BRADCO®

OM515
REV. 2

650 TRENCHER

ALL HIGH FLOW SKID-STEER APPLICATIONS

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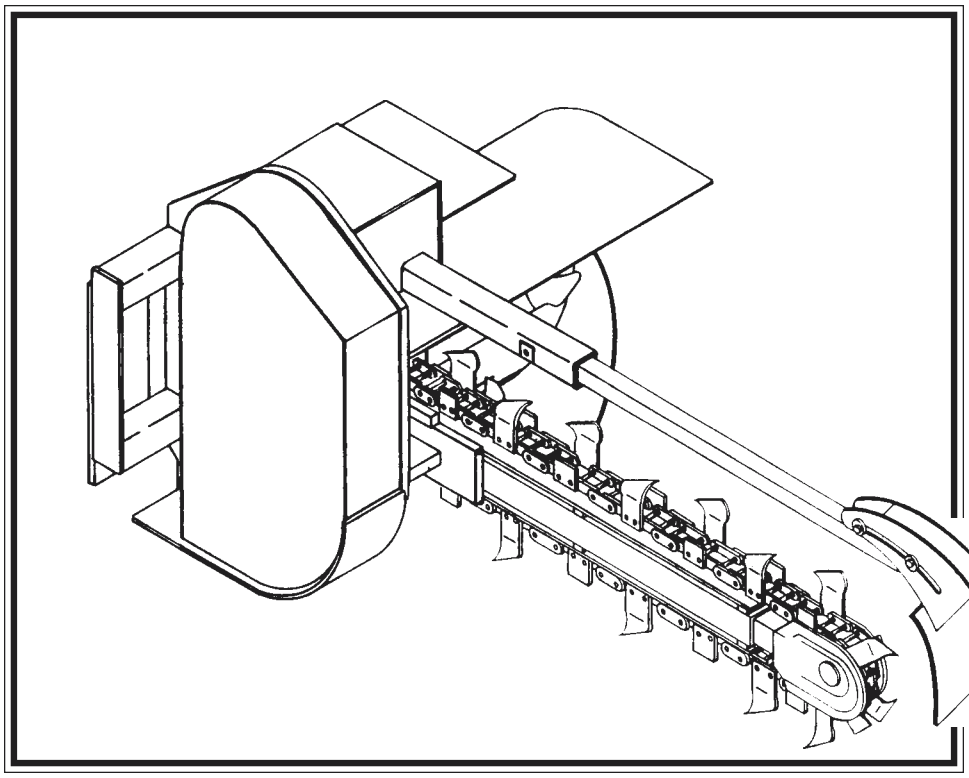

OPERATOR'S & PARTS MANUAL

75415

BRADCO®
P.O. Box 266 · Delhi, Iowa 52223 USA
(563) 922-2981 ·(800) 922-2981
Fax 563-922-2130

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TO THE OWNER

GENERAL COMMENTS

Congratulations on the purchase of your new trencher! Your trencher was carefully designed and manufactured to give you many years of dependable service. Your trencher will require some minor maintenance (such as cleaning and lubricating) to keep it in top working condition. Be sure to observe all safety precautions and maintenance procedures as described in this manual.

ABOUT THIS MANUAL

This manual has been designed to help you do a better, safer job. Read this manual carefully and become familiar with it's contents. **Remember, never let anyone operate this trencher without reading the "Safety Precautions" and "Operating Instructions" sections of this manual. (See Sections B and G respectively.)**

Unless noted otherwise, "right-hand" and "left-hand" sides are determined from the position of the skid steer operator sitting in the seat facing forward.

SAFETY ALERT SYMBOL

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

SERVICE

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

To facilitate parts ordering, record the model and serial number of your trencher in the space provided on this page. This information may be obtained from the trencher identification plate located on the right side of the trencher main frame.

MODEL _____ DATE PURCHASED _____

SERIAL NO. _____

MOUNTED ON _____

Your parts dealer needs this information to insure that you receive the correct parts for your specific trencher.

SAFETY PRECAUTIONS

TAKE NOTE! THIS SAFETY ALERT SYMBOL FOUND THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY OR OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.

THIS SYMBOL MEANS:

ATTENTION!

BECOME ALERT!

YOUR SAFETY IS INVOLVED!

SIGNAL WORDS: Note the use of signal words DANGER, WARNING, and CAUTION with the safety messages. The appropriate signal word for each has been selected using the following guidelines:

DANGER: Indicates an imminently hazardous situation, which if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations, **typically for machine components which, for functional purposes, cannot be guarded.**

WARNING: Indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury, and **includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.**

CAUTION: Indicates a potentially hazardous situation, which if not avoided, **may result in minor or moderate injury. It may also be used to alert against unsafe practices.**

SAFETY PRECAUTIONS

TRENCHERS

GENERAL INFORMATION

This section is composed of various warnings and safety tips. **Read and learn all the information in this section before you attempt to use your trencher.** Also read your vehicle owner's manual before using your equipment. This knowledge will help you operate your unit safely. **Do not take this information lightly, it is presented for your own benefit and for the benefit of others working around you.**

The "Safety Alert Symbol" , as previously described, will be used throughout this manual. It will appear with one of the words **DANGER, WARNING**, or **CAUTION** above it, and a safety message pertaining to the specific topic being covered. Take the time to read these messages as you come across them.

TO THE OPERATOR

The primary responsibility for safety with the equipment falls to the operator. It is the skill, care, common sense, and good judgment of the operator that will determine how efficiently and safely the job is performed. Know your equipment before you start. Know its capabilities, dimensions, and how to operate all the controls. Visually inspect your equipment before you start, and never operate equipment that is not in proper working order with all safety devices intact.

BEFORE YOU START

1. **Wear the right clothing and gear for the job. Protective equipment such as hard hat, steel toed shoes, leather gloves, or safety glasses may be in order. They can protect you from needless injury.**

2. **Do not wear loose clothing, or things such as rings and watches around the equipment. They could get caught in moving parts, and lead to serious injury or death.**

3. **Know your equipment inside and out. Know how to operate all controls, and know emergency shutdown procedures. Make sure all safety devices are in place and working.**

4. **Keep all step plates, grab bars, pedals, and controls free of dirt, grease, and oil. Keep equipment clean to help avoid injury from a fall when getting on or off equipment.**

SAFETY PRECAUTIONS

TRENCHERS

5. **Do not use the trencher or crumber bar as a step, or grab the digging chain when climbing on or off the trencher. Damage to the equipment or personal injury could result.**

6. **Know your work area before you begin. Observe any potential hazard areas such as soft ground, drop-offs, rocks and other obstacles.**

7. **Know where all utility lines are. Observe overhead electrical and phone lines. Be sure equipment will safely clear them. Know the location of underground cables, wires, gas and water lines, tanks, etc. Contact with electrical lines could cause electrocution. Hitting a gas line or underground tank could cause an explosion.**

8. **Be alert to others in the work area. Be sure others know when and where you will be working. Make sure no one is underneath or behind equipment.**

9. **Never try to board equipment while it's moving.**

10. **Always use your seatbelt and safety ROPS (Roll-Over-Protective Structure) that are on the equipment. They could save your life in the event of a mishap.**

11. **Never take passengers on your equiment. There is no safe place for riders.**

12. **Test all controls before you start. This includes safety equipment and devices.**

DURING TRENCHER OPERATION

1. **Be alert to what is going on around you. Watch for others who may not be watching out for themselves.**

2. **Never operate equipment while under the influence of alcohol, or prescription drugs which could inhibit physical and or mental capacity.**

3. **Stop the trencher and shut off the engine if anyone approaches the equipment while it's in motion. They may not be familiar with the equipment and get in the way of moving parts.**

4. **Be alert to changes in the work area. Changes in weather and soil conditions could turn a safe work site into a hazardous area.**

SAFETY PRECAUTIONS

TRENCHERS

5. **Keep equipment away from the trencher after it has been dug. The weight of the unit could cause a cave-in.**

6. **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. Have the chain moving slowly, and lower the boom carefully when starting a new cut.**

7. **Use caution when digging on a slope. The natural vibration of the trencher will make the unit creep sideways downhill. Try to dig with the trencher in a level position.**

8. **Never try to make sharp turns while trenching. The trencher boom could become wedged in the trench and damaged.**

9. **Never attempt to free a stuck chain with the unit running. If the trencher does become jammed, stop the unit and visually inspect the situation.**

10. **Check the trencher frequently for loose hardware and fittings. The natural vibration of the unit will cause fasteners to loosen during operation.**

TRANSPORTING THE TRENCHER

1. **Follow all federal, state, and local regulations when transporting the unit on public roads.**

2. **Use a SMV (Slow Moving Vehicle) sign on the vehicle when transporting. This will help alert others to your presence.**

3. **Be sure all lights and turn signals are in working order. Use them as required.**

4. **When parking, park the unit on hard level ground and lower the trencher boom. Block the wheels, and set the parking brake. Shut off the engine.**

5. **Follow factory recommended shut down procedures for equipment.**

6. **Stop the trencher and vehicle before dismounting.**

SAFETY PRECAUTIONS

TRENCHERS

MAINTAINING THE TRENCHER

1. **Replace all safety shields and guards when performing maintenance. Do not operate the trencher with protective equipment removed.**

2. **Lower the trenching boom, and shut off the engine before working on the unit. Never perform maintenance on a trencher while it is running.**

3. **Make sure all operating and residual pressures are relieved before working on a hydraulic system. Shut engine off, and operate all the controls to relieve any pressure.**

4. **Use only manufacturer recommended replacement parts. Other parts may be substandard in fit and quality.**

5. **Do not set any relief valve higher than recommended by the manufacturer. Relief valves should be checked and adjusted only by a trained service technician. Do not remove or block a relief valve.**

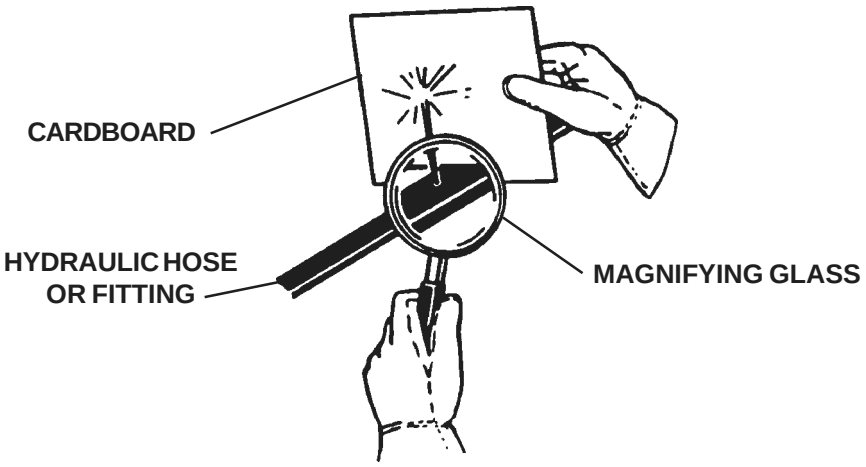
6. **Observe proper maintenance schedules. Proper maintenance can help prevent a hazardous condition.**

7. **Always wear safety goggles or glasses when working on equipment.**

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.



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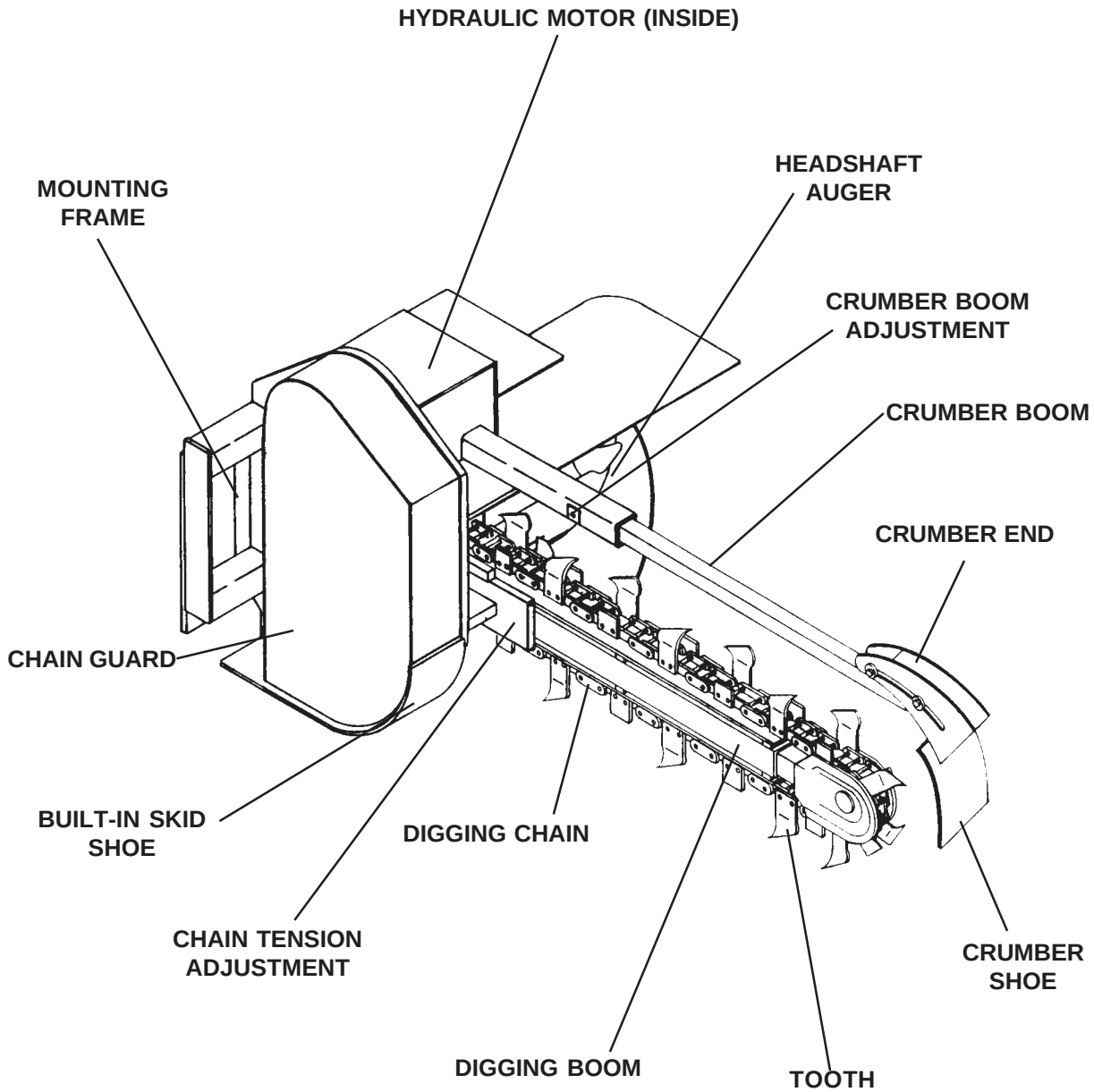
PREOPERATION

TRENCHER MAJOR NOMENCLATURE
650 TRENCHER

GENERAL INFORMATION

The purpose of this page is to acquaint you with the 650 trencher and the names of its various components. This knowledge will be helpful when reading through this manual or when ordering service parts.



PREOPERATION

650 TRENCHER

GENERAL INFORMATION

The purpose of this manual is to assist in setting up, operating and maintaining your trencher. Read it carefully. It furnishes information and instructions that will help you achieve years of dependable performance.

Right and left when referred to in this manual are determined by the operator's right and left when seated at the skid-steer controls in the normal operating position facing forward.

The illustrations and data used in this manual were current at the time of printing, however, we reserve the right to redesign and change the trenchers as may be necessary without notification.

PREPARING THE SKID-STEER LOADER

WARNING!  **Never let anyone operate this skid-steer loader and trencher without understanding all of the "Safety Precautions" and "Operating Instructions" located in this manual (see Sections B and G respectively). Always choose hard, level ground to park the skid-steer loader on and set the brake so that the skid-steer loader cannot roll.**

Check to ensure that the skid-steer loader is equipped with high flow auxiliary hydraulics and that a case drain line has been installed going directly to the reservoir tank.

NOTE: High flow auxiliary hydraulics is considered optional equipment on most skid-steer loaders. If your skid-steer loader is not equipped with high flow auxiliary hydraulics, consult your skid-steer dealer for information on availability.

The 650 trencher was designed to be easy to use and maintain. The trencher mounts to the toolbar/attachment plate of the skid-steer. The mount incorporates the quick attach mechanism of the skid-steer for fast, easy mounting.

The trencher is powered by the skid-steer's auxiliary hydraulic system. Your skid-steer **MUST** have a high flow auxiliary hydraulic system to run the 650 trencher.

PREOPERATION

650 TRENCHER

An adapter is needed to attach the trencher to the skid-steer. Most trenchers are shipped with the adapter already mounted to the trencher. If yours was not shipped this way, see Section E for mounting kit installation. To install the trencher on the skid-steer see Section F. Operating instructions are covered in Section G.

A hydraulic kit is not included with your trencher mounting kit. Hydraulic hoses and couplers must be purchased from your skid-steer dealer. (Remember a case drain line must be installed on your skid-steer loader connecting the trencher's hydraulic motor to your skid-steers reservoir tank.)

TRENCHER HYDRAULIC MOTOR PORT SPECIFICATIONS:

Your trencher's hydraulic motor pressure and return ports are SAE #12 female boss o-ring and case drain port is SAE #6 female boss o-ring.

Use the chart below to determine which trencher assembly is needed for your specific skid-steer. A diagram and parts list of all trencher assemblies can be found in Section I.

TRENCHER/SKID-STEER FIT-UP CHART

TRENCHER DESCRIPTION	SKID-STEER GPM REQUIREMENT	TRENCHER ASSEMBLY
650A (16 Tooth Sprocket)	34-36 GPM	80500
650B (19 Tooth Sprocket)	31-33 GPM	80502
650C (22 Tooth Sprocket)	27-30 GPM	80501
650D (24 Tooth Sprocket)	22-26 GPM	80503

NOTE: Choose the Bradco Basic 650 Trencher Assembly to match your skid-steer high flow hydraulic system.

Use the following chart to determine which mounting kit is needed for your specific skid-steer. A diagram and parts list of all mounting kits can be found in Section E.

PREOPERATION

650 TRENCHER

FIT-UP CHART

SKID-STEER	MOUNTING KIT
BOBCAT 843/853/873	80548
CASE 1838/1840/1845C/40XT/60XT/70XT/75XT/ 85XT/90XT/95XT	80548
CATERPILLAR 228/248	80548
NEW HOLLAND L550/L780	80550
NEW HOLLAND L565/LX665/L865/LX885/LX985/LS160/ LS170/LS180/LS190	80548
GEHL SL4625DX/SL5625DX/SL6625DX	80552
GEHL 5635/6635	80548
JOHN DEERE 240/250/260/270/6675/7775/8875	80548
MUSTANG 960/2060-2070 Single Pin	80553
MUSTANG 2060/2070 Dual Pin	80548
THOMAS T203/T233	80554

OPTIONS

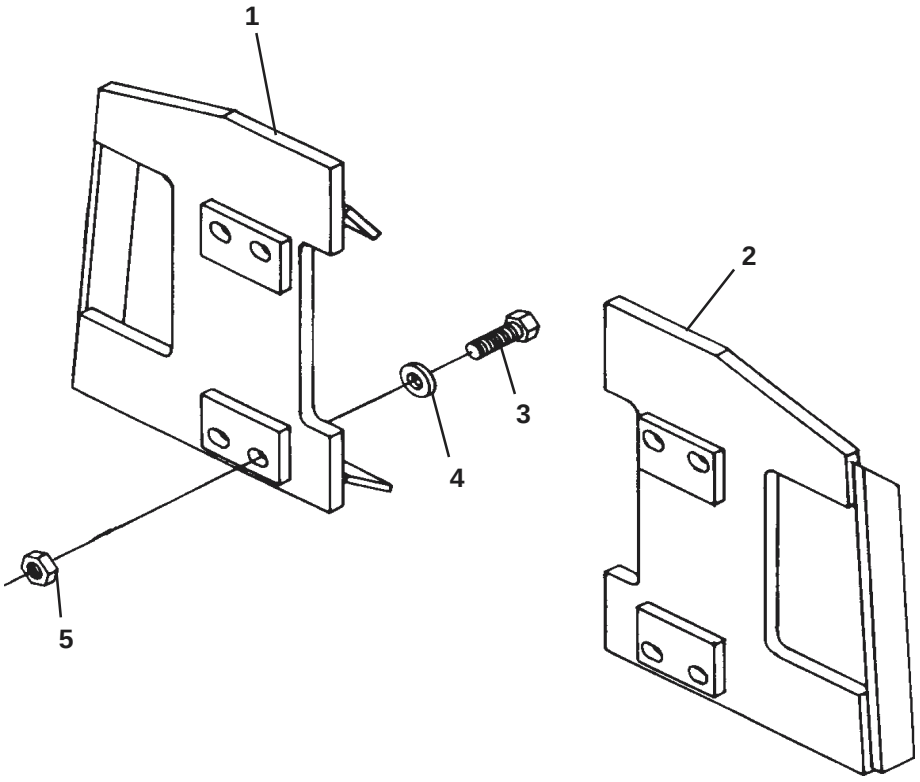
Eventually you may wish to dig a trench of a depth or width other than what your unit was originally equipped to dig. The 650 trencher can be fitted with optional booms, digging chains, sprockets, and crumber assemblies to allow you to dig a variety of different sized trenches with a digging chain option of a tooth every station or every other station. The chart below 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 Sections I & J of this manual.

TRENCH DEPTHS*	**TRENCH WIDTHS**			
30" Depth	6.00"	8.00"	10.00"	12.00"
36" Depth	6.00"	8.00"	10.00"	NA
48" Depth	6.00"	8.00"	NA	NA
60" Depth	6.00"	NA	NA	NA

*Trench depths are given with the digging boom at an optimum 65° diggging angle and the skid shoe 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.

MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80548



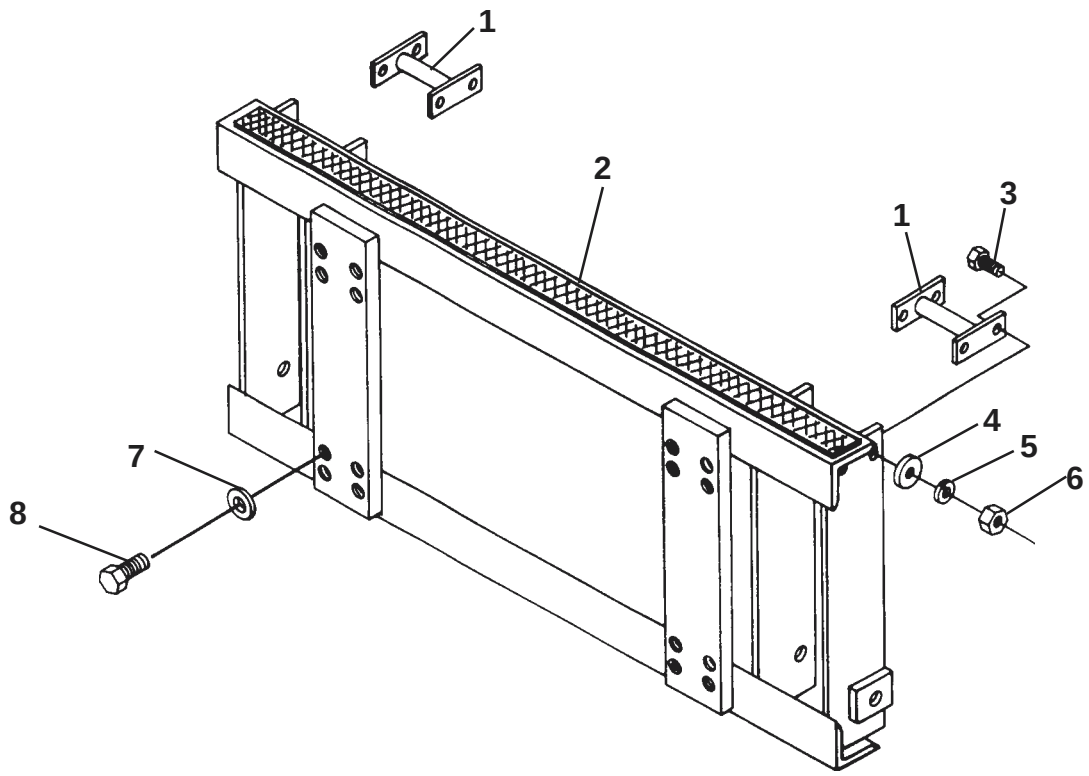
MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80548

NO	REQ'D	PART NO.	DESCRIPTION
1	1	78259	Right Trencher Mount
2	1	78260	Left Trencher Mount
3	8	1140	.75" UNC x 2.25" Hex Capscrew
4	8	1649	.75" Hard Flat Washer
5	8	1231	.75" UNC Hex Nut

MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80549



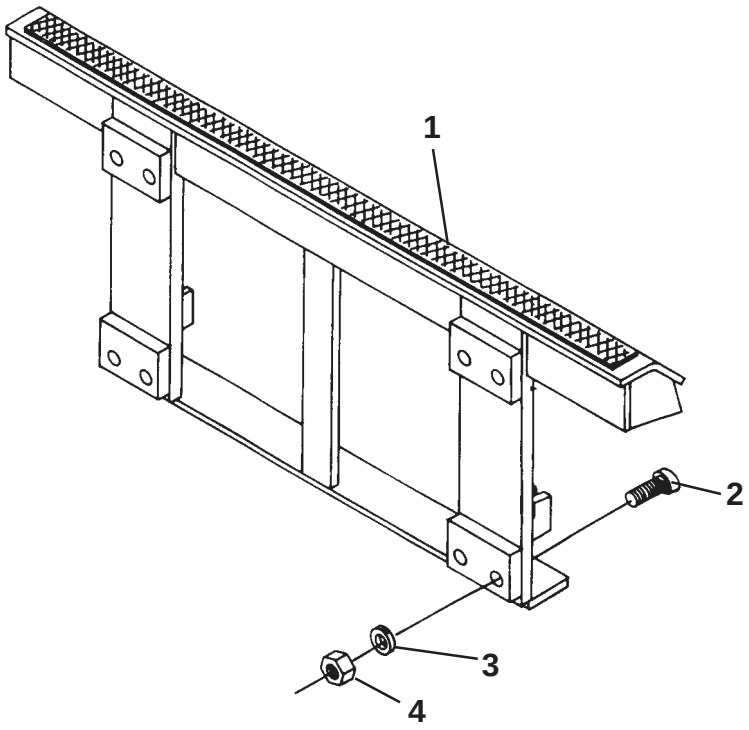
MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80549

NO	REQ'D	PART NO.	DESCRIPTION
1	2	59065	Pin
2	1	68935	Trencher Attaching Bracket
3	8	1089	.50" UNC x 1.25" Hex Capscrew
4	8	1516	.50" Flat Washer
5	8	1505	.50" Lock Washer
6	8	1228	.50" UNC Hex Nut
7	8	1649	.75" Hard Flat Washer
9	8	1137	.75" UNC x 1.50" Hex Capscrew

MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80550



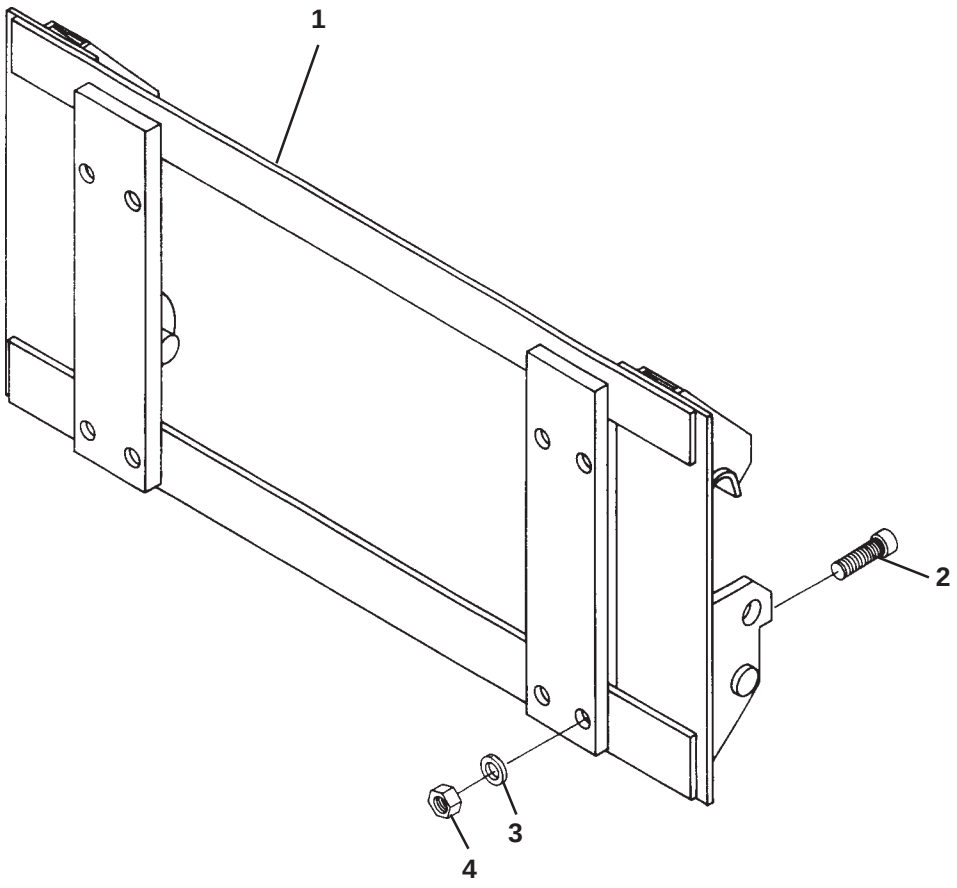
MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80550

NO	REQ'D	PART NO.	DESCRIPTION
1	1	78046	Trencher Attaching Bracket
2	8	1866	.75" UNC x 2.25" Socket Head Capscrew
3	8	1649	.75" Hard Flat Washer
4	8	1231	.75" UNC Hex Nut

MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80551



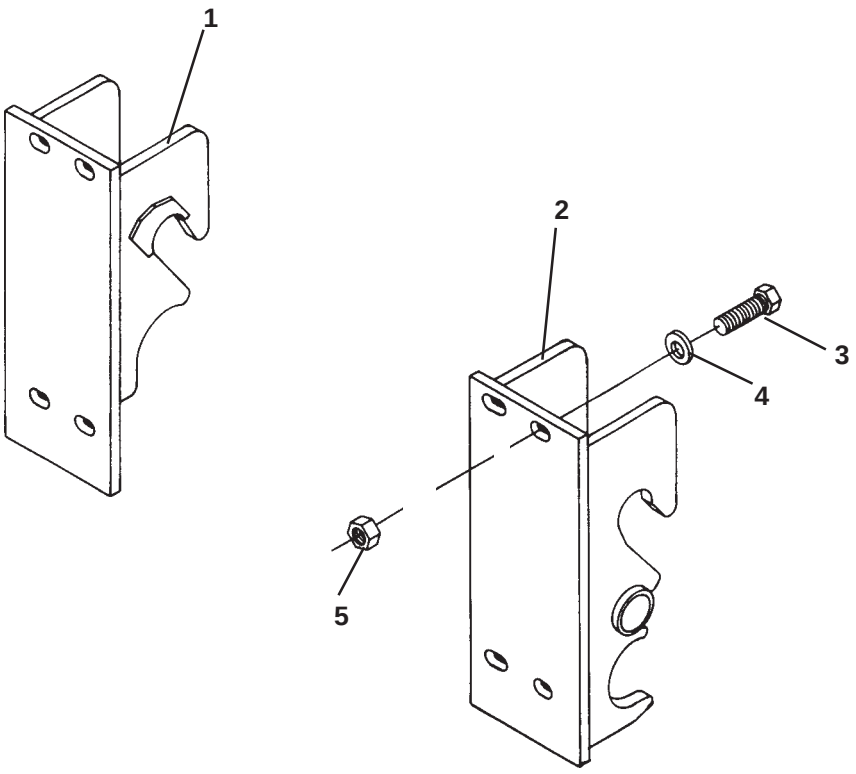
MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80551

NO	REQ'D	PART NO.	DESCRIPTION
1	1	78226	Trencher Attaching Bracket
2	8	1866	.75" UNC X 2.25" Socket Head Capscrew
3	8	1649	.75" Hard Flat Washer
4	8	1231	.75" Hex Nut

MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80552



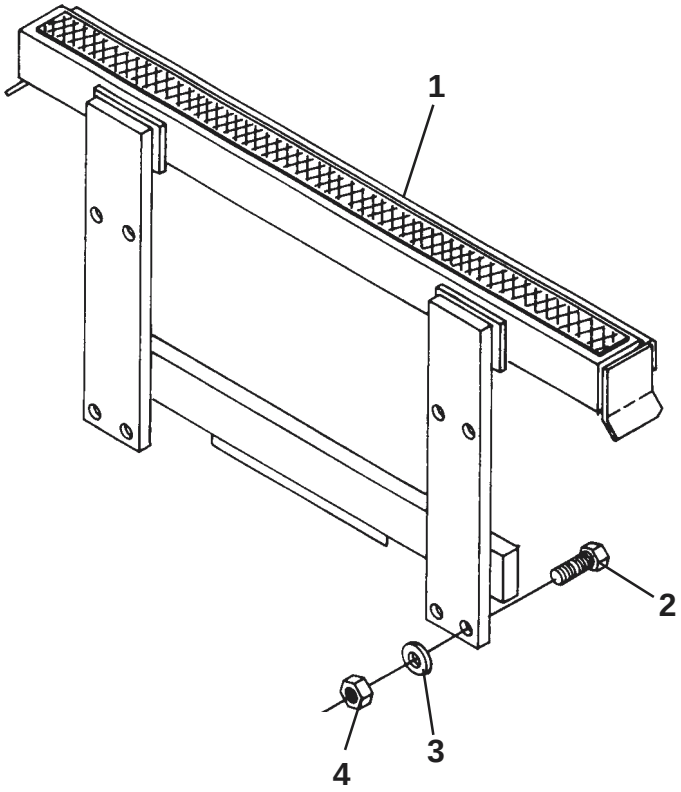
MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80552

NO	REQ'D	PART NO.	DESCRIPTION
1	1	67050	Right Trencher Mount
2	1	67049	Left Trencher Mount
3	8	1140	.75" UNC X 2.25" Hex Capscrew
4	8	1649	.75" Hard Flat Washer
5	8	1231	.75" Hex Nut

MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80553



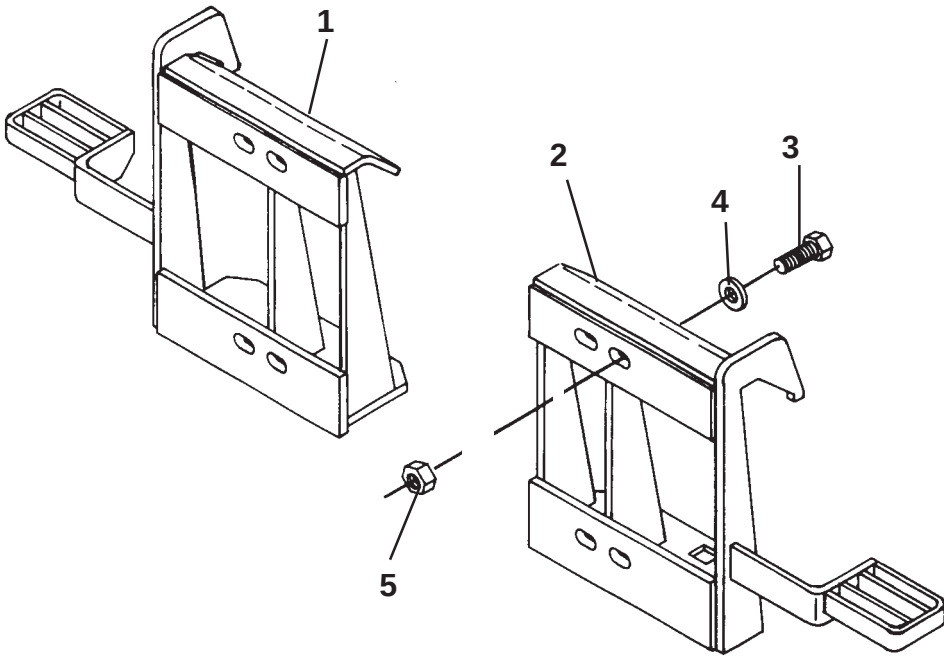
MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80553

NO	REQ'D	PART NO.	DESCRIPTION
1	1	78232	Trencher Attaching Bracket
2	8	1140	.75" UNC x 2.25" Hex Capscrew
3	8	1649	.75" Hard Flat Washer
4	8	1231	.75" UNC Hex Nut

MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80554



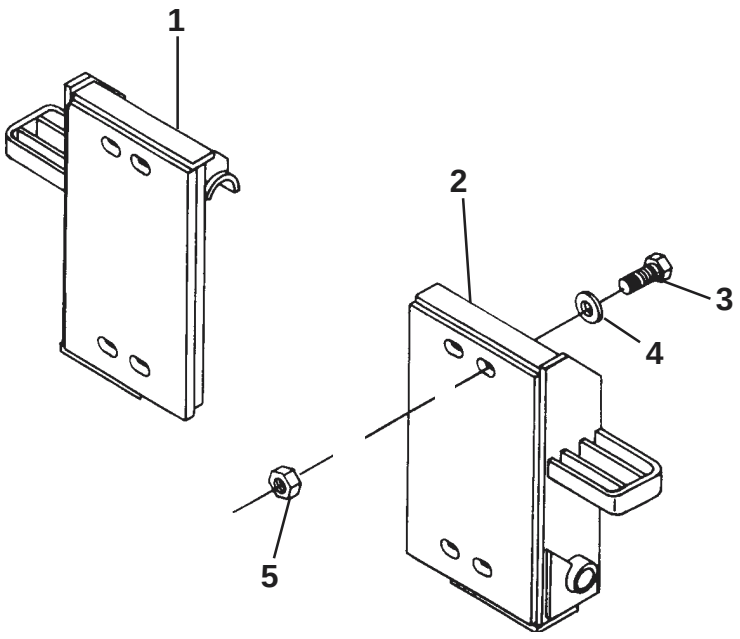
MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80554

NO	REQ'D	PART NO.	DESCRIPTION
1	1	78252	Right Trencher Mount
2	1	78253	Left Trencher Mount
3	8	1140	.75" UNC x 2.25" Hex Capscrew
4	8	1649	.75" Hard Flat Washer
5	8	1231	.75" UNC Hex Nut

MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80555



MOUNTING KIT INSTALLATION

TRENCHER MOUNTING KIT #80555

NO	REQ'D	PART NO.	DESCRIPTION
1	1	78247	Right Trencher Mount
2	1	78248	Left Trencher Mount
3	8	1140	.75" UNC x 2.25" Hex Capscrew
4	8	1649	.75" Hard Flat Washer
5	8	1231	.75" UNC Hex Nut

MOUNTING KIT INSTALLATION

650 TRENCHER

GENERAL INFORMATION

A mounting kit is required to attach the 650 trencher to your skid- steer loader. Your trencher may have been shipped with the mounting kit installed. The following instructions are provided here to help you install the mounting kit in the case that yours was not installed at the factory.

This manual contains a diagram and parts list of the mounting kits located in the front of this section. To determine which mounting kit you need for your skid-steer loader, refer to the Fit-Up Chart in Section D. Study the diagram and familiarize yourself with the names of the various parts. This knowledge will assist you in understanding these instructions. Read the the complete mounting instructions that follow before you begin. Read all safety warnings before operating the trencher.

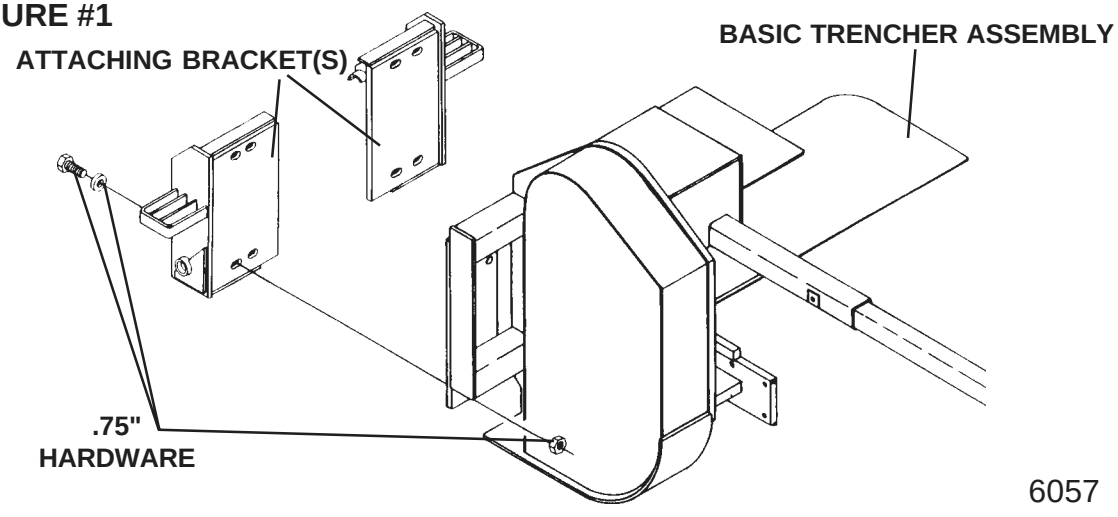
In addition to a complete trencher assembly and mounting kit, you will need hydraulic hoses and couplers to hook up the trencher to your skid steer high flow auxiliary hydraulic system and also a case drain line must be installed going directly from the trencher hydraulic motor to the skid steer reservoir tank. You should be able to purchase the necessary hydraulic supplies from your skid-steer dealer.

MOUNTING INSTRUCTIONS

1. Remove all shipping banding from around the trencher and attaching bracket(s). Remove any other mounting kit components from their packaging.

2. Mount the attaching bracket(s) to the mounting frame of the trencher using the .75" hardware provided. Use the mounting kit assembly diagram and parts list at the front of this section as a reference for the correct hardware needed. (See Figure #1)

FIGURE #1



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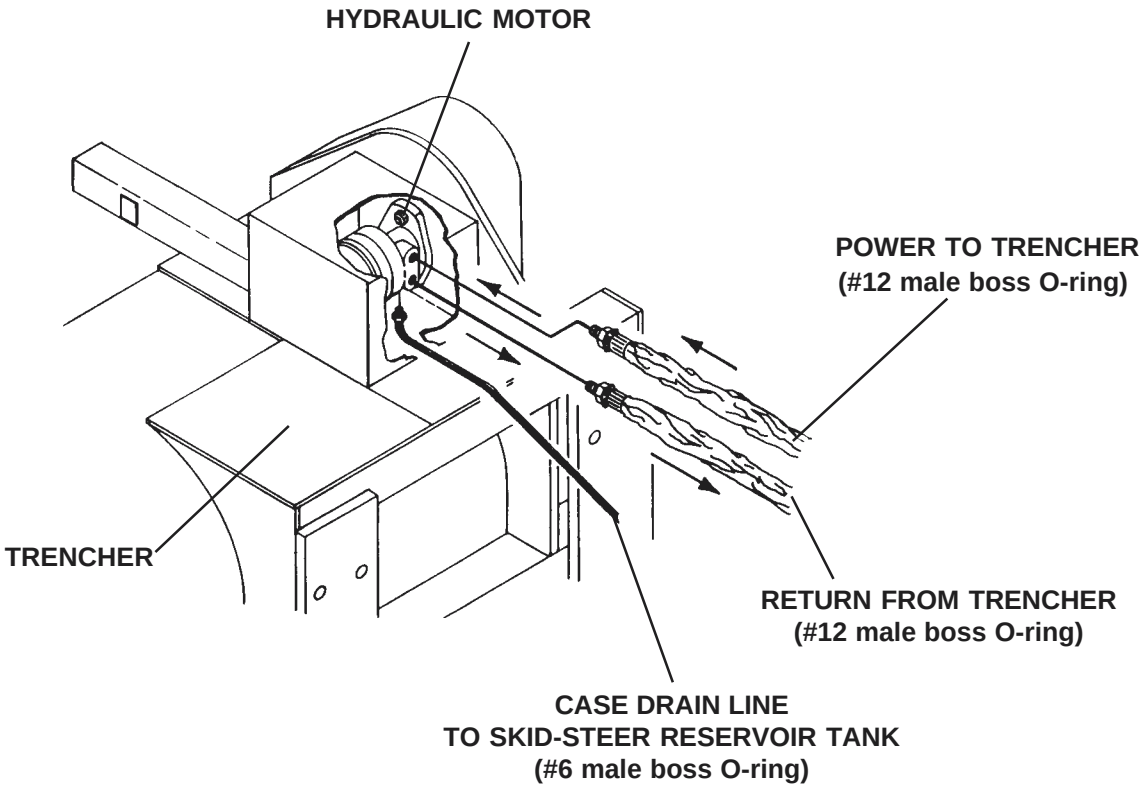
MOUNTING KIT INSTALLATION

650 TRENCHER

3. Install a case drain line from the hydraulic motor on the trencher to the reservoir tank on your skid-steer .

4. See your skid-steer owner's manual for proper identification of auxiliary hydraulic coupler flow. See Figure #2 for trencher hydraulic motor flow pattern. Install your hydraulic hoses and fittings as per the flow pattern indicated.

FIGURE #2



TRENCHER INSTALLATION

650 TRENCHER

GENERAL INFORMATION

The following instructions will help you to mount your trencher on your skid-steer. The trencher uses the skid-steer's quick-change attaching system for ease of installation. Therefore, if you know how to attach the skid-steer loader bucket, attaching the trencher should prove no problem.

You must install the mounting kit prior to installing the trencher. If you have not installed the mounting kit, turn to Section E and do it now. Remember to read all safety warnings, decals, and operating instructions before operating the skid-steer or trencher.

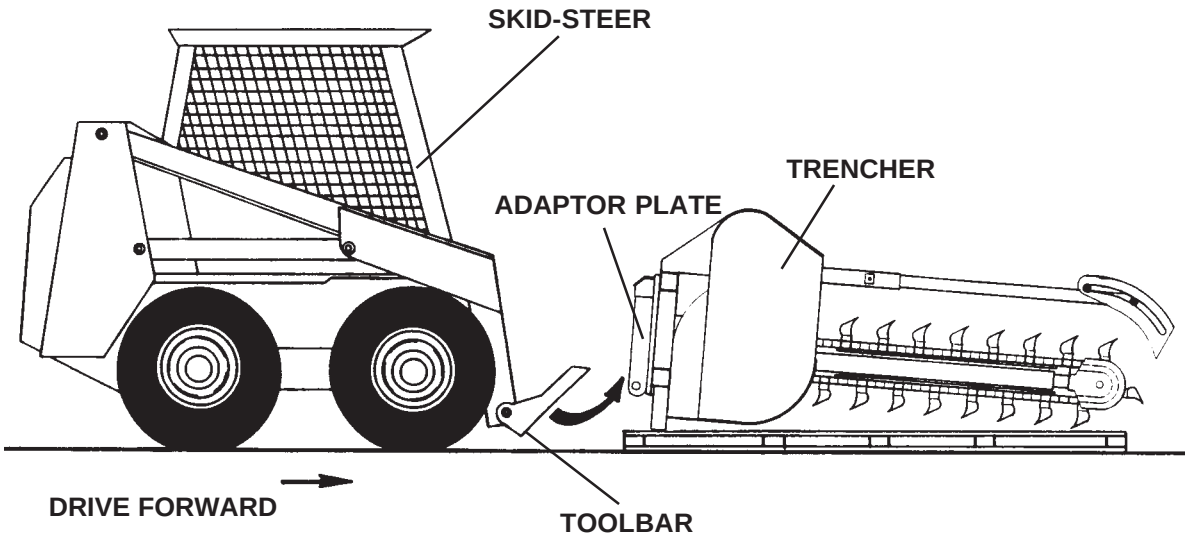
MOUNTING INSTRUCTIONS

1. If you haven't done so already, remove the steel shipping banding from around the trencher and skid.

2. Set the quick-change attaching lock on the skid-steer toolbar to the un-locked position. Lower the skid-steer loader arms and tilt the toolbar down low enough to pass under the top lip of the mounting kit adaptor plate.

