R	6L	6R	CL	6R	6L	6R	6L	6R	6L	CR	6L	6R	6L	6R	6L	6R	CL	6R
8"	CR	6L	6R	8L	8R	6L	6R	8L	8R	CL	6R	6L	8R	8L	6R	6L	8R	8L	CR	6L	6R	8L	8R
10"	CR	6L	6R	8L	8R	10	6L	6R	8L	8R	10	CL	6R	6L	8R	8L	10	6R	6L	8R	8L	10	6R
12"	CR	6L	6R	8L	8R	10	12	6L	6R	8L	8R	10	12	CL	6R	6L	8R	8L	10	12	6R	6L	8R

TRENCH WIDTH

36" BOOM DIGGING TOOTH STATIONS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
6"	CR	6L	6R	6L	6R	6L	6R	CL	6R	6L	6R	6L	6R	6L	CR	6L	6R	6L	6R	6L	6R	CL	6R	6L	6R	6L
8"	CR	6L	6R	8L	8R	6L	6R	8L	8R	CL	6R	6L	8R	8L	6R	6L	8R	8L	CR	6L	6R	8L	8R	6L	6R	6L
10"	CR	6L	6R	8L	8R	10	6L	6R	8L	8R	10	CL	6R	6L	8R	8L	10	6R	6L	8R	8L	10	CR	6L	6R	8L

TRENCH WIDTH

48" BOOM DIGGING TOOTH STATIONS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
6"	CR	6L	6R	6L	6R	6L	6R	CL	6R	6L	6R	6L	6R	6L	CR	6L	6R	6L	6R	6L	6R	CL	6R	6L	6R	6L	6R	6L	CR	6L	6R	6L	6R
8"	CR	6L	6R	8L	8R	6L	6R	8L	8R	CL	6R	6L	8R	8L	6R	6L	8R	8L	CR	6L	6R	8L	8R	6L	6R	8L	8R	CL	6R	6L	8R	8L	6R

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING TOOTH STATION SEQUENCE

TOOTH EVERY STATION

**TRENCH
WIDTH**

**60" BOOM
DIGGING TOOTH STATIONS**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6"	CR	6L	6R	6L	6R	6L	6R	CL	6R	6L	6R	6L	6R	6L	CR	6L	6R	6L	6R	6L	6R	CL	6R	6L	6R	6L	6R	6L	CR	6L

	31	32	33	34	35	36	37	38	39	40
6"	6R	6L	6R	6L	6R	CL	6R	6L	6R	6L

TOOTH EVERY OTHER STATION

**TRENCH
WIDTH**

**30" BOOM
DIGGING TOOTH STATIONS**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
6"	CR	B	6L	B	6R	B	6L	B	6R	B	6L	B	6R	B	CL	B	6R	B	6L	B	6R	B	6L
8"	CR	B	6L	B	6R	B	8L	B	8R	B	6L	B	6R	B	8L	B	8R	B	CL	B	6R	B	6L
10"	CR	B	6L	B	6R	B	8L	B	8R	B	10L	B	6L	B	6R	B	8L	B	8R	B	10L	B	6L
12"	CR	B	6L	B	6R	B	8L	B	8R	B	10L	B	12L	B	6L	B	8R	B	8L	B	10L	B	12L

**TRENCH
WIDTH**

**36" BOOM
DIGGING TOOTH STATIONS**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
6"	CR	B	6L	B	6R	B	6L	B	6R	B	6L	B	6R	B	CL	B	6R	B	6L	B	6R	B	6L	B	6R	B
8"	CR	B	6L	B	6R	B	8L	B	8R	B	6L	B	6R	B	8L	B	8R	B	CL	B	6R	B	6L	B	8R	B
10"	CR	B	6L	B	6R	B	8L	B	8R	B	10L	B	CL	B	6L	B	6R	B	8L	B	8R	B	10L	B	6L	B

**TRENCH
WIDTH**

**48" BOOM
DIGGING TOOTH STATIONS**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
6"	CR	B	6L	B	6R	B	6L	B	6R	B	6L	B	6R	B	CL	B	6L	B	6R	B	6L	B	6R	B	CL	B	6R	B	6L	B	6R	B	6L
8"	CR	B	6L	B	6R	B	8L	B	8R	B	6L	B	6R	B	8L	B	8R	B	CL	B	6L	B	6R	B	8L	B	8R	B	6L	B	6R	B	8L

**TRENCH
WIDTH**

**60" BOOM
DIGGING TOOTH STATIONS**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
6"	CR	B	6L	B	6R	B	6L	B	6R	B	6L	B	6R	B	CL	B	6R	B	6L	B	6R	B	6L	B	6R	B	6L	B	CR	B

	31	32	33	34	35	36	37	38	39	40
6"	6L	B	6R	B	6L	B	6R	B	6L	B

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING CHAIN WIDTH CONVERSIONS

GENERAL INFORMATION

Digging chains can be modified to dig trenches in a variety of widths. By modifying an existing chain, it can be used to dig the width you want and thus save going the expense of a whole new digging chain assembly. This can be a considerable cost savings, however it is more work than just installing a new digging chain assembly.

The information given below is a complete listing of all the possible chain width conversions for 2.00" pitch chain for your trencher. Included in the listing is a break down of all the parts (including part numbers and quantities) needed to make the conversion. Simply install the new parts (and rearrange the old parts) so that the finished chain construction follows that described in the "Digging Tooth Station Sequence" chart and the "Digging Tooth Station Break Down" diagrams for 2.00" pitch chain (located elsewhere in this section).

It should be noted that this information only applies to modifying chains of the same length and pitch. All components must be of the same pitch. You cannot intermix components of different pitch.

CHAIN CONVERSIONS FOR 30" BOOMS - TOOTH EVERY STATION

1) FROM 6" WIDE TO 8" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
20	1351	.50"UNF X 4.50" Capscrew
2	54440	Spacer Tube
10	54439	8" Spacer
1	53055	8" Crumber Shoe

2) FROM 8" WIDE TO 6" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
20	1347	.50"UNF X 3.25" Capscrew
2	54628	Spacer Tube
1	53054	6" Crumber Shoe

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING CHAIN WIDTH CONVERSIONS

3) FROM 6" WIDE TO 10" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
8	1692	.50" UNF High Hex Nut
16	1351	.50"UNF X 4.50" Capscrew
2	54431	Left Tooth
2	54432	Right Tooth
4	54441	10" Chain Spacer
1	53058	10" Crumber Shoe
8	54439	8" Spacer

4) FROM 10" WIDE TO 6" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
8	1347	.50"UNF X 3.25" Capscrew
4	54628	Spacer Tube
4	54440	Spacer Tube
1	53054	6" Crumber Shoe

5) FROM 6" WIDE TO 12" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
12	1692	.50" UNF High Hex Nut
26	1351	.50"UNF X 4.50" Capscrew
12	1527	.50" SAE Flat Washer
3	54431	Left Tooth
3	54432	Right Tooth
3	54441	10" Chain Spacer
3	54442	12" Chain Spacer
1	53059	12" Crumber Shoe
7	54439	8" Spacer

6) FROM 12" WIDE TO 6" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
14	1347	.50"UNF X 3.25" Capscrew
4	54628	Spacer Tube
8	54440	Spacer Tube
1	53054	6" Crumber Shoe

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING CHAIN WIDTH CONVERSIONS

7) FROM 8" WIDE TO 10" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
8	1692	.50" UNF High Hex Nut
12	1347	.50"UNF X 3.25" Capscrew
2	54431	Left Tooth
2	54432	Right Tooth
4	54441	10" Chain Spacer
1	53058	10" Crumber Shoe

