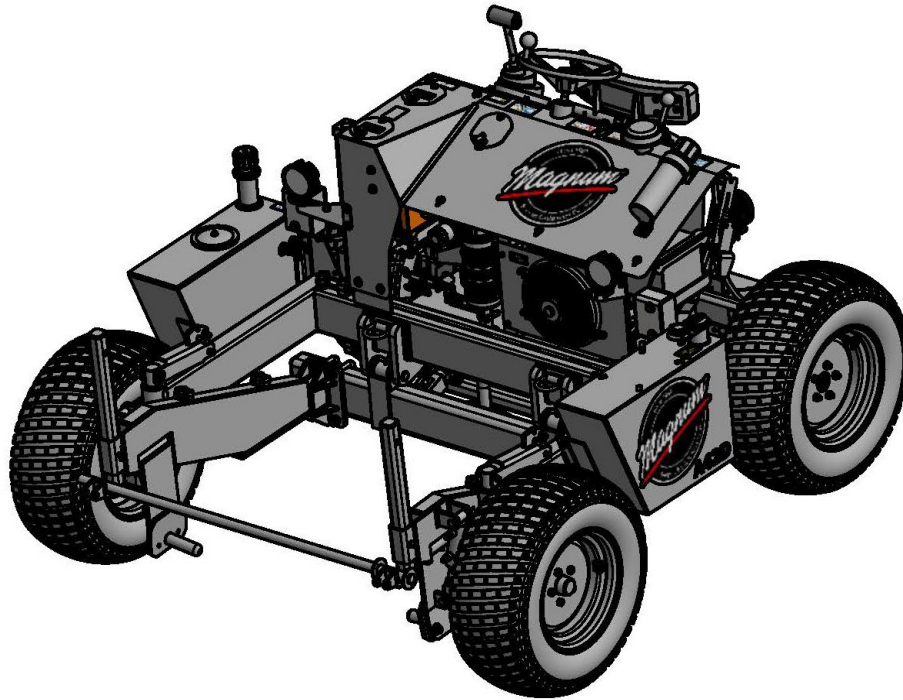


MAGNUM A SERIES DIESEL SOD INSTALLER OPERATOR'S MANUAL



MAGNUM A42D MAGNUM A48D



WARNING

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel.

Bucyrus Equipment Co., Inc.
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MAGNUM A42D/A48D SOD INSTALLER OPERATOR'S MANUAL

Foreword

This manual is designed primarily for use by BECI Magnum A series sod installer operators in a properly equipped shop. Persons using this manual should have a sound knowledge of mechanical theory, tool use, machine operation, and shop procedures in order to perform the work safely and correctly. The operator should read the text and be familiar with service procedures before starting the work. Certain procedures require the use of special tools and procedures. Use only the proper tools, as specified. Cleanliness of parts and tools as well as the work area is of primary importance.

This manual includes procedures for operator use, maintenance operations, component identification and unit repair, along with service specifications for the Magnum A series sod installers. A table of contents is placed at the beginning of the manual. Keep this manual available for reference. At the time of publication all information contained in this manual was technically correct. However, all materials and specifications are subject to change without notice.

Comments or suggestions about this manual may be directed to: Bucyrus Equipment Company Inc., Box 156-209 Central, Hillsdale, KS 66036. Phone 1—800 330—0857.

© Copyright 2018 BECI. All information contained within this publication is based on the latest product information at the time of publication. Due to constant improvements in the design and quality of production components, some minor discrepancies may result between the actual vehicle and the information presented in this publication. Depictions and/or procedures in this publication are intended for reference use only. No liability can be accepted for omissions or inaccuracies. Any reprinting or reuse of the depictions and/or procedures contained within, whether whole or in part, is expressly prohibited. Printed in U.S.A.

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CHAPTER 1

GENERAL INFORMATION

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INTRODUCTION

This publication is designed to help supply you with the knowledge to better operate and maintain your new Magnum "A" series big roll installer.

Any piece of equipment must have a certain amount of service and maintenance to keep it in top running condition. We have attempted to cover all the adjustments required to fit most conditions. There may be a time, however, when special care must be taken that is appropriate to certain conditions.

Read this manual carefully and become acquainted with all the adjustments and operating procedures before attempting to operate your new installer. Remember it is a machine and has been designed and tested to do an efficient job in most operating conditions and will perform in relation to the service it receives.

If special attention is required for some conditions, contact Bucyrus Equipment Company for help and to answer any questions regarding operation and service of your new machine.

IMPORTANT: The replacement of any part on this product other than the manufacturer's authorized replacement part may adversely affect the performance, durability or safety of this product.

SERIAL NUMBER

The machine ID or Serial Number (SN) must be used with any correspondence regarding warranty or service. See Figure 1.1 for the location of the serial number plate.

Machine ID or Serial number: _____

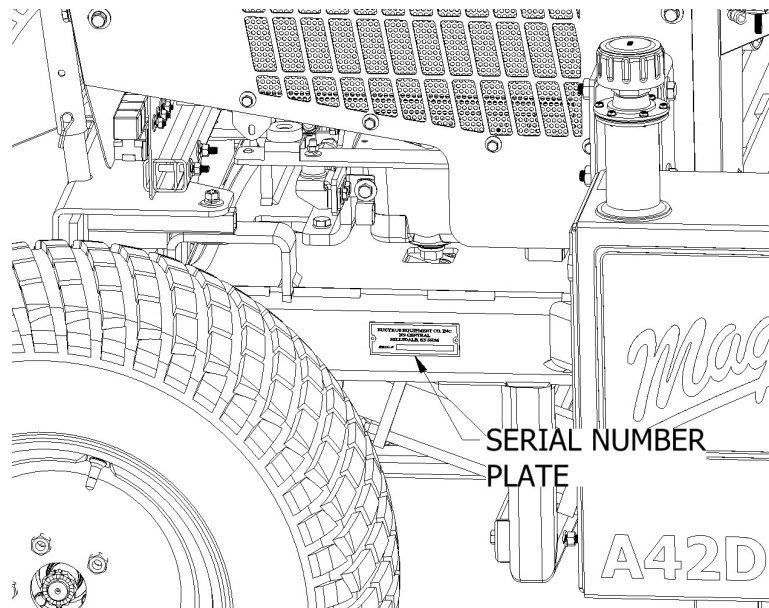


Figure 1.1 – Serial Number Plate Location

Attachments and accessories manufactured by companies other than Bucyrus Equipment Co. Inc. are not approved for use on this machine.

WARNING: For clarity some illustrations or figures in this manual may show shields, guards, plates removed or open. Never operate or perform maintenance on this machine with these devices removed. Serious injury or death may occur.

OPERATOR'S MANUAL

This manual was compiled from the latest product information available at the time of publication. The company reserves the right to make changes at any time without prior notice.

THIS MANUAL SHOULD REMAIN WITH THE INSTALLER AFTER DELIVERY

DIRECTION REFERENCE

The "Right" and "Left," "Front" and "Rear" of the machine are referenced from the operator's position on the operator's platform facing the forward traveling direction of the machine.

SERVICING THE ENGINE AND HYDRAULIC DRIVE COMPONENTS

This machine is equipped with a Kubota diesel engine. Operation and maintenance details for the engine are contained in a separate publication provided with the machine. The detailed servicing and repair of the engine and hydraulic drive components are not covered in this manual. For information about servicing these components please contact Bucyrus Equipment Co. Inc. or an authorized servicing agent of the component manufacturer. Any unauthorized servicing to these components during the warranty period may void the warranty.

MACHINE SPECIFICATIONS

SPECIFICATIONS (Refer to engine owner's manual for engine specifications)

Engine	26 hp (19.4 kw) three cylinder diesel
Load lift capacity	2500 lbs. (1134 kg)
Transmission	Tandem hydrostatic pump
Tire size	29 X 12.50-15 standard tire turf type 29 X 14.00-15 optional flotation tire
Width – A42D Model	
Front wheels inboard	78 in. (198 cm)
Front wheels outboard	84 in. (213 cm)
Width – A48D Model	
Front wheels inboard	84 in. (213 cm)
Front wheels outboard	90 in. (229 cm)
Length	97 in. (246 cm)
Height	60 in. (152 cm)
Fuel capacity	9 gal. (34 L)
Hydraulic tank capacity	10.5 gal. (39.7 L)
Electrical System	12 volt
Shipping weight	2600 lbs. (1179 kg)

HYDRAULIC SYSTEM

Drive system	Twin hydrostatic drives with aux. gear pump
Hydrostat displacement	1.33 cu.-in. (21 cc)
Maximum speed	3600 rpm
Recommend hydraulic oil	Amsoil HVJ ISO68 synthetic hydraulic fluid

WARRANTY INFORMATION

Bucyrus Equipment Company Inc. when selling goods, gives a warranty, which is subject to certain conditions, guarantees that the goods are free from defects in material and workmanship. Since this book is published for worldwide circulation, it is impossible to detail the exact terms and conditions of warranty that apply to a retail customer in any particular country. Purchasers of new Magnum products should request full warranty details when purchasing their equipment.

Call Bucyrus Equipment Company Inc. with any warranty questions or issues at 800-330-0857.

SAFETY INFORMATION

TO THE OPERATOR: It is not possible to anticipate every circumstance that might involve a potential hazard. The safety messages in this document and on the products are, therefore, not all inclusive. If you use a tool, procedure, work method or operating technique that is not specifically recommended by the manufacturer, you must satisfy yourself that it is safe for you and for others. You should also ensure that the product will not be damaged or be made unsafe by the operation, lubrication, maintenance or repair procedures that you choose.

Read all safety precautions and operating and service instructions before attempting to operate. As with all equipment proper use and training are fundamental for the safe operation of the Magnum A series sod installer. Your machine is only as safe as the operator. Carelessness or operator error may result in serious bodily injury or death. Hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of the personnel involved in the operation, transport, maintenance and storage of the equipment. Make sure every operator is properly trained and thoroughly familiar with all of the controls before operating the machine. The owner/user can prevent and is responsible for accidents or injuries occurring to themselves, other people or property.

READ THIS OPERATOR'S MANUAL BEFORE ATTEMPTING TO START YOUR MACHINE.

A replacement manual is available from Bucyrus Equipment Co., Inc. Contact Bucyrus Equipment Co., Inc. at 1-800-330-0857.

All protective shields are in place and properly secured at the time of shipment from the manufacturer. All warning decals are in place.

Do not accept delivery of this machine if the protective shields or safety decals are not in place and properly secured. If safety decals or shields become damaged or are in need of replacement contact: Bucyrus Equipment Co., Inc. for replacements.

Bucyrus Equipment Co., Inc. cannot anticipate every operating condition and every hazard associated with each. We cannot be responsible for improper maintenance, abuse, operator negligence, or use of the Magnum "A" series sod installer for any purpose other than what it was designed for.

DEFINITIONS

WARNING: Failure to follow WARNING instructions could result in severe injury or death to the operator, bystander or person inspecting and servicing the Magnum "A" series sod installer.

CAUTION: A CAUTION indicates special precautions that must be taken to avoid personal injury or damage to the machine.

CAREFULLY READ THE FOLLOWING BEFORE OPERATING THE MACHINE:

BEFORE MACHINE OPERATION

WARNING: NEVER allow children to operate this machine. Do not allow adults to operate this machine without proper instructions.

WARNING: If the operator(s) or mechanic(s) cannot read English, it is the owner's responsibility to explain this material to them.

WARNING: Never service the machine while running. Unexpected engagement of the hydraulic system could cause your hands, arms, fingers, feet, legs, and/or clothing to become caught up in moving parts, resulting in injury or loss of body parts.

WARNING: Use the proper jack stands when servicing the machine or any other parts of the machine that can be raised and lowered.

WARNING: Dress properly. Do not wear loose fitting clothing. Keep long hair tied back or under a hat. Wearing safety glasses, safety shoes and a helmet is advisable and is required by some local ordinances and insurance regulations.

WARNING: DO NOT operate, service, or be in the area where the machine is running when under the influence of alcohol or drugs.

WARNING: Hydraulic oil escaping under pressure can penetrate skin causing serious injury. Keep body and hands away from pin holes or leaks that eject hydraulic fluid under pressure. Use cardboard or paper to search for leaks. Be sure the machine is OFF and relieve all pressure from the hydraulic system before disconnecting any hydraulic lines, fitting, or servicing any hydraulic components.

WARNING: Check the machine daily before use. Check all nuts and bolts for tightness. Check all hydraulic connections for tightness. Look for dirty hydraulic connections. A leaky connection will attract dirt and dust. Tighten all loose connections and replace leaky hoses or lines. Failure to perform basic inspections could result in machine failure or personal injury.

WARNING: Engine exhaust fumes contain carbon monoxide and can cause serious injury or death. Do not run the machine in an enclosed area without adequate ventilation.

CAUTION: Read and understand operator manual before operating this machine

CAUTION: Touching HOT surfaces can burn skin. Stay away from hot surfaces and allow components to cool off before touching them.

CAUTION: Fuel vapors, fuel, oils, and lubricants are flammable! Do not smoke, produce flames, or sparks around any of the items listed. Store fuel only in approved containers in a well-ventilated area away from any source of sparks or flame. DO NOT add fuel to the tank while the engine is hot or running.

CAUTION: To avoid a fire or explosion, properly clean up any spilled flammable materials.

CAUTION: Always wear hearing protection. Operating the machine for prolonged periods of time can cause loss of hearing.

DURING MACHINE OPERATION

WARNING: Know the function of all controls and how to stop the machine quickly.

WARNING: Never operate the machine on steep inclines or slopes. The machine may roll over causing serious injury or death. Under no circumstance should the machine be operated on slopes greater than 25 degrees. ALWAYS FOLLOW OSHA APPROVED OPERATION.

OPERATOR'S MANUAL

WARNING: Reduce speed and exercise extreme caution on slopes and in sharp turns to prevent tipping or loss of control. Be especially cautious when changing directions on slopes.

WARNING: To prevent tipping or loss of control, start and stop smoothly. Avoid unnecessary turns and travel at reduced speeds.

WARNING: Immediately apply the parking brake if you lose steering control while operating. Inspect the machine and correct the problem before continuing to operate.

WARNING: Start the engine with the operator in the operating position, parking brake engaged, and the control lever in the neutral position.

WARNING: Be alert of your surroundings. Make certain the area is clear of potential hazards. Keep away from drop offs. Be aware of overhead obstructions. Keep bystanders a safe distance away from the machine during operations.

WARNING: Use care when approaching blind corners or other objects that may obscure vision.

WARNING: DO NOT install sod in the reverse direction. ALWAYS check that the area behind the machine is clear of hazards or bystanders before backing up.

WARNING: DO NOT ride anywhere on the machine while transporting. Only ride on the operator's platform during sod installing procedures.

WARNING: DO NOT use the machine to transport items or people. Damage may occur to the sod installer. Serious injury or death may occur. Only ride on the operator's platform during sod installing procedures.

WARNING: NEVER get close or within proximity to the sod roll lift while the machine is running. Severe injury, loss of limbs, or death may occur.

WARNING: When the operator leaves the operator's platform, turn off the machine, remove the key, and engage the parking brake.

WARNING: Stay clear of all moving parts during machine warm up and sod installing operations. Severe injury may occur.

WARNING: DO NOT leave machine unattended at any time during machine warm up and operations.

WARNING: Keep all shields in place during machine warm up and operation. The shields help to prevent clothes and body parts from being caught in moving parts. Severe injury or death may occur.

WARNING: NEVER allow anyone to operate or service the machine without complete instructions.

WARNING: Operate the machine from the operator's platform only. All operation of the machine must be performed from the operator's platform.

WARNING: Maintain a safe distance from the machine while it is in operation. The sod rolls are carried from the front of the machine and possible injury can occur if the sod rolls onto a bystander.

WARNING: Keep the parking brake engaged when the machine is not in operation.

WARNING: When operating this machine, ALWAYS keep both feet planted firmly on operator platform. ALWAYS keep one hand firmly on steering wheel.

WARNING: Never attach yourself to the machine using a safety harness of any kind.

WARNING: Never travel up or down an incline. When necessary, travel across an incline.

WARNING: To avoid tipping keep the load as low as possible.

CAUTION: The installer can be operated continuously on grades up to 25 degrees; however, to do so the engine oil level must be at the *F* (Full) mark on the dipstick. To prevent major engine damage, never operate the machine in any direction on a grade that exceeds 25 degrees. Doing so will result in engine damage due to insufficient lubrication.

CAUTION: Bring the installer to a complete stop before switching from two-wheel drive mode to four-wheel drive mode. NEVER switch between these two modes while the installer is in motion. Sever damage could result to the installer's hydraulic system.

CAUTION: Read and understand operator manual before operating this machine

TRANSPORTING THE MACHINE

WARNING: Transport the machine using a truck and/or trailer with the proper load rating. Make certain that the truck and trailer has all of the proper lighting and marking as required by law, codes, and ordinances. Secure a trailer with a safety towing chain.

WARNING: Be cautious when unloading and loading the machine onto trucks or trailers. Use only a full width ramp. ALWAYS back onto and drive off a trailer.

WARNING: When transporting the machine, make sure the engine is off and key removed, the control lever is in the neutral position, the parking brake is engaged, and the wheels have been blocked.

WARNING: Tie the machine down securely using the tie down points located on the front and rear of the machine. See Figure 1.2. Secure using straps, chains, cable, or ropes. Both front and rear straps must be directed down and outward from the machine.

WARNING: When loading the installer with a forklift: Read and understand the forklift operator's manual before operating the forklift. Follow all safety pre-cautions lined out by the forklift manufacturer. Be certain that the forklift has the capacity to lift the installer. Also, be sure that the forks are long enough to reach completely under the installer's frame cross member before attempting to lift the installer. Keep bystanders at a safe distance away from the forklift while loading the installer. Serious injury or death may occur.

CAUTION: Do not tow the installer or damage to the hydraulic system will occur. However, if the engine fails to start, the installer can still be moved short distances (at slow speed). To do so, loosen and open the manual release valves located on the hydrostat. Refer to the Transporting, Loading, and Towing section in Chapter 2 of the manual.

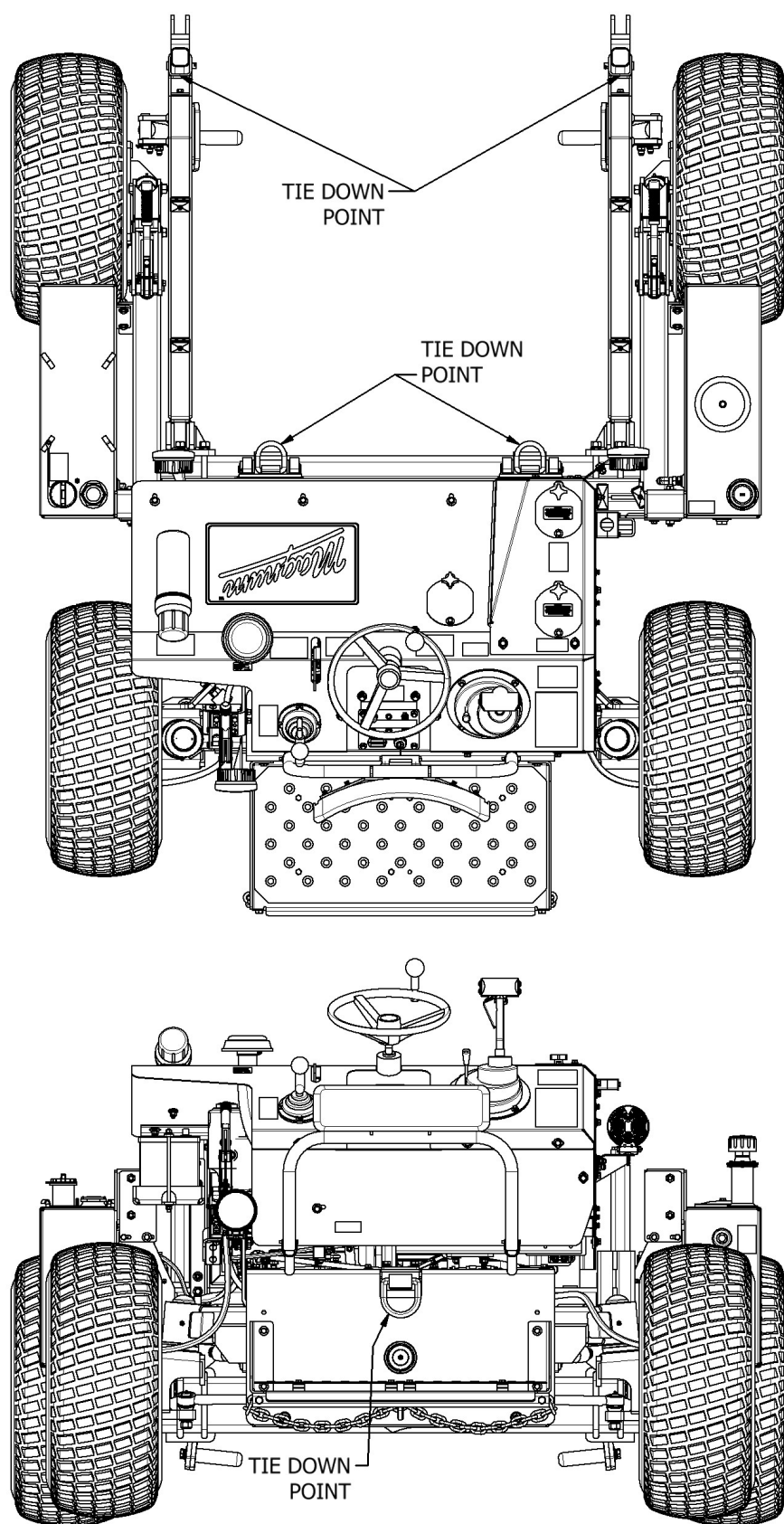


Figure 1.2 – Tie Down Point Location

MAINTENANCE AND STORAGE

WARNING: NEVER allow untrained personnel to service the machine.

WARNING: NEVER make adjustments to the machine while the engine is running unless specifically instructed to do so. If the engine is running keep hands, feet, body parts, and clothing away from moving parts. Serious injury or death may occur.

WARNING: To prevent accidental starting of the engine or electrical shock disconnect the battery before starting to work on the machine. Attach a "Do Not Operate" tag in the operator's station.

WARNING: Park the machine on level ground with the parking brake engaged. Make all repairs with the machine parked on a level, hard surface. Engage the parking brake and block the machine to prevent it from rolling while working on or under the machine.

WARNING: DO NOT work on any machine that is supported only by lift jacks or a hoist. Always use blocks or jack stands to support the machine before performing any service or disassembly.

WARNING: Make sure the work area around the product is made safe and be aware of hazardous conditions that may exist. If an engine is started inside an enclosure, make sure that the engine's exhaust is properly vented.

WARNING: Be sure all protective devices including guards and shields are properly installed and functioning correctly before starting a repair. If a guard or shield must be removed to perform the repair work, use extra caution.

CAUTION: Always use tools that are in good condition and be sure you understand how to use them before performing any service work.

CAUTION: Keep all nuts, bolts, and screws tight. Replace all fasteners with the same part number. Do not use lesser quality fasteners if replacements are necessary.

CAUTION: Be prepared to stop an engine if it has been recently overhauled or the fuel system has been recently worked on. If the engine has not been assembled correctly, or if the fuel settings are not correct, the engine can possibly over speed and cause bodily injury, death or property damage. Be prepared to shut off the fuel and air supply to the engine in order to stop the engine.

CAUTION: Be careful when removing covers or parts. Gradually back off the last two bolts or nuts located at opposite ends of the cover or device. Then, pry the cover loose to relieve any spring or other pressure before removing the last two nuts or bolts completely.

CAUTION: Repairs requiring welding should be performed only with the benefit of the appropriate reference information and by personnel adequately trained and knowledgeable in welding procedures. Determine the type of metal being welded and select the correct welding procedures and electrodes, rods or wire to provide a weld equivalent at least to that of the parent weld.

CAUTION: Do not damage wiring during removal operations. Reinstall the wiring so it is not damaged during installation or operation by contacting sharp corners or by rubbing against some object or hot surface.

CAUTION: Tighten connections to the correct torque, if provided. Make sure that all heat shields, clamps and guards are installed correctly to avoid excessive heat, vibration or rubbing against other parts during operation. Shields that protect against oil spray onto hot exhaust components in event of a line, tube or seal failure must be installed correctly.

CAUTION: Do not operate a machine if any rotating part is damaged or contacts another part during operation. Any high-speed rotating component that has been damaged or altered should be checked for balance before reusing. Make sure all protective devices, including guards and shields, are properly installed and functioning correctly before starting the engine or operating the machine.

CAUTION: ALWAYS disconnect the negative battery cable from the battery before removing any covers, panels or cowlings from the machine.

CAUTION: Let the engine cool before storing.

CAUTION: DO NOT store the machine near open flames.

CAUTION: Shut off fuel while storing or transporting the machine.

CAUTION: DO NOT store fuel near flames or drain fuel while indoors.

INFORMATION MESSAGES

DEFINITIONS

IMPORTANT: The word IMPORTANT identifies special instructions or procedures which, if not strictly followed could result in damage to or destruction of the machine, the process or the surroundings.

NOTE: A NOTE provides key information to clarify instructions.

NOTICE: A NOTICE brings attention to the operator or technician of the possibility of damaging the equipment.

CAREFULLY READ THE FOLLOWING:

NOTICE: Keep the machine clean and free of excessive dirt and grease buildup. Grease the lubrication fittings daily if in use.

NOTICE: With the key in the OFF position and engine not running, check under shields that may cover grease fittings. Grease the fittings as needed and reinstall the shields.

BASIC PRECAUTIONS

Read and always observe the following list of basic precautions.

SAFETY SIGNS

Read and understand all "Safety" signs on the product before operating, lubricating or repairing this product. Replace any damaged, illegible or missing safety plates, signs or decals.

PROTECTIVE EQUIPMENT

ALWAYS wear a hard hat, protective glasses, protective shoes and other protective equipment as required by job conditions when working on or around this product. In particular, wear protective glasses when working on any part of the product with a tool, a hammer, or sledge. Use welder's gloves, hood/goggles, apron and other protective clothing appropriate to the welding job being performed. DO NOT wear loose clothing or jewelry that can catch on parts of the product.

MOUNTING AND DISMOUNTING

Use handholds when mounting or dismounting the machine. Clean any mud or debris from the operator platform before using it. Always face the machine when using the operator platform.

LIFTING

Use a hoist when lifting components that weigh 50 lbs. (23 kg) or more, to avoid back injury. Make sure all chains, hooks, slings or other lifting equipment are in good condition and are of the correct capacity. Be sure hooks are positioned correctly and equipped with a spring latch. Lifting eyes are not to be side loaded during a lifting operation.

HOT FLUIDS AND PARTS

To avoid burns, be alert for hot parts on machines that have just been stopped and hot fluids in lines, tubes and compartments. ALWAYS allow the machine to cool before checking fluids. Be careful when removing fill caps, breathers and plugs from the machine. Hold a rag over the cap or plug to prevent being sprayed or splashed by liquids under pressure. The danger is even greater if the machine has just been stopped because fluids can be hot.

PRESSURIZED ITEMS

WARNING: ALWAYS use a board or a piece of cardboard when you check for a leak. Leaking fluid under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. A pin-hole leak can cause severe injury. If fluid is injected into your skin, get treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

1. Relieve all pressure in air, oil or water systems before disconnecting or removing any lines, fittings or related items. Always make sure all raised components are blocked correctly and be alert for possible pressure when disconnecting any device from a system that utilizes pressure.
2. Loose or damaged lubricant and hydraulic lines, tubes and hoses can cause a fire. Do not bend or strike high-pressure lines or install lines that have been bent or damaged. Check lines, tubes and hoses carefully. Do not use your bare hand to check for leaks.
3. Pressurized air or water can cause personal injury. When pressurized air or water is used for cleaning, wear a protective face shield, protective clothing, and protective shoes. The maximum air pressure for cleaning purposes must be below 30 psi (205 kPa). When using a pressure washer, keep in mind that nozzle pressures are very high, generally well above 2000 psi (13,790 kPa). Follow all recommended practices provided by the pressure washer manufacturer.

