SKID LOADER

3310/3410

Form No.
903666
Replaces
903418

SL3310 GASOLINE
SL3410 DIESEL

GEHL®

OPERATOR'S MANUAL

Warranty

GEHL COMPANY
New Loader Equipment
(Skid Loader and Attachments)

GEHL Company (Inc.), hereinafter referred to as GEHL, warrants new GEHL machinery and attachments (the "Equipment") to be free from defects in material and workmanship at the time of delivery to the original purchaser if properly set up and operated in accordance with the recommendations set forth in GEHL's Operator's Manual.

GEHL's liability for any defect shall be limited to repair or replacement of the Equipment. GEHL's obligation shall terminate twelve (12) months/or 1000 hours after the delivery of the goods to the original user or when the Equipment is first put into use, whichever combination of events occurs first.

This warranty shall not apply to tires which are subject to the warranty of the tire manufacturer. Please contact your GEHL dealer for further information on tire warranties.

This warranty shall not apply to any item of Equipment which shall have been repaired or altered outside the GEHL factory or authorized GEHL dealership or which has been subject to misuse, negligence or accident; neither shall it apply to Equipment which has not been operated in accordance with GEHL's printed instructions or has been operated beyond the Company's recommended machine rated capacity.

EXCLUSION OF WARRANTIES

Except as otherwise expressly stated herein, **GEHL makes no representation or warranty of any kind, express or implied, including merchantability or fitness for a particular purpose in respect to the Equipment.** GEHL shall not be liable for incidental or consequential damages for any breach of warranty, including but not limited to inconvenience, rental or replacement equipment, loss of profits or other commercial loss.

No agent, employee or representative of GEHL has any authority to bind GEHL to any affirmation, representation or warranty concerning its machinery and attachments except as specifically set forth herein.

Certain limitations expressed herein are excludable in accordance with provisions of local law. Such provisions shall be deemed struck if such local law is applicable. All other provisions shall continue to apply.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

Mr. Operator:

Your decision to purchase this piece of GEHL equipment was a good one. We are sure that your decision was strongly considered and that you are looking forward to many seasons of work from this machine.

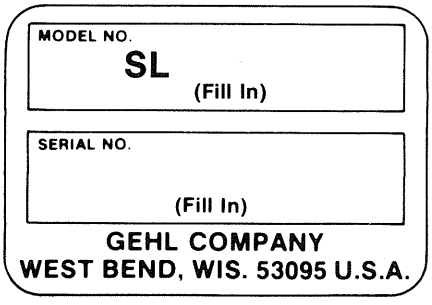
We, as a Company, have invested a great deal of time and effort in developing our lines of agricultural and industrial equipment. The equipment you have purchased is built with a great deal of pride and designed to give you long life, efficient operation, durability and dependability.

This manual was developed specifically for the machine you have purchased. The information, contained within, was prepared for your assistance in preparing, adjusting, maintaining and servicing your machine. More importantly, this manual provides an operating plan for safe and proper use of your machine. Major points of safe operation are detailed in the **SAFETY** chapter of this manual. Refer to the Table of Contents for an outline (by chapters) of this manual. Use the Index, in the back of the manual, for specific chapter and topic/page number references.

Modern machinery has become more sophisticated and, with that in mind, GEHL Company asks that you read and understand the contents of this manual COMPLETELY and become familiar with your new machine, BEFORE attempting to operate it.

Our wide Dealership network stands by to provide you with any assistance you may require, including genuine GEHL service parts. All parts should be obtained from or ordered through your GEHL Dealer. Give complete information about the part as well as the model number and the serial number of your machine. Record numbers, in space provided, as a handy record for quick reference.

Typical Model & Serial No. Plate



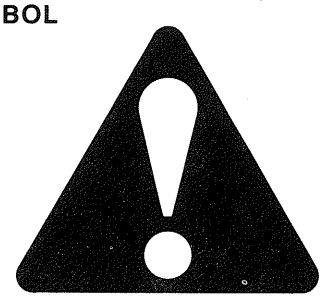
The model number and serial number for this unit are on a decal located inside the Right Chassis Riser, between the Lift Arm and Lift Cylinder.

"Right" and "Left" are determined from a position sitting on the Seat and facing forward. From this position, the Propulsion Control T-bar is on the "Left" side and the Lift/Tilt Control T-bar is on the "Right".

GEHL Company reserves the right to make changes or improvements in the design or construction of any part without incurring the obligation to install such changes on any unit previously delivered.

Throughout this manual, information is provided which is set in **bold type** and introduced by the word **NOTE. BE SURE** to **read carefully** and **comply with** the message or directive given. Following this information will improve your operating or maintenance efficiency, help you to avoid costly breakdown or unnecessary damage and, extend your machine's life.

The GEHL Company and the American Society of Agricultural Engineers have adopted this SAFETY ALERT SYMBOL



to pinpoint characteristics which, if not properly followed, can create a safety hazard. When you see this symbol in this manual or on the unit itself, you are reminded to BE ALERT! Your Safety is involved.

CHAPTER 2

SPECIFICATIONS

All Dimensions are in Inches (Millimeters) Unless Otherwise Noted

Model & Description ..... SL3310 (Gasoline) & SL3410 (Diesel) Skid Loaders

Engines ...**3310** Air-cooled, Onan B48G, 2 Cylinder, Gasoline, SAE 20 hp (15 kw) with 32 ft-lb (44.25 N-m) Torque @ 2700 RPM

3410 Water-cooled, Isuzu QT23, 3 Cylinder, Diesel, SAE 23 hp (17 kw) with 46.5 ft-lb (64.3 N-m) Torque @ 2000 RPM

Electrical Systems ....**3310** 12 volt D.C. Wet Cell Battery with 12 volt Starter and 15 Ampere Alternator

3410 12 volt D.C. Wet Cell Battery with 12 volt Starter and 37 Ampere Alternator

SAE Operating Capacities* ...**3310** 750 lb (340.5 kg)
3410 900 lb (408 kg)

Operating Weights **3310** 2870 lb (1865 kg)
3410 3135 lb (1422 kg)

Volumetric Capacities & Deliveries ..... 12 gallon (45.4 l) Hydraulic System Reservoir with 10 Micron Filtration

8-1/2 gallon (32 l) Fuel Tank

16 gpm (60.06 l/m) Hydrostatic Pumps

3310 11 gpm (0.7 l/s) Hydraulic Pump
3410 8.5 gpm (0.54 l/s) Hydraulic Pump

*Operating capacity rated with 48 (1220) Wide Utility Bucket, 27 x 8.50-15 Tires and a 175 lb (79 kg) Operator, according to SAE J818

Optional Features

5.70 x 15 4-Ply Tire & Wheel Set

27 x 8.50 x 15 4-ply Flotation Tire & Wheel Set

Standard Features

Tandem-mounted Hydrostatic Pumps
SAE Approved ROPS-FOPS (Overhead Guard) with Self-activating Rollback Lock
Side-mounted Propulsion & Lift/Tilt T-Bar Controls
Hydro-Lock (Rapid Tach) Mechanism for Attachment Mounting
0 to 7 mph (0 to 11.3 kmh) Travel Speed
Seat and Secondary Operator Restraint Interlock for Starter and Lift Cylinders
Hand-operated (Parking/Emergency) Disc-type Brake
SAE J386 Construction-approved Seat Belt
Secondary Operator Restraint Bar with Arm Rests
Mechanical Lift Cylinder Lock
Hand-operated Throttle
Overhead Instrument and Control Panel
Hinged Rear Grill
Louvered Engine Cover
Integral Bellyplate with Cleanout Cover

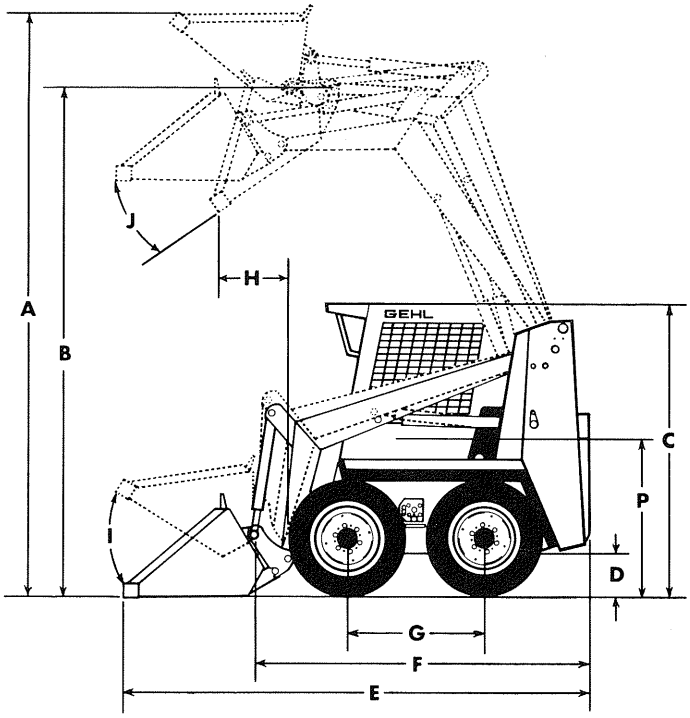
Accessories

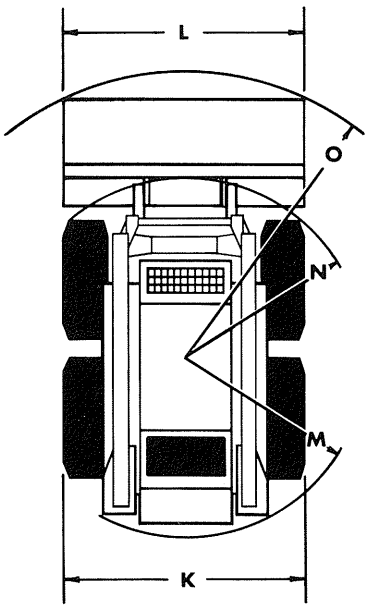
Front Auxiliary Hydraulics
Tandem-wheel Towing Trailer
Work & Warning Lights
Horn
Hydraulic Oil Heater
Drawbar
All-weather Operator Vinyl Enclosure
All-weather Operator Rigid Enclosure
Heater and Defroster for Enclosures
Windshield Wiper for Rigid Enclosure
Sound-deadening Package
Audible Back-up Alarm
Amber Flashing Warning Light
Amber Beacon Light
Grapple Fork (for Manure Fork or 54" Utility Bucket)
Weld-on Dirt & Rock Teeth for Buckets
Pallet Fork

Buckets (& Capacities)**

Bucket Description	Heaped in cu ft	Heaped in cu m
48 (1219) Wide Utility	6.5	0.18
54 (1372) Wide Utility	7.3	0.21
54 (1372) Wide Light Material	10.5	0.30
54 (1372) Wide Granular Fertilizer	13	0.37
60 (1524) Wide Produce/Snow	16	0.45

**For average volumes/weights, for different materials, refer to the Operation chapter of this manual.





key to illustration

A. Overall Operation Height
Fully Raised 131 (3327)
B. Height to Hinge Pin
Fully Raised 102 (2591)
C. Overall Height
with Operator Guard 70 (1778)
D. Ground Clearance 9 (229)
E. Overall Length with Bucket 99 (2515)
F. Overall Length less Bucket -
Utility (54") 76 (1930)
G. Wheel Base 32 (813)
H. Dump Reach 15-1/2 (394)
I. Rollback at Ground ..... 32°
J. Dump Angle ..... 35°
K. Overall Width
5.70 x 15 4-Ply Tires 47 (1194)
27 x 8.50 x 15 4-Ply Tires 52 (1321)
L. Bucket Width - Utility ..... 48 (1219) & 54 (1372)
M. Clearance Circle - Rear 46 (1168)
N. Clearance Circle - Front
Less Bucket 38 (965)
O. Clearance Circle - Front
With Utility Bucket 59 (1499)
P. Seat to Ground Height 30 (762)

CHAPTER 3

CHECK LISTS

PRE-DELIVERY

The following Checklist is an important reminder of valuable information and inspections which **MUST** be made before delivering the Loader to the Customer. Check off each item after prescribed action is taken.

Check that:

- ____**NO** parts of the unit have been damaged in shipment. Check for such things as dents and loose or missing parts; correct or replace components as required.
- ____Fuel Tank, Fuel Lines and Fittings are **NOT** damaged, leaking or loosely secured.
- ____Battery is securely mounted and **NOT** cracked. Cable connections are tight and Electrolyte is at proper level and strength. (Batteries for domestic sales are filled at the factory.)
- ____Lift and Tilt Cylinders are **NOT** damaged, leaking or loosely anchored.
- ____Hydrostatic Motors and Pumps are **NOT** damaged, leaking or loosely anchored.
- ____Hydraulic Hoses and Fittings are **NOT** damaged. leaking or loosely secured.
- ____Radiator (3410 Only) Hoses and Fitting are **NOT** damaged, leaking or loosely secured.
- ____Oil Filters are **NOT** damaged, leaking or loosely secured.
- ____Wheels are properly and securely attached and Tires are properly inflated.
- ____Entire Loader is properly lubricated, **NO** Fittings are missing, and that the Hydraulic system Reservoir, Engine Crankcase, Drive Chain Cases and the Diesel Governor and Injection Pump (as applicable) are filled to their proper operating levels.
- ____All adjustments are made to comply with the settings given in the Adjustments chapter of this manual.
- ____All Guards, Shields and Decals are in place and securely attached.
- ____Model and Serial Numbers of this unit are recorded in spaced provided on this page and page 2.

Start the Loader Engine and test-run the unit while checking that proper operation is exhibited by all controls.

Check that:

- ____Drive Chains are properly adjusted.
- ____Propulsion Control and Lift/Tilt Control T-bars operate properly and are **NOT** damaged or binding.
- ____Propulsion Control T-bar is properly adjusted for a correct "neutral" position so that Loader does **NOT** creep.
- ____Lift Cylinder and Starter Interlock system functions properly. By design, the Engine will **NOT** start unless the Operator is sitting on the Seat and the Restraint Bar is "lowered". Furthermore, the Lift Arms will **NOT** lower unless the Operator is sitting on the Seat, the Restraint Bar is "lowered" and, the Ignition Key is in the "Run" position.

I acknowledge that pre-delivery procedures were performed on this unit as outlined above.

_____
Dealership's Name

_____
Dealer Representative's Name

_____
Date Checklist Filled-out

_____ _____ _____
Model Number Loader Serial # Engine Serial #

DELIVERY

The following Checklist is an important reminder of valuable information that **MUST** be passed on to the Customer at the time the unit is delivered. Check off each item as you explain it to the Customer.

- ____Give the Customer his Operator's Manual. Instruct him to be sure to read and completely understand its contents **BEFORE** operating the unit.
- ____Direct him on how to use the Index of this manual as a quick page number locating guide.
- ____Explain and review with him the **SAFETY** chapter of this manual.
- ____Explain and review with him the Controls & Safety Equipment chapter of this manual.
- ____Explain that regular lubrication is required for continued proper operation and long life. Review with him the Lubrication chapter of this manual.
- ____Explain and review with him the Service chapter of this manual.
- ____Explain the importance of his thorough understanding of and familiarity with the Loader Controls **BEFORE** attempting to operate the Loader. Refer to the appropriate information in the Operation chapter.
- ____Explain that he **MUST** consult the Engine Manual (provided) for related specifications, operating adjustments and maintenance instructions.
- ____Completely fill out Owner's Registration, including Customer's signature, and return it to the GEHL Company.

I acknowledge that above points were reviewed with me at the time of delivery.

_____
Customer's Signature

_____
Date Delivered

(Dealer's File Copy)

(Remove Dealer's File Copy At Perforation)

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(To be removed as Dealer's File Copy)

CHAPTER 3

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- ____Wheels are properly and securely attached and Tires are properly inflated.
- ____Entire Loader is properly lubricated, **NO** Fittings are missing, and that the Hydraulic system Reservoir, Engine Crankcase, Drive Chain Cases and the Diesel Governor and Injection Pump (as applicable) are filled to their proper operating levels.
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I acknowledge that pre-delivery procedures were performed on this unit as outlined above.

_____
Dealership's Name

_____
Dealer Representative's Name

_____
Date Checklist Filled-out

_____	_____	_____
Model Number	Loader Serial #	Engine Serial #

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- ____Explain and review with him the **SAFETY** chapter of this manual.
- ____Explain and review with him the Controls & Safety Equipment chapter of this manual.
- ____Explain that regular lubrication is required for continued proper operation and long life. Review with him the Lubrication chapter of this manual.
- ____Explain and review with him the Service chapter of this manual.
- ____Explain the importance of his thorough understanding of and familiarity with the Loader Controls **BEFORE** attempting to operate the Loader. Refer to the appropriate information in the Operation chapter.
- ____Explain that he **MUST** consult the Engine Manual (provided) for related specifications, operating adjustments and maintenance instructions.
- ____Completely fill out Owner's Registration, including Customer's signature, and return it to the GEHL Company.

I acknowledge that above points were reviewed with me at the time of delivery.

_____
Customer's Signature

_____
Date Delivered

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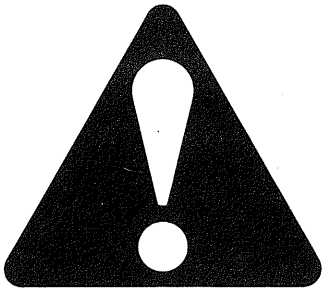
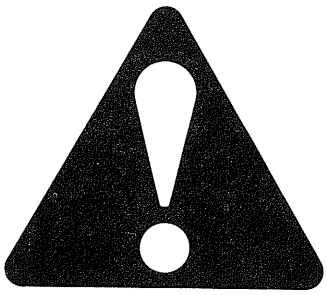
CHAPTER 4



SAFETY



BEFORE YOU ATTEMPT TO OPERATE THIS EQUIPMENT, READ AND STUDY THE FOLLOWING SAFETY INFORMATION. IN ADDITION, MAKE SURE THAT EVERY INDIVIDUAL WHO OPERATES OR WORKS WITH THIS EQUIPMENT, WHETHER FAMILY MEMBER OR EMPLOYEE, IS FAMILIAR WITH THESE SAFETY PRECAUTIONS.

GEHL Company always takes the operator and his safety into consideration when designing machinery and guards exposed moving parts for his protection; however, some areas cannot be guarded or shielded in order to assure proper operation. In addition, the operator's manual and decals on the machine itself warn you of further danger and should be read and observed closely.

The safety alert symbol above means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!** It stresses an attitude of **"HEADS UP"** for safety and can be found throughout this operator's manual and on the unit itself.

Remember: The careful operator is the best operator. Most accidents are caused by human error. Certain precautions must be observed to prevent the possibility of injury or damage.

Please read the rules listed below for safe operation **BEFORE** you operate this equipment.

Use of the word **CAUTION, WARNING** or **DANGER** herein and on the machine itself signals three degrees of hazard. **CAUTION** is used for general reminders of good safety practices or to direct attention to unsafe practices. **WARNING** is used to denote a specific potential hazard. **DANGER** is used to denote the most serious specific potential hazard.

NEVER operate Loader without wearing Seat Belt!

MANDATORY SAFETY SHUTDOWN PROCEDURE

Work of any type on machinery is always more dangerous when the machine is operating. BEFORE cleaning, adjusting, lubricating or servicing this unit, the following MANDATORY SAFETY SHUTDOWN PROCEDURE should ALWAYS be followed:

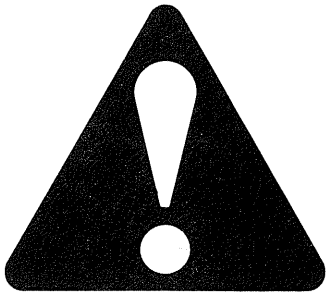
1. **Move the Propulsion Control T-bar to the "neutral" position**
2. **Lower the Lift Arms completely and roll the Attachment (Bucket or Fork) forward so that the front edge is in contact with the ground.**
3. **Engage the Hand Brake**
4. **Move the Throttle to the slow idle position, shut the Engine off and remove the Ignition Key**
5. **If the Lift Arms MUST be left in the "raised" position, BE SURE to properly engage the Mechanical Lift Cylinder Lock instead of performing step 2.**

GEHL Skid Loaders are designed and intended to be used ONLY with a mounted GEHL Company Attachment (Bucket or Fork) or with an approved (by GEHL) accessory Attachment! The GEHL Company will NOT be responsible for operator safety if used with an unapproved Attachment!