8) FROM 10" WIDE TO 8" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
4	1351	.50"UNF X 4.50" Capscrew
2	54628	Spacer Tube
6	54440	Spacer Tube
2	54439	8" Spacer
1	53055	8" Crumber Shoe

9) FROM 8" WIDE TO 12" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
12	1692	.50" UNF High Hex Nut
6	1347	.50"UNF X 3.25" Capscrew
6	1351	.50"UNF X 4.50" Capscrew
12	1527	.50" SAE Flat Washer
3	54431	Left Tooth
3	54432	Right Tooth
3	54441	10" Chain Spacer
3	54442	12" Chain Spacer
1	53059	12" Crumber Shoe

10) FROM 12" WIDE TO 8" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
2	54628	Spacer Tube
10	54440	Spacer Tube
3	54439	8" Spacer
1	53055	8" Crumber Shoe

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING CHAIN WIDTH CONVERSIONS

11) FROM 10" WIDE TO 12" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
4	1692	.50" UNF High Hex Nut
10	1351	.50"UNF X 4.50" Capscrew
12	1527	.50" SAE Flat Washer
1	54431	Left Tooth
1	54432	Right Tooth
3	54442	12" Chain Spacer
1	53059	12" Crumber Shoe

12) FROM 12" WIDE TO 10" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
6	1347	.50"UNF X 3.25" Capscrew
4	54440	Spacer Tube
1	54441	10" Chain Spacer
1	53058	10" Crumber Shoe

CHAIN CONVERSIONS FOR 36" BOOMS - TOOTH EVERY STATION

1) FROM 6" WIDE TO 8" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
20	1351	.50"UNF X 4.50" Capscrew
2	54440	Spacer Tube
10	54439	8" Spacer
1	53055	8" Crumber Shoe

2) FROM 8" WIDE TO 6" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
20	1347	.50"UNF X 3.25" Capscrew
2	54628	Spacer Tube
1	53054	6" Crumber Shoe

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING CHAIN WIDTH CONVERSIONS

3) FROM 6" WIDE TO 10" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
8	1692	.50" UNF High Hex Nut
18	1351	.50"UNF X 4.50" Capscrew
2	54431	Left Tooth
2	54432	Right Tooth
4	54441	10" Chain Spacer
1	53058	10" Crumber Shoe
9	54439	8" Spacer

4) FROM 10" WIDE TO 6" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
10	1347	.50"UNF X 3.25" Capscrew
2	54628	Spacer Tube
6	54440	Spacer Tube
1	53054	6" Crumber Shoe

5) FROM 8" WIDE TO 10" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
8	1692	.50" UNF High Hex Nut
10	1347	.50"UNF X 3.25" Capscrew
2	54431	Left Tooth
2	54432	Right Tooth
4	54441	10" Chain Spacer
1	53058	10" Crumber Shoe

6) FROM 10" WIDE TO 8" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
2	1351	.50"UNF X 4.50" Capscrew
8	54440	Spacer Tube
1	54439	8" Spacer
1	53055	8" Crumber Shoe

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING CHAIN WIDTH CONVERSIONS

CHAIN CONVERSIONS FOR 48" BOOMS - TOOTH EVERY STATION

1) FROM 6" WIDE TO 8" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
28	1351	.50"UNF X 4.50" Capscrew
2	54440	Spacer Tube
14	54439	8" Spacer
1	53055	8" Crumber Shoe

2) FROM 8" WIDE TO 6" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
28	1347	.50"UNF X 3.25" Capscrew
2	54628	Spacer Tube
1	53054	6" Crumber Shoe

CHAIN CONVERSIONS FOR 30" BOOMS - TOOTH EVERY OTHER STATION

1) FROM 6" WIDE TO 8" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
8	1351	.50"UNF X 4.50" Capscrew
4	54439	8" Spacer
1	53055	8" Crumber Shoe

2) FROM 8" WIDE TO 6" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
8	1347	.50"UNF X 3.25" Capscrew
1	53054	6" Crumber Shoe

3) FROM 6" WIDE TO 10" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
4	1692	.50" UNF High Hex Nut
8	1351	.50"UNF X 4.50" Capscrew
1	54431	Left Tooth
1	54432	Right Tooth
2	54441	10" Chain Spacer
1	53058	10" Crumber Shoe
4	54439	8" Spacer

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DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING CHAIN WIDTH CONVERSIONS

4) FROM 10" WIDE TO 6" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
4	1347	.50"UNF X 3.25" Capscrew
2	54628	Spacer Tube
2	54440	Spacer Tube
1	53054	6" Crumber Shoe

5) FROM 6" WIDE TO 12" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
8	1692	.50" UNF High Hex Nut
16	1351	.50"UNF X 4.50" Capscrew
8	1527	.50" SAE Flat Washer
2	54431	Left Tooth
2	54432	Right Tooth
2	54441	10" Chain Spacer
2	54442	12" Chain Spacer
1	53059	12" Crumber Shoe
4	54439	8" Spacer

6) FROM 12" WIDE TO 6" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
8	1347	.50"UNF X 3.25" Capscrew
2	54628	Spacer Tube
6	54440	Spacer Tube
1	53054	6" Crumber Shoe

7) FROM 8" WIDE TO 10" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
4	1692	.50" UNF High Hex Nut
4	1347	.50"UNF X 3.25" Capscrew
1	54431	Left Tooth
1	54432	Right Tooth
2	54441	10" Chain Spacer
1	53058	10" Crumber Shoe

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING CHAIN WIDTH CONVERSIONS

8) FROM 10" WIDE TO 8" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
2	54628	Spacer Tube
2	54440	Spacer Tube
1	53055	8" Crumber Shoe

9) FROM 8" WIDE TO 12" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
8	1692	.50" UNF High Hex Nut
8	1351	.50"UNF X 4.50" Capscrew
8	1527	.50" SAE Flat Washer
2	54431	Left Tooth
2	54432	Right Tooth
2	54441	10" Chain Spacer
2	54442	12" Chain Spacer
1	53059	12" Crumber Shoe

10) FROM 12" WIDE TO 8" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
2	54628	Spacer Tube
6	54440	Spacer Tube
1	53055	8" Crumber Shoe

11) FROM 10" WIDE TO 12" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
4	1692	.50" UNF High Hex Nut
8	1351	.50"UNF X 4.50" Capscrew
8	1527	.50" SAE Flat Washer
1	54431	Left Tooth
1	54432	Right Tooth
2	54442	12" Chain Spacer
1	53059	12" Crumber Shoe

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING CHAIN WIDTH CONVERSIONS

12) FROM 12" WIDE TO 10" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
4	1347	.50"UNF X 3.25" Capscrew
4	54440	Spacer Tube
1	53058	10" Crumber Shoe

CHAIN CONVERSIONS FOR 36" BOOMS - TOOTH EVERY OTHER STATION

1) FROM 6" WIDE TO 8" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
10	1351	.50"UNF X 4.50" Capscrew
5	54439	8" Spacer
1	53055	8" Crumber Shoe

2) FROM 8" WIDE TO 6" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
10	1347	.50"UNF X 3.25" Capscrew
1	53054	6" Crumber Shoe

3) FROM 6" WIDE TO 10" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
4	1692	.50" UNF High Hex Nut
8	1351	.50"UNF X 4.50" Capscrew
1	54431	Left Tooth
2	54441	10" Chain Spacer
1	53058	10" Crumber Shoe
4	54439	8" Spacer