3. Following all standard safety practices, start the skid-steer and slowly drive it in back of the trencher. Position the skid-steer so that the top of the toolbar is in under the lip on the adaptor plate. (See Figure #1)

FIGURE #1



TRENCHER INSTALLATION

650 TRENCHER

4. Tilt the toolbar back to hook the trencher onto the toolbar. It may be necessary to lift the loader arm somewhat.

5. Set the quick-change attaching lock to the locked position to secure the trencher. It may be necessary to raise, lower, or tilt the toolbar in order for the trencher mount and toolbar to properly align so the locking mechanism can be activated.

NOTE: Auxiliary hydraulic hoses and couplers must be obtained from your dealer.

WARNING! THE HYDRAULIC MOTOR LOCATED ON THE TRENCHER IS EQUIPPED WITH CASE DRAIN. A CASE DRAIN LINE MUST BE INSTALLED GOING FROM THE HYDRAULIC MOTOR DIRECTLY TO THE RESERVOIR TANK ON YOUR SKID-STEER.

FAILURE TO INSTALL A CASE DRAIN LINE FROM THE TRENCHER'S HYDRAULIC MOTOR TO THE SKID-STEER RESERVOIR TANK WILL CAUSE DAMAGE OR FAILURE OF THE HYDRAULIC MOTOR.

6. With the auxiliary hydraulic system turned off, route the trencher hydraulic hoses over the top of the mount and toolbar and connect to their proper auxiliary couplers. (Check that a case drain line is installed from the hydraulic motor on the trencher to the skid-steer reservoir tank.)

7. Complete the predelivery check list located in the back of this manual (Section R). Trencher installation is now complete.

OPERATING INSTRUCTIONS

CONTROLS
650 TRENCHER

GENERAL INFORMATION

Simplicity of operation is one of the key features of the 650 trencher. The trenchers themselves have no controls, 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 skid-steer. Such knowledge is crucial for safe, efficient operation of equipment. Take the time to learn how they operate now.

SKID STEER

Your trencher mounts to the toolbar / attachment plate of the skid- steer. Due to this arrangement, thorough knowledge of the skid-steer controls is necessary for trencher operation. Read your skid-steer owner's manual for information regarding skid-steer operation before attempting to use the trencher.

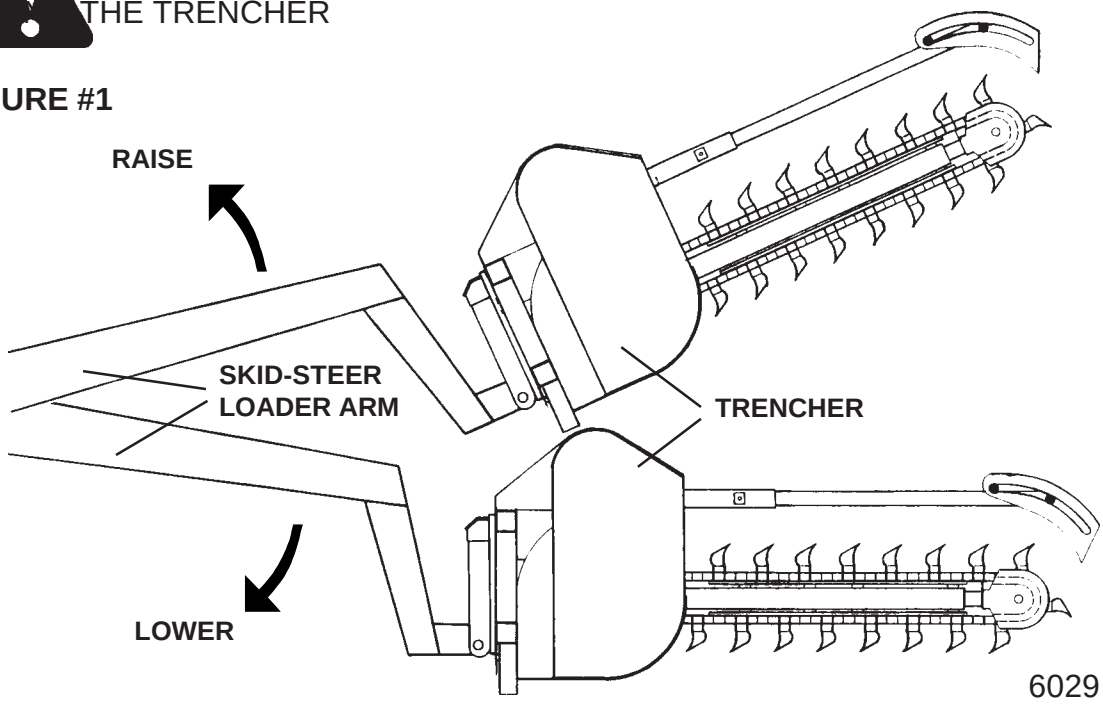
RAISING / LOWERING THE TRENCHER

Raise / lower the trencher unit by raising / lowering the skid-steer loader arms through their appropriate skid-steer controls. (See Figure #1)

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 serious injury or death.

TI[illegible]THE TRENCHER

FIGURE #1



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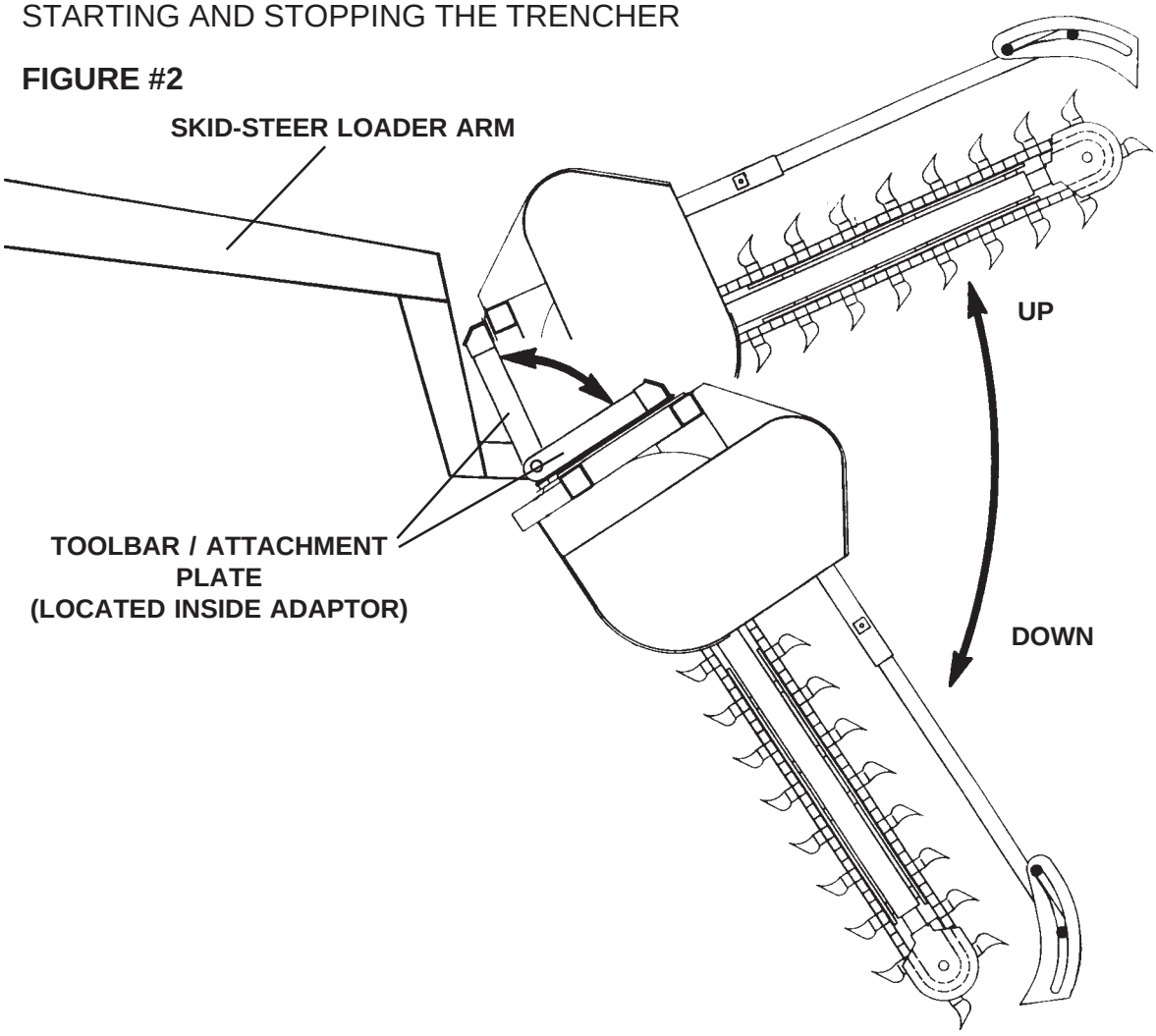
OPERATING INSTRUCTIONS

CONTROLS
650 TRENCHER

Tilt the trencher unit up or down by tilting the toolbar / attachment plate back or forward through its skid-steer control. We recommend a 60° digging angle for general trenching as measured from ground level (the horizon). (See Figure #2)

STARTING AND STOPPING THE TRENCHER

FIGURE #2



Power to the trencher is supplied by oil from the skid-steer auxiliary hydraulic system, which passes through the hydraulic hoses and into the trencher's hydraulic motor.

The trencher unit itself does not have an on/off control but is operated by the skid-steer auxiliary hydraulic control mechanism. To start the trencher, engage the auxiliary hydraulics. (See your skid-steer owner's manual.) To stop the trencher, disengage the auxiliary hydraulics.

OPERATING INSTRUCTIONS

CONTROLS
650 TRENCHER

TRENCHER SPEED CONTROL

Again it may be noted that power to the trencher is supplied by the skid-steer's auxiliary hydraulics. Trencher speed and power are determined by the flow of oil coming out of the auxiliary system, which in turn is dependent upon skid-steer engine speed. To increase trencher speed, increase skid-steer engine speed, to decrease trencher speed, decrease skid-steer engine speed.

When first starting a trench throttle down the skid-steer engine to half throttle. This will reduce the shock to the skid-steer and trencher when the digging teeth first contact the ground. Once the trench is started, set the engine back to full throttle.

For general use operate the trencher with the-skid steer engine at full throttle to provide maximum power to the auxiliary hydraulics and thus the trencher.

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 built-in skid shoe on the 650 trencher will prevent the auger from being lowered to the extent that the auger itself starts to dig in the ground as this will greatly reduce efficiency.

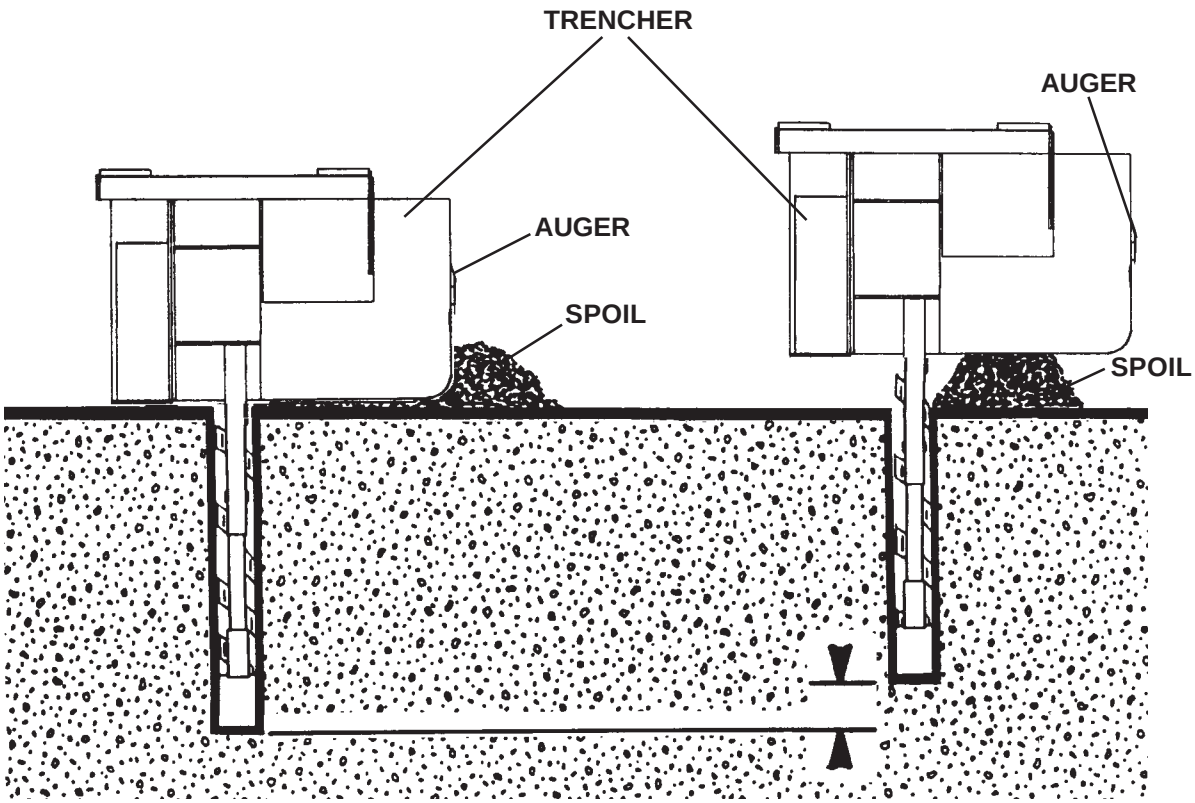
It should be noted that raising or lowering the trencher to change the auger height will also change the trenching depth. You will need to compensate for this by changing the tilt of the trencher down or up accordingly. (See Figure #3 on the next page.)

CRUMBER SHOE/BAR ADJUSTMENT

OPERATING INSTRUCTIONS

CONTROLS
650 TRENCHER

FIGURE #3



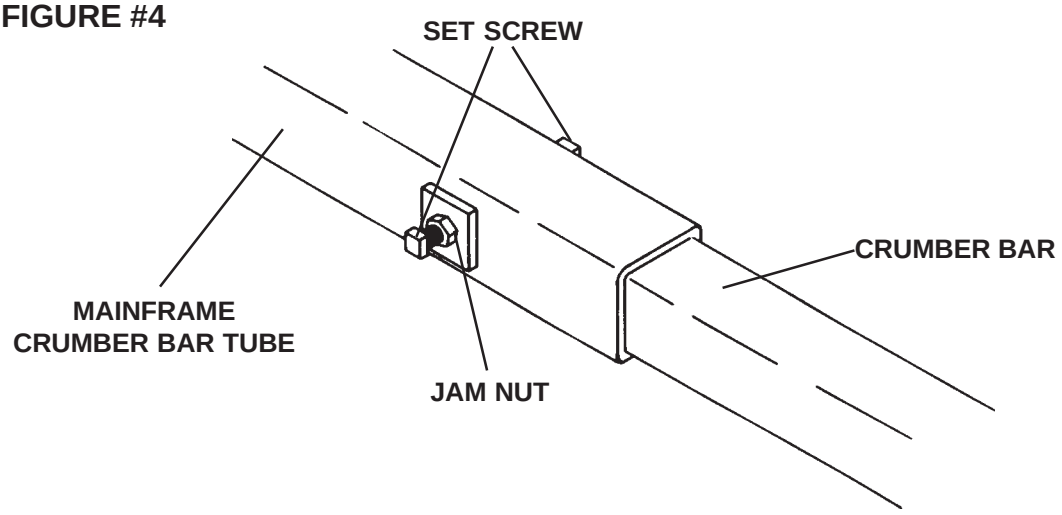
The purpose of the crumber shoe is to keep any loose dirt in the trench close enough to the digging chain so that the digging teeth can grab it and remove it. This will give you a cleaner finished trench. Your trencher has an adjustable crumber bar that can be lengthened or shortened to bring the crumber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

To adjust the crumber bar length, loosen the two jam nuts found at the end of the mainframe crumber bar 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 #4 on the next page)

OPERATING INSTRUCTIONS

CONTROLS
650 TRENCHER

FIGURE #4

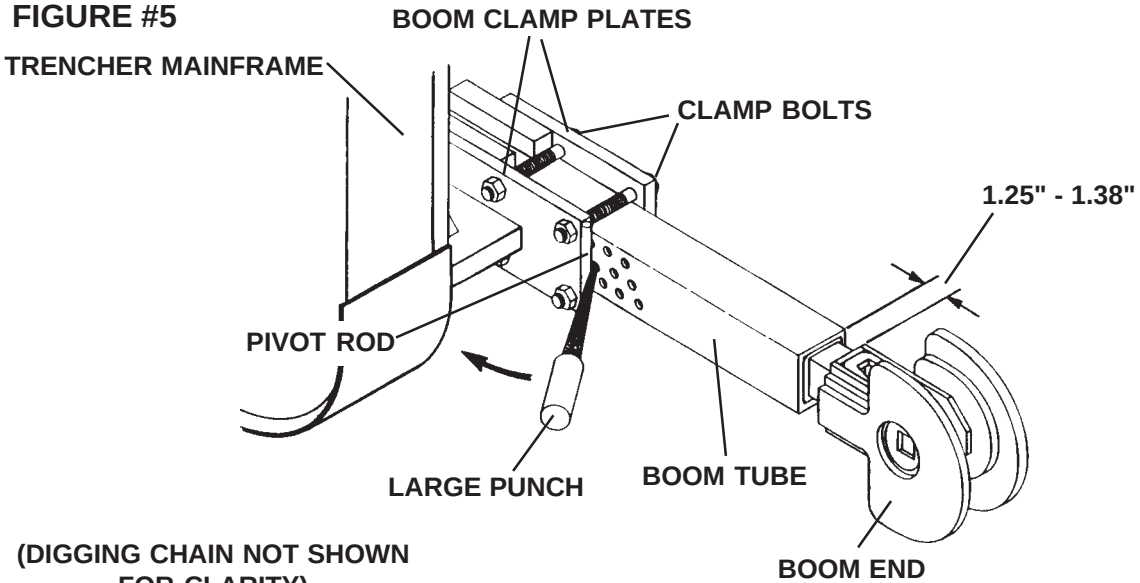


CHAIN TENSION ADJUSTMENT

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" and 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 #5)

FIGURE #5



(DIGGING CHAIN NOT SHOWN FOR CLARITY)

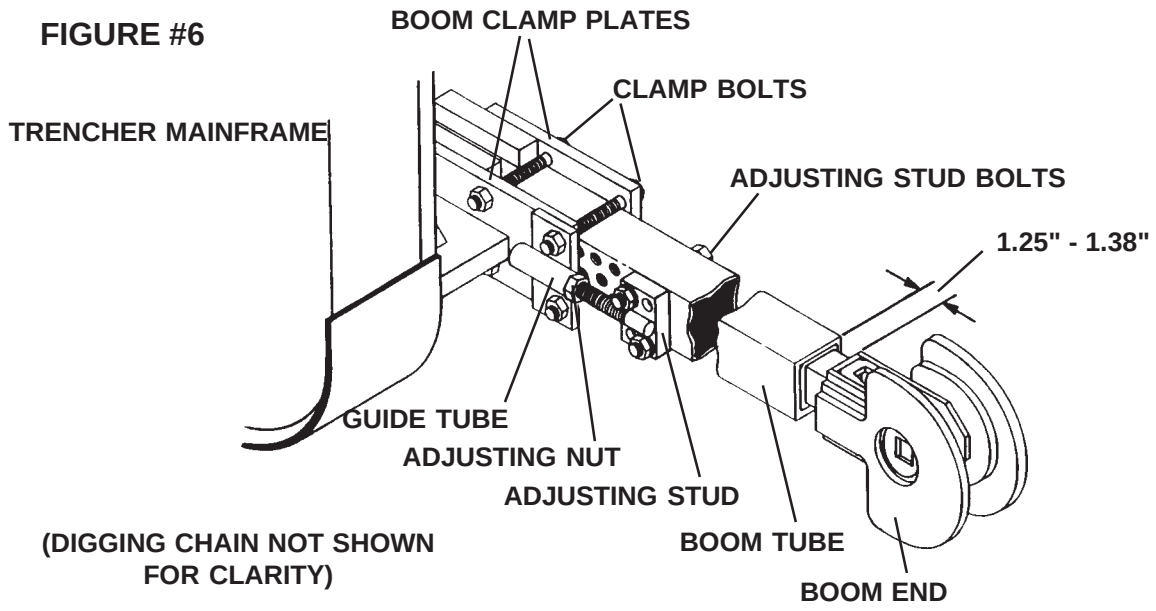
OPERATING INSTRUCTIONS

CONTROLS
650 TRENCHER

CHAIN TENSION ADJUSTMENT (CONTINUED)

For the longer booms (48" and 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 #6.)

FIGURE #6



If the adjusting stud is too short to obtain proper chain tension tighten the four clamp plate bolts. Remove the two adjusting stud 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

CONTROLS
650 TRENCHER

DRIVE CHAIN ADJUSTMENT

Drive chain tension is maintained by a chain tightener and sprocket located inside the chain cover on the right side of your trencher.

Remove the four (4) .31" UNC X .75" capscrews on the chain cover and remove the chain cover to gain access to the drive chain.

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 or chain and be severely injured or killed.**

It is common for your trencher to need its drive chain adjusted after the first eight (8) working hours of operation as the chain and sprocket seat themselves and after every one hundred (100) working hour interval thereafter.

NOTE: Chain is properly adjusted when the long side of chain can be moved by hand ½" either way from centerline of chain.

To adjust the drive chain on your trencher assembly, loosen the two (2) .75" UNC X 1.50" capscrews located on the chain tightener and rotate the chain tightener until the opposite side of chain can be moved by hand ½" either way from centerline.

Position chain cover into place and reinstall four (4) .31" UNC X .75" capscrews, lock washers and flat washers.

WARNING! **Replace all safety covers and guards after performing maintenance. Never operate trencher with chain cover removed, serious injury or death may occur.**

Chain tension is important to monitor since improper tension will cause high wear rates on the chain and sprockets.

IMPORTANT: When replacing the drive chain or drive sprockets on your trencher we recommend replacing all three sprockets and the drive chain at the same time to avoid excessive wear of replacement parts.

When replacing digging chain or digging sprockets on your trencher we recommend replacing all at the same time to avoid excessive wear of replacement part.

OPERATING INSTRUCTIONS

OPERATING TECHNIQUES
SKID STEER 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 it's 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. (See Section B)

CAUTION! **Operate the trencher only when seated at the skid steer controls.**

Do not operate the skid steer 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.

Always use a crumber assembly on the trencher.

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 on any potential hazards in the area. He should have a complete understanding of the task 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 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, sprocket, boom, crumber bar and shoe for the job at hand. Information on chains, sprockets, booms, crumber bars and shoes may be found in Sections I and J.

OPERATING INSTRUCTIONS

OPERATING TECHNIQUES
SKID-STEER TRENCHERS

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

STARTING THE TRENCH

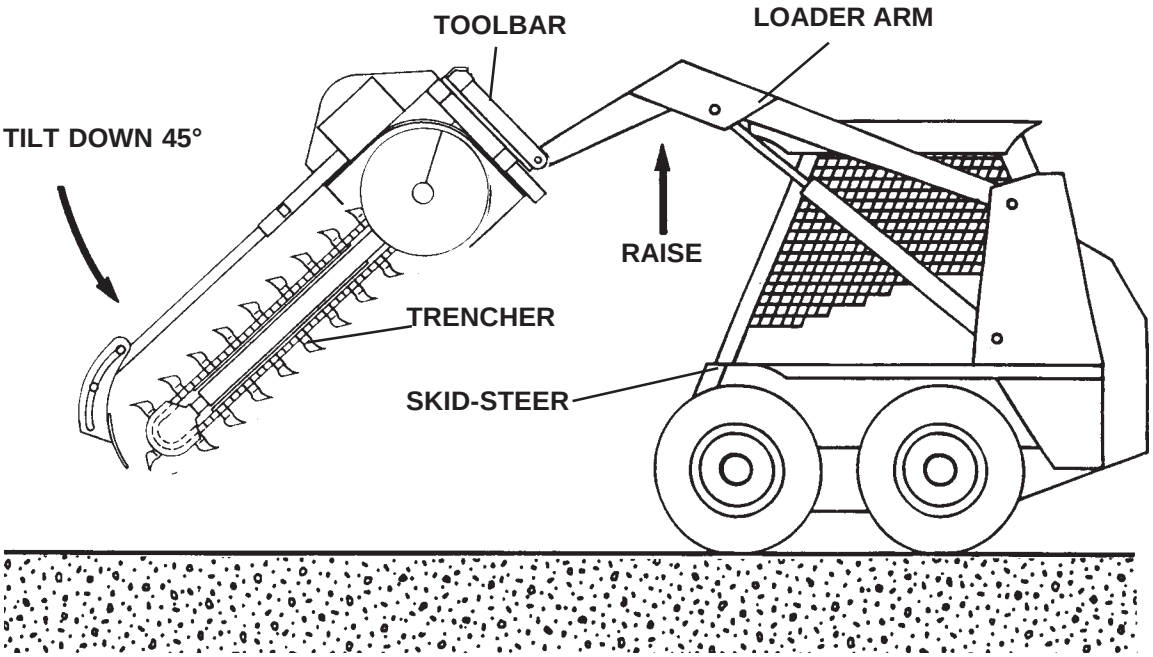
Position the skid-steer with the trencher boom directly over the center of the trench layout. It will take about 4' of trenching before the trencher will be able to operate at the desired level, so plan for this and position the trencher about 4' behind where you want the actual trench to start.