WORK TOOLS

1. Only use work tools that are recommended by the manufacturer of the machine. Make certain work tools are in good operating condition.
2. Make sure that all necessary guarding is in place on the host machine and on the work tool.
3. Wear protective glasses and protective equipment as required by conditions or as recommended by the work tool's manufacturer.
4. When using work tools that throw sparks or produce flame, make certain that the work area is clear of bystanders or items that may catch fire.

SAFETY DECAL

NOTE: If a safety decal is removed or needs to be replaced, contact Bucyrus Equipment Co. Inc. for replacement. Read and understand all safety decals on the product before operating or servicing this machine. Replace any damaged, illegible or missing safety decal. The decal re-order number is located on the lower right corner of the decal (see Figure 1.3). See Figures 1.4 and 1.5 for the locations of the safety decals on the machine.



Figure 1.3 - Decal re-order number location

1. **NOTICE:** FLUID LEVEL. DO NOT FILL ABOVE LINE
2. **NOTICE:** Synthetic hydraulic fluid ONLY. See operators manual.
3. **SAFETY INSTRUCTIONS:**
 - DO NOT OPERATE THIS MACHINE UNLESS:
 - YOU HAVE READ AND UNDERSTAND THE SAFTY AND OPERATING INSTRUCTIONS CONTAINED IN THE OPERATOR'S MANUAL.
 - YOU HAVE CHECKED YOUR MACHINE AND ALL FUNCTIONS ARE SAFE AND OPERATING CORRECTLY.
 - YOU HAVE YOUR HANDS AND FEET AWAY FROM ALL MOVING PARTS EXCEPT OPERATOR CONTROLS.
 - YOU HAVE CHECKED THAT YOUR MACHINE RETURNS TO NEUTRAL, DOES NOT CREEP AND THE PARKING BRAKE WORKS PROPERLY.
 - WHEN TRAVELING WITH OR WITHOUT A SOD ROLL:
 - MAKE ALL TURNING MANEUVERS SLOWLY AND CAREFULLY.
 - ALWAYS BACK UP SLOWLY AND OBSERVE OBSTRUCTIONS FROM BEHIND.
 - DO NOT STOP OR START TRAVEL SUDDENLY.
 - WHEN LIFTING AND/OR PLACING A LOAD:
 - MAKE SURE YOU ARE ON A STABLE SURFACE.
 - NEVER GET OFF THE MACHINE.
 - MAKE SURE YOU KNOW THE WEIGHT OF YOUR LOAD AND THE MACHINE LOAD CAPACITY.
 - WHEN TRAVELING ON AN INCLINE:
 - NEVER TRAVEL UP OR DOWN INCLINE BUT ACROSS IT.
 - KEEP THE LOAD AS LOW AS POSSIBLE.
 - NEVER EXCEED 20 DEGREE INCLINE
4. **CAUTION:** Read and understand operator manual before operating this machine.
5. **WARNING:** When operating this machine, ALWAYS keep both feet planted firmly on operator platform. ALWAYS keep one hand firmly on steering wheel.
6. **NOTICE:** WHEEL LOCK. NO NOT LEAVE WHEEL LOCK ENGAGED
7. **WARNING:** Avoid injury. Do NOT operate with guard removed. Replace guard before operating machine.

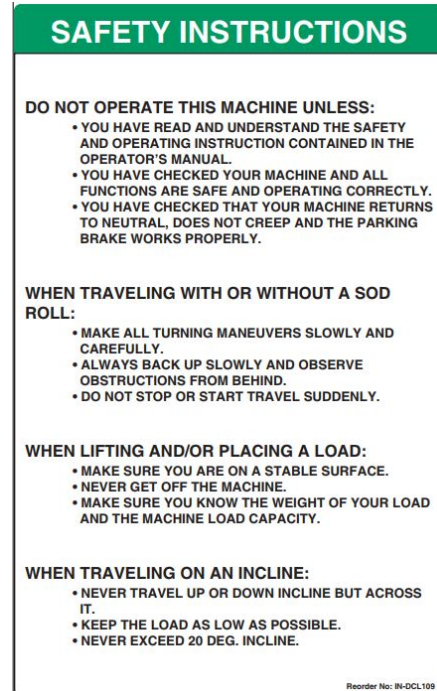
8. **WARNING:** Keep hands clear. Rotating fan blades.
9. **NOTICE:** Avoid equipment damage. Do NOT exceed maximum rated load: 2500 lbs (1134 kg).
10. **IMPORTANT:** HYDRAULIC WARM UP 10 MINUTES.
11. **CAUTION:** Do Not use ether or starting fluid. Sever Damage will occur.
12. **CAUTION:** A Solution of 50% antifreeze and 50% water must be used in the engine. (freezing point about -34 F). Do not use 100% antifreeze, or severe damage will occur.
13. Use Ultra-low sulfur diesel fuel only.



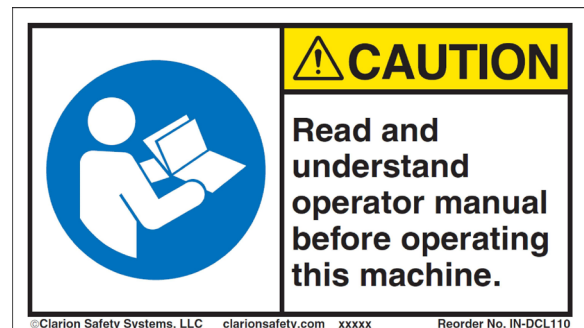
1. Re-order Number: IN-DCL105



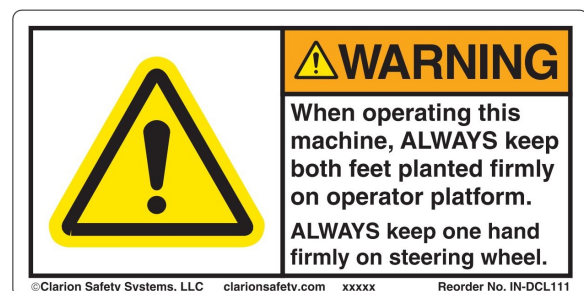
2. Re-order Number: IN-DCL107



3. Re-order Number: IN-DCL109



4. Re-order Number: IN-DCL110



5. Re-order Number: IN-DCL111



6. Re-order Number: IN-DCL115



7. Re-order Number: IN-DCL123



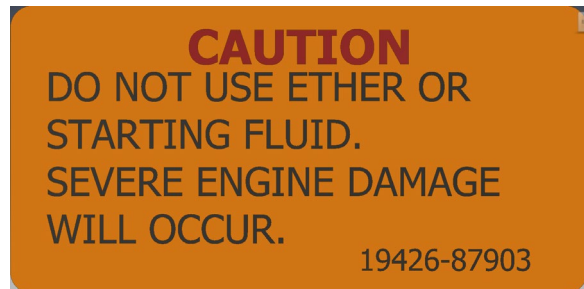
8. Re-order Number: IN-DCL125



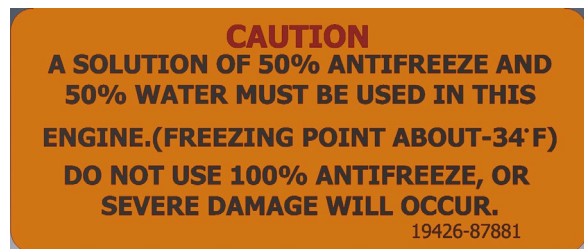
9. Re-order Number: IN-DCL126



10. Re-order Number: STKE



11. Re-order Number: 19426-87903



12. Re-order Number: 19426-87881



13. Re-order Number: IND-DCL200

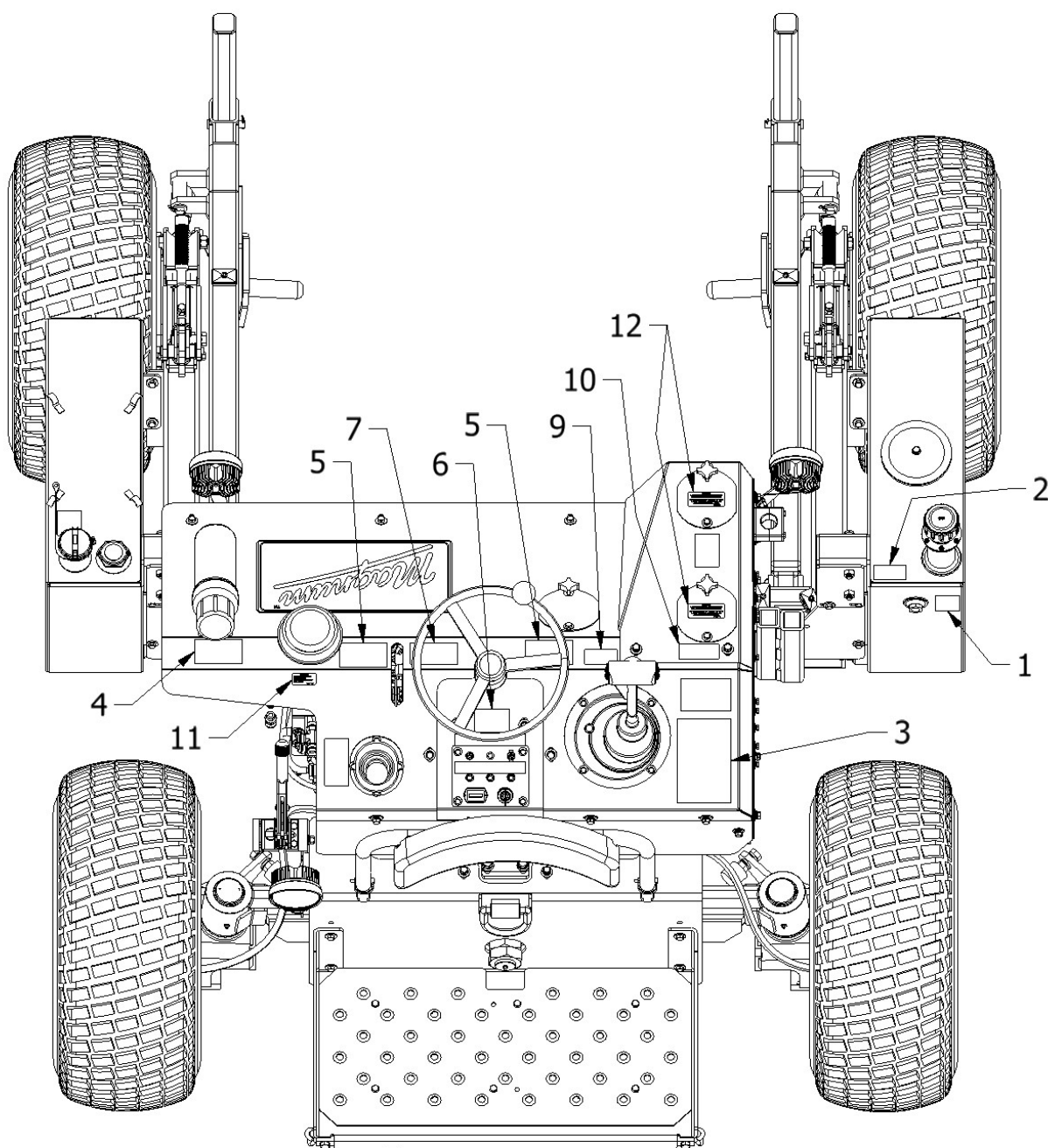
SAFETY DECAL LOCATION

Figure 1.4 – Safety decal location on machine.

SAFETY DECAL LOCATION

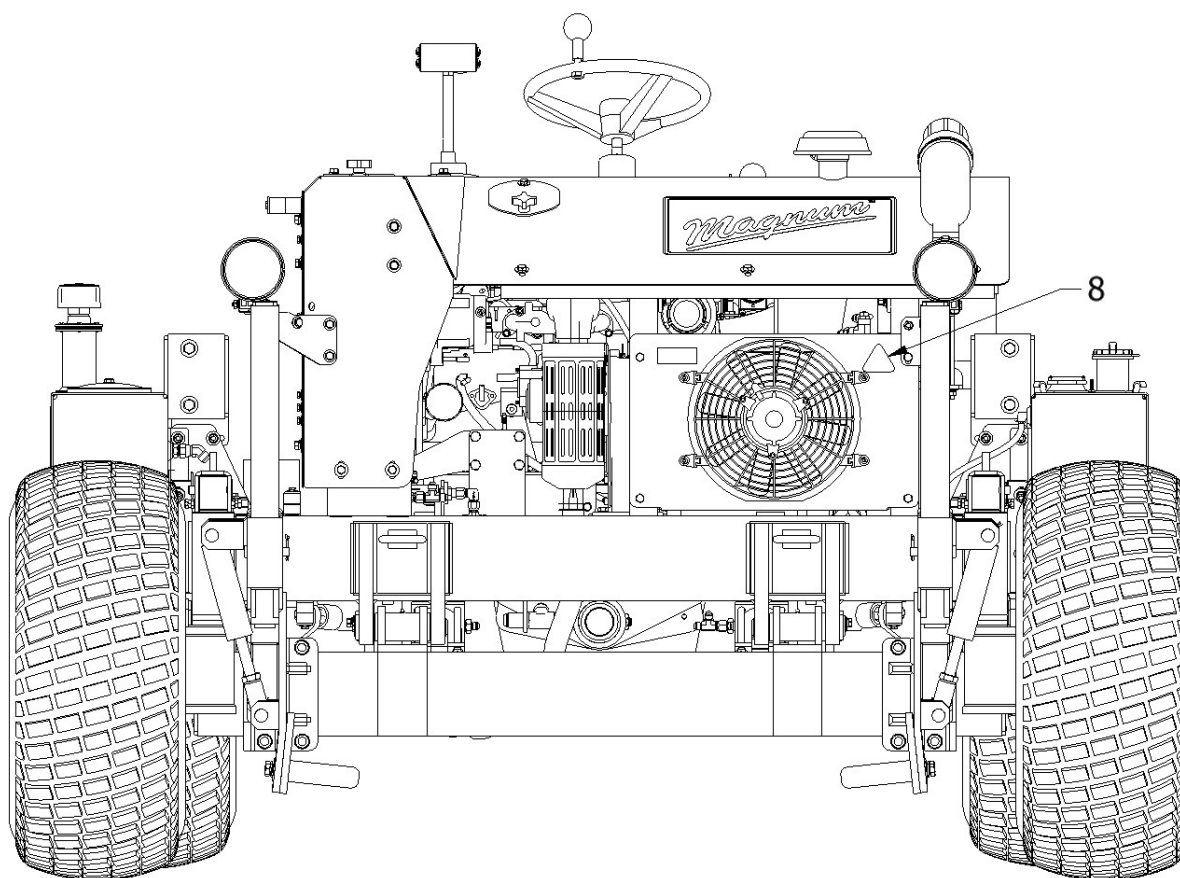
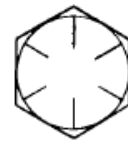
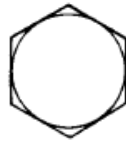


Figure 1.5 – Safety decal location on machine.

STANDARD TORQUE SPECIFICATIONS



Bolt Size	Threads/In	Grade 2	Grade 5	Grade 8
<u>Torque in. lbs. (Nm)</u>				
#10 -	24	27 (3.1)	43 (5.0)	60 (6.9)
#10 -	32	31 (3.6)	49 (5.6)	68 (7.8)
<u>Torque ft. lbs. (Nm)*</u>				
1/4 -	20	5 (7)	8 (11)	12 (16)
1/4 -	28	6 (8)	10 (14)	14 (19)
5/16 -	18	11 (15)	17 (23)	25 (35)
5/16 -	24	12 (16)	19 (26)	29 (40)
3/8 -	16	20 (27)	30 (40)	45 (62)
3/8 -	24	23 (32)	35 (48)	50 (69)
7/16 -	14	30 (40)	50 (69)	70 (97)
7/16 -	20	35 (48)	55 (76)	80 (110)
1/2 -	13	50 (69)	75 (104)	110 (152)
1/2 -	20	55 (76)	90 (124)	120 (166)

Metric

6 x 1.0	72-78 In. lbs. (8.1-8.8 N·m)
8 x 1.25	14-18 ft. lbs. (19-24.4 N·m)
10 x 1.25	26-30 ft. lbs. (35.2-40.7 N·m)

*To convert ft. lbs. to Nm multiply foot pounds by .1.3558

*To convert Nm to ft. lbs. multiply Nm by .7376.

SAE TAP DRILL SIZES

Thread Size/Drill Size		Thread Size/Drill Size	
#0-80	3/64	1/2-13	27/64
#1-64	53	1/2-20	29/64
#1-72	53	9/16-12	31/64
#2-56	51	9/16-18	33/64
#2-64	50	5/8-11	17/32
#3-48	5/64	5/8-18	37/64
#3-56	45	3/4-10	21/32
#4-40	43	3/4-16	11/16
#4-48	42	7/8-9	49/64
#5-40	38	7/8-14	13/16
#5-44	37	1-8	7/8
#6-32	36	1-12	59/64
#6-40	33	1 1/8-7	63/64
#8-32	29	1 1/8-12	1 3/64
#8-36	29	1 1/4-7	1 7/64
#10-24	24	1 1/4-12	1 11/64
#10-32	21	1 1/2-6	1 11/32
#12-24	17	1 1/2-12	1 27/64
#12-28	4.6mm	1 3/4-5	1 9/16
1/4-20	7	1 3/4-12	1 43/64
1/4-28	3	2-4 1/2	1 25/32
5/16-18	F	2-12	1 59/64
5/16-24	I	2 1/4-4 1/2	2 1/32
3/8-16	O	2 1/2-4	2 1/4
3/8-24	Q	2 3/4-4	2 1/2
7/16-14	U	3-4	2 3/4
7/16-20	25/64		

METRIC TAP DRILL SIZES

Tap Size	Drill Size	Decimal Equivalent	Nearest Fraction
3 x .50	#39	0.0995	3/32
3 x .60	3/32	0.0937	3/32
4 x .70	#30	0.1285	1/8
4 x .75	1/8	0.125	1/8
5 x .80	#19	0.166	11/64
5 x .90	#20	0.161	5/32
6 x 1.00	#9	0.196	13/64
7 x 1.00	16/64	0.234	15/64
8 x 1.00	J	0.277	9/32
8 x 1.25	17/64	0.265	17/64
9 x 1.00	5/16	0.3125	5/16
9 x 1.25	5/16	0.3125	5/16
10 x 1.25	11/32	0.3437	11/32
10 x 1.50	R	0.339	11/32
11 x 1.50	3/8	0.375	3/8
12 x 1.50	13/32	0.406	13/32
12 x 1.75	13/32	0.406	13/32

DECIMAL EQUIVALENTS

1/64	.....	.0156	
1/32	.....	.0312	... 1 mm = .0394"
3/64	.....	.0469	
1/16	.....	.0625	
5/64	.....	.0781	... 2 mm = .0787"
3/32	.....	.0938	
7/64	.....	.1094	... 3 mm = .1181"
1/8	....	.1250	
9/64	.....	.1406	
5/32	.....	.1563	... 4 mm = .1575"
11/64	.....	.1719	
3/16	.....	.1875	... 5 mm = .1969"
13/64	.....	.2031	
7/32	.....	.2188	
15/64	.....	.2344	... 6 mm = .2362"
1/4	....	.25	
17/64	.....	.2656	... 7 mm = .2756"
9/32	.....	.2813	
19/64	.....	.2969	
5/16	.....	.3125	... 8 mm = .3150"
21/64	.....	.3281	
11/32	.....	.3438	... 9 mm = .3543"
23/64	.....	.3594	
3/8	....	.375	
25/64	.....	.3906	... 10 mm = .3937"
13/32	.....	.4063	
27/64	.....	.4219	... 11 mm = .4331"
7/16	.....	.4375	
29/64	.....	.4531	
15/32	.....	.4688	... 12 mm = .4724"
31/64	.....	.4844	
1/2	....	.5	... 13 mm = .5118
33/64	.....	.5156	
17/32	.....	.5313	
35/64	.....	.5469	... 14 mm = .5512"
9/16	.....	.5625	
37/64	.....	.5781	... 15 mm = .5906"
19/32	.....	.5938	
39/64	.....	.6094	
5/8	....	.625	... 16 mm = .6299"
41/64	.....	.6406	
21/32	.....	.6563	... 17 mm = .6693"
43/64	.....	.6719	
11/16	.....	.6875	
45/64	.....	.7031	... 18 mm = .7087"
23/32	.....	.7188	
47/64	.....	.7344	... 19 mm = .7480"
3/4	....	.75	
49/64	.....	.7656	
25/32	.....	.7813	... 20 mm = .7874"
51/64	.....	.7969	
13/16	.....	.8125	... 21 mm = .8268"
53/64	.....	.8281	
27/32	.....	.8438	
55/64	.....	.8594	... 22 mm = .8661"
7/8	....	.875	
57/64	.....	.8906	... 23 mm = .9055"
29/32	.....	.9063	
59/64	.....	.9219	
15/16	.....	.9375	... 24 mm = .9449"
61/64	.....	.9531	
31/32	.....	.9688	... 25 mm = .9843
63/64	.....	.9844	
1	....	1.0	

CONVERSION TABLE

Unit of Measure	Multiplied by	Converts to
ft. lbs.	x 12	= in. lbs.
in. lbs.	x .0833	= ft. lbs.
ft. lbs.	x 1.356	= Nm
in. lbs.	x .0115	= kg-m
Nm	x .7376	= ft. lbs.
kg-m	x 7.233	= ft. lbs.
kg-m	x 86.796	= in. lbs.
kg-m	x 9.807	= Nm
in.	x 25.4	=mm
mm	x .03937	= in.
in.	x 2.54	= cm
mile (mi.)	x 1.6	= km
km	x .6214	= mile (mi.)
Ounces (oz)	x 28.35	= Grams (g)
Fluid Ounces (fl. oz.)	x 29.57	= Cubic Centimeters (cc)
Cubic Centimeters (cc)	x .03381	= Fluid Ounces (fl. oz.)
Grams (g)	x 0.035	= Ounces (oz)
lb.	x .454	= kg
kg	x 2.2046	= lb.
Cubic inches (cu in)	x 16.387	= Cubic centimeters (cc)
Cubic centimeters (cc)	x 0.061	= Cubic inches (cu in)
Imperial pints (Imp pt)	x 0.568	= Liters (l)
Liters (l)	x 1.76	= Imperial pints (Imp pt)
Imperial quarts (Imp qt)	x 1.137	= Liters (l)
Liters (l)	x 0.88	= Imperial quarts (Imp qt)
Imperial quarts (Imp qt)	x 1.201	= US quarts (US qt)
US quarts (US qt)	x 0.833	= Imperial quarts (Imp qt)
US quarts (US qt)	x 0.946	= Liters (l)
Liters (l)	x 1.057	= US quarts (US qt)
US gallons (US gal)	x 3.785	=Liters (l)
Liters (l)	x 0.264	= US gallons (US gal)
Pounds - force per square inch (psi)	x 6.895	= Kilopascals (kPa)
Kilopascals (kPa)	x 0.145	= Pounds - force per square inch (psi)
Kilopascals (kPa)	x 0.01	= Kilograms - force per square cm
Kilograms - force per square cm	x 98.1	= Kilopascals (kPa)
$\pi (3.14) \times R^2 \times H$ (height)		= Cylinder Volume

°C to °F: $9 (^\circ\text{C} + 40) \mid 5 - 40 = ^\circ\text{F}$

°F to °C: $5 (^\circ\text{F} + 40) \mid 9 - 40 = ^\circ\text{C}$

GLOSSARY OF TERMS

BECI: Bucyrus Equipment Company Inc.

DCV: Direct current voltage.

Electrical Open: Open circuit. An electrical circuit which isn't complete.

Electrical Short: Short circuit. An electrical circuit which is completed before the current reaches the intended load.(a bare wire touching the chassis).

ft.: Foot/feet.

Foot Pound: Ft. lb. A force of one pound at the end of a lever one foot in length, applied in a rotational direction.

g: Gram. Unit of weight in the metric system.

gal.: Gallon.

ID: Inside diameter.

in.: Inch/inches.

Inch Pound: In. lb. 12 in. lbs. = 1 ft. lb.

kg/cm²: Kilograms per square centimeter.

kg-m: Kilogram meters.

Kilogram/meter: A force of one kilogram at the end of a lever one meter in length, applied in a rotational direction.

l or ltr: Liter.

lbs/in²: Pounds per square inch.

Left or Right Side: Always referred to based on normal operating position of the driver.

m: Meter/meters.

Mag: Magneto.

mm: Millimeter. Unit of length in the metric system. 1mm = approximately .040".

Nm: Newton meters.

OD: Outside diameter.

Ohm: The unit of electrical resistance opposing current flow.

oz.: Ounce/ounces.

psi.: Pounds per square inch.

PTO: Power take off.

qt.: Quart/quarts.

Regulator: Voltage regulator. Regulates battery charging system output at approx. 14.5 DCV as engine RPM increases.

Hydraulic Tank: The fill tank for the hydraulic fluid.

Resistance: In the mechanical sense, friction or load. In the electrical sense, ohms, resulting in energy conversion to heat.

RPM: Revolutions per minute.

Volt: The unit of measure for electrical pressure of electromotive force. Measured by a voltmeter in parallel with the circuit.

Watt: Unit of electrical power. Watts = amperes x volts.

WOT: Wide open throttle.