4) FROM 10" WIDE TO 6" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
4	1347	.50"UNF X 3.25" Capscrew
4	54440	Spacer Tube
1	53054	6" Crumber Shoe

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING CHAIN WIDTH CONVERSIONS

5) FROM 8" WIDE TO 10" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
4	1692	.50" UNF High Hex Nut
6	1347	.50"UNF X 3.25" Capscrew
2	54431	Left Tooth
2	54441	10" Chain Spacer
1	53058	10" Crumber Shoe

6) FROM 10" WIDE TO 8" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
2	1351	.50"UNF X 4.50" Capscrew
4	54440	Spacer Tube
1	54439	8" Spacer
1	53055	8" Crumber Shoe

CHAIN CONVERSIONS FOR 48" BOOMS - TOOTH EVERY OTHER STATION

1) FROM 6" WIDE TO 8" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
14	1351	.50"UNF X 4.50" Capscrew
2	54440	Spacer Tube
7	54439	8" Spacer
1	53055	8" Crumber Shoe

2) FROM 8" WIDE TO 6" WIDE

<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
14	1347	.50"UNF X 3.25" Capscrew
2	54628	Spacer Tube
1	53054	6" Crumber Shoe

LUBRICATION

GENERAL INFORMATION

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

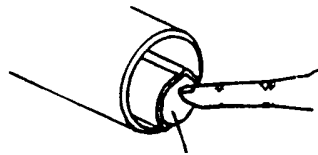
All parts provided with grease fittings should be lubricated as indicated. If any grease fittings are missing, replace them immediately. Clean all fittings thoroughly before using grease gun.

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

LUBRICATION

Lubricate grease zerks at mainframe / gear box pivot and also at end of lift cylinder, every (8) eight hours.

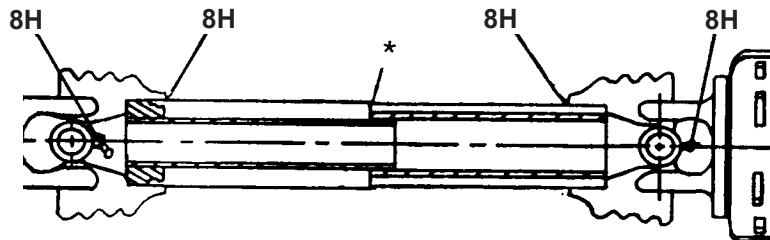
Grease PTO Drive before putting trencher into operation and at specified intervals thereafter.



GREASE INSIDE OF OUTER TELESCOPING TUBE (EVERY 20 HOURS)

Frequency of Lubrication:

(Swing joint sideways for greasing.)



*** When used in winter the outer tube must be greased to prevent it freezing solid!**

EVERY 40 HOURS OF OPERATION

The oil level in the gear box should be checked once a week. Proper level of lubricant in the gear box is approx. 3.50" (about 6 pints). Fill as necessary with #90 transmission oil.

The previously mentioned areas are the only ones that require lubrication. No lubrication is needed on any other part of the trencher. Boom assemblies do not require any lubricating. **DO NOT** lubricate the digging chain. Lubricating the chain will only cause dirt to collect on the chain resulting in increased chain wear.

MAINTENANCE

GENERAL INFORMATION

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

CAUTION!  **Always choose level and hard ground to park the tractor on and set the brake so that the tractor cannot roll. Never perform maintenance on the trencher when the tractor engine is running.**

The main part of the maintenance procedure is proper lubrication. This information is covered in detail in Section "H". Be sure to follow the recommended lubrication time intervals. This is crucial to your trencher's longevity.

Trenchers are subject to extreme vibration due to their very nature. Be sure to check the trencher and its mounting daily for loose bolts and hardware. Tighten according to the bolt torque specification charts found in Section "O".

THE HYDRAULIC SYSTEM

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

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

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

The most common cause of premature wear and malfunctioning of hydraulic system components is the ingress of contaminants, incorrect pressure and pump cavitation.

MAINTENANCE

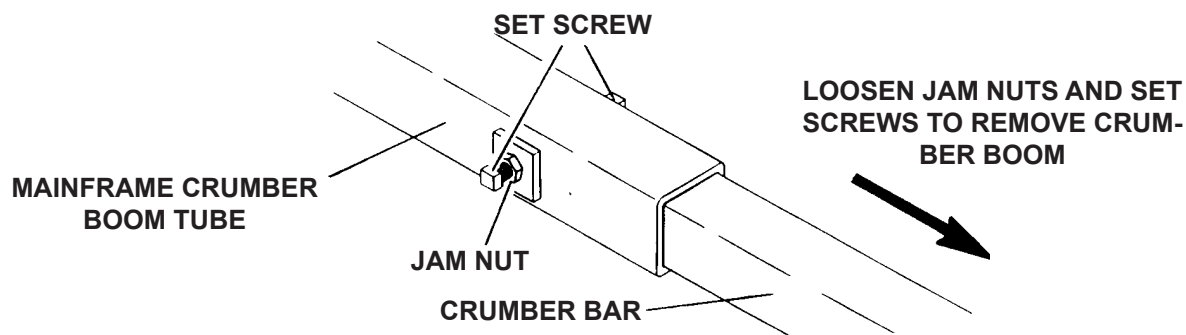
Observe a high standard of cleanliness when doing valve or cylinder maintenance. During maintenance cover or plug ends of disconnected hydraulic lines to prevent contaminants from entering. Use clean oil and a clean container when adding oil for hydraulic purposes. Use the tractor manufacturer's recommended hydraulic oil.

Refer to your hydraulic hose circuit if in doubt about the correct connection.

DIGGING CHAIN REMOVAL

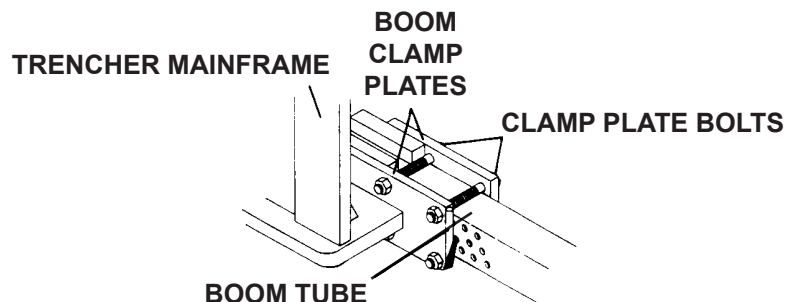
1. To remove digging chain, position trencher boom in transport position and install jack stands under trencher mainframe to achieve ground clearance and to support trencher.
2. Remove crumbar assembly by loosening two jam nuts and set screws. Pull the crumbar bar / personal restraint bar out of its support tube. See Figure #1