NOTE: The skid-steer is driven in <u>reverse</u> when trenching. You cannot trench driving the skid-steer forward.

Raise the trencher with the skid-steer loader arms and tilt the trencher at a 45° angle. (See Figure #7) Position the unit so that the digging teeth are just above ground level.

Set the skid-steer throttle at half speed. Start the digging chain by engaging the skid-steer auxiliary hydraulic system.

FIGURE #7



OPERATING INSTRUCTIONS

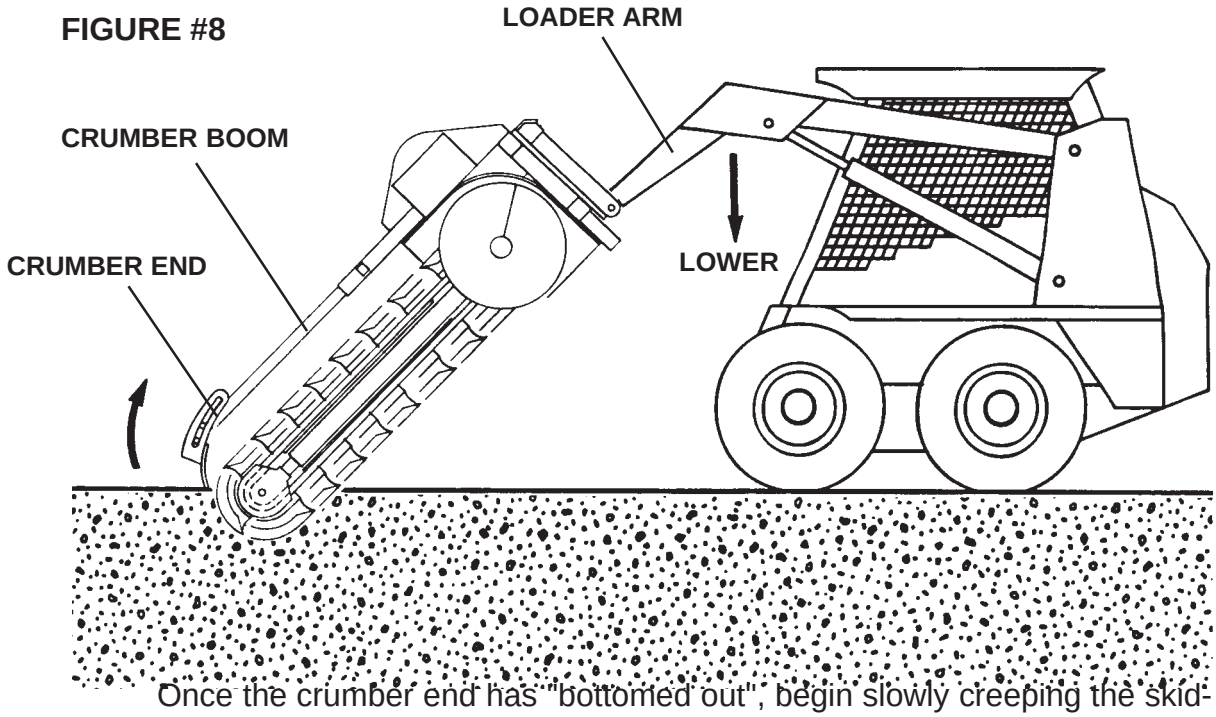
OPERATING TECHNIQUES
SKID-STEER TRENCHERS

CAUTION! **When lowering a moving digging chain to the ground the force of the teeth grabbing the ground will try to pull the trencher suddenly forward. Be prepared. Have the brake on the skid-steer set to help counteract the force.**

Slowly lower the digging chain into the ground to start the trench. Do this by lowering the trencher with the loader arms. Continue lowering the unit until the crumber end rolls all the bay back on the crumber bar (See Figure #8)

IMPORTANT: After the crumber end has rolled all the way back, do not lower the trencher any farther without moving the skid-steer in reverse. Failure to do so could result in bending of the crumber boom, which is not covered by warranty.

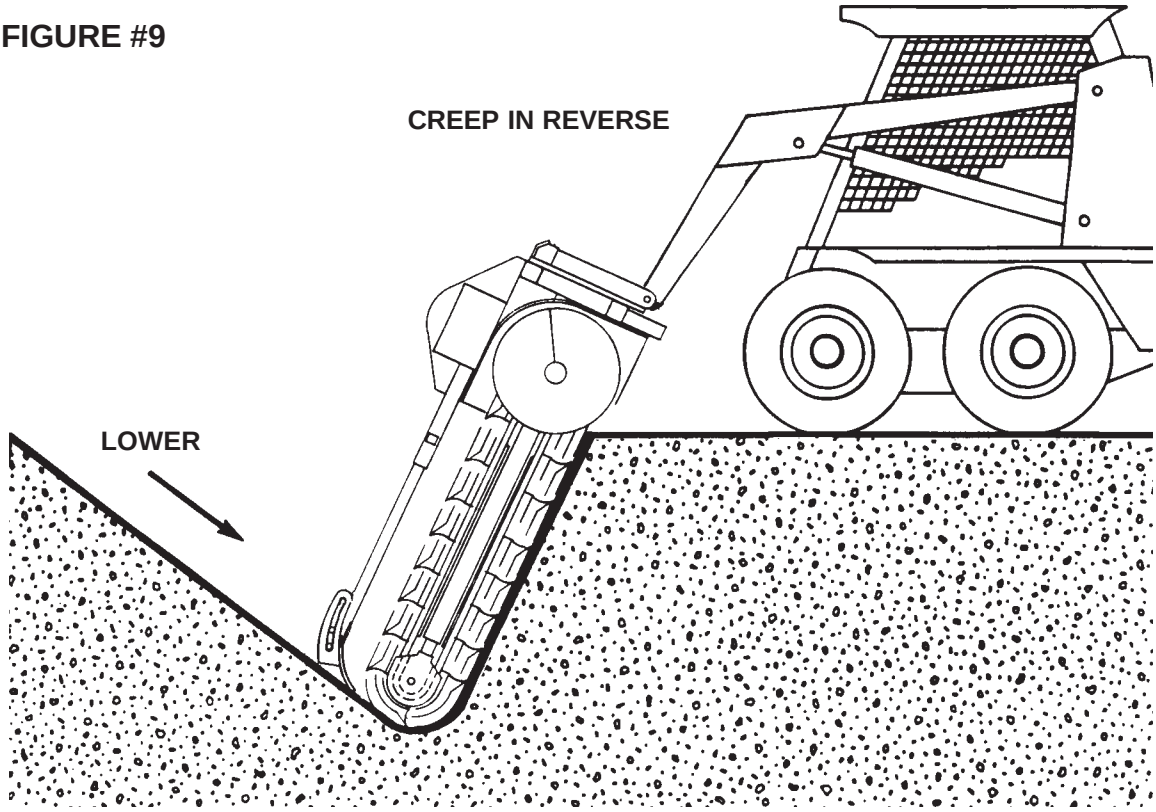
FIGURE #8



Once the crumber end has "bottomed out", begin slowly creeping the skid-steer in reverse while continuing to lower the loader arms. When nearing the required depth, stop lowering and tilt the trencher to a 60° to 65° angle. A 60° - 65° angle works best for general trenching. (See Figure #9)

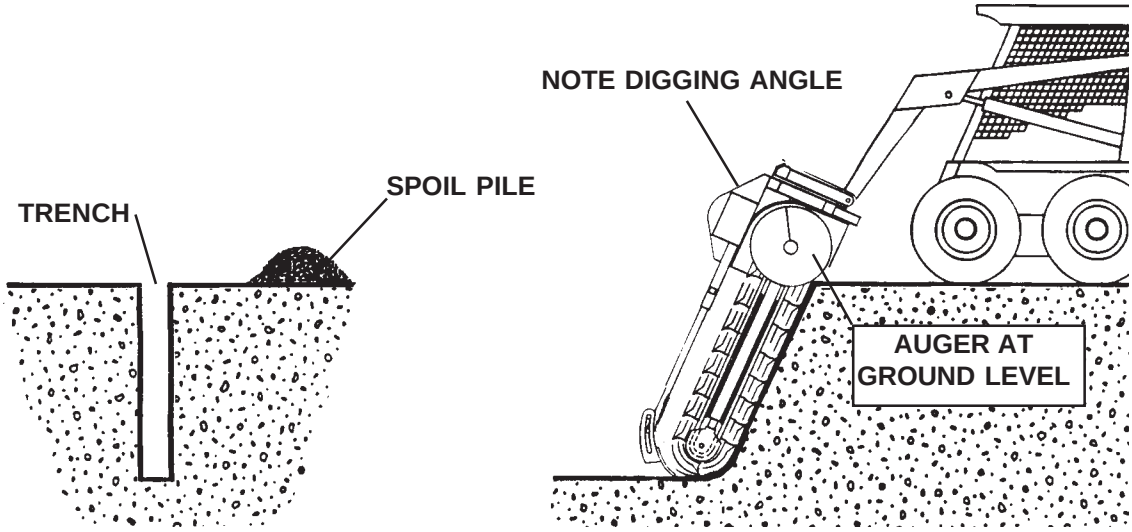
WARNING! **Be alert to what is happening around you. Look behind you before reversing the skid-steer to trench. Be aware of any person or thing in the path of the skid-steer. Observe any terrain changes such as drop-offs or soft ground.**

FIGURE #9



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. (See Figure #10)

FIGURE #10

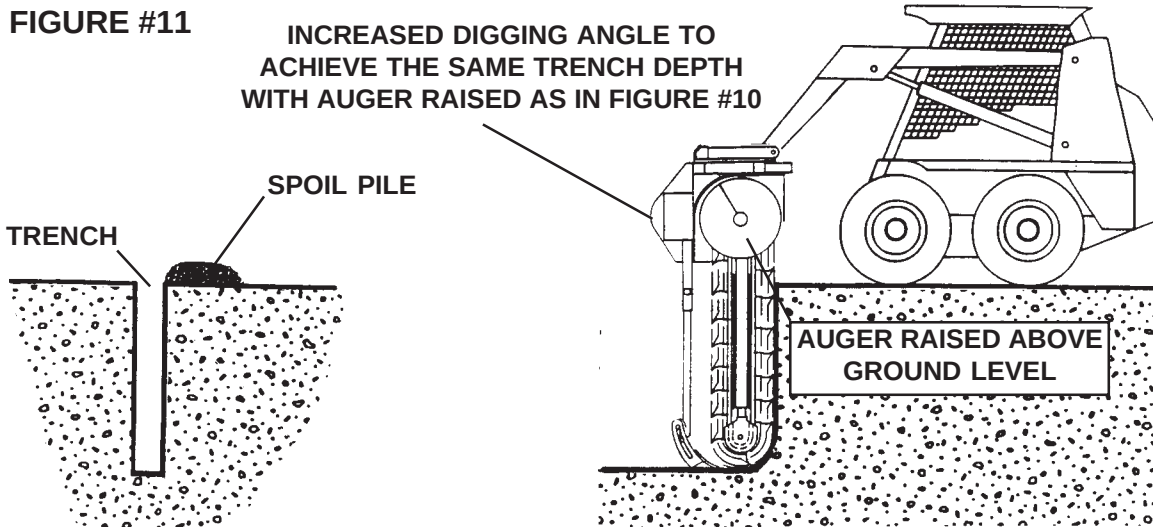


OPERATING INSTRUCTIONS

OPERATING TECHNIQUES
SKID-STEER TRENCHERS

Raise the trencher so that the auger rides above the ground level to leave the spoil beside the trench. The higher the auger, the closer to the trench the spoil will be placed. 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. (See Figure #11)

FIGURE #11



With the desired trench depth reached, advance the skid-steer throttle to the desired engine RPM (we suggest full throttle for maximum digging power). Continue creeping the skid-steer in reverse. Monitor the skid-steer hydraulic oil pressure and temperature gauges as you trench. If hydraulic oil temperature or pressure gets too high, reduce skid-steer creeping speed to reduce the load on the auxiliary hydraulic system.

IMPORTANT: Trying to trench at a speed faster than the auxiliary hydraulic system can handle could cause the trencher to stall. Continued stalling in a short period of time can cause excessive oil temperature which can lead to pump failure. Do not try to trench too much too quickly. If oil temperature becomes too hot, stop the trencher and allow the oil to cool.

STALLING THE TRENCHER

If the trencher stalls while digging, move the skid-steer forward slightly to free the trencher. You may be able to free up the digging chain by changing its direction of travel with the auxiliary hydraulic controls. Repeated stalling of the trencher will cause oil to overheat rapidly and should be avoided.

OPERATING INSTRUCTIONS

OPERATING TECHNIQUES
SKID-STEER TRENCHERS

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 #12 & #13) 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 too tightly while trenching will cause the trencher to jam in the trench and stall, leading to excessive oil temperatures. Turning too tightly can also cause the trencher boom to bend. Take it easy when turning. Proceed slowly with caution.

FIGURE #12

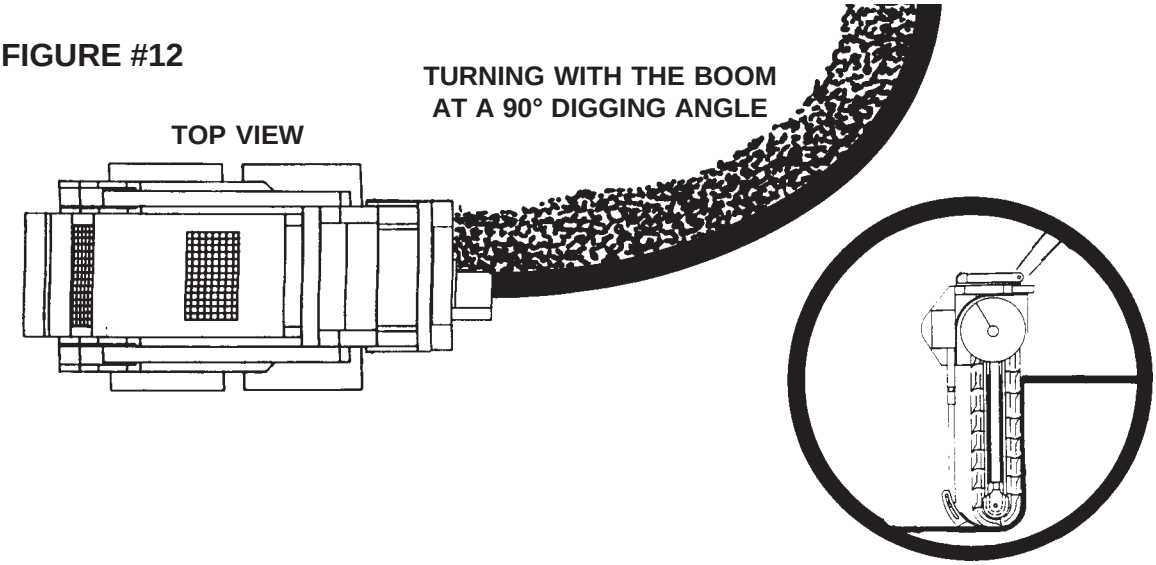
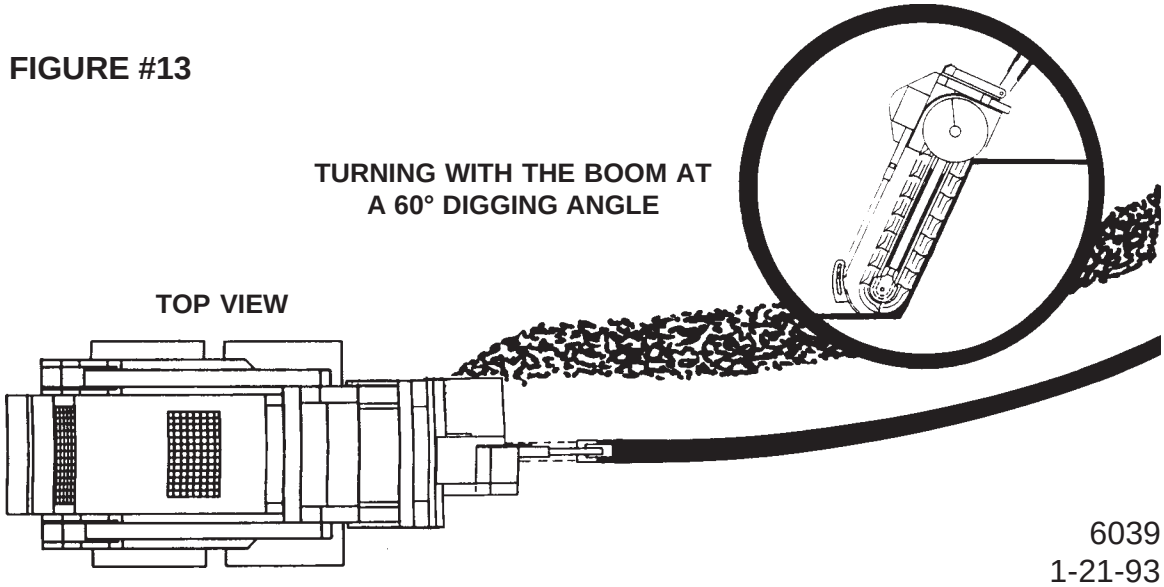


FIGURE #13



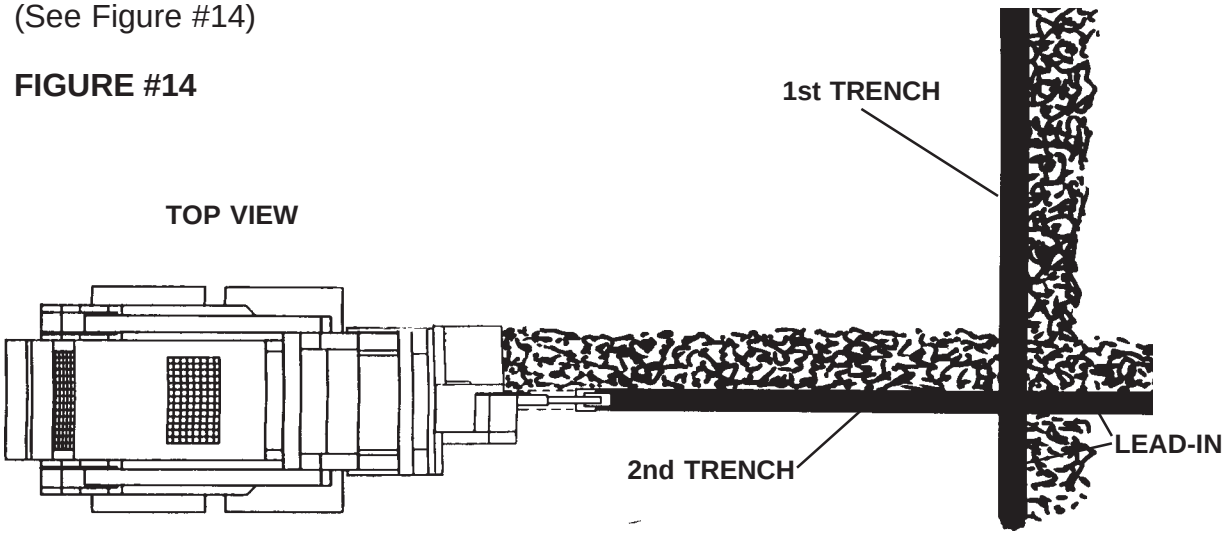
OPERATING INSTRUCTIONS

OPERATING TECHNIQUES
SKID-STEER TRENCHERS

MAKING SHARP TURNS

To make sharp turns and 90° angles 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 #14)

FIGURE #14

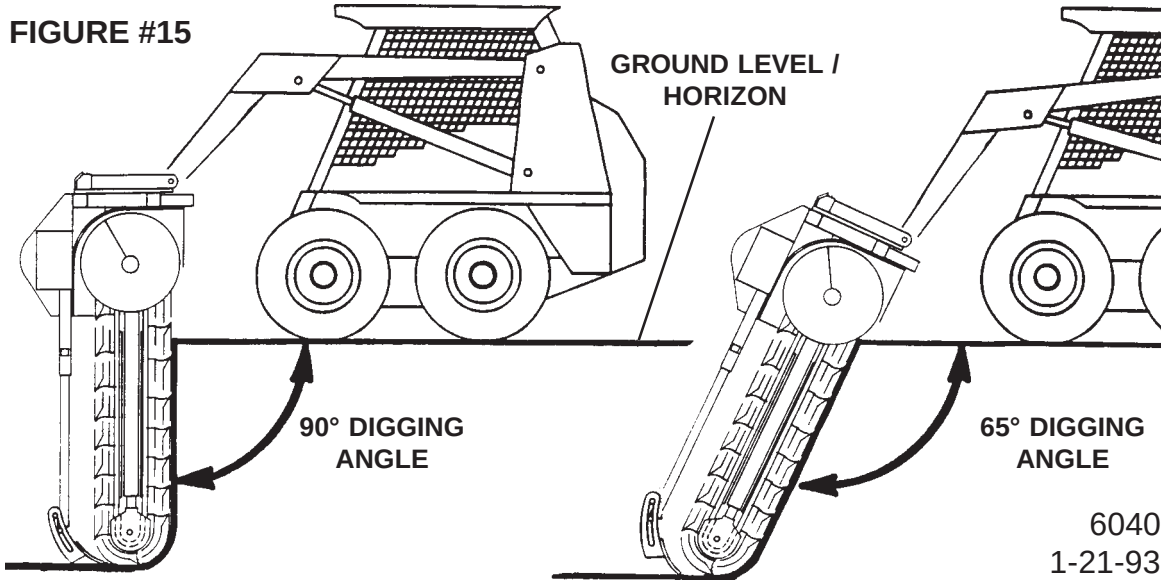


RECOMMENDED DIGGING ANGLES

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. (See Figure #15)

A 60° - 65° digging angle is recommended for normal trenching. At this angle there will be less carry-over, and a cleaner trench bottom can be maintained than at a 90° angle. (See Figure #15)

FIGURE #15



OPERATING INSTRUCTIONS

OPERATING TECHNIQUES
SKID-STEER TRENCHERS

TRENCHING WITHOUT THE CRUMBER ASSEMBLY

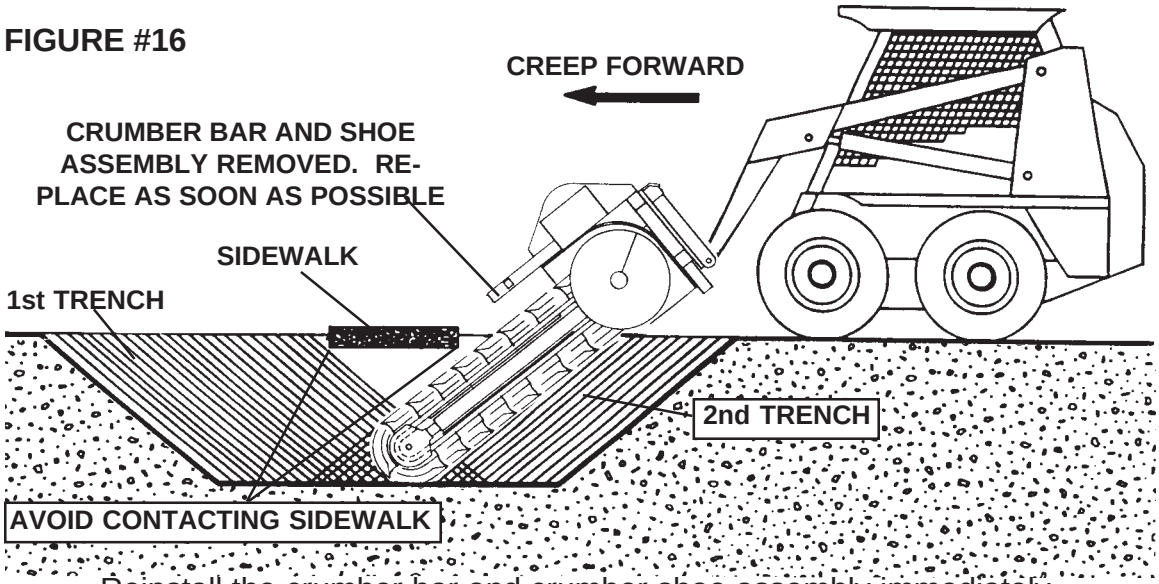
WARNING! **The crumber bar and crumber shoe assembly are there for a reason, YOUR SAFETY! There are a few instances where removal may be necessary however. In these cases operate with extreme caution. Reinstall the crumber bar and crumber shoe as soon as possible.**

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

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

After you have gone as far as you can without contacting the sidewalk, drive the skid-steer in reverse 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 #16)

FIGURE #16



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

ENDING A 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 skid steer loader arms to lift the unit clear of the trench. When the trencher has cleared the trench, disengage the auxiliary hydraulics to stop the trencher. Drive the skid steer away from the trench.

