

**MAN0003**

(Rev. 7/4/2008)

# **ALITEC™**

# **SKID STEER**

# **TILLER**

**TL52**

**TL73**

**TL84**

**Effective Serial Numbers:**

**TL52A 4200690202**

**TL73A 4300730102**

**TL84A 5600020102**

**WOODS®**

Tested. Proven. Unbeatable.

**OPERATOR'S MANUAL**

## TO THE DEALER:

Assembly and proper installation of this product is the responsibility of the Woods® dealer. Read manual instructions and safety rules. Make sure all items on the Dealer's Pre-Delivery and Delivery Check Lists in the Operator's Manual are completed before releasing equipment to the owner.

**The dealer must complete the Product Registration online at the Woods Dealer Website** or complete the mail-in form included with the Operator's Manual. If using the mail-in form, the dealer is to return the prepaid postage portion to Woods, give one copy to the customer, and retain one copy. **Failure to register the product does not diminish customer's warranty rights.**

## TO THE OWNER:

Read this manual before operating your Woods equipment. The information presented will prepare you to do a better and safer job. Keep this manual handy for ready reference. Require all operators to read this manual carefully and become acquainted with all adjustment and operating procedures before attempting to operate. Replacement manuals can be obtained from your dealer. To locate your nearest dealer, check the Dealer Locator at [www.WoodsEquipment.com](http://www.WoodsEquipment.com), or in the United States and Canada call 1-800-319-6637.

The equipment you have purchased has been carefully engineered and manufactured to provide dependable and satisfactory use. Like all mechanical products, it will require cleaning and upkeep. Lubricate the unit as specified. Observe all safety information in this manual and safety decals on the equipment.

For service, your authorized Woods dealer has trained mechanics, genuine Woods service parts, and the necessary tools and equipment to handle all your needs.

Use only genuine Woods service parts. Substitute parts will void the warranty and may not meet standards required for safe and satisfactory operation. Record the model number and serial number of your equipment in the spaces provided:

**Model:** \_\_\_\_\_ **Date of Purchase:** \_\_\_\_\_

**Serial Number: (see Safety Decal section for location)** \_\_\_\_\_

Provide this information to your dealer to obtain correct repair parts.

Throughout this manual, the term **NOTICE** is used to indicate that failure to observe can cause damage to equipment. The terms **CAUTION**, **WARNING**, and **DANGER** are used in conjunction with the Safety-Alert Symbol (a triangle with an exclamation mark) to indicate the degree of hazard for items of personal safety.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

**IMPORTANT**  
or **NOTICE**

Is used to address practices not related to personal injury.

**NOTE**

Indicates helpful information.

**WOODS®**


**ALITEC™**  
**BMP®**  
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**WAIN-ROY®**  
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## 2 Introduction

Gen'l (Rev. 2/19/2008)


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**¡LEA EL INSTRUCTIVO!**

Si no lee Ingles, pida ayuda a alguien que si lo lea para que le traduzca las medidas de seguridad.



**This Operator's Manual should be regarded as part of the machine. Suppliers of both new and second-hand machines must make sure that this manual is provided with the machine.**

# GENERAL INFORMATION

The purpose of this manual is to assist you in operating and maintaining your tiller. Read it carefully. It furnishes information and instructions that will help you achieve years of dependable performance. These instructions have been compiled from extensive field experience and engineering data. Some information may be general in nature due to unknown and varying operating conditions. However, through experience and these instructions, you should be able to develop procedures suitable to your particular situation.

The illustrations and data used in this manual were current at the time of printing but, due to possible inline production changes, your machine may vary slightly in detail. We reserve the right to redesign and change the machines as may be necessary without notification.

Throughout this manual, references are made to right and left direction. These are determined by standing behind the equipment facing the direction of forward travel.

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## SPECIFICATIONS

	<b>TL52</b> Dual Direct	<b>TL73</b> Dual Direct	<b>TL84</b> Dual Direct
<b>Motor</b>	Char-Lynn 2000 - 18.7	Char-Lynn 2000 - 18.7	Ross ME180405 AAAB
<b>Maximum Pressure</b>	3300 psi (228 bars)	3300 psi (228 bars)	5000 psi (245 bars)
<b>Working Depth</b>	0 - 6 Inches	0 - 6 Inches	0 - 6 Inches
<b>Working Width</b>	52 Inches (1321 mm)	73 Inches (1854 mm)	84 Inches (2134 mm)
<b>Overall Width</b>	60 Inches (1524 mm)	86 Inches (2184 mm)	97 Inches (2462 mm)
<b>Overall Length</b>	44 Inches (1118 mm)	44 Inches (1118 mm)	44 Inches (1118 mm)
<b>Tines</b>	28	36	40
<b>RPM</b>	@ 12 gpm (46 lpm) 148 rpm  @ 15 gpm (57 lpm) 185 rpm  @ 18 gpm (69 lpm) 22 rpm	@ 15 gpm (76 lpm) 247 rpm  @ 25 gpm (95 lpm) 309 rpm  @ 32 gpm (122 lpm) 395 rpm	@ 20 gpm (76 lpm) 247 rpm  @ 25 gpm (95 lpm) 432 rpm  @ 32 gpm (122 lpm) 432 rpm  @ 40 gpm (152 lpm) 540 rpm

# SAFETY RULES



**ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be erased by an operator's single careless act.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, judgement, and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

It has been said "The best safety device is an informed, careful operator." We ask you to be that kind of operator.

## INSTALLATION

- Hydraulics must be connected as instructed in this manual. Do not substitute parts, modify, or connect in any other way.
- After connecting hoses, check that all control lever positions function as instructed in the Operator's Manual. Do not put into service until control lever and equipment movements are correct.

## TRAINING

- Safety instructions are important! Read all attachment and power unit manuals; follow all safety rules and safety decal information. (Replacement manuals and safety decals are available from your dealer. To locate your nearest dealer, check the Dealer Locator at [www.WoodsEquipment.com](http://www.WoodsEquipment.com), or in the United States and Canada call 1-800-319-6637.) Failure to follow instructions or safety rules can result in serious injury or death.
- If you do not understand any part of this manual and need assistance, see your dealer.
- Know your controls and how to stop engine and attachment quickly in an emergency.
- Operators must be instructed in and be capable of the safe operation of the equipment, its attachments, and all controls. Do not allow anyone to operate this equipment without proper instructions.
- Keep hands and body away from pressurized lines. Use paper or cardboard, not hands or other body parts to check for leaks. Wear safety goggles. Hydraulic fluid under pressure can easily penetrate skin and will cause serious injury or death.

- Make sure that all operating and service personnel know that if hydraulic fluid penetrates skin, it must be surgically removed as soon as possible by a doctor familiar with this form of injury or gangrene, serious injury, or death will result. **CONTACT A PHYSICIAN IMMEDIATELY IF FLUID ENTERS SKIN OR EYES. DO NOT DELAY.**

- Never allow children or untrained persons to operate equipment.

## PREPARATION

- Check that all hardware is properly installed. Always tighten to torque chart specifications unless instructed otherwise in this manual.

- Counterweight ballast may be required for machine stability. Check your power unit manual or contact your dealer.

- Air in hydraulic systems can cause erratic operation and allows loads or equipment components to drop unexpectedly. When connecting equipment or hoses or performing any hydraulic maintenance, purge any air in hydraulic system by operating all hydraulic functions several times. Do this before putting into service or allowing anyone to approach the equipment.

- After connecting hoses, check that all control lever positions function as instructed in the Operator's Manual. Do not put into service until control lever and equipment movements are correct.

- Protective hose sleeves must cover all hydraulic hoses within 20 inches of the operator and be secured onto metal hose fittings. Replace hoses or sleeves if damaged or if protective sleeve cannot be properly positioned or secured.

- Make sure all hydraulic hoses, fittings, and valves are in good condition and not leaking before starting power unit or using equipment. Check and route hoses carefully to prevent damage. Hoses must not be twisted, bent sharply, kinked, frayed, pinched, or come into contact with any moving parts. Operate moveable components through full operational range to check clearances. Replace any damaged hoses immediately.

- Always wear relatively tight and belted clothing to avoid getting caught in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing, and head; and respirator or filter mask where appropriate.

*(Safety Rules continued on next page)*

# SAFETY RULES



**ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



*(Safety Rules continued from previous page)*

■ Be sure attachment is properly secured, adjusted, and in good operating condition. Coupler lockpins must be fully extended and properly engaged into attachment retaining slots.

■ Power unit must be equipped with ROPS and seat belt/operator restraint. Keep seat belt/operator restraint securely fastened/engaged. Falling off power unit can result in death from being run over or crushed. Keep ROPS systems in place at all times.

■ Make sure all safety decals are installed. Replace if damaged. (See Safety Decals section for location.)

■ Make sure shields and guards are properly installed and in good condition. Replace if damaged.

■ Inspect and clear area of stones, branches, or other hard objects that might be thrown, causing injury or damage.

## OPERATION

■ Improper operation can cause the machine to tip or roll over and cause injury or death.

- Keep power unit lift arms and attachment as low as possible.
- Do not travel or turn with power unit lift arms and attachment raised.
- Turn only on level ground.
- Go up and down slopes, not across them.
- Keep the heavy end of the machine uphill.
- Do not overload the machine.

■ Never use attachment to carry loads that exceed the rated operating capacity or other specifications of the power unit. Check your power unit manual or see your dealer for rated operating capacity. Exceeding this capacity can cause machine to tip, roll over, or present other hazards that can cause injury or death.

■ Do not allow bystanders in the area when operating, attaching, removing, assembling, or servicing equipment.

■ Contact with high voltage, overhead power lines, underground cables, gas lines, and other hazards can cause serious injury or death from electrocution, explosion, or fire.

■ Keep bystanders away from equipment.

■ Never direct discharge toward people, animals, or property.

■ Do not operate or transport equipment while under the influence of alcohol or drugs.

■ Operate only in daylight or good artificial light.

■ Keep hands, feet, hair, and clothing away from equipment while engine is running. Stay clear of all moving parts.

■ Always comply with all state and local lighting and marking requirements.

■ Do not allow riders. Do not lift or carry anybody on the power unit or attachments.

■ Always sit in power unit seat when operating controls or starting engine. Securely fasten seat belt/operator restraint, place transmission in park or neutral, engage brake and ensure all other controls are disengaged before starting power unit engine.

■ Look down and to the rear and make sure area is clear before operating in reverse.

■ Use extreme care when working close to fences, ditches, other obstructions, or on hillsides.

■ Do not operate or transport on steep slopes.

■ Do not stop, start, or change directions suddenly on slopes.

■ Use extreme care and reduce ground speed on slopes and rough terrain.

■ Watch for hidden hazards on the terrain during operation.

■ Stop power unit and implement immediately upon striking an obstruction. Dismount power unit, using proper procedure. Inspect and repair any damage before resuming operation.

■ Leak down or failure of mechanical or hydraulic system can cause equipment to drop.

■ Before making any adjustments on attachment, stop engine and engage parking brake. Never adjust or work on attachment while the power unit or attachment is running.

*(Safety Rules continued on next page)*



# SAFETY RULES

**ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



*(Safety Rules continued from previous page)*

## MAINTENANCE

■ Before leaving operator's seat, follow power unit manual instructions. Lower lift arms and put attachment on the ground. Stop engine, remove key, engage brake, and remove seat belt/operator restraint.

■ **NEVER GO UNDERNEATH EQUIPMENT.** Never place any part of the body underneath equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak-down, hydraulic system failures, mechanical failures, or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death.

- Service work does not require going underneath.
- Read Operator's Manual for service instructions or have service performed by a qualified dealer.

■ Do not modify or alter or permit anyone else to modify or alter the equipment or any of its components in any way.

■ Your dealer can supply original equipment hydraulic accessories and repair parts. Substitute parts may not meet original equipment specifications and may be dangerous.

■ Do not allow bystanders in the area when operating, attaching, removing, assembling, or servicing equipment.

■ Never perform service or maintenance with engine running.

■ Keep all persons away from operator control area while performing adjustments, service, or maintenance.

■ Tighten all bolts, nuts, and screws to torque chart specifications. Check that all cotter pins are installed securely to ensure equipment is in a safe condition before putting unit into service.

■ Make sure all safety decals are installed. Replace if damaged. (See Safety Decals section for location.)

■ Make sure shields and guards are properly installed and in good condition. Replace if damaged.

■ Do not disconnect hydraulic lines until all system pressure is relieved. Lower unit to ground, stop engine, and operate all hydraulic control levers.

■ Leak down or failure of mechanical or hydraulic system can cause equipment to drop.

## STORAGE

■ Follow manual instructions for storage.

■ Keep children and bystanders away from storage area.



# SAFETY & INSTRUCTIONAL DECALS

## ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

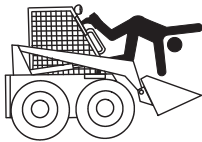
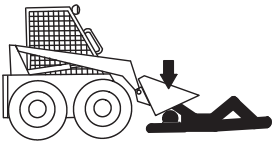
### Replace Immediately If Damaged!