CHAPTER 2

MACHINE OPERATION/ COMPONENT IDENTIFICATION / TRANSPORTING & TOWING

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INSTALLER MAIN COMPONENT IDENTIFICATION

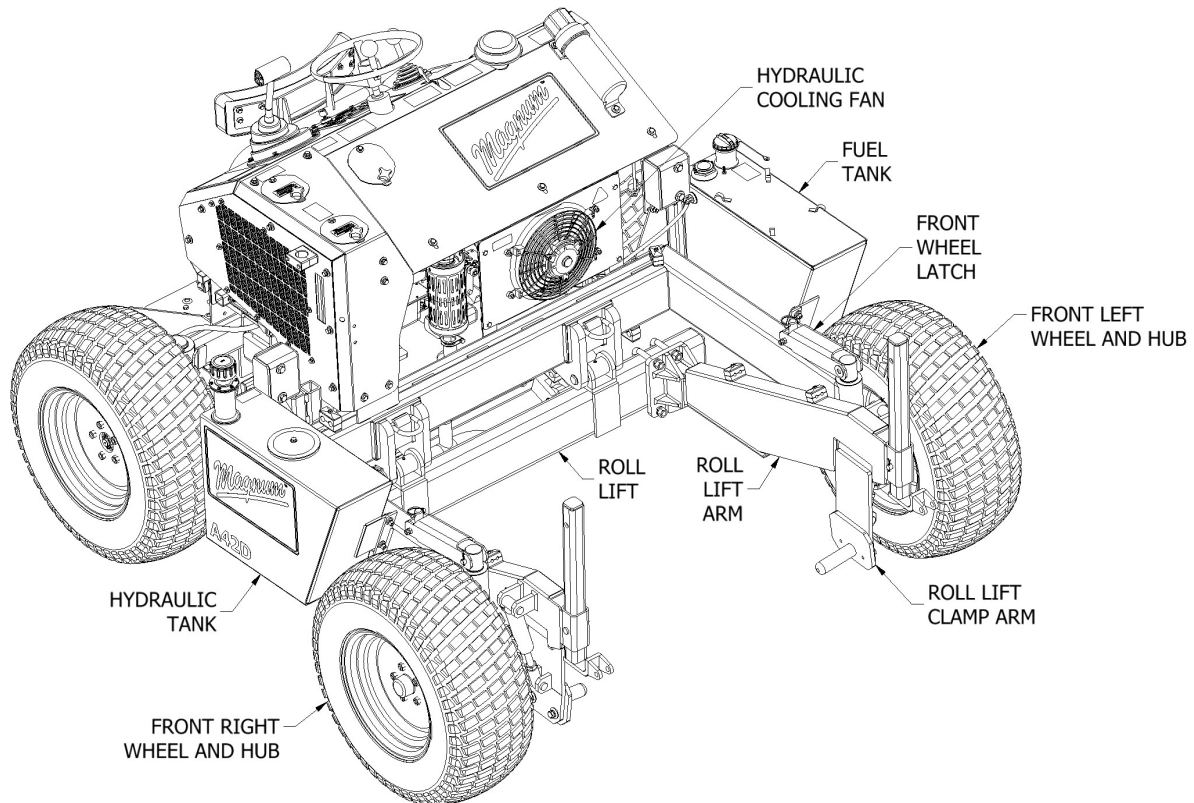


Figure 2.1 – Main Component Identification

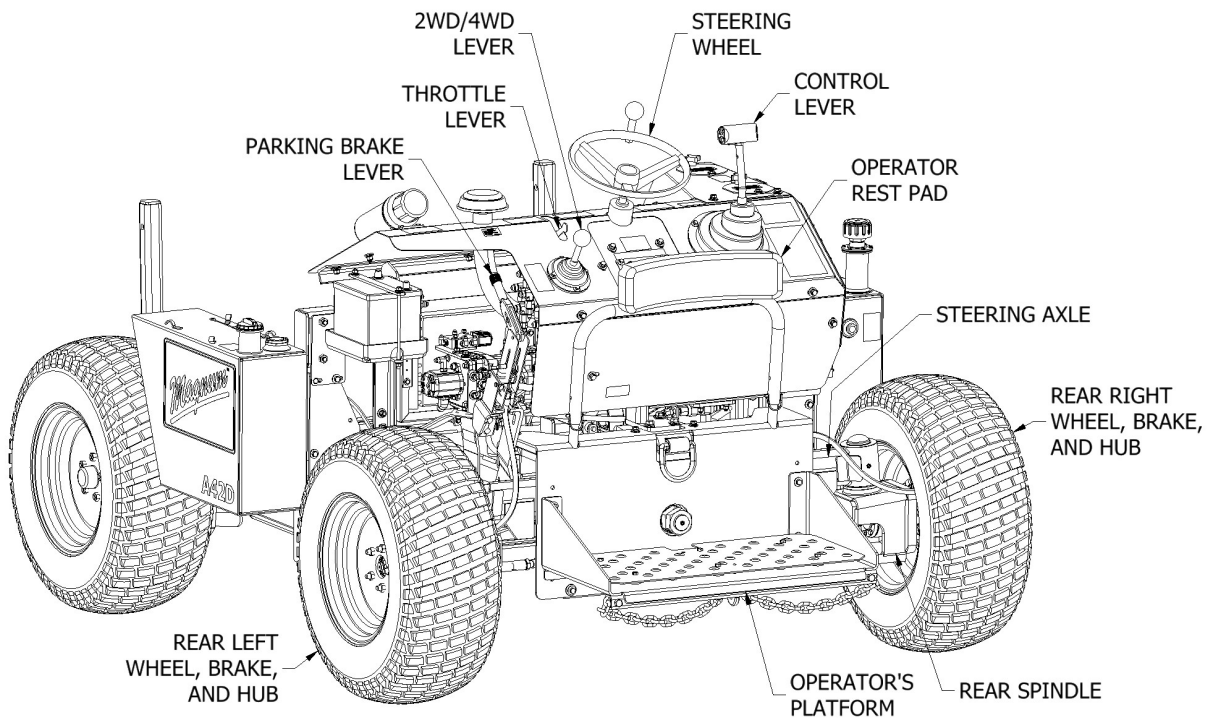


Figure 2.2 – Main Component Identification

INSTALLER OPERATOR CONTROL IDENTIFICATION

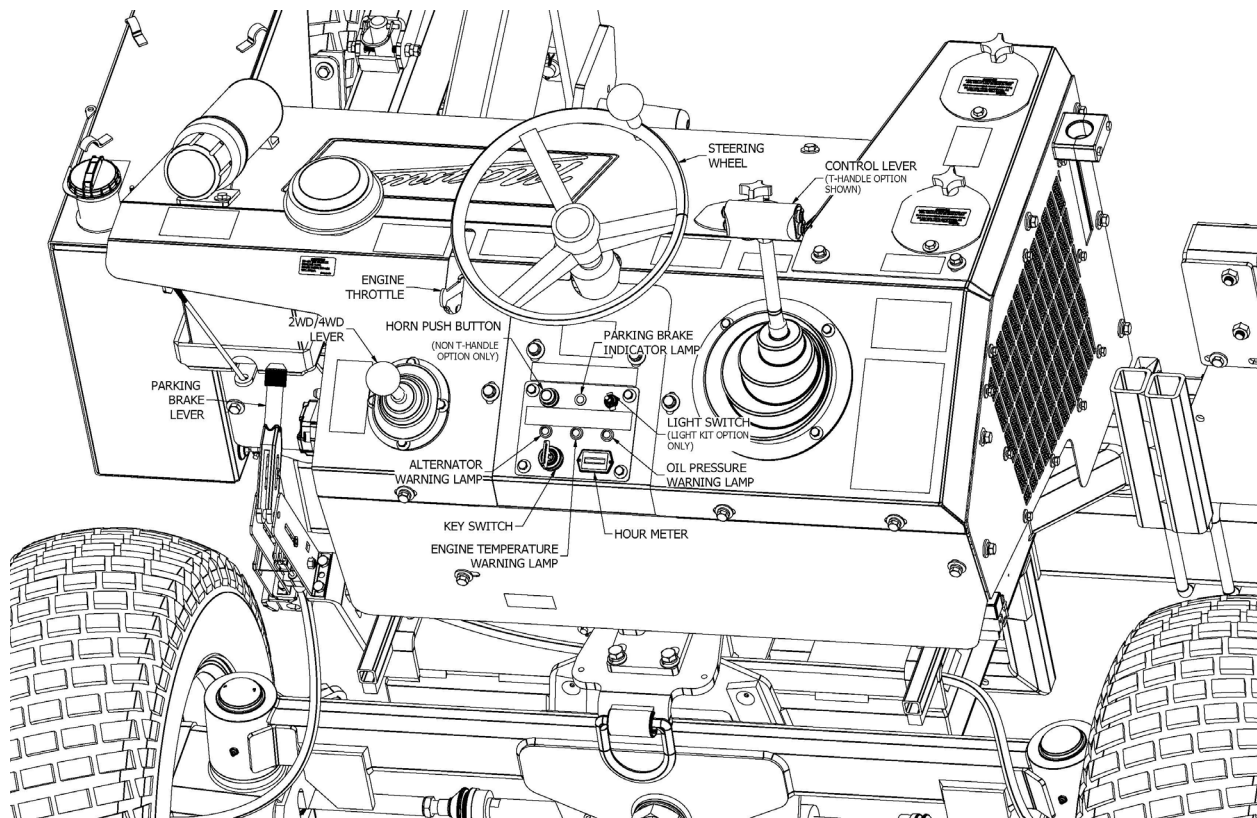


Figure 2.3 – Operator Control Identification

The Magnum “A” series sod installer is a stand on big roll sod installer. The “A” series is available as two models the A42D and A48D. The A42D is able to install 30” or 42” wide sod rolls. The A48D is able to install 30”, 42”, or 48” wide sod rolls.

It is powered by a diesel engine and tandem hydrostatic drive. The tandem hydrostats, driven by the diesel engine, sends power to four hydraulic drive motors, one at each wheel. The installer can be operated in two drive modes, two wheel drive or four wheel drive. The installer is steered at the rear of the machine using a conventional steering wheel. Sod rolls are lifted at the front of the machine via the installer’s roll lift arms.

PRE-INSPECTION

WARNING: Check the machine daily before use. Check all nuts and bolts for tightness. Check all hydraulic connections for tightness. Look for dirty hydraulic

connections. A leaky connection will attract dirt and dust. Tighten all loose connections and replace leaky hoses or lines. Failure to perform basic inspections could result in machine failure or personal injury.

WARNING: Hydraulic oil escaping under pressure can penetrate skin causing serious injury. Keep body and hands away from pin holes or leaks that eject hydraulic fluid under pressure. Use cardboard or paper to search for leaks. Be sure the machine is OFF and relieve all pressure from the hydraulic system before disconnecting any hydraulic lines, fitting, or servicing any hydraulic components.

WARNING: Never allow anyone to operate or service the installer without complete instructions.

1. Before attempting to operate the machine check the following items:
 - The operator has completely read

this manual and understands all safety warnings and operation procedures involved with operating the machine.

- Check all nuts and bolts for tightness. Check all hydraulic connections for tightness. Look for dirty hydraulic connections. A leaky connection will attract dirt and dust.
- All grease points have been properly lubricated.
- The hydraulic tank contains the correct amount of hydraulic fluid.
- Tires contain proper amount of air pressure.
- The work area is clear of potential hazards or obstructions.
- Never operate the installer in an enclosed area without adequate ventilation.
- Keep the operator's platform free of debris and mud to prevent slippery surfaces.
- Be sure all controls are in the proper position for starting and are operating correctly.

Before starting the engine.

Check the engine oil level on the dipstick (Figure 2.4). Refer to the Engine operator's manual for the recommended engine oil.

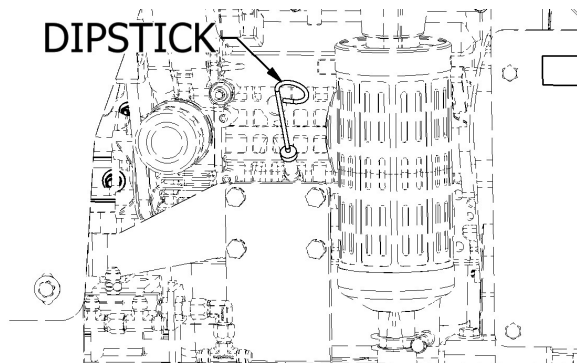


Figure 2.4 – Engine Oil Dipstick

Make sure the engine coolant in the reservoir (Figure 2.5) is even with the full mark on the reservoir.

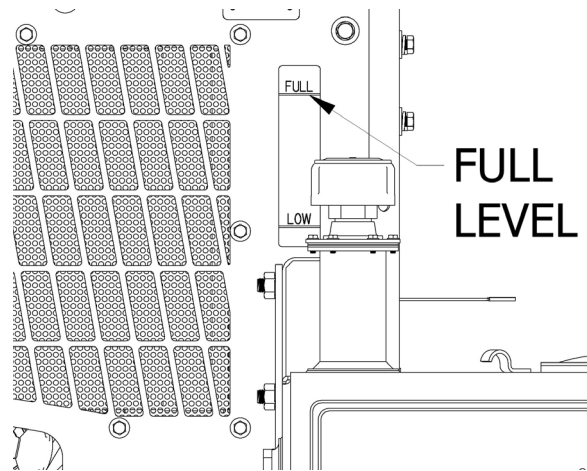


Figure 2.5 – Engine Coolant Level

Inspect the tires for deep cuts or other damage. Make sure the tires are inflated to 30-35 psi (200-250 kPa).

Check the hydraulic fluid level by looking into the reservoir sight glass (Figure 2.6). The fluid level should be even with the middle of the sight glass. Add fluid as necessary if not visible in the sight glass. The recommended oil is Amsoil HVJ ISO68 synthetic hydraulic fluid or good quality equivalent SAE 20 synthetic oil.

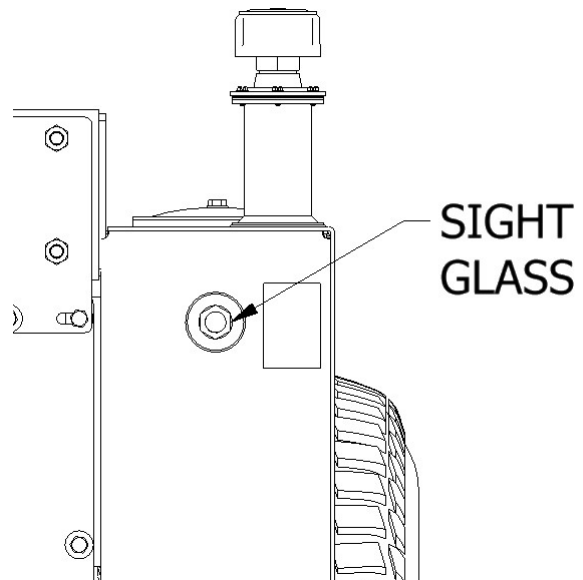


Figure 2.6 – Hydraulic Fluid Level - Sight Glass

Perform a quick inspection of the entire machine. Check for any broken, damaged or

excessively worn components and repair as necessary.

Check for leaking or damaged hydraulic fittings or hoses. Tighten fittings or replace hoses as required. Check for leaking engine oil or engine coolant on diesel engines.

Make sure all shields are installed and securely fastened to the machine.

Make sure the fuel tank contains sufficient fuel.

BASIC OPERATION

NOTICE: Before operating the machine read the Safety Information, and Basic Precautions sections in Chapter 1.

NOTICE: The machine requires a warm-up period before operation. Allow the hydraulic oil in the system to warm up for approximately 10 minutes. This will allow for smoother machine operation. Cold weather conditions may require a longer warm-up time.

WARNING: Know the function of all controls and how to stop the machine quickly.

WARNING: Never operate the machine on steep inclines or slopes. The machine may roll over causing serious injury or death. Under no circumstance should the machine be operated on slopes greater than 25 degrees. **ALWAYS FOLLOW OSHA APPROVED OPERATION.**

WARNING: Be alert of your surroundings. Make certain the area is clear of potential hazards. Keep away from drop offs. Be aware of overhead obstructions. Keep bystanders a safe distance away from the machine during operations.

WARNING: Stay clear of all moving parts during machine warm up and sod installing operations. Severe injury may occur.

WARNING: NEVER allow anyone to operate or service the machine without complete instructions.

WARNING: Operate the machine from the operator's platform only. All operation of the

machine must be performed from the operator's platform.

WARNING: DO NOT use the machine to transport items or people. Damage may occur to the sod installer. Serious injury or death may occur. Only ride on the operator's platform during sod installing procedures.

WARNING: When operating this machine, ALWAYS keep both feet planted firmly on operator platform. ALWAYS keep one hand firmly on steering wheel.

WARNING: To prevent tipping or loss of control, start and stop smoothly. Avoid unnecessary turns and travel at reduced speeds.

CAUTION: Read and understand operator manual before operating this machine.

During operation, observe the following precautions:

- Only operate the installer from the operator's platform.
- Begin ground travel smoothly and then adjust travel speed according to the prevailing terrain. Reduce ground speed when traveling over rough or uneven ground.
- Avoid sudden starts and stops.
- Keep one hand firmly on the steering wheel during operation.
- Carry the load as low as possible, especially large heavy sod rolls.
- Apply the parking brake (Figure 2.7) when stopped for any reason.

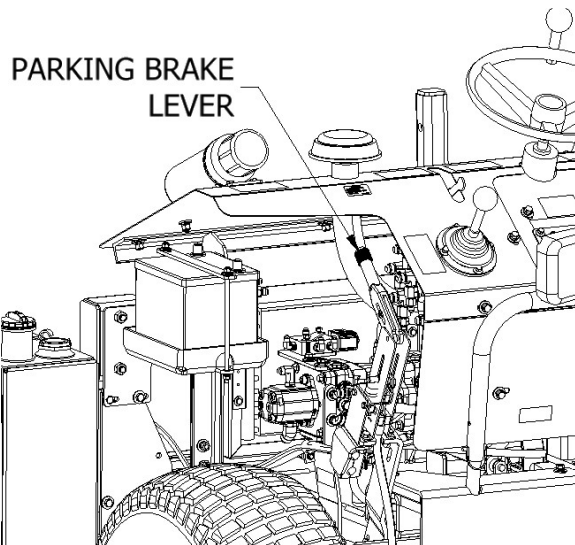


Figure 2.7 – Parking Brake Lever Location

STARTING THE ENGINE

The diesel engine is equipped with a glow-plug preheating system to assist cold starting. The preheat system is activated by turning the key switch counterclockwise and remains on as long as the key is held.

WARNING: Start the engine with the operator in the operating position, parking brake engaged, and the control lever in the neutral position.

CAUTION: Never use starting fluid to start this engine. Severe engine damage can occur when using ether or starting fluid to start the engine.

Use the following chart to determine approximate preheat times to ensure prompt engine starting.

Preheat Times Chart

Above 50°F (10°C).....not required
 23-50° F (-5-10° C).....5 seconds
 Below 23° F (-5° C).....10 seconds

To prevent damage to the glow plugs or preheat system, do not activate the system continuously for more than 20 seconds.

Make sure the fuel valve is in the on position (pointing straight down). See Figure 2.8.

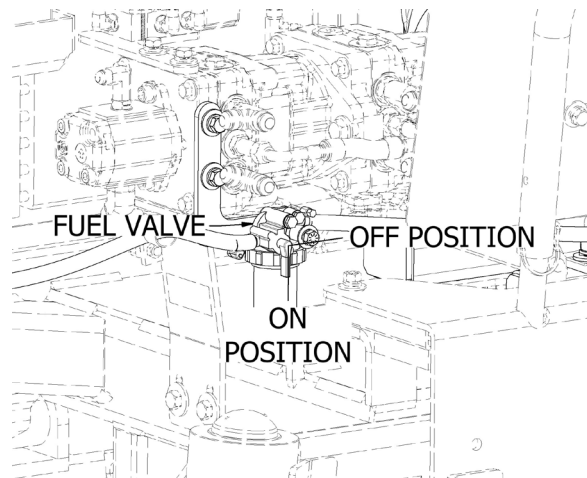


Figure 2.7 – Fuel Valve

Reference the Preheat Times Chart. If necessary, turn the key switch (Figure 2.8) counterclockwise to activate the preheat system.

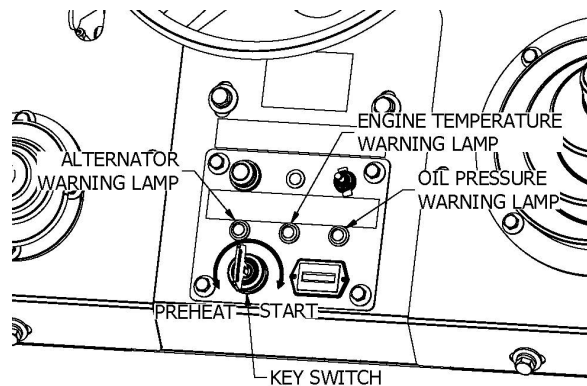


Figure 2.8 – Key switch / Warning Lamps

CAUTION: To prevent starter motor damage, do not crank the engine continuously for more than 20 seconds. Allow the starter motor to cool for 30-60 seconds between cranking attempts.

Crank the engine until it starts. When the engine starts, make sure the alternator, temperature and oil pressure warning lamps go out. **If any of the warning lamps remain on, stop the engine immediately and determine the cause.**

Warm the engine at medium speed without load.

CAUTION: Stop the engine immediately if the warning buzzer sounds or if the any of the warning lamps remain on.

Allow the engine to run at idle speed for 30-60 seconds prior to stopping the engine. To stop the engine, turn the key switch to off.

OPERATOR CONTROLS

WARNING: Know the function of all controls and how to stop the machine quickly.

WARNING: Operate the machine from the operator's platform only. All operation of the machine must be performed from the operator's platform.

WARNING: To prevent tipping or loss of control, start and stop smoothly, avoid unnecessary turns and travel at reduced speeds.

WARNING: Reduce speed and exercise extreme caution on slopes and in sharp turns to prevent tipping or loss of control. Be especially cautious when changing directions on slopes.

WARNING: When operating this machine, ALWAYS keep both feet planted firmly on operator platform. ALWAYS keep one hand firmly on steering wheel.

CAUTION: DO NOT leave the wheel lock engaged.

CONTROL LEVER

The control lever operates the forward, neutral, and reverse movements of the machine. It operates the up and down motion of the roll lift and open and close motion of the hydraulic clamp arms. The wheel lock function is also engaged from the control lever.

NON T-HANDLE OPERATION

There are two versions of the control lever. The first is the standard option or non T-handle option. See Figure 2.9. It performs all the functions previously listed, but the roll lift clamp arms are operated from a lever located next to the control lever.

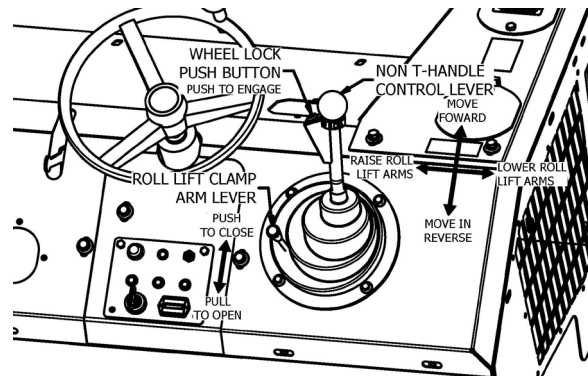


Figure 2.9 – Non T-Handle Option

Pushing the control lever forward causes the installer to move forward. Pulling the control lever rearward causes the installer to move in reverse. The further the control lever is moved, the faster the installer will move.

Moving the control lever toward the left raises the roll lift arms and toward the right lowers the arms.

Pulling the hydraulic clamp arm lever rearward opens the arms and pushing the lever forward closes the arms.

Note: Machines equipped with a solid arm roll lift will not have the hydraulic clamp arm lever.

Pushing the wheel lock button engages the wheel lock mode while in four wheel drive. The wheel lock should only be engaged temporarily.

T-HANDLE OPERATION

The second version of the control lever is the T-handle option. It performs all of the same functions as the non T-handle control lever, but the hydraulic clamp arms and horn are operated from push buttons located on the sides of the handle. See Figure 2.10.

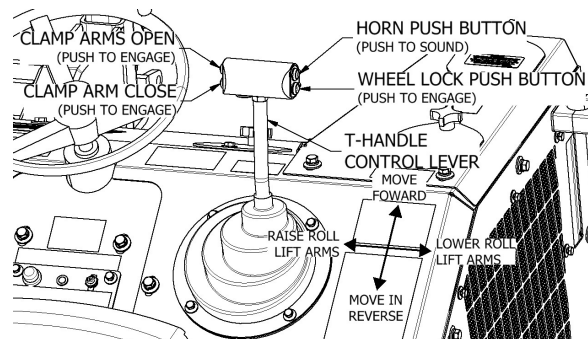


Figure 2.10 – T-Handle Option

Pushing the control lever forward causes the installer to move forward. Pulling the control lever rearward causes the installer to move in reverse. The further the control lever is moved, the faster the installer will move.

Moving the control lever toward the left raises the roll lift arms and toward the right lowers the arms.

Pushing top clamp arm button opens the arms and pushing the bottom clamp arm button closes the arms.

Pushing the horn push button will sound the horn.

Pushing the wheel lock button engages the wheel lock mode while in four wheel drive. The wheel lock should only be engaged temporarily.

CONTROL LEVER TO HYDROSTAT LINKAGE

Both the non T-handle and T-handle control levers operate the hydrostat in the same manner. The control lever is connected to the hydrostat thru a series of cams and solid linkage. See Figure 2.11. As the control lever is pushed forward the linkage from the control lever rotates the first cam. Linkage from the first cam rotates the second cam. As the second cam rotates it pulls the linkage to the hydrostat control plates actuating both hydrostat sections.

NOTICE: The linkage ball joint ends should be lubricated periodically with a spray lubricant.

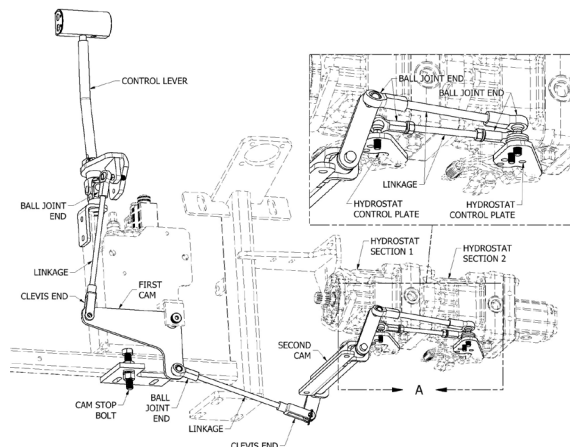


Figure 2.11 – Control Lever to Hydrostat Linkage

CONTROL LEVER TO ROLL LIFT CONTROL VALVE LINKAGE

Both the non T-handle and T-handle control levers operate the roll lift control valve in the same manner. The control lever is connected to the control valve via a ball joint end. See Figure 2.12. As the control lever is moved left or right the control valve spool is actuated sending hydraulic fluid to the roll lift cylinders, which raises and lowers the roll lift arms.

NOTICE: The ball joint end should be lubricated periodically with a spray lubricant.

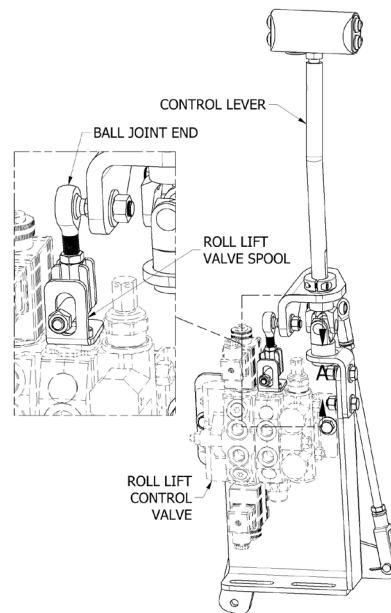


Figure 2.12 – Control Lever to Roll Lift Control Valve

STEERING

WARNING: Reduce speed and exercise extreme caution on slopes and in sharp turns to prevent tipping or loss of control. Be especially cautious when changing directions on slopes.

WARNING: Immediately apply the parking brake if you lose steering control while operating. Inspect the machine and correct the problem before continuing to operate.

WARNING: When operating this machine, ALWAYS keep both feet planted firmly on operator platform. ALWAYS keep one hand firmly on steering wheel.

The installer is rear wheel steer. As the steering wheel is turned the steering valve is operated, which actuates the steering cylinder turning the wheels. As the steering wheel is turned clockwise the wheels turn counter clockwise. As the steering wheel is turned counter clockwise the wheels turn clockwise.

2WD/4WD LEVER

WARNING: Never operate the machine on steep inclines or slopes. The machine may roll over causing serious injury or death. Under no circumstance should the machine be operated on slopes greater than 25 degrees. **ALWAYS FOLLOW OSHA APPROVED OPERATION.**

CAUTION: Bring the installer to a complete stop before switching from two-wheel drive mode to four-wheel drive mode. **NEVER** switch between these two modes while the installer is in motion. Severe damage to the equipment could occur.

NOTE: The decal next to the 2WD/4WD lever indicates two-wheel drive as 2WD and four-wheel drive as 4WD.

Two travel modes are available on the big roll installer: two-wheel drive (2WD) and four-wheel drive (4WD). Select the necessary mode using the 2WD/4WD lever. Push the lever forward to engage two-wheel drive and pull the lever back to engage four-wheel drive. See Figure 2.13.

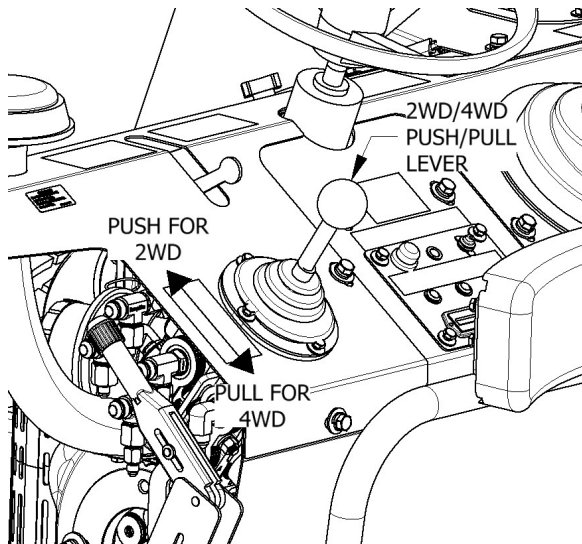


Figure 2.13 – 2WD/4WD Push/Pull Lever

Earlier models were equipped with a push pull handle. Pull the handle up to engage two-wheel drive (2WD) and push the handle down to engage four-wheel drive (4WD). See Figure 2.14.

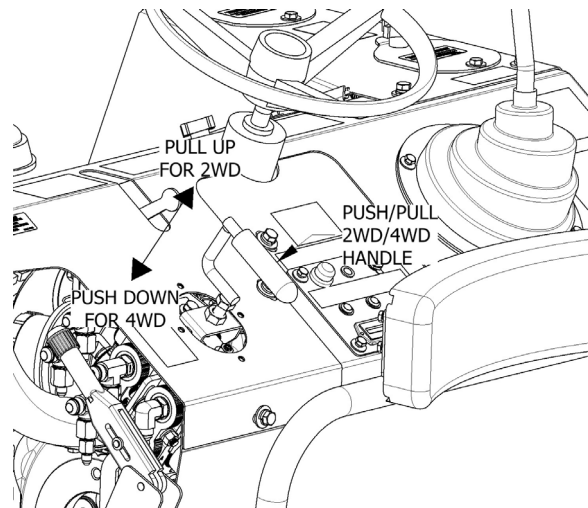


Figure 2.14 – 2WD/4WD Push/Pull Handle (Earlier Models)

TWO-WHEEL DRIVE MODE

Two-wheel drive (2WD) mode is suitable for operation on dry, firm and level ground conditions.