Some photographs, used herein, may show Door(s), Guard(s) or Shield(s) open or removed for illustration purposes ONLY! BE SURE that all Door(s), Guard(s), or Shield(s) are in their proper position(s) and securely attached BEFORE operating the Loader!

Read and observe ALL Safety information and Decals on the Loader BEFORE operating the unit! In addition, familiarize yourself with ALL of the Safety devices and periodically check that they are functioning properly!

The stability of a Skid Loader is determined by its desirable but short wheel base. Any or all of the following elements: the terrain, the Engine speed, the load being carried or dumped, and/or abrupt T-Bar movements, can affect stability! IF MISUSED, ANY OF THE ABOVE FACTORS CAN CAUSE THE LOADER TO TIP, THROWING YOU FORWARD OR OUT OF THE UNIT, CAUSING DEATH OR SERIOUS BODILY INJURY! Therefore, ALWAYS have the Secondary Operator Restraint Bar "lowered" and wear the Seat Belt! Operate the Control T-Bars smoothly and gradually at an appropriate Engine speed which matches the operating conditions!



SAFETY

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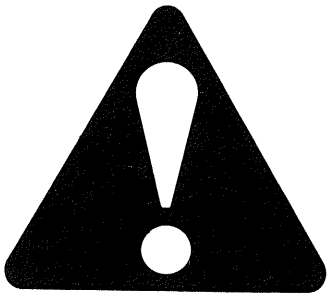


BEFORE leaving the Operator's Compartment, engage the Hand Brake and remove the Ignition Key!

Rest the Attachment on the ground when the Loader is NOT being used!

BE SURE that both Control T-bars are in their "Neutral" positions BEFORE attempting to start the Loader Engine!

For additional stability when operating on inclines or ramps, ALWAYS travel with the heavier end of the Loader in the same direction as the top of the incline!

ALWAYS carry the loaded Attachment as low as possible and travel with the Lift Arms down, to insure maximum stability!

To prevent unexpected and undesired Attachment release from the Lift Arms, BE SURE to secure the Hydro-lock Handles to the Anchor Pins on the Hydro-lock Mechanism with Lockpins provided, BEFORE and while operating the Loader!

Keep ALL Guards, Shields and Decals in place and properly secured!

CAREFULLY inspect ALL Hydraulic Hoses and connections on a routine basis; NEVER use your hand, escaping fluid under pressure can cause serious injury!

ALWAYS wear Safety Glasses with Side Shields when striking metal against metal! In addition, it is recommeded that a softer (non-chipable material) be used to cushion the blow. Failure to heed could result in serious injury to the eye(s) or other part(s) of the body!

Do NOT exceed the Loader's rated operating capacity for any Bucket (or Attachment) being used!

Do NOT allow minors and personnel, other than a qualified operator, to operate or be near the Loader unless properly supervised; a Skid Loader is a single Seat NO passenger machine!

Do NOT operate the Loader in a closed or confined area; if necessary, adequate ventilation MUST be provided!

Do NOT leave the Operator's Compartment with the Lift Arms raised, unless the Mechanical Lift Cylinder Lock and the Hand Brake are properly engaged and the Ignition Key is removed!

Do NOT extend your feet beyond the front bounds of the Operator's Compartment!

Do NOT raise or drop a loaded Bucket or Fork suddenly! Abrupt movements under load can cause serious instability!

Do NOT push the Lift/Tilt Control T-Bar all the way forward (into the "float" position) with the Attachment loaded and the Lift Arms raised as this will cause the Lift Arms to drop!

Do NOT drive too close to an excavation or ditch; BE SURE the surrounding ground has adequate strength to support the weight of the Loader and the load!

Do NOT attempt to tow the Loader without first engaging the Emergency Hydrostatic Lockouts!

Do NOT attempt to remove the 3410 Radiator Cap when the Engine is HOT, running or overheated. Coolant is extremely HOT and under pressure. Wait for the Engine to cool BEFORE relieving the pressure and removing the Radiator Cap!

REMEMBER! It is the owner's responsibility for communicating information on the safe use and proper maintenance of this machine!

CHAPTER 5

CONTROLS & SAFETY EQUIPMENT

This Skid Loader is provided with features for operator safety and convenience.

CAUTION: Become familiar with and know how to use ALL safety devices and controls on the Skid Loader BEFORE attempting to operate the unit. Know how to stop Loader operation BEFORE starting it. This GEHL Skid Loader is designed and intended to be used ONLY with a mounted GEHL Company Attachment (Bucket or Fork) or an approved (by GEHL) accessory or referral attachment. The GEHL Company can NOT be responsible for operator safety if Loader is used without a recommended and approved Attachment.

CHOKE (SL3310 Model Only) (Fig. 5-1)

A Choke Knob and Cable linkage is provided on the SL3310 Gasoline Engine model Skid Loader for cold starting assistance, when required. The Choke Knob is located in front of and below the Seat assembly. After the Engine has warmed-up and is running smoothly, **BE SURE** to push the Knob in all the way.

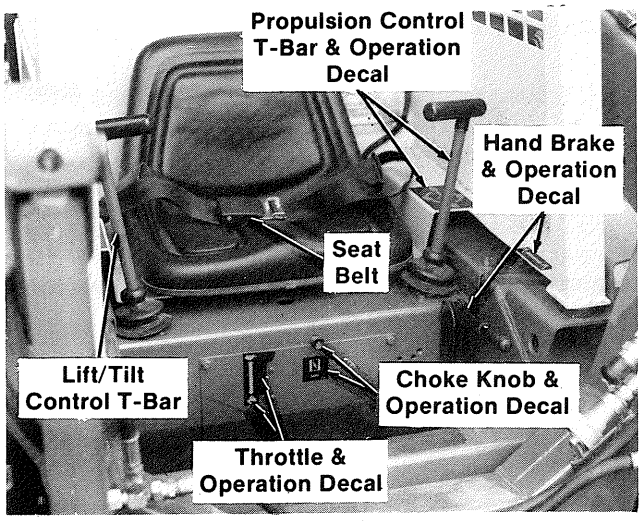


Fig. 5-1

FOOTPEDAL (for Optional Front Hydraulics Controls) (Fig. 5-2)

Skid Loaders, which are equipped with optional (factory or field installed) Auxiliary Hydraulics, have a Footpedal on the left side. The Footpedal is used to control operation of the Auxiliary Valve and the direction of oil flow into and out of the Male and Female Quick-disconnect Fittings mounted on the front of the Lift Arms.

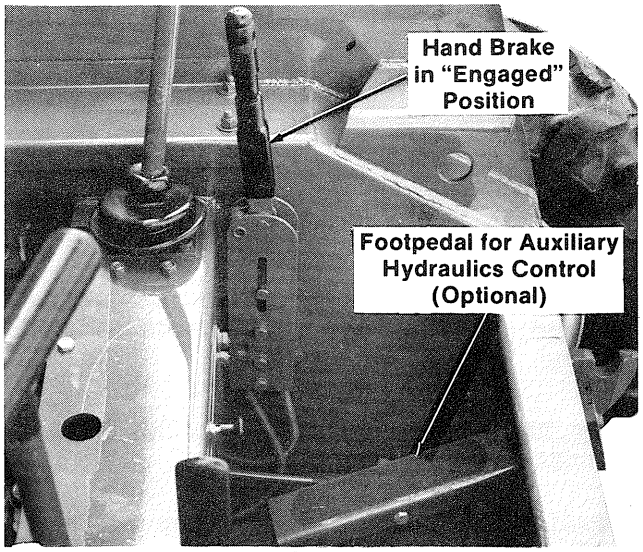


Fig. 5-2

GUARDS & SHIELDS

Whenever and wherever possible and without affecting Loader operation, Guards and Shields have been used on the unit to protect potentially hazardous areas. In many places, Decals are also provided to warn of potential dangers as well as to display special operating procedures.

WARNING: Read and observe ALL Warnings on the unit BEFORE attempting to operate the Loader. Do NOT attempt to operate this equipment unless ALL factory installed Guards and Shields are properly secured in place.

HAND BRAKE (See Figs. 5-1 & 5-2)

The Skid Loader is furnished with a Hand Brake which functions as both a parking brake and an emergency brake. The Hand Brake Handle is linked by Cables to a Disc Brake assembly on each Hydrostatic Drive Motor. As an emergency brake, the Hand Brake can be gradually engaged to slow-down and stop Wheel rotation.

CAUTION: Function and adjustment of the Hand Brake should be checked on a routine basis to maintain proper operation at all times. The Hand Brake should NEVER be used as a means of checking Hydrostatic torque as this will cause overheating and accelerated wear of the Discs and Pads resulting in early and unexpected Hand Brake failure.

HYDRO-LOCK LEVERS (Fig. 5-3)

Hydro-lock Levers are provided on the Skid Loader to conveniently hook-up and lock the Attachment (Bucket or Fork) onto the front of the Lift Arms. The Hydro-lock Latching and Locking Mechanism enables use of the Loader Hydraulics system to facilitate hooking-up and removing the Attachment. **BE SURE** to use the Lockpins provided to secure the Hydro-lock Levers to the Anchor Pins in either the "attached" or the "released" positions of both Levers.

IN-LINE CIRCUIT FUSE(S)

An In-line 30 Ampere Fuse is provided to protect the wiring to the Starter from overloads due to circuit malfunctions or accidental grounding.

NOTE: Do NOT attempt to defeat the fusing by jumping the Holder or by using a higher amperage fuse.

On SL3410 model Loaders only, an additional 30 Ampere In-line Fuse is provided in the Fuel Shut-off Solenoid electrical circuit.

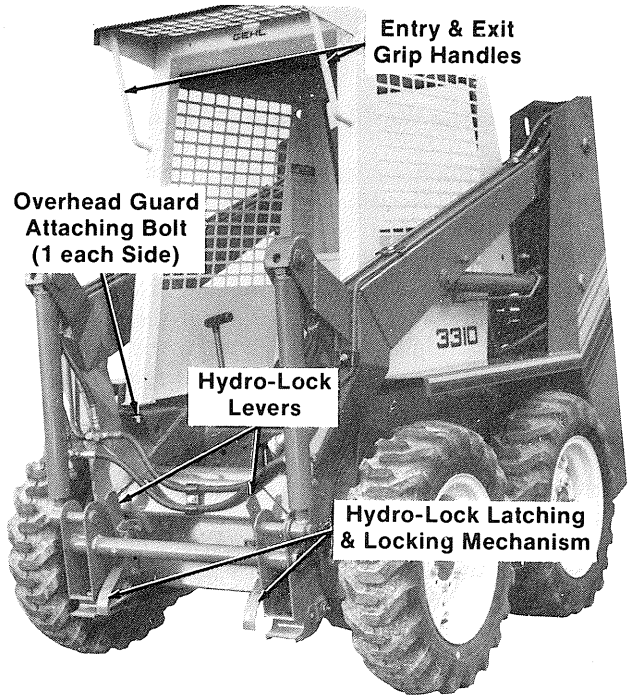


Fig. 5-3

INTERLOCKS

Lift Cylinder

The Hydraulic Cylinders, which control the Lift Arms, have their rear ports connected through a Solenoid Valve. This Valve is controlled by a Relay which is activated by pressure-sensitive Switches mounted in the Seat and the Secondary Operator Restraint Bar Pivot assembly. When the Operator sits on the Seat with the Restraint Bar lowered and the Ignition Key is "on", both Switch contacts are closed to activate the Relay contacts closing the circuit to the Solenoid Valve and allowing normal oil flow through the Lift Cylinders. If the Operator leaves the Seat or shuts off the Ignition Key or raises the Restraint Bar, the Relay contacts open and power to the Solenoid Valve is turned off which blocks oil flow from the rear ports of the Cylinders. When the flow is blocked, the Cylinders will hold their positions and thus stop Lift Arm travel.

CAUTION: Operation of the Lift Cylinder Interlock should be tested frequently to insure proper operation at all times. NEVER attempt to defeat system function by mechanically or electrically bypassing the Switches, Relay or Solenoid.

Starter Circuit

A second Relay, which is activated by the pressure-sensitive Switches mounted in the Seat and the Secondary Operator Restraint Bar Pivot assembly, is provided to control operation of the Ignition system starter circuit. When the Operator sits on the Seat with the Secondary Operator Restraint Bar lowered, both Switch contacts are closed to activate the Relay contacts energizing the starter circuit. The Switches are safety devices which make it necessary for the operator to always be seated on the Seat and have the Restraint Bar lowered in order to start the Engine. The Engine will **NOT** stop however, if the operator leaves the Seat with the Engine running or if he raises the Restraint Bar.

CAUTION: Operation of the Starter Interlock should be tested frequently to insure proper operation at all times. NEVER attempt to defeat system function by mechanically or electrically bypassing the Switches or Relay.

MECHANICAL LIFT CYLINDER LOCK (Figs. 5-4 & 5-5)

WARNING: ALWAYS use the Mechanical Lift Cylinder Lock when the Lift Arms are raised and BEFORE leaving the Operator's Compartment to work around the outside of the Loader with the Lift Arms raised.

A Mechanical Lock is provided on the left side of the Lift Arms to be used as a Cylinder block to prevent the Lift Arms from unexpectedly lowering while working around the Loader while the Lift Arms are raised. When the Lock is **NOT** being used, it can be secured to the Anchor Pin on the underside of the Lift Arm using the Lockpin provided. Refer to the details in the Adjustments chapter for correct engagement and disengagement procedure. The Lift Cylinder Lock is a safety device which should always be kept in proper operating condition at all times.

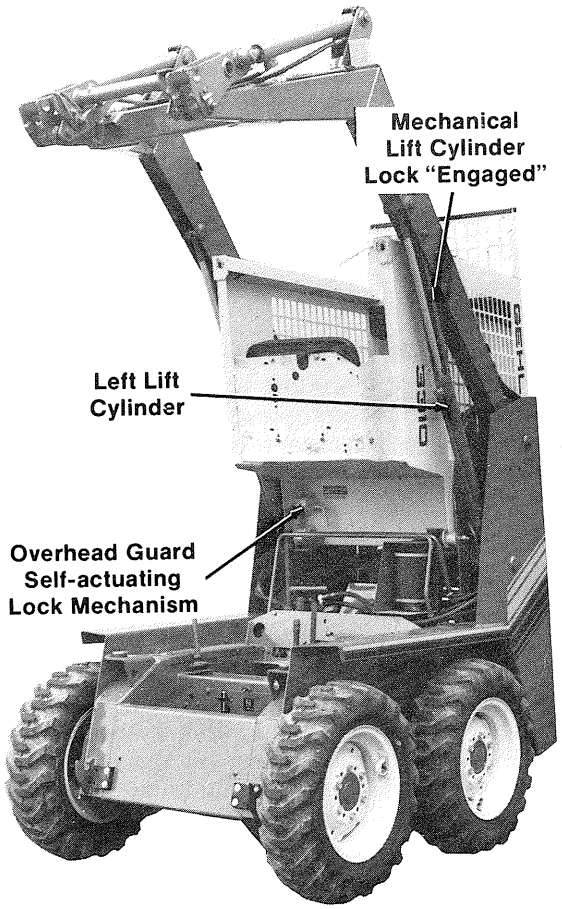


Fig. 5-4: Lift Arms Raised & Overhead Guard Unbolted & Rolled-back

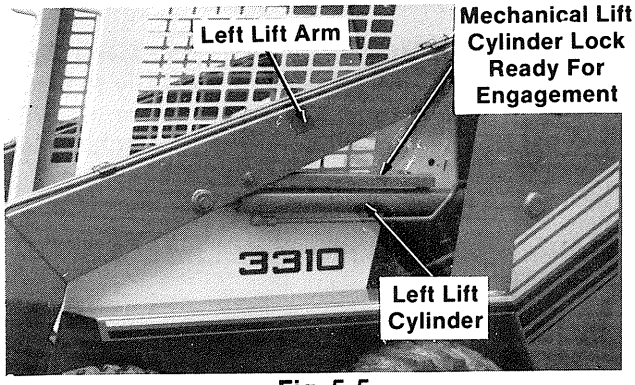


Fig. 5-5

OVERHEAD GUARD & LOCK MECHANISM (See Figs. 5-3 & 5-4)

The Overhead Guard, provided on all Skid Loaders, is SAE ROPS and FOPS approved. The Guard is designed to protect the operator from falling objects and to be a lifesaving protection if the Loader is accidentally tipped-over or rolled, provided the operator is secured within the confines of the Overhead Guard by the Seat Belt and Restraint Bar. When the Guard is unbolted and rolled-back, a self-actuating Lock Mechanism engages a hole in the Chassis Riser to maintain the Guard in the rolled-back position.

WARNING: NEVER attempt to operate the Skid Loader with the Overhead Guard removed or locked back. BE SURE that the end of the Lockpin is protruding through the hole in the Riser when the Guard is rolled-back. Properly support the Overhead Guard while releasing the Lockpin and lowering it and, BE SURE to replace and secure the front anchor bolts and locknuts.

OVERHEAD INSTRUMENT & CONTROL PANEL (Figs. 5-6)

The Overhead Instrument and Control Panel contains several Loader and Engine controls Switches and Indicators. Internationally recognized standard symbols are provided on the Panel to represent various functions, conditions and Switch positions.

Ammeter (3310 model only)

On the 3310 model only, an Ammeter is provided on the left side of the Panel next to the Fuel Level Gauge. The Ammeter provides a visual indication of whether the Battery is discharging or being charged. The Ammeter Needle should register zero when the Engine is **NOT** running and be in the "charge" (+) area when the Alternator is charging the Battery.

Battery Charge Warning Light (3410 models only)

A Square-framed Indicator Light is provided on the right side of the Hourmeter (on SL3410 model Loaders only), to warn (when lighted) of a malfunction in the Battery charge system, when the Engine is running. When the Engine is **NOT** running and the Ignition Key is in either the "On" (run) position or the "Accessory" position, both Lights will be lighted; this can be termed the "bulb-test" position. **BE SURE** to return the Ignition Key to "Off" and remove the Key when leaving the Operator's Compartment.

Control Panel Fuse

A Fuse Holder is provided on the left side of the Panel to protect the wiring to the Switches, Gauges and Indicators from overloads due to circuit malfunction or accidental grounding. The Holder accepts an SAE 20 ampere in-line style Fuse.

NOTE: Do NOT attempt to defeat the fusing by jumping the Holder or by using a higher amperage Fuse.

Fuel Level Gauge

A Fuel Level Gauge is provided on the far left side of the Panel for monitoring the level of fuel in the Tank. The Gauge has three division marks between empty and full to represent the amount of fuel remaining in the 8.5 gallon (32 liter) Fuel Tank.