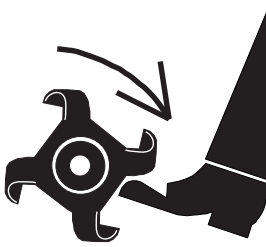
#### 1 - Serial Number Plate

<b>ALITEC™</b>	
Woods Equipment Company    Oregon, Illinois, U.S.A.	
Model No: _____	
Serial No: _____	Mass: _____

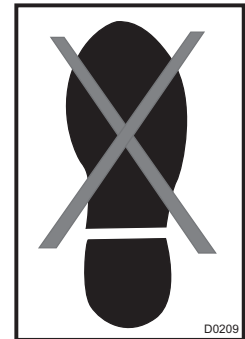
#### 2 - PN 54519

<b>⚠ WARNING</b>	
	
<p><b>FALLING OFF CAN RESULT IN BEING RUN OVER.</b></p> <ul style="list-style-type: none"> <li>■ Skid steer must have ROPS and seat belt/operator restraint. Keep seat belt/operator restraint securely fastened.</li> <li>■ Never allow riders.</li> </ul> <p><b>RAISED EQUIPMENT CAN DROP AND CRUSH.</b></p> <ul style="list-style-type: none"> <li>■ Never go under raised equipment or raised skid steer lift arms. They can drop from hydraulic or mechanical failure, or moving control levers.</li> <li>■ Service work does not require going under equipment. Read manual instructions.</li> </ul> <p><b>FALLING OFF OR GOING UNDER MACHINE CAN RESULT IN SERIOUS INJURY OR DEATH.</b></p> <p style="text-align: right; font-size: small;">54519-B</p>	


#### 3 - PN D0200

<b>⚠ WARNING</b>

<p style="text-align: center;"><b>ROTARY CUTTER</b></p> <p>Keep clear during operation. See Operator's Manual for maintenance precautions.</p> <p style="text-align: right; font-size: x-small;">D0200</p>

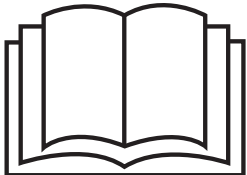
#### 4 - PN D0209



#### 5 - PN 19924

	<b>⚠ WARNING</b>
19924-B	<p><b>HIGH-PRESSURE HYDRAULIC OIL LEAKS CAN PENETRATE SKIN RESULTING IN SERIOUS INJURY, GANGRENE OR DEATH.</b></p> <ul style="list-style-type: none"> <li>■ Check for leaks with cardboard; never use hand.</li> <li>■ Before loosening fittings: lower load, release pressure, and be sure oil is cool.</li> <li>■ Consult physician immediately if skin penetration occurs.</li> </ul>

#### 6 - PN D0404

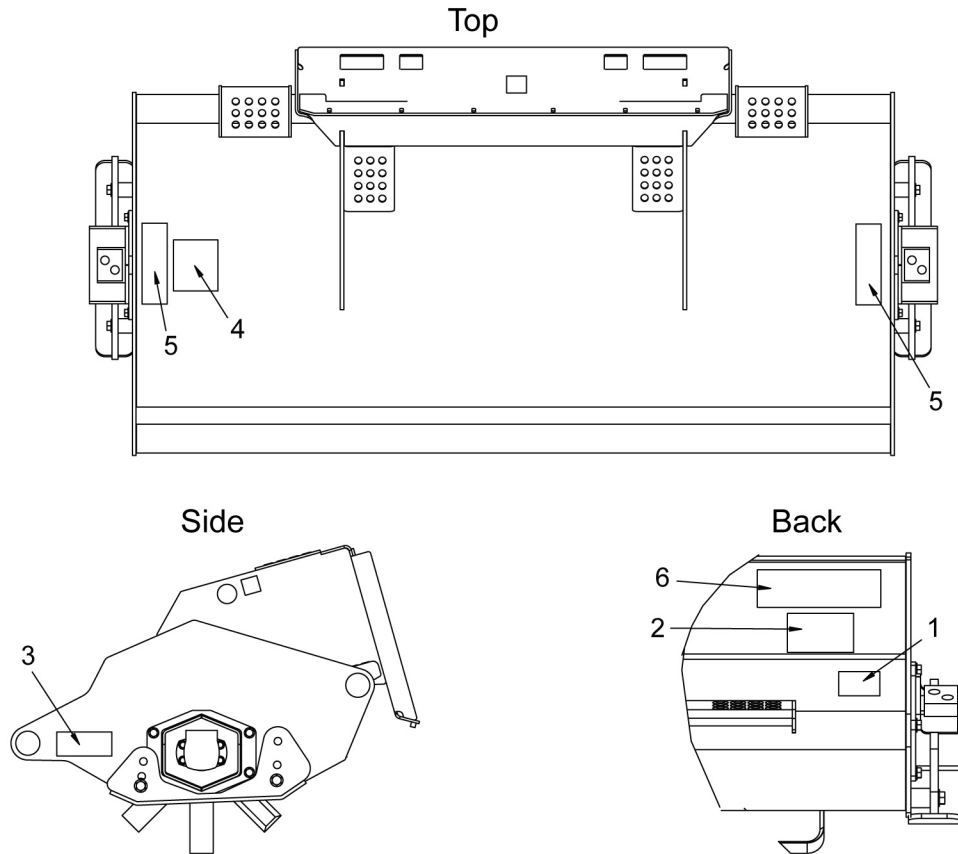
<b>⚠ WARNING</b>	<b>TO AVOID SERIOUS INJURY OR DEATH:</b>
	<ul style="list-style-type: none"> <li>■ Read attachment and power unit manuals before you use, service, or repair machine. Follow all safety rules and instructions. (Manuals can be obtained from your dealer, or in the United States and Canada call 1-800-319-6637.)</li> <li>■ Use only when sitting in operator's seat with seat belt/operator restraint fastened.</li> <li>■ Before leaving operator's seat, follow power unit manual instructions, lower lift arms and attachment to ground, stop engine, remove key, engage brake, and remove seat belt/operator restraint.</li> <li>■ Never let children or untrained persons run equipment.</li> </ul>
D0404-C	





# SAFETY & INSTRUCTIONAL DECALS

**ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**  
**Replace Immediately If Damaged!**



## BE CAREFUL!

Use a clean, damp cloth to clean safety decals. Avoid spraying too close to decals when using a pressure washer; high-pressure water can enter through very small scratches or under edges of decals causing them to peel or come off.

Replacement safety decals can be ordered free from your Woods dealer. To locate your nearest dealer, check the Dealer Locator at [www.WoodsEquipment.com](http://www.WoodsEquipment.com), or in the United States and Canada call 1-800-319-6637.

# OPERATION

## **WARNING**

■ **Safety instructions are important! Read all attachment and power unit manuals; follow all safety rules and safety decal information. (Replacement manuals and safety decals are available from your dealer. To locate your nearest dealer, check the Dealer Locator at [www.WoodsEquipment.com](http://www.WoodsEquipment.com), or in the United States and Canada call 1-800-319-6637.) Failure to follow instructions or safety rules can result in serious injury or death.**

■ **Power unit must be equipped with ROPS and seat belt/operator restraint. Keep seat belt/operator restraint securely fastened/engaged. Falling off power unit can result in death from being run over or crushed. Keep ROPS systems in place at all times.**

■ **The operator is responsible for the safe operation of this equipment. Operators must be instructed in and be capable of the safe operation of the equipment, its attachments and all controls. Do not allow anyone to operate this equipment without proper instructions.**

■ **Skid steers must be equipped with an auxiliary hydraulic system capable of supplying continuous flow for hydraulic motor operation.**

## **PRE-OPERATION CHECK LIST**

### **Owner's Responsibility**

- \_\_\_ Review and follow all safety rules and decals. See safety rules on page 5 and safety decals on page 8.
- \_\_\_ Check that all safety decals are installed and in good condition. Replace if damaged.
- \_\_\_ Check that all shields and guards are properly installed and in good condition. Replace if damaged.
- \_\_\_ Check that equipment is properly and securely attached to skid steer.
- \_\_\_ Check that all hardware and cotter pins are properly installed and secured.
- \_\_\_ Do not allow riders.

- \_\_\_ Keep all bystanders away from equipment working area.
- \_\_\_ Check that all hydraulic hoses and fittings are in good condition and not leaking before starting power unit.
- \_\_\_ Check that hoses are not twisted, bent sharply, kinked, frayed or pulled tight. Replace any damaged hoses immediately.
- \_\_\_ Make sure power unit ROPS and seat belts are in good condition. Keep seat belt securely fastened during operation.

## **TILLER INSTALLATION**

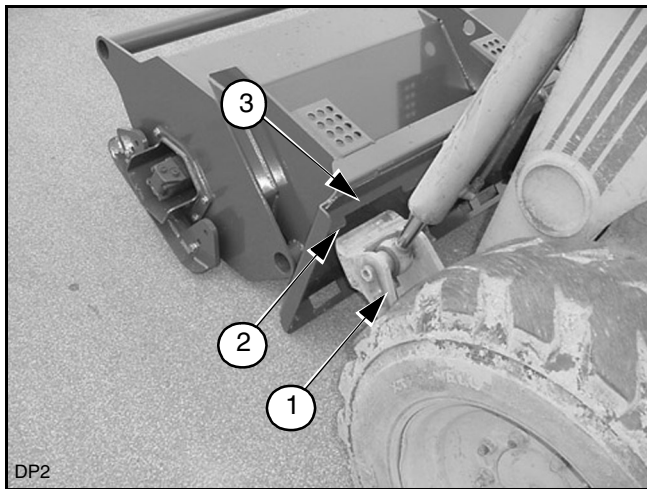
Read instructions in the skid steer operator's manual for connecting and removing attachment.

Place the couplers in the disengaged position as shown in Figure 1. Rotate the skid steer attachment slightly forward and fully lower the lift arms.



**Figure 1.**

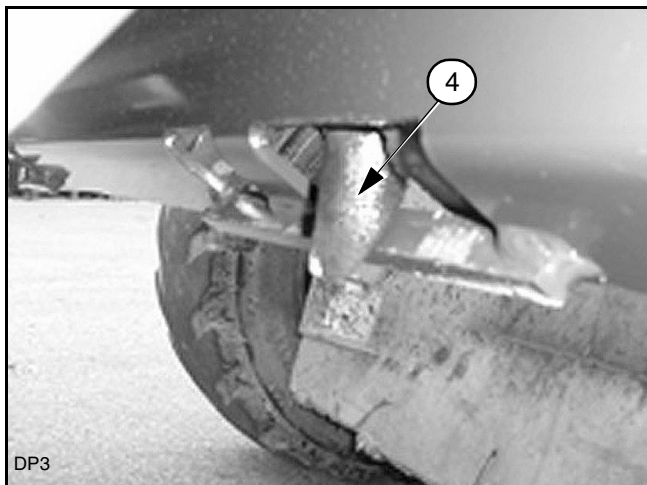
Pull forward to the attachment as shown in Figure 2. Make sure the outside of the skid steer attach (1) is aligned with the inside of the tiller attach (2). Continue to pull forward until the skid steer attach makes contact with the tiller attach. Raise the skid steer arms until the top of the skid steer attach contacts the top latch bar (3) on the tiller.



**Figure 2.**

Roll the skid steer arms back until the tiller is completely off the ground. Engage the parking break on the skid steer. Stop engine and relieve the back pressure in the auxiliary hydraulic system. Exit the skid steer.

Move the coupler pins to the engaged position. Hook up the auxiliary hydraulic hoses. Be sure they are routed to prevent any hose interference. Check the attach pins (4) to be sure they are fully engaged in the attach bracket as shown in Figure 3.



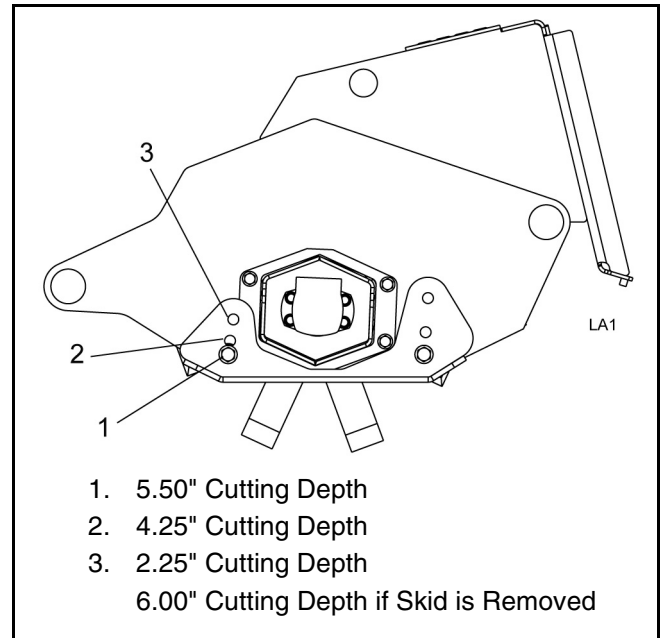
**Figure 3.**

### **TILLER DEPTH ADJUSTMENT**

All tiller models have four depth settings. Moving the depth skid location allows the depth setting to be changed. Figure 4 shows the cutting depth for the four depth positions. When making adjustments, be sure that both skids are set at the same position.

To change the depth skid position, lower the tiller to the ground so the weight is supported on the tines. Remove the two bolts from each depth skid. Adjust the

depth skid for the desired cutting depth. Reinstall the two bolts and torque to 250 lbs-ft (325 N-m).



**Figure 4.**

### **TILLER OPERATION**

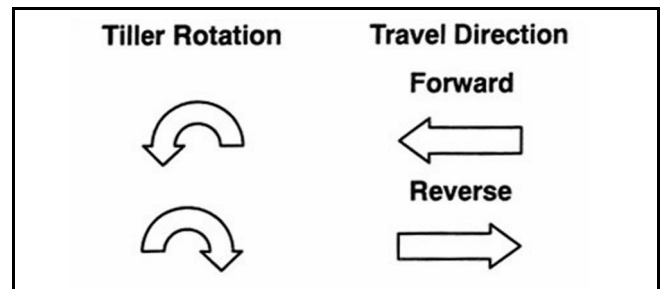
**⚠ WARNING**

■ **Read and understand the tiller and skid steer operator's manuals before operating the tiller. Failure to do so may result in death, serious personal injury or property damage.**

The tiller is a hydraulic powered attachment intended to cultivate soil. The tiller attachment operation is bi-directional; it will operate with tines rotating in either direction.

The TL52 has an offset mounting configuration to allow the right tracks to be covered when the skid steer moves in reverse for finishing the tilling operation.