Maximum ground speed is available when operating in two-wheel drive. During two-wheel drive operation, only the rear wheels (steering axle) are driving the machine.

FOUR-WHEEL DRIVE MODE

CAUTION: To prevent generating excessive heat and possible hydraulic system damage, always operate the installer in the four-wheel drive mode when carrying and installing a sod roll.

Always use four-wheel drive (4WD) when carrying a load, especially on uneven, slippery, muddy or soft ground conditions.

During four-wheel drive operation, ground speed is limited to approximately 50 percent of the maximum two-wheel drive speed. Four-wheel drive is especially useful when traveling up or down an incline or over uneven ground. During four-wheel drive operation, all four wheels will drive the machine equally if each wheel has

equal traction. However, because each wheel is driven by a separate hydraulic motor, the wheel or wheels with the least traction can spin independently of the wheels with better traction. When operating on soft, muddy or slippery surfaces it may be necessary to engage the wheel lock valve. Refer to *Wheel Lock* in this section.

WHEEL LOCK

CAUTION: To prevent generating excessive heat in the hydraulic system and possible hydraulic system damage, apply the wheel lock function only when necessary for additional traction. ALWAYS disengage the wheel lock function when ground conditions improve or when additional traction is unnecessary.

NOTICE: DO NOT leave wheel lock engaged.

When traveling over uneven, slippery and soft ground a loss of traction can occur even when operating in four-wheel drive mode. If additional traction is required, push the wheel lock button to engage the wheel lock function. The wheel lock function is only engaged as long as the button is being pushed. As soon as the button is released the wheel lock function is disengaged. The wheel lock button is located on the control lever. See Figure 2.15 for the location on the non T-handle control lever and 2.16 for the location on the T-handle control lever.

When activated, the wheel lock function provides equal drive force at both wheels of each axle. Installer speed and handling is affected when the traction controls are activated. So, when better ground conditions are encountered, disengage the wheel lock function for improved handling characteristics.

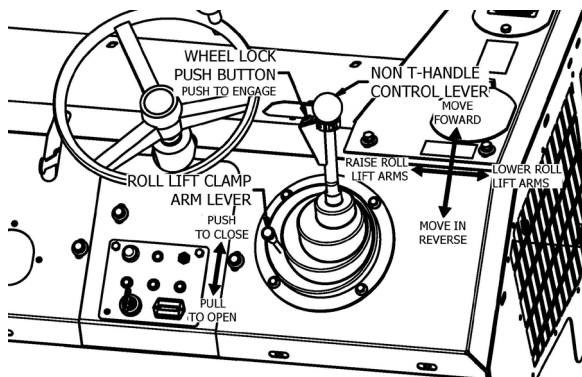


Figure 2. – Non T-Handle – Wheel Lock Push Button

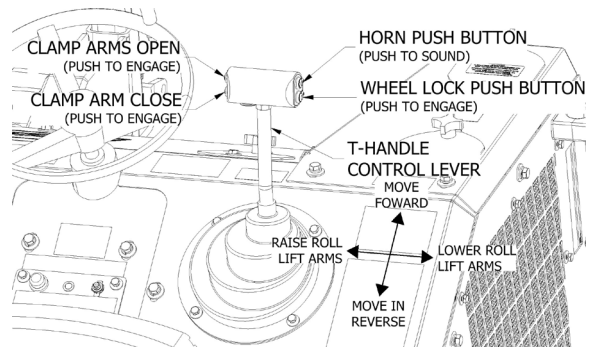


Figure 2.16 – T-Handle – Wheel Lock Push Button

ENGINE THROTTLE

The engine throttle is located to the left of the steering wheel. To increase engine speed push the throttle lever forward. To decrease engine speed pull the throttle back.

PARKING BRAKE LEVER

WARNING: Immediately apply the parking brake if you lose steering control while operating. Inspect the machine and correct the problem before continuing to operate.

WARNING: Start the engine with the operator in the operating position, parking brake engaged, and the control lever in the neutral position.

WARNING: When the operator leaves the operator's platform, turn off the machine, remove the key, and engage the parking brake.

WARNING: Keep the parking brake engaged when the machine is not in operation.

WARNING: Park the machine on level ground with the parking brake engaged. Make all repairs with the machine parked on a level, hard surface. Engage the parking brake and block the machine to prevent it from rolling while working on or under the machine.

The installer is equipped with drum brakes on the steering axle. To apply the parking brake pull back on the parking brake lever. To disengage push the lever forward. See Figure 2.17. When the parking brake is engaged the parking brake

indicator lamp will illuminate. See Figure 2.18. The parking brakes should be applied any time the machine is stopped and dismounted.

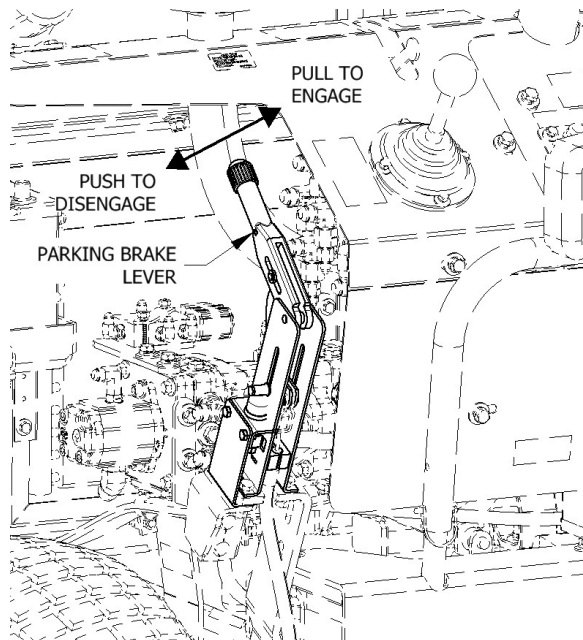


Figure 2.17 – Parking Brake Lever

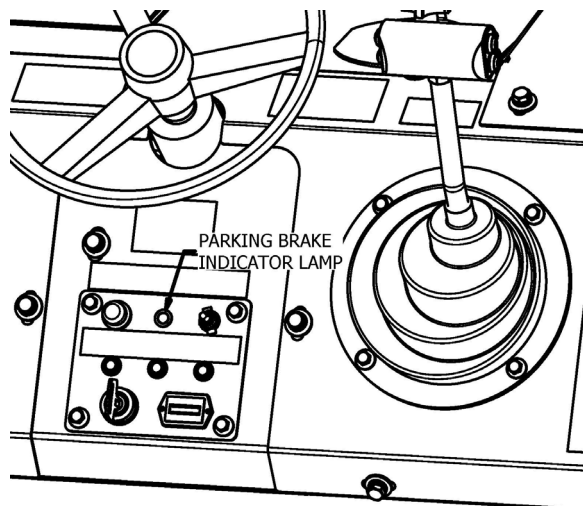


Figure 2.18 – Parking Brake Indicator Lamp

PARKING BRAKE ADJUSTMENT

Inspect the brake shoes once each year for excessive wear or damage. To inspect the shoes, remove the cotter pin and nut that secure the brake drums and remove the drum using a suitable puller.

If necessary, adjust parking brake tension using the knob located on the end of the brake lever. See Figure 2.19.

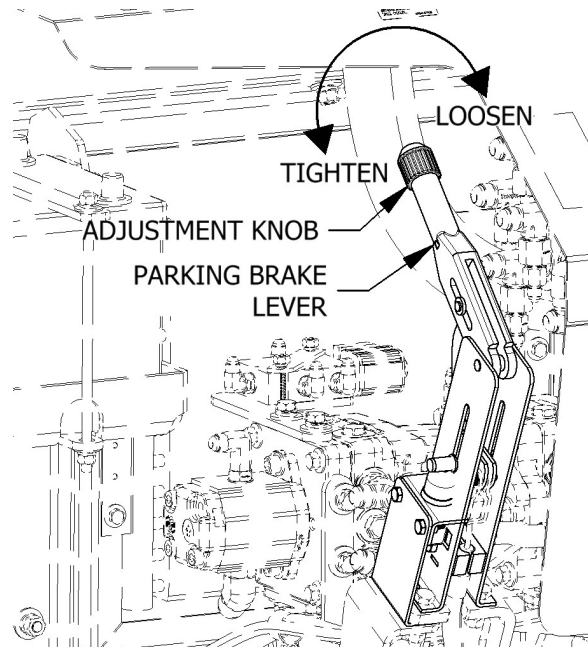


Figure 2.19 – Parking Brake Lever Adjustment Knob

If sufficient tension cannot be obtained (See Figure 2.20):

1. Loosen the adjustment knob to approximately one half of its travel.
2. Remove the wheels from the steering axle.
3. Loosen the front jam nut (Figure 2.20) and adjust the rear nut to move the cable housing rearward. Make sure both brakes are adjusted equally.
4. Securely tighten the jam nuts and check parking brake operation. Perform final adjustment using the knob on the brake lever.

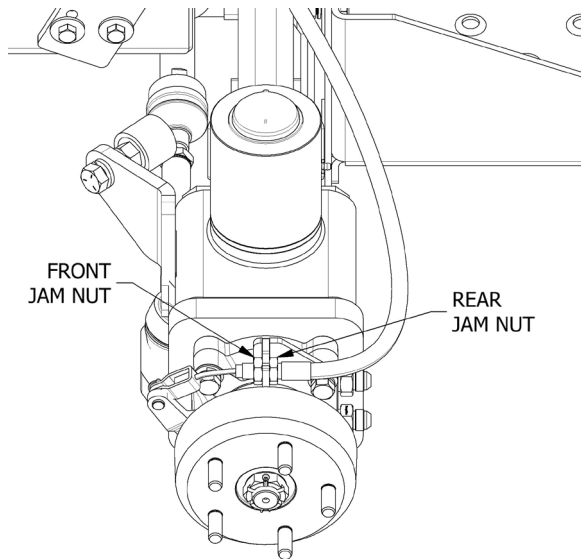


Figure 2.20 – Parking Brake Adjustment at Wheel

ROLL LIFT

WARNING: NEVER get close or within proximity to the sod roll lift while the machine is running. Severe injury, loss of limbs, or death may occur.

WARNING: DO NOT install sod in the reverse direction. ALWAYS check that the area behind the machine is clear of hazards or bystanders before backing up.

WARNING: To avoid tipping keep the load as low as possible.

NOTICE: Avoid equipment damage. DO NOT exceed maximum rated load: 2500 lbs (1134 kg).

The roll lift's primary function is to lift and install big roll sod. The roll lift can also be used to transport sod rolls short distances. The roll lift can be configured to handle varying widths of sod rolls. The most common being 30", 42" and 48" wide rolls. The roll lift functions are operated from the operator's platform using the control lever. See the Control Lever section for details.

ROLL LIFT – SOLID ARMS

The roll lift is available in two different configurations. The standard option is the roll lift with solid arms. The solid arm roll lift utilizes a steel bar to lift the sod roll. To use the solid arms, insert the bar through the sod roll tube.

The installer is maneuvered so that the sod roll is in between the roll lift arms. The arms are then brought up underneath the bar. As the roll lift is raised the bar is set into grooves in each of the solid arms and the sod roll is lifted. See Figure 2.21.

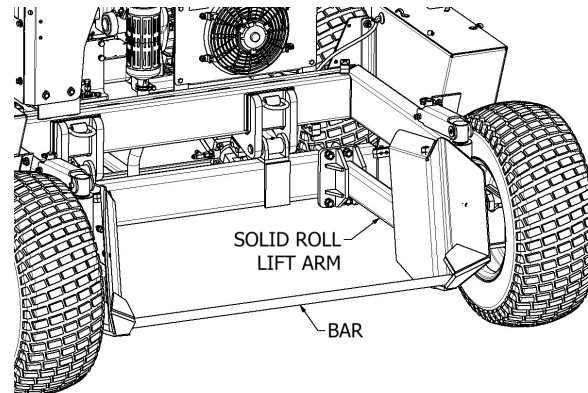


Figure 2.21 – Roll Lift Solid Arm

ROLL LIFT – HYDRAULIC CLAMP ARMS

The second option is the roll lift with hydraulic clamp arms. The hydraulic clamp arm roll lift utilizes two hydraulically actuated clamping arms to clamp and lift the sod roll. To use the hydraulic clamp arms, first open the arms. Maneuvered the installer so the sod roll is centered in between the roll lift arms and align the clamp arm spikes with the sod roll tube. Then close the clamp arms to clamp the sod roll between the roll lift arms. Raise the roll lift to raise the sod roll. Alternatively, if the ends of the sod roll tube are split or damaged the clamp arm bar can be used. To do so, lower the clamp arm bar mounts. Install the bar through the sod roll tube and use the clamp arm bar mounts to lift the sod roll. See Figure 2.22.

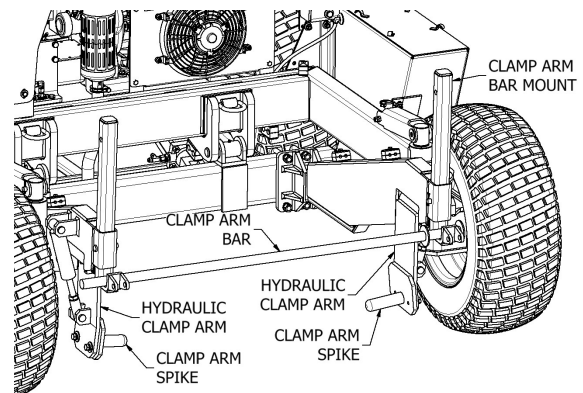


Figure 2.22 – Roll Lift Hydraulic Clamp Arms

ROLL LIFT WIDTH ADJUSTMENT

The roll lift can be configured to handle varying widths of sod rolls. The most common being 30, 42, and 48 inch wide rolls. The arms can be adjusted by loosening the roll lift arm U-bolts and sliding the arms inboard or outboard. Make sure the hydraulic clamp arms are closed before loosening the U-bolts. Having them closed will allow the operator to measure the distance between the clamp arms to ensure they will clamp the roll securely. Normally this measurement is 1 to 1-1/2 inches narrower than the width of the sod roll. Additionally, the clamp arm spacer blocks can be bolted between the clamp arm and clamp arm spike. See Figure 2.23.

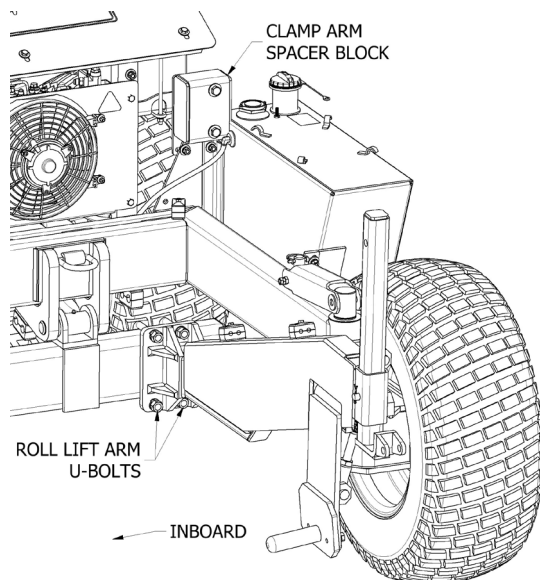


Figure 2.23 – Roll Lift Adjustment

ROLL LIFT - CONVERT 42 INCH TO 30 INCH

To convert the roll lift from 42-inch wide sod rolls to 30-inch wide sod rolls move each arm inboard 3 inches and install the clamp arm spacer blocks.

ROLL LIFT - CONVERT 48 INCH TO 42 INCH

To convert the roll lift from 48 inch wide sod rolls to 42 inch wide sod rolls move each arm inboard 3 inches and install the clamp arm spacer blocks.

ROLL LIFT - CONVERT 48 INCH TO 30 INCH

To convert the roll lift from 48-inch wide sod rolls to 30-inch wide sod rolls move each arm inboard

6 inches and install the clamp arm spacer blocks.

TRANSPORTING, LOADING, OR TOWING THE MACHINE

WARNING: Transport the machine using a truck and/or trailer with the proper load rating. Make certain that the truck and trailer has all of the proper lighting and marking as required by law, codes, and ordinances. Secure a trailer with a safety towing chain.

WARNING: Be cautious when unloading and loading the machine onto trucks or trailers. Use only a full width ramp. **ALWAYS** back onto and drive off a trailer.

WARNING: When transporting the machine, make sure the engine is off and key removed, the control lever is in the neutral position, the parking brake is engaged, and the wheels have been blocked.

WARNING: Tie the machine down securely using the tie down points located on the front and rear of the machine. Secure using straps, chains, cable, or ropes. Both front and rear straps must be directed down and outward from the machine.

WARNING: When loading the installer with a forklift: Read and understand the forklift operator's manual before operating the forklift. Follow all safety precautions outlined by the forklift manufacturer. Be certain that the forklift has the capacity to lift the installer. Also, be sure that the forks are long enough to reach completely under the installer's frame cross member before attempting to lift the installer. Keep bystanders at a safe distance away from the forklift while loading the installer. Serious injury or death may occur.

CAUTION: Do not tow the installer or damage to the hydraulic system will occur. However, if the engine fails to start, the installer can still be moved short distances (at slow speed). To do so, loosen and open the

manual release valves located on the hydrostat. Refer to the Transporting, Loading, and Towing section in Chapter 2 of the manual.

INSTALLER TIE DOWN POINT LOCATION

The installer is equipped with a D-ring on the back side of the machine above the operator's platform and two D-rings on the front side above the roll lift. See Figure 2.24.

Note: Earlier models were not equipped with d-rings on the front side of the machine. Use the second tie down point as indicated in Figure 2.24.

Use these points to attach straps, chains, cable, or ropes to secure the installer.

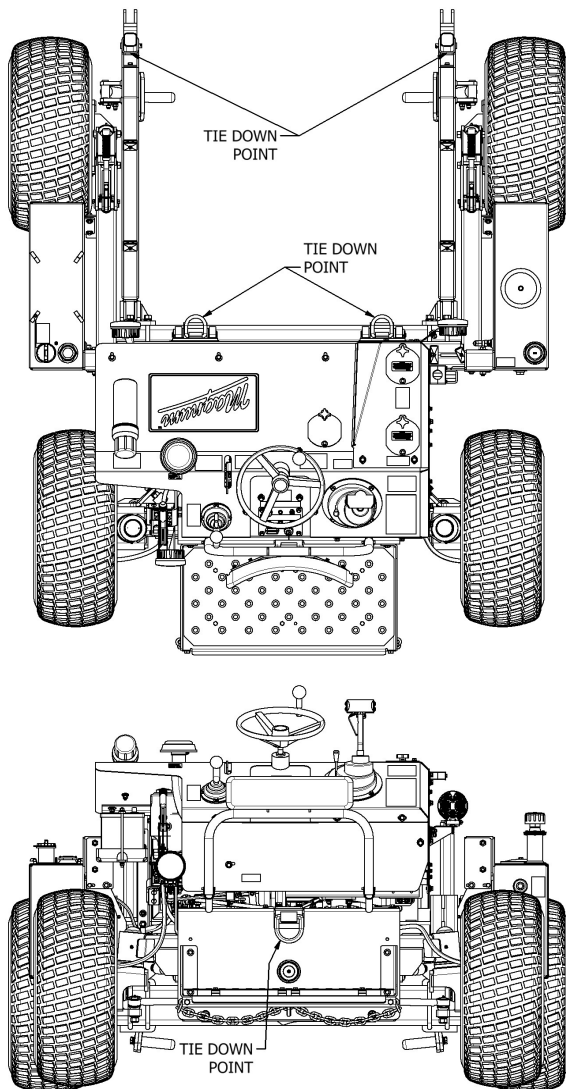


Figure 2.24 – Tie Down Point Location

ROTATING FRONT WHEEL INBOARD FOR TRANSPORT

CAUTION: DO NOT operate the installer in four-wheel drive mode when the front wheels are rotated inboard.

The front wheels of the installer can be rotated inboard of the installer main frame to reduce overall width for loading onto narrow trailers. If the wheels are in the inboard position, the machine can only be operated in two-wheel drive mode. DO NOT operate the machine in four-wheel drive mode while the front wheels are rotated inboard.

To rotate the front wheels inboard begin by releasing the front wheel latch. To release the latch, pull the retaining pin and rotate the latch upward. See Figure 2.25. For earlier models pull the retaining pin and pull the front latch lever backwards to release the hooks. Rotate the hooks upward. See Figure 2.26.

Note: Figures 2.25 and 2.26 show the front left wheel. The procedure to rotate the front right wheel inboard is the same.

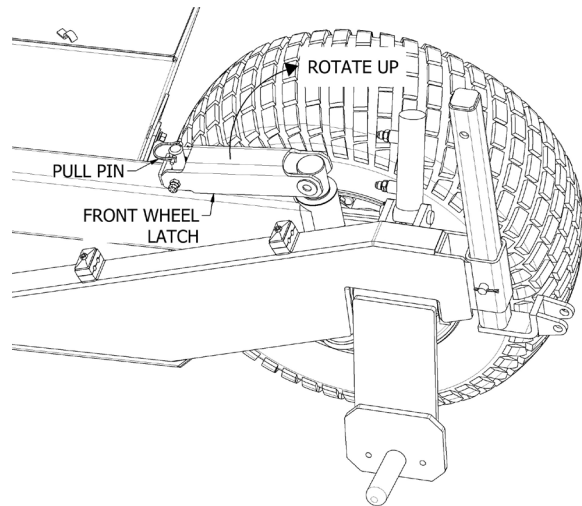


Figure 2.25 – Front Wheel Latch (Later Models)

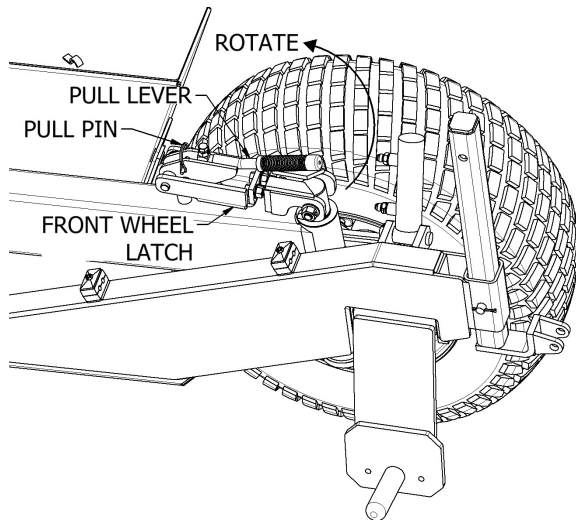


Figure 2.26 – Front Wheel Latch (Earlier Models)

Raise the roll lift arms to the highest position. Remove the front wheel locking bolt. See Figure 2.27.

Notice: The front wheel locking bolt should always remain fastened to the front wheel spindle during all operations. It should only be removed when the front wheels are rotated to the inboard position for transport.

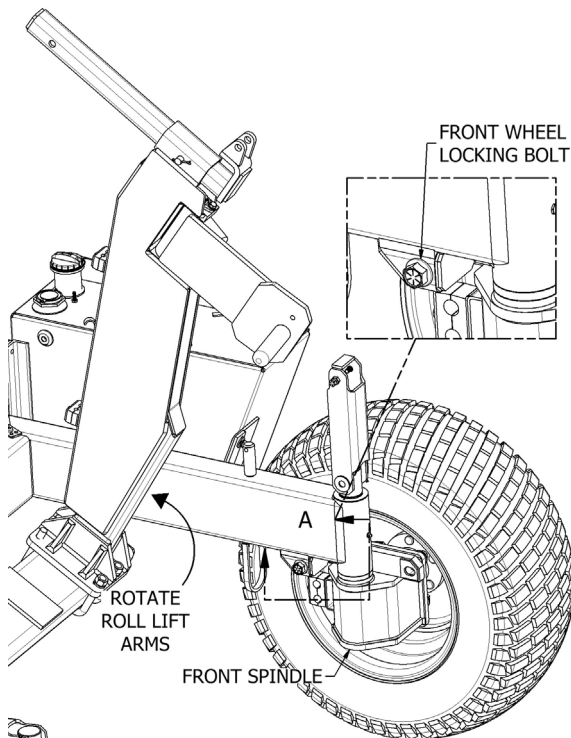


Figure 2.27 – Front Wheel Lock Bolt

Leave the roll lift arms in the raised position. Rotate the wheel to the inboard position. Lower the front wheel latch back into position and reinstall the retaining pin. Finally reinstall the front wheel locking bolt. See Figure 2.28.

CAUTION: DO NOT lower the roll lift while traveling with the front wheels rotated inboard. Damage to the front tires or machine could occur.

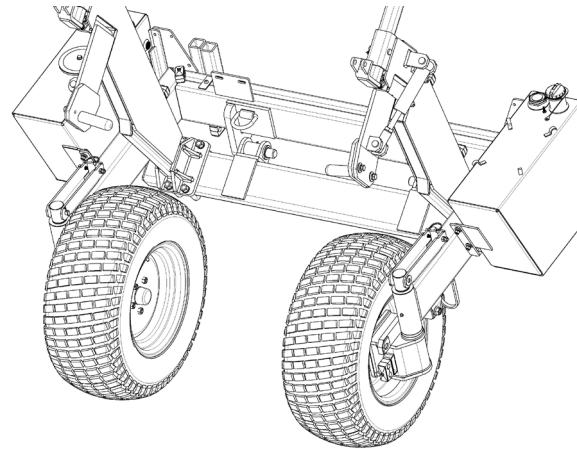


Figure 2.28 – Front Wheels Inboard
LOADING THE INSTALLER WITH FORKLIFT

WARNING: When loading the installer with a forklift: Read and understand the forklift operator's manual before operating the forklift. Follow all safety precautions outlined by the forklift manufacturer. Be certain that the forklift has the proper load capacity to lift the installer. Also, be sure that the forks are long enough to reach completely under the installer's frame cross member before attempting to lift the installer. Keep bystanders at a safe distance away from the forklift while loading the installer. Serious injury or death may occur.

The installer can be loaded onto a truck using a forklift if necessary. Approach the installer from the operator's end.

Make sure the lifting forks are located between the platform and chains shown in Figure 2.29. Check that the forks are below and extend past the front of the frame cross member. See Figure 2.30.

The chains shown in Figure 2.29 are designed to prevent the installer from tipping forward

when lifted with a forklift. **DO NOT** use the chains to secure the installer to a trailer or truck.