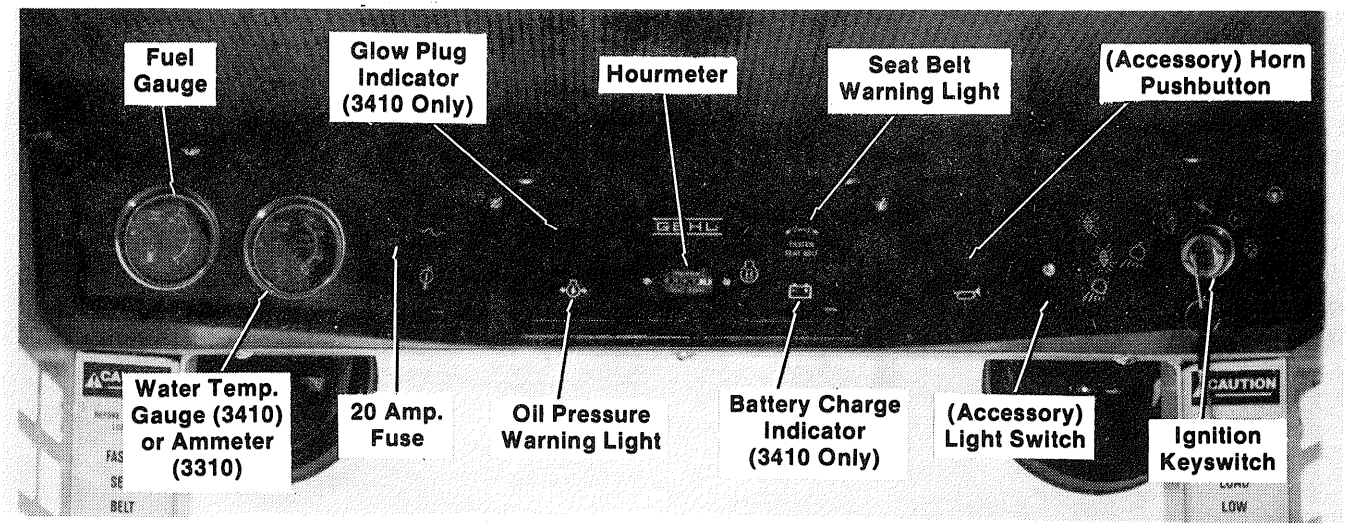


Fig. 5-6

Horn (Accessory)

An optional Horn Kit can be installed on the Skid Loader, when desired. By design, the Horn is designed to be installed with existing hardware inside the left Riser above the Fuel Tank and a location for the Horn Pushbutton Switch is already marked on the Panel. The power connection lead, between the Pushbutton and Horn, is already provided in the Main Wiring Harness.

Hourmeter

An Hourmeter is provided in the center of the Panel for added convenience in proper routine maintenance performance. The Hourmeter has a capacity for 9999 hours of operating time, a 1/10 hour Indicator and a "running" Indicator. The Hourmeter is especially useful for logging time in the Maintenance Schedule at the back of this manual.

Ignition (& Cold Start-3410) Keyswitch

The Ignition Keyswitch, is located on the right end of the Panel. International symbols, around the perimeter of the Switch, denote the functions and positions the Key can be moved to. For the gasoline Engine model Loader, the positions are (going clockwise): Accessories, Off, On (Run) and Start. For the diesel Engine model Loader, the positions are (going clockwise): Glow Plug Heater, Off, On (Run) and Start. To operate the Glow Plugs, the Key **MUST** be turned counterclockwise and held for 30 seconds to 1 minute, depending on outside conditions, until the Indicator glows. Then, rotate the Key clockwise to start the diesel Engine.

NOTE: The Key MUST always be returned to the "Off" position between starting attempts.

Light Switch (Accessory)

An accessory Light package can be field installed on the Skid Loader, when desired. The Light Switch is mounted on the Panel to the left of the Starter Keyswitch. International symbols denote the four positions of the Light Switch. In a clockwise direction these are: Off, Flashers, Headlight/Taillight with flashers and, Headlight/Taillight only. For the Lights to operate, the Ignition Keyswitch **MUST** be in either the "Accessories" or the "On" (Run) position.

Oil Pressure Warning Light

A Square-framed Indicator Light is provided on the right side of the Hourmeter to warn of a malfunction in the Engine Oil system, when the Engine is running. When the Engine is **NOT** running and the Ignition Key is in either the "On" (Run) position or the "Accessory" position, the Indicator Light will be lighted; this can be considered the "bulb-test" position. **BE SURE** to return the Key to "Off" and remove it when leaving the Operator's Compartment.

Seat Belt Warning Light & Buzzer

Audible and visual indication is provided to remind the operator to fasten his Seat Belt. The Warning circuit to activate the Seat Belt Indicator Light and Buzzer operates for a few seconds after the Ignition Switch is activated, then, it self-extinguishes.

Water Temperature Gauge (3410 models only)

A Gauge is provided on the left side of the Panel next to the Fuel Level Gauge on SL3410 model Loaders only, to monitor cooling system water temperature. The Gauge has both Fahrenheit and Celcius scales for full range coolant temperature indication. Under normal operating conditions, the water temperature will be at approximately 185F (85C). Under peak loading conditions, operating temperatures may rise as high as 220F (105C).

SEAT BELT (Fig. 5-7)

The Seat Belt furnished on all Skid Loaders meets SAE J386 Regulations for construction equipment use. **BE SURE** to adjust both Belt sections to obtain the correct length to match your build and comfort requirements.

CAUTION: BE SURE to fasten and properly adjust your Seat Belt BEFORE starting the Loader Engine. When properly adjusted, Seat Belt Buckle should be centered and Belt slack should be minimal.

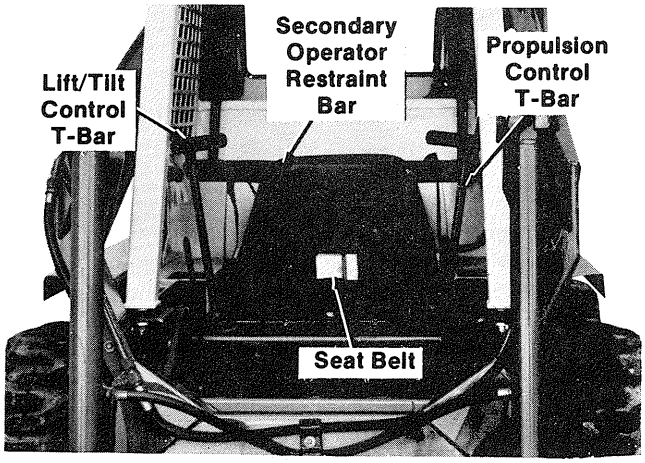


Fig. 5-7

SECONDARY OPERATOR RESTRAINT BAR (Fig. 5-7)

The Secondary Operator Restraint Bar (Seat Bar) is a sturdy Bar which is securely anchored to the Overhead Guard. It is designed to be pivoted up when leaving or down after entering the Operator's Compartment. When used in conjunction with the Seat Belt, the Restraint Bar serves to keep you in the Operator's Compartment. The Restraint Bar pressure-sensitive Switch is wired in series with the Switch in the Seat to form an interlock for the Lift Cylinder and Starter circuits so that the Lift Arms will **NOT** lower and the Engine can **NOT** be started unless the operator is on the Seat and the Restraint Bar is "lowered".

For operator comfort and convenience, the Restraint Bar is fully padded and intended to serve as an arm rest, while operating the Loader.

WARNING: NEVER attempt to electrically or mechanically defeat the Secondary Operator Restraint Bar and, in addition, ALWAYS wear your Seat Belt; both are there to protect you.

T-BARS (Figs. 5-7 & 5-8)

Side-mounted T-Bars are provided on the Skid Loader to control the hydraulic and hydrostatic functions of the Loader.

CAUTION: ALWAYS make sure that both T-Bars are in their "neutral" positions BEFORE attempting to start the Engine. Excessive speed for either T-Bar movements and operations with NO regard for conditions and circumstances can be hazardous.

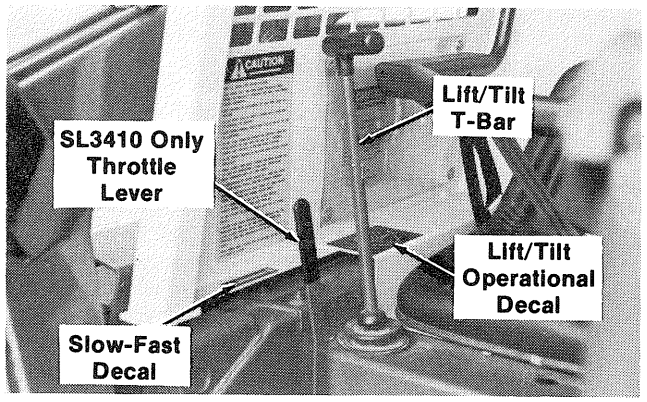


Fig. 5-8: SL3410 Lift/Tilt T-Bar & Throttle Lever

Propulsion Control T-Bar

The left hand T-Bar is the Propulsion Control which is linked to the Hydrostatic Transmissions. Push the T-Bar straight (without twisting) forward from the neutral position to cause a forward Loader movement. Pull the T-Bar straight (without twisting) backward from the neutral position to cause a rearward Loader movement. Twisting the T-Bar clockwise will cause a spin turn to the right. Twisting the T-Bar counterclockwise will cause a spin turn to the left. On a spin turn, the Wheels (opposite the direction of the turn) will rotate forward and the Wheels (on the same side as the direction of the turn) will rotate rearward. When the T-Bar is moved slightly forward or rearward and twisted, a slow gradual forward or rearward turn will be maneuvered. The farther the T-Bar is moved forward or rearward or twisted in either direction, the faster the resulting maneuver will be made. Engine RPM also has a directly proportional affect on movement.

Lift/Tilt Control T-Bar

The right hand T-Bar is the Lift (Arm) and Tilt (Attachment) Control which is linked to the Loader's Main Hydraulic Control Valve. Twisting the T-Bar clockwise dumps the Bucket and twisting it counterclockwise rolls the Bucket up or back. Pushing the T-Bar straight forward (without twisting) lowers the Lift Arms and pulling the T-Bar straight back (without twisting) raises the Lift Arms. Pushing the T-Bar all the way forward, past the detent, places the Lift Arms in the "float" condition. The speed of all movements controlled by the Lift/Tilt T-Bar is directly proportional to the amount of T-Bar movement and the Engine RPM.

THROTTLE (Fig. 5-8 & See Fig. 5-1)

On the SL3310 model Loader, a Throttle Lever is provided for adjusting the Engine RPM. Pushing the Lever down increases RPM and pulling the Lever up decreases RPM.

On the SL3410 model Loader, a right hand control Throttle Lever is provided for adjusting the Engine RPM. Pushing the Throttle forward increases the RPM and pulling the Throttle Lever backwards decreases the RPM.

CHAPTER 6

OPERATION

CAUTION: BEFORE starting the Skid Loader Engine and operating the Loader, review and comply with ALL Safety recommendations set forth in the SAFETY chapter of this manual. Know how to STOP the Loader BEFORE starting it. BEFORE starting the Loader Engine, BE SURE to fasten and properly adjust the Seat Belt.

GENERAL INFORMATION (Fig. 6-1)

Stopping Loader

The following procedure is the recommended sequence for stopping the Loader:

1. Move the Propulsion Control T-bar to the "neutral" position and engage the Hand Brake.
2. Using the Lift/Tilt Control T-bar, completely lower the Lift Arms and rest the front edge of the Attachment (Bucket or Fork) on the ground.
3. Move the Throttle to the "idle" position (toward Turtle symbol).
4. Turn the Ignition Key to the "off" position to shut the Engine off.
5. Engage the Hand Brake, raise the Restraint Bar, unlatch the Seat Belt and grasp the Hand Holds while climbing out of the Operator's Compartment.

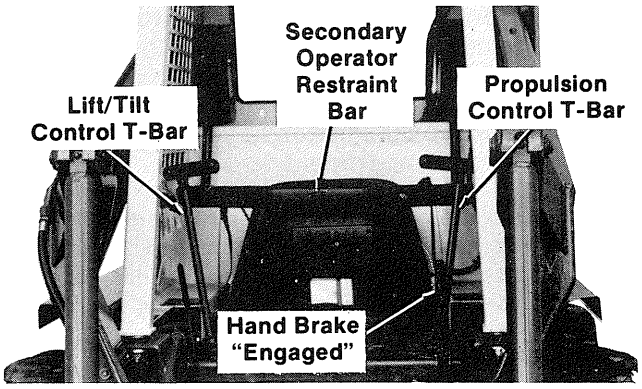


Fig. 6-1

Before Starting Engine

Before actually starting the Engine and running the Loader, familiarize yourself with the Control T-bars to coordinate your mind with your hand movement. Grasp the T-bars and move them in the appropriate directions to simulate the various movements of the Loader, Lift Arms and Attachment.

Starting Engine

The following procedure is recommended for starting either a gasoline or diesel powered Loader:

1. Step up onto the back of the Bucket. Then, grasp the Hand Holds, pivot around and move backwards into the Operator's Compartment.
2. Sit on the Seat, fasten the Seat Belt and lower the Restraint Bar.

CAUTION: ALWAYS fasten your Seat Belt BEFORE starting the Loader Engine. Leave the Hand Brake "engaged" until the Engine is running and you are ready to operate the Loader. Keep your left hand on the Propulsion T-bar while starting Engine.

3. Check that both Control T-bars are in their "neutral" positions.
4. Move the Throttle to about the midpoint of its travel.

5a. **On a Gasoline Engine model only,** pull the Choke Knob out and turn the Ignition Key to start the Engine. After the Engine is running and becomes sufficiently warmed-up, push in the Choke.

5b. **On a Diesel Engine model only,** rotate the Ignition Key counterclockwise, of the "OFF" position to activate the Glow Plugs. Hold the Key in this position until the Indicator glows. Then, rotate the Key, in the opposite (clockwise) direction, to start the Engine.

NOTE: If the Engine runs a short time and dies-out or will NOT start, return the Ignition Key to the "off" position and repeat step 5 until the Engine can be started and kept running. BE SURE to allow a sufficient warm-up time before attempting to operate the Control T-bars. Do NOT continue to crank the Starter for more than 20 seconds at a time.

Stopping Loader Movement

The Hydrostatic Transmissions of the Skid Loader control forward and reverse acceleration and speed. As rapidly as the Propulsion Control T-bar is moved to the straight "neutral" position, movement of the Wheels is slowed accordingly. By all means, **BE SURE** to move the Propulsion Control T-bar gradually and deliberately to slow-down and stop the Wheels.

CAUTION: Operate the Propulsion Control T-bar gradually and smoothly when starting, stopping, turning or reversing Loader directions.

First-time Practice Running

CAUTION: BE SURE the area being used for test-running is clear of spectators and obstructions. Operate the Loader with an empty Attachment.

Smoothest and most efficient Loader operation is achieved while operating the Engine at half Throttle. After the Engine is sufficiently warmed-up, with the right hand slowly and deliberately pull straight back on the Lift/Tilt Control T-bar to raise the Lift Arms. Twist the T-bar to roll the Attachment forward or back. Attempt all raise and lower functions, Attachment roll forward and backward functions, and combinations of the two functions before proceeding to operate the Propulsion Control T-bar. **BE SURE** also to lower the Lift Arms and roll the Attachment back before proceeding to operate the Propulsion Control T-bar.

With your right hand off the Lift/Tilt T-bar, slowly and deliberately move the Propulsion Control T-bar with your left hand straight forward to travel forward with the Loader. Then, slowly pull the T-bar back to "neutral" to stop forward movement. To travel backwards, slowly and deliberately move the T-bar straight back. Then return the Propulsion Control T-bar to the "neutral" position to stop reverse movement. Next, twist the T-bar slowly clockwise to turn right and counterclockwise to turn left. Attempt all forward, reverse and turning movement before proceeding to operate both T-bars at the same time.

Skid Loader operating skills are only obtained through proper coordination of the Loader's forward and reverse movements with raising and lowering the Lift Arms and with rolling the Attachment forward and backward. To gain proficiency, practice all Control T-bar operations until they happen naturally and without mistake or hesitation.

CAUTION: Excessive speed for conditions and circumstances can be hazardous. ALWAYS exercise caution and good judgement while operating the Skid Loader.

If the Loader Engine kills while the Lift/Tilt T-bar is being operated to raise the Lift Arms, the Lift Arms will stop rising and hold at the level already reached. Lower the Lift Arms and return the T-bar to "neutral" before attempting to restart the Engine. If the Loader Engine kills while the Lift/Tilt Control T-bar is being operated to lower the Lift Arms, the Arms will continue to lower until they rest against the Loader Frame. Return the T-bar to "neutral" before attempting to restart the Engine.

HAND BRAKE (Fig. 6-2)

CAUTION: BEFORE leaving the Operator's Compartment, engage the Hand Brake and remove the Ignition Key. BE SURE also to lower the Lift Arms or engage the Mechanical Lift Cylinder Lock, as appropriate.

In an **EMERGENCY** or otherwise when it becomes necessary to **STOP** Loader forward or reverse movement **IMMEDIATELY,** pull-up on the Hand Brake to engage

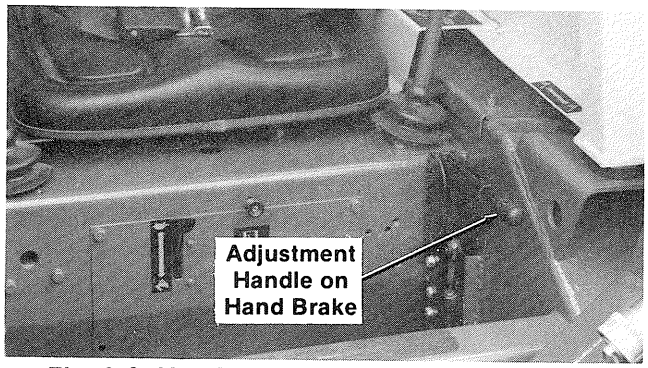


Fig. 6-2: Hand Brake in Disengaged Position

the Disc Brake assemblies on the Hydrostatic Motor Drive Shafts. The proper sequence for correct Loader operation is to always engage the Brake before shutting off the Loader Engine and to disengage the Brake **ONLY** after the Engine is running and you are ready to move the T-bars.

NOTE: The Hand Brake is NOT intended to be used as the primary means of stopping Loader movement. The Hydrostatic Drive has enough torque to overpower the Hand Brake. BE SURE the Hand Brake is in the "disengaged" position whenever the Loader is being driven.

MECHANICAL LIFT CYLINDER LOCK (Figs. 6-3, 6-4 & 6-5)

CAUTION: BEFORE leaving the Operator's Compartment to work around the outside of the Loader with the Lift Arms raised, ALWAYS engage the Mechanical Lift Cylinder Lock. BE SURE also to engage the Hand Brake and remove the Ignition Key BEFORE leaving the Operator's Compartment.

The Mechanical Lift Cylinder Lock will hold the Lift Arms in the raised position and prevent accidental dropping if the Lift/Tilt T-bar is actuated or the hydraulic Hose connections are disconnected.

Lock Engagement

To operate the Lock, first lower the Lift Arms into contact with the Loader Frame. Then, stop the Engine and turn the Ignition Key off and engage the Hand Brake. Next, leave the Operator's Compartment and pull the Pin which holds the Lock up against the Lift Arm and allow the Lock to come down into contact with the Lift Cylinder. Then, get back into the Operator's Compartment and restart the Engine. Next, operate the Lift/Tilt T-bar to raise the Lift Arms until the Lock drops over the end of the Lift Cylinder Housing and around the Cylinder Shaft. Then, carefully lower the Lift Arms just enough so that the Lock securely contacts the Rod end of the Lift Cylinder.

Lock Disengagement

To return the Mechanical Lift Cylinder Lock to its "storage" position, first raise the Lift Arms completely. Then, stop the Engine and turn the Ignition Key to the "off" position. Then, before leaving the Operator's Compartment, check if the Lift Arms are held in the raised position by the Solenoid Holding Valve by pushing the Lift/Tilt T-bar forward. If the Solenoid Valve will **NOT** hold the Lift Arms in the raised position, do **NOT** leave the Operator's Compartment until the Lift Arms have been lowered or, have another person replace the Lock into the "storage" position for you. To store the Lock, raise it back up into contact with the Lift Arms and install the Lockpin thru the hole in the Lock Anchor Pin under the Lift Arm.