FIGURE #1



3. Relieve the chain tension. See Figures #2 and #3

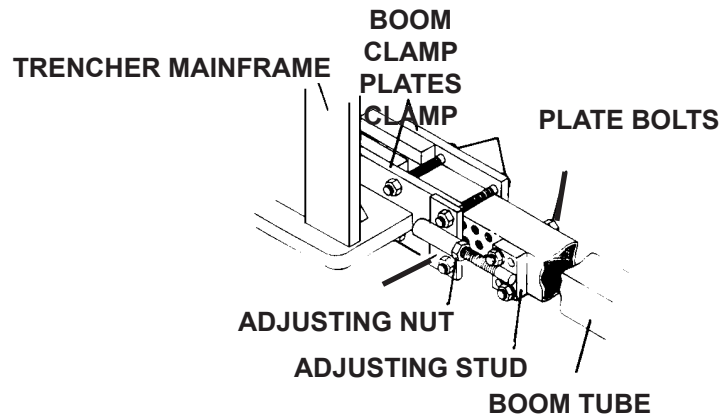
FIGURE #2



**LOOSEN THE FOUR CLAMP PLATE BOLTS
(THIS ALLOWS THE BOOM TUBE TO SLIDE LOOSENING THE DIGGING CHAIN.)**

MAINTENANCE

FIGURE #3



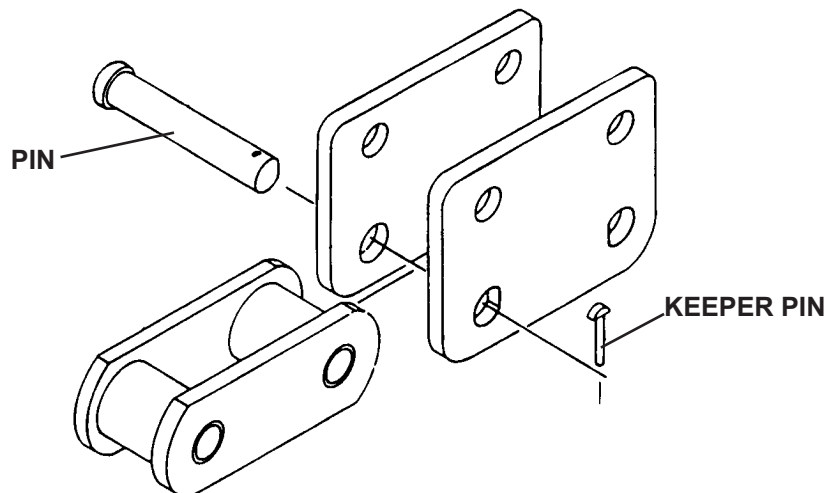
LOOSEN THE FOUR CLAMP PLATE BOLTS AND TURN ADJUSTING NUT COUNTER CLOCKWISE UNTIL TENSION IS RELEASED

CAUTION! Once the digging chain has been removed the boom and boom end idler are free to come off. Be careful that these components do not fall off and possibly injure you or a bystander.



4. Remove one of the chain pins by straightening the chain keeper pin and removing it with a pliers. The pin can now be pulled or driven out. See Figure #4

FIGURE #4



5. Carefully remove the digging chain from the boom end idler and drive sprocket.

REVERSE THE PROCEDURE TO REINSTALL THE DIGGING CHAIN.

MAINTENANCE

HEADSHAFT DRIVE SPROCKET REMOVAL

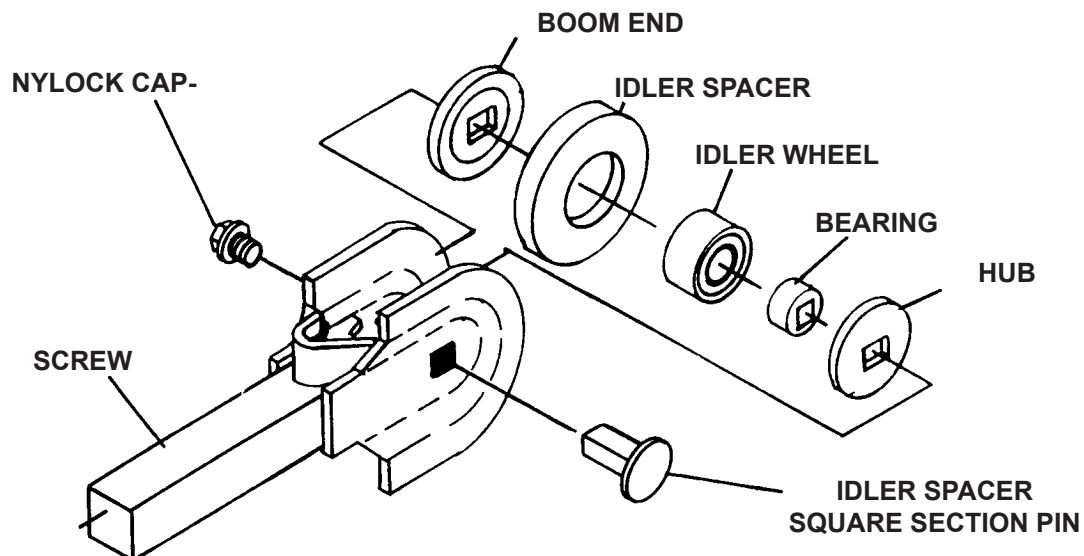
1. To remove the headshaft drive sprocket, first remove the digging chain and boom.
2. Remove the spiral auger by removing the three clamp bolts and slide the auger off the headshaft. (Use a wedge or screwdriver to spread the clamp for easy installation or removal.)
3. Remove the headshaft drive sprocket by removing the two clamp bolts and sliding the sprocket off the headshaft. (Use a wedge or screwdriver to spread the clamp for easy installation or removal.)

REVERSE THE PROCEDURE TO REINSTALL THE HEADSHAFT DRIVE SPROCKET.

BOOM END IDLER BEARING REMOVAL

1. To remove the boom end idler bearing first remove the digging chain as previously described in this section.
2. Remove the nylock capscrew and the square section pin from the boom end. The idler spacers and wheel will separate from the chain guides when the pin is removed. See Figure #5.

FIGURE #5



3. Press out the idler bearing from the idler wheel.
4. Press out the idler hub.
5. Check idler spacer, idler wheel, and bearing for wear and replace as necessary.

REVERSE THE PROCEDURE TO REINSTALL THE END IDLER.

MAINTENANCE

FRICITION CLUTCH - PTO DRIVE ASSEMBLY

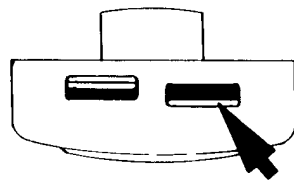
The 612 trencher friction clutches are belleville spring loaded, factory set units which do not require readjustment over the life of the friction discs. After each long period of inactivity the clutch must be slipped in order to avoid high torque settings caused by the friction plates sticking. The clutch can be purposely slipped by tightening the four nuts against the plate springs and then turning the clutch rapidly. Back off the nut upon completion and the design torque is automatically restored.

CAUTION! Any overheating caused by too long or too frequent operation of the clutch must be avoided, since this can damage the friction discs and clutch parts.

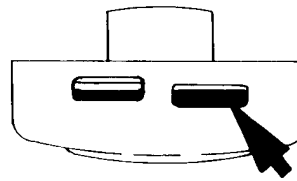


The condition of the friction discs can be determined without disassembling the clutch. See Figure #6

FIGURE #6



Condition when new.

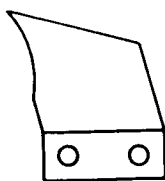


If the thrust plate edges are no longer visible, new friction discs are needed.

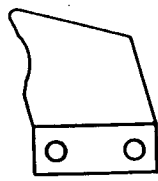
DIGGING TOOTH REPLACEMENT

Sharp teeth are important to good performance. When teeth wear out, production will drop sharply, increasing wear and tear on other components. Trenching chain costs per foot of trencher will increase dramatically.

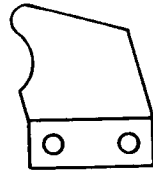
Cup teeth wear on the tip and side bulge in varying amounts. Wear patterns change with different digging conditions. The following patterns and captions are approximate and should be used as a guide to help you determine your own best cost / benefit tooth replacement time. Normal replacement should be made between 30% and 60% reduction in performance. Replacement is a simple bolt-on procedure.