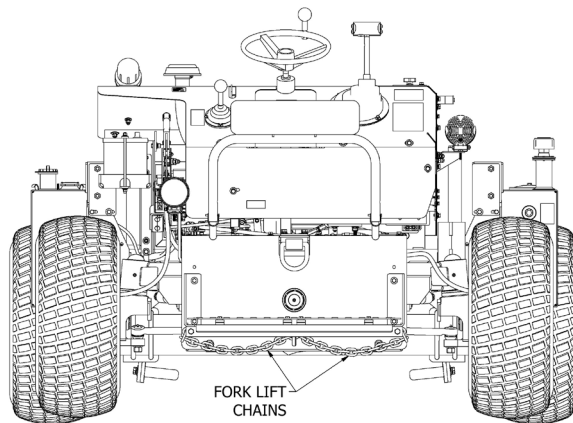


Figure 2.29 – Forklift Chains

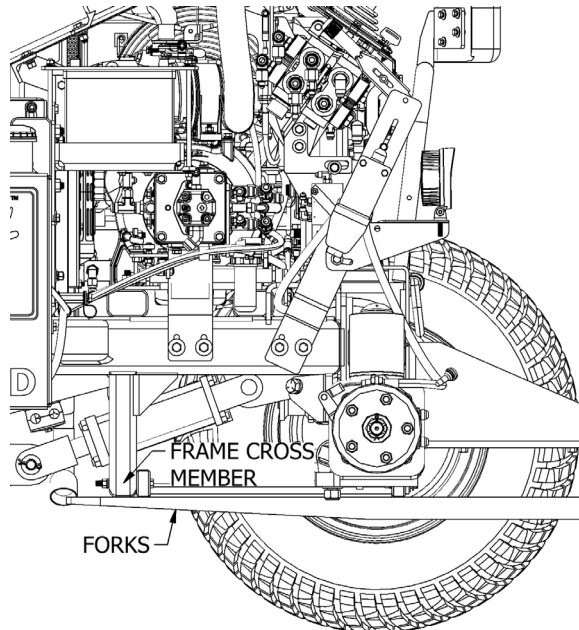


Figure 2.30 – Forks/Frame Cross Member Orientation (Rear left wheel removed for clarity)

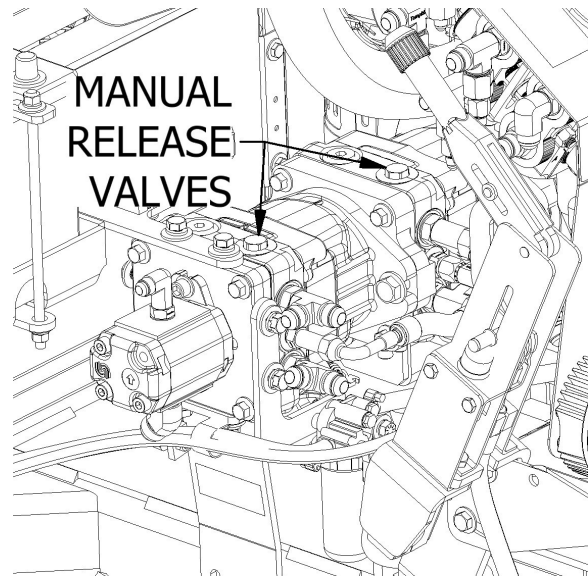


Figure 2.31 – Hydrostat Manual Release Valves

TOWING THE INSTALLER

CAUTION: DO NOT tow the installer or damage to the hydraulic system will occur.

If the engine fails to start, the installer can still be moved **short distances (at slow speed)**. To do so, locate the manual release valves located on the top side of the hydrostat. Loosen and open the valves 1-2 turns. See Figure 2.31. After moving the machine, securely tighten the manual release valves.

CHAPTER 3

ELECTRICAL COMPONENT IDENTIFICATION/OPERATION

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INTRODUCTION

WARNING: To prevent accidental starting of the engine or electrical shock disconnect the battery before starting to work on the machine. Attach a "Do Not Operate" tag in the operator's station.

The installer's electrical system is a 12-volt DC negative ground system. The electrical system provides the operator the necessary power to start the engine and to operate functions such as the wheel lock, roll lift clamp arms (T-handle option only), horn, and lights if the machine is equipped with them.

The electrical system also powers the hydraulic cooling fan and temperature switch.

OPERATION / COMPONENT IDENTIFICATION

BATTERY

WARNING: Batteries generate explosive gasses, especially when charging. Keep sparks, open flames or any other ignition source away from the battery at all times. Always disconnect the negative battery cable from the battery or frame before performing any service to the electrical system or working near the battery. Always wear proper eye protection when working on or near a battery.

WARNING: A charging battery will generate explosive gasses. Charge the battery only in a well-ventilated area, away from sparks, flames or any other source of ignition. Always wear suitable eye protection when working on or around a battery.

CAUTION: ALWAYS disconnect the negative battery cable from the battery before removing any covers, panels or cowlings from the machine.

The battery's main function is to provide electrical power to the machine. The battery is located on the left hand side of the machine. See Figure 3.1.

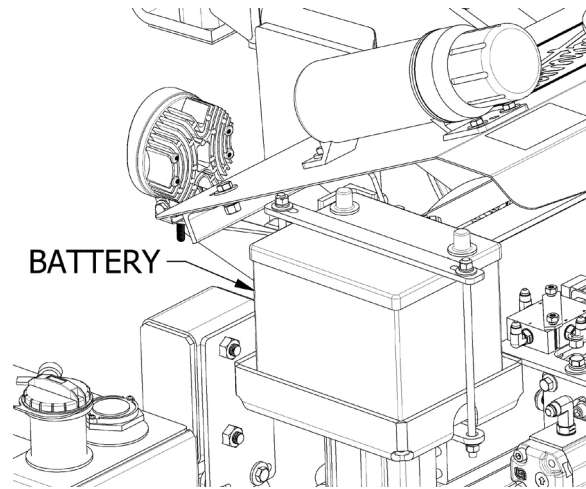


Figure 3.1 – Battery Location

During replacement, install a battery with at least 450 CCA.

Periodically check the electrolyte level in the battery cells if equipped with a serviceable battery. First wipe the top of the battery clean of all dirt and debris to prevent contamination from entering the cells. If necessary, add distilled water to top off electrolyte. Check the battery hold-down clamp for tightness to prevent vibration and movement from damaging the battery case.

Clean the battery case and terminals using a stiff brush and water and baking soda solution. Do not allow the water and baking soda solution to enter the battery cells. The baking soda will seriously weaken the cell. Replace the battery cables if excessive corrosion or damage is evident.

JUMP STARTING

Note: The positive terminal on the battery is designated with a "+" symbol and the negative terminal is designated with a "-" symbol. See Figure 3.2.

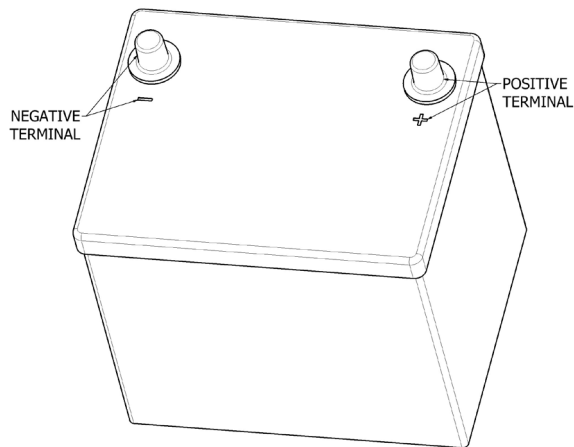


Figure 3.2 – Battery Terminal Identification

To prevent creating a spark that could result in a battery explosion, use the following procedure if jump starting the installer:

1. Attach one booster cable clamp to the positive terminal of the installer battery. Attach the other end of the booster cable to the positive terminal of the source battery.
2. Attach one booster cable clamp to the negative terminal of the source battery and the remaining clamp to a good engine ground on the installer.
3. After starting the installer, disconnect the booster cables in the reverse order of connection.

STARTER

CAUTION: To prevent starter motor damage, do not crank the engine continuously for more than 20 seconds. Allow the starter motor to cool for 30-60 seconds between cranking attempts.

The starter cranks the engine. When the key switch is turned to the start position, power from the battery is applied to the starter solenoid. The solenoid engages the starter drive shaft. The starter drive shaft pushes out and turns the engine flywheel cranking over the engine.

The starter is located on the front side of the engine behind the muffler. See Figure 3.3.

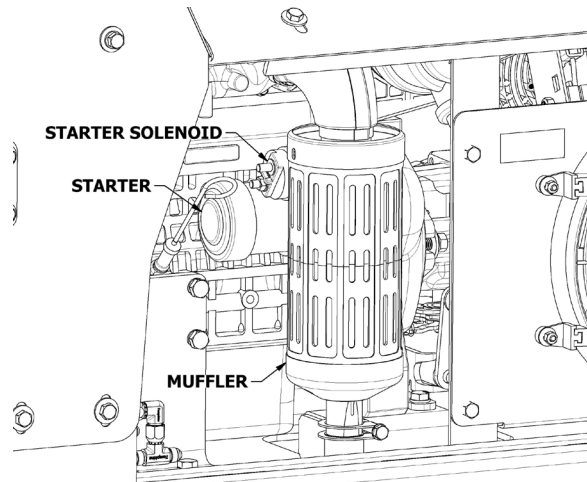


Figure 3.3 – Starter Location

FUSE PANEL / MAIN CIRCUIT BREAKER

CAUTION: ALWAYS disconnect the negative battery cable from the battery before removing any covers, panels or cowling from the machine.

The main circuit breaker provides protection for the entire electrical system. The circuit breaker is a manual reset type; if the breaker trips, manually reset the lever to reset the breaker.

The fuses in the fuse panel provide electrical protection for individual circuits on the machine. For identification of each fuse see Figure 3.6. If a fuse blows, determine the cause of the failure before replacing the fuse.

The fuse panel and main circuit breaker are located behind the machine's rear shield. See Figure 3.4 and 3.5.

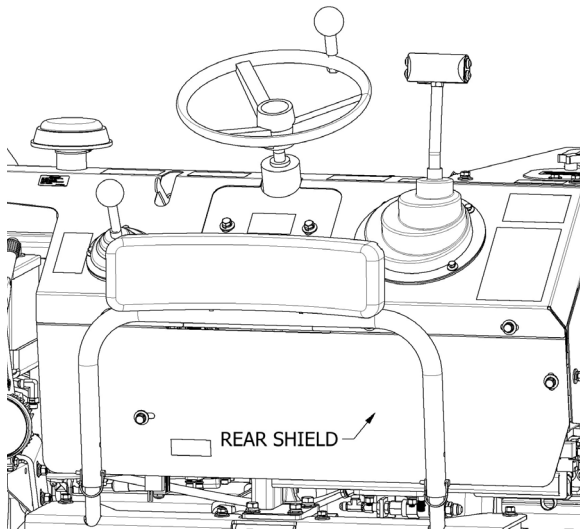


Figure 3.4 – Rear Shield Location

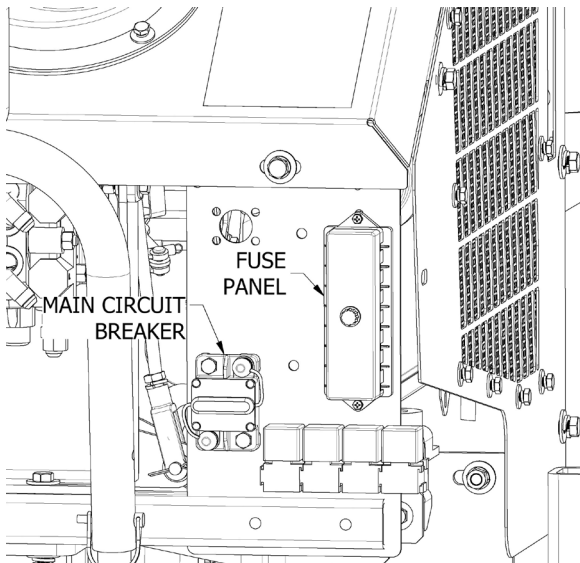


Figure 3.5 – Main Circuit Breaker / Fuse Panel Location

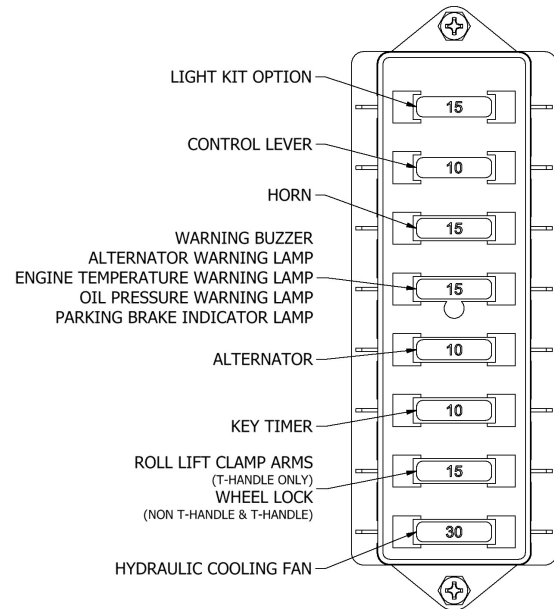


Figure 3.6 – Fuse Identification

ALTERNATOR

The alternator's main function is to charge the battery. The alternator is located on the front side of the engine just above the engine oil filter. See Figure 3.7.

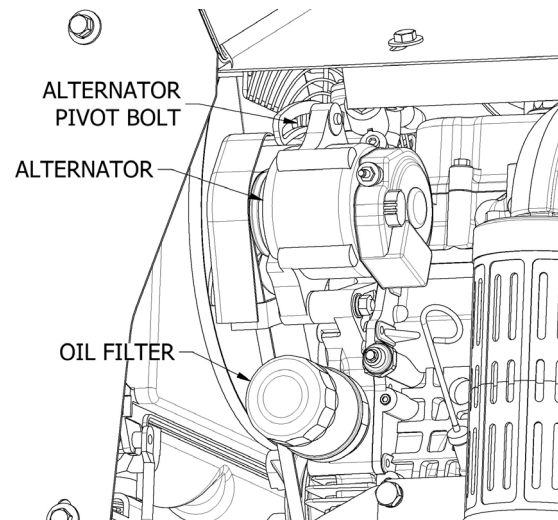


Figure 3.7 – Alternator Location

WARNING: NEVER make adjustments to the machine while the engine is running unless specifically instructed to do so. If the engine is running keep hands, feet, body parts, and clothing away from moving parts. Serious injury or death may occur.

WARNING: To prevent accidental starting of the engine or electrical shock disconnect the battery before starting to work on the machine. Attach a "Do Not Operate" tag in the operator's station.

Inspect the fan/alternator drive belt after each 50 hours of operation. Replace the belt if cracked or frayed.

Check belt tension by applying moderate finger pressure at a point midway between the alternator pulley and crankshaft pulley. The belt should deflect approximately $\frac{1}{4}$ to $\frac{3}{8}$ in. (7-9 mm).

If belt adjustment is necessary, loosen the alternator pivot bolt (Figure 3.7) and pivot the alternator as necessary to adjust the belt.

WARNING SYSTEM

The installer is equipped with an engine temperature, engine oil pressure, and alternator (charging system) warning system.

A warning lamp and buzzer will activate if the engine overheats, if the oil pressure drops below a predetermined value or the charging system fails.

The warning buzzer and two outer lamps activate when the key switch is in the preheat position.

The warning lamps are located on the control panel above the key switch. See Figure 3.8.

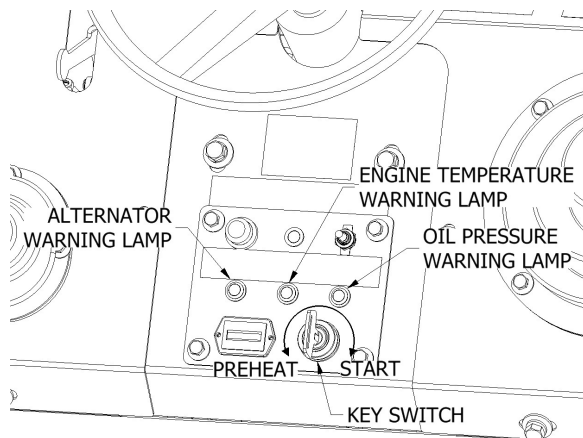


Figure 3.8 – Key Switch and Warning Lamps

The warning buzzer is located behind the rear shield above the main circuit breaker. See Figure 3.9.

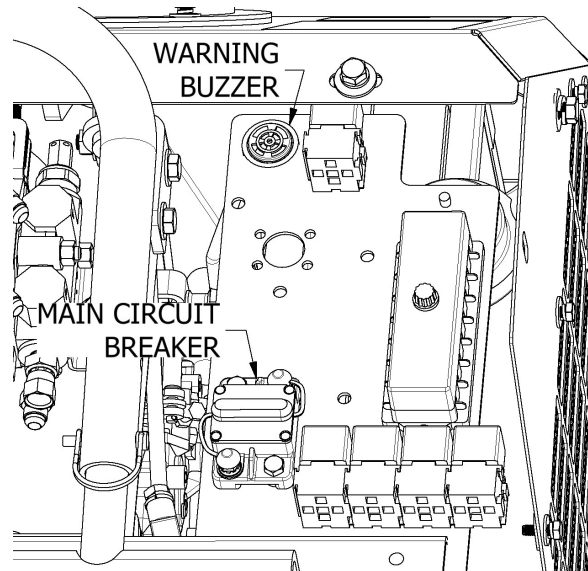


Figure 3.9 – Warning Buzzer Location

The parking brake is equipped with an indicator lamp. When the parking brake is engaged it activates the parking brake switch, which then illuminates the parking brake indicator lamp. The parking brake switch is located on the side of the parking brake lever. See Figure 3.10. The parking brake indicator lamp is located at the top of the control panel. See Figure 3.11.

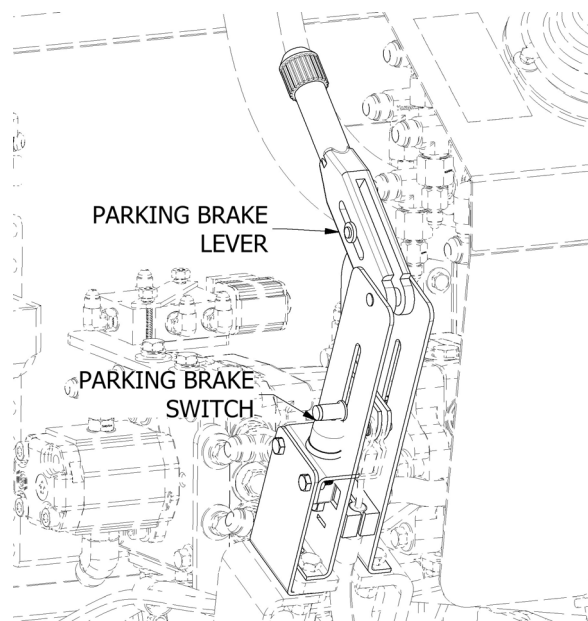


Figure – 3.10 – Parking Brake Switch Location

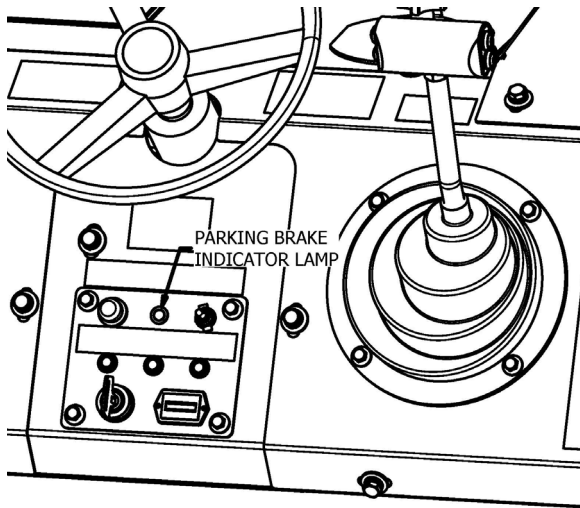


Figure 3.11 – Parking Brake Indicator Lamp

CONTROL LEVER – PUSH BUTTONS AND RELAYS

The pushbuttons on the control lever activate relays located behind the rear shield. When the relay is activated it sends power to the corresponding electronic device.

The non T-handle has only one push button that operates the wheel lock function. The push button is located on the control lever beneath the control lever knob. See Figure 3.12. The wheel lock relay is located behind the rear shield beneath the fuse panel. See Figure 3.13.

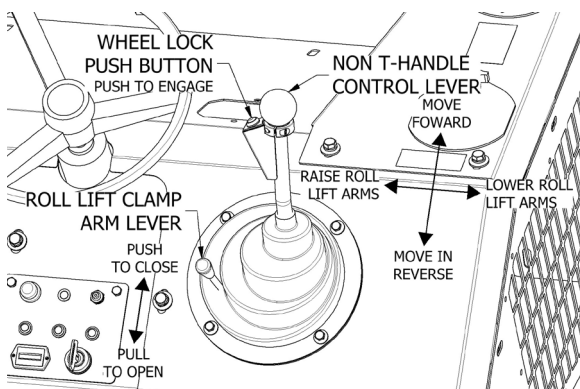


Figure 3.13 – Non T-Handle Wheel Lock Push Button

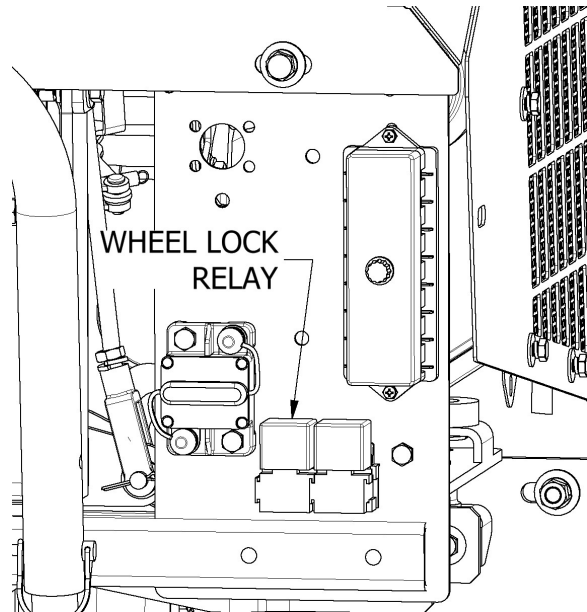


Figure 3.14 – Non T-Handle Wheel Lock Relay

The T-handle has four push buttons that operate the roll lift clamp arms open and close, horn, and wheel lock function. The push buttons are located on the sides of the control lever handle. See Figure 3.14. The wheel lock relay is located behind the rear shield beneath the fuse panel. See Figure 3.15.

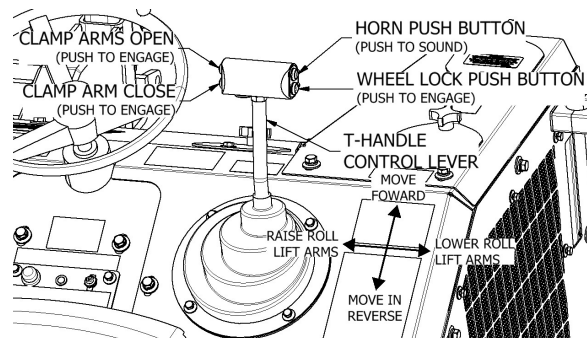


Figure 3.14 – T-Handle Push Buttons

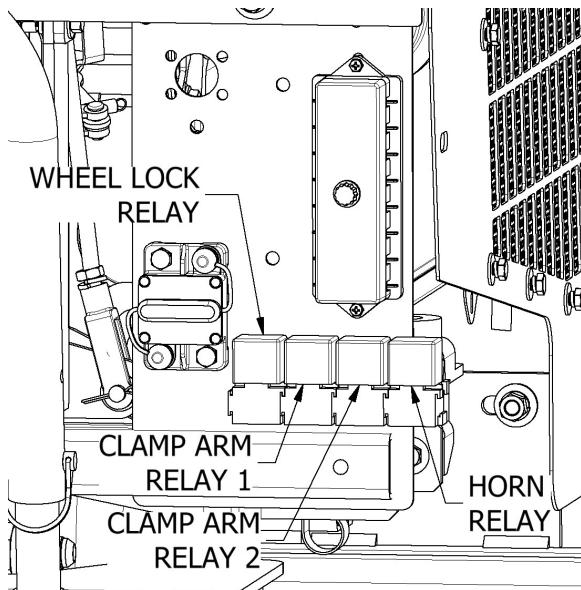


Figure 3.15 – T-Handle Push Button Relays

WHEEL LOCK AND ROLL LIFT CLAMP ARM SOLENOIDS

When the wheel lock and clamp arm relays are activated by the pushbuttons, power is sent from the relay to the wheel lock and clamp arm valve solenoids. When either solenoid is energized it shuttles the spool in the hydraulic valve to operate the wheel lock and clamp arms.

Note: The clamp arm valve is operated through solenoids only on machines with the T-Handle option. On machines with the non T-handle the clamp arm valve is operated with a manual lever.

The wheel lock solenoid is located on the left side of the machine above the hydrostat. See Figure 3.16. On earlier models it located behind the rear shield below the 2WD/4WD valve. See Figure 3.17.

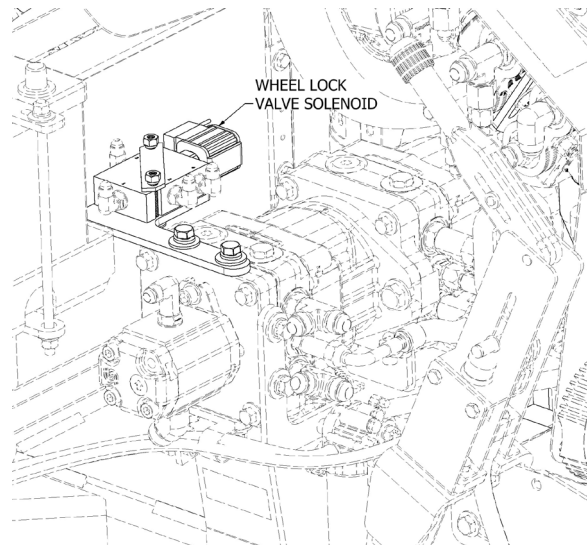


Figure 3.16 – Wheel Lock Valve Solenoid

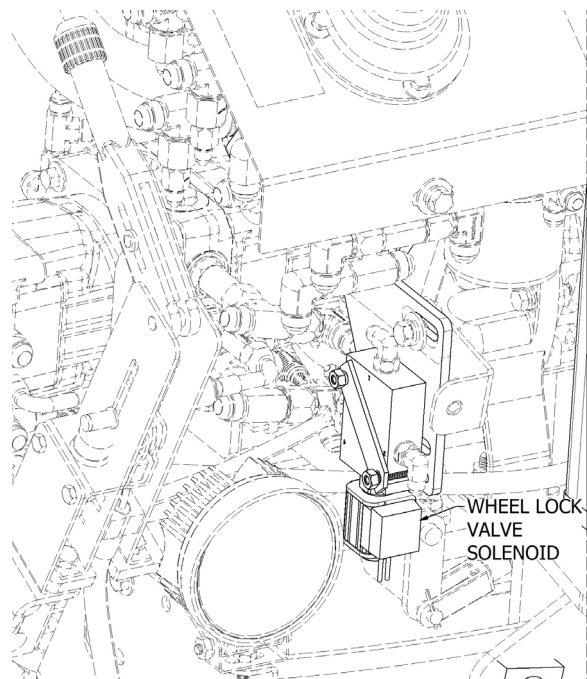


Figure 3.17 – Wheel Lock Valve Solenoid, Earlier Models

HORN, PUSH BUTTON, AND RELAY

The horn is used by the operator as an audible signal to alert bystanders in the work area of the machine's approach or presence, or to call attention to some hazard.

The horn is operated by a push button and relay. When the push button activates the relay it sends power to the horn.

For machines with the T-handle option the horn push button is located on the control lever. See Figure 3.18. The horn relay is located behind the rear shield beneath the fuse panel. See Figure 3.19.

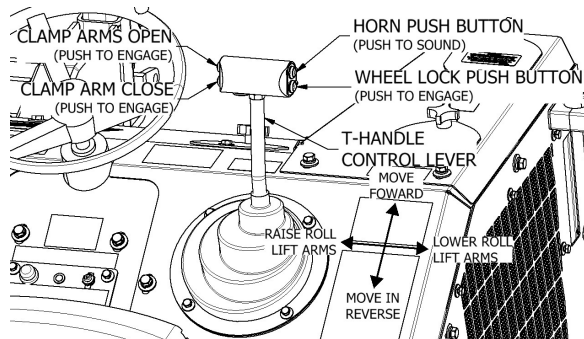


Figure 3.18 – T-Handle Horn Push Button

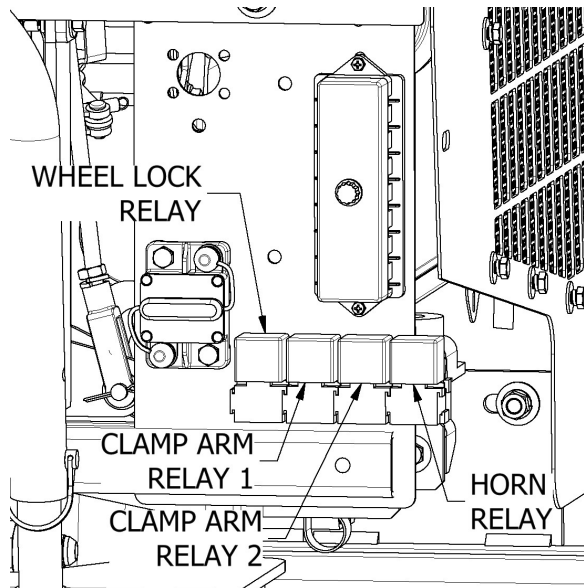


Figure 3.19 – T-Handle Horn Push Button Relay

For machines with the non T-handle option the horn push button is located on the control panel above the alternator warning lamp. See Figure 3.20. The horn relay is located behind the rear shield beneath the fuse panel. See Figure 3.21.