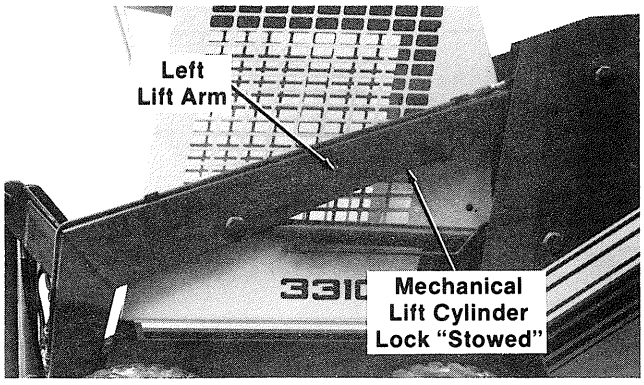


Fig. 6-3

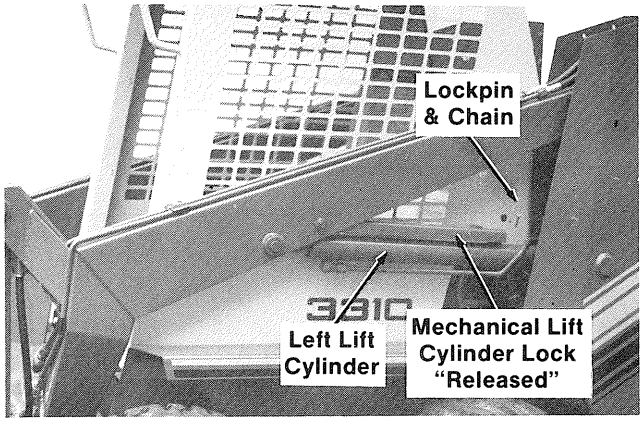


Fig. 6-4

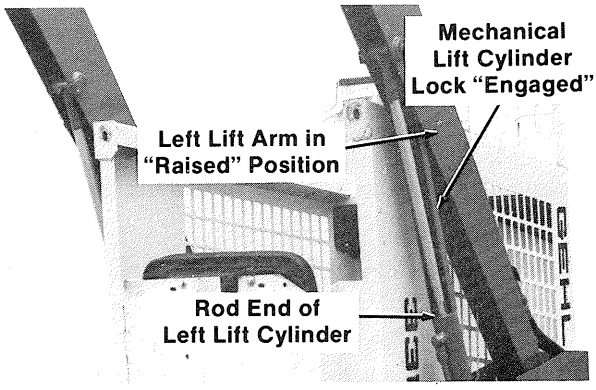


Fig. 6-5

Table of Common Material Densities in lb/cu ft*

Materials	For 6.8 & 7.3 cu ft Buckets	For 10.5 cu ft Buckets	For 13 & 16 cu ft Buckets
Alfalfa Meal			17
Ashes			35 - 50
Barley			38
Bone Meal		60	
Bran			20
Brick-common	112		
Carrots			40
Cement	110		
Clay	80 - 100		
Concrete	115		
Corn-shelled			45
Corn-ear			28
Cotton Seed			25
Cinders			50
Coal-antracite	94		
Coke			30
Earth-loam dry		65	
Earth-loam wet	100		
Ensilage			36
Flax Seed			45
Fertilizer Blend		66	
Gravel-dry	90		
Gravel-wet	115		
Gypsum-crushed	95		
Lime		60	
Lime Stone	90		
Manure-dry			45
Manure-wet		65	
Milo			45
Oats			26
Onions			46
Peanuts-shelled			20
Phosphate-granular	90		
Potash		68	
Potatoes			48
Rice			48
Rye			44
Salt-dry	100		
Sand-dry	108		
Sand-wet	125		
Sand-foundry	95		
Shale-crushed	90		
Silage			40
Soybean Meal			40
Soybeans-whole			50
Sugar-granulated		55	
Sugar Beets			50
Sulpha Mag	95		
Taconite Pellets	107		
Wheat			48

*For kg/m^3, Multiply lb/ft^3 x 16

MATERIAL DENSITIES

The preceding Table lists densities for some common materials which can be carried in a Bucket. The densities listed are average values and intended only as a guide for Bucket selection.

CAUTION: NEVER exceed the rated operating capacity of the Loader.

NOTE: The SAE operating capacity of the SL3310 is 750 lb (340.5 kg) and the SAE operating capacity of the SL3410 is 900 lb (408 kg). To prevent exceeding the operating capacity of either model Loader, use the following table to calculate the weight of the load to be carried. Multiply the weight per cubic foot of material from the chart by the cubic foot capacity of the Bucket to obtain the specific weight of the load. For a material which is NOT in the chart, obtain its density value before selecting the appropriate Bucket.

WORKING WITH LOADER

Digging with and Loading a Bucket (Figs. 6-6, 6-7, 6-8 & 6-9)

To dig with and load a Bucket, first lower the Lift Arms down into contact with the Loader Frame and roll the Bucket Cutting Edge down into contact with the ground. Move the Loader into the material and, as the Engine loads-down, roll the Bucket back slowly and, at the same time, gradually pull back on the Propulsion T-bar to decrease your travel speed while still maintaining the Wheel torque.

NOTE: Loader working ability is increased when travel speed is decreased. To obtain maximum Wheel torque, move the Propulsion Control T-bar only a slight amount forward from its "neutral" position, while filling the Bucket.

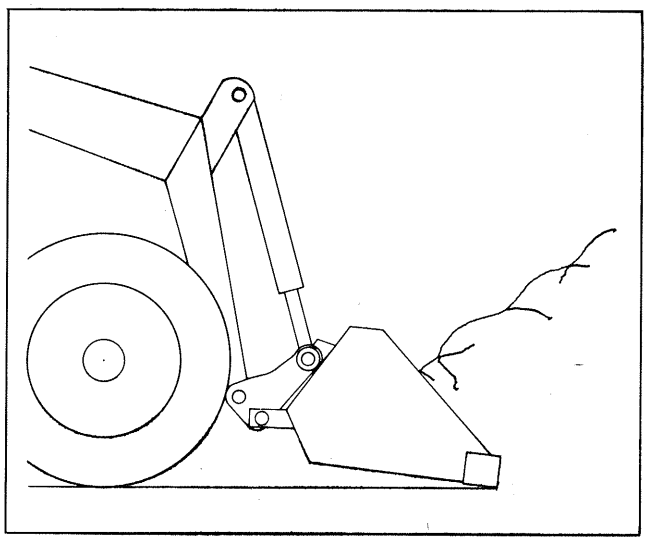


Fig. 6-6

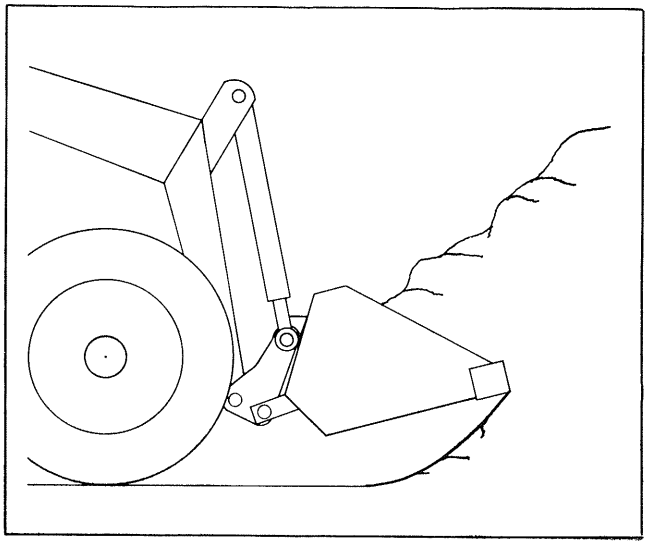


Fig. 6-7

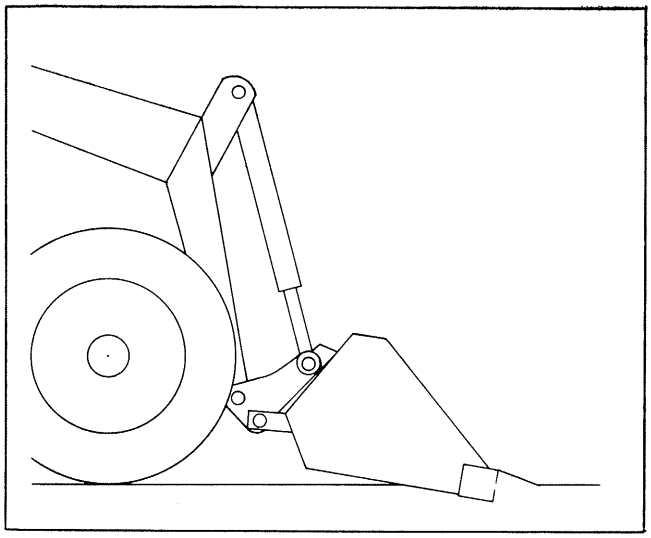


Fig. 6-8

In most hard-packed materials, to fill the Bucket, it will be necessary to also raise the Lift Arms while rolling the Bucket back. Avoid driving onto the material, if at all possible. With the Bucket filled, back the Loader away from the material and rest the Lift Arms against the Loader Frame before proceeding to the dumping area.

CAUTION: ALWAYS carry a loaded Bucket or Fork LOW with the Lift Arms resting on the Loader Frame. For additional stability when operating on inclines or ramps, ALWAYS travel with the heavier end of the Loader in the same direction as the top of the incline.

Dumping the Bucket or Fork

Onto a Pile

Carry the loaded Bucket or Fork low until reaching the pile. Then, slowly stop forward motion and raise the Lift

Arms high enough so that the Bucket or Fork clears the top of the pile. Then, slowly move the Loader ahead to position the Bucket or Fork to dump the material on top of the pile. Empty the Bucket or Fork and back the Loader away while lowering the Lift Arms and rolling the Attachment back.

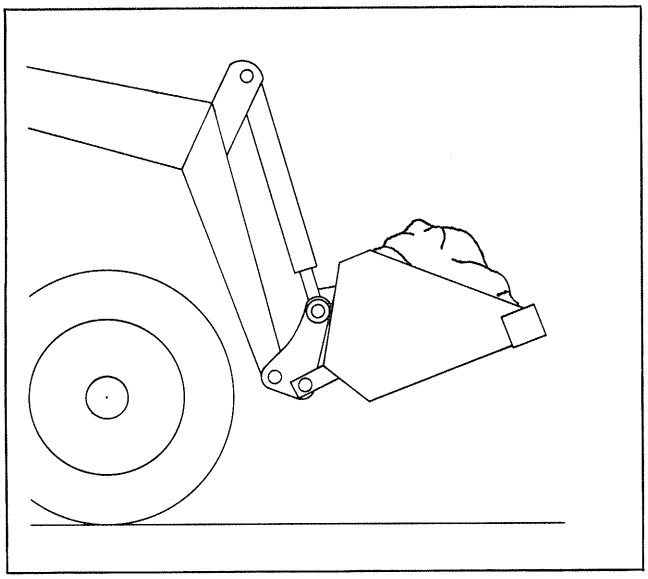


Fig. 6-9

Into a Box

Carry the loaded Bucket or Fork low and approach the truck, trailer or spreader box squarely with the side of the box. Stop your approach as close to the side of the box as possible while still allowing clearance for raising the Lift Arms and loaded Bucket or Fork. Then, raise the Lift Arms until the Attachment clears the top of the box and slowly move the Loader ahead to position the Bucket or Fork over the inside of the box. After the material is dumped, slowly back away from the box and lower the Lift Arms while rolling the Attachment back.

Over a Solid Embankment

CAUTION: Do NOT drive too close to an excavation or ditch; BE SURE the surrounding ground has adequate strength to support the weight of the Loader and the load.

Carry the loaded Bucket or Fork low while slowly traveling toward the dumping area. Stop the Loader at the position where the Attachment extends half-way over the edge of the embankment. Then, roll the Bucket or Fork forward and raise the Lift Arms to dump the material. After the material is dumped, back away from the embankment slowly while lowering the Lift Arms and rolling the Attachment back.

Scraping with a Bucket (Figs. 6-10 & 6-11)

For scraping, the Skid Loader should be operated in the forward direction. First, position the Lift Arms down against the Loader Frame. Tip the Bucket Cutting Edge at a slight angle to the surface being scraped. While traveling slowly forward, with the Bucket in this position, material can flow over the Cutting Edge and collect inside the Bucket.

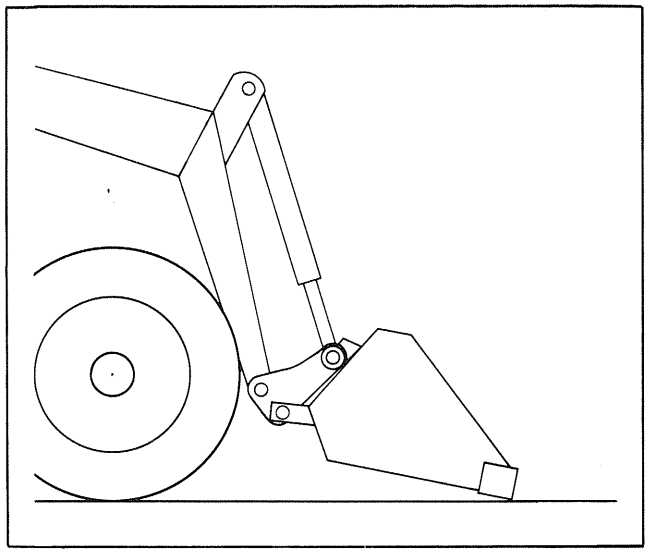


Fig. 6-10

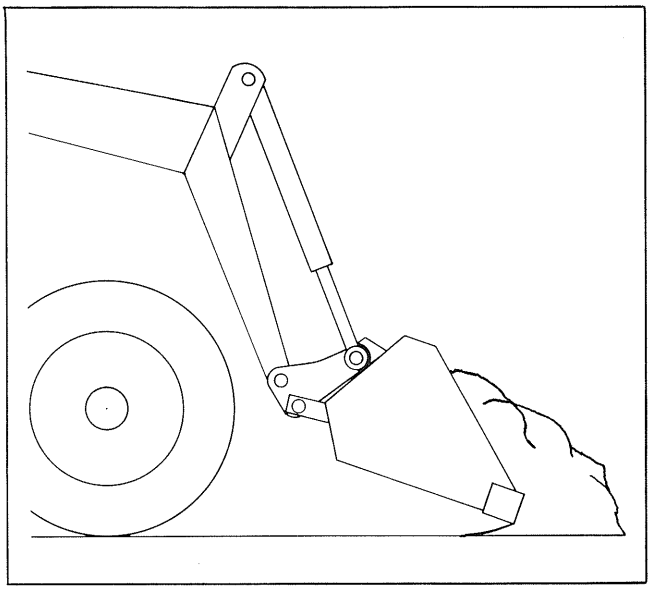


Fig. 6-11

Leveling with a Bucket (Fig. 6-12)

First drive the Loader to the outer edge of the area to be leveled. Then, with the Lift Arms down against the Frame, push the Lift/Tilt T-bar into the "float" position and roll the Bucket forward to place the Bucket Cutting Edge at a 30° to 45° angle to the surface being leveled. Proceed to drive the Loader backwards dragging the dirt and, at the same time, leveling it.

The "float" (detent) position for the Lift/Tilt Control T-bar is reached by pushing the T-bar all the way forward.

This T-bar position opens both work ports to the Reservoir and thus allows the Lift Arms to "float" while the Bucket follows the ground contour.

WARNING: NEVER push the Lift/Tilt Control T-bar into the "float" position with the Attachment loaded and the Lift Arms raised as this will cause the Lift Arms to drop.

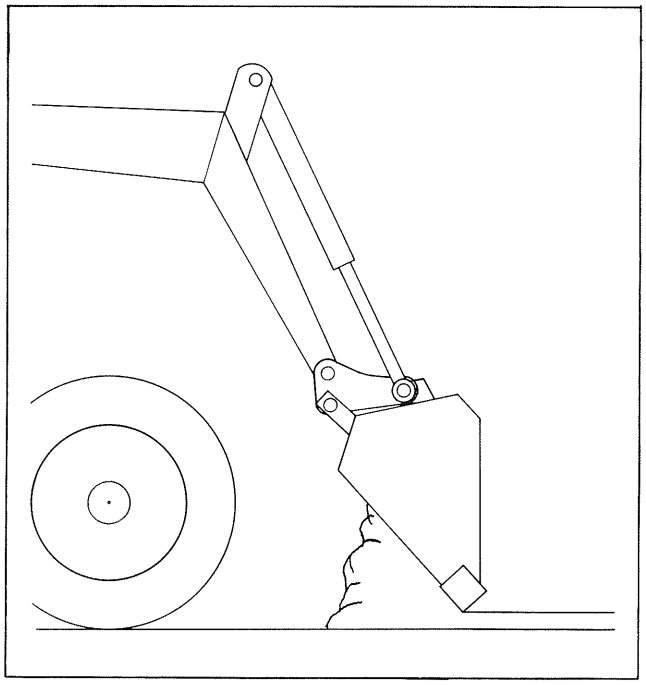


Fig. 6-12

CHANGING ATTACHMENTS (Fig. 6-13 & 6-14)

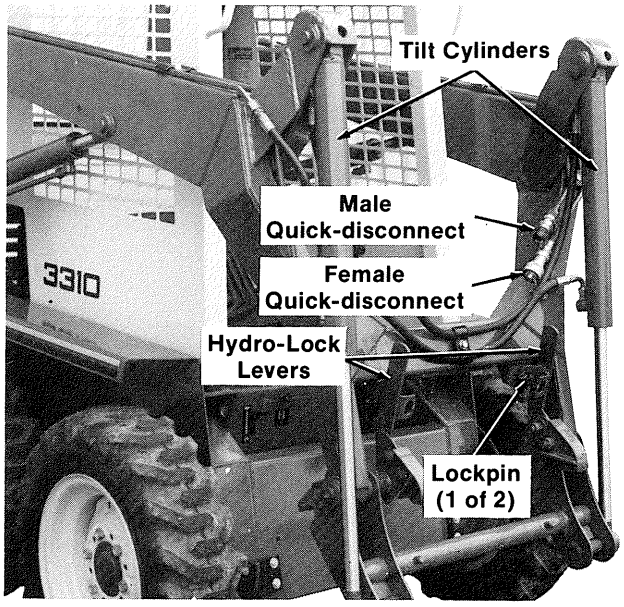


Fig. 6-13

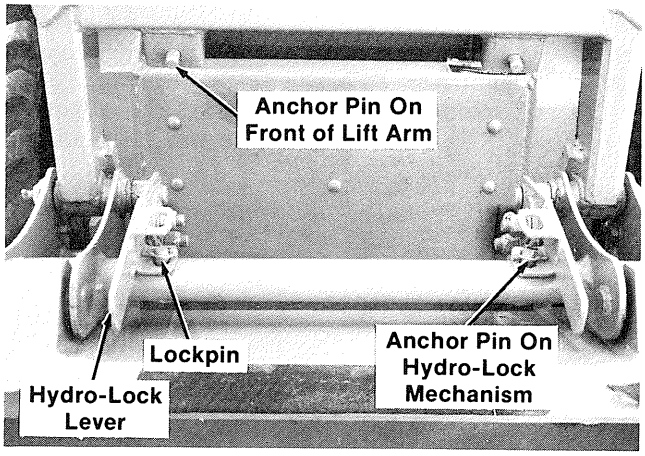


Fig. 6-14

CAUTION: To prevent unexpected and undesired Attachment release from the Lift Arms, BE SURE to secure the Hydro-lock Handles to the Anchor Pins on the Hydro-lock Mechanism with Lockpins provided, BEFORE and while operating the Loader.

The Skid Loader features a Hydro-lock Latching and Locking Mechanism which enables use of the Loader hydraulics system (if desired) to hook-up or remove the Attachment (Bucket or Fork).

To attach a Bucket or Fork, first lower the Lift Arms against the Loader Frame. Then, lock the Hydro-lock Levers to the Anchor Pins on the front of the Lift Arms with the Lockpins provided. Next, line-up the Loader squarely with the back of the Attachment. Then, roll the Hydro-lock Mechanism forward until the Hydro-lock Pins are slightly below the mating Hooks on the back of the Attachment. Then, slowly drive the Loader forward while rolling the Hydro-lock back to engage the Attachment Hooks. Stop forward travel when the Hooks are engaged but continue to roll the Hydro-lock back to pick the Attachment up off the ground. When the Hydro-lock is rolled-back completely, the lower portion of the Attachment will also seat into the mating Yokes on the Hydro-lock Mechanism. Finally, remove the Lockpins and rotate the Hydro-lock Levers so that they engage the Anchor Pins on the Hydro-lock Mechanism. Then, reinstall the Lockpins to secure the Attachment.