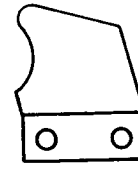
New



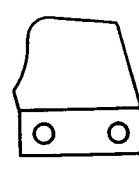
20% Reduced
Performance



50% Reduced
Performance



70% Reduced
Performance



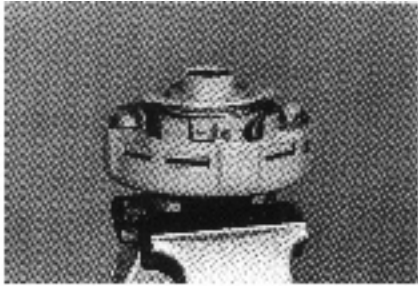
Beyond
Use

After the first 8 hours of operation and then at 100 hour intervals the trencher drive chain should be checked for proper tension adjustment. Chain is properly adjusted when the long side of chain can be moved by hand $\frac{1}{2}$ " either way from centerline of chain. Improper adjustment will cause excessive wear on drive chain and drive sprockets.

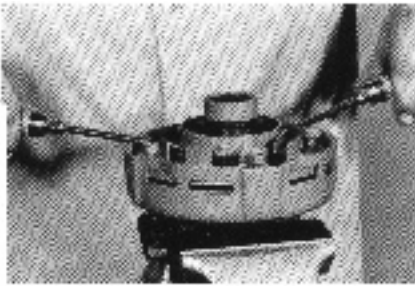
MAINTENANCE

FRICTION CLUTCH

DISASSEMBLY

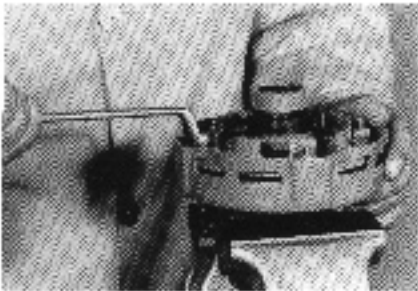


See disassembly instructions for quick disconnect lock, ball type, on Form #4-QD.

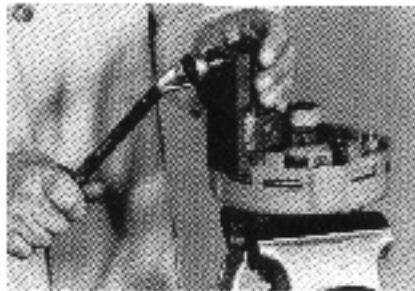


If the clutch has a warning device, remove the sleeve with the leaf springs by prying it up with two screw drivers as illustrated.

BRADCO units not equipped with warning device.



Tighten the four hex nuts (12) uniformly until the clutch pack and hub are loose.



Use special tool SW18 to bend all four retaining lugs back on the edge of the clutch housing.



Remove the thrust plate with Belleville spring(s) and lug ring (if used) to get at the friction disks, drive plates and hub for inspection and service. (Note: K92 two plate does not use drive plates #8 & #9)

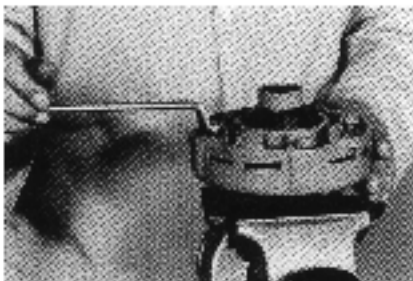
ASSEMBLY



Place hub and friction disks into the clutch housing. Note that items #8 & #9 are only used in the four plate clutch. Next, compress the Belleville spring(s) and the lug ring (if used) to the pressure plate by tightening the four hex nuts and placing them into the clutch housing as illustrated.



Use special tool SW18 to bend the retaining lugs inward over the Belleville spring edges to secure the spring(s) when you back the four hex nuts off. (Note: Wide lugs for one (1) Belleville spring, narrow lugs for two (2) Belleville springs.)



With the lugs in place loosen the four hex nuts completely to the end of the threaded studs. (Replace the sleeve with the leaf springs for the warning device if used.)

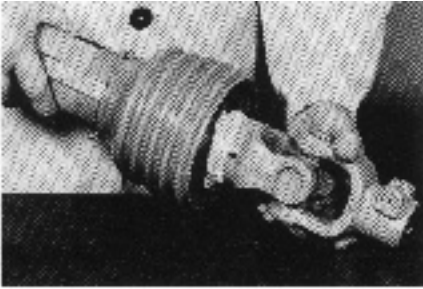


Replace the quick-disconnect or clamp bolt assembly, if so equipped.

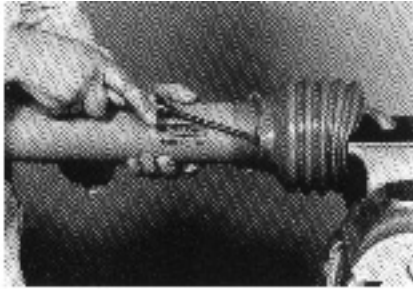
MAINTENANCE

SAFETY SHIELD

DISASSEMBLY

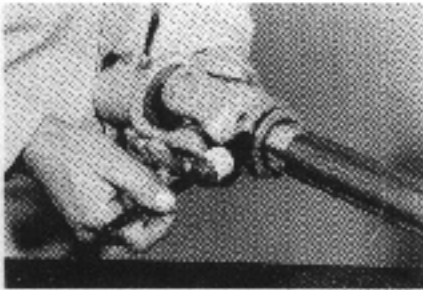


Use special tool SW21 to release bearing locking tabs and remove the shield from P.T.O. drive shaft half.



Or, clamp the P.T.O. yoke in the vise as shown to create pressure on the locking tabs and use a flat bladed screw driver to release one tab at a time to remove shield.

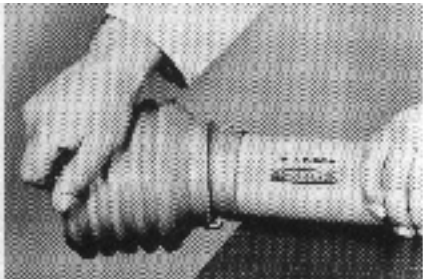
ASSEMBLY



Grease the shield bearing groove on the yoke and the telescoping tube before assembly.



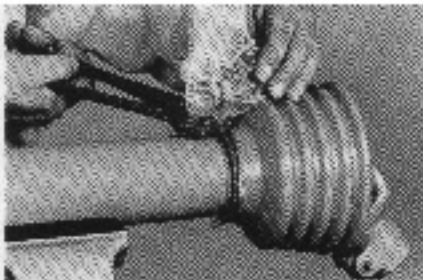
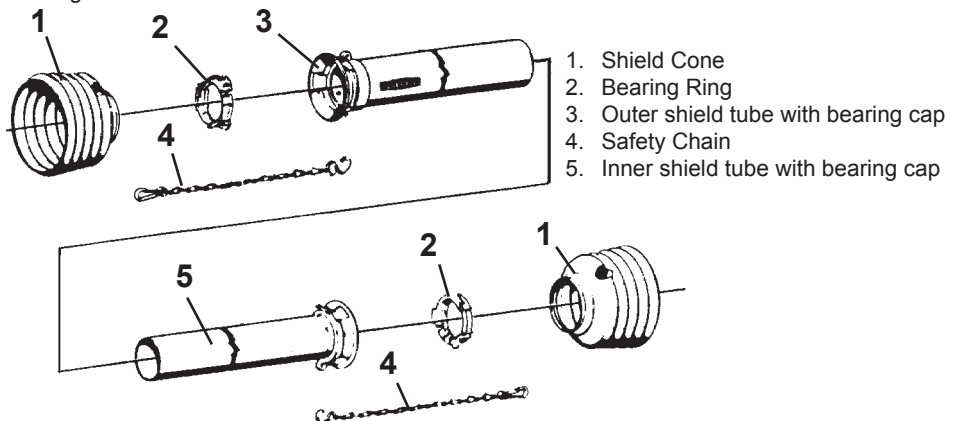
Place bearing ring in groove with the locking tabs nearest the telescoping tube side.