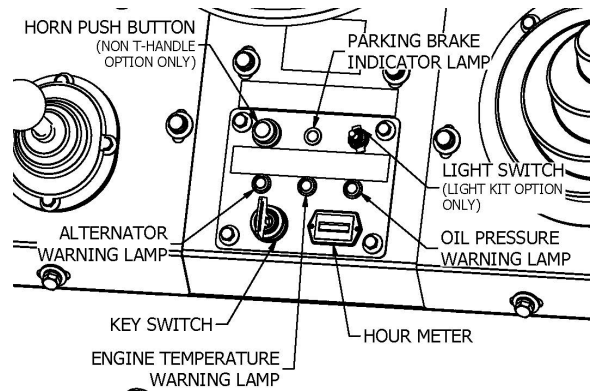


Figure 3.20 – Non T-handle Horn Push Button

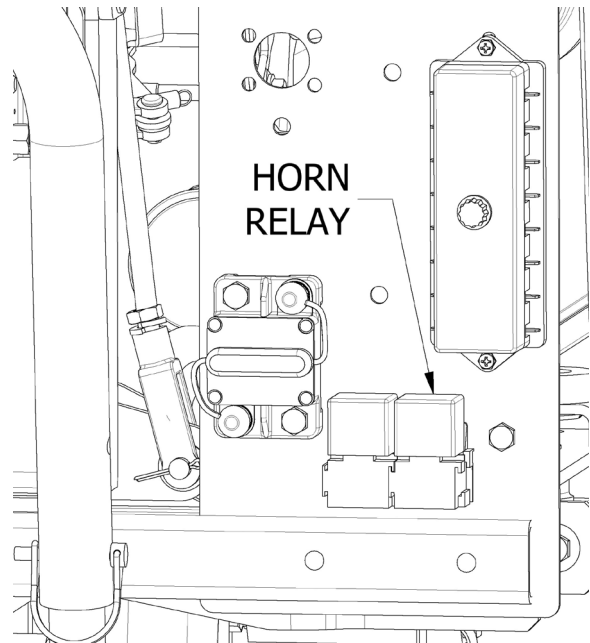


Figure 3.21 – Non T-handle Horn Relay

The horn is located behind the right side shield on the back side of the electrical panel. See Figure 3.22.

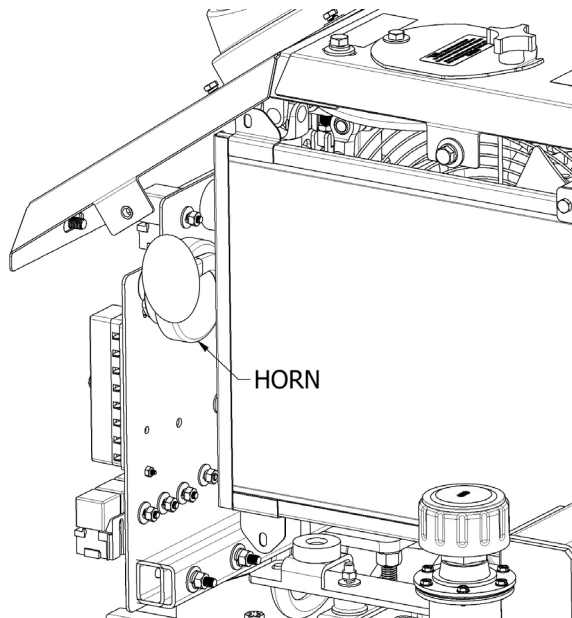


Figure 3.22 – Horn Location

HYDRAULIC COOLING FAN AND TEMPERATURE SWITCH

The hydraulic cooling fan cools the hydraulic system. As the hydraulic fluid passes through the hydraulic cooler the fan draws air through cooler lowering the temperature of the fluid.

The fan is operator by a temperature switch. The temperature switch turns the fan on when the hydraulic fluid reaches a certain temperature.

The hydraulic cooling fan and temperature switch are located on the front side of the machine. See Figure 3.23.

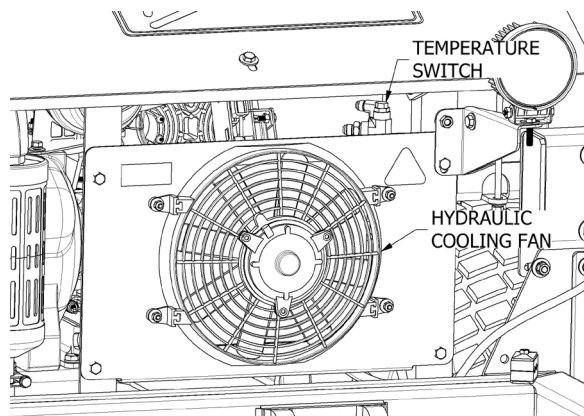


Figure 3.23 – Hydraulic Cooling Fan and Temperature Switch

LIGHT KIT OPTION

Lights are available as an option. The lights are operated by a toggle switch and relay. The toggle switch activates the relay. When the relay is activated it sends power to the lights. The light switch is located on the control panel above the oil pressure warning lamp. See Figure 3.24. The relay is located at the top of the electrical panel behind the rear shield. See Figure 3.25.

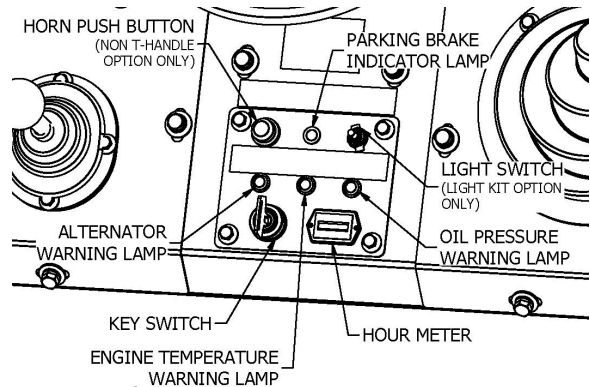


Figure 3.24 – Light Switch

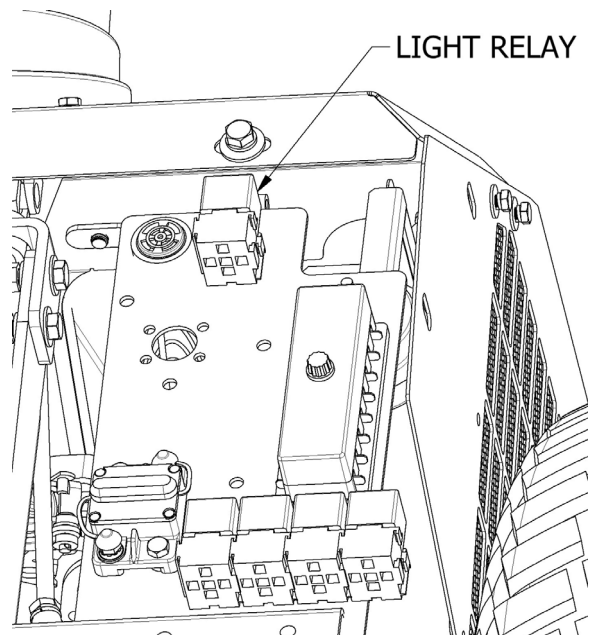


Figure 3.25 – Lights Relay

The lights are mounted to the machine with mounting brackets. There are two lights on the front of the machine and one at the rear left side of the machine. See Figures 3.26 and 3.27.

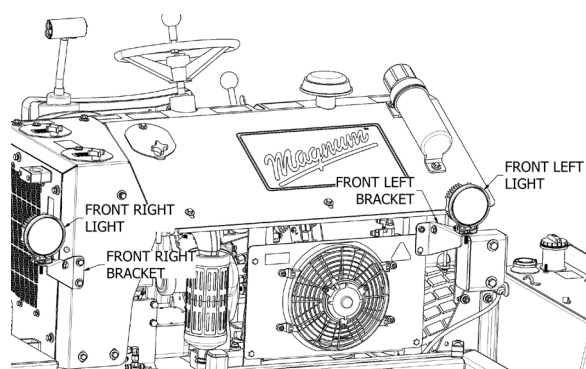


Figure 3.26 – Front Lights and Brackets

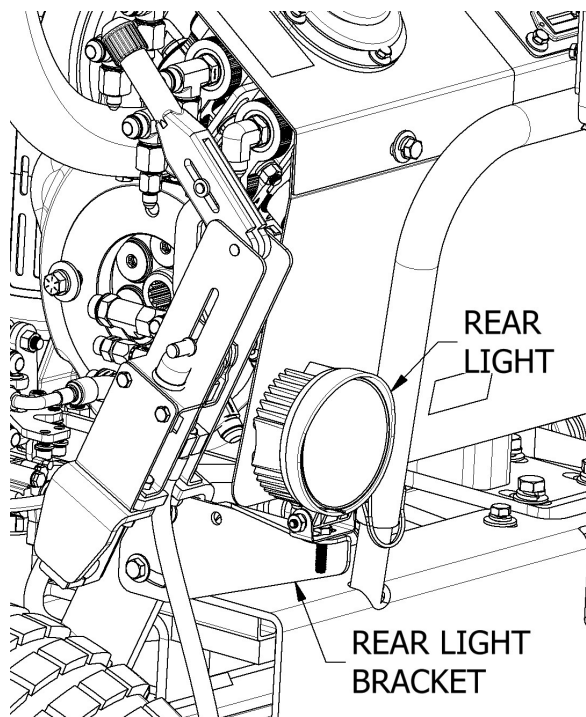


Figure 3.27 – Rear Light and Bracket

CHAPTER 4

HYDRAULICS
COMPONENT IDENTIFICATION / OPERATION

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INTRODUCTION

CAUTION: Thoroughly read Chapter 1 before performing any operations or procedures in this chapter. Important safety and operating information is covered in this section of the book. Failure to read and comply with these important messages could result in injury or death.

WARNING: Hydraulic oil escaping under pressure can penetrate skin causing serious injury. Keep body and hands away from pin holes or leaks that eject hydraulic fluid under pressure. Use cardboard or paper to search for leaks. Be sure the machine is OFF and relieve all pressure from the hydraulic system before disconnecting any hydraulic lines, fitting, or servicing any hydraulic components.

WARNING: Never service the machine while running. Unexpected engagement of the hydraulic system could cause your hands, arms, fingers, feet, legs, and/or clothing to become caught up in moving parts, resulting in injury or loss of body parts.

WARNING: Check the machine daily before use. Check all nuts and bolts for tightness. Check all hydraulic connections for tightness. Look for dirty hydraulic connections. A leaky connection will attract dirt and dust. Tighten all loose connections and replace leaky hoses or lines. Failure to perform basic inspections could result in machine failure or personal injury.

WARNING: Hydraulic fluid can be flammable and could cause serious injury or death.

IMPORTANT: HYDRAULIC WARM UP 10 MINUTES.

The installer's hydraulic system powers the machines propel, roll lift, and steering functions.

Hydraulic fluid is provided to all three of these functions from the machine's hydraulic tank.

The propel circuit consists of the 2WD/4WD valve, the wheel lock valve, the tandem hydrostat, and drive motors.

The roll lift circuit consists of the roll lift valve, roll lift cylinders, clamp arm cylinders (only on

machines equipped with the clamp arm option), and auxiliary pump.

The steering function consists of the steering valve, steering cylinder, steering relief valve, and the steering pump.

OPERATION / COMPONENT IDENTIFICATION

HYDRAULIC TANK

The hydraulic tank is located on the right hand side of the machine. See Figure 4.1. The tank holds the hydraulic fluid. The tank is filled with fluid through the fill cap. Fluid level is checked at the sight glass. See Figure 4.1. The fluid level should be even with the middle of the sight glass. The inside of the tank can be inspected or cleaned by removing the access cover located on the top side of the tank. See Figure 4.1. The fluid can be drained by removing the drain plug located on the bottom side of the tank. See Figure 4.2.

The hydraulic tank is equipped with an in-tank strainer. The in-tank strainer mounts inside the hydraulic tank. The strainer prevents contaminants from entering the hydraulic system. See Figure 4.2.

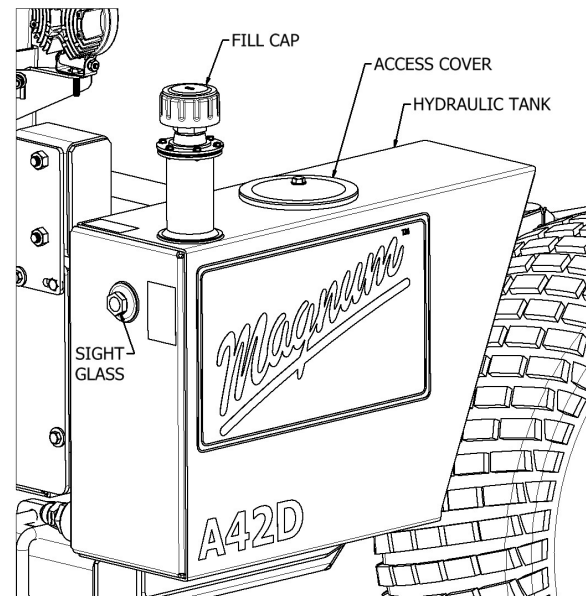


Figure 4.1 – Hydraulic Tank

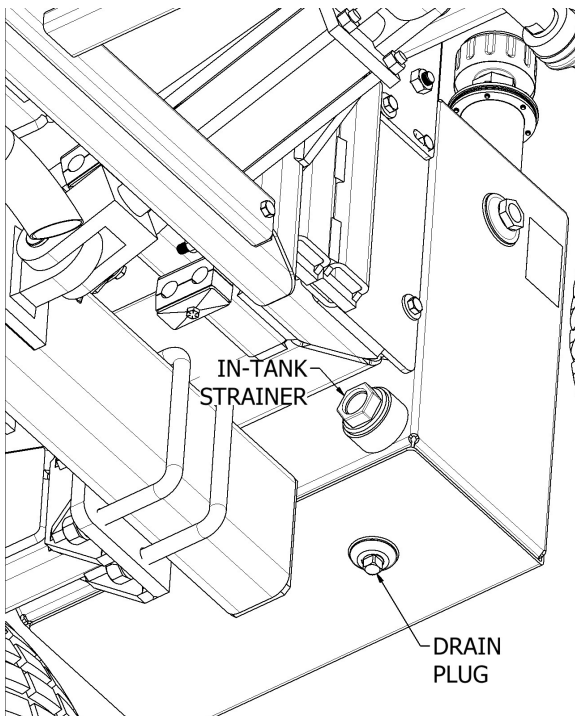


Figure 4.2 – Hydraulic Tank Drain Plug and In-Tank Strainer

CAUTION: DO NOT dispose of used oil by placing it in the trash, or by pouring it onto the ground, into sewers, or into any body of water. Follow local and federal regulations when disposing of used oil.

HYDRAULIC FILTER

The hydraulic filter is located behind the rear shield. See Figure 4.3.

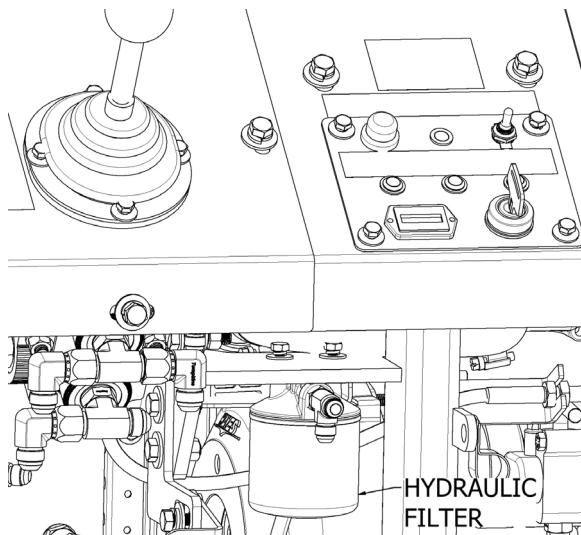


Figure 4.3 – Hydraulic Filter

The hydraulic filter removes contaminants from the hydraulic system. The filter should be changed after the initial 50 hours of operation and every 500 hours thereafter, or if the hydraulic oil has been over heated or is contaminated.

HYDRAULIC COOLER

The hydraulic cooler is located behind the hydraulic cooling fan to the front of the hydrostat. See Figure 4.4.

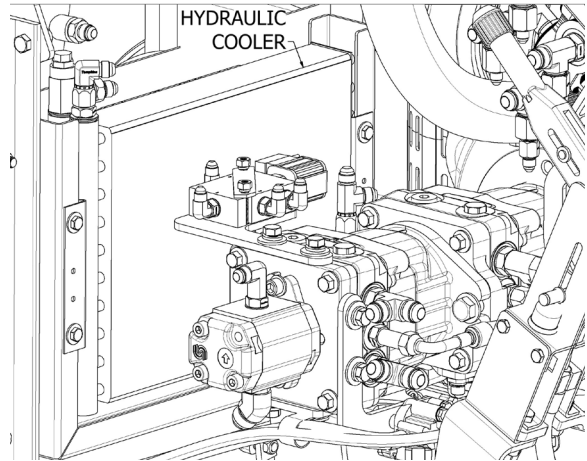


Figure 4.4 – Hydraulic Cooler

The hydraulic cooler dissipates heats from the hydraulic fluid in the system. As the hydraulic fluid heats up the hydraulic temperature switch turns on the hydraulic cooling fan (See Chapter 3). The fan pulls air through the cooler. The hydraulic fluid is then cooled as it passes through the cooler.

PROPEL CIRCUIT

HYDROSTAT AND AUXILIARY PUMP

The hydrostat and auxiliary pump are located under the main shield to the left of the engine. See Figure 4.5.

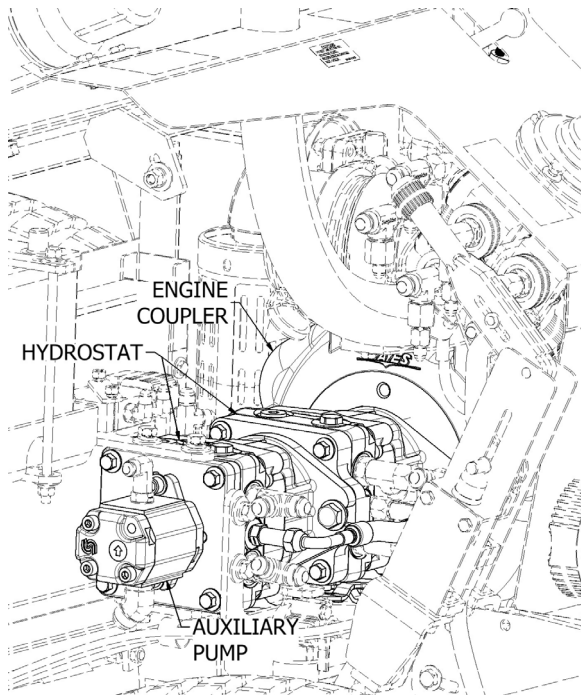


Figure 4.5 – Hydrostat and Auxiliary Pump

The hydrostat is made up of two sections. The hydrostat receives power from the engine through the engine coupler. See Figure 4.5. When the hydrostat is engaged from the control lever, hydraulic fluid is sent from the hydrostat through the 2WD/4WD valves to the drive motors, propelling the machine forward or backward.

The auxiliary pump provides charge pressure to the hydrostat and fluid to the roll lift valve for the roll lift functions.

2WD/4WD VALVES

The 2WD/4WD valves are located under the main shield. See Figure 4.6.

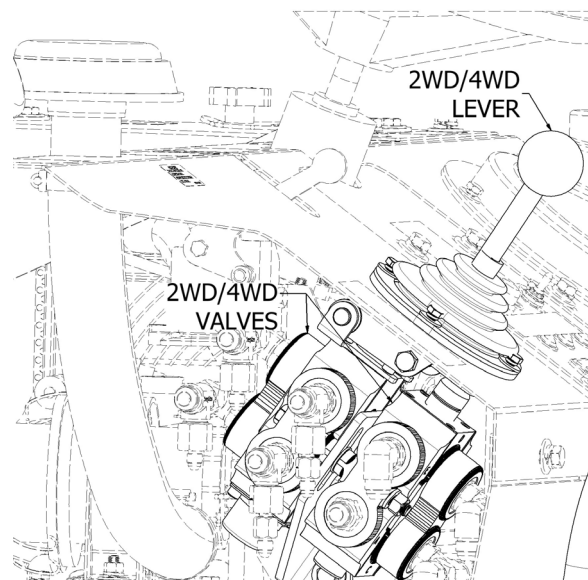


Figure 4.6 – 2WD/4WD Valves

The valves are actuated in tandem by the 2WD/4WD lever.

The valve controls flow of hydraulic fluid from the hydrostat to allow the machine to be either operated in two-wheel drive (2WD) mode or four-wheel drive (4WD) mode. In two-wheel drive mode flow from the hydrostat is diverted to both rear wheel motors. In four-wheel drive mode flow from the hydrostat is diverted to both the front and rear wheel motors.

WHEEL LOCK VALVE

CAUTION: To prevent generating excessive heat in the hydraulic system and possible hydraulic system damage, apply the wheel lock function only when necessary for additional traction. **ALWAYS** disengage the wheel lock function when ground conditions improve or when additional traction is unnecessary.

The wheel lock valve is located on the left side of the machine above the hydrostat. See Figure 4.7. On earlier models it located behind the rear shield below the 2WD/4WD valve. See Figure 4.8.

The valve should only be operated while the machine is in four-wheel drive mode. When the valve is engaged flow from the hydrostat is divided. One section of the hydrostat powers the rear wheels and the other section powers the front wheels. The valve is actuated by the pushbutton on the control lever.

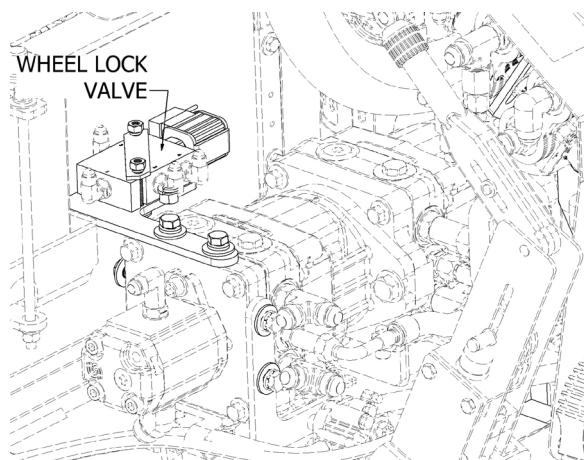


Figure 4.7 – Wheel Lock Valve

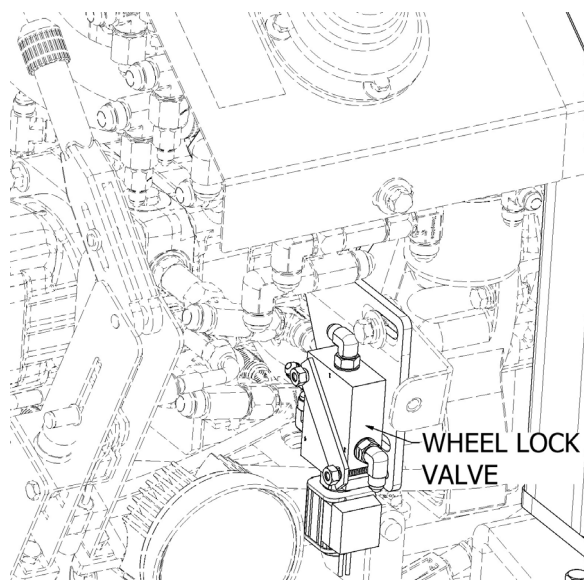


Figure 4.8 – Wheel Lock Valve, Earlier Models

WHEEL MOTORS

There are four wheel motors, one located at each wheel. See Figure 4.9. The wheel motors receive hydraulic fluid from the hydrostat. The fluid turns the motor and wheel to propel the machine forward or backward.

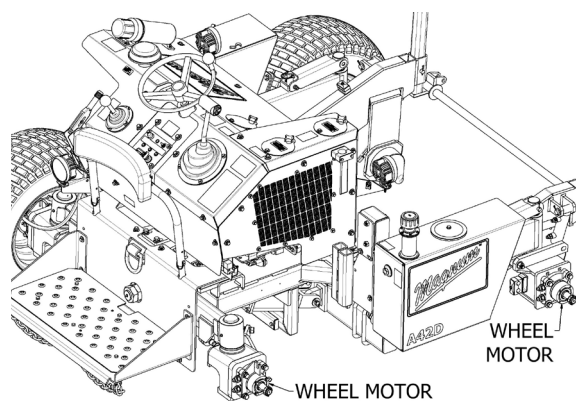


Figure 4.9 – Wheel Motors (Wheels removed for clarity)

ROLL LIFT CIRCUIT

ROLL LIFT CONTROL VALVE

The roll lift control valve is located behind the rear shield. There are two versions of the roll lift control valve. The first is for the standard option or non T-handle option. See Figure 4.10. The second version is for the T-Handle option. See Figure 4.11.

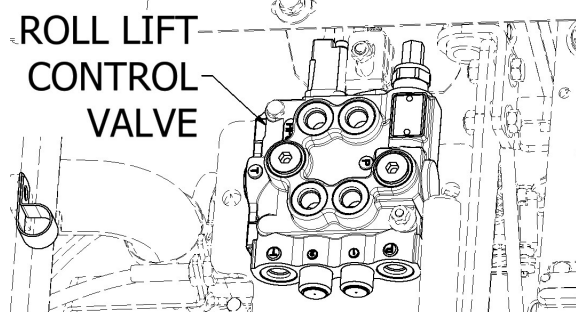
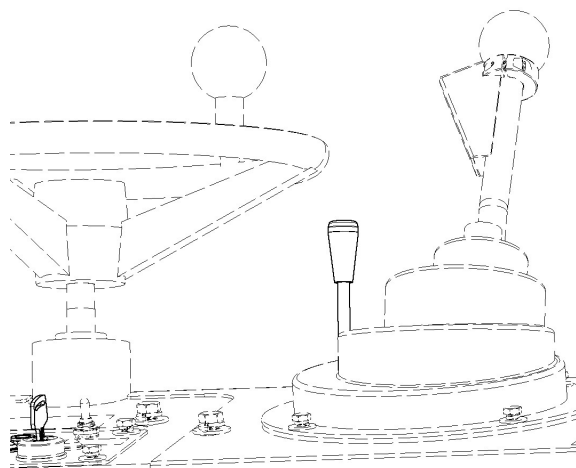


Figure 4.10 – Roll Lift Control Valve – Non T-Handle

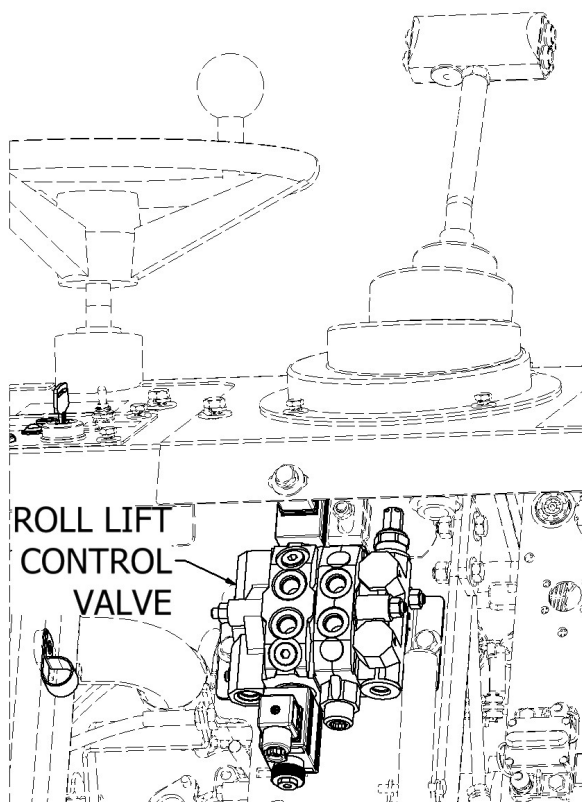


Figure 4.11 – Roll Lift Control Valve – T-Handle

The roll lift control valve receives hydraulic fluid from the auxiliary pump. It directs the fluid to the roll lift cylinders to raise and lower the machine's roll lift. It also directs fluid to the roll lift hydraulic clamp arm cylinders to open and close the clamp arms.