The performance of the tiller can vary significantly depending upon the way it is used. The tiller attachment requires a minimum hydraulic supply. For requirements on each model see specifications on page 4.



## NOTICE

■ **To avoid tiller and motor damage, stop prime mover hydraulic flow. Allow tiller to stop completely before changing direction of rotation.**

For maximum productivity and to maintain optimal operation, keep chassis free of residue build up and replace worn or broken tines.

Never raise the attachment more than 24" off the ground. When loading, keep the attachment as low to ramps and trailers as possible.

For finish tilling operation, the tiller may be operated in the reverse direction with the tines rotating in a clockwise direction when viewed from the left side of the machine.

Roll the skid steer arms fully back and lower the arms completely. Activate auxiliary hydraulics and make sure the tines are rotating in the desired direction. Bring skid steer to high idle, slowly tilt the tiller forward until the depth skids contact the ground. Move the skid steer in the desired direction of travel.

## TRANSPORT

### NOTICE

■ **When transporting the attachment, be sure the tines do not contact the ground as this may cause the drum to turn resulting in damage to the motor.**

Roll the skid steer arms fully back and raise the attachment 12" to 15" from the ground. Avoid excessive ground speed and sudden maneuvers. Never raise the attachment more than 24" off the ground. When loading, keep the attachment as low to ramps and trailers as possible.

### **WARNING**

■ **Improper operation can cause the machine to tip or roll over and cause injury or death.**

- Keep power unit lift arms and attachment as low as possible.
- Do not travel or turn with power unit lift arms and attachment raised.
- Turn only on level ground.
- Go up and down slopes, not across them.
- Keep the heavy end of the machine uphill.
- Do not overload the machine.

■ **Look down and to the rear and make sure area is clear before operating in reverse.**

## CLEANING

### After Each Use

- Remove large debris such as clumps of dirt, grass, crop residue, etc. from machine.
- Inspect machine and replace worn or damaged parts.
- Replace any safety decals that are missing or not readable.

### Periodically or Before Extended Storage

- Clean large debris such as clumps of dirt, grass, crop residue, etc. from machine.
- Remove the remainder using a low-pressure water spray.
  1. Be careful when spraying near scratched or torn safety decals or near edges of decals as water spray can peel decal off surface.
  2. Be careful when spraying near chipped or scratched paint as water spray can lift paint.
  3. If a pressure washer is used, follow the advice of the pressure washer manufacturer.
- Inspect machine and replace worn or damaged parts.
- Sand down scratches and the edges of areas of missing paint and coat with spray paint of matching color (purchase from your dealer).
- Replace any safety decals that are missing or not readable (supplied free by your dealer). See Safety Decals section for location drawing.

## STORAGE

### NOTICE

■ **Store the tiller inside when possible. If this is not possible, store the tiller on a pallet. Be sure the tiller is stored off the ground to protect the couplers and hoses.**

■ **The supply and return hoses must always be secured with quick disconnects or caps to prevent loss of fluids and contamination.**

### **WARNING**

■ **Keep children and bystanders away from storage area.**

# TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSES	SOLUTION
Drum will not rotate	<p>Auxiliary hoses are not hooked up to skid steer</p> <p>There is an obstruction in one or both of the auxiliary hoses</p> <p>One or more seals on the motor have failed</p> <p>Skid steer auxiliary hydraulics are not operating properly</p> <p>Motor hoses are not plumbed correctly</p>	<p>Inspect connections visually (make sure QD's are fully engaged).</p> <p>Remove and inspect hoses visually.</p> <p>Contact dealer.</p> <p>Refer to skid steer owner's manual.</p> <p>See "Hydraulic Assembly TL52" on page 22. Verify correct hose routing.</p>
Drum rotates sluggishly	<p>Insufficient hydraulic flow from the skid steer</p> <p>The hydraulic oil filter on the skid steer is dirty</p> <p>One or more seals on the motor have failed</p>	<p>Refer to skid steer owner's manual.</p> <p>Refer to skid steer owner's manual.</p> <p>Contact dealer.</p>
Motor operates, but the drum does not rotate	<p>Cross bolt on coupler is sheared</p> <p>Coupler splines are stripped</p> <p>Motor shaft splines are stripped.</p>	<p>Inspect visually and repair as needed.</p> <p>Inspect visually and repair as needed.</p> <p>Inspect visually and repair as needed.</p>
Oil is leaking from the motor area.	<p>One or more seals on the motor have failed.</p> <p>O-rings on fitting are damaged</p> <p>Fittings are loose or damaged</p> <p>Hydraulic hoses are loose or damaged</p>	<p>Contact dealer.</p> <p>Visually inspect o-rings and replace as needed.</p> <p>Refer to skid steer owner's manual.</p> <p>Refer to skid steer owner's manual.</p>
Insufficient cutting power	<p>One or more seals on motor have failed</p> <p>Oil filter on the skid steer is dirty</p> <p>Insufficient auxiliary flow from skid steer</p> <p>Relief valve on skid steer is not set properly</p>	<p>Contact dealer.</p> <p>Refer to skid steer owner's manual.</p> <p>Refer to skid steer owner's manual.</p> <p>Refer to skid steer owner's manual.</p>

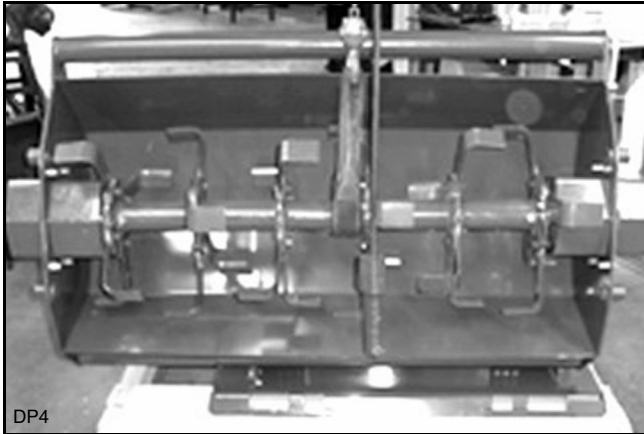
# TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSES	SOLUTION
Excessive oil temperature	Obstruction in one or both auxiliary hoses	Visually inspect and replace hoses as necessary.
	Hydraulic oil level on skid steer is low	Refer to skid steer owner's manual.
	Hydraulic oil in skid steer is dirty	Refer to skid steer owner's manual.
	Hydraulic oil filter on skid steer is dirty	Refer to skid steer owner's manual.
	Relief valve on skid steer is not set properly	Refer to skid steer owner's manual.
Insufficient tilling power	The tines are worn or bent	Replaced damaged tines.
	Debris has built up inside the chassis	Clean debris from inside of chassis.
	Insufficient hydraulic flow from the skid steer	Refer to skid steer owner's manual.
	The hydraulic oil filter on the skid steer is dirty	Refer to skid steer owner's manual.
	One or more seals on the motor have failed	Contact dealer.

# SERVICE

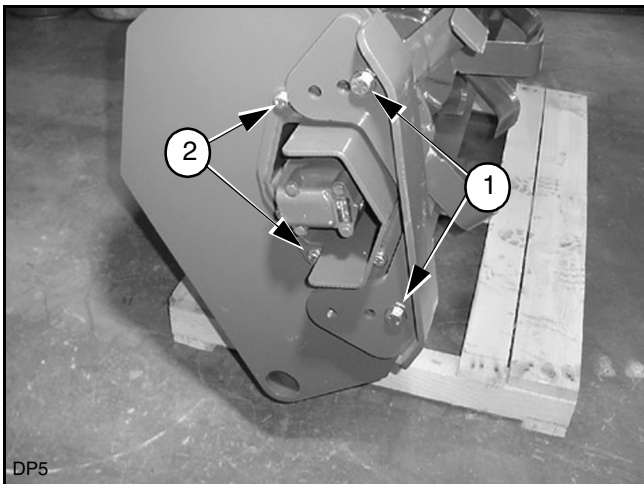
## DRUM REMOVAL

Rotate the tiller so it rests on the attach wings as shown in Figure 5. Use a hoist to support the drum at the midpoint.



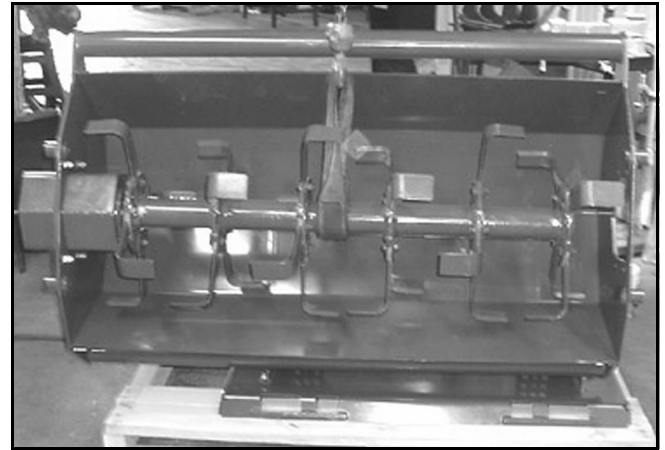
**Figure 5.**

Remove the two depth skid bolts (1) and four motor housing bolts (2) from one side as shown in Figure 6.



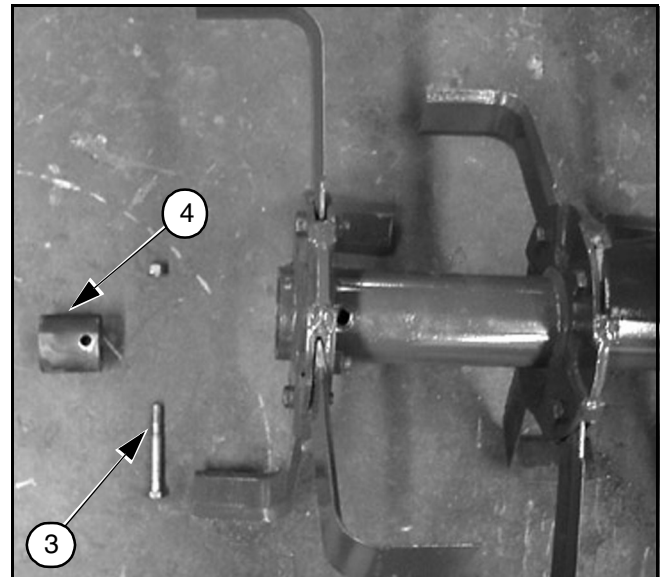
**Figure 6.**

Remove the depth skid and the motor housing from one side as shown in Figure 7. Slide the drum off remaining motor shaft.



**Figure 7.**

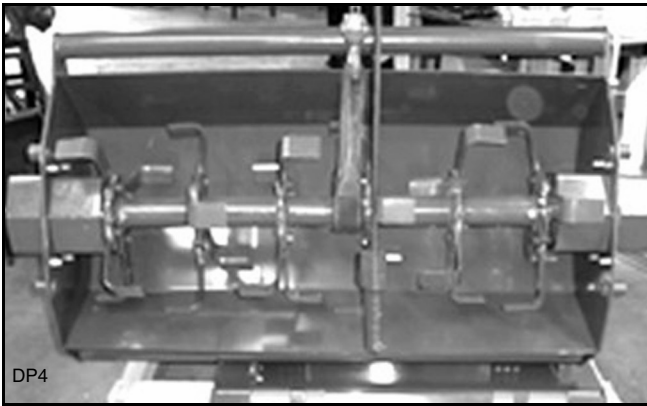
Remove the coupler bolt (3) and the coupler (4) from both sides of the drum as shown in Figure 8.



**Figure 8.**

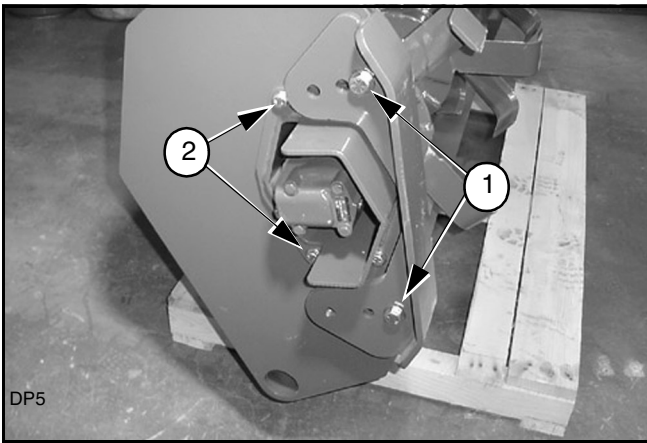
## MOTOR REMOVAL

Rotate the tiller so it rests on the attach wings as shown in Figure 9. Use a hoist to support the drum at the midpoint.



**Figure 9.**

Remove the two depth skid bolts (1) and four motor housing bolts (2) from one side as shown in Figure 10.



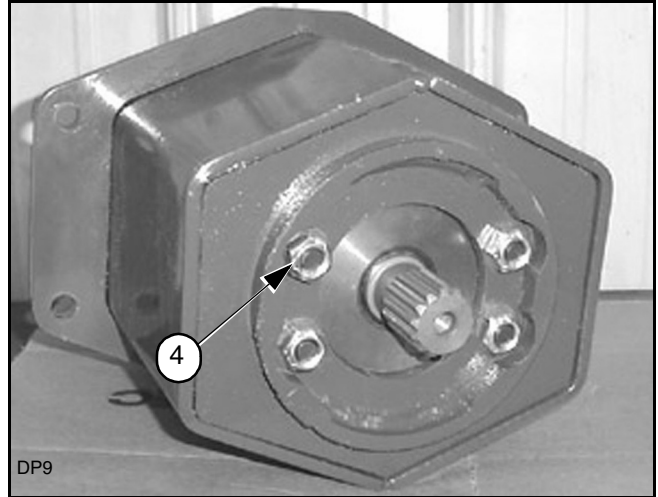
**Figure 10.**

Remove the depth skid and motor housing. Place the motor housing in vice (3) as shown in Figure 11.