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 skid steer will be. You do not want the trencher so low that the digging teeth touch the 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

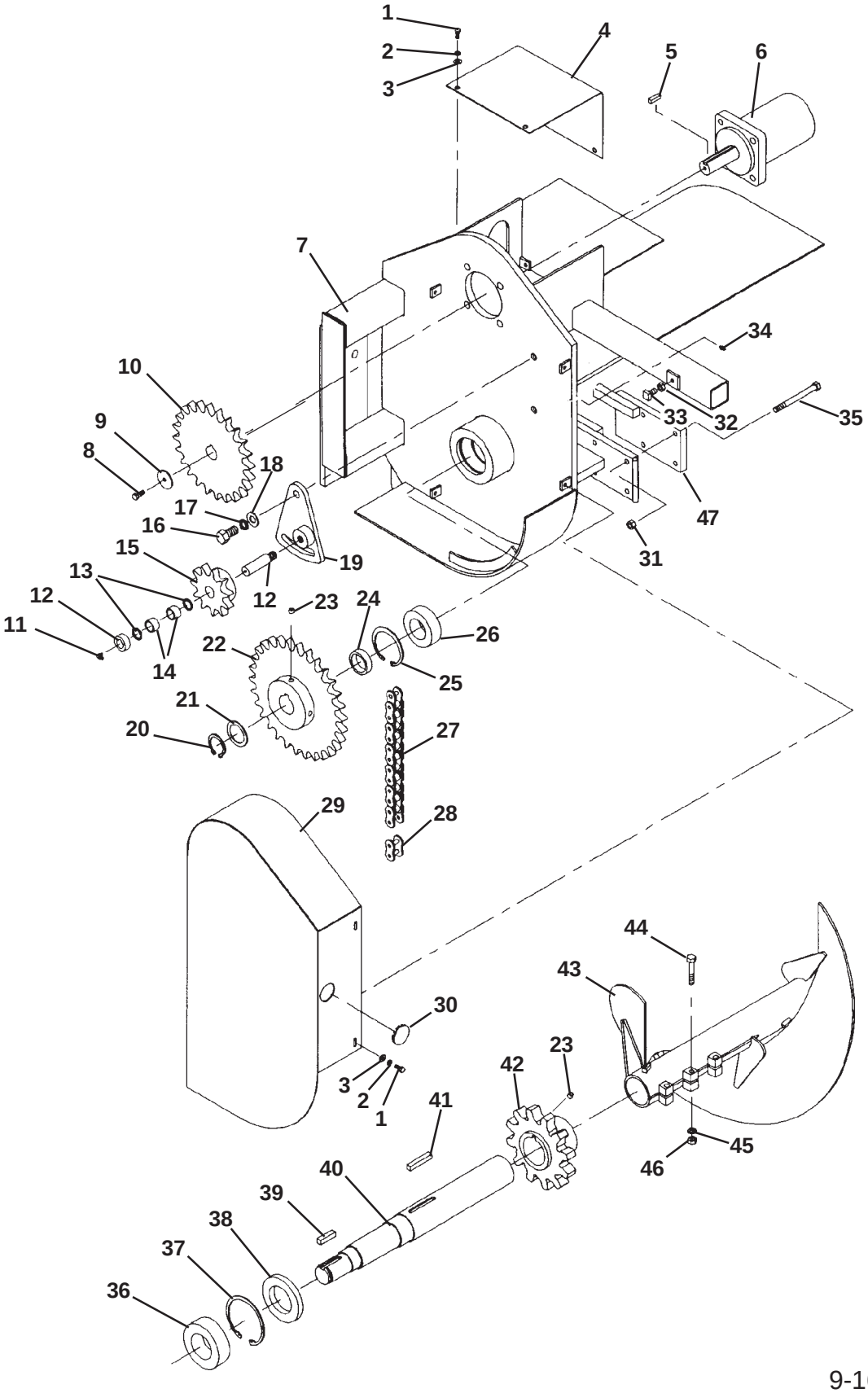
Remember that your trencher's performance is directly related to the power available at you skid steer's auxiliary hydraulic system. If the trencher seems to lack power or speed, it may be due to your skid steer's lack of sufficient auxiliary power.

Trencher performance is also related to how well it's maintained, digging tooth wear, and type and size of digging chain, crumber boom and shoe used. For more information on proper maintenance and chain wear see Section L. For information on chain, sprocket, boom, and crumber options see Sections I and J. If problems arise see "Trouble Shooting" Section N.

TRENCHER ASSEMBLY

650 TRENCHER ASSEMBLIES

ASSEMBLY #80500 - 16-Tooth Sprocket / ASSEMBLY #80502 - 19-Tooth Sprocket,
ASSEMBLY #80501 - 22-Tooth Sprocket / ASSEMBLY #80503 - 24-Tooth Sprocket



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TRENCHER ASSEMBLY

650 TRENCHER ASSEMBLIES

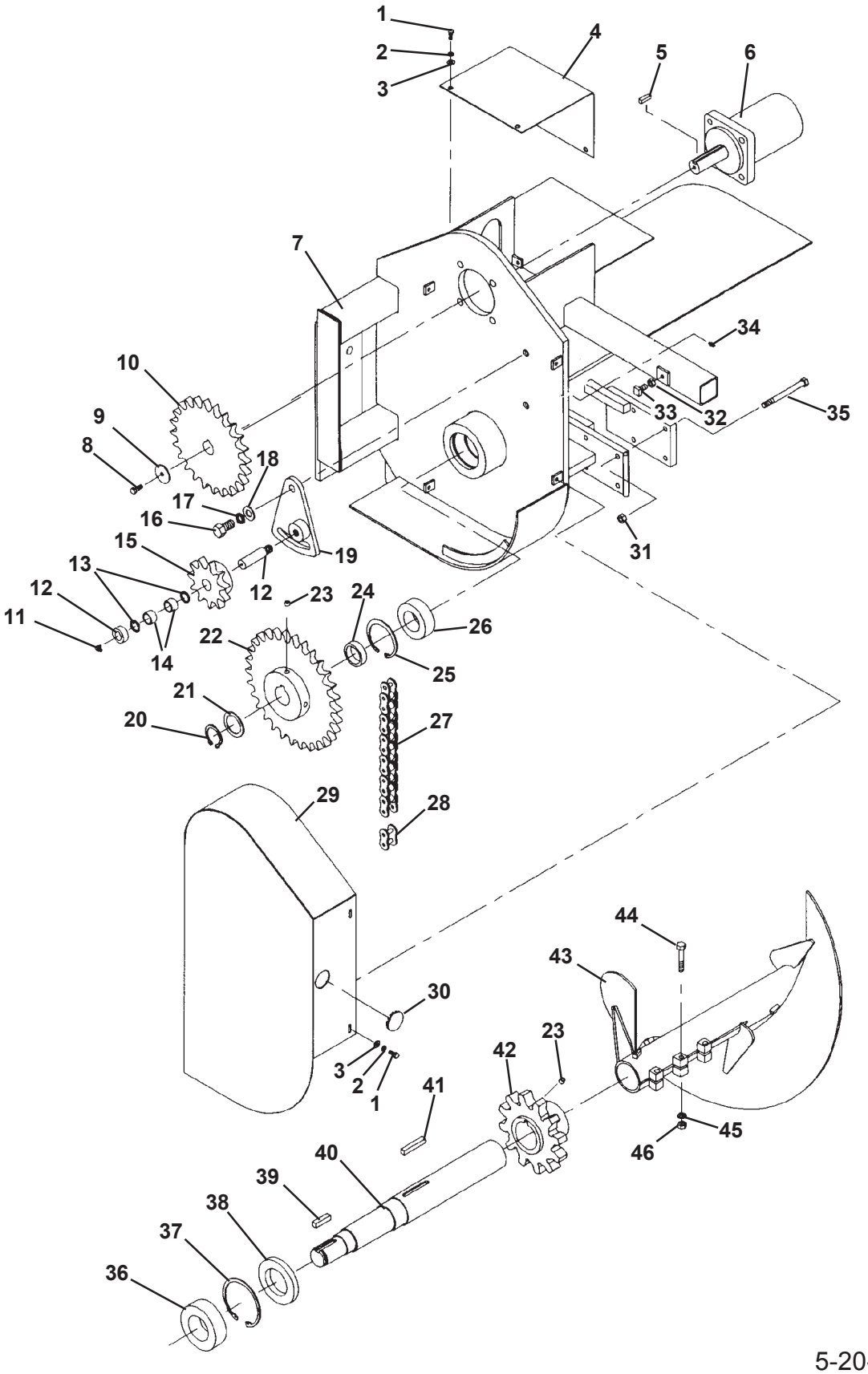
ASSEMBLY #80500 - 16-Tooth Sprocket / ASSEMBLY #80502 - 19-Tooth Sprocket,
ASSEMBLY #80501 - 22-Tooth Sprocket / ASSEMBLY #80503 - 24-Tooth Sprocket

NO	REQ'D	PART NO.	DESCRIPTION
1	8	1021	.31" UNC X .75" Hex Capscrew
2	8	1502	.31" Lock Washer
3	8	1513	.31" Flat Washer
4	1	80378	Motor Cover
5	1	80753	Replacement Key
6	1	80337	Motor
		45612	Replacement Shaft Seal Kit
	4	1093	.50" UNC X 2.25" Hex Capscrew
	4	1505	.50" Lock Washer
	4	1228	.50" UNC Hex Nut
7	1	80351	Mainframe
8	1	1043	.38" UNC X 1.00" Hex Capscrew
9	1	80403	Washer
10	1	80334	16 Tooth Sprocket (Assembly #80500)
		80336	19 Tooth Sprocket (Assembly #80502)
		80335	22 Tooth Sprocket (Assembly #80501)
		80332	24 Tooth Sprocket (Assembly #80503)
11	1	53031	90° Grease Zerk
12	1	80339	Tightener Shaft with Collar
13	2	45602	Seal
14	2	80388	Bearing
15	1	80338	11 Tooth Sprocket
16	2	1137	.75" UNC X 1.50" Hex Capscrew
17	2	1507	.75" Lock Washer
18	2	1518	.75" Flat Washer
19	1	80344	Chain Tightener
20	1	1901	Snap Ring
21	As Req'd	78198	Thrust Washer
22	1	80333	30 Tooth Sprocket
23	5	1572	Set Screw
24	1	80368	Spacer
25	1	1601	Snap Ring

TRENCHER ASSEMBLY

650 TRENCHER ASSEMBLIES

ASSEMBLY #80500 - 16-Tooth Sprocket / ASSEMBLY #80502 - 19-Tooth Sprocket,
ASSEMBLY #80501 - 22-Tooth Sprocket / ASSEMBLY #80503 - 24-Tooth Sprocket



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TRENCHER ASSEMBLY

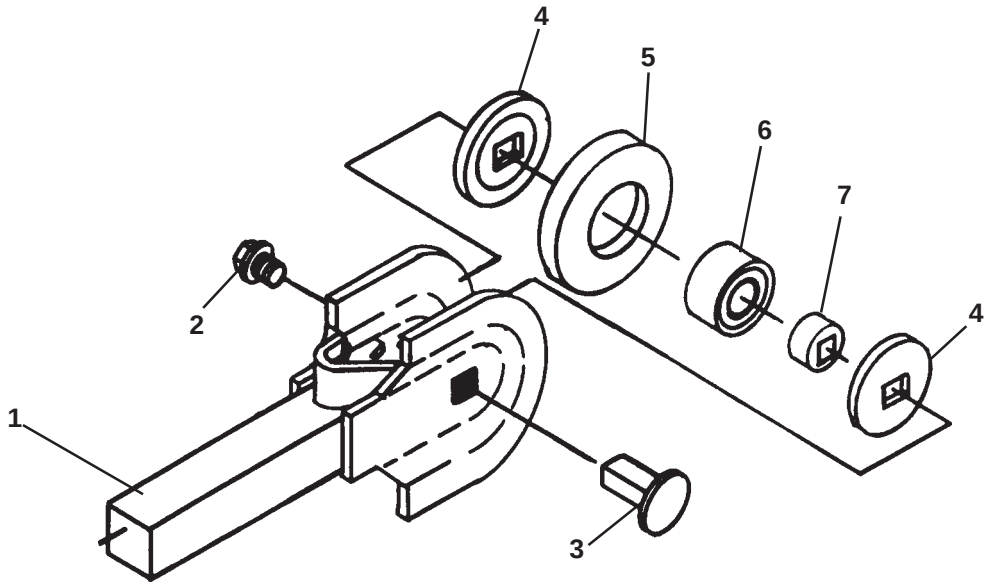
650 TRENCHER ASSEMBLIES

ASSEMBLY #80500 - 16-Tooth Sprocket / ASSEMBLY #80502 - 19-Tooth Sprocket,
ASSEMBLY #80501 - 22-Tooth Sprocket / ASSEMBLY #80503 - 24-Tooth Sprocket

NO	REQ'D	PART NO.	DESCRIPTION
26	1	8085	Bearing
27	1	80428	16 Tooth Sprocket Drive Chain (52 Pitches) (Includes 1 Connector Link Item #29)
		80429	19 Tooth Sprocket Drive Chain (54 Pitches) (Includes 1 Connector Link Item #29)
		80429	22 Tooth Sprocket Drive Chain (54 Pitches) (Includes 1 Connector Link Item #29)
		80728	24 Tooth Sprocket Drive Chain (56 Pitches) (Includes 1 Connector Link Item #29)
28	1	67451	Connector Link
29	1	80369	Chain Cover
30	1	7096	Button Plug
31	4	1542	.50" UNC Nylock Nut
32	2	1242	.50" UNC Hex Jam Nut
33	2	1769	.50" UNC X 1.00" Square Head Set Screw
34	1	6616	Grease Zerk
35	4	1984	.50" UNC X 5.50" Hex Capscrew GR 8
36	1	80340	Bearing
37	1	1710	Snap Ring
38	1	80366	Dirt Guard
39	1	53744	Key .50" Square X 2.00"
40	1	80352	Headshaft
41	1	80367	Key .50" Square X 3.00"
42	1	86213	Drive Sprocket
43	1	80381	Auger
44	3	1095	.50" UNC X 2.75" Hex Capscrew
45	3	1505	.50" Lock Washer
46	3	1228	.50" UNC Hex Nut
47	1	87092	Boom Clamp

TRENCHER ASSEMBLY

BOOM END
(PART OF TRENCHER ASSEMBLIES)



TRENCHER ASSEMBLY

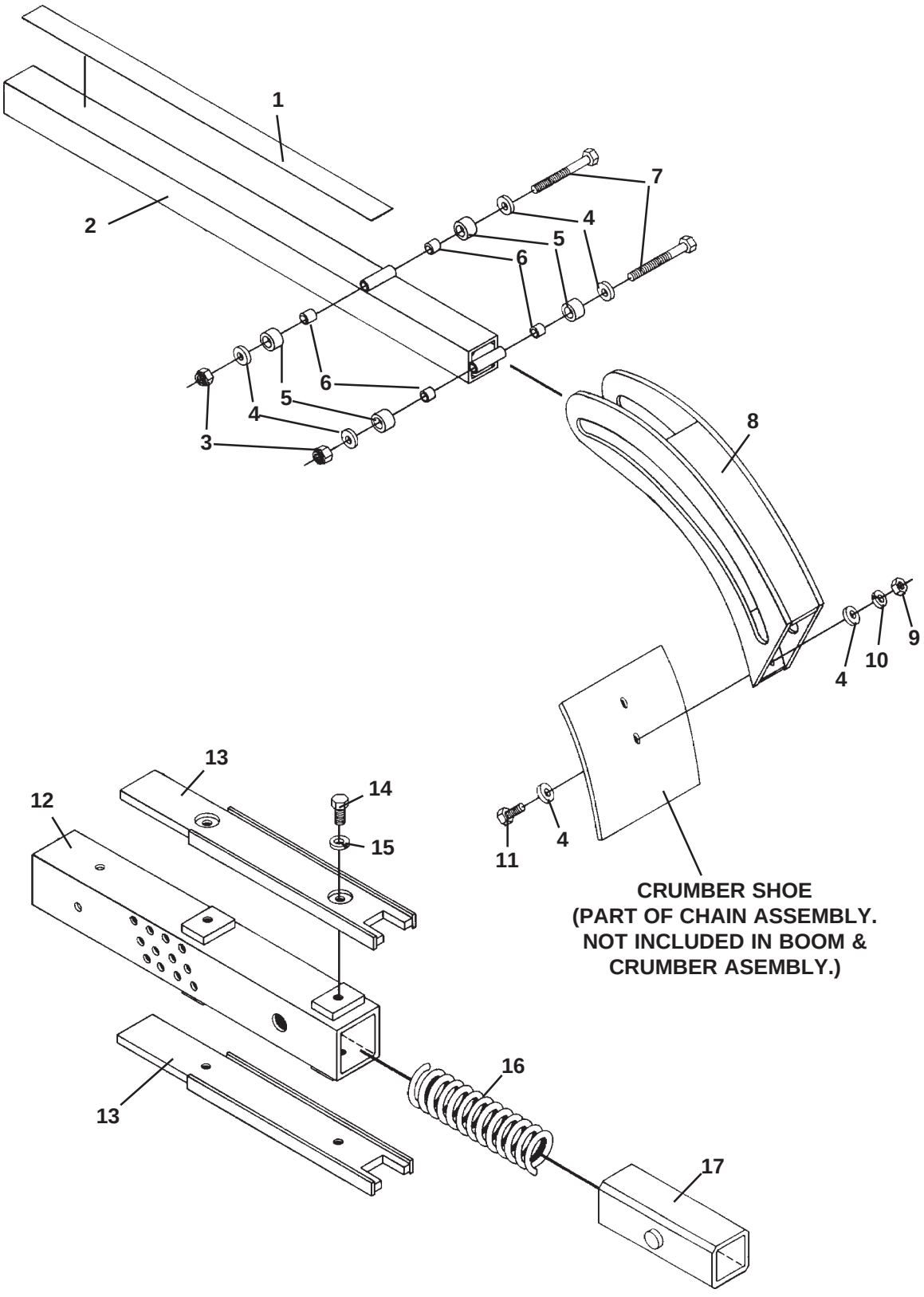
BOOM END
(PART OF TRENCHER ASSEMBLIES)

NO	REQ'D	PART NO.	DESCRIPTION
1	1	80032	Boom End
2	1	1548	.75" UNC X 1.25" Nylock Capscrew
3	1	53132	1.12" Square Pin
4	2	54067*	Idler Spacer
5	1	79103*	Idler Wheel
6	1	8085*	Idler Bearing
7	1	53988*	Idler Bearing Hub

NOTE: Idler Roller Assembly Repair Kit #80868 includes all parts marked with an asterisk (*).

TRENCHER ASSEMBLY

30" BOOM AND CRUMBER
ASSEMBLY #52992



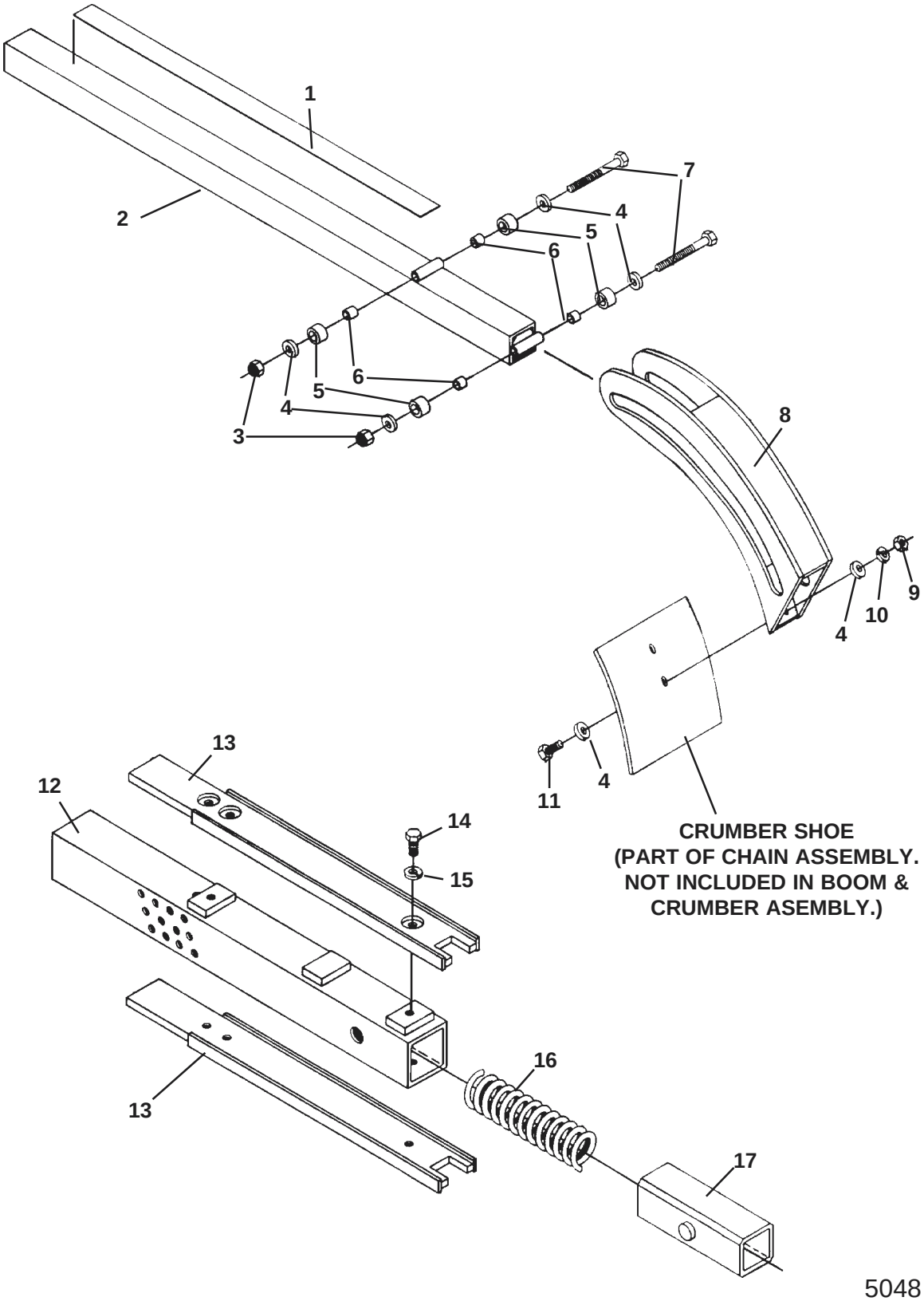
TRENCHER ASSEMBLY

30" BOOM AND CRUMBER
ASSEMBLY #52992

NO	REQ'D	PART NO.	DESCRIPTION
1	2	40161	Decal - Stand Clear
2	1	53070	30" Crumber Bar / Restraint Bar
3	2	1536	.38" UNC Nylock Nut
4	8	1514	.38" Flat Washer
5	4	53038	Crumber Roller
6	4	53039	Crumber Roller Bushing
7	2	1054	.38" UNC X 3.75" Hex Capscrew
8	1	53087	Crumber End
9	2	1226	.38" UNC Hex Nut
10	2	1503	.38" Lock Washer
11	2	1044	.38" UNC X 1.25" Hex Capscrew
12	1	53009	30" Boom
13	2	53115	30" Wear Strip
14	4	1087	.50" UNC X .75" Hex Capscrew
15	4	1505	.50" Lock Washer
16	1	53188	Spring
17	1	53138	Boom Bushing