To remove the Attachment, reverse the hook-up procedure by first removing the Lockpins from the Anchor Pins in the Hydro-lock Mechanism. Then, rotate the Levers so that they engage the Anchor Pins on the front of the Lift Arms. Next, install the Lockpins to secure the Levers to the Lift Arms. Then, roll the Hydro-lock Mechanism forward into contact with the ground and far enough forward so that the Hooks on the back of the Attachment are released by the Hydro-lock Pins on the Lift Arms. Next, slowly back the Loader away from the Attachment.

AUXILIARY FRONT HYDRAULICS (OPTIONAL) (Fig. 6-15 & See Fig. 6-13)

A Skid Loader which is equipped with an optional Auxiliary Front Hydraulics system has Male and Female Quick-disconnect Fittings for convenient hook-up to the appropriately terminated hose connections of an accessory hydraulically operated device, such as a

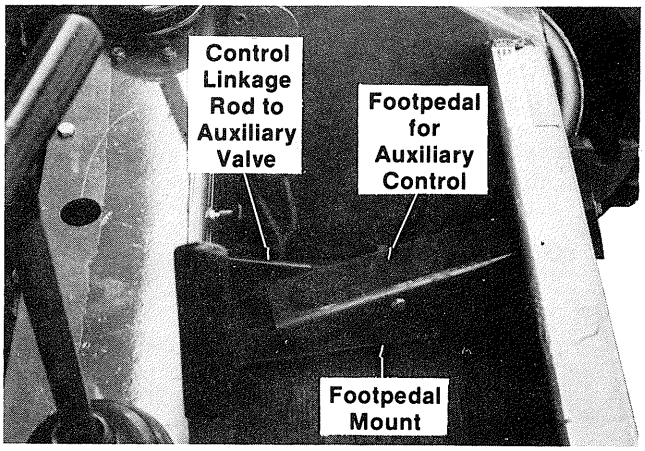


Fig. 6-15

Grapple Fork. Operation of the Auxiliary Flow Control Valve is controlled by a Footpedal which is mounted on the left side. Pushing forward on the Pedal (with your toe) causes flow through the Valve in the direction of the Male Quick-disconnect. Pushing back on the Pedal (with your heel) causes flow through the Valve in the opposite direction. When there is **NO** hose coupling made to both Quick-disconnects and the Footpedal is actuated, the main System Relief Valve will operate to bypass the Auxiliary Hydraulics system.

TOWING & HIGHWAY TRAVEL (Figs. 6-16 & 6-17)

The Skid Loader is equipped with Emergency Hydrostatic Lockouts for use if Loader becomes disabled and requires a tow. Access to the Lockouts is gained by unbolting, rolling back and locking the Overhead Guard.

NOTE: If the Loader is to be towed behind another vehicle, BE SURE to turn the Lockout Valves on both Hydrostats. BE SURE also that Lockouts are restored to their original positions immediately after towing is completed. Do NOT exceed a maximum towing speed of 2mph (3.2 kmh).

For short distance highway travel, use the SMV Emblem Mounting Bracket to attach an SMV Emblem (purchased locally). A Loader which is used frequently on the highway should be equipped with a Work & Warning Light Kit.

COLD WEATHER STARTING ASSISTANCE (3410 ONLY) (Figs. 6-16 & 6-17)

An Engine Block Heater is provided for starting assistance in below freezing temperatures to warm-up the SL3410 Engine block. The Heater is designed for all night operation (if desired) however, 2 to 4 hours is usually sufficient time to warm the coolant.

CAUTION: BEFORE plugging the Heater Line Cord into a 120 volt, 60 hz power source, BE SURE the Loader Attachment (Bucket or Fork) is in contact with the ground and that the Ignition Key is in the "off" position. Likewise, disconnect the Line Cord from the power source, BEFORE proceeding to start the Loader Engine.

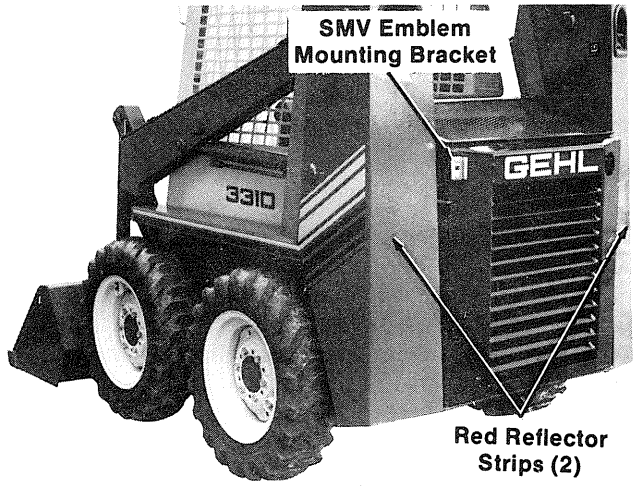


Fig. 6-16

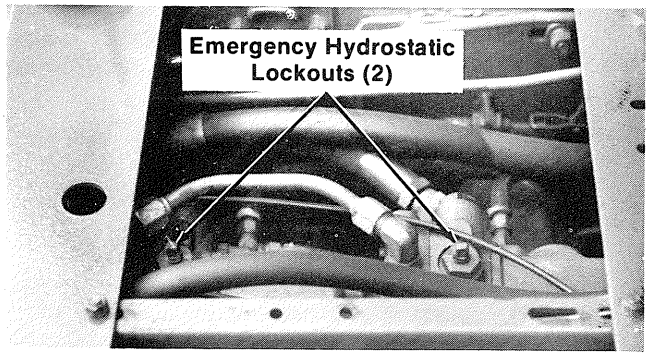


Fig. 6-17: Emergency Hydrostatic Lockouts (Shown in Normal "De-activated" Positions)

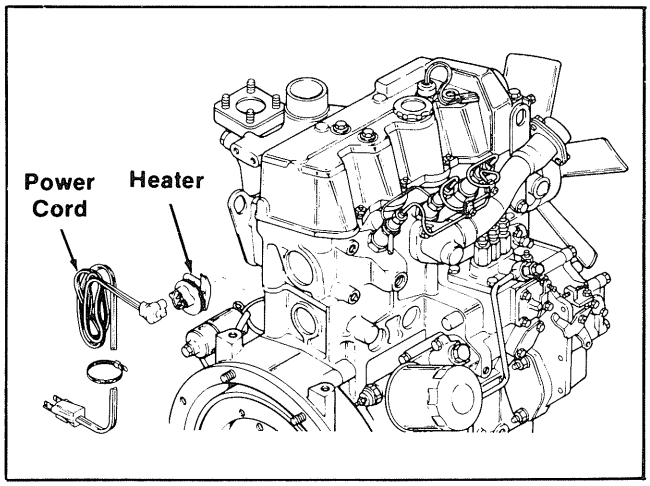


Fig. 6-18: SL3410 Engine Block Heater

CHAPTER 7

ADJUSTMENTS

CAUTION: BEFORE proceeding to perform any adjustments on the Skid Loader, exercise the MANDATORY SAFETY SHUTDOWN PROCEDURE (page 8).

LOADER RAISING PROCEDURE (Figs. 7-1 & 7-2)

Whenever it becomes necessary to raise the Loader, so the Wheels are **NOT** contacting the ground, the mounted Bucket and Lift Arms can be used to pick the Loader up off its Tires and Wheels.

WARNING: The procedure below, for raising the Loader, MUST only be used to do just that. Do NOT leave the Operator's Compartment with the Engine running and the Loader in the "raised" position. Shut off the Engine and carefully climb out of the Operator's Compartment, making sure as to avoid disturbing the Lift/Tilt Control T-bar while getting out of the Loader. Once out of the Operator's Compartment and BEFORE proceeding to work on the Loader, carefully and properly install additional blocking and supports under both front and back ends of the Loader. Do NOT rely on the Loader Hydraulics system to maintain the "raised" position without additional blocking and supports.

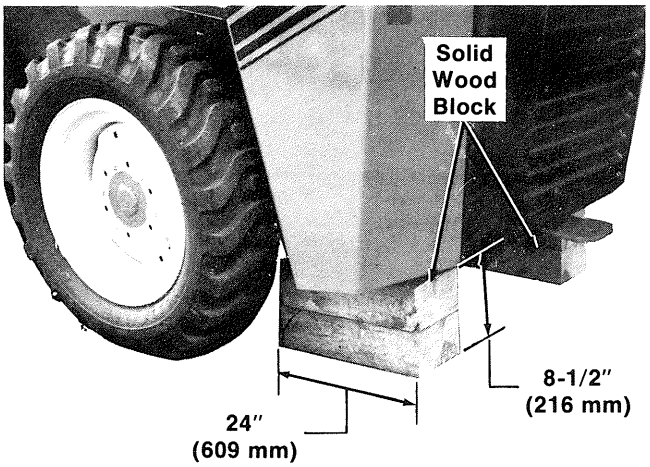


Fig. 7-1

Raising the Skid Loader can be conveniently accomplished by first placing two equal height (approximately 8-1/2" tall) solid blocks of wood (at least 2 feet long) parallel (but **NOT** in contact) with the rear Wheels and centered under the horizontal portions of the rear of the Loader Frame. Then, climb into the Operator's Compartment, fasten your Seat Belt, start the Engine and raise the Lift Arms to the necessary height to allow the Bucket to be rolled-forward so that the Cutting Edge is straight and perpendicular to the ground. Next, lower the Lift Arms while making sure that the Bucket Cutting Edge clears the Tires. Slowly lower the Lift Arms and, in turn, raise the Loader up until all four Tires are off the ground. Then, shut off the Loader Engine and climb out of the Operator's Compartment, making sure **NOT** to disturb the Lift/Tilt Control T-bar. Once out of the Loader, carefully and properly install additional blocking and supports under both the front and back ends of the Loader before proceeding to perform service or adjustments with the Engine running.

To take the Loader back out of the "raised" position, reverse the "raising" sequence.

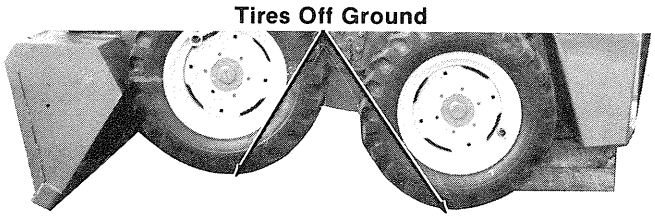


Fig. 7-2

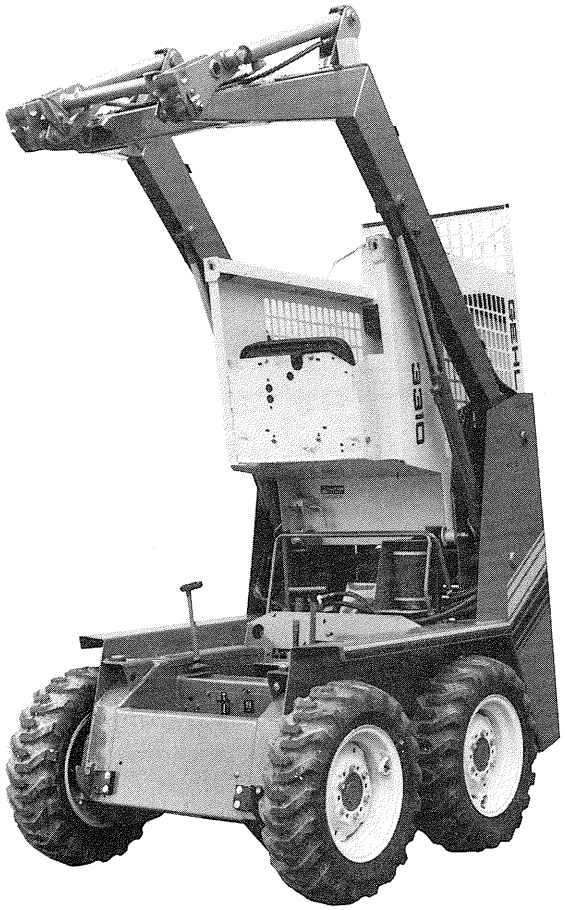


Fig. 7-3: Lift Arms Raised, Mechanical Lift Cylinder Lock "Engaged" and Overhead Guard Unbolted, Rolled-back and Locked

ALTERNATOR DRIVE BELT (SL3410 model only)

On the SL3410 diesel Engine model Loader only, the Alternator Drive Belt tension should be checked and readjusted, if necessary, after every 100 hours of operation. Access to the Drive Belt is gained by opening the Engine Access Cover and by unlatching and swinging-open the Hinged Rear Guard.

The Alternator is mounted on a pivot and secured in a slotted Adjustment Bracket. To adjust Belt tension, first loosen (but do **NOT** remove) the Pivot Bolt. Then, loosen the Bolt in the slotted Bracket slightly and pry against the Alternator to reposition it. Proper tension is adjusted by obtaining approximately a 1/4" (6 mm) deflection of the Belt at the midpoint between the Sheaves when a 4 lb (1.8 kg) force is applied. After proper tension is adjusted, tighten both the Bolt in the slot and the Pivot Bolt.

CONTROL T-BARS (Figs. 7-3 thru 7-6)

Both Control T-bars are factory adjusted for proper operating characteristics and should require **NO** additional readjustment unless Linkages have to be disturbed from their original factory settings. Unless otherwise noted, the Overhead Guard **MUST** be unbolted (in front only), rolled-back and locked out of the way for adjustments access.

Lift/Tilt T-bar

The Lift/Tilt T-bar has two Ball Joints connected through Control Rods, to Valve Spool Actuator Plates which, in turn, are coupled directly to the Lift and the Tilt Spools of the Hydraulic Control Valve. If the Control Rods have to be disconnected from the Actuator Plates and are later replaced, the Rod lengths can be readjusted into the Ball Joints before the opposite ends are reconnected to the Actuator Plates. The Plates can be left intact and the Valve can be uncoupled and removed, if desired, without disturbing the T-bars and Linkage Rods.

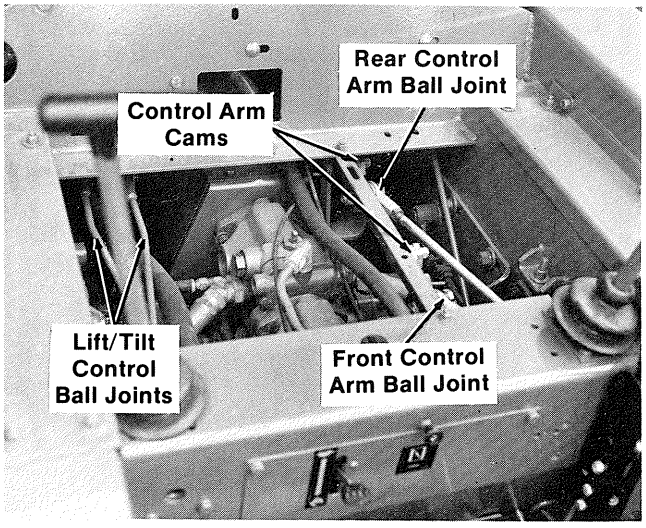


Fig. 7-4

NOTE: BE SURE that, anytime the Linkage Rods are removed, replaced and readjusted, the Locknuts are tightened against the Ball Joint connectors to fix the positions of the Rods.

Propulsion T-bar

Three separate adjustments are possible to restore proper Propulsion Control T-bar operation. All three adjustments are made at the factory and should require **NO** additional readjustment unless linkages have to be disturbed from their original factory settings.

Control Arm Cams

Cam assemblies are provided on both Hydrostatic Pumps to limit the strokes of the Control Arms which, in turn, governs forward movement of the Loader. Each Cam can be independently adjusted to limit the Control Arm stroke so as to prevent distortion of the Pump's internal Cam Plates and to equalize the oil flow through each Pump so that the Loader travels as straight as possible when the Propulsion T-bar is moved forward to the full-stroke position.

Detent

Friction Strips are provided for the T-bar assembly. Pressure on the Strips is controlled by Compression Springs on both ends of the Strips. The flat surface on the T-bar Handle locates the rotational centerpoint of the Handle and, the notch in the Friction Pad opposite the flat surface locates the forward and backward centerpoint of the Handle movement. Whenever the Detent is adjusted or whenever the "neutral" for the Propulsion Control is reestablished, **BE SURE** that both centerpoints are accurately established.

NOTE: The Friction Pad Compression Springs can be readjusted, without raising the Overhead Guard, by just removing the Access Cover below the front of the Seat. Tension Springs should only require readjustment to eliminate chatter in the T-bar. Likewise, the Springs should NOT be overtightened and thus restrict the T-bar Handle movement.

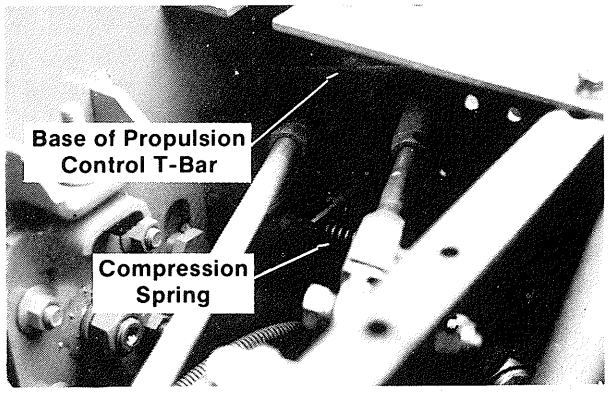


Fig. 7-5: Propulsion Control T-Bar Friction Pad Compression Springs

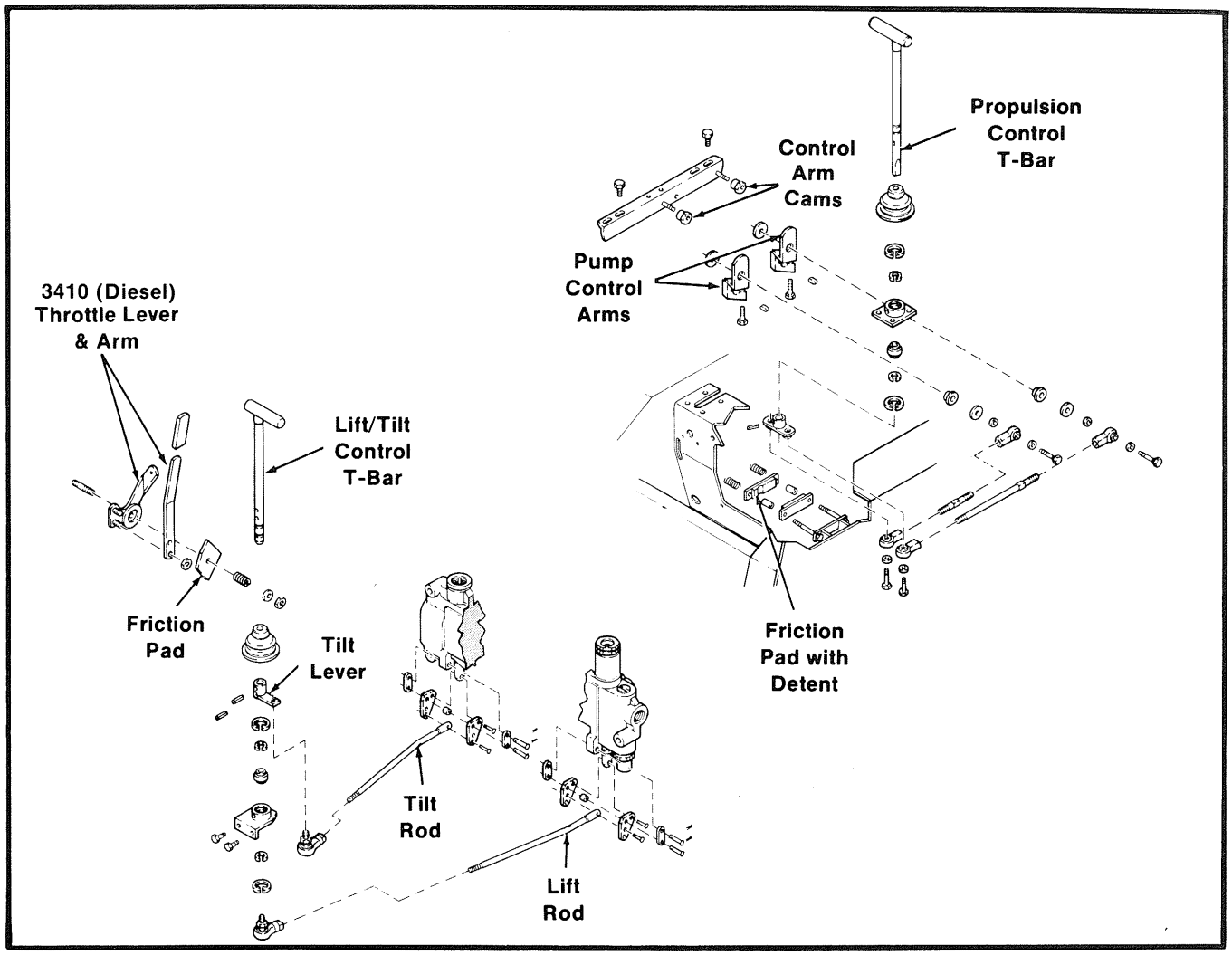


Fig. 7-6: T-Bars & Throttle (Exploded View)

Linkage Rods

Right-hand and left-hand threads are provided on the ends of the Linkage Rods which connect the Ball Joints on the Propulsion Control T-bar to the Ball Joints on the Control Arms attached to the Hydrostatic Pumps. By loosening the Locknuts and rotating the Rods, with the T-bar in "neutral" detent, the Control Arms can be readjusted until the Wheel rotation stops. This Rod adjustment should be made with the Loader raised-up so that Tires are **NOT** touching the ground. Refer to the Loader Raising Procedure in the beginning of this chapter for the correct procedure to follow for raising the Loader off the ground.