**Figure 11.**

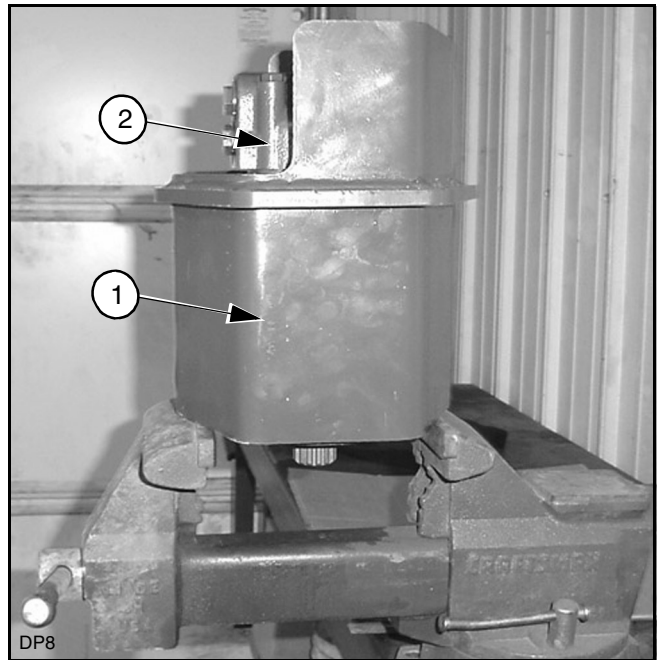
Use an extension and a 1/2" twelve point socket to hold motor bolts from the inside and remove the four 1/2" nuts (4) from the bottom as shown in Figure 12.



**Figure 12.**

### **MOTOR INSTALLATION**

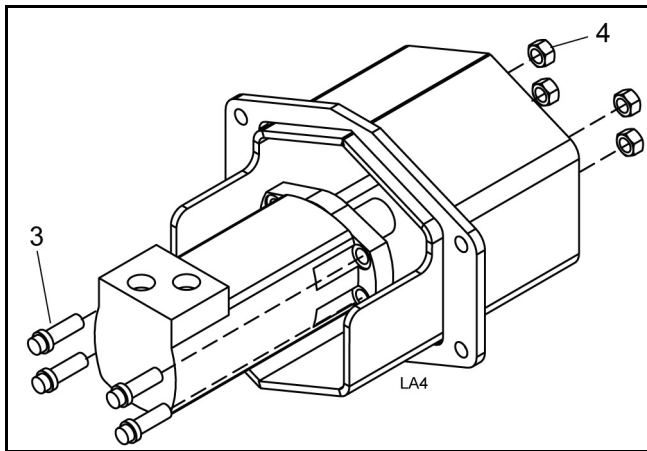
Place the motor housing into a vice (1). Install the motor and orient the motor ports (2) as shown in Figure 13.



**Figure 13.**

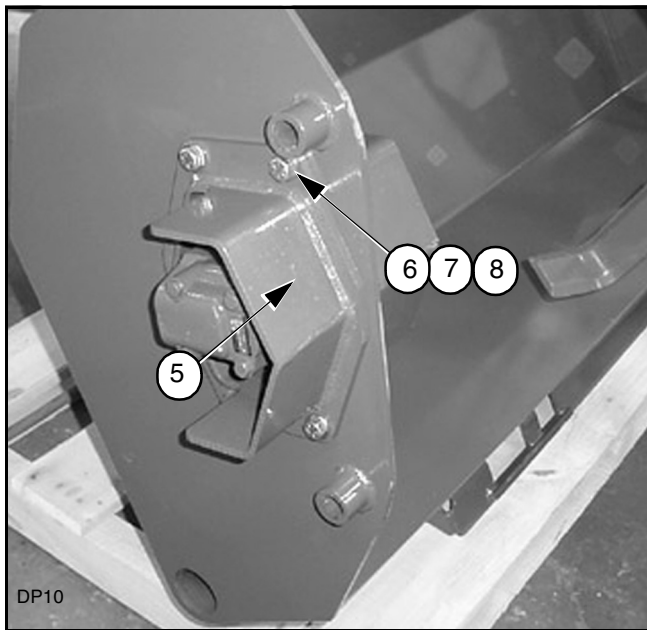
Install four 1/2" - 20 x 1-1/2" twelve-point bolts (3) and four 1/2" - 20 (4) nuts as shown in Figure 14 and Figure 16. While using an extension and 1/2" twelve-point socket, hold bolts from the inside and torque nuts to 85 lbs-ft. (115 N-m).



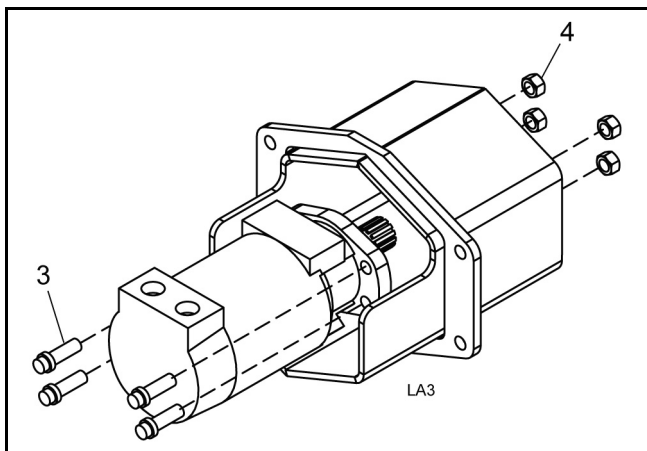


**Figure 14.** TL52 and TL73

Install motor housing (5) into one side of the chassis using four 1/2" x 1-1/2" bolts (6), eight 1/2" flat washers (7) and four 1/2" - 13 nuts (8) as shown in Figure 15.



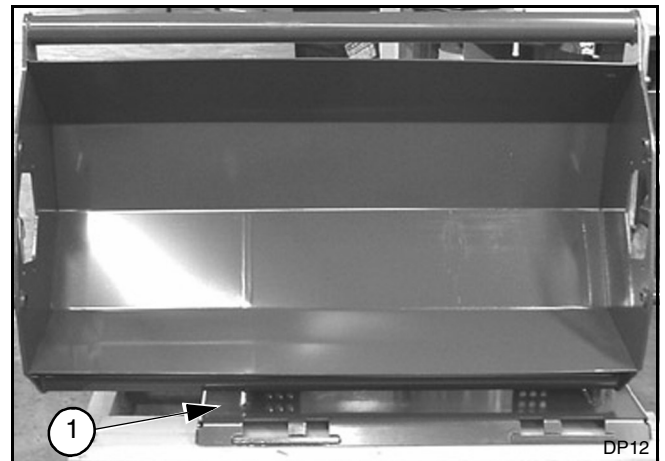
**Figure 15.**



**Figure 16.** TL84

## **DRUM INSTALLATION**

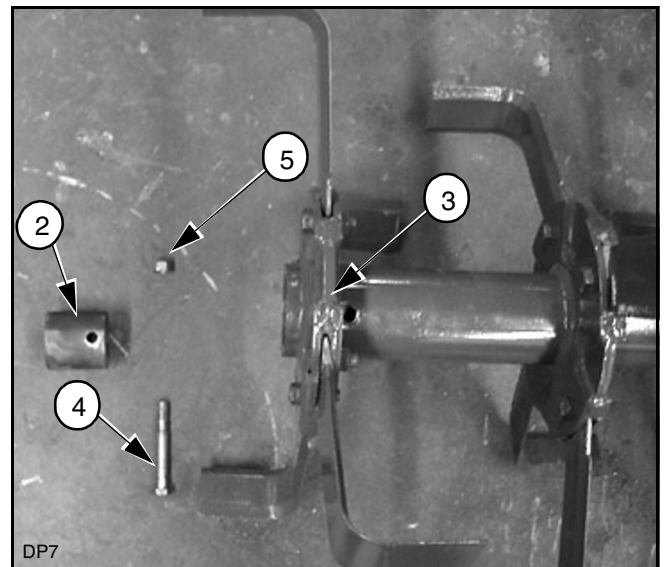
Rotate the tiller chassis (1) so that it rests on the attach bracket as shown in Figure 17.



**Figure 17.**

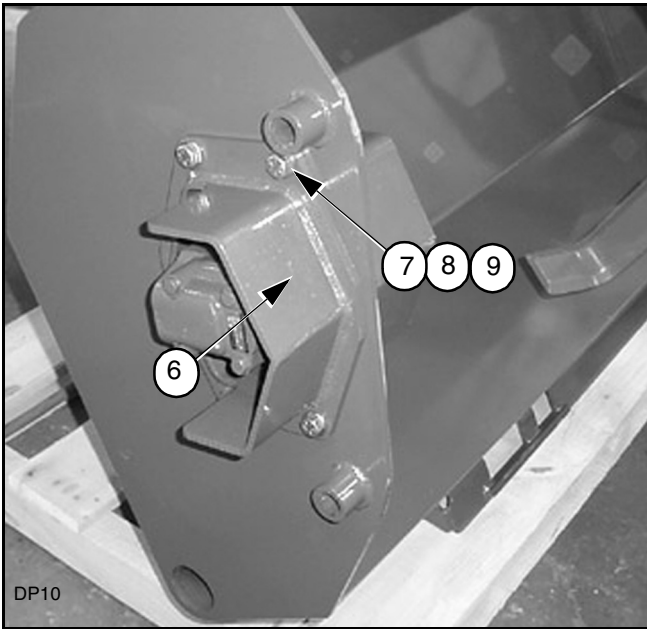
Insert one coupler (2) into each end of the drum as shown in Figure 18. Make sure the end nearest the hole is to the inside. Line up the hole in the drum (3) with the hole in the coupler and install one 1/2" x 3-3/4" bolt (4) and one 1/2" - 20 nut (5).

Torque to 85 lbs-ft (115 N-m).



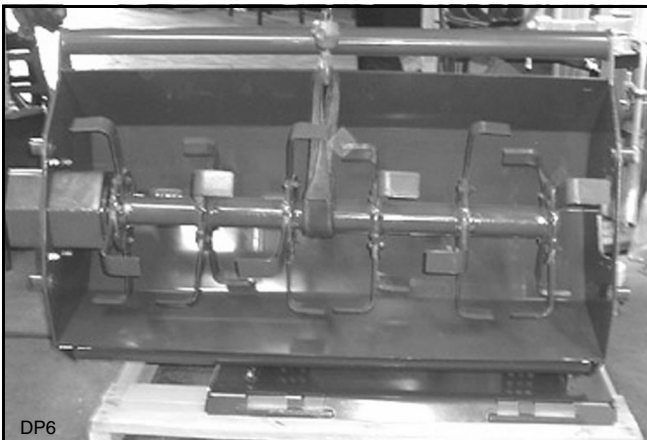
**Figure 18.**

Install the motor housing (6) into one side of the chassis using four 1/2" x 1-1/2" bolts (7), eight 1/2" flat washers (8) and four 1/2" - 13 nuts (9) as shown in Figure 19. Torque to 120 lbs-ft (163 N-m).



**Figure 19**

Use a hoist to lift the drum. Make sure the coupler is aligned with the motor shaft and insert motor shaft into drum as shown in Figure 20.



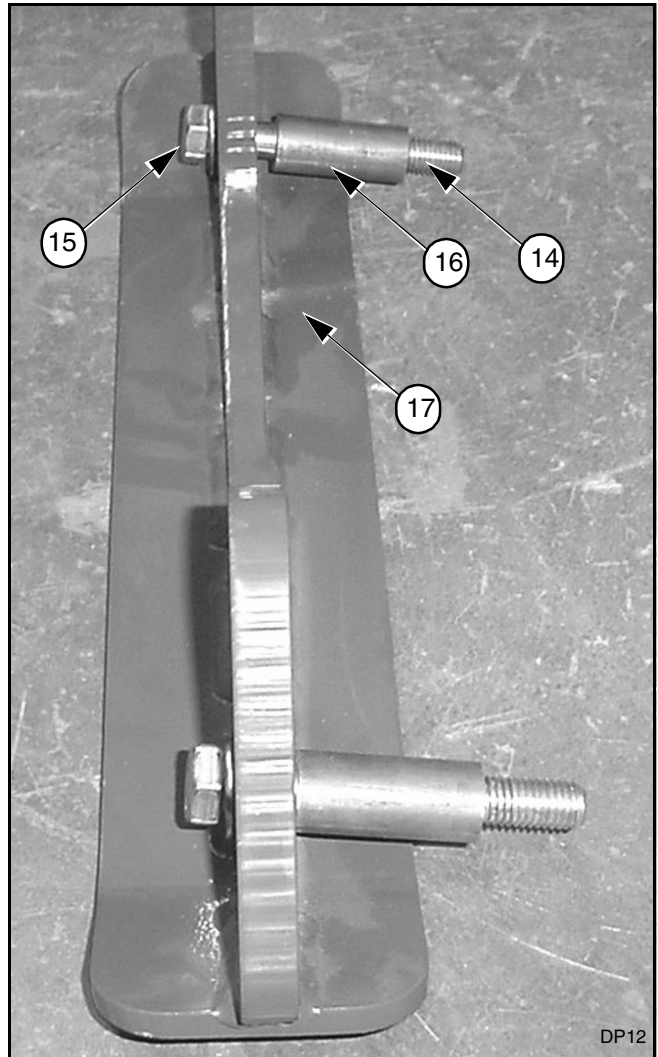
**Figure 20.**

Install the motor housing into other side of the chassis. Install the motor housing (6) into one side of the chassis using four 1/2" x 1-1/2" bolts (7), eight 1/2" flat washers (8) and four 1/2" - 13 nuts (9) as shown in Figure 19. Torque to 120 lbs-ft (163 N-m).