TRENCHER ASSEMBLY

36" BOOM AND CRUMBER
ASSEMBLY #52993



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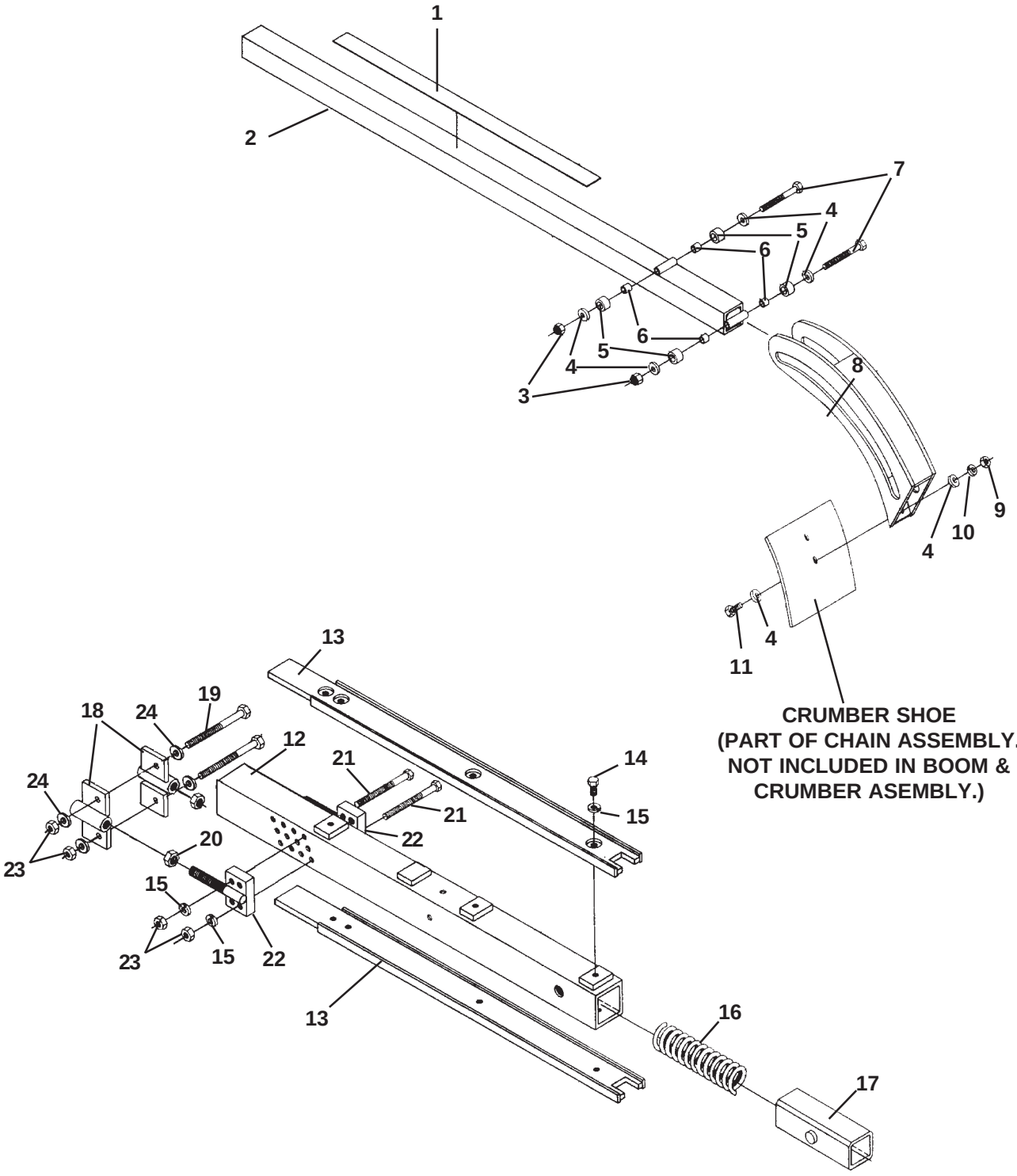
TRENCHER ASSEMBLY

36" BOOM AND CRUMBER
ASSEMBLY #52993

NO	REQ'D	PART NO.	DESCRIPTION
1	2	40161	Decal - Stand Clear
2	1	53069	36" Crumber Bar / Restraint Bar
3	2	1536	.38" UNC Nylock Nut
4	8	1514	.38" Flat Washer
5	4	53038	Crumber Roller
6	4	53039	Crumber Roller Bushing
7	2	1054	.38" UNC X 3.75" Hex Capscrew
8	1	53087	Crumber End
9	2	1226	.38" UNC Hex Nut
10	2	1503	.38" Lock Washer
11	2	1044	.38" UNC X 1.25" Hex Capscrew
12	1	53010	36" Boom
13	2	53116	36" Wear Strip
14	4	1087	.50" UNC X .75" Hex Capscrew
15	4	1505	.50" Lock Washer
16	1	53188	Spring
17	1	53138	Boom Bushing

TRENCHER ASSEMBLY

48" BOOM AND CRUMBER
ASSEMBLY #69832



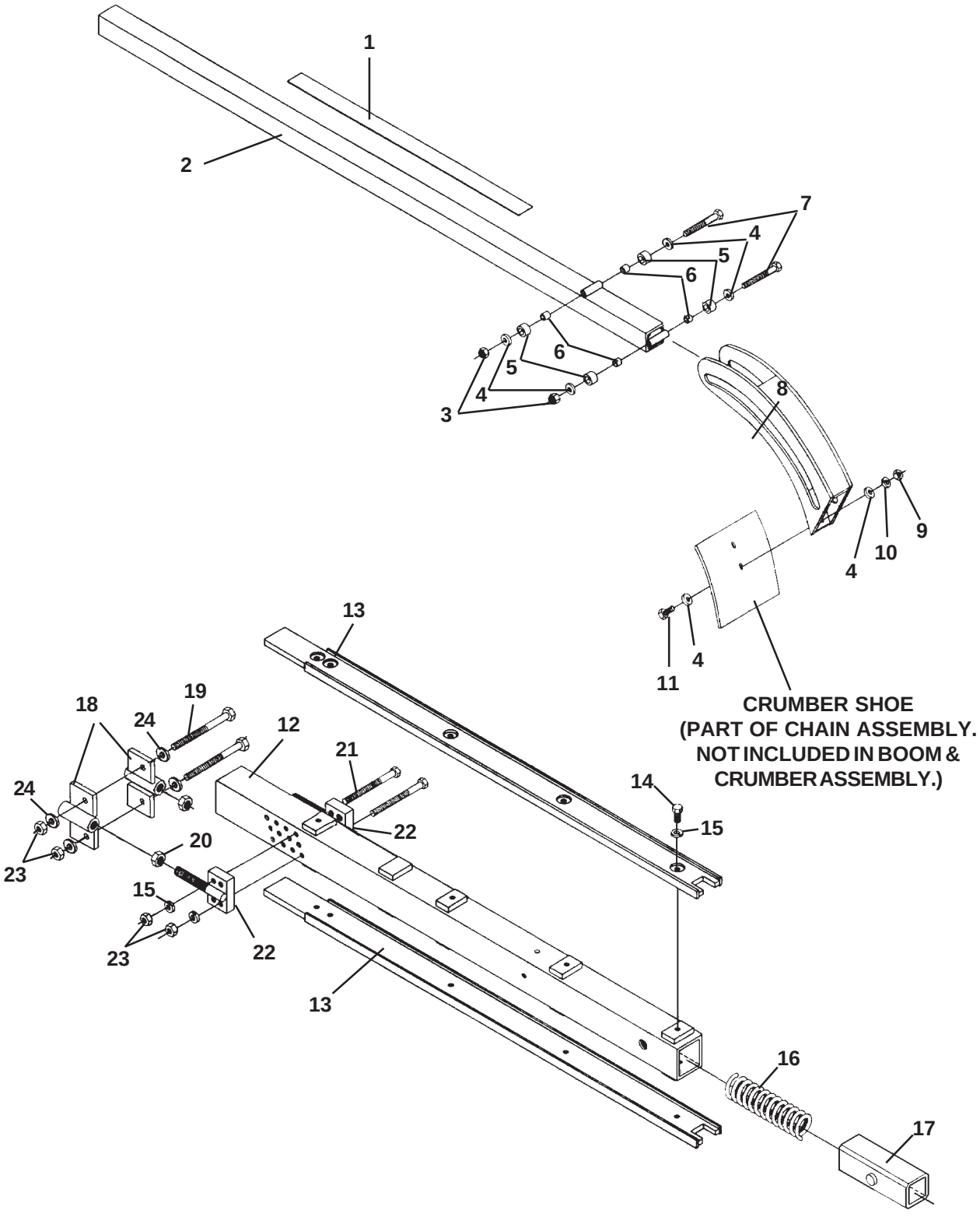
TRENCHER ASSEMBLY

48" BOOM AND CRUMBER
ASSEMBLY #69832

NO	REQ'D	PART NO.	DESCRIPTION
1	2	40161	Decal - Stand Clear
2	1	53068	48" Crumber Bar / Restraint Bar
3	2	1536	.38" UNC Nylock Nut
4	8	1514	.38" Flat Washer
5	4	53038	Crumber Roller
6	4	53039	Crumber Roller Bushing
7	2	1054	.38" UNC X 3.75" Hex Capscrew
8	1	53087	Crumber End
9	2	1226	.38" UNC Hex Nut
10	2	1503	.38" Lock Washer
11	2	1044	.38" UNC X 1.25" Hex Capscrew
12	1	53011	48" Boom
13	2	53117	48" Wear Strip
14	6	1087	.50" UNC X .75" Hex Capscrew
15	8	1505	.50" Lock Washer
16	1	53188	Spring
17	1	53138	Boom Bushing
18	2	56417	Guide Tube
19	2	1981	.50" UNC X 6.50" Hex Capscrew GR 8
20	2	1231	.75" UNC Hex Nut
21	2	1980	.50" UNC X 6.00" Hex Capscrew GR 8
22	2	56416	Adjusting Stud
23	4	1228	.50" UNC Hex Nut
24	4	1646	.50" Flat Hard Washer

TRENCHER ASSEMBLY

60" BOOM AND CRUMBER
ASSEMBLY #69833



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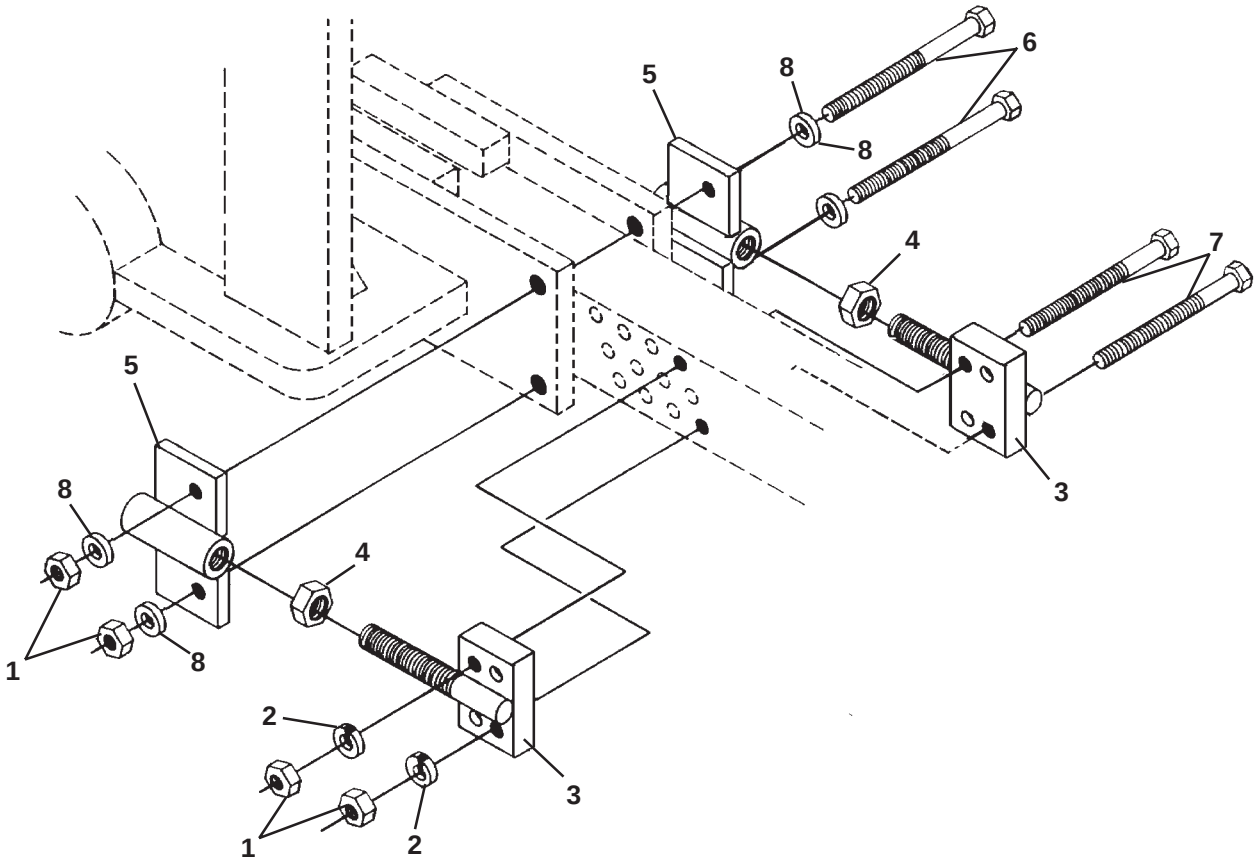
TRENCHER ASSEMBLY

60" BOOM AND CRUMBER
ASSEMBLY #69833

NO	REQ'D	PART NO.	DESCRIPTION
1	2	40161	Decal - Stand Clear
2	1	53067	48" Crumber Bar / Restraint Bar
3	2	1536	.38" UNC Nylock Nut
4	8	1514	.38" Flat Washer
5	4	53038	Crumber Roller
6	4	53039	Crumber Roller Bushing
7	2	1054	.38" UNC X 3.75" Hex Capscrew
8	1	53087	Crumber End
9	2	1226	.38" UNC Hex Nut
10	2	1503	.38" Lock Washer
11	2	1044	.38" UNC X 1.25" Hex Capscrew
12	1	53012	60" Boom
13	2	53118	60" Wear Strip
14	8	1087	.50" UNC X .75" Hex Capscrew
15	10	1505	.50" Lock Washer
16	1	53188	Spring
17	1	53138	Boom Bushing
18	2	56417	Guide Tube
19	2	1981	.50" UNC X 6.50" Hex Capscrew GR 8
20	2	1231	.75" UNC Hex Nut
21	2	1980	.50" UNC X 6.00" Hex Capscrew GR 8
22	2	56416	Adjusting Stud
23	4	1228	.50" UNC Hex Nut
24	4	1646	.50" Flat Hard Washer

TRENCHER ASSEMBLY

CHAIN TIGHTENER
ASSEMBLY #56418



TRENCHER ASSEMBLY

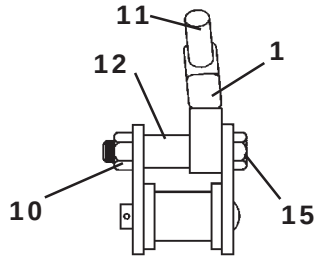
CHAIN TIGHTENER
ASSEMBLY #56418

NO	REQ'D	PART NO.	DESCRIPTION
1	4	1228	.50" UNC Hex Nut
2	2	1505	.50" Lock Washer
3	2	56416	Adjusting Stud
4	2	1231	.75" UNC Hex Nut
5	2	56417	Guide Tube
6	2	1981	.50" UNC X 6.50" Hex Capscrew GR 8
7	2	1980	.50" UNC X 6.00" Hex Capscrew GR 8
8	4	1646	.50" Flat Hard Washer

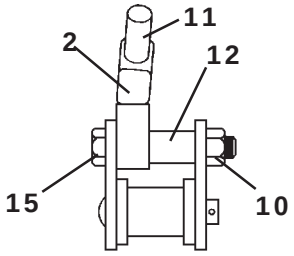
COMBINATION ROCK AND FROST CHAIN

2.00" PITCH - TOOTH EVERY STATION
SERVICE PARTS

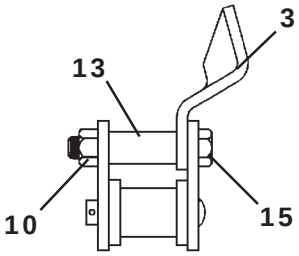
STATION #1



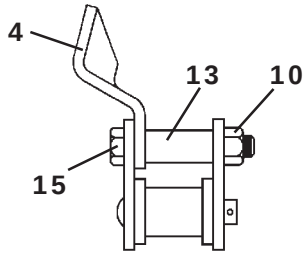
STATION #2



STATION #3



STATION #4



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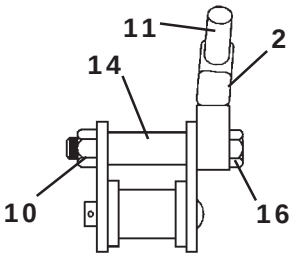
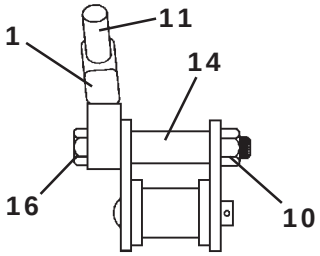


STATION #6



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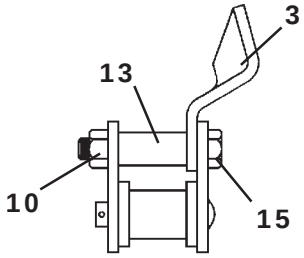
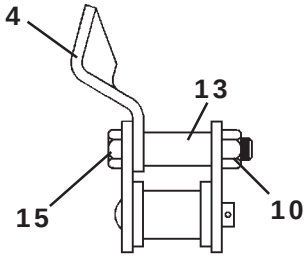
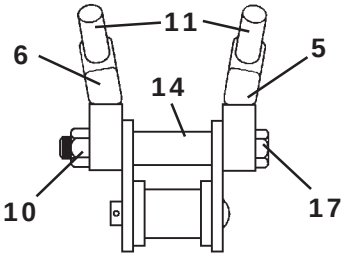


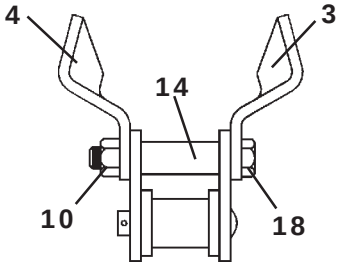
STATION #8



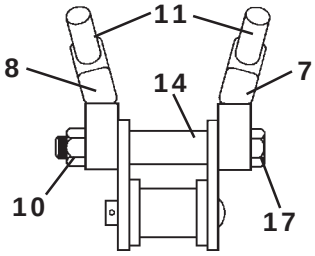
STATION #9



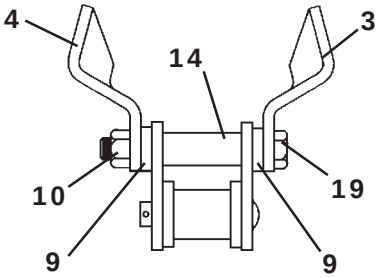
STATION #10



STATION #11



STATION #12



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COMBINATION ROCK AND FROST CHAIN

2.00" PITCH - TOOTH EVERY STATION
SERVICE PARTS

NO	PART NO.	DESCRIPTION
1	83802	Carbide Bit Holder - 4" Right
2	83801	Carbide Bit Holder - 4" Left
3	54432	Cup Cutter - Right
4	54431	Cup Cutter - Left
5	83804	Carbide Bit Holder - 5" Right (1) Weld Spot on Top for Identifying Purposes
6	83803	Carbide Bit Holder - 5" Left (1) Weld Spot on Top for Identifying Purposes
7	83806	Carbide Bit Holder - 6" Right (2) Weld Spots on Top for Identifying Purposes
8	83805	Carbide Bit Holder - 6" Left (2) Weld Spots on Top for Identifying Purposes
9	83800	Spacer - 6" Cut
10	1692	.50" UNF Hex Nut
11	51547	Carbide Bit
12	83798	Tube Spacer (Inside Mount Carbide Bit Holder)
13	54628	Tube Spacer (Inside Mount Cup Cutter)
14	54440	Tube Spacer (Outside Cup or Carbide Bit Holder)
15	1347	.50" UNF X 3.25" Hex Capscrew
16	1349	.50" UNF X 3.75" Hex Capscrew
17	1351	.50" UNF X 4.50" Hex Capscrew
18	1348	.50" UNF X 3.50" Hex Capscrew
19	1350	.50" UNF X 4.00" Hex Capscrew

NOTE: There are weld spots located on the top of the 5" and 6" Carbide Bit Holders to assist in parts identification. One weld spot on the 5" Holders and two weld spots on the 6" Holders.

DIGGING CHAIN OPTIONS

GENERAL INFORMATION

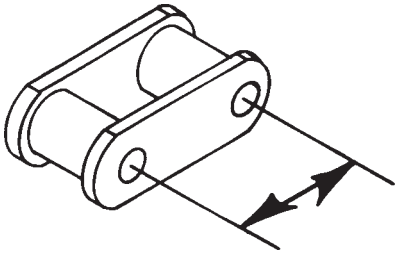
This section is devoted to digging chain options for your trencher. In it you will find a listing of all the chain options available. You will also find information on replacement parts, chain assembly, and chain conversion. These options will increase the flexibility of your equipment, and make your trenching job easier.

There is some basic information about the trencher and it's digging components that you should know before you try to order any options. This information is given here for your convenience. With it you will be able to better understand the rest of this section.

CHAIN PITCH

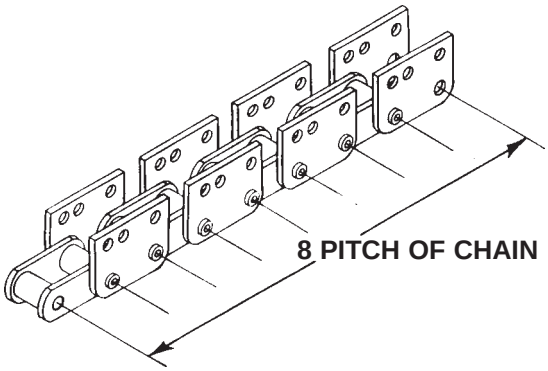
The digging chains may be divided into groups by pitch. The pitch of the chain is the distance between the centers of the holes in the chain links (See Figure 1). The word pitch can also be used to describe the length of the chain.

FIGURE #1



DISTANCE BETWEEN HOLE CENTERS = PITCH

FIGURE #2



The 650 Trencher has a heavy weight chain with a tensil strength of 50,000 pounds and a pitch of 2.00".