NOTE: The Bolts which secure the Ball Joints to the Pump Arms and the Traction T-bar should be torqued to a maximum of 55 ft-lb (74.5 N-m).

DRIVE CHAINS (Figs. 7-7 thru 7-10)

Skid Loader Drive Chain tension should be checked and readjusted initially after the first 50 hours of operation and thereafter following every 200 hours of operation. To adjust Chain tension, on either side of the Loader, the procedure is the same. First, unbolt, roll back and lock the Overhead Guard. Then, remove and retain the Chain Housing Access Cover to observe tension adjustment on either side, as appropriate. The Loader can be left on its Tires to make the Chain tension adjustment.

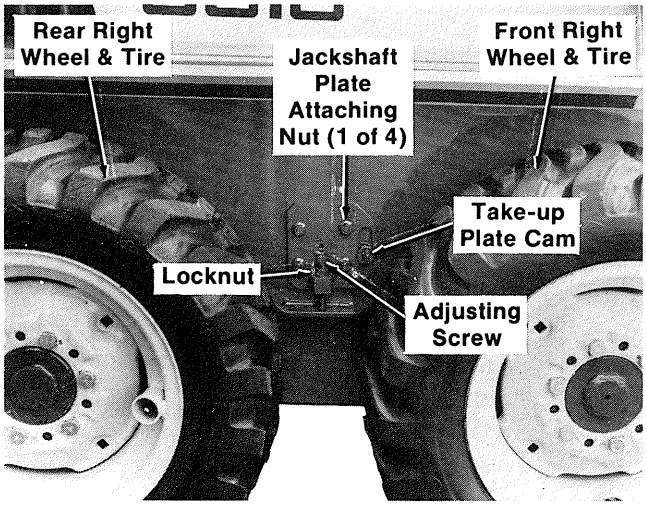


Fig. 7-7

To adjust the tension, proceed as follows:

1. Loosen (but do **NOT** remove) the (6) Nuts which secure the Hydraulic Motor Mounting Plate and withdraw the Adjustment Screw enough to allow full travel of the Plate.

2. Loosen (but do **NOT** remove) the (8) Nuts which hold each Jackshaft in position. In addition, loosen (but do **NOT** remove) the Locknuts on the Takeup Plate Cams.

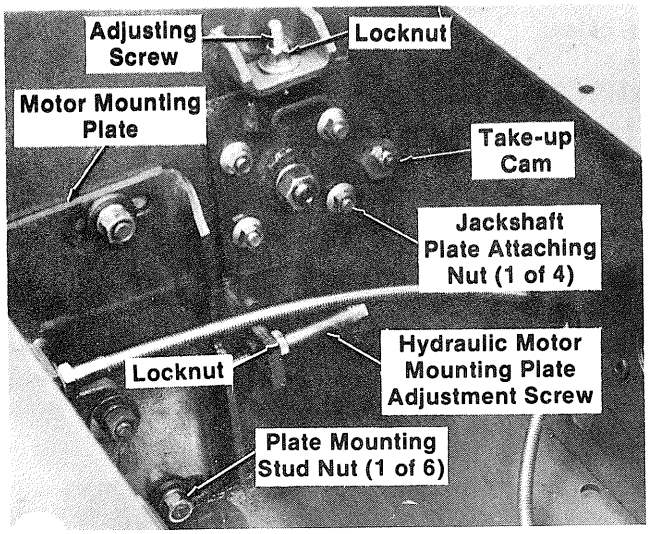


Fig. 7-8

3. Rotate the Adjustment Screws on the Takeup Plates clockwise until a maximum deflection of approximately 1/4" (6 mm) for about 20 lb (9 kg) of force is obtained for each of the secondary Drive Chains. Tighten the Adjustment Screws equally in order to square the Jackshaft Sprocket vertically inside the Housing. Tighten or loosen the Cams (as necessary) to adjust the Jackshaft Sprocket horizontally inside the Housing.

NOTE: After adjustment is made, check to make sure that there is a sufficient clearance between Chain and side Plate and, that the large Jackshaft Sprocket runs parallel to the Chaincase side.

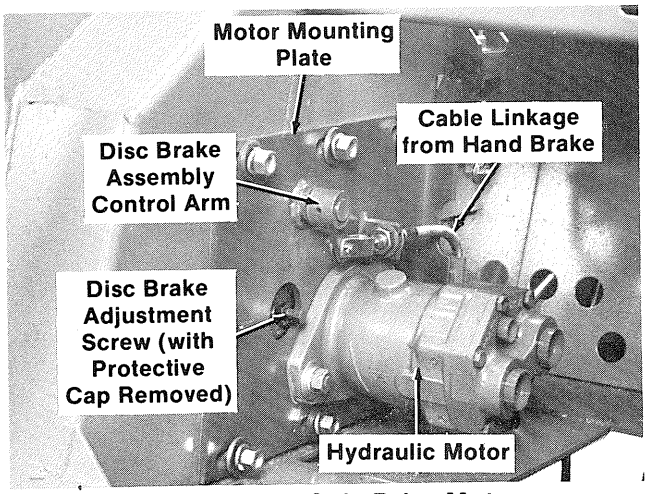


Fig. 7-9: Left Side Drive Motor

4. Tighten the Adjustment Screw on the Motor Mounting Plate until a maximum deflection of approximately 1/4" (6 mm) for about 20 lb (9 kg) of force is obtained for the primary Drive Chain.

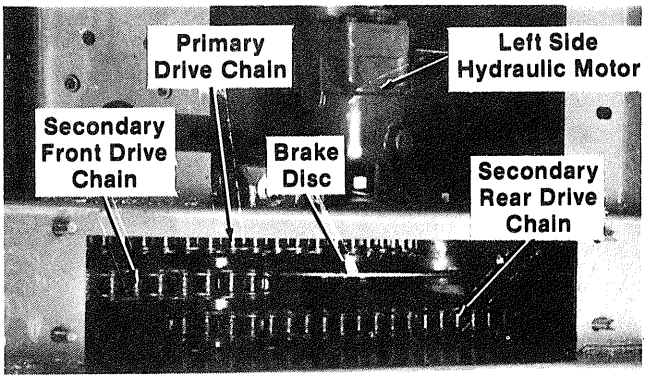


Fig. 7-10: Left Side Drive Motor & Chains (with Chaincase Cover Removed & Oil Drained)

5. After the proper Chain tension is obtained, retighten the (6) Nuts on the Motor Mounting Plate, replenish the oil level (so that it is about 2-1/2" deep in each wheel well) and replace the Access Cover after Chain adjustment is completed.

ENGINES

The SL3310 (Gasoline) and SL3410 (Diesel) powered Skid Loaders are furnished with respective Engine Manuals. Refer to the Engine Manual for all Engine related specification, adjustment, maintenance and service information.

HAND BRAKE (Fig. 7-11)

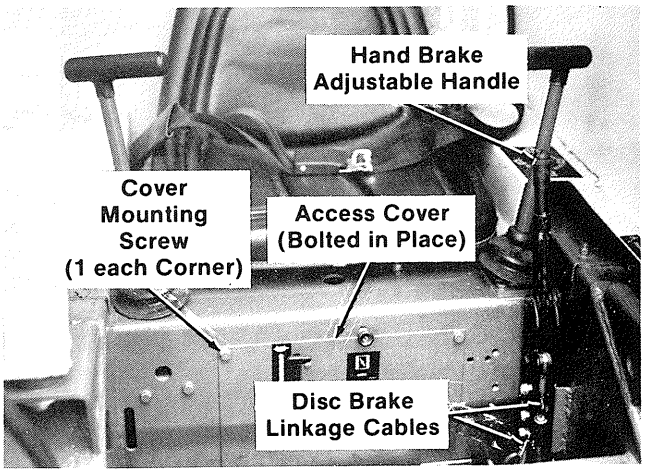


Fig. 7-11

The Hand Brake is linked by Cables to Disc Brake assemblies on the end of each Hydrostatic Drive Motor. The end of the Brake Handle can be rotated to remotely adjust the Cable lengths and, in turn, the Brake mechanisms. After every 200 hours of operation, Hand Brake function should be checked and the Brakes adjusted by rotating the end of the Brake Handle.

After numerous adjustments, the end of the Handle will become rotated to its travel limit and **NO** longer affect Brake adjustment. At this time the end of the Handle should be turned back to the opposite end of rotating limits and the Adjustment Screw on the Brake assembly itself **MUST** be readjusted. Access to the Adjustment Screw is gained by removing and retaining the Protective Cap. Access to the Protective Cap and Brake assembly is obtained by unbolting, rolling-back and locking the Overhead Guard. **BE SURE** to readjust the Handle before proceeding to adjust the Screw on the Disc Brake assembly. To adjust the Screw, first loosen the Locking Nut. In addition, after the Screw is adjusted, retighten the Locking Nut. After about two adjustments on the Brake assembly Adjustment Screw, the Pads on the Disc Brake mechanism will require replacement.

HYDRO-LOCK LEVERS (Fig. 7-12)

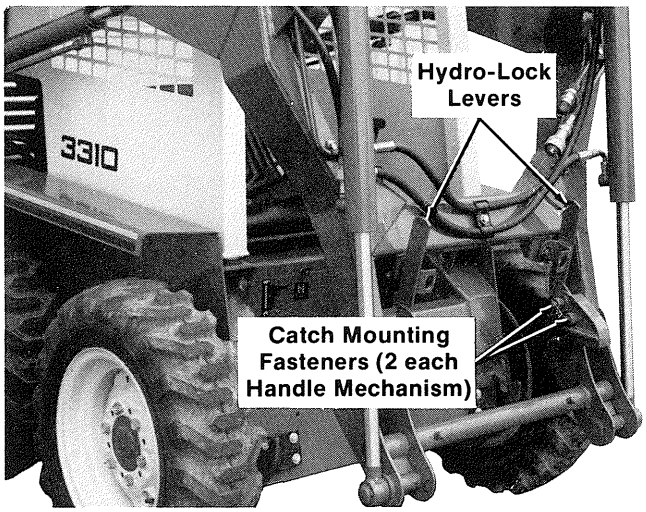


Fig. 7-12

The Hydro-lock Latching and Locking Mechanism for Attachment mounting has adjustments on both sides to enable repositioning the Catches to help eliminate looseness due to normal wear. To make the Catch adjustment, first attach the Bucket or Fork. Then, after exercising the **MANDATORY SAFETY SHUTDOWN PROCEDURE** (page 8), loosen the (2) Catch mounting bolt fasteners slightly. Next, with the fasteners loosened slightly, pry against the top of the Catch to force it down against the Latch Pin. Then, with pressure being applied, retighten the fasteners to a torque of 110 to 115 ft-lb (149 to 156 N-m). Repeat this procedure for the other Catch.

(OPTIONAL) AUXILIARY FRONT HYDRAULICS FOOTPEDAL

The Footpedal, which activates the Optional Auxiliary Front Hydraulics Control Valve, is linked to the Valve by a threaded Linkage Rod. The Rod length can be adjusted, as desired, to appropriately position the Pedal to a comfortable center or neutral point. Once the desired Rod length is obtained, the position can be fixed by tightening the Locking Nut. Refer to the Set-up & Assembly chapter for additional readjustment detail, if required.

THROTTLE (3410 Only) (Fig. 7-13 & See Fig. 7-6)

The Throttle on SL3410 Skid Loaders has a threaded Linkage Rod connection to a yoke on the Throttle. The opposite end of the Linkage Rod is connected to a Pivot Mechanism which, in turn is linked to the Injection Pump on a Diesel Engine. The Linkage Rod length is factory set and requires **NO** further readjustment, except if the Linkage is removed or otherwise disturbed during service performance. Access to the Linkage Rod is gained by unbolting, rolling-back and locking the Overhead Guard. **BE SURE** to retighten the Locking Nut to fix the Linkage Rod position, after it has been adjusted.

Besides the Linkage Rod adjustment, a Compression Spring is also provided for Friction Pad pressure adjustment. Spring pressure may require readjustment if the Throttle Lever does **NOT** hold its position. Access for Throttle Lever Compression Spring adjustment can be gained by removing the Access Cover in front of the Seat.

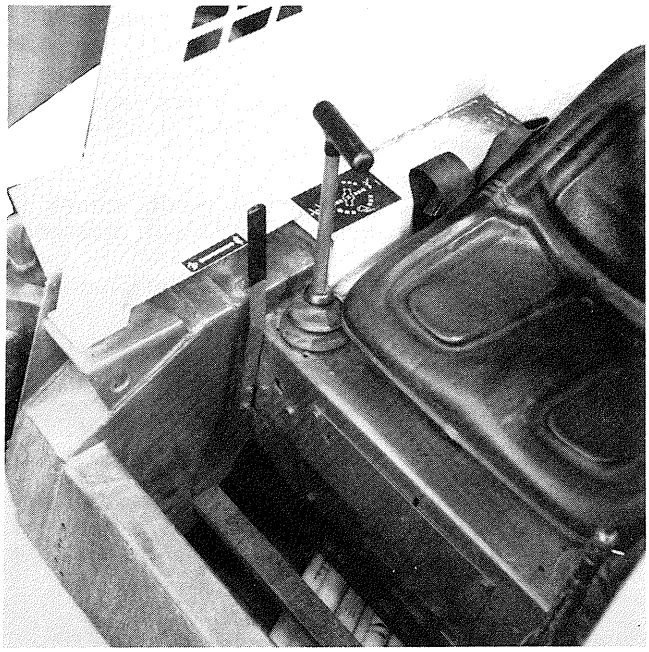


Fig. 7-13: Diesel Engine Model Throttle

CHAPTER 8

LUBRICATION

GENERAL INFORMATION

CAUTION: NEVER attempt to lubricate the Skid Loader with the Engine running. ALWAYS BE SURE to exercise the MANDATORY SAFETY SHUTDOWN PROCEDURE (page 8) BEFORE proceeding to lubricate the Loader.

NOTE: The Maintenance chapter has provisions for recording dates of lubrication; use the spaces provided to log lubrication at specified intervals.

It is well to remember that a sufficient amount of oil or grease will prevent excessive part wear and early failure.

OILS

Loader and Engine operation greatly depends on correct grade, good quality lubricating oils. In addition to the following information, refer also to your separate Engine Manual (provided) for specific quantities, grades and ratings spelled-out by the Engine manufacturer.

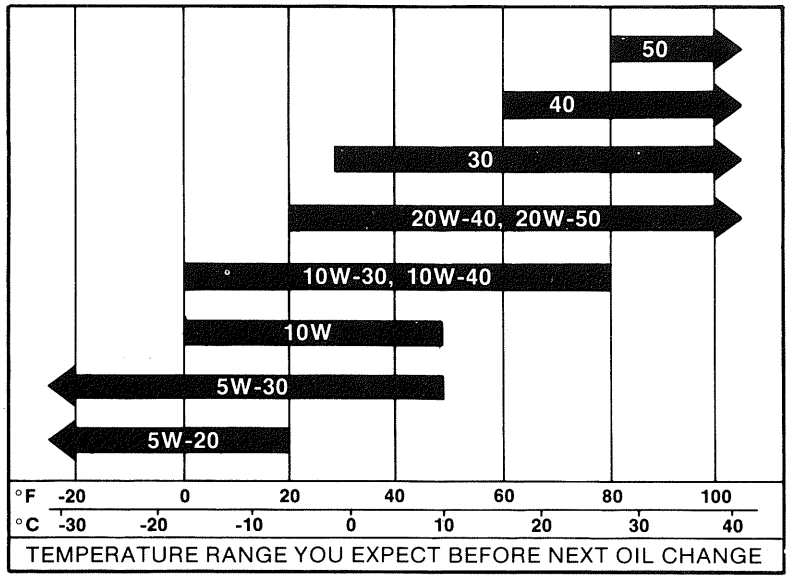
The **Drive Chain Cases** each require 1 U.S. gallon (3.8 liters) of multiviscosity (or equivalent good quality) motor oil. This quantity of oil should be maintained at all times. After every 500 hours of operation or annually, the oil in both Chaincases should be drained and new oil should be installed; refer to the Service chapter for draining and refilling details.

The **Engine Crankcase** requires 1.7 U.S. quarts of oil for the 3310 and 3.0 quarts of oil for the 3410, with every Filter Element change. The replacement Filter Element part number for the 3310 is 611990 and for the 3410 is 078855. Additional information about changing the oil is detailed in the separate Engine Manual furnished. Depending on the seasonal temperatures, refer to the viscosity information provided in the chart below for the type of oil recommended.

The **Hydraulic Reservoir** for the Hydrostatic and Hydraulic systems of the Loader has a capacity of 12 U.S. gallons (45.4 liters). Use Automatic Transmission Fluid - Type A (suffix A), Type F or Dexron Automatic Transmission Fluid, or equivalent Hydraulic Fluid which meets characteristics specified in the Hydrostatic Fluid Viscosity Chart provided. After every 500 hours of operation or annually, the oil in the Hydraulic Reservoir should be drained and new oil should be installed; refer to the Service chapter for draining and refilling details. The replacement Filter Element part number is 076030.

NOTE: Besides the various oil level checks and replacements on the Loader and Engine, BE SURE to apply a few drops of oil to all Linkage Ball Joints after every 200 hours of operation or every 6 months.