**Note:** It may be necessary to rotate drum to allow the splines on the coupler to align with the splines on the motor shaft.

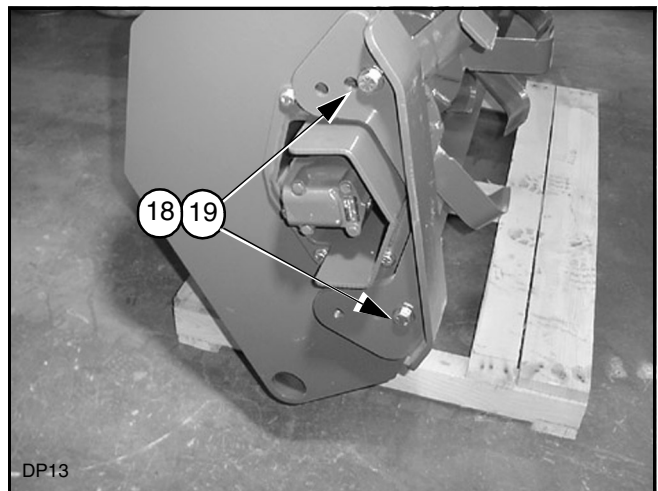
### **DEPTH SKID ASSEMBLY**

Install two 5/8" x 4-1/2" bolts (14) and two 5/8" washers (15) in each depth skid (17) as shown in Figure 21. Slide the two bushings (16) onto the 5/8" bolts.



**Figure 21.**

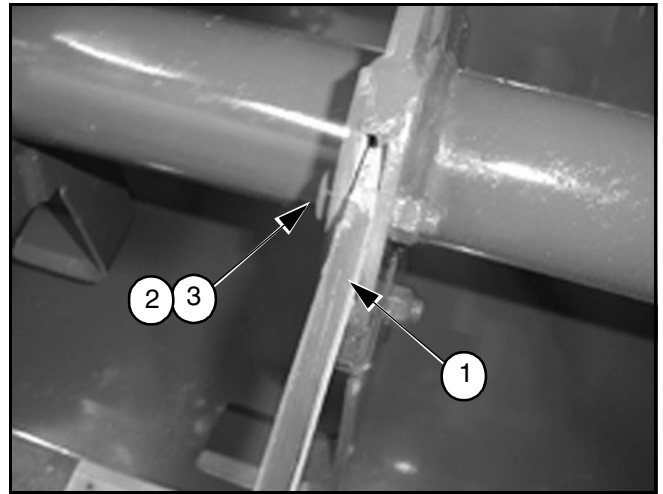
Assemble the depth skid on either side of the chassis, using an additional two 5/8" washers (18) and two 5/8" nuts (19) for each side as shown in Figure 22. Torque to 240 lbs-ft (325 N-m).



**Figure 22.**

## **TINE REPLACEMENT**

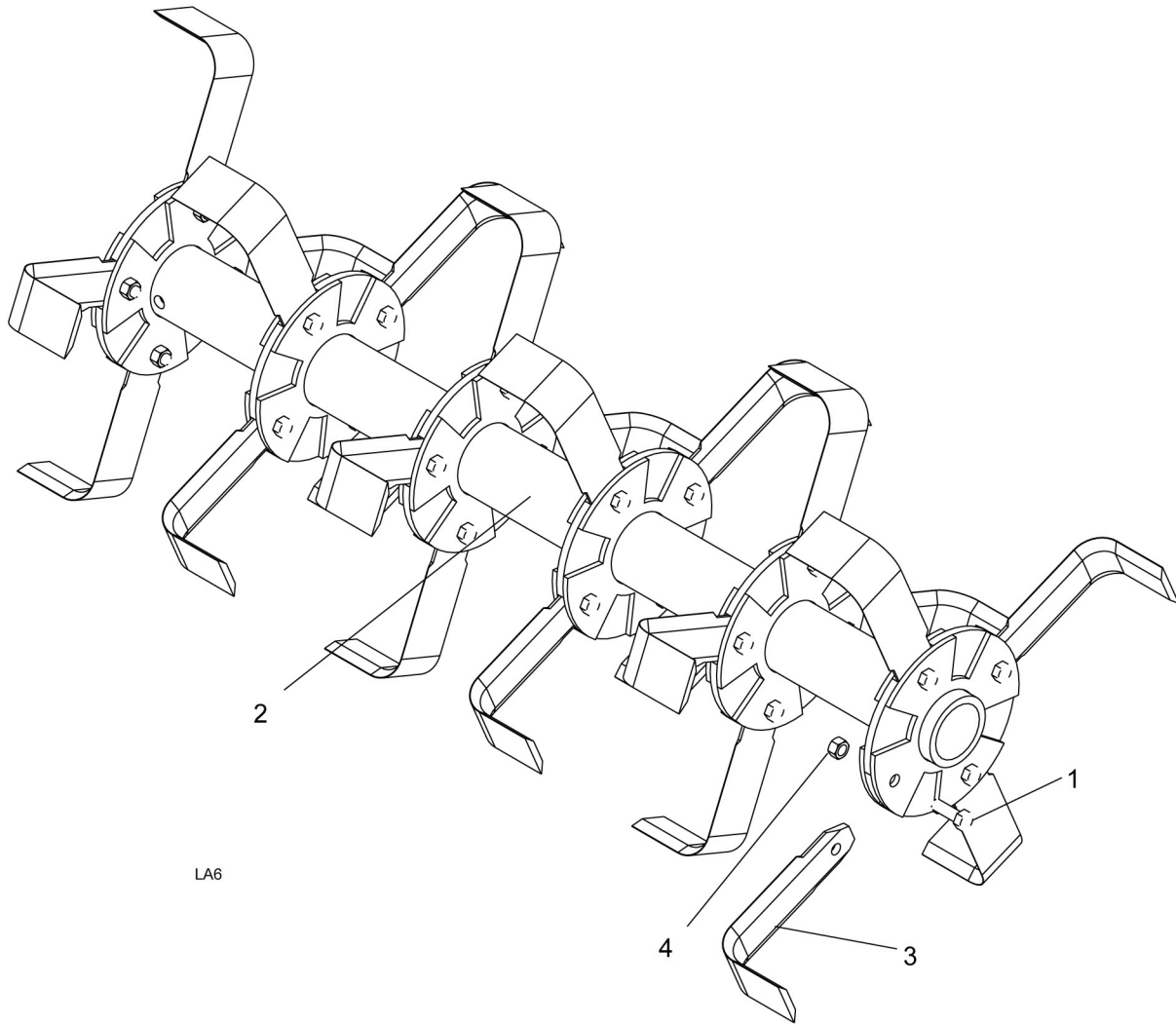
To replace worn or broken tines (1), remove the 1/2" nut (3) and bolt (2) as shown in Figure 23. Remove the worn or broken tine and replace with a new tine. Install 1/2" x 1-1/2" - 20 bolt (2) and 1/2" - 20 nut (3). Torque to 50 lbs-ft (68 N-m). The tine should rotate  $\pm 15^\circ$  when a small force is applied to the tine. If the tine does not rotate, loosen the nut until the tine is free to rotate.



**Figure 23.**



## DRUM ASSEMBLY



LA6

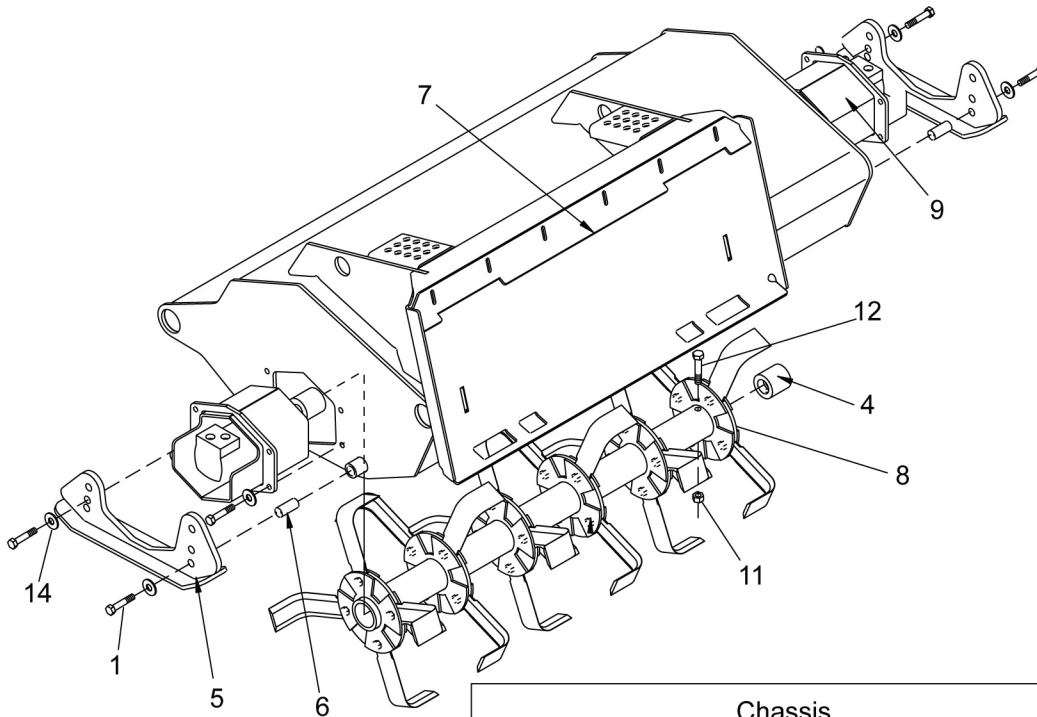
REF	PART	QTY	DESCRIPTION
1	59000	24	Bolt, 1/2 NF x 1-1/2 GR8 ZP <b>TL52</b>
1	59000	24	Bolt, 1/2 NF x 1-1/2 GR8 ZP <b>TL73</b>
1	59000	24	Bolt, 1/2 NF x 1-1/2 GR8 ZP <b>TL84</b>
2	105170	1	Drum weld, 52" <b>TL52</b>
2	101913	1	Drum weld, 73" <b>TL73</b>
2	102402	1	Drum weld, 84" <b>TL84</b>

REF	PART	QTY	DESCRIPTION
3	101533	24	Tine, <b>TL52</b>
3	101533	36	Tine, <b>TL73</b>
3	101533	40	Tine, <b>TL84</b>
4	B0816	24	Nut, 1/2 - 20 Stover PLT <b>TL52</b>
4	B0816	36	Nut, 1/2 - 20 Stover PLT <b>TL73</b>
4	B0816	40	Nut, 1/2 - 20 Stover PLT <b>TL84</b>