To remove the old shield cone, cut the cone near the bearing cap being careful not to damage the cap. Heat the new shield cone by placing the contact portion in water heated to approximately 180° F. until it is very flexible. Then, pull it over the tube and on to the bearing cap. As it cools, the cone will return to its natural size and become secure for normal function.



To mount the shield on to the half shaft, place it over the telescoping member, align the locking tabs on the bearing in the appropriate channels of the bearing cap and push the shield into place or apply light blows until all three locking tabs are visible in the openings.



Attach safety chain.

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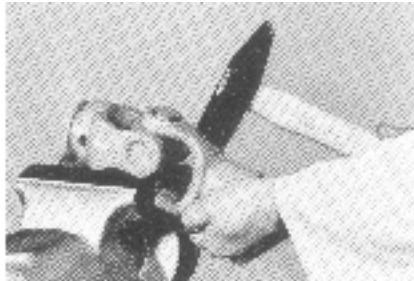
MAINTENANCE

U-JOINT

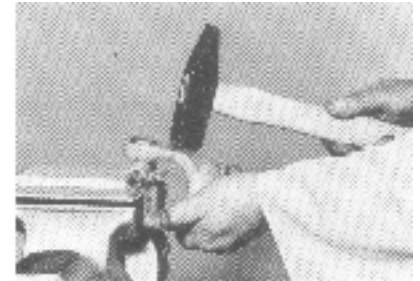
DISASSEMBLY



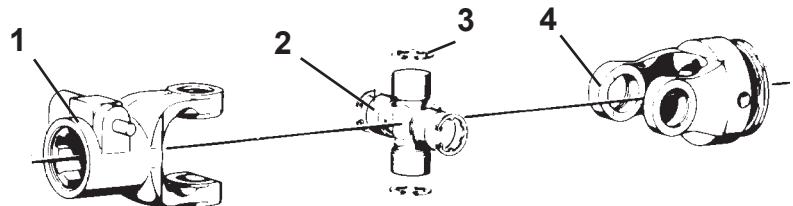
Remove retaining rings (3).



Place joint in the vise as illustrated (do not clamp tight) and with light hammer blows, drive up the bearing bushing.



Use special tool SW23 or SW27 to clamp the bearing bushing in the vise. Using either light hammer blows or by twisting the yoke, remove the bearing bushing.



1. Quick-disconnect yoke coupling
2. Cross and bearing kit coupling
3. Retaining ring
4. Inboard yoke

ASSEMBLY



Clamp the yoke in the vise as illustrated. Remove the bearing bushing from the cross kit and place the cross into one of the yokes. Begin mounting the bearings by extending the cross journal out through the bearing bore. Place a bearing on it and holding the cross with one hand to position the bearing, tap with light hammer blows until you notice resistance. Do the same for the opposite bearing.



Using a flat surfaced drift punch or special tool SW28 drive the bearing in until the annular groove is visible.



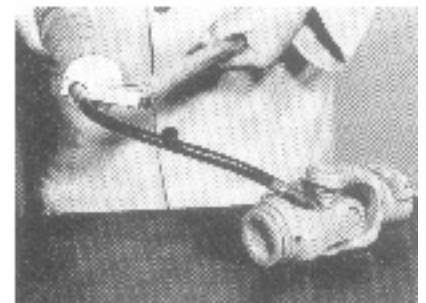
Replace the retaining ring, make sure it is properly seated.



When installing the second yoke and bearings, make sure the grease zerk is positioned on the proper side for easy access when lubricating. Replace the bearings as described previously using the cross journal to help guide the bearings into the bore.



Relieve the stress from the bearings and yoke by applying several sharp hammer blows to the yoke ears.



Grease the joint. Note that all four bearings are properly purged and rotate to make sure the U-joint will move freely.

2627 8-29-12-3

MAINTENANCE AND SERVICE

CYLINDER SEAL REPLACEMENT

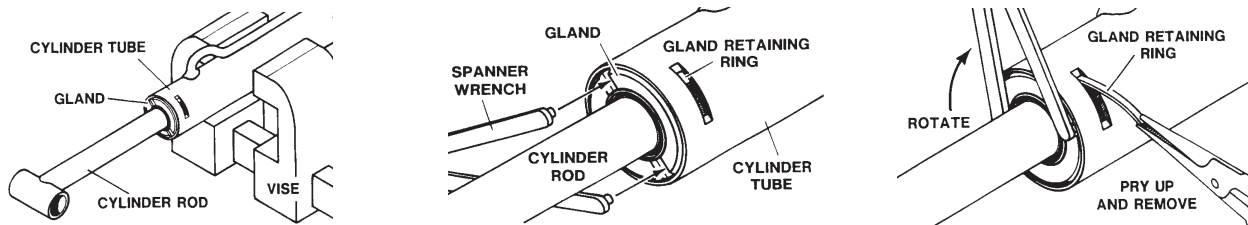
The following information is provided to assist you in the event you should need to repair or rebuild a hydraulic cylinder. When working on hydraulic cylinders, make sure that the work area and tools are clean and free of dirt to prevent contamination of the hydraulic system and damage to the hydraulic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

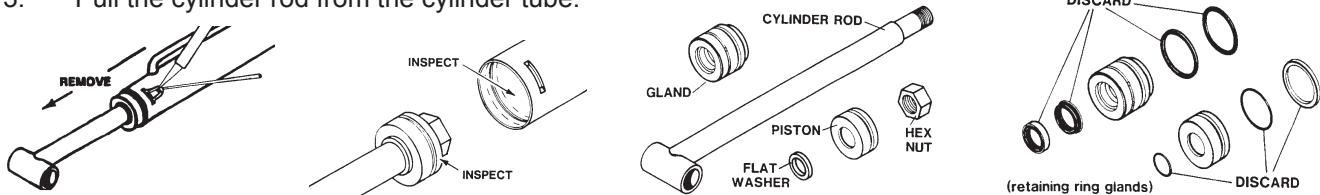
RETAINING RING TYPE GLAND

1. Mount the cylinder tube securely in a vise. **NOTICE:** Do not clamp too tight and distort the tube.
2. Rotate the gland with a spanner wrench (available from your dealer), until the gland retaining ring appears in the milled slot.



Pry up the end of the gland retaining ring with a pointed tool. Rotate the gland with a spanner wrench while removing the retaining ring. **NOTE:** The gland and piston seal(s) can be pulled out and cut as they appear in the milled slot during disassembly. After cutting, pull them on out through the milled slot.

3. Pull the cylinder rod from the cylinder tube.

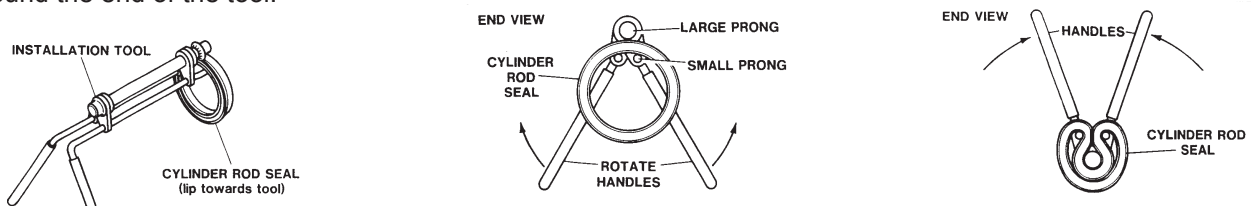


4. Inspect the piston and the bore of the cylinder tube for deep scratches or galling. If damaged, the piston and cylinder tube must be replaced.
5. Remove the hex nut, piston, flat washer or spacer tube (if so equipped), and gland from the cylinder rod. If the cylinder rod is rusty, scratched, or bent, it must be replaced.
6. Remove and discard all old seals.