SL3310 (GASOLINE) ENGINE OIL VISCOSITY INDEX
(Per API Specifications)



SL3410 (DIESEL) ENGINE OIL VISCOSITY INDEX
(Per API Specifications)

Temperature in F (C)	10 (-12) & Above	Below 10 (-12)
Viscosity (Type CD or SC)	30W, 10W-30 or 10W-40	10W, 5W-20 or 5W-30

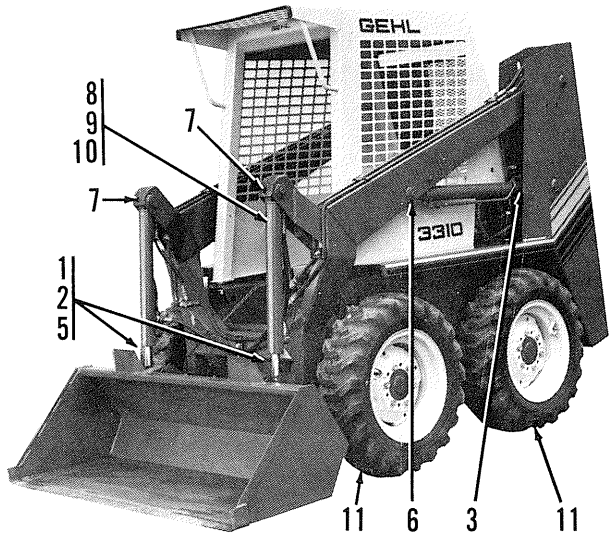
HYDROSTATIC OIL VISCOSITY INDEX
(VI level 150 - 200 per SUS Specifications)

Temperature in F (C)	0 (-18)	100 (38)	210 (99)
Viscosity	6000 Maximum	180 Minimum	47 Minimum

GREASING

NOTE: Grease all fittings at the intervals of operation listed. Use a good grade of Lithium base grease.

Wipe dirt from the fittings before greasing to prevent the dirt from being forced into the Bearing or pivot. Replace any missing fittings, when noted. Force the grease into the fitting until it comes out at the Bearing Seal or at the Shaft. To minimize dirt build-up, avoid excessive greasing.



Grease Fitting Locations

NOTE: All fittings listed should be understood as provided on both the right side and the left sides of the Loader when the term "(each side)" accompanies the location description.

Lubricate Every 10 hours (or daily)

1. Hydro-lock Lever Pivot (each side)
2. Hydro-lock Mechanism Pivot (each side)
3. Lift Cylinder Rear Pivot (each side)
4. Lift Arm Rear Pivot (each side)
5. Tilt Cylinder Front Pivot (each side)
6. Lift Cylinder Front Pivot (each side)
7. Tilt Cylinder Rear Pivot (each side)

Lubricate Every 100 hours

8. Lift/Tilt Control T-bar Pivot (access hole provided)

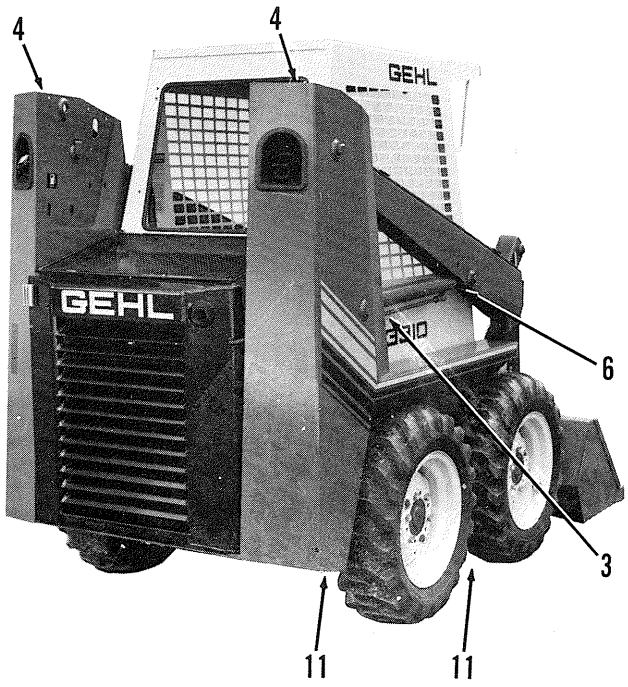
9. Propulsion Control T-bar Pivot (raise boot for access)

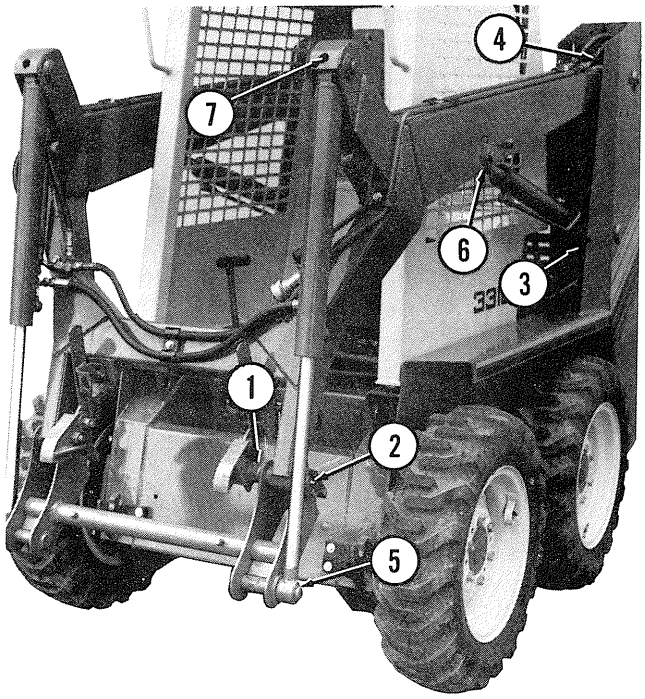
Lubricate Every 200 hours

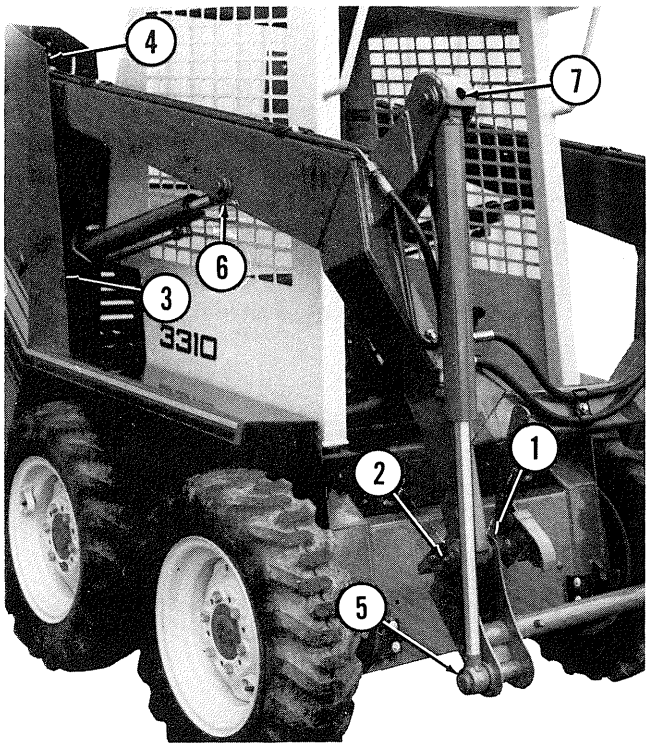
10. 3310 Only Universal Joint (3 places)

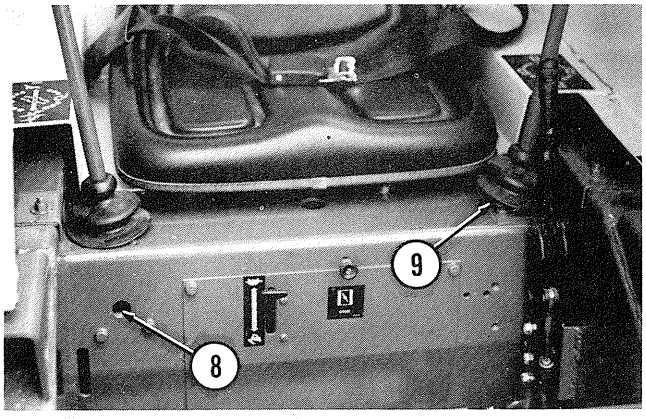
Lubricate Every 500 hours

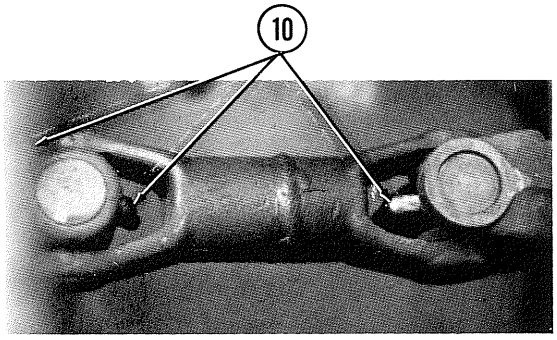
11. Each Axle Bearing (4 places - remove Wheels for access) - (Not Shown)











3310 Universal Joint

CHAPTER 9

SET-UP & ASSEMBLY

NOTE: The Skid Loader is shipped from the factory (for domestic delivery) completely assembled. Customer selected Buckets, Manure Fork or approved accessory Attachments, Auxiliary Front Hydraulics Kit or Work & Warning Lights Kit MUST be mounted separately for field adaptation.

NOTE: The following abbreviations are used in these instructions:

CB - Carriage Bolt
CS - Cap Screw (Hexagon Head)
TFS - Thread-forming Screw
RHMS - Round Head Machine Screw
THMS - Truss Head Machine Screw
N - Nut (Hexagon)
LN - Lock Nut (Hexagon)
NILN - Nylon-insert Lock Nut
L - Lock (Washer)
P - Plain (Washer)
JIC - 37° Flare SAE Thread
NF - National Fine (Thread)

AUXILIARY FRONT HYDRAULICS KIT (Field Installation) (Figs. 9-1 thru 9-7)

The Auxiliary Front Hydraulics Kit contains the Auxiliary Control Valve, Connecting Hoses and Tubes, the Footpedal Control, Control Linkage, the Quick-disconnect Fittings, Clamps and attaching hardware. Installation of these components should be made in the order listed to avoid unnecessary component removal and replacement.

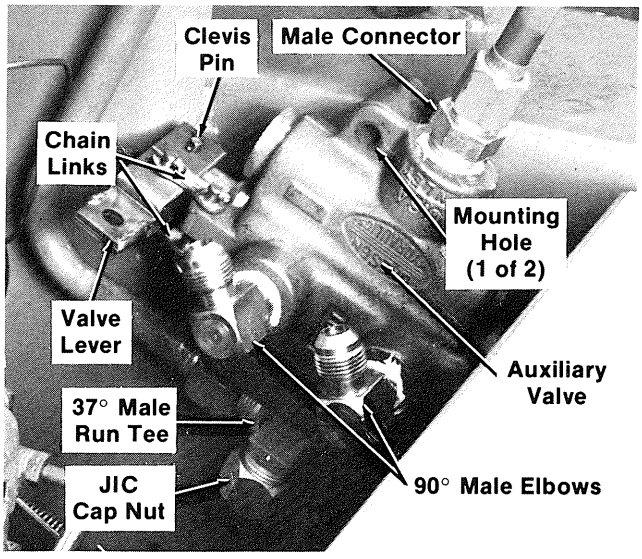


Fig. 9-1

NOTE: Before proceeding to install the Kit, remove the Drain Plug from the bottom of the Hydraulic Oil Reservoir and drain at least 2/3 of the oil out of the Reservoir into a catchpan. BE SURE to replace the oil after installation is completed. Use 2 drops of Loctite® or equivalent pipe sealing compound on all Fittings with standard pipe threads. Exercise good judgement when securing JIC or flared Fitting connections; do NOT overtighten them. For access to the area being worked on, unlatch and open the Hinged Rear Guard and unbolt, roll back and lock the Overhead Guard.

1. Refer to the illustration provided and preassemble the Fittings and control Linkages to the Auxiliary Valve.

   a. Using pipe compound, install the (2) 90° Male Elbows (057992), the Male Connector (073411) and the 37° Male Run Tee (056088) into respective ports of the Valve (051392). Install the JIC Cap Nut (056085) onto one of the Male Run Tee ports.

   b. Connect the Valve Lever (073412) to the Valve (051392) Spool with a Clevis Pin (054842) and 1/16 x 1/2 Cotterpin (650590). Make the pivot Linkage connection by securing one side of each Chain Link (073420) to the Valve with a Coupler Pin (500187) and its Cotterpins. Connect the other side of the Chain Links to the Valve Lever with another Coupler Pin and its Cotterpin.

2. After the Fittings and control Linkage is properly attached to the Auxiliary Valve, the Valve can be secured to the left Fender Wall in the position shown using (2 each) 3/8 x 2-1/4 CB, L and N. Install the CB from the outside of the Fender Wall.

3. Install (2) 3/8 NF-N onto both ends of the Control Rod (073409). Then, properly orient and route the Rod through the appropriate access hole in the Loader Frame and install Ball Joints onto both ends of the Rod. Thread the Ball Joints (054202) half way up the threaded portions of the Rod on both ends.

4. Install a 3/8 NF-N onto the Ball Joint to be connected to the Valve Lever. Then, couple the Ball Joint to the Valve Lever with another 3/8 NF-N.

5. Secure the Ball Joint on the other end of the Rod to the Footpedal (073414) with a 3/8 L and N. Then, attach the Footpedal into the Footpedal Mount (073416) with a 3/8 x 3-1/2 CS and a 3/8 NILN.

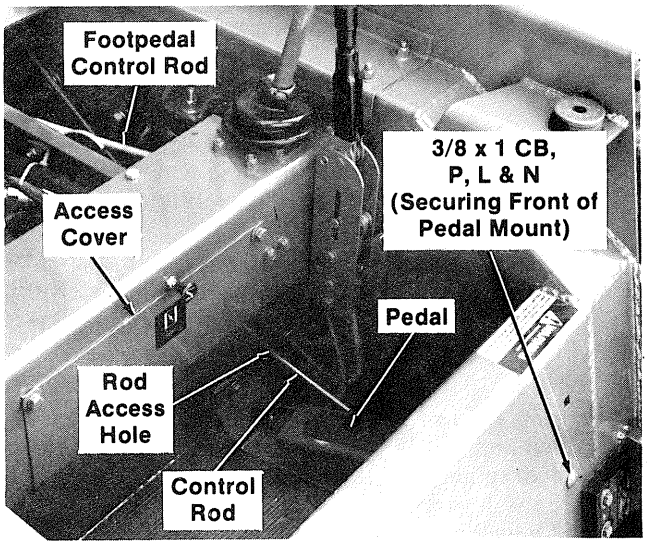


Fig. 9-2

6. Remove the lower left corner mounting bolt from the Access Cover below the Seat. Then, position the Footpedal assembly and check the height of the heel end of the Footpedal above the Floorbars. This dimension should be approximately 2-7/8″ (73 mm) with the Control Valve Spool in the middle of its travel. Readjust the Ball Joint thread length (by rotating the Footpedal assembly) to obtain this dimension, before securing the Footpedal Mount to the Loader. When the Rod length is correct to obtain this dimension, secure both 3/8 NF-N to lock the Ball Joint positions on both ends of the Rod. In addition, when the correct Rod length is adjusted, the Footpedal should rest with its heel end slightly dropped (approximately 10°). Tightly secure the Footpedal Mount to the Loader with a 5/16 x 1 CS, P and L in the back and a 3/8 x 1 CB, P, L and N in the front.

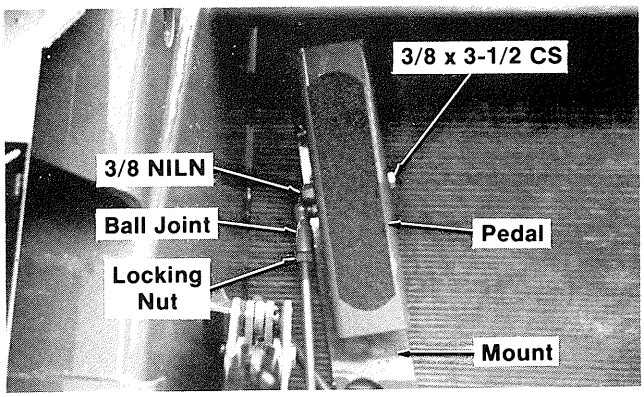


Fig. 9-3

NOTE: When the Footpedal is correctly adjusted and operated, it should travel back and forth to completely stroke the Valve Spool without bottoming-out against the Floorbars in either direction. Travel of the Valve Spool should also be checked to insure an equal distance of movement in both directions from "neutral".

After step 6 is complete, the Lift Arms should be down so that the Auxiliary Hoses and terminations can be conveniently made.

7. Preassemble the Auxiliary Hoses, Tubes and Quick-disconnects.

   a. Attach the Cap (056104) and Plug (073404) to the respective Male (073403) and Female (073402) Quick-disconnect Coupler Fittings.

   b. Assemble the Rings (on the Chains of the Cap and Plug) over the ends of the (2) Flare Adapters (062274) and attach the Adapters to the Quick-disconnect Fittings using pipe sealing compound.

   c. Connect the Male Quick-disconnect Fitting to the shorter Inside Tube (078026). Connect the Female Quick-disconnect Fitting to the longer Outside Tube (078027).

   d. Attach a Hose (073412) onto the Inside Tube and another Hose (073412) onto the Outside Tube.

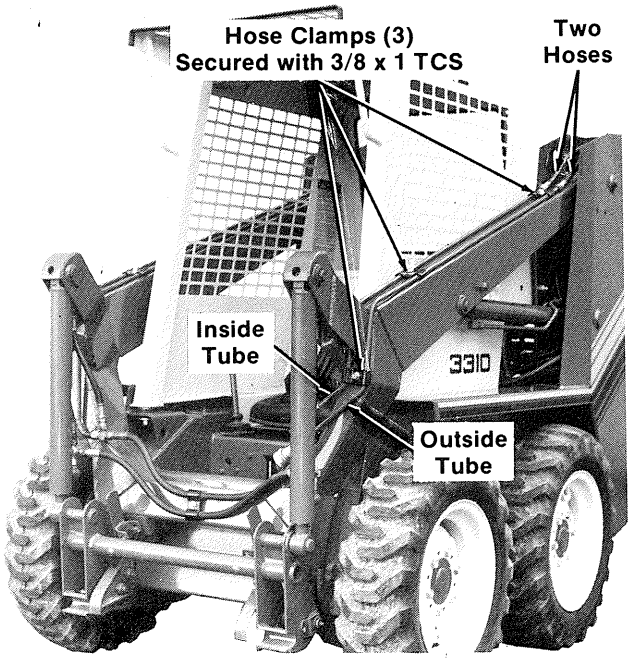


Fig. 9-4

8. After the Hoses, Tubes and Quick-disconnects have been preassembled, properly orient the Auxiliary Tubes and Hoses on the left Lift Arm and loosely anchor the Tubes to the top of the Lift Arm (after removing the two original screws) with (2 each) Hose Clamps (074395) and 3/8 x 1 TCS. Using an 11/32″ diameter drill bit, drill a pilot hole into the Lift Arm, in the area between the two Tubes and Quick-disconnect Fittings, slightly above the bends of the Tubes. Then, anchor the Tubes to the Lift Arm with a Clamp (074395), a 3/8 x 1 TCS and 3/8 P.

9. Route the loose ends of the Hoses (073412) through the top opening of the Left Riser, behind the Lift Arm and Tilt Cylinder Pivots, and out in front of the bottom of the Riser. Then, connect the Male Quick-disconnect terminated Hose to the rear 90° Male Elbow on the Auxiliary Valve and connect the Female Quick-disconnect terminated Hose to the forward 90° Male Elbow on the Auxiliary Valve.

10. Remove the JIC Cap Nut from the front port of the Filter assembly and connect the appropriate end of the larger diameter Drain Tube (073410) to the Filter assembly. Connect the other end of the Drain Tube to the 37° Male Run Tee on the Auxiliary Valve. **BE SURE** that the branch side of the Tee is capped with the JIC Cap Nut.