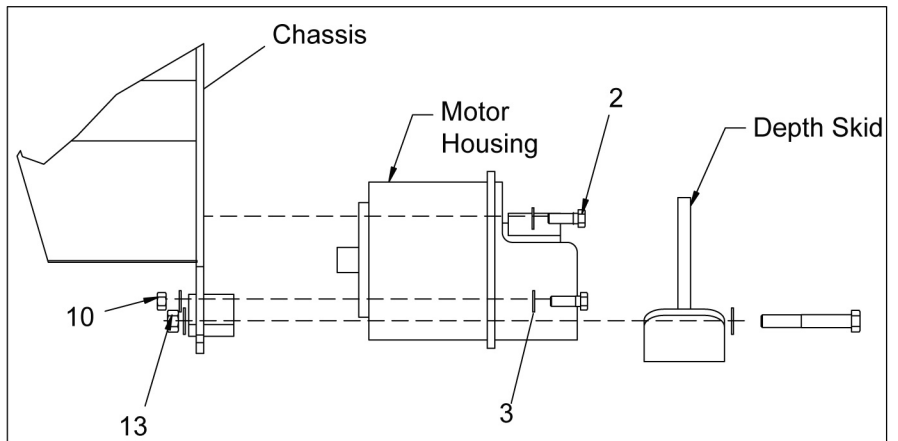
**20 Parts**

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## BASE UNIT ASSEMBLY



LA5



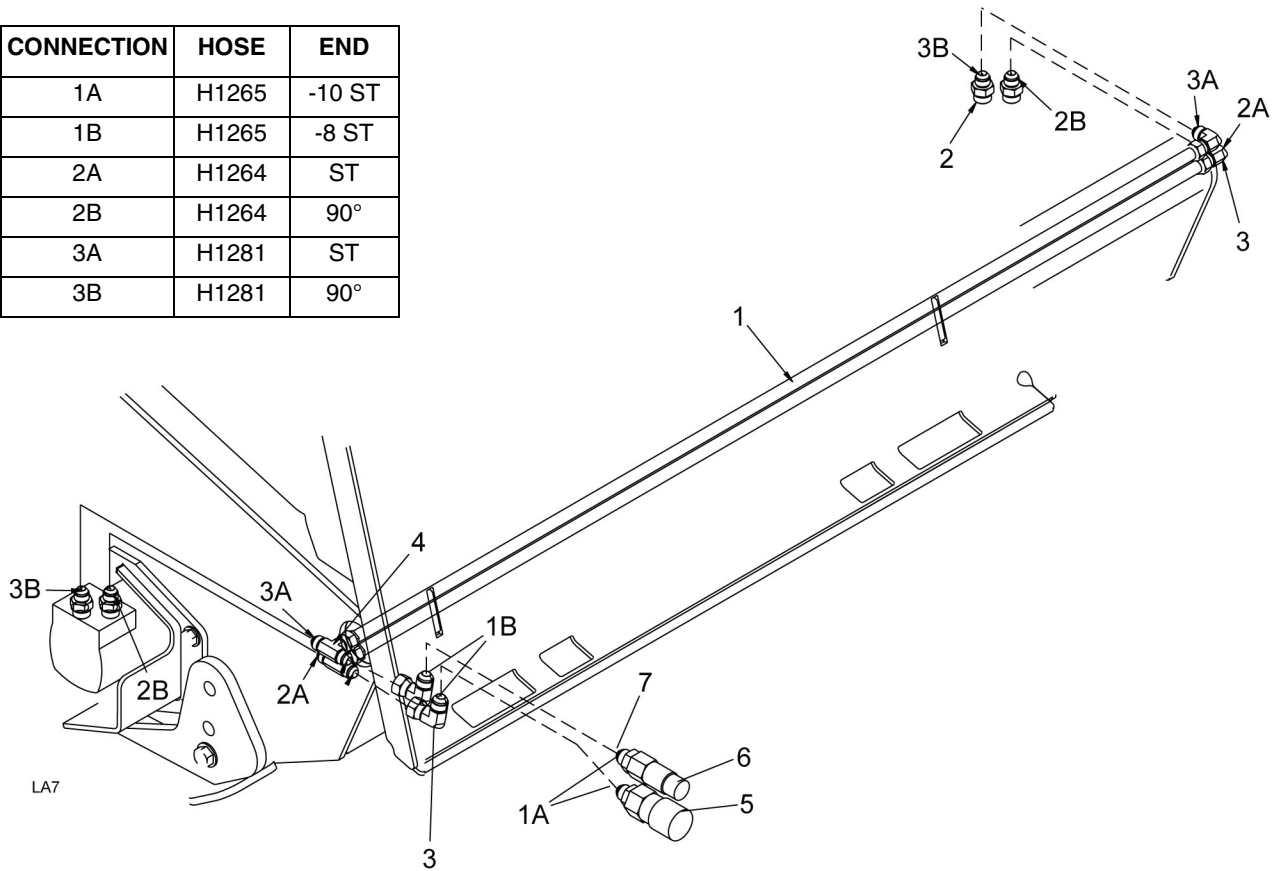
REF	PART	QTY	DESCRIPTION	REF	PART	QTY	DESCRIPTION
1	20551	4	Bolt, 5/8 NC x 4-1/2 GR8 ZP	8	105899	1	Drum assembly <b>TL73</b>
2	21666	8	Bolt, 1/2 NC x 1-1/2 GR8 ZP	8	105900	1	Drum assembly <b>TL84</b>
3	57816	16	Washer 1/2 SAE flat hrd	9	105901	2	Housing/motor asy <b>TL52/TL73</b>
4	101921	2	Collar, round bore <b>TL73</b>	-	S0100111	1	Seal kit ( <b>TL52/TL73 motor</b> )
5	102993	2	Skid	9	105902	2	Housing/motor asy <b>TL84</b>
6	104351	4	Bushing, TL Skid pin	-	1025864	1	Seal Kit ( <b>TL84 motor</b> )
7	105715	1	Attach chassis <b>TL52</b>	10	B0815	8	Nut, 1/2 - 13 Stover plt GR5
7	105784	1	Attach chassis <b>TL73</b>	11	B0816	2	Nut, 1/2 - 20 Stover plt GR5
7	105786	1	Attach chassis <b>TL84</b>	12	B0830	2	Bolt, 1/2 x 3-3/4 - 20 GR8
				13	B1015	4	Nut, 5/8 - 11 Stover UNC GR5
				14	B1021	8	Washer, 5/8 flat SAE plt hrd

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MAN0003 (Rev. 11/30/2006)

# Parts 21

# HYDRAULIC ASSEMBLY TL52

CONNECTION	HOSE	END
1A	H1265	-10 ST
1B	H1265	-8 ST
2A	H1264	ST
2B	H1264	90°
3A	H1281	ST
3B	H1281	90°



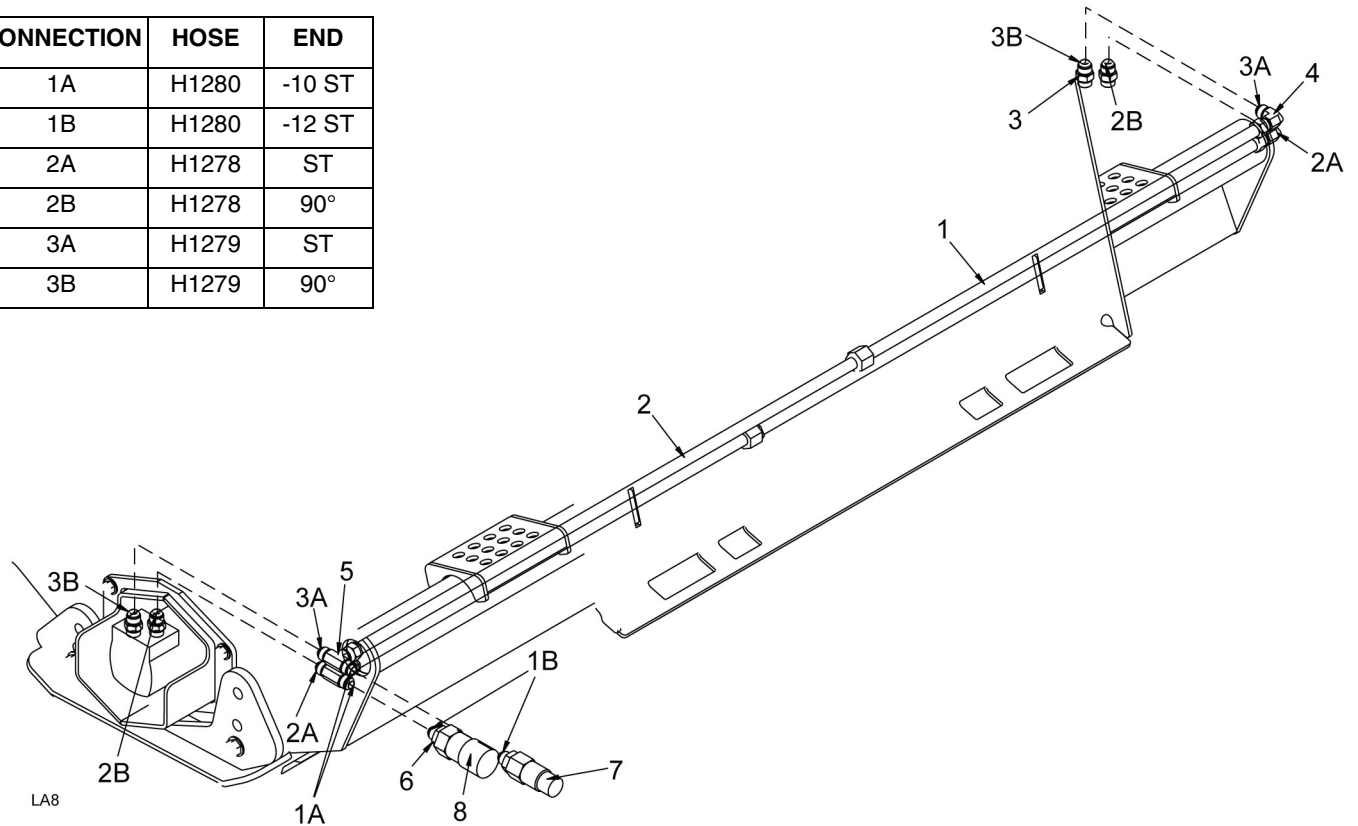
REF	PART	QTY	DESCRIPTION	REF	PART	QTY	DESCRIPTION
1	105716	2	Tube, 63.39 hyd <b>TL52</b>	6	HC414	1	QD 1/2" M Parker FE502-12 FO
2	F1016	4	Fitting 10 OM x 8 FLM ST	7	F1140	2	Fitting 12 OM x 10 FLM ST
3	F1020	4	Fitting 8 FLF x 8 FLM 90°	-	H1264	2	Hose #8 x 19" 8 FLF x 8 FLF 90° R2
4	F1231	2	8 FLM x 8 FLM x 8 FLM	-	H1265	2	Hose #10 x 52" 10 FLF x 8 FLF R2
5	HC415	1	QD 1/2" F Parker FE501-12 FONL	-	H1281	2	Hose #8 x 21" 8 FLF x 8 FLF 90° R2

**22 Parts**

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## HYDRAULIC ASSEMBLY TL73

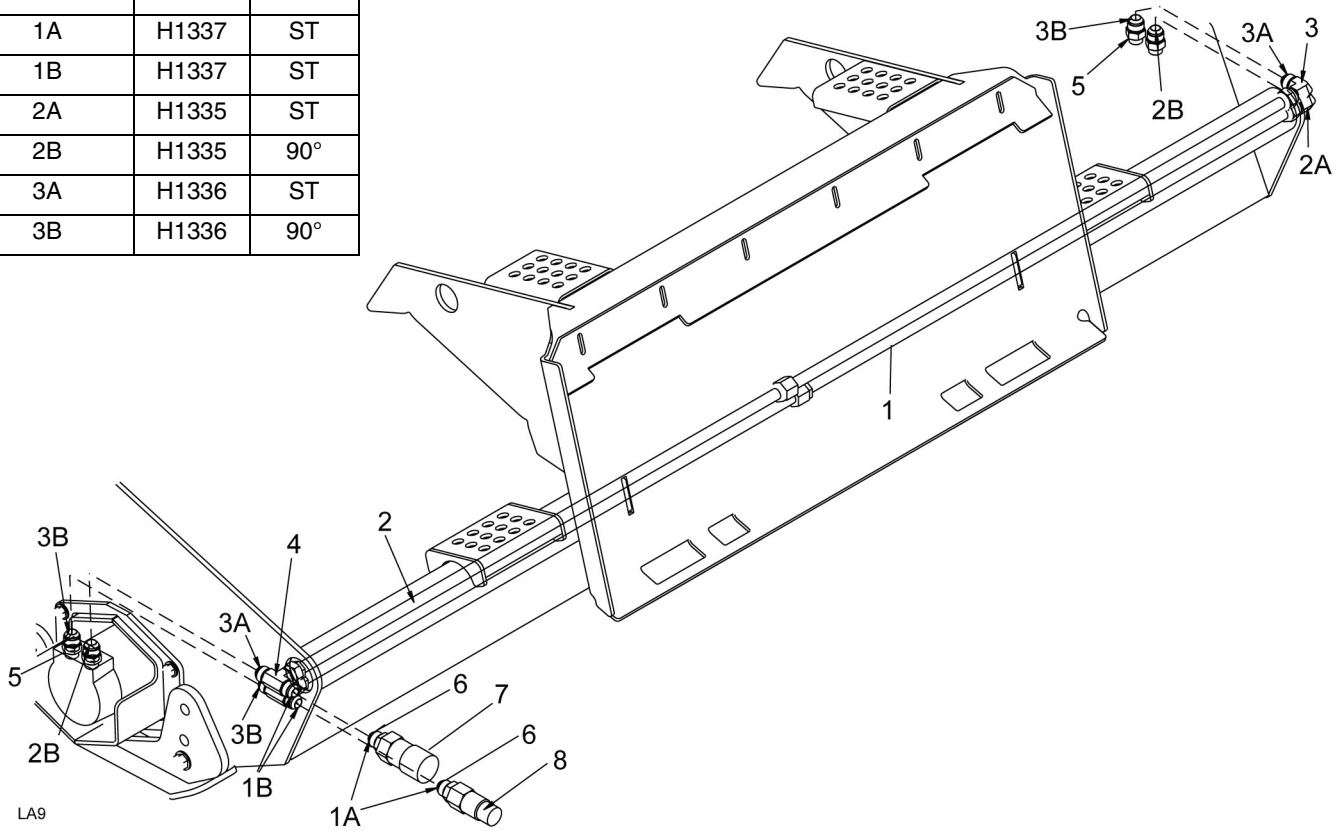
CONNECTION	HOSE	END
1A	H1280	-10 ST
1B	H1280	-12 ST
2A	H1278	ST
2B	H1278	90°
3A	H1279	ST
3B	H1279	90°



REF	PART	QTY	DESCRIPTION	REF	PART	QTY	DESCRIPTION
1	101897	2	Tube, hyd <b>TL73</b>	6	F1006	2	Fitting, 12 OM x 12 FLM
2	102360	2	Tube, hyd <b>TL73/TL84</b>	7	HC414	1	QD 1/2" M Parker FE502-12FO
3	F1087	4	Fitting, 10 OM x 10 FLM ST	8	HC415	1	QD 1/2" F Parker FE501-FONL
4	F1110	2	Fitting, 10 FLM x 10 FLF 90°	-	H1278	2	Hose #10 x 19" 10 FLF x 10 FLF 90°
5	F1232	2	Fitting, 10 FLM x 10 FLF x 10 FLM	-	H1279	2	Hose #10 x 21" 10 FLF x 10 FLF 90°
				-	H1280	2	Hose #10 x 21" 10 FLF x 10 FLF 90°

# HYDRAULIC ASSEMBLY TL84

CONNECTION	HOSE	END
1A	H1337	ST
1B	H1337	ST
2A	H1335	ST
2B	H1335	90°
3A	H1336	ST
3B	H1336	90°



REF	PART	QTY	DESCRIPTION
1	102746	2	Tube, hyd TL84
2	102747	2	Tube, hyd TL84
3	F1023	2	Fitting, 12 FLF x 12 FLM 90°
4	F1077	2	Fitting, 12 FLM x 12 FLF x 12 FLM
5	F1089	4	Fitting, 12 FLM x 10 OM ST