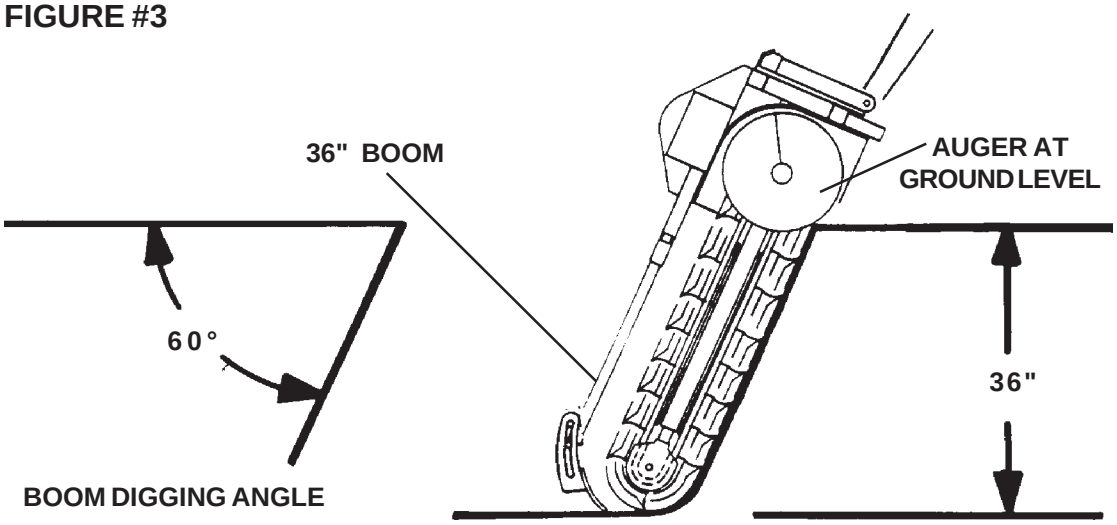
There is one thing that you must understand about chain pitch. You can not intermix components of different pitches. You cannot substitute chain links of different pitches in a digging chain. Nor can you use a digging chain of one pitch, with a driver sprocket of a different pitch. Attempting to do so will cause the chain to "jump" off the sprocket continuously.

DIGGING CHAIN OPTIONS

COMPONENT SIZE

The size of the digging component is based on the depth of the trench it will dig with auger at ground level and a 60° boom digging angle (See Figure 3). For example, a 36" boom is not necessarily 36" long. The 36" length means it will dig a trench 36" deep with the augers in their float position and at a 60° digging angle.

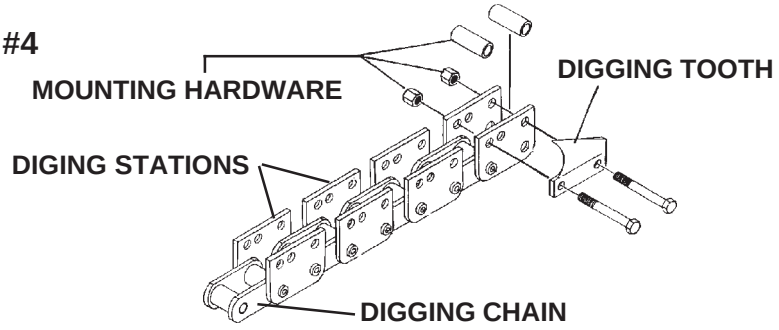
FIGURE #3



DIGGING STATIONS

Digging chains are made up of a series of individual links pinned together. Every link has a special "Digging Station" link. These links are designed so that the digging teeth can be attached to the basic chains (See Figure 4). Digging chains may be purchased in any length, with or without teeth. All chains, teeth, spacers and assorted digging hardware may be purchased separately.

FIGURE #4



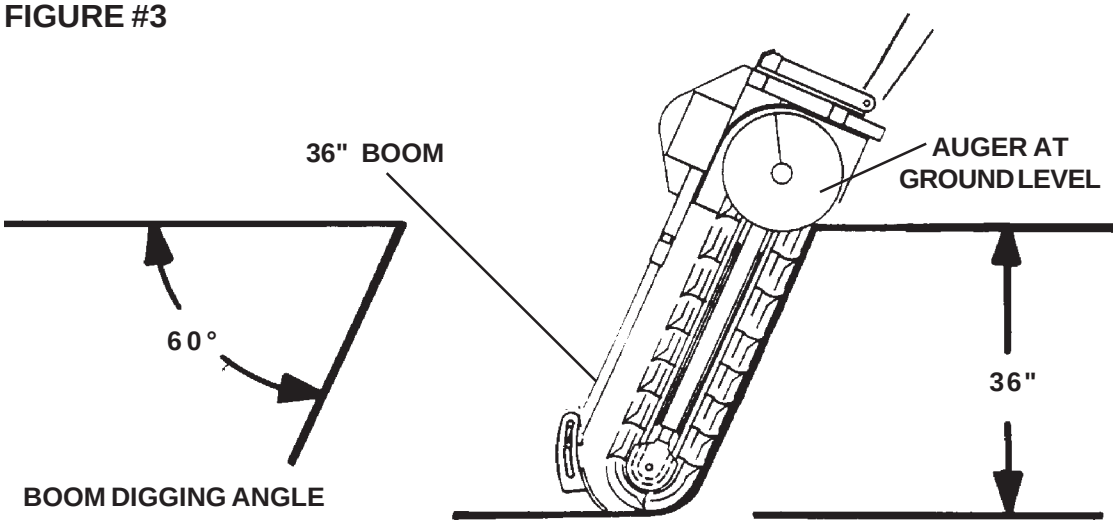
This completes the basic information on digging chain options. The rest of this section contains specific information on digging chains and parts available, complete with part numbers. Again it may be noted that these options are designed to increase the flexability of your equipment and to make your trenching jobs easier. We offer them to better serve your trenching needs.

DIGGING CHAIN OPTIONS

COMPONENT SIZE

The size of the digging component is based on the depth of the trench it will dig with auger at ground level and a 60° boom digging angle (See Figure 3). For example, a 36" boom is not necessarily 36" long. The 36" length means it will dig a trench 36" deep with the augers in their float position and at a 60° digging angle.

FIGURE #3



DIGGING STATIONS

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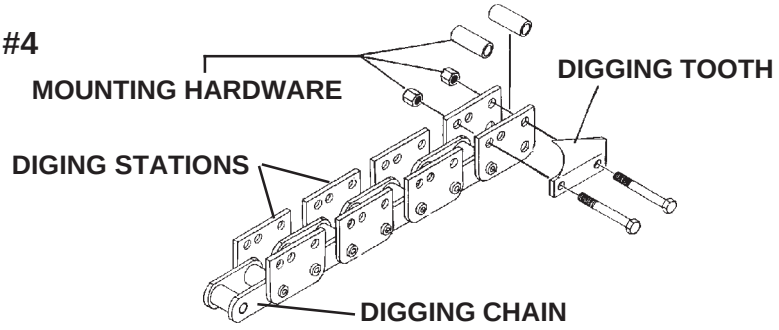
FIGURE #4



This completes the basic information on digging chain options. The rest of this section contains specific information on digging chains and parts available, complete with part numbers. Again it may be noted that these options are designed to increase the flexability of your equipment and to make your trenching jobs easier. We offer them to better serve your trenching needs.

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

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

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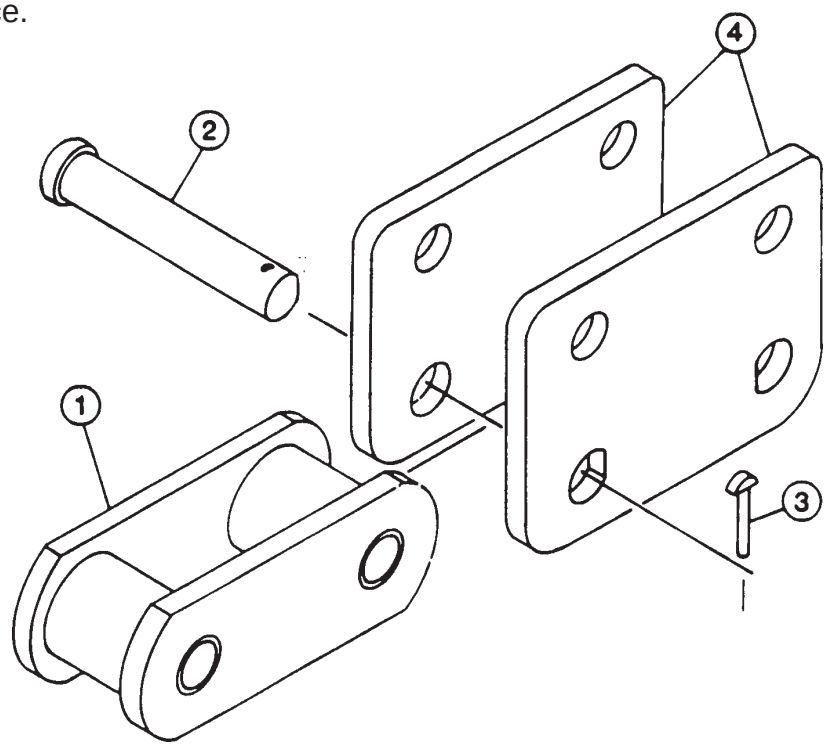
DIGGING CHAIN OPTIONS

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.



NO.	REQ'D	PART NO.	DESCRIPTION
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

30" BOOM
DIGGING TOOTH STATIONS

TRENCH WIDTH

	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

36" BOOM
DIGGING TOOTH STATIONS

TRENCH WIDTH

	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

48" BOOM
DIGGING TOOTH STATIONS

TRENCH WIDTH

	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

60" BOOM
DIGGING TOOTH STATIONS

TRENCH WIDTH

	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

30" BOOM
DIGGING TOOTH STATIONS

TRENCH WIDTH

	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	10	B	6L	B	6R	B	8L	B	8R	B	10	B	6L
12"	CR	B	6L	B	6R	B	8L	B	8R	B	10	B	12	B	6L	B	8R	B	8L	B	10	B	12

36" BOOM
DIGGING TOOTH STATIONS

TRENCH WIDTH

	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	10	B	CL	B	6L	B	6R	B	8L	B	8R	B	10	B	6L	B

48" BOOM
DIGGING TOOTH STATIONS

TRENCH WIDTH

	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

60" BOOM
DIGGING TOOTH STATIONS

TRENCH WIDTH

	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

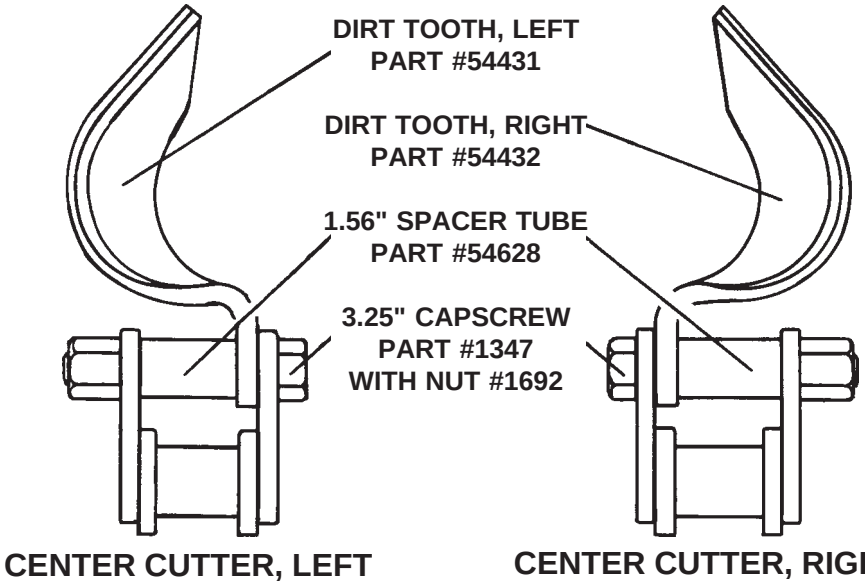
	31	32	33	34	35	36	37	38	39	40
6"	6L	B	6R	B	6L	B	6R	B	6L	B

DIGGING CHAIN OPTIONS

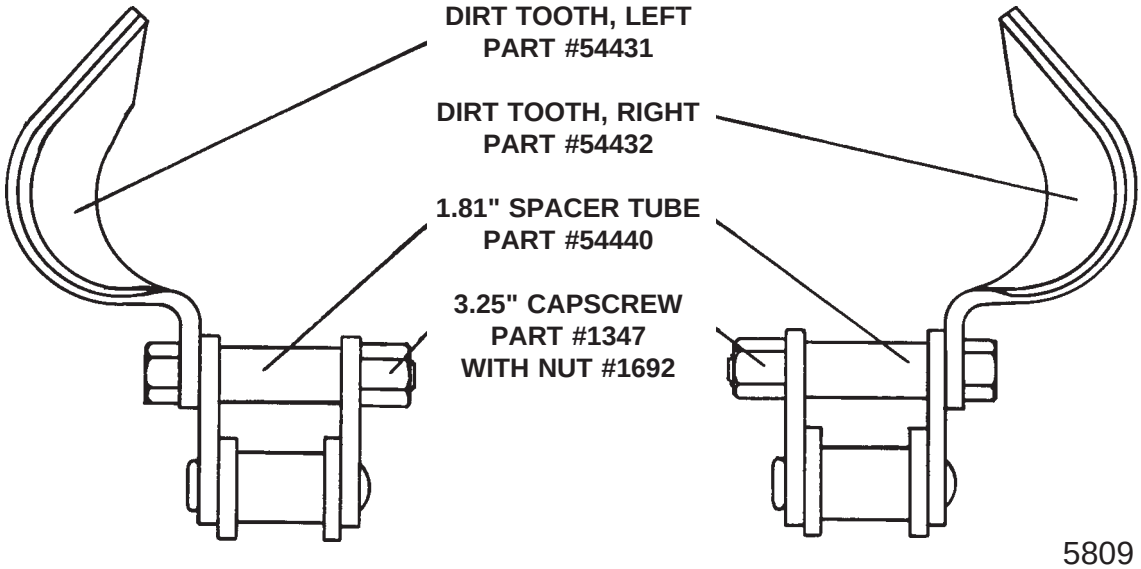
2.00" PITCH DIGGING TOOTH STATION BREAK DOWN

GENERAL INFORMATION

The following diagrams are the complete parts break downs of all the different digging tooth arrangements used on the digging stations for 2.00" pitch chains. The diagrams are frontal views according to the digging chain direction of travel. All 2.00" pitch chains are made up of a combination of some or all of these various digging tooth arrangements. See the "2.00" Pitch Digging Tooth Station Sequence Charts" (located earlier in this section) to find out how the arrangements are used for the various digging chains.



CENTER CUTTER, LEFT **CENTER CUTTER, RIGHT**



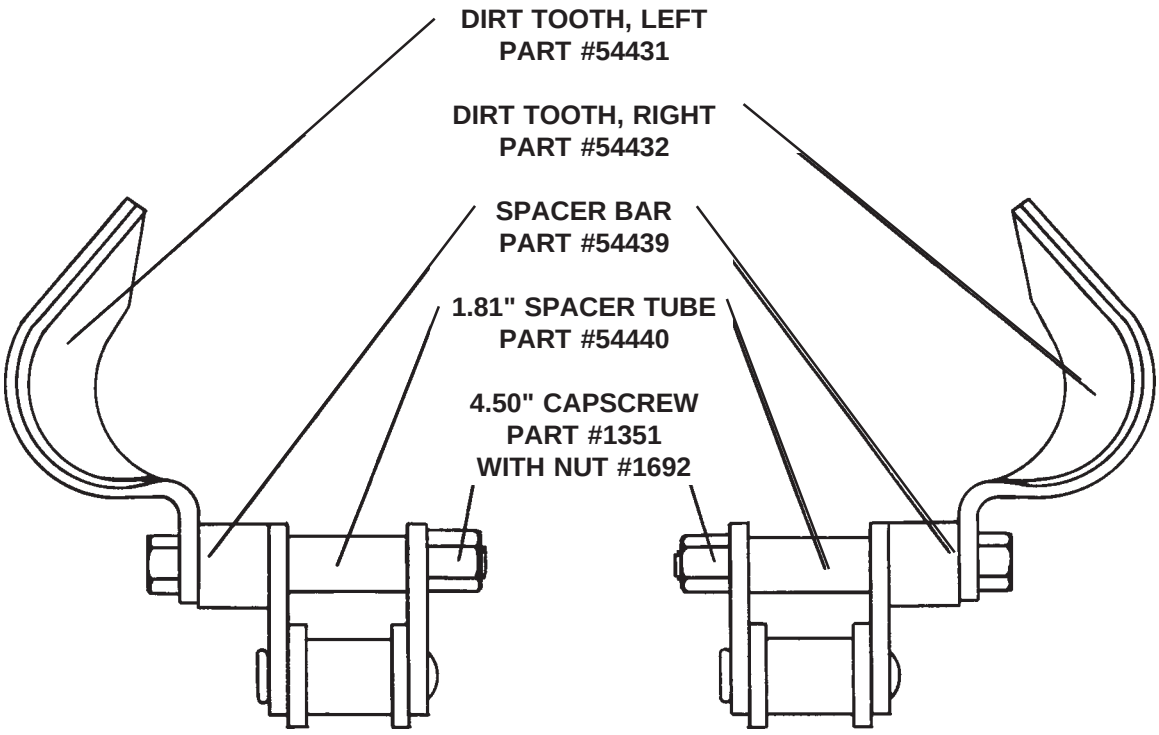
6" LEFT STATION **6" RIGHT STATION**

5809
3-2-92

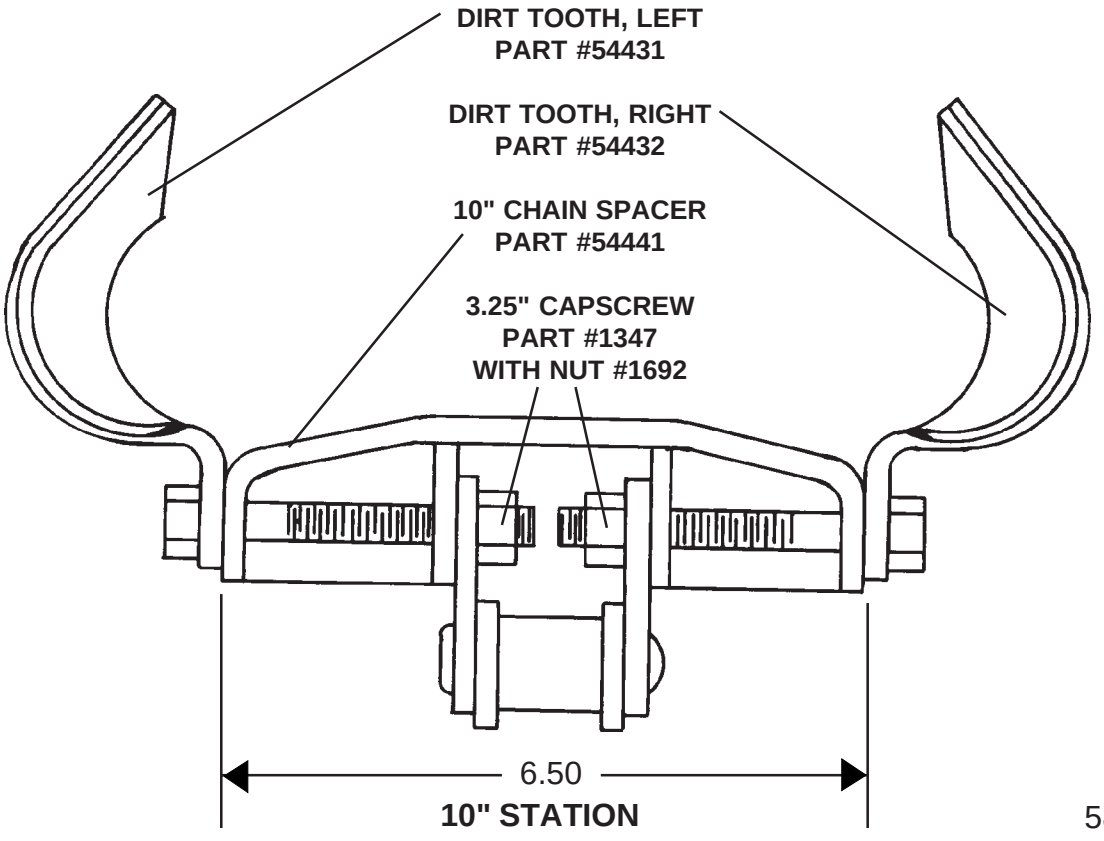
J

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING TOOTH STATION BREAK DOWN



8" LEFT STATION **8" RIGHT STATION**

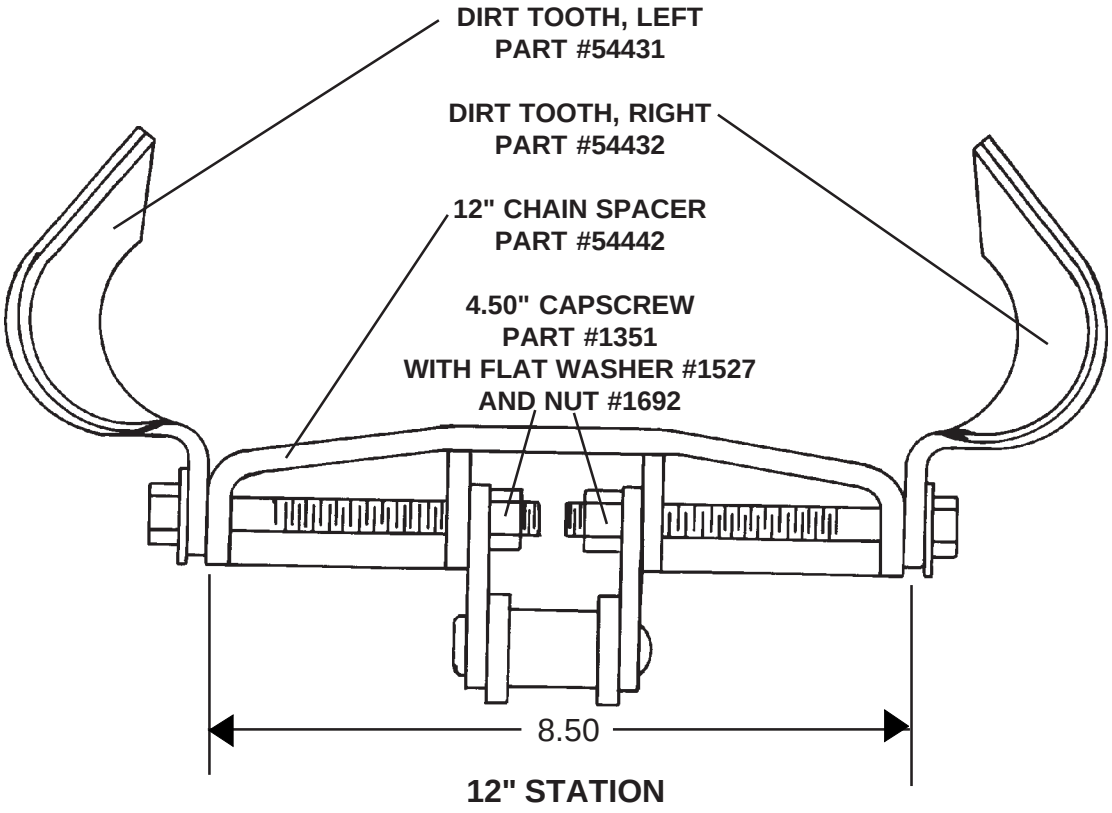


10" STATION

5810
3-2-92

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING TOOTH STATION BREAK DOWN



12" STATION

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

REQ’D	PART NO.	DESCRIPTION
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

REQ’D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

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

2) FROM 8" WIDE TO 6" WIDE

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

3) FROM 6" WIDE TO 10" WIDE

REQ'D	PART NO.	DESCRIPTION
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

DIGGING CHAIN OPTIONS

2.00" PITCH DIGGING CHAIN WIDTH CONVERSIONS

4) FROM 10" WIDE TO 6" WIDE

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

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

9) FROM 8" WIDE TO 12" WIDE

REQ'D	PART NO.	DESCRIPTION
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

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

11) FROM 10" WIDE TO 12" WIDE

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

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

2) FROM 8" WIDE TO 6" WIDE

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

3) FROM 6" WIDE TO 10" WIDE

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

REQ'D	PART NO.	DESCRIPTION
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

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

GENERAL INFORMATION

Your trencher was designed to be virtually maintenance free. Very little effort is needed to keep it in top condition. It is however important to follow these procedures to get full performance and longevity out of the trencher.