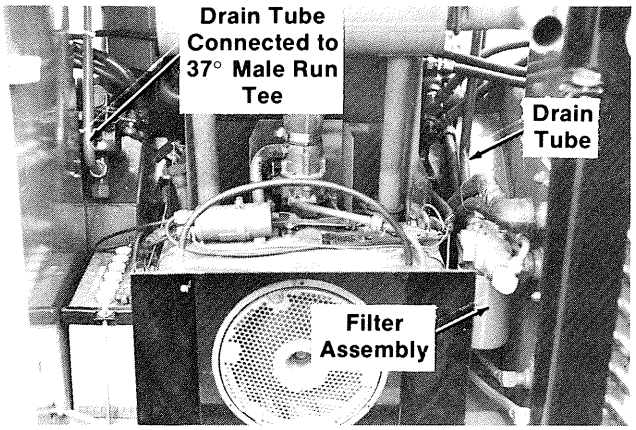


Fig. 9-5: Rear of Loader Showing Drain Tube

11. Remove the Endplug from the appropriate port of the System Control Valve and install a Power Beyond Sleeve (051393) into the System Control Valve port. Install a 90° Male Elbow (068105) into the open end of the Sleeve. To insure correct Valve function, **BE SURE** the square Rubber Ring is on the end of the Power Beyond Sleeve when it is installed into the System Control Valve port. Then, connect the appropriate end of the Auxiliary Charge Line smaller diameter tube to the 90° Male Elbow in the Sleeve. Connect the other end of the Charge Line Tube to the Male Connector (073411) in the Auxiliary Valve.

After step 11 is completed, the Overhead Guard can be unlocked and rolled down and secured (after the Auxiliary Hydraulics System is checked-out. **BE SURE** to replace the Hydraulic Oil (if it was removed) or replace any oil which was lost during Kit installation.

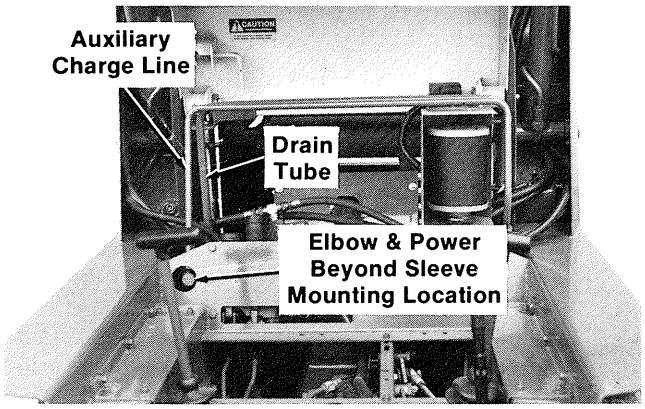


Fig. 9-6

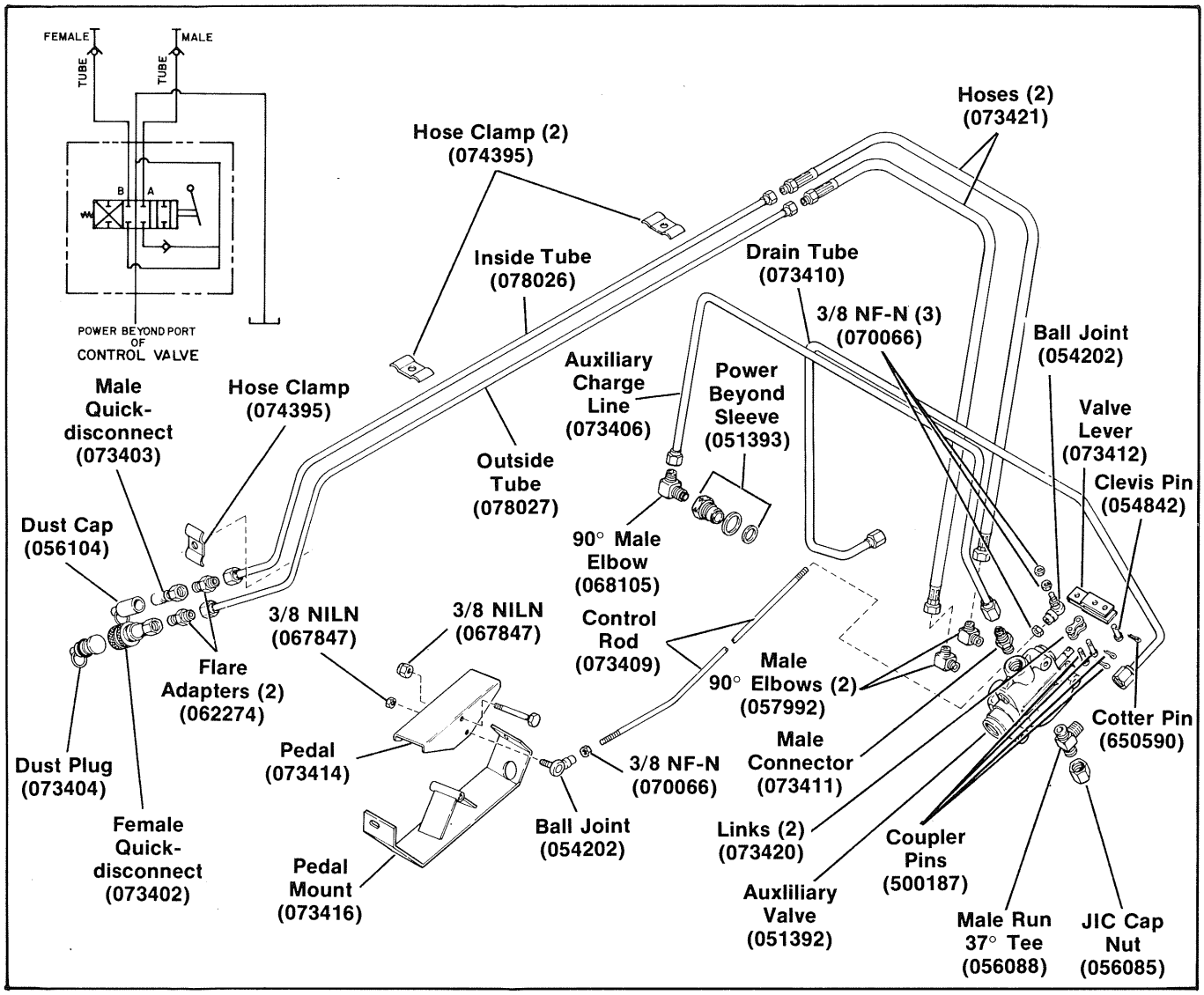


Fig. 9-7: Auxiliary Hydraulics

WORK & WARNING LIGHT KIT (Field Installation) (Figs. 9-8 thru 9-11)

The Work & Warning Light Kit contains a Light Switch, a Lighting Wire Harness, two Headlight assemblies, a Work/Tail Light assembly, two Flasher Light assemblies, a Flasher and Mounting Bracket, attaching hardware and (2) Red Reflector Strips. Remotely mounted Work/Tail Light and Flasher Lights interconnection wires are already provided in the Loader's Main Wire Harness between the Overhead Instrument and Control Panel and the Engine area. Installation of the Light Kit is as follows:

1. Detach the Overhead Instrument and Control Panel by removing the (5) 1/4 x 3/4 THMS. Once the Panel is detached, carefully lower it and turn it around for access to the wiring on the back.

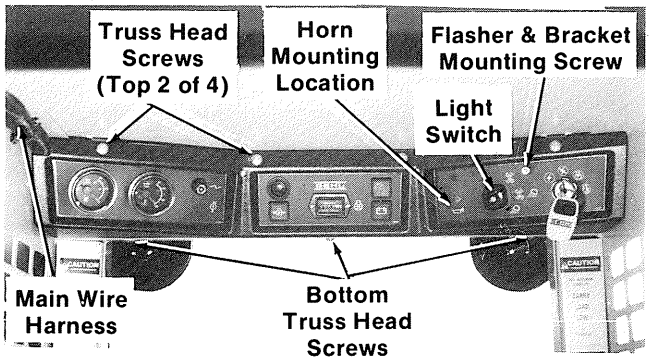


Fig. 9-8: Overhead Instrument & Control Panel (Installed)

2. Using a sharp knife, make the Light Switch cutout and the Flasher unit Mounting Bracket Screw cutout in the Right Panel Decal. Both cutouts are already provided in the Panel to follow for templates.

3. Attach the Flasher unit Mounting Bracket to the back of the Panel using a #6-24 x 1/2 RHMS, L and N. Then, attach the Flasher into the clamp brackets of the Mounting Bracket.

4. Install the Light Switch from the back of the Panel through the cutout while aligning the tab of the Switch with the notch in the Panel. Then, secure the Switch with the Mounting Ring. After the Switch is mounted, install the Knob and fasten it to the Switch Shaft.

5. Preassemble and secure the (2) Headlights and the Work/Tail Light units to their respective Mounting Brackets (furnished with the Lights). Then, secure the Headlights to the undersides of the Overhead Guard, in the appropriate positions shown, using (1 each) 3/8 NF x 1 CS, L and 3/8 NF-N. Route the Wire leads from the Headlights through the appropriate holes through the Overhead Guard and into the area of the Panel mounting location.

6. Plug the Light Wire Harness onto the Light Switch. Then, refer to the appropriate Electrical Wiring Diagram (for your model Loader) in the Service chapter for the correct color-coded lead interconnections to be made between the Light Wire Harness, the Main Wire Harness, the Flasher unit, the Headlights and the Loader Battery power.

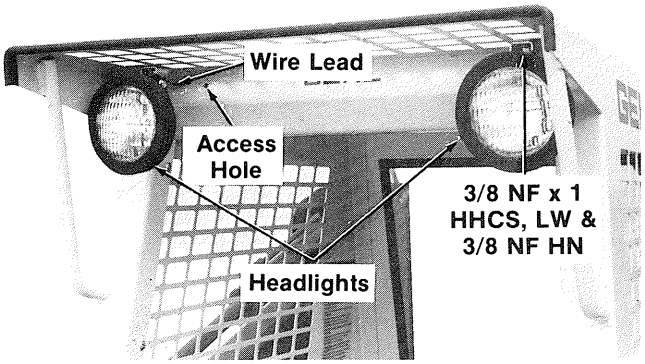


Fig. 9-9

7. After the proper wire connections are made, turn the Ignition Key to the "accessory" or the "on" position and test the Headlights. After they are checked-out, shut off the Ignition Key and proceed to replace the Overhead Instrument and Control Panel by resecuring it with the (5) Truss Head Screws.

8. Attach and secure the Work/Tail Light (with its Mounting Bracket already preassembled) to the back of the Overhead Guard and secure it. Make sure that the two leads for connection to the Work/Tail Light are brought out of the Harness before the Light is secured.

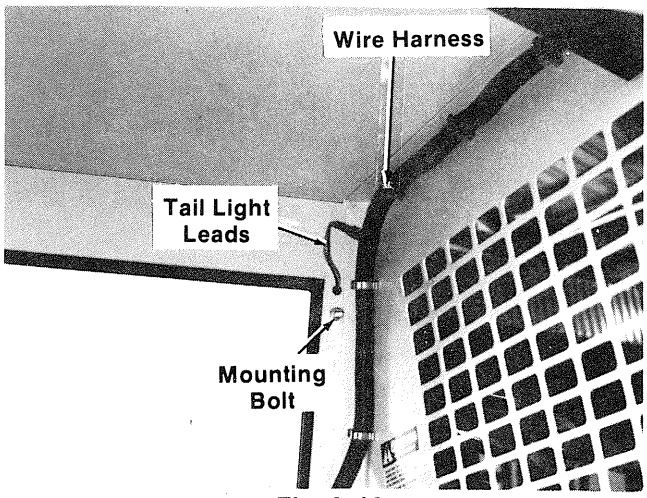


Fig. 9-10

9. After the Work/Tail Light is mounted, route its two leads through the access hole in the Overhead Guard and connect the Light leads to the Wire Harness leads, following the color-coding shown in the Wiring Diagram. Once again, turn the Ignition Key and test the function of the Work/Tail Light before proceeding.

10. Preassemble the Flashers to their respective Mounting Brackets and Guards (with the hardware provided) and then secure the Brackets to the top inside walls of both Chassis Risers using (2 each) 5/16 x 1 CS, L and N. **BE SURE** that both Flashers and their Mounting Brackets are properly oriented before tightly securing the attaching hardware. Install a 058615 Clamp on each side using the top Light Bracket mounting bolt.

11. After the Flashers are mounted, route the Wire leads from each Light assembly through the Loom and down through the Risers, behind the Tilt Cylinder and Lift Arm pivots and out in front of the Risers.

    Using an available hole near the bottom of each inside Riser wall, anchor the lead from each Flasher with a 068256 Clamp. **BE SURE** that all slack is taken-up, along the path of the wire between the Clamps on both sides, to prevent the Leads from being pinched by the pivoting Arms and Cylinders.

    Last, connect the leads to appropriate mating connections from the Engine Harness which are on each side of the Engine. Refer to the Wiring diagram for color-code verification. Once the leads are connected, turn the Ignition Key and check the function of the Flashers as well as all other combinations of Light functions.

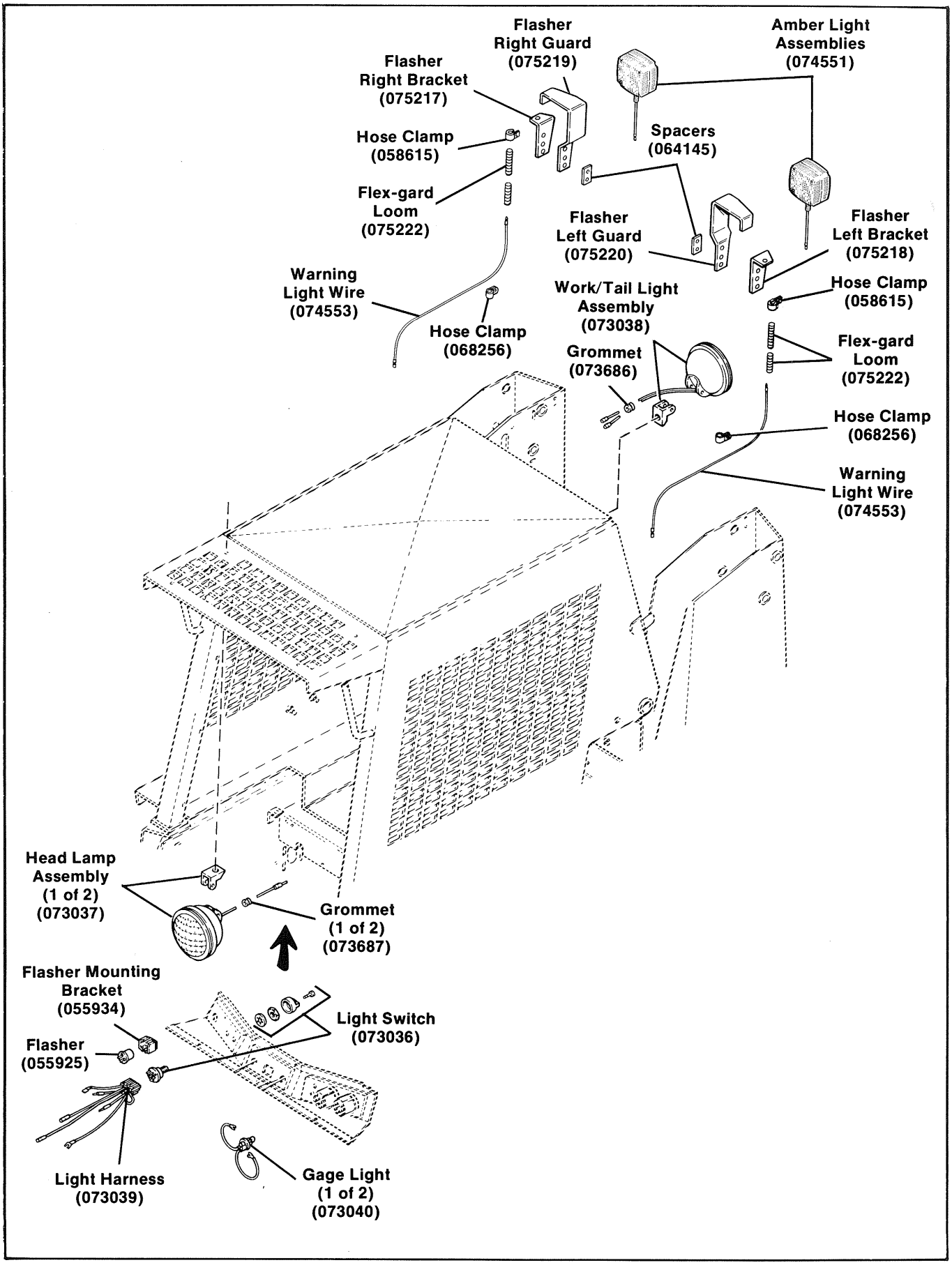


Fig. 9-11: Light Kit Mounting Detail

CHAPTER 10

OPTIONAL FEATURES & ACCESSORIES

ATTACHMENTS & ACCESSORIES

Buckets (Figs. 10-1 thru 10-5)

As listed in the Specifications chapter of this manual, several size and differing purpose Buckets are available. Refer to the Operation chapter for mounting and removal information. To obtain the desired Bucket, order it by the appropriate stock number.

Stock Number	Description
802218	48″ (1219 mm) Utility Bucket
802219	54″ (1372 mm) Utility Bucket
802229	54″ (1372 mm) Light Material Bucket
802230	54″ (1372 mm) Granular Fertilizer Bucket
802239	60″ (1524 mm) Produce Bucket

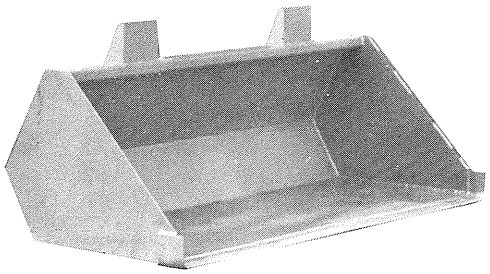


Fig. 10-1: 48″ Wide Utility Bucket

Dirt & Rock Teeth Kit (See Fig. 10-2)

When desired, the 48″ or 54″ Utility Buckets can be equipped with a Dirt and Rock Teeth Kit (802303). The Kit contains a total of (7) Teeth with only (6) used on the 48″ wide Bucket. The Teeth are properly and evenly spaced and welded onto the Bucket Cutting Edge. Refer to the separate mounting instructions furnished with the Kit for additional information.

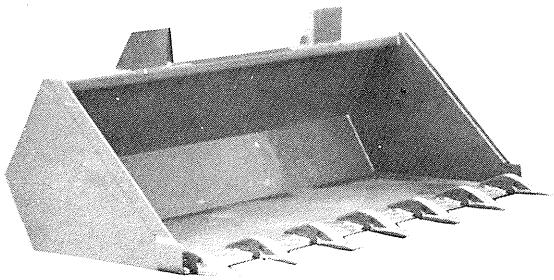


Fig. 10-2: 54″ Wide Utility Bucket with Accessory Dirt & Rock Teeth Kit

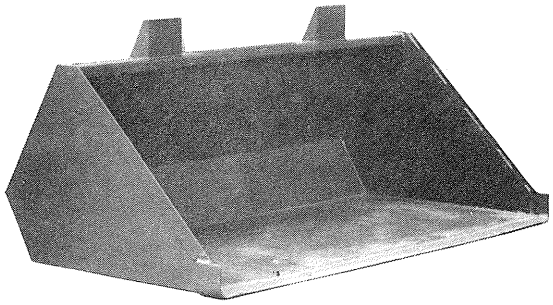


Fig. 10-3: 54″ Wide Light Material Bucket

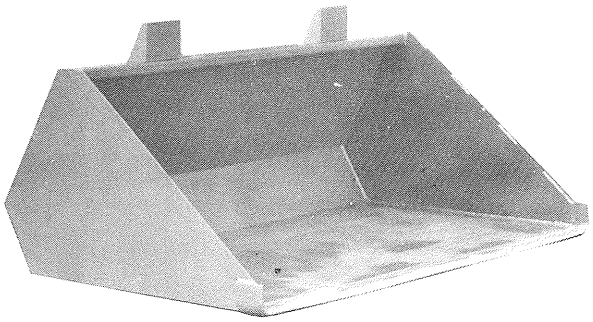


Fig. 10-4: 54″ Wide Granular Fertilizer Bucket