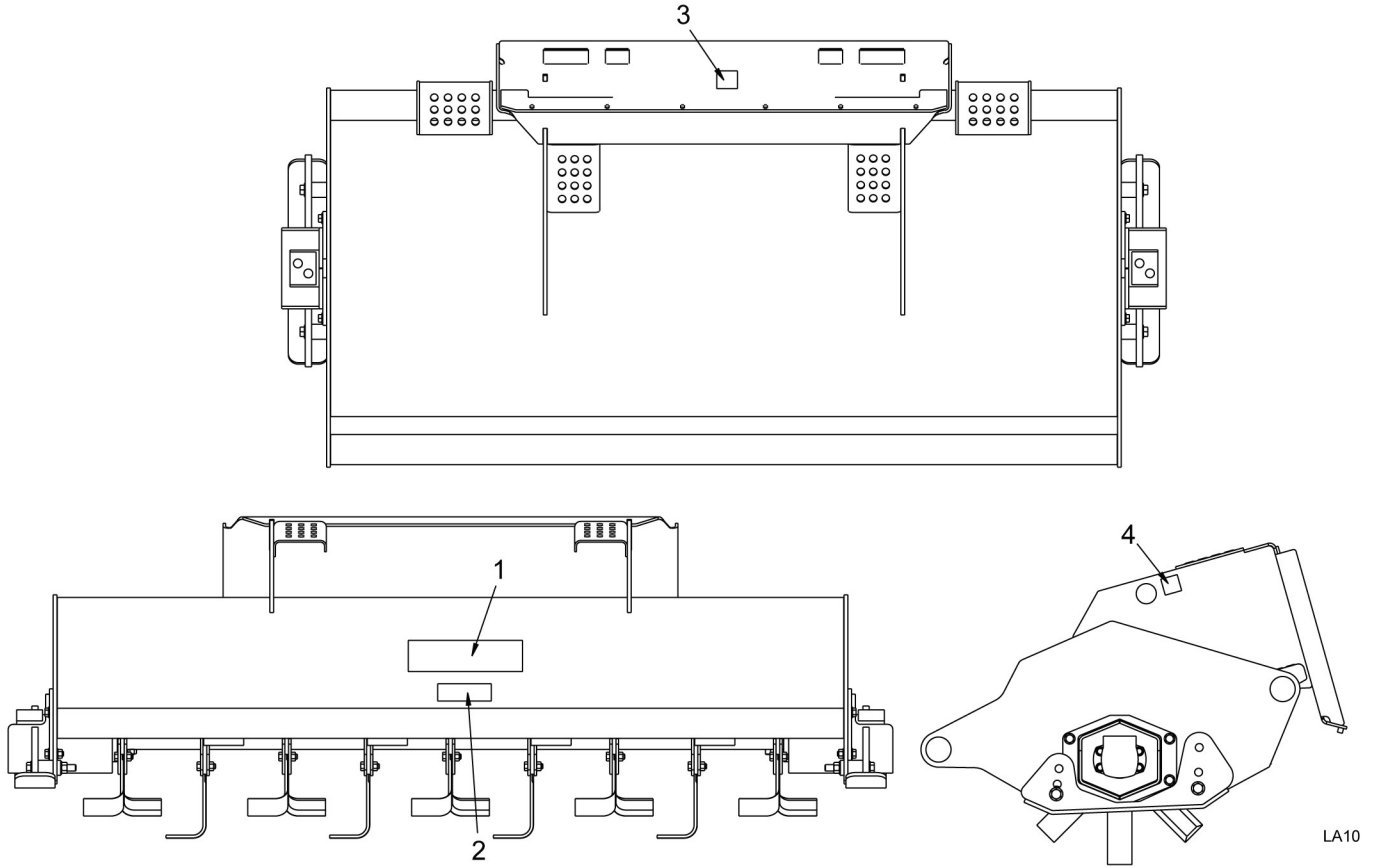
REF	PART	QTY	DESCRIPTION
6	F1006	2	Fitting, 12 OM x 12 FLM
7	HC415	1	QD 1/2" F Parker FE501-FONL
8	HC414	1	QD 1/2" M Parker FE502-12FO
-	H1335	2	Hose #12 x 19" 12 FLF x 12 FLF
-	H1336	2	Hose #12 x 21" 12 FLF x 12 FLF 90°
-	H1337	2	Hose #12 x 84" 12 FLF x 12 FLF

**24 Parts**

(Rev. 4/4/2008)  
MAN0003 (Rev. 11/30/2006)



## DECAL PLACEMENT



REF	PART	QTY	DESCRIPTION
1	D0119	1	Decal, Alitec (white with black)
2	D0155	1	Decal, <b>TL52</b>
2	D0161	1	Decal, <b>TL73</b>
2	D0264	1	Decal, <b>TL84</b>
3	D0157	1	Decal, tie down
4	D0158	2	Decal, lift point

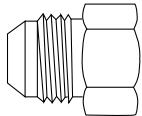
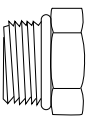
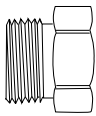
LA10

# FITTING TORQUE CHART

Always tighten fittings to these values unless a different torque value is listed for a specific service procedure.

Make sure fastener threads are clean and threads are engaged properly.

All torque values are adopted from SAE J514 and SAE J1453.

			
Size	SAE (JIC) 37° Flare Thread Size	O-Ring Style Straight Thread Size	Seal-Lok Thread
2	5/16 - 24	5/16 - 24	---
3	3/8 - 24	3/8 - 24	---
4	7/16 - 20	7/16 - 20	9/16 - 18
5	1/2 - 20	1/2 - 20	---
6	9/16 - 18	9/16 - 18	11/16 - 16
8	3/4 - 16	3/4 - 16	13/16 - 16
10	7/8 - 14	7/8 - 14	1 - 14
12	1-1/16 - 12	1-1/16 - 12	1-3/16 - 12
14	1-3/16 - 12	1-3/16 - 12	---
16	1-5/16 - 12	1-5/16 - 12	1-7/16 - 12
20	1-5/8 - 12	1-5/8 - 12	1-11/16 - 12
24	1-7/8 - 12	1-7/8 - 12	2 - 12
32	2-1/2 - 12	2-1/2 - 12	---

SAE Dash Size	TORQUE					
	SAE 37° Flare		O-Ring Straight Thread		Seal-Lok	
	Lbs-Ft	N-m	Lbs-Ft	N-m	Lbs-Ft	N-m
2	4	5	4	5	---	---
3	8	11	9	12	---	---
4	12	16	16	22	18	25
5	15	20	22	30	---	---
6	18	25	35	48	27	37
8	37	50	60	82	40	54
10	48	65	105	143	63	86
12	74	100	140	190	92	125
14	88	120	184	250	---	---
16	100	135	221	300	122	165
20	133	180	258	350	147	200
24	166	225	317	430	166	225
32	236	320	---	---	---	---

# QUICK COUPLER KITS

Make		High-Flow with Auxiliary		High-Flow with No Auxiliary		Low-Flow	
		QC Kit	Description	QC Kit	Description	QC Kit	Description
Bobcat		HC356	Flush Face	HC355	Flush Face	HC357	Flush Face
	Vintage					HC243	Poppet
						HC211	Ag Ball Valve
Case		1013825	Flush Face	HC212	Flush Face	HC279	Flush Face
	Vintage	HC278	Flush Face			HC211	Ag Ball Valve
		HC209	Flush Face & Ag Ball Valve				
Cat		HC538	Flush Face	1014196	Flush Face	1014197	Flush Face
Daewoo		HC209	Flush Face	HC212	Flush Face	HC211	Ag Ball Valve
Gehl		HC398	Flush Face	1014195	Flush Face	HC400	Flush Face
	Vintage			HC305	Poppet & Ag Ball		
John Deere		1014198	Flush Face	1013826	Flush Face	HC310	Flush Face
Komatsu		1013834	Flush Face	1013833	Flush Face	1013835	Flush Face
New Holland		1014199	Flush Face	HC308	Flush Face	HC310	Flush Face
Scat Trak		HC537	Flush Face			HC243	Poppet

## QUICK COUPLER KIT COMPONENTS

QC KIT	Includes	Style	Male/Female	Body Size	Hose End
HC209	HC193	Flush Face	Male	3/4	SAE #12 O-ring
	HC194	Flush Face	Female	3/4	SAE #12 O-ring
	HC195	Ag Ball	Female	1/2	1/2-14 NPT
	HC196	Ag Ball	Male	1/2	1/2-14 NPT
	HC197	Flush Face	Female	1/2	SAE #10 O-ring
HC211	HC195	Ag Ball	Female	1/2	1/2-14 NPT
	HC196	Ag Ball	Male	1/2	1/2-14 NPT
HC212	HC193	Flush Face	Male	3/4	SAE #12 O-ring
	HC194	Flush Face	Female	3/4	SAE #12 O-ring
	HC197	Flush Face	Female	1/2	SAE #10 O-ring
HC278	HC193	Flush Face	Male	3/4	SAE #12 O-ring
	HC194	Flush Face	Female	3/4	SAE #12 O-ring
	HC197	Flush Face	Female	1/2	SAE #10 O-ring
	HC201	Flush Face	Male	1/2	SAE #10 O-ring
HC279	HC197	Flush Face	Female	1/2	SAE #10 O-ring
	HC201	Flush Face	Male	1/2	SAE #10 O-ring

# QUICK COUPLER KIT COMPONENTS

QC KIT	Includes	Style	Male/Female	Body Size	Hose End
HC308	HC416	Flush Face	Female	5/8	SAE #12 O-ring
	HC417	Flush Face	Male	5/8	SAE #12 O-ring
	HC418	Flush Face	Male	3/8	SAE #8 O-ring
HC310	HC414	Flush Face	Male	1/2	SAE #12 O-ring
	HC415	Flush Face	Female	1/2	SAE #12 O-ring
HC355	HC344	Flush Face	Male	12 mm	SAE #12 O-ring
	HC345	Flush Face	Female	12 mm	SAE #12 O-ring
	HC346	Flush Face	Female	9 mm	SAE #8 O-ring
HC356	HC342	Flush Face	Female	7 mm	SAE #6 O-ring
	HC343	Flush Face	Male	7 mm	SAE #6 O-ring
	HC344	Flush Face	Male	12 mm	SAE #12 O-ring
	HC345	Flush Face	Female	12 mm	SAE #12 O-ring
	HC346	Flush Face	Female	9 mm	SAE #8 O-ring
HC357	HC344	Flush Face	Male	12 mm	SAE #12 O-ring
	HC345	Flush Face	Female	12 mm	SAE #12 O-ring
HC398	HC344	Flush Face	Male	12 mm	SAE #12 O-ring
	HC345	Flush Face	Female	12 mm	SAE #12 O-ring
	HC346	Flush Face	Female	9 mm	SAE #8 O-ring
HC400	HC344	Flush Face	Male	12 mm	SAE #12 O-ring
	HC345	Flush Face	Female	12 mm	SAE #12 O-ring
HC537	HC415	Flush Face	Female	1/2	SAE #12 O-ring
	HC416	Flush Face	Female	5/8	SAE #12 O-ring
	HC417	Flush Face	Male	5/8	SAE #12 O-ring
	HC418	Flush Face	Male	3/8	SAE #8 O-ring
HC538	HC521	Flush Face	Female	16 mm	SAE #12 O-ring
	HC522	Flush Face	Male	16 mm	SAE #12 O-ring
	1532994	Flush Face	Female	3/4	SAE #12 O-ring
	1532995	Flush Face	Male	3/4	SAE #12 O-ring
	1532997	Flush Face	Female	1/2	SAE #8 O-ring
1013825	HC417	Flush Face	Male	5/8	SAE #12 O-ring
	HC418	Flush Face	Male	3/8	SAE #8 O-ring
	HC545	Flush Face	Female	5/8	SAE #12 O-ring
	HC546	Flush Face	Female	1/2	SAE #10 O-ring
	HC547	Flush Face	Male	1/2	SAE #10 O-ring
1013826	HC343	Flush Face	Male	7 mm	SAE #6 O-ring
	HC521	Flush Face	Female	16 mm	SAE #12 O-ring
	HC522	Flush Face	Male	16 mm	SAE #12 O-ring
1013833	HC415	Flush Face	Female	1/2	SAE #12 O-ring
	HC521	Flush Face	Female	16 mm	SAE #12 O-ring
	HC522	Flush Face	Male	16 mm	SAE #12 O-ring

# QUICK COUPLER KIT COMPONENTS

QC KIT	Includes	Style	Male/Female	Body Size	Hose End
1013834	HC414	Flush Face	Male	1/2	SAE #12 O-ring
	HC415	Flush Face	Female	1/2	SAE #12 O-ring
	HC521	Flush Face	Female	16 mm	SAE #12 O-ring
	HC522	Flush Face	Male	16 mm	SAE #12 O-ring
1013835	46058	Flush Face	M/F Set	3/4	SAE #12 O-ring
1014195	HC344	Flush Face	Male	12 mm	SAE #12 O-ring
	HC345	Flush Face	Female	12 mm	SAE #12 O-ring
	HC346	Flush Face	Female	9 mm	SAE #8 O-ring
1014196	HC521	Flush Face	Female	16 mm	SAE #12 O-ring
	HC522	Flush Face	Male	16 mm	SAE #12 O-ring
	1532997	Flush Face	Female	1/2	SAE #8 O-ring
1014197	1532994	Flush Face	Female	3/4	SAE #10 O-ring
	1532995	Flush Face	Male	3/4	SAE #10 O-ring
1014198	HC343	Flush Face	Male	7 mm	SAE #6 O-ring
	HC414	Flush Face	Male	1/2	SAE #12 O-ring
	HC415	Flush Face	Female	1/2	SAE #12 O-ring
	HC521	Flush Face	Female	16 mm	SAE #12 O-ring
	HC522	Flush Face	Male	16 mm	SAE #12 O-ring
1014199	HC414	Flush Face	Male	1/2	SAE #12 O-ring
	HC415	Flush Face	Female	1/2	SAE #12 O-ring
	HC416	Flush Face	Female	5/8	SAE #12 O-ring
	HC417	Flush Face	Male	5/8	SAE #12 O-ring
	HC418	Flush Face	Male	3/8	SAE #8 O-ring

# BOLT TORQUE CHART

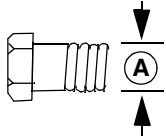
Always tighten hardware to these values unless a different torque value or tightening procedure is listed for a specific application.