ROLL LIFT CYLINDERS

The roll lift cylinders are located on the underside of the machine. They are connected to the machine's main frame and the roll lift. See Figure 4.12.

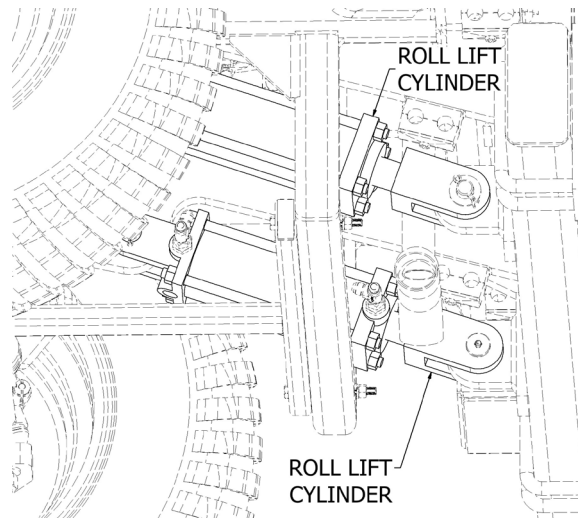


Figure 4.12 – Roll Lift Cylinders

The roll lift cylinder receive hydraulic fluid from the roll lift control valve. The cylinders raise and lower the machine's roll lift.

HYDRAULIC CLAMP ARM CYLINDERS

The hydraulic clamp arm cylinders are located on the outside of the roll lift arm. They are connected to the roll lift arms and hydraulic clamp arms. See Figure 4.13.

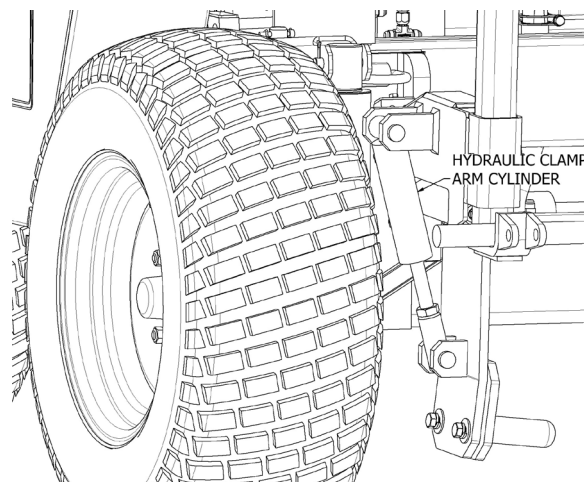


Figure 4.13 – Hydraulic Clamp Arm Cylinders

The hydraulic clamp arm cylinders receive hydraulic fluid from the roll lift control valve. The cylinders open and close the hydraulic clamp arms.

HYDRAULIC CLAMP ARM LOAD CHECK VALVE

The hydraulic clamp arm load check valve is located on the right side of the machine in front of the engine. See Figure 4.14.

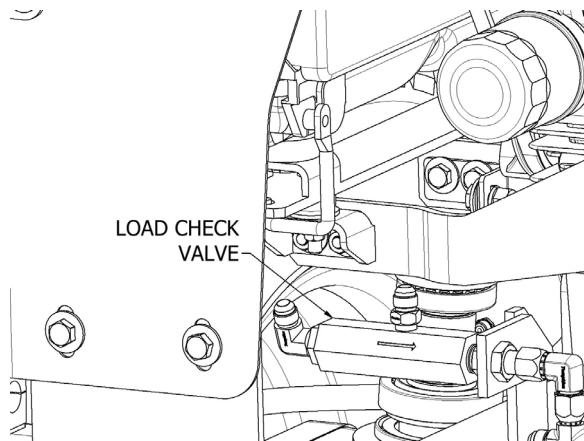


Figure 4.14 – Load Check Valve

The load check valve prevents the hydraulic clamp arms from opening when under load. It does this by preventing the hydraulic fluid in the cylinder from back feeding through the system. When the clamp arms are opened a pilot signal is sent to the load check valve. The valve then opens allowing the clamp arm cylinders to retract and the clamp arms to open.

STEERING CIRCUIT

STEERING VALVE

The steering wheel is attached to the steering valve. See Figure 4.15.

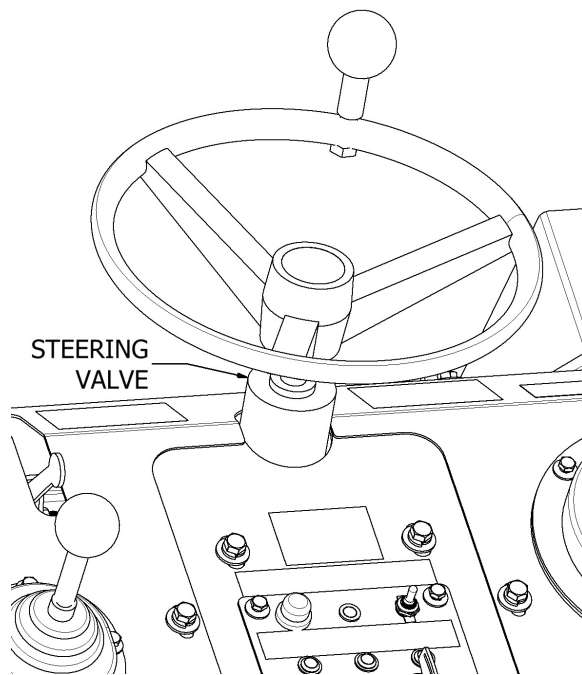


Figure 4.15 – Steering Valve

The steering valve receives hydraulic fluid from the steering pump. As the steering wheel is turned the valve is actuated. It then directs the flow of the hydraulic fluid through the steering relief valve to the steering cylinder, turning the machine left or right.

STEERING PUMP

The steering pump is located on the rear side of the engine behind the roll lift control valve. See Figure 4.16.

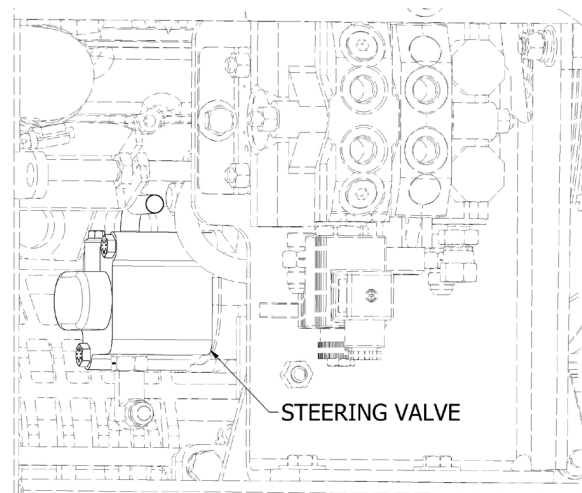


Figure 4.16 – Steering Pump

The steering pump receives hydraulic fluid from the hydraulic tank. It supplies fluid for the steering system.

STEERING RELIEF VALVE

The steering relief valve is located on the underside of the machine above the steering cylinder. See Figure 4.17.

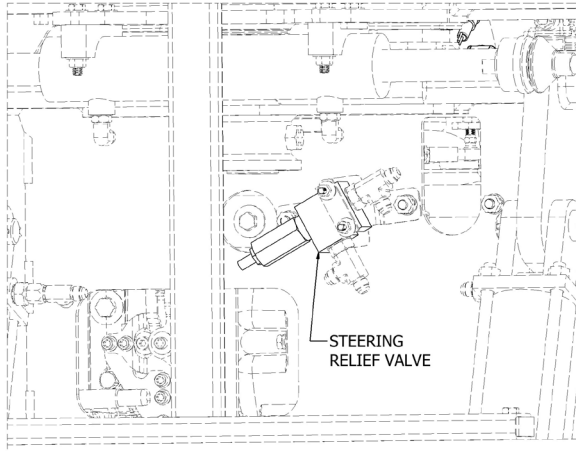


Figure 4.17 – Steering Relief Valve

The steering relief valve regulates the hydraulic fluid pressure to the cylinder.

STEERING CYLINDER

The steering cylinder is attached to the steering axle on the underside of the machine. See Figure 4.18.

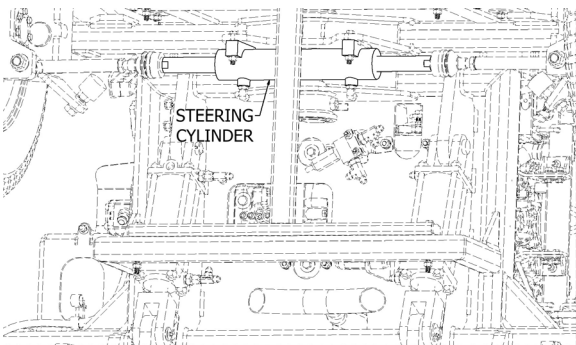


Figure 4.18 – Steering Cylinder

CHAPTER 5

MAINTENANCE

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MAINTENANCE SCHEDULE

See Page	Item	Service Frequency
5.3	Hydraulic Tank Fluid Level	Check every 10 hours of service.
5.4	Hydraulic Fluid	Change after initial 50 hours of operation. Change every 500 hours.
5.4	Hydraulic In-Tank Strainer	Check after initial 50 hours of operation. Change every 500 hours.
5.4	Hydraulic Filter	Change after initial 50 hours of operation. Change every 250 hours.
5.4	Hydraulic Hoses	Check every 10 hours of operation. Look for leaks, cracks, or possible worn hoses. (See Chapter 1 for safety notes.)
5.5	Hydraulic Cooler/Cooling Fan	Check every 10 hours of service.
5.6	Engine Oil Filter	Change after initial 50 hours of operation. Change every 100 hours.
5.6	Engine Oil	Change after initial 50 hours of operation. Change every 100 hours.
5.7	Engine Air Filter	Check every 40 hours of operation. Change every 500 hours.
5.7	Engine Fuel Filter	Check every 10 hours of operation. Change every 400 hours.
5.9	Engine Coolant	Check every 10 hours of operation.
5.11	Tires	Check every 10 hours of operation.
5.12	Steering Axle Pivot Pin	Grease once per week. (1 fitting)
5.12	Rear Spindle	Grease once every 6 months (2 fittings)
5.12	Tie Rod Ends	Grease once per month. (2 fittings)
5.13	Roll Lift Pivot Pin	Grease once per week. (2 fitting)
5.13	Roll Lift Cylinder Pin	Grease once per week. (2 fitting)
5.13 – 5.14	Clamp Arm Pivot Pin	Grease once per week. (2 fitting)
5.14	Front Spindle	Grease once per month. (2 fitting)

NOTE: BECI recommends the use of a lithium based grease.

NOTE: If operating in extremely dirty and dusty conditions perform the service more often.

INTRODUCTION

CAUTION: Thoroughly read Chapter 1 before performing any operations or procedures in this chapter. Important safety and operating information is covered in this section of the book. Failure to read and comply with these important messages could result in injury or death.

This chapter covers basic maintenance procedures for the sod installer. These procedures are based on normal operating conditions. Bucyrus Equipment Co., Inc. cannot anticipate every operating condition and every hazard associated with each. We cannot be responsible for improper maintenance, abuse, operator negligence, or use of the Magnum "A" series sod installer for any purpose other than what it was designed for.

HYDRAULICS

WARNING: Hydraulic oil escaping under pressure can penetrate skin causing serious injury. Keep body and hands away from pin holes or leaks that eject hydraulic fluid under pressure. Use cardboard or paper to search for leaks. Be sure the machine is OFF and relieve all pressure from the hydraulic system before disconnecting any hydraulic lines, fitting, or servicing any hydraulic components.

WARNING: Never service the machine while running. Unexpected engagement of the hydraulic system could cause your hands, arms, fingers, feet, legs, and/or clothing to become caught up in moving parts, resulting in injury or loss of body parts.

WARNING: Check the machine daily before use. Check all nuts and bolts for tightness. Check all hydraulic connections for tightness. Look for dirty hydraulic connections. A leaky connection will attract dirt and dust. Tighten all loose connections and replace leaky hoses or lines. Failure to perform basic inspections could result in machine failure or personal injury.

WARNING: Hydraulic fluid can be flammable and could cause serious injury or death.

NOTICE: Collect and contain liquids in a suitable container. Dispose of all liquids according to local and federal regulations.

NOTE: During any hydraulic component disassembly, cap all hoses and fittings to prevent fluid loss and contamination of the system.

NOTE: For more information on the installer hydraulic system, refer to Chapter 4.

IMPORTANT: HYDRAULIC WARM UP 10 MINUTES.

HYDRAULIC FLUID LEVEL CHECK

1. Locate the hydraulic tank sight glass. See Figure 5.1. The fluid level should be even with the center of the sight glass.
2. Remove the hydraulic tank fill cap and fill the tank as needed. The recommended fluid is Amsoil HVJ ISO68 synthetic hydraulic fluid or equivalent SAE 20 synthetic oil. Use the sight glass to monitor the fluid level.
3. Re-install the fill cap.

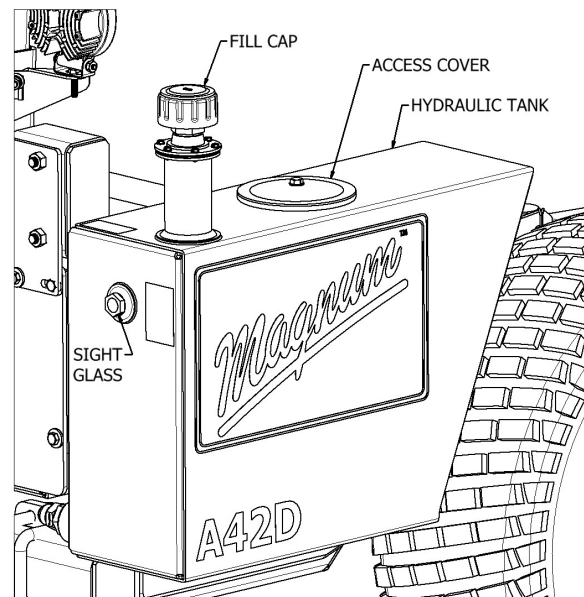


Figure 5.1 – Hydraulic Tank

HYDRAULIC FLUID CHANGE / IN-TANK STRAINER

NOTICE: Collect and contain liquids in a suitable container. Dispose of all liquids according to local and federal regulations.

1. Locate the drain plug on the bottom of the hydraulic tank. See Figure 5.2.
2. Remove the drain plug to drain the oil.
3. Use a suitable container to catch the draining fluid.
4. Check the in-tank strainer for contaminants and clean the strainer using compressed air. Replace if necessary.
5. Replace the fluid with 9 gallons (34 liters) of Amsoil HVJ ISO68 synthetic hydraulic fluid or equivalent SAE 20 synthetic oil. Fill the tank until the fluid level is even with the center of the sight glass. See Figure 5.1.

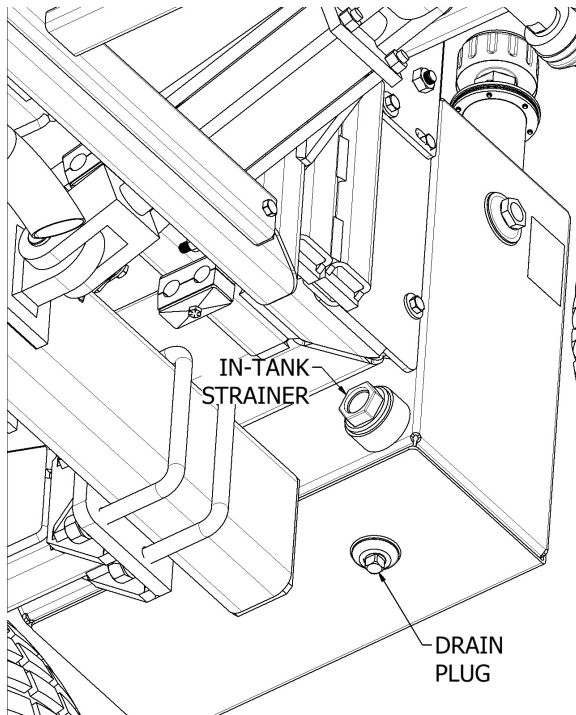


Figure 5.2 – Hydraulic Tank Drain Plug and In-Tank Strainer

HYDRAULIC FILTER

1. Locate the hydraulic filter. See Figure 5.3. Change according to the maintenance schedule at the beginning of the chapter or if it has been over heated or contaminated.
2. Be sure the hydraulic fluid pressure is relieved from the line.
3. Use a suitable container to catch the draining fluid.
4. Replace the filter.

NOTE: Dispose of hydraulic fluid according to local and federal regulation.

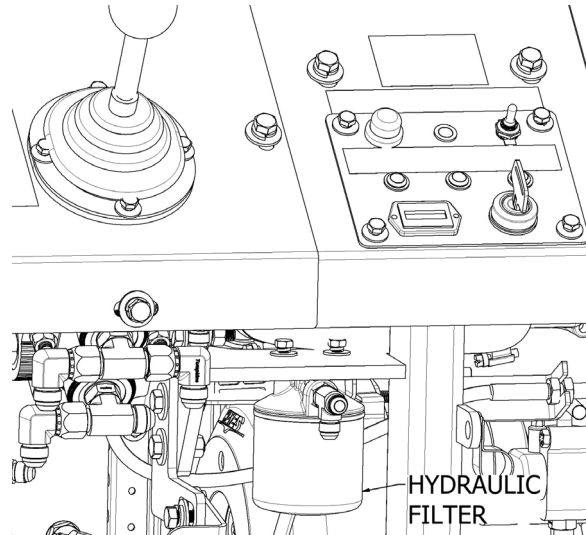


Figure 5.3 – Hydraulic Filter

HYDRAULIC HOSES

WARNING: Hydraulic oil escaping under pressure can penetrate skin causing serious injury. Keep body and hands away from pin holes or leaks that eject hydraulic fluid under pressure. Use cardboard or paper to search for leaks. Be sure the machine is OFF and relieve all pressure from the hydraulic system before disconnecting any hydraulic lines, fitting, or servicing any hydraulic components.

1. Inspect all hydraulic lines and connections for possible leaks and wear.

2. Leaky connections can be identified by locating the build-up of dirt or grease on the connection or hose. The dirt or grease will collect on the leaking hydraulic fluid. If no dirt build-up is present use a piece of cardboard or paper to locate the leak. Never use hands or body parts to locate a leak. Hydraulic oil escaping under pressure can penetrate skin causing serious injury.
3. When replacing hydraulic hoses be sure to depressurize the hydraulic line or circuit.
4. Place a drain pan under the hose to drain any excess hydraulic fluid from the hose during removal.
5. Use a shop rag to clean around the hose fitting. Slowly loosen the hydraulic hose using a wrench. Place a shop rag over the fitting to keep hydraulic oil from spraying.
6. Cap off any hoses or fittings to keep the lines from leaking and to avoid contamination.
7. Replace the hydraulic hose. Tighten the hose ends and then check for leaks.

NOTE: Dispose of hydraulic fluid according to local and federal regulation.

HYDRAULIC COOLER AND COOLING FAN

Inspect the hydraulic fluid cooling system for leaks, damage or debris accumulation in the hydraulic cooler. If necessary, wash out the hydraulic cooler (See Figure 5.4) with low pressure water or blow it out using compressed air.

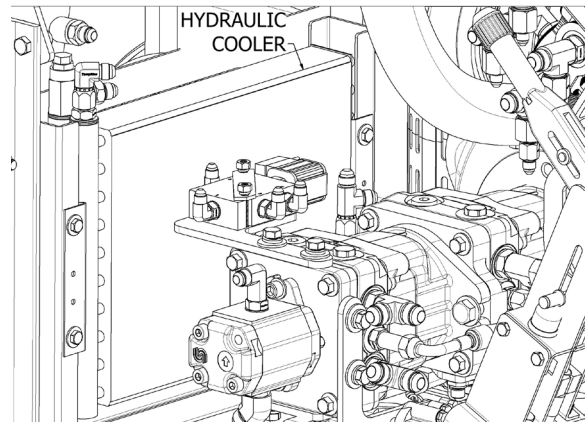


Figure 5.4 – Hydraulic Cooler

Also inspect the cooling fan blades and cover (See Figure 5.5) for damage or excessive debris. Clean the cover using compressed air.

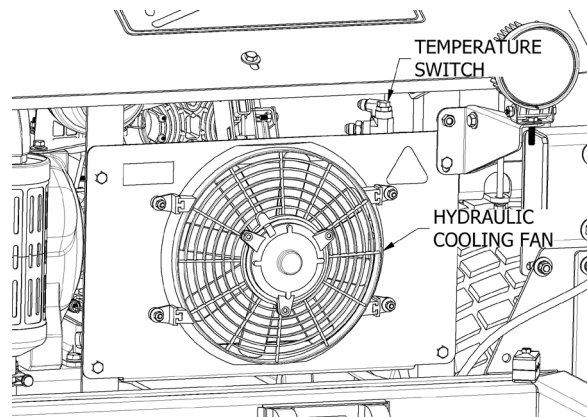


Figure 5.5 – Hydraulic Cooling Fan and Temperature Switch

HYDRAULIC COMPONENT REPLACEMENT

The following steps are basic instructions for removing, replacing, and testing hydraulic components such as: drive motors, valves, and cylinders.

1. With the machine OFF and in a resting position, locate the hydraulic component.
2. When replacing hydraulic components be sure to depressurize the hydraulic line or circuit.
3. Place a drain pan under the component to drain any excess hydraulic fluid from the component during removal.

4. Use a shop rag to clean around any connections. Slowly loosen the hydraulic connections using a wrench. Place a shop rag over the connection to keep hydraulic oil from spraying.
5. Cap off any hoses, fittings, or open ports on the hydraulic component to keep them from leaking and to avoid contamination.
6. Remove the hydraulic component and replace if necessary.
7. Reconnect all fittings and hoses.
8. Start the machine. Run the machine at a fast idle. Let the hydraulic fluid warm up and cycle through the system.
9. Slowly engage and disengage the hydraulic component to test it. Do this several times to remove any air that may be in the hydraulic system.
10. After operation and with the machine OFF, check the hydraulic component for any fluid leaks.
11. If any leaks are found, repair as needed.
12. Check the hydraulic fluid level at the tank. Fluid may have been lost during removal of the component.

ENGINE

ENGINE OIL FILTER

1. Locate the engine oil filter. See Figure 5.6. Change according to the maintenance schedule at the beginning of the chapter or more frequently if operated in severe conditions.
2. Use a suitable container to catch the draining fluid.
3. Replace the filter. Refer to the Engine Owner's Manual for specific engine oil filter specifications.

NOTE: Dispose of engine oil according to local and federal regulation.

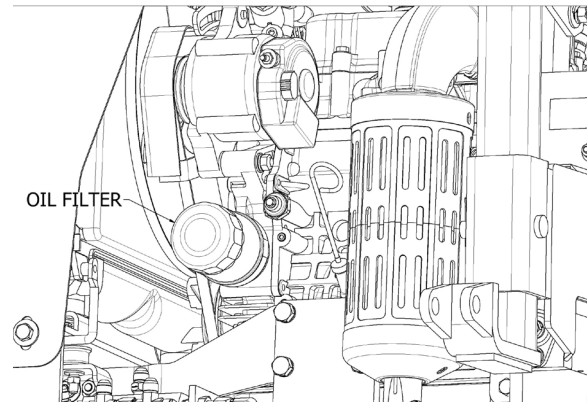


Figure 5.6 – Engine Oil Filter

ENGINE OIL

1. Locate the engine oil drain plug on the right side of the machine on the bottom of the engine oil pan. See Figure 5.7. Change according to the maintenance schedule at the beginning of the chapter or more frequently if operated in severe conditions.
2. Remove the drain plug to drain the oil.
3. Use a suitable container to catch the draining fluid.
4. Locate the engine oil fill cap. See Figure 5.8. Remove the cap and replace the oil. Re-install the oil fill cap. Refer to the Engine Owner's Manual for specific engine oil recommendations.

NOTE: Dispose of engine oil according to local and federal regulation.

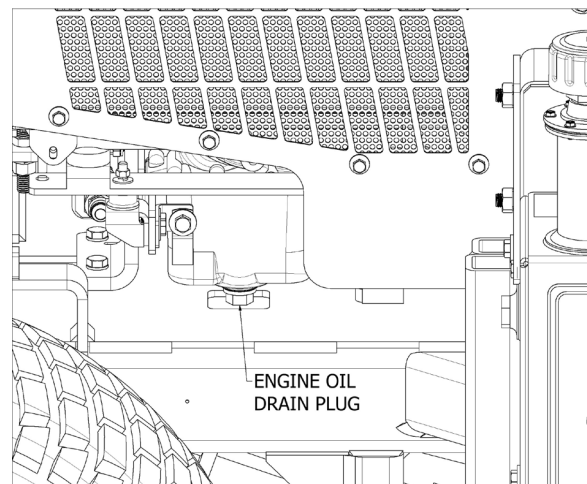


Figure 5.7 – Engine Oil Drain Plug

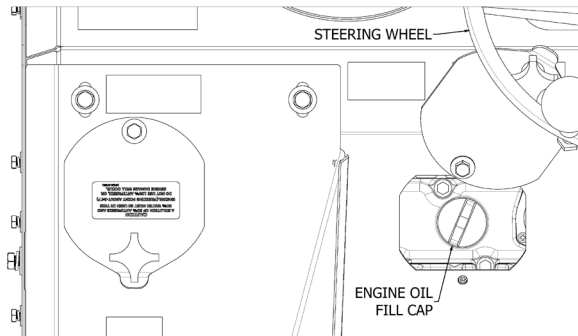


Figure 5.8 – Engine Oil Fill Cap

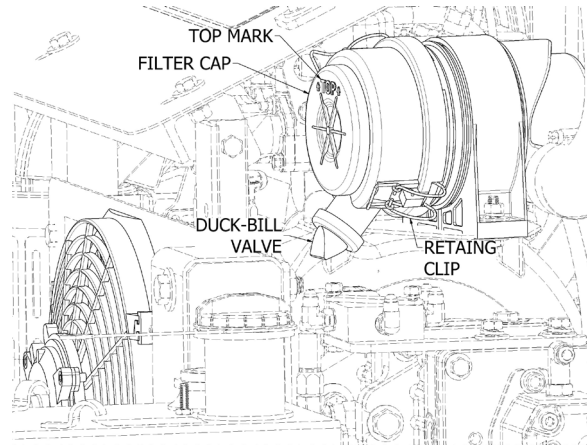


Figure 5.9 – Engine Air Filter

ENGINE AIR FILTER

The diesel engine is equipped with a dry-element air filter. Do not apply filter oil or any other material to the filter element.

Inspect the filter once each week for excess dirt and plugging. Also, when inspecting the air filter open the duck-bill valve (See Figure 5.9) to remove excess dust and dirt.

1. Locate the engine air filter under the main shield behind the hydraulic cooling fan. See Figure 5.9. Change according to the maintenance schedule at the beginning of the chapter or more frequently when operating in extremely dusty conditions.
2. Remove the filter cap by unsnapping the two retainer clips on each side of the filter housing. See Figure 5.9.
3. Pull the element from the housing. See Figure 5.10.
4. Clean the filter using low-pressure compressed air from the inside out. When cleaning, do not exceed 30 psi (205 kPa) air pressure. Wipe the inside of the filter housing using a clean cloth.
5. Re-install the filter element into the housing and make sure it is fully seated. Install the filter cover with the TOP mark and arrows facing upward. See Figure 5.9. Check to be sure the filter cap retainer clips are properly closed and seated.