LUBRICATION

The only lubrication your trencher needs is the greasing of the headshaft end bearing and the idler sprocket bearing. The bearings should be lubricated with an SAE multi-purpose grease every 8 hours of operation. A grease zerk is installed in both bearings to facilitate this task.

NOTE: The idler sprocket bearing is located inside the chain guard. Remove the button plug from the front of the chain guard to gain access to the idler sprocket bearing grease zerk.

IMPORTANT: DO NOT lubricate any other part of the trencher! Lubricating parts such as the digging chain or the idler wheel will only attract dirt, resulting in increased wear.

EVERY 40 HOURS OF OPERATION

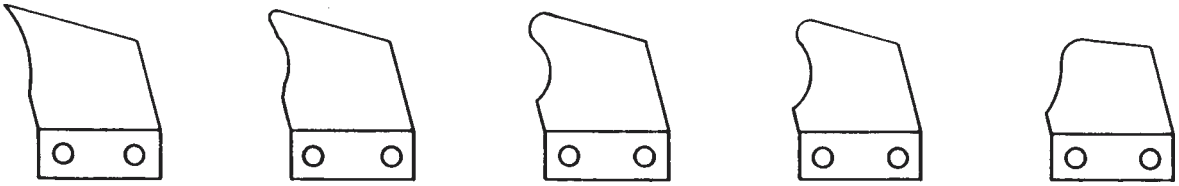
Every 40 hours of operation the trencher should be inspected for loose nuts, capscrews, bearings etc. Tighten as required, replace where necessary. Clean equipment of all dirt, oil, grease, etc. This will assist you in making visual inspections and help avoid overlooking worn or damaged components. Keep all safety decals clean and legible. Replace if damaged or worn.

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.

DIGGING TOOTH REPLACEMENT (CONTINUED)

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 bolt-on procedure. See Section J.



New	20% Reduced Performance	50% Reduced Performance	70% Reduced Performance	Beyond Use

EVERY 100 HOURS OF OPERATION

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 ½" either way from centerline of chain. Improper adjustment will cause excessive wear on drive chain and drive sprockets.

STORAGE

650 TRENCHER

GENERAL INFORMATION

The following storage procedures will help you to keep your trencher in top condition. They will also help you get off to a good start the next time your trencher is needed. We therefor strongly recommend that you take the extra time to follow these procedures whenever your trencher will not be used for an extended period of time.

PREPARATION FOR 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. Store the trencher in a dry and protected place. Leaving the trencher outside, exposed to the elements will materially shorten its life.

6. 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.

7. Replace operating 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. Tighten all loose bolts, nuts, and set screws.

4. During cold weather, operate the trencher slowly for a short time before placing the unit under full load.

TROUBLE SHOOTING

650 TRENCHER

GENERAL INFORMATION

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

PROBLEM: DIGGING CHAIN WILL NOT TURN

POSSIBLE CAUSE AND REMEDY:

1. Quick coupler not completely engaged. Check to see that all couplers are matched pairs and engaged correctly.

2. Quick coupler failure. Check couplers for dirt, rust, or other contaminates that could effect coupler engagement. Clean or replace couplers as needed.

3. Obstruction in hydraulic hose. Remove hydraulic hoses and couplers one at a time and check flow through hose by blowing through the hose or by pouring hydraulic fluid through the hose. Clean or replace hose as needed.

4. Skid-steer relief valve stuck open. Have relief valve serviced and checked by an authorized dealer.

5. Skid-steer auxiliary valve not operating properly. See skid-steer operator's manual or dealer for information and help.

6. Hydraulic motor failed. Be sure you have hydraulic flow to the motor. If oil flow to motor is good, but motor will still not turn when detached from trencher headshaft, remove motor and have it serviced or replaced as needed.

7. Headshaft bearings failed. Inspect headshaft bearings for free movement. Check for binding or foreign matter jamming bearing. Clean or replace as necessary.

8. Boom end bearing failed. Inspect boom end bearing for free movement. Check for binding or foreign matter jamming bearing. Clean or replace as necessary.

9. Digging chain to tight. Digging chain should only be tight enough to remain on sprockets while turning under load. Their should be some sag in the chain. If too tight, loosen chain by the adjusting nut(s) on the boom.

10. Sand build-up in tooth root of sprocket. Sand can build up in the sprockets effectively increasing the chain tension. Raise the boom out of the ditch and reverse the digging chain on the trencher, then run the trencher out of the trench to clear the sprockets. Reinstall the chain in its correct digging direction and readjust chain tension.

11. Digging sprocket clamp loose on headshaft. Observe if the headshaft is turning. If shaft is turning but sprocket is not, stop the trencher and tighten the sprocket clamp.

PROBLEM: TRENCHER DOES NOT DIG FAST ENOUGH

POSSIBLE CAUSE AND REMEDY:

1. Digging teeth worn. See maintenance Section L in this manual. Inspect teeth and replace as needed.

2. Skid-steer relief valve set too low. See skid-steer operator's manual and or dealer for proper relief valve service and adjustment.

3. Quick coupler or hose restriction. Inspect couplers and hoses for dirt, rust, and other contaminates and repair or replace as needed.

4. Hydraulic system over heating. Shut the trencher and skid-steer down and allow oil to cool. Repeated stalling of the trencher will cause the oil to over heat. Avoid excessive stalling.

5. Cutting a ditch size beyond the ability of the skid-steer. Your trencher is powered by oil from the skid-steers auxiliary hydraulic system. The horsepower transmitted through the auxiliary hydraulics is substantially less than that of the engine.

PROBLEM: HYDRAULIC OIL OVER HEATING

POSSIBLE CAUSE AND REMEDY:

1. Skid-steer relief valve set too low. See skid-steer operator's manual and/ or dealer for proper relief valve service and adjustment.

2. Quick coupler or hose restriction. Inspect couplers and hoses for dirt,

rust, and other contaminates and repair or replace as needed.

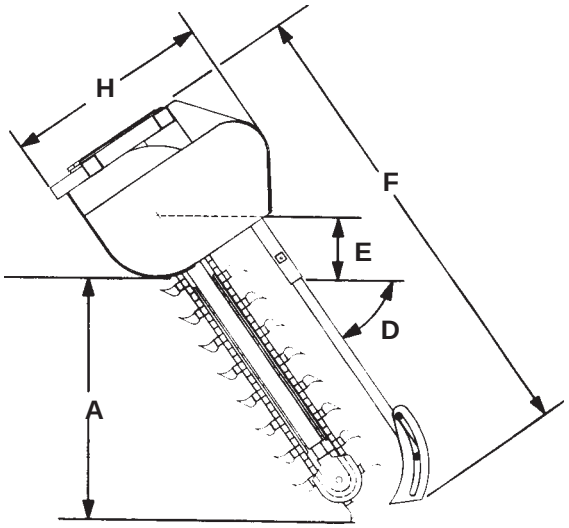
3. Motor or hose size not balanced to skid-steer. A hose or a motor that is too small can cause added internal friction and resultant heat build-up.

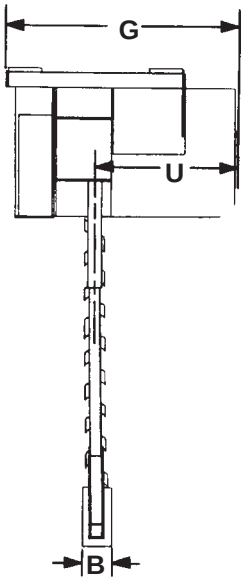
4. Skid-steer not equipped with oil cooler or sufficient sump capacity. Check with your skid-steer dealer for information and availability of auxiliary cooling and sump kits. Install if available. If not available stop skid-steer and trencher and allow them to cool when they get too hot.

BRADCO®

650 TRENCHER SPECIFICATIONS

For High Flow Skid-Steer Loaders





	DESCRIPTION	SPEC.
A.	Trench Depth w/auger touching ground At 65° 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", & 48" Boom Lengths	10.00"
	30" Boom Lengths	12.00"
D.	Recommended Trenching Angle	65°
E.	Headshaft Height	11.25"
F.	Trencher Length	
	30" Boom	58.00"
	36" Boom	71.00"
	48" Boom	84.00"
	60" Boom	97.00"
G.	Trencher Width	43.00"
H.	Trencher Height	37.00"
U.	Spoil Discharge Reach	27.00"
	Distance From Centerline Drive Sprocket To Back Of Mounting Frame	16.00"
	Hydrostatic Motor	18-19 Cu. In. Displacement
	Hydraulic System	
	Pump Requirements	24-32 GPM
	Relief Setting	2250-3200 PSI
	Weight w/4' X 6" Chain & Boom	1200#

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

Bradco Trenchers are covered by a one year limited warranty.

BRADCO®
P.O. Box 266
Delhi, Iowa 52223 USA
(319) 922-2981 · (800) 922-2981
Fax 319-922-2130
A Division of ATI Incorporated
Construction Machinery Since 1964

S-423
2-24-93

SPECIFICATIONS

NOISE EMISSIONS DATA

MACHINE TYPE ..... **TRENCHER ATTACHMENT**
BRADCO MODEL NO **650**
METHOD OF DRIVE ..... **HYDRAULIC MOTOR**
POWER SOURCE ..... **35.0 kW (47HP) SKID-STEER LOADER WITH 100 l/min. (26.5 GPM) HIGH FLOW KIT**
RATED SPEED DURING TEST ..... **2500 RPM**
MOUNTING CONDITIONS DURING TEST ..... **MOUNTED TO QUICK ATTACH PLATE ON RUBBER TIRED SKID-STEER LOADER**

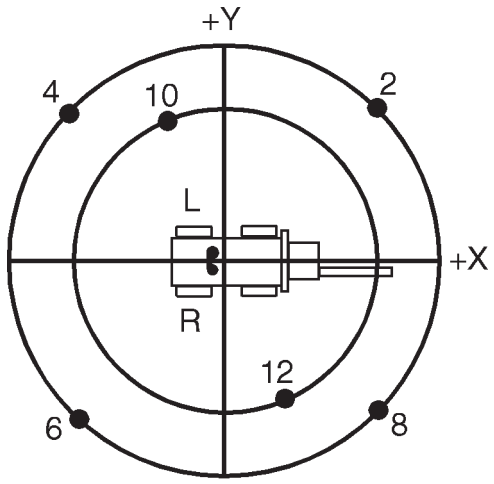
INSTRUMENT LOCATION (10M HEMISPHERE)

POSITION	X	Y	Z
2	7.1m	7.1m	1.5m
4	-7.1m	7.1m	1.5m
6	-7.1m	-7.1m	1.5m
8	7.1m	-7.1m	1.5m

OPERATOR'S EAR POSITION COORDINATES (SEE NOTE)

RH	0mm	-200mm	0mm
LH	0mm	200mm	0mm

NOTE: X COORDINATE IS FROM OPERATOR'S EYE PLANE
Y COORDINATE IS FROM CENTER AXIS OF SEAT
Z COORDINATE IS FROM OPERATOR'S EYE PLANE



MICROPHONE POSITIONS ON 10m HEMISPHERE CENTERED ON MACHINE (NOT TO SCALE)

MEASURED EMISSION SOUND PRESSURE AT OPERATOR'S EAR (including power unit)

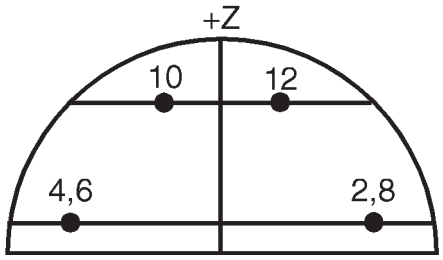
LOCATION	LpA (dBA)
RH	98.7
LH	96.0
ARITHMETIC MEAN VALUE	97.4

CALCULATED EMISSION SOUND PRESSURE AT OPERATOR'S EAR (excluding power unit)

LOCATION	LpA (dBA)
RH	93.0
LH	91.1
ARITHMETIC MEAN VALUE	92.0

MEASURED SOUND POWER @ 10m HEMISPHERICAL SURFACE (including power unit)

READING	LWA (dBA)
1	109.8
2	110.5
3	110.8
ARITHMETIC MEAN VALUE (two highest)	110.6



CALCULATED SOUND POWER @ 10m HEMISPHERICAL SURFACE (excluding power unit)

READING	LWA (dBA)
1	99.6
2	101.8
3	100.1
ARITHMETIC MEAN VALUE (two highest)	101.0

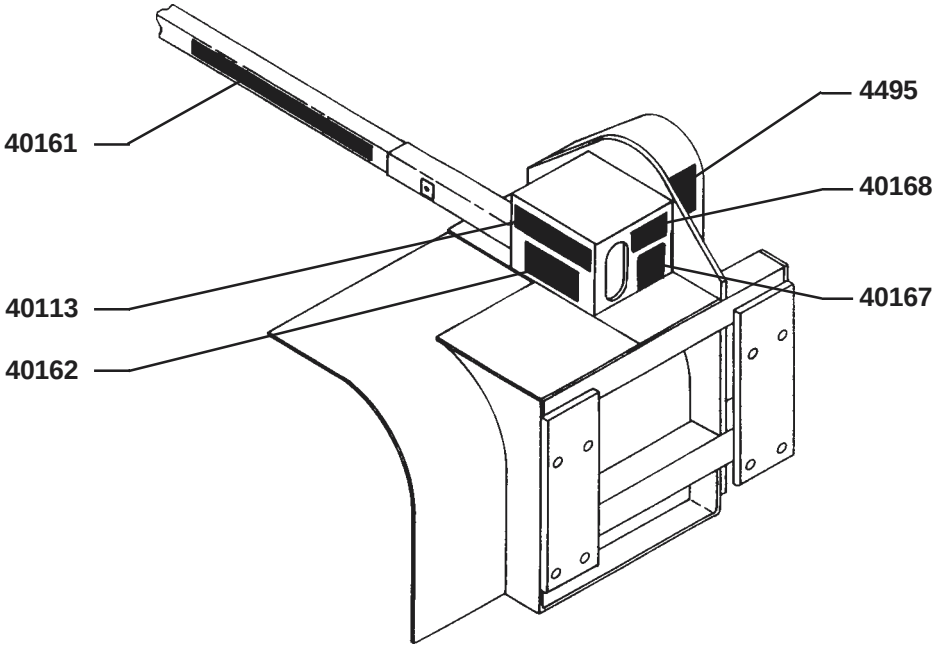
MEASUREMENTS CONFORM WITH SAE STANDARD NO J1805 (EQUIVALENT TO ISO 6393) EXCEPT UPPER POINTS ON HEMISPHERE WERE NOT INCLUDED.

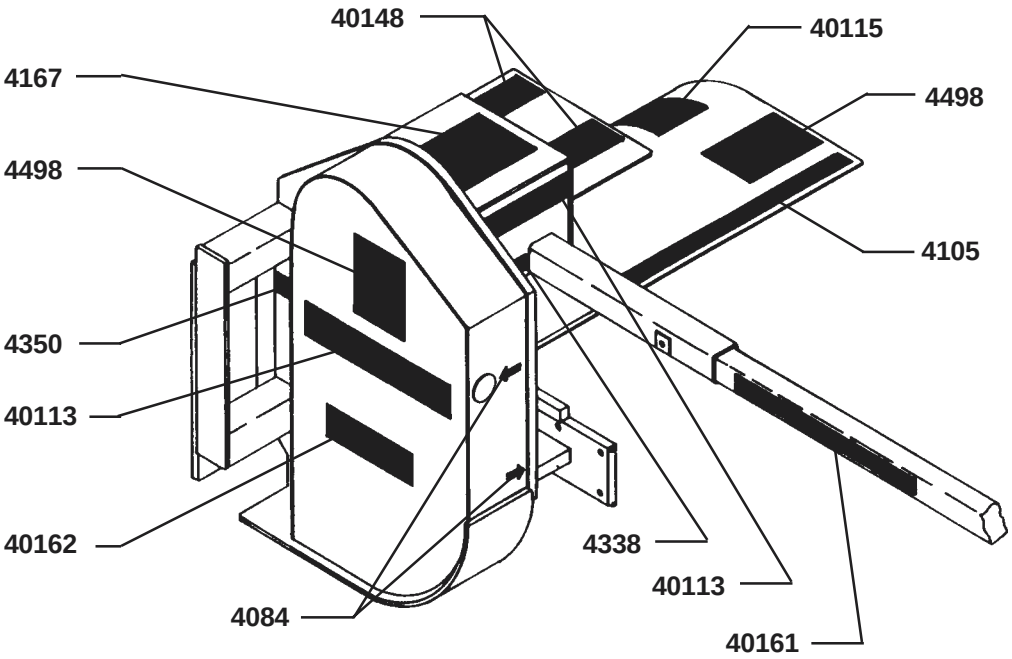
DECALS

DECAL PLACEMENT
650 TRENCHER

GENERAL INFORMATION

The diagrams on this page show the location of all the decals used on the 650 trencher. The decals are identified by their part numbers, with reductions of the actual decals located on the following pages. Use this information to order replacement for lost or damaged decals. Be sure to read all decals before operating the trencher. They contain information you need to know for both safety and trencher longevity.





DECALS

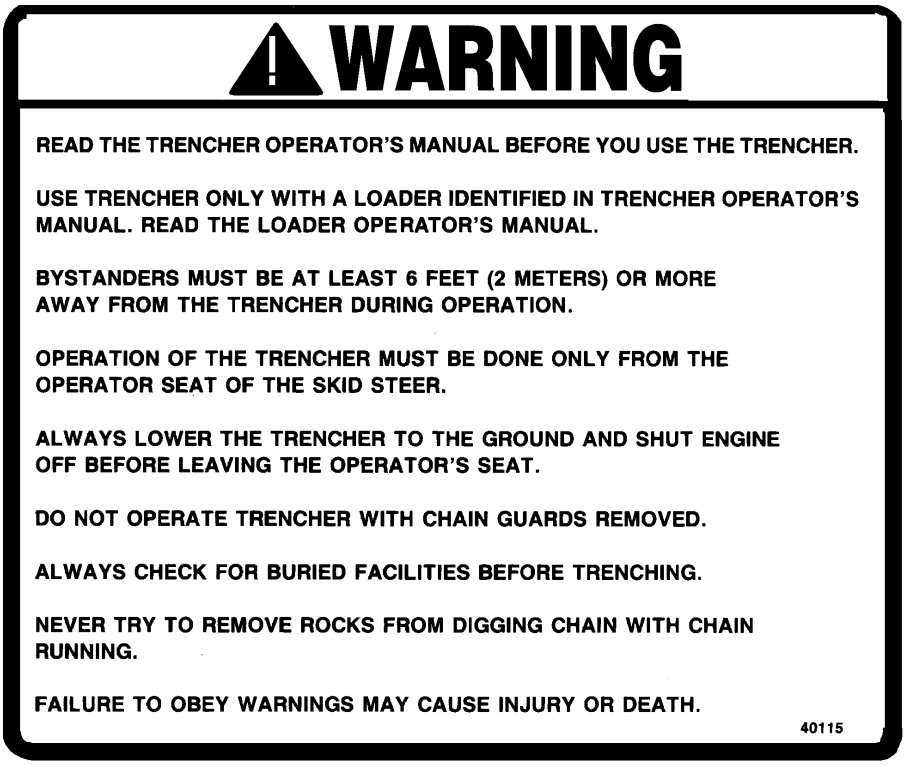
PART #4167
NO STEP

PART #4498
DANGER!

PART #4495
WARNING! GUARDS

PART #4350
SERIAL NUMBER TAG

DECALS



PART #40115
WARNING! GENERAL

PART #4105
DANGER STAND CLEAR

PART #40161
STAND CLEAR

DECALS

650

PART #40162
650 MODEL NUMBER

⚠ CAUTION

TO AVOID HYDRAULIC MOTOR FAILURE:

HYDRAULIC MOTOR IS EQUIPPED WITH A CASE DRAIN PORT. DRAIN LINE MUST BE INSTALLED PRIOR TO OPERATION.

ROUTE CASE DRAIN LINE FROM HYDRAULIC MOTOR DIRECTLY TO RESERVOIR TANK.

#40167

PART #40167
CAUTION! CASE DRAIN

⚠ WARNING

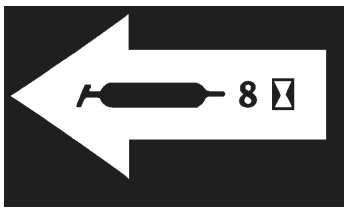
HIGH-PRESSURE FLUID HAZARD

To prevent serious injury or death:

Hydraulic Hoses Must Have A Minimum Operating Pressure Equal To Or Greater Than The Maximum Skid-Steer Operating Pressure.

#40168

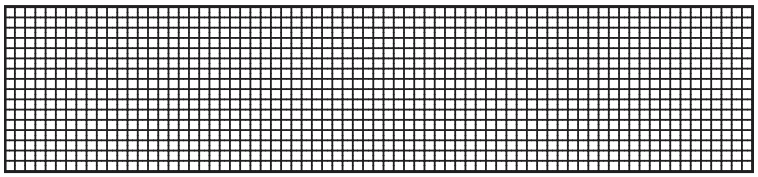
PART #40168
WARNING! HIGH PRESSURE FLUID



PART #4084
GREASE 8 HOURS

BRADCO®

PART #40113
BRADCO LOGO



PART #40148
NON-SLIP SURFACE DECAL

PART #4338
MADE IN USA

PREDELIVERY CHECKLIST

650 TRENCHER

GENERAL INFORMATION

The following is a list of areas that should be inspected by the dealer prior to delivery of the trencher to the customer. The customer should check the list and make sure that the dealer has completed the inspection. Completion of this checklist will help insure that the customer receives the trencher in complete working order, ready to install.

PREDELIVERY CHECKLIST - CHECK AND ADJUST AS NECESSARY

1. _____ Check and lubricate trencher if necessary. See "Lubrication" Section H.

2. _____ Visually inspect the trencher for bent, loose, cracked, damaged or missing parts. Check for any other irregularities.

3. _____ Check all hydraulic connections for leaks, and all hydraulic hoses for proper positioning to reduce chafing and binding.

4. _____ Check trencher to insure that a case drain line has been properly installed. (From trencher motor to skid-steer hydraulic reservoir.)

5. _____ Check the trencher's digging chain adjustment. See "Operating Instructions - Chain Tension Adjustment" Section G.

6. _____ Check trencher attachment bolts for tightness. Retighten after the first eight working hours, and after every forty working hour interval thereafter. See "Bolt Torque" Section O.

7. _____ Make sure decals are not damaged or missing and are in their correct location. See "Decals" Section Q.

8. _____ Complete and return the manufacturers "Warranty Validation Form" and sign your dealership predelivery checklist.

9. _____ Operator to read the FIEI Trencher Safety Manual provided, before operating the trencher.

LIMITED WARRANTY

EFFECTIVE ON PRODUCTS MANUFACTURED AFTER JANUARY 1, 2001

All new BRADCO products are warranted to be free from defects in materials or workmanship which may cause failure under normal usage and service when used for the purpose intended.

In the event of failure within twenty four (24) months from initial retail sale, lease or rental date (excluding cable, ground engaging parts such as sprockets, digging chain, bearings, teeth, tamping and demolition heads, blade cutting edges, pilot bits, auger teeth, auger heads & broom bristles), if after examination, BRADCO determines failure was due to defective material and/or workmanship, parts will be repaired or replaced. BRADCO may request defective part or parts be returned prepaid to them for inspection at their place of business at Delhi, Iowa, or to a location specified by BRADCO.

Any claims under this warranty must be made within fifteen (15) days after the Buyer learns of the facts upon which such claim is based. All claims not made in writing and received by BRADCO within the time period specified above shall be deemed waived.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED AND THERE ARE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL BRADCO BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGE.

BRADCO'S LIABILITY FOR ANY AND ALL LOSSES AND DAMAGES TO BUYER, RESULTING FROM ANY CAUSE WHATSOEVER, INCLUDING BRADCO'S NEGLIGENCE, IRRESPECTIVE OF WHETHER SUCH DEFECTS ARE DISCOVERABLE OR LATENT, SHALL IN NO EVENT EXCEED THE PURCHASE PRICE OF THE PARTICULAR PRODUCTS WITH RESPECT TO WHICH LOSSES OR DAMAGES ARE CLAIMED, OR, AT THE ELECTION OF BRADCO, THE REPAIR OR REPLACEMENT OF DEFECTIVE OR DAMAGED PRODUCTS.