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.

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



10530 3-8-06

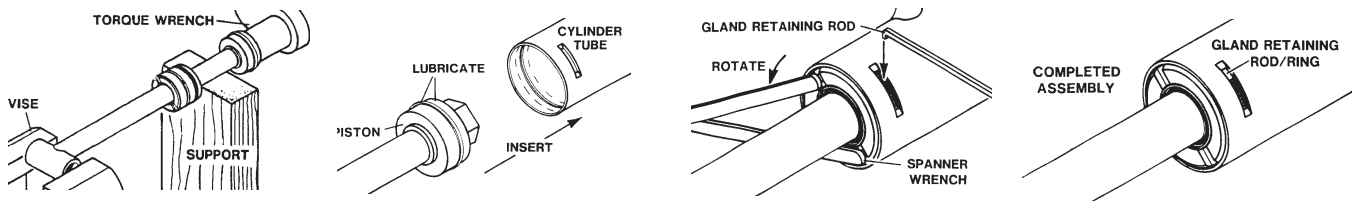
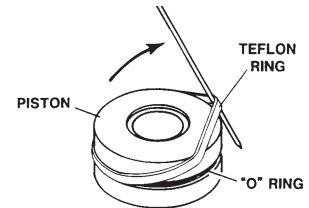
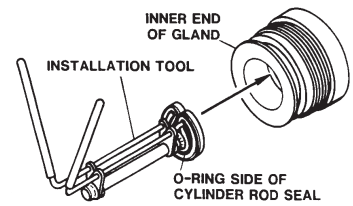
MAINTENANCE AND SERVICE

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.

NOTE: Threaded gland is shown in diagram for reference only.

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. 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.
4. Secure the cylinder rod (mounting end) in a vise, with a support at its center. Torque the nut to the value shown on the chart for the thread diameter of the cylinder rod.

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.

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

5. Apply a lubricant (such as Lubriplate #105) to the piston and teflon ring. Insert the cylinder rod assembly into the cylinder tube.
6. Rotate the gland with a spanner wrench until the hole (drilled into the retaining slot of the gland) appears in the milled slot of the cylinder tube. Insert the hooked end of the gland retaining rod into the hole.

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

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, causing severe personal injury or even death.

TROUBLE SHOOTING

612 TRENCHER

GENERAL INFORMATION

Your trencher was designed to be as simple and trouble free as possible. The purpose of this section is to help you in the event that a problem does develop. While we cannot possibly cover every problem that might occur, you will find that those that are most common are covered here.

PROBLEM: 3-POINT WILL NOT RAISE OR LOWER

POSSIBLE CAUSE AND SOLUTION:

1. **Incorrect tractor hydraulic oil level.** Check tractor hydraulic oil level and maintain proper level.
2. **Quick coupler not completely engaged.** Check to see that all couplers are matched pairs and engaged correctly.
3. **Quick coupler or hose restriction.** Check for dirt, rust, or other contaminants and repair or replace as needed.
4. **Incorrect hose routing.** See operator's manual for correct hose routing.
5. **Lift arms not parallel.** (This is critical only on small tractors with limited lift capacity.) Adjust top link length and position all three links as parallel as possible.
6. **Incorrect PTO drive installation.** Check PTO for proper length and installation. (See Mounting Kit Installation)
7. **Insufficient pump pressure.** Check tractor pump pressure and adjust or repair as required.

PROBLEM: HYDRAULIC OIL OVERHEATING

POSSIBLE CAUSE AND SOLUTION:

1. **Tractor relief valve set too low.** See tractor operator's manual and/or dealer for proper relief valve service and adjustment. Adjust relief valve to proper PSI.

TROUBLE SHOOTING

612 TRENCHER

2. **Quick coupler or hose restriction.** Check for dirt, rust, or other contaminants and repair or replace as needed.
3. **Relief valve stuck open.** Have relief valve serviced and checked by an authorized dealer.
4. **3-point control in extreme "UP" position.** (Applies only on some tractor models.) Lower 3-point control lever until system discontinues going over relief.
5. **Creeping in other than low range in transmission.** (Hydrostatic transmissions only.) Trench only in low range of transmission.

PROBLEM: PTO SHAFT DOES NOT TURN

POSSIBLE CAUSE AND SOLUTION:

1. **PTO shaft not properly installed.** Check shaft for proper installation.
2. **Slip clutch or tractor clutch slipping.** Check chain for dirt build up and/or rocks in chain. Turn chain to remove all foreign material.
3. **PTO in tractor not properly engaged.** Engage PTO properly or repair tractor.

PROBLEM: HEADSHAFT AND AUGER TURNS - DIGGING CHAIN DOES NOT

POSSIBLE CAUSE AND SOLUTION:

1. **Digging chain sprocket slipping on headshaft.** Check sprocket and tighten bolts or replace as necessary.

PROBLEM: PTO TURNS - DIGGING CHAIN \ AUGERS DO NOT TURN

POSSIBLE CAUSE AND SOLUTION:

1. **Digging chain bound up.** Check chain for dirt build up and/or rocks in chain. Remove foreign material.

TROUBLE SHOOTING

612 TRENCHER

2. **PTO clutch slipping.** Remove clutch and inspect. (Look for discolored paint of clutch housing.) Repair or replace as necessary.
3. **Key sheared at trencher end of PTO shaft.** Remove shaft and replace key.
4. **Broken chain or sprocket slipping inside of chain cover.** Remove cover and check chain and sprocket. Repair or replace as necessary.
5. **Sheared key or broken gear in gear box.** Remove gear box cover and inspect. Repair or replace as necessary.

PROBLEM: GEARBOX LEAKING OIL

POSSIBLE CAUSE AND SOLUTION:

1. **Oil level too high.** Drain and fill to proper level.
2. **Plugged or wrong vent plug.** Clean or replace with correct vent plug.
3. **Seals worn or defective.** Inspect seal, bearing and housing. Replace as required.

PROBLEM: POOR TRENCH PRODUCTION

POSSIBLE CAUSE AND SOLUTION:

1. **Digging teeth worn or missing.** See maintenance - Section L in this manual. Inspect teeth and replace as needed. (Excessively worn teeth can cut a trench that is too narrow for boom end to slide through.)
2. **Augers running on ground.** Raise headshaft to keep auger off ground.
3. **Incorrect tooth style or spacing for digging conditions.** Consult manual for correct tooth style and spacing. Left/right must be balanced to within one tooth difference.

TROUBLE SHOOTING

612 TRENCHER

4. **Turning too short of radius with tractor.** Make wider turns or remove trencher from the ditch and reposition. See "Operating Instructions" section of this manual.
5. **Trenching on uneven terrain.** Level trench path before trenching.
6. **Digging chain too tight.** Adjust to proper tension. Digging chain should be tight enough to remain on sprockets while turning under load. There should be some sag in the chain. If too tight, loosen chain by the adjusting nut(s) on the boom.
7. **Trenching uphill.** Trench downhill whenever possible.
8. **Incorrect boom angle for trenching conditions.** Trench at recommended angle. Refer to "Operating Instructions" section of this manual.
9. **Trencher not setting level.** Adjust leveling lift linkage.