Fasteners must always be replaced with the same grade as specified in the manual parts list.

Always use the proper tool for tightening hardware: SAE for SAE hardware and Metric for metric hardware.

Make sure fastener threads are clean and you start thread engagement properly.

All torque values are given to specifications used on hardware defined by SAE J1701 MAR 99 & J1701M JUL 96.



## SAE SERIES TORQUE CHART



SAE Grade 2  
(No Dashes)

SAE Bolt Head Identification

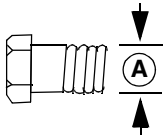


SAE Grade 5  
(3 Radial Dashes)



SAE Grade 8  
(6 Radial Dashes)

Ⓐ Diameter (Inches)	Wrench Size	MARKING ON HEAD					
		SAE 2		SAE 5		SAE 8	
		lbs-ft	N-m	lbs-ft	N-m	lbs-ft	N-m
1/4"	7/16"	6	8	10	13	14	18
5/16"	1/2"	12	17	19	26	27	37
3/8"	9/16"	23	31	35	47	49	67
7/16"	5/8"	36	48	55	75	78	106
1/2"	3/4"	55	75	85	115	120	163
9/16"	13/16"	78	106	121	164	171	232
5/8"	15/16"	110	149	170	230	240	325
3/4"	1-1/8"	192	261	297	403	420	569
7/8"	1-5/16"	306	416	474	642	669	907
1"	1-1/2"	467	634	722	979	1020	1383



## METRIC SERIES TORQUE CHART



Metric  
Grade 8.8

Metric Bolt Head Identification

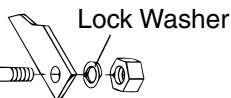


Metric  
Grade 10.9

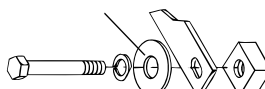
Ⓐ Diameter & Thread Pitch (Millimeters)	Wrench Size	COARSE THREAD				FINE THREAD				Ⓐ Diameter & Thread Pitch (Millimeters)
		MARKING ON HEAD								
		Metric 8.8		Metric 10.9		Metric 8.8		Metric 10.9		
		N-m	lbs-ft	N-m	lbs-ft	N-m	lbs-ft	N-m	lbs-ft	
6 x 1.0	10 mm	8	6	11	8	8	6	11	8	6 x 1.0
8 x 1.25	13 mm	20	15	27	20	21	16	29	22	8 x 1.0
10 x 1.5	16 mm	39	29	54	40	41	30	57	42	10 x 1.25
12 x 1.75	18 mm	68	50	94	70	75	55	103	76	12 x 1.25
14 x 2.0	21 mm	109	80	151	111	118	87	163	120	14 x 1.5
16 x 2.0	24 mm	169	125	234	173	181	133	250	184	16 x 1.5
18 x 2.5	27 mm	234	172	323	239	263	194	363	268	18 x 1.5
20 x 2.5	30 mm	330	244	457	337	367	270	507	374	20 x 1.5
22 x 2.5	34 mm	451	332	623	460	495	365	684	505	22 x 1.5
24 x 3.0	36 mm	571	421	790	583	623	459	861	635	24 x 2.0
30 x 3.0	46 mm	1175	867	1626	1199	1258	928	1740	1283	30 x 2.0

### Typical Washer Installations

Bolt



Flat Washer



8/9/00

# BOLT SIZE CHART

**NOTE:** Chart shows bolt thread sizes and corresponding head (wrench) sizes for standard SAE and metric bolts.

## SAE Bolt Thread Sizes

5/16

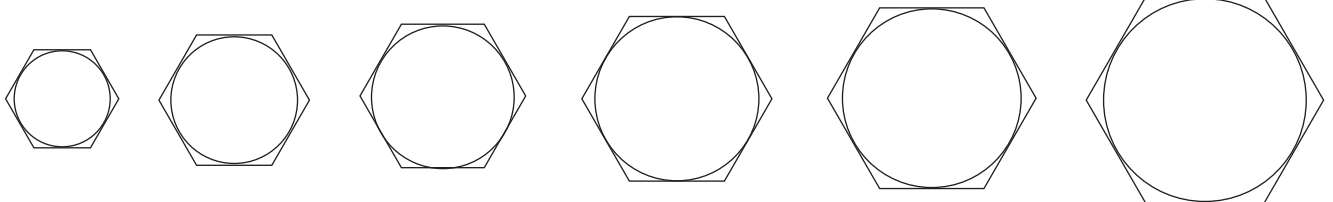
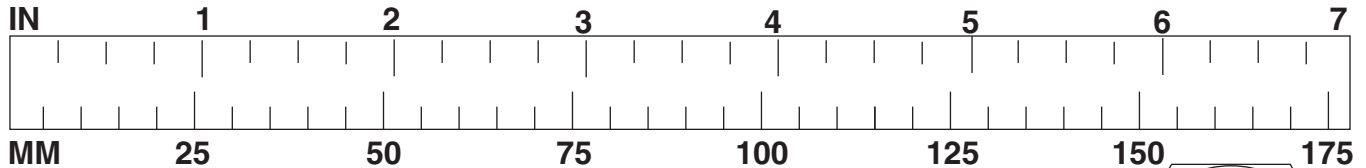
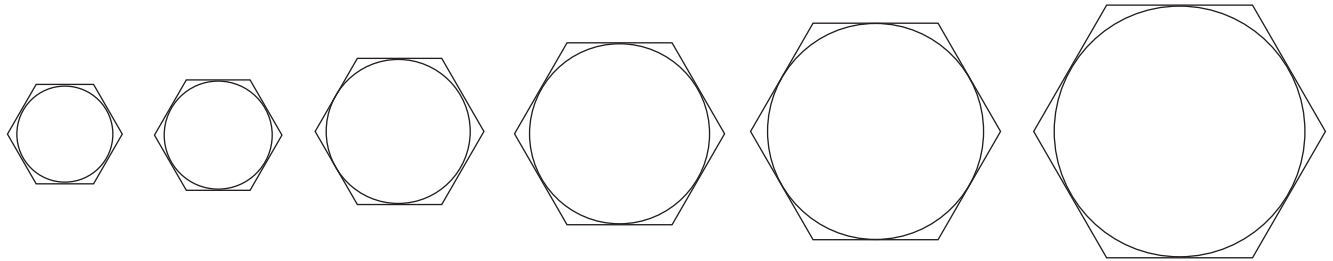
3/8

1/2

5/8

3/4

7/8



## Metric Bolt Thread Sizes

8MM

10MM

12MM

14MM

16MM

18MM

## ABBREVIATIONS

AG .....	Agriculture	MPa.....	Mega Pascal
ASABE.....	American Society of Agricultural & Biological Engineers (formerly ASAE)	N.....	Newton
ASAE .....	American Society of Agricultural Engineers	NC .....	National Coarse
ATF .....	Automatic Transmission Fluid	NF .....	National Fine
BSPP .....	British Standard Pipe Parallel	NPSM.....	National Pipe Straight Mechanical
BSPTM .....	British Standard Pipe Tapered Male	NPT .....	National Pipe Tapered
CV.....	Constant Velocity	NPT SWF .....	National Pipe Tapered Swivel Female
CCW .....	Counter-Clockwise	ORB.....	O-Ring Boss - Male
CW.....	Clockwise	P.....	Pitch
F .....	Female	PBY .....	Power-Beyond
FT .....	Full Thread	psi.....	Pounds per Square Inch
GA .....	Gauge	PTO.....	Power Take Off
GR (5, etc.) .....	Grade (5, etc.)	QD.....	Quick Disconnect
HHCS .....	Hex Head Cap Screw	RH.....	Right Hand
HT.....	Heat-Treated	ROPS .....	Roll-Over Protective Structure
JIC .....	Joint Industry Council 37° Degree Flare	RPM .....	Revolutions Per Minute
LH.....	Left Hand	RT .....	Right
LT.....	Left	SAE .....	Society of Automotive Engineers
m.....	Meter	UNC .....	Unified Coarse
mm.....	Millimeter	UNF .....	Unified Fine
M.....	Male	UNS.....	Unified Special

# WARRANTY

(All Models Except Mow'n Machine™ Zero-Turn Mowers and Woods Boundary™ Utility Vehicles)

Please Enter Information Below and Save for Future Reference.

Date Purchased: \_\_\_\_\_ From (Dealer): \_\_\_\_\_  
 Model Number: \_\_\_\_\_ Serial Number: \_\_\_\_\_

Woods Equipment Company ("WOODS") warrants this product to be free from defect in material and workmanship. Except as otherwise set forth below, the duration of this Warranty shall be for TWELVE (12) MONTHS COMMENCING ON THE DATE OF DELIVERY OF THE PRODUCT TO THE ORIGINAL PURCHASER.

Woods backhoe models BH70-X, BH80-X, and BH90-X are warranted for two (2) years from the date of delivery to the original purchaser.

The warranty periods for specific parts or conditions are listed below:

Part or Condition Warranted	Model Number	Duration (from date of delivery to the original purchaser)
Gearbox components	BW1260, BW1800	8 years
	BB48X, BB60X, BB72X, BB84X, BB600X, BB720X, BB840X, BB6000X, BB7200X, BB8400X, DS1260, DSO1260, DS1440, TS1680, BW126-3, BW180-3	6 years
	PHD25, PHD35, PHD65, PHD95, 2162, 3240, DS96, DS120, RCC42, RM550-2, RM660-2, RM990-3, PRD6000, PRD7200, PRD8400, 7144RD-2, 9180RD-2, 9204RD-2, S15CD, S20CD, S22CD, S25CD, S27CD	5 years
	RDC54, RD60, RD72	3 years (1 year if used in rental or commercial applications)
Blade spindles	RM550-2, RM660-2, RM990-3, PRD6000, PRD7200, PRD8400, 7144RD-2, 9180RD-2, 9204RD-2	3 years
Rust-through	BB600, BB720, BB840, BB6000, BB7200, BB8400, BW126-3, BW180-3, BW1260, BW1800, 2162, 3240, DS1260, DSO1260, DS1440, TS1680	10 years

Under no circumstances will this Warranty apply in the event that the product, in the good faith opinion of WOODS, has been subjected to improper operation, improper maintenance, misuse, or an accident. This Warranty does not apply in the event that the product has been materially modified or repaired by someone other than WOODS, a WOODS authorized dealer or distributor, and/or a WOODS authorized service center. This Warranty does not cover normal wear or tear, or normal maintenance items. This Warranty also does not cover repairs made with parts other than those obtainable through WOODS.

This Warranty is extended solely to the original purchaser of the product. Should the original purchaser sell or otherwise transfer this product to a third party, this Warranty does not transfer to the third party purchaser in any way. There are no third party beneficiaries of this Warranty.

WOODS makes no warranty, express or implied, with respect to engines, batteries, tires or other parts or accessories not manufactured by WOODS. Warranties for these items, if any, are provided separately by their respective manufacturers.

WOODS' obligation under this Warranty is limited to, at WOODS' option, the repair or replacement, free of charge, of the product if WOODS, in its sole discretion, deems it to be defective or in noncompliance with this Warranty. **The product must be returned to WOODS with proof of purchase within thirty (30) days after such defect or noncompliance is discovered or should have been discovered, routed through the dealer and distributor from whom the purchase was made, transportation charges prepaid.** WOODS shall complete such repair or replacement within a reasonable time after WOODS receives the product. **THERE ARE NO OTHER REMEDIES UNDER THIS WARRANTY. THE REMEDY OF REPAIR OR REPLACEMENT IS THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY.**

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE OF THIS WARRANTY. WOODS MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND WOODS SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY AND/OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

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This Warranty is subject to any existing conditions of supply which may directly affect WOODS' ability to obtain materials or manufacture replacement parts.

No agent, representative, dealer, distributor, serviceperson, salesperson, or employee of any company, including without limitation, WOODS, its authorized dealers, distributors, and service centers, is authorized to alter, modify, or enlarge this Warranty.

Answers to any questions regarding warranty service and locations may be obtained by contacting:

**Woods Equipment Company**  
 2606 South Illinois Route 2  
 Post Office Box 1000  
 Oregon IL 61061  
 800-319-6637 tel  
 800-399-6637 fax  
 www.WoodsEquipment.com



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## WARRANTY

(Replacement Parts For All Models Except Mow'n Machine™  
Zero-Turn Mowers and Woods Boundary™ Utility Vehicles)

Woods Equipment Company ("WOODS") warrants this product to be free from defect in material and workmanship for a period of ninety (90) days from the date of delivery of the product to the original purchaser with the exception of V-belts, which will be free of defect in material and workmanship for a period of 12 months.

Under no circumstances will this Warranty apply in the event that the product, in the good faith opinion of WOODS, has been subjected to improper operation, improper maintenance, misuse, or an accident. This Warranty does not cover normal wear or tear, or normal maintenance items.

This Warranty is extended solely to the original purchaser of the product. Should the original purchaser sell or otherwise transfer this product to a third party, this Warranty does not transfer to the third party purchaser in any way. There are no third party beneficiaries of this Warranty.

WOODS' obligation under this Warranty is limited to, at WOODS' option, the repair or replacement, free of charge, of the product if WOODS, in its sole discretion, deems it to be defective or in noncompliance with this Warranty. **The product must be returned to WOODS with proof of purchase within thirty (30) days after such defect or noncompliance is discovered or should have been discovered, routed through the dealer and distributor from whom the purchase was made, transportation charges prepaid.** WOODS shall complete such repair or replacement within a reasonable time after WOODS receives the product. THERE ARE NO OTHER REMEDIES UNDER THIS WARRANTY. THE REMEDY OF REPAIR OR REPLACEMENT IS THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY.

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This Warranty is subject to any existing conditions of supply which may directly affect WOODS' ability to obtain materials or manufacture replacement parts.

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