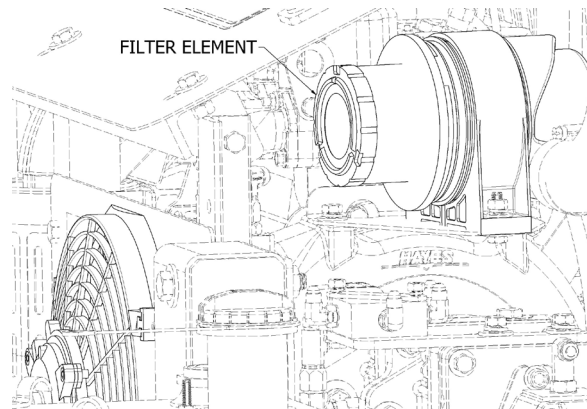


Figure 5.10 – Engine Air Filter Element

ENGINE FUEL FILTER

CAUTION: Fuel vapors, fuel, oils, and lubricants are flammable! Do not smoke, produce flames, or sparks around any of the items listed. Store fuel only in approved containers in a well-ventilated area away from any source of sparks or flame. DO NOT add fuel to the tank while the engine is hot or running.

Inspect the fuel filter bowl frequently for water or other contamination. Clean the fuel filter element after each 100 hours of operation. To service the filter, refer to Figure 5.11 and proceed as follows:

1. Locate the engine fuel filter and fuel valve on the left hand side of the machine attached to the hydrostat. See Figure 5.12. Change according to the maintenance schedule at the beginning of the chapter or more frequently when operating in extremely dusty conditions.

2. Turn the fuel valve to the off position. See Figure 5.13.
3. Unscrew the fuel bowl retaining ring.
4. Remove the fuel bowl, filter element and related components.
- 4 Clean the fuel bowl using a clean cloth.
- 5 Inspect the filter O-rings and replace if necessary.
- 6 Clean the filter element using clean diesel. Replace the element if necessary.
- 7 Install the element into the filter housing.
- 8 Fill the filter bowl with clean fuel then install the bowl and retainer ring. Tighten the ring securely.
- 9 Turn the fuel valve on and **bleed the fuel system** as described in this section.
- 10 After bleeding the system, start the engine and check for fuel leakage. Repair any fuel leakage prior to returning the unit to service.

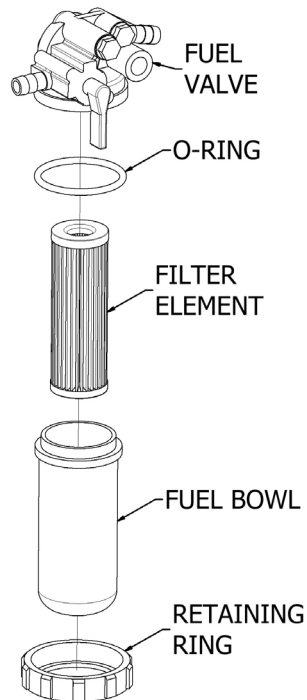


Figure 5.11 – Fuel Filter Assembly Exploded View

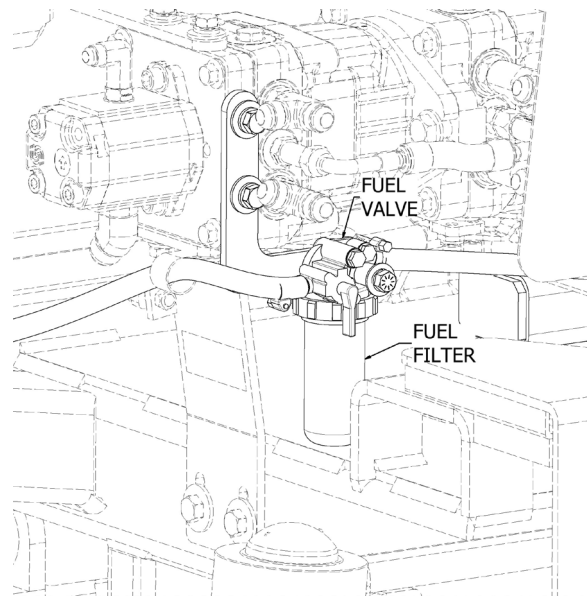


Figure 5.12 – Fuel Valve/Filter Location

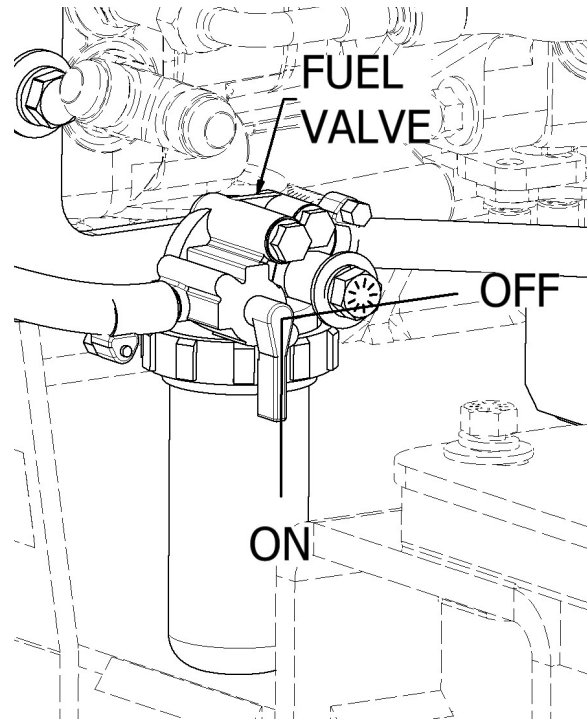


Figure 5.13 – Fuel Valve On/Off

BLEEDING THE FUEL SYSTEM

Air must be purged from the fuel system if the filter or any fuel lines have been removed or if the fuel tank runs dry.

1. Make sure the fuel tank has sufficient fuel.
2. Turn the fuel valve to the ON position (Figure 5.13).
3. Locate the injector lines under the main shield behind the engine valve cover. See Figure 5.14. Loosen the injector lines at the three injectors.
4. Crank the engine until air free fuel flows from the injector lines. Do not crank the engine continuously for more than 20 seconds. Allow the starter motor to cool for 60 seconds before cranking again.
5. Tighten the injector lines securely. Start the engine and carefully check for fuel leakage. Repair any fuel leakage prior to returning the unit to service.

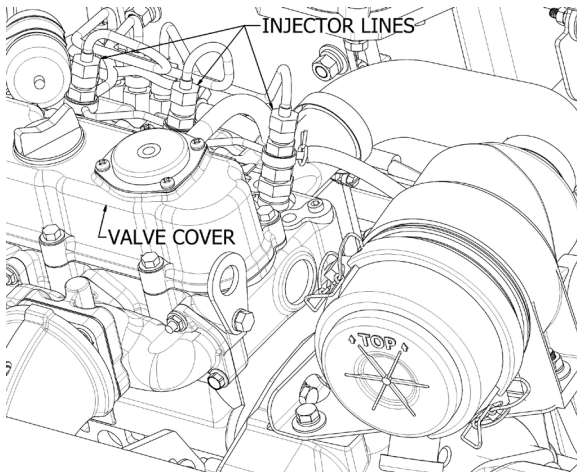


Figure 5.14 – Injector Lines (Main shield removed for clarity.)

ENGINE COOLANT

Check the coolant level in the recovery reservoir each day prior to starting.

Maintain the coolant level at the FULL mark on the reservoir (Figure 5.16).

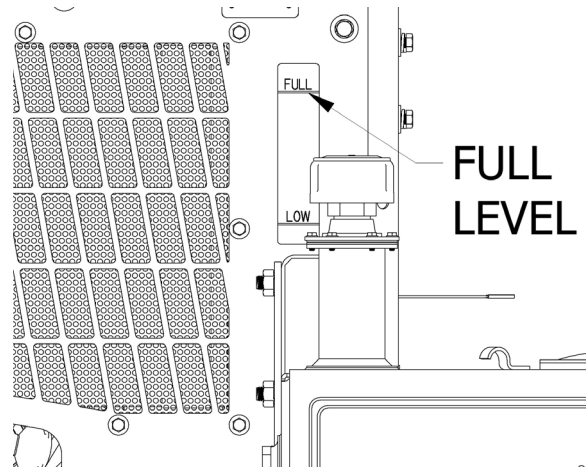


Figure 5.16 – Engine Coolant Level

If necessary, locate the recovery reservoir fill cap (Figure 5.17) and add a 50:50 mixture of antifreeze and pure water. If the recovery reservoir is empty check the coolant level in the radiator fill cap. See Figure 5.17.

WARNING: DO NOT remove the radiator cap if the engine is hot. Allow sufficient time (cool to touch) for the engine and coolant to cool to prevent personal injury from scalding coolant temperature.

Add a 50:50 mixture of antifreeze and water to the radiator as required. The proper level is approximately 1 in. (25.4 mm) below the bottom of the filler neck.

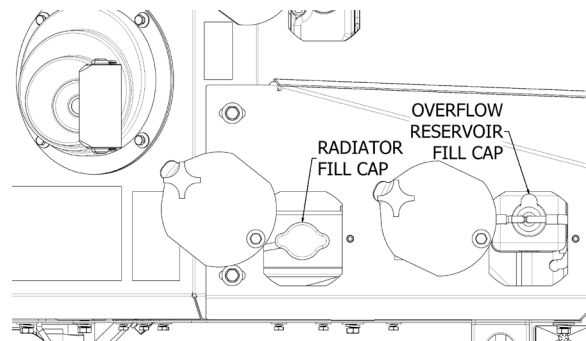


Figure 5.17 – Radiator / Overflow Reservoir Fill Cap

BATTERY

WARNING: Batteries generate explosive gasses, especially when charging. Keep sparks, open flames or any other ignition source away from the battery at all times. Always disconnect the negative battery cable from the battery or frame before performing any service to the electrical system or

working near the battery. Always wear proper eye protection when working on or near a battery.

WARNING: A charging battery will generate explosive gasses. Charge the battery only in a well-ventilated area, away from sparks, flames or any other source of ignition. Always wear suitable eye protection when working on or around a battery.

CAUTION: ALWAYS disconnect the negative battery cable from the battery before removing any covers, panels or cowlings from the machine.

The battery's main function is to provide electrical power to the machine. The battery is located on the left hand side of the machine. See Figure 5.18.

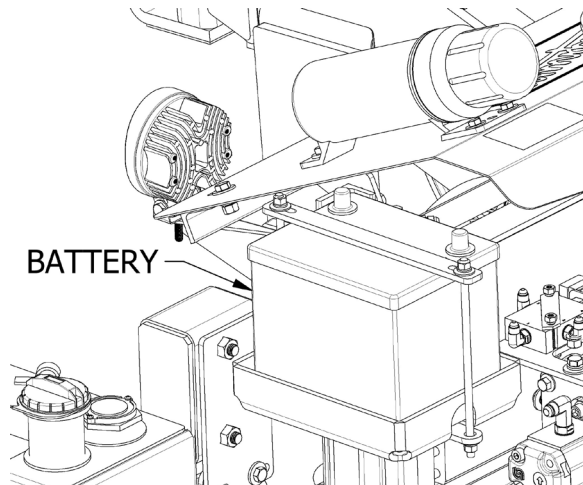


Figure 5.18 – Battery Location

During replacement, install a battery with at least 450 CCA.

Periodically check the electrolyte level in the battery cells if equipped with a serviceable battery. First wipe the top of the battery clean of all dirt and debris to prevent contamination from entering the cells. If necessary, add distilled water to top off electrolyte. Check the battery hold-down clamp for tightness to prevent vibration and movement from damaging the battery case.

Clean the battery case and terminals using a stiff brush and water and baking soda solution. Do not allow the water and baking soda solution to enter the battery cells. The baking soda will seriously weaken the cell. Replace the battery

cables if excessive corrosion or damage is evident.

JUMP STARTING

Note: The positive terminal on the battery is designated with a "+" symbol and the negative terminal is designated with a "-" symbol. See Figure 5.19.

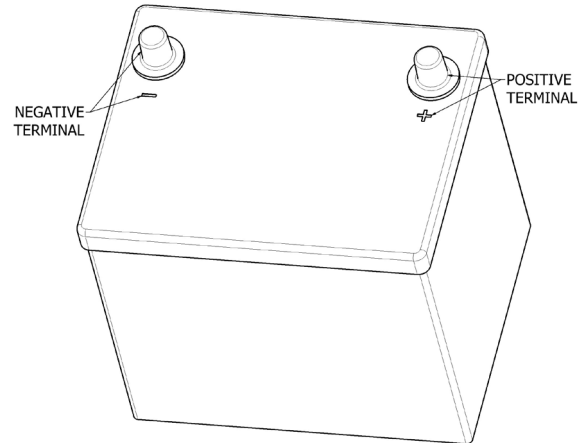


Figure 5.19 – Battery Terminal Identification

To prevent creating a spark that could result in a battery explosion, use the following procedure if jump starting the installer:

1. Attach one booster cable clamp to the positive terminal of the installer battery. Attach the other end of the booster cable to the positive terminal of the source battery.
2. Attach one booster cable clamp to the negative terminal of the source battery and the remaining clamp to a good engine ground on the installer.
3. After starting the installer, disconnect the booster cables in the reverse order of connection.

PARKING BRAKE

WARNING: Immediately apply the parking brake if you lose steering control while operating. Inspect the machine and correct the problem before continuing to operate.

WARNING: Start the engine with the operator in the operating position, parking brake engaged, and the control lever in the neutral position.

WARNING: When the operator leaves the operator's platform, turn off the machine, remove the key, and engage the parking brake.

WARNING: Keep the parking brake engaged when the machine is not in operation.

WARNING: Park the machine on level ground with the parking brake engaged. Make all repairs with the machine parked on a level, hard surface. Engage the parking brake and block the machine to prevent it from rolling while working on or under the machine.

PARKING BRAKE ADJUSTMENT

Inspect the brake shoes once each year for excessive wear or damage. To inspect the shoes, remove the cotter pins and nuts that secure the brake drums and remove the drum using a suitable puller.

If necessary, adjust parking brake tension using the knob located on the end of the brake lever. See Figure 5.20.

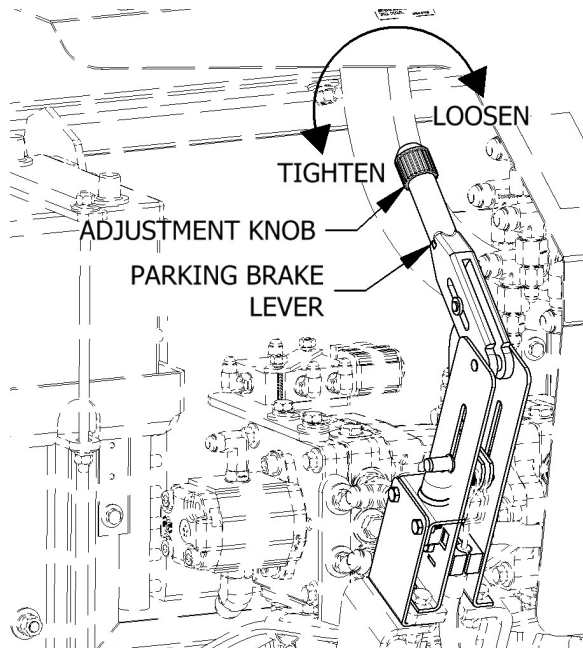


Figure 5.20 – Parking Brake Lever Adjustment Knob

If sufficient tension cannot be obtained (See Figure 5.21):

1. Loosen the adjustment knob to approximately one half of its travel.
2. Remove the wheels from the steering axle.
3. Loosen the front jam nut (Figure 5.21) and adjust the rear nut to move the cable housing rearward. Make sure both brakes are adjusted equally.
4. Securely tighten the jam nuts and check parking brake operation. Perform final adjustment using the knob on the brake lever.

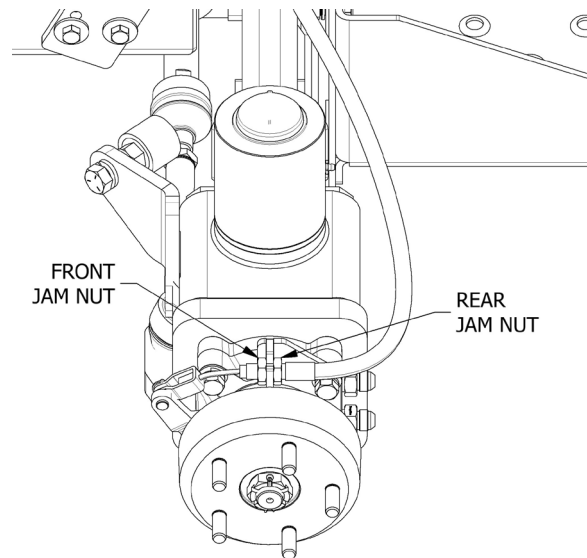


Figure 5.21 – Parking Brake Adjustment at Wheel

TIRES

Inspect the tires for deep cuts or other damage. Frequently check the pressure in the tires. Tire pressure specifications are listed on the side of the tire. Maintaining proper air pressure helps to maintain smooth machine operation.

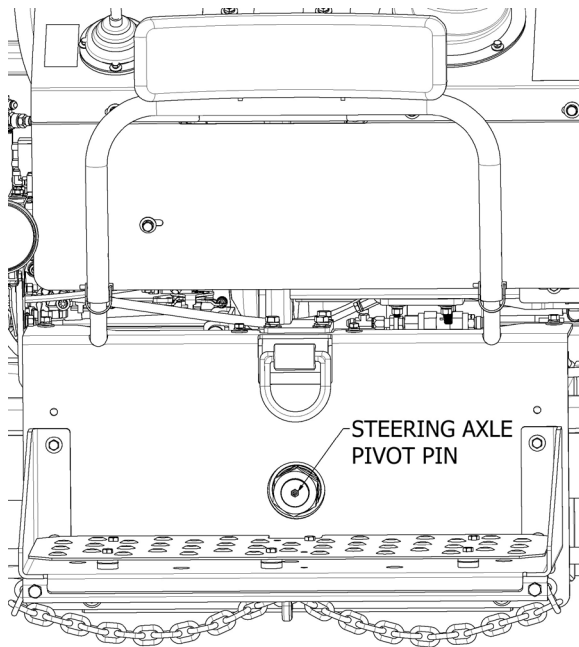
LUBRICATION POINTS

NOTICE: It is extremely important to lubricate all grease fittings as required in the maintenance schedule to prevent component failure and to extend the life of the machine. Some components will need to be greased more often than other components.

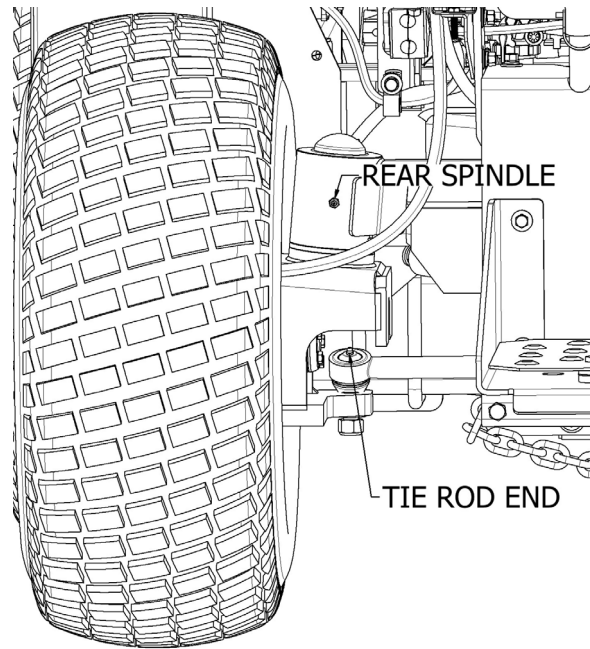
Locate all grease fittings on the installer and grease as needed. Below are some examples of critical components that should be greased.

NOTE: All of the lubrication points may not be shown. Be sure to locate and grease all points as needed.

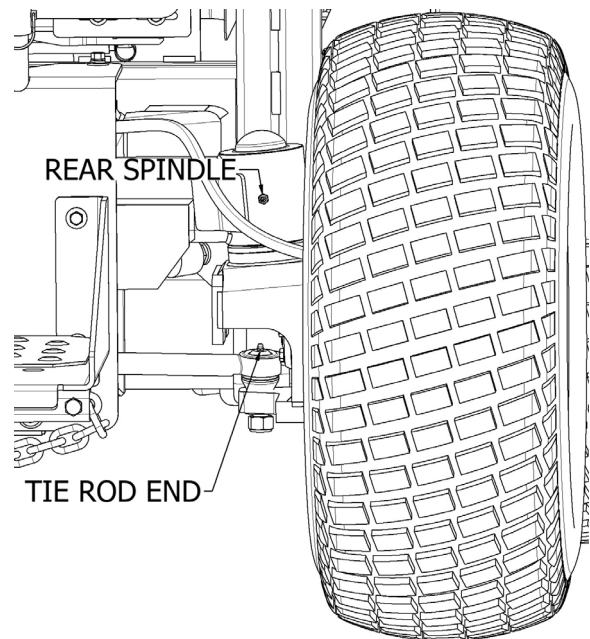
STEERING AXLE PIVOT PIN



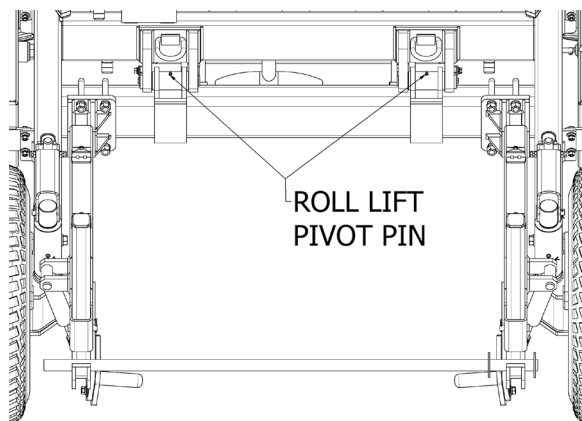
REAR SPINDLE / TIE ROD END - LEFT HAND SIDE



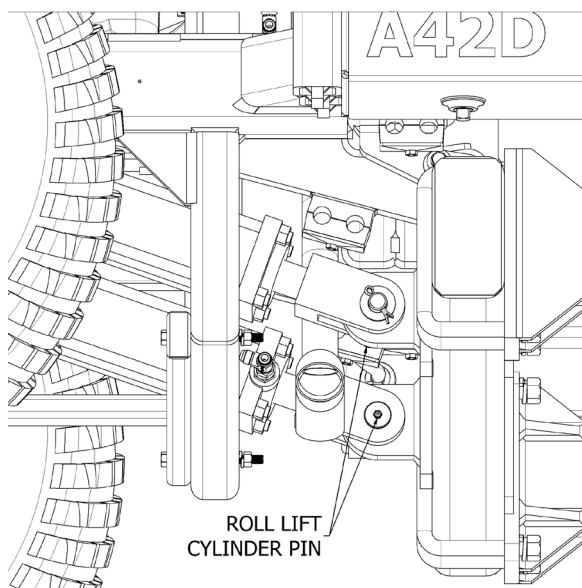
REAR SPINDLE / TIE ROD END - RIGHT HAND SIDE



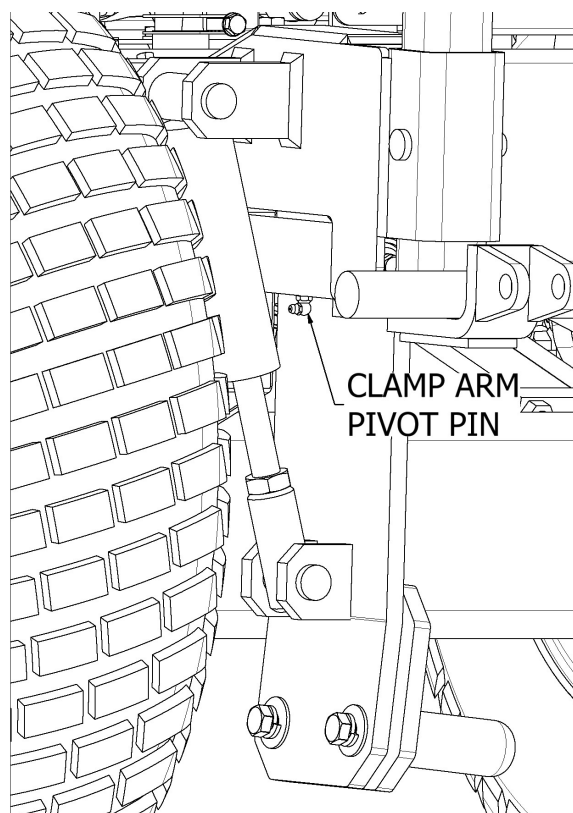
ROLL LIFT PIVOT PINS



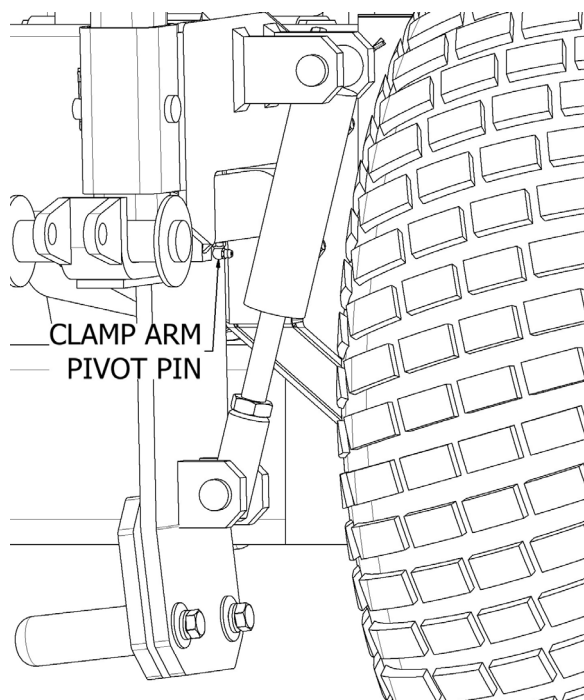
ROLL LIFT CYLINDER PINS



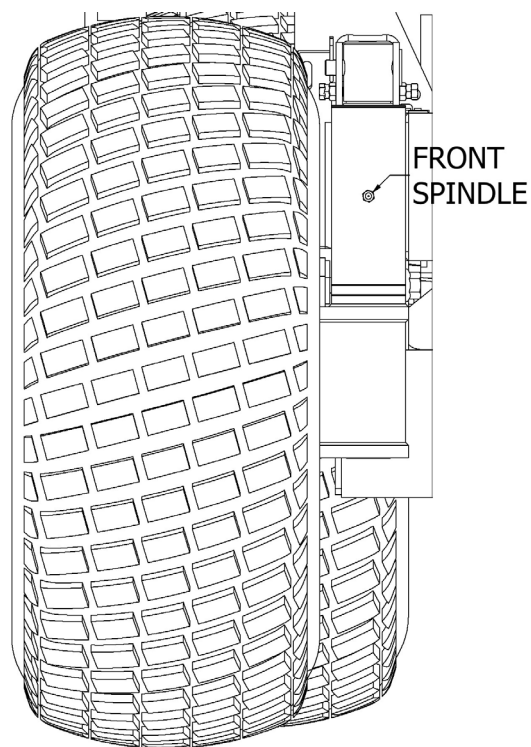
CLAMP ARM PIVOT PIN – RIGHT HAND SIDE



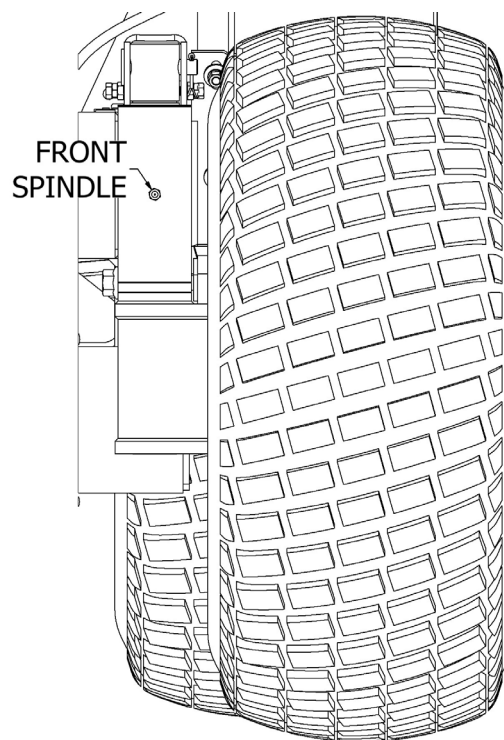
**CLAMP ARM PIVOT PIN – LEFT
HAND SIDE**



**FRONT SPINDLES – RIGHT HAND
SIDE**



**FRONT SPINDLES – LEFT HAND
SIDE**





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