BOLT TORQUE SPECIFICATIONS

GENERAL TORQUE SPECIFICATION TABLES

Use the following charts when determining bolt torque specifications when special torques are not given. Always use grade 5 or better when replacing bolts.

SAE BOLT TORQUE SPECIFICATIONS

NOTE: The following torque values are for use with extreme pressure lubricants, plating or hard washer applications. Increase torque 15% when using hardware that is unplated and either dry or lubricated with engine oil.

Bolt Size		SAE GRADE 5 TORQUE				SAE GRADE 8 TORQUE				Bolt head identification marks as per grade. NOTE: Manufacturing Marks Will Vary
		Pounds Feet		Newton-Meters		Pounds Feet		Newton-Meters		
Inches	Millimeters	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF	
1/4	6.35	8	9	11	12	10	13	14	18	
5/16	7.94	14	17	19	23	20	25	27	34	
3/8	9.53	30	36	41	49	38	46	52	62	
7/16	11.11	46	54	62	73	60	71	81	96	
1/2	12.70	68	82	92	111	94	112	127	152	
9/16	14.29	94	112	127	152	136	163	184	221	
5/8	15.88	128	153	174	207	187	224	254	304	
3/4	19.05	230	275	312	373	323	395	438	536	
7/8	22.23	340	408	461	553	510	612	691	830	
1	25.40	493	592	668	803	765	918	1037	1245	
1-1/8	25.58	680	748	922	1014	1088	1224	1475	1660	
1-1/4	31.75	952	1054	1291	1429	1547	1700	2097	2305	
1-3/8	34.93	1241	1428	1683	1936	2023	2312	2743	3135	
1-1/2	38.10	1649	1870	2236	2535	2686	3026	3642	4103	

GRADE 2



GRADE 5



GRADE 8



METRIC BOLT TORQUE SPECIFICATIONS

NOTE: The following torque values are for use with metric hardware that is unplated and either dry or lubricated with engine oil. Reduce torque 15% when using hardware that has extreme pressure lubricants, plating or hard washer applications.

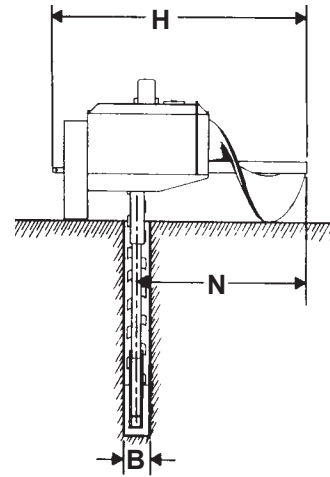
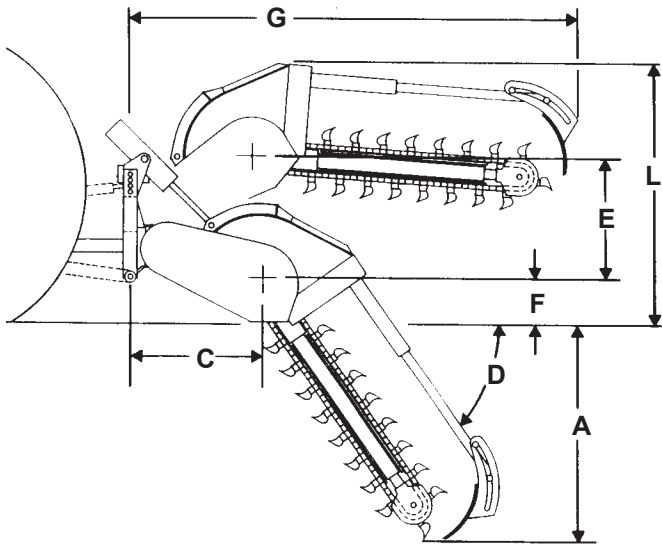
Bolt head identification marks as per grade.		
		

Size of Bolt	Grade No.	Pitch (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

SPECIFICATIONS

612 TRENCHER

TRENCHER DIMENSIONS



SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE AND WITHOUT LIABILITY THEREFORE. WHENEVER APPLICABLE SPECIFICATIONS ARE IN ACCORDANCE WITH SAE STANDARDS.

STANDARD FEATURES

- ❖ 3-Point hitch mounting system (Category #1)
- ❖ Dual pitch convenience
- ❖ Remote valve for dual pivot control (power beyond capability)
- ❖ Heavy duty gear box
- ❖ Heavy duty headshaft and bearings protected with "CAT" duo cone seal
- ❖ Heavy duty roller chain and hardened sprockets
- ❖ Drive line protected with slip clutch
- ❖ 43,000# 2.00" pitch trenching chain and sprockets
- ❖ Ribbon type discharge auger
- ❖ 6.00" - 12.00" digging widths available
- ❖ High profile, high strength trenching teeth with hard surfacing
- ❖ Crumpler assembly matched to boom and trench size
- ❖ Chain guides to prevent trenching chain run-off

DESCRIPTION	SPEC.
A. Trench Depth w/Auger Touching Ground At a 60° Digging Angle	
30" Boom.....	30.00"
36" Boom.....	36.00"
48" Boom.....	48.00"
60" Boom.....	60.00"
B. Trench Width	
All Boom Lengths	6.00"
30", 36", 48" Boom Lengths	8.00"
30", 36" Boom Lengths.....	10.00"
30" Boom Length.....	12.00"
C. Distance from 3-Point to Headshaft	24.25"
D. Recommended Trenching Angle.....	60° - 65°
E. Total Headshaft Movement	Varies
F. Headshaft Height (w/Auger Touching Ground)	10.00"
G. Trencher Length (From 3-Point to End of Crumpler Shoe - Transport Position)	69.00"
H. Trencher Width.....	43.00"
L. Transport Height	Varies
N. Centerline of Trench to Outside of Auger.....	27.00"
3-Point Mounting	Category 1
Chain Speed @ 540 RPM	308 FPM
Weight w/36" Boom and 6" Chain	850 lbs. (385 kgs)
NOTES:	
1. Specifications may vary between tractor models.	
2. Trench depths given are as calculated on drawings. Actual depths during operation will vary due to tractor model, tire size, ground conditions and carryover.	
3. Trench depths and widths shown are maximum recommended for general service and use. ATI Incorporated makes no claim or warranty that you will be able to operate satisfactorily at these depths and widths or that you cannot exceed these recommendations in your application.	

PARTS

In order to provide you with the most UP-TO-DATE part information, all parts for this attachment have been moved to our website at www.paladinattachments.com/Manuals. Please use these diagrams and parts lists to locate replacement parts.

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

To facilitate parts ordering when contacting the factory, please have the product control number (PCN or C/N) or model and serial number of your product ready to ensure that you receive the correct parts for your specific attachment.

The product control number, model and serial number for your attachment should be recorded in the space provided on the cover of this manual. This information may be obtained from the serial number identification plate located on your attachment.

NOTE: Most daily and emergency parts orders (in stock) received by 10:30 A.M. (Eastern Standard Time) will be shipped UPS Ground the same day received. UPS Next Day orders must be received by 1:30 PM (Eastern Standard Time.)

SERVICE DEPARTMENT

(734) 996-9116

(800) 456-7100

For Fax and E-mail Orders

PLC_Sales@paladinattachments.com

(734) 996-9014

WARRANTY

In order to provide you with the most UP-TO-DATE Warranty information, Paladin Warranty Statement and Warranty Procedures along with Warranty Registration and Claim Forms have been moved to our website at www.paladinattachments.com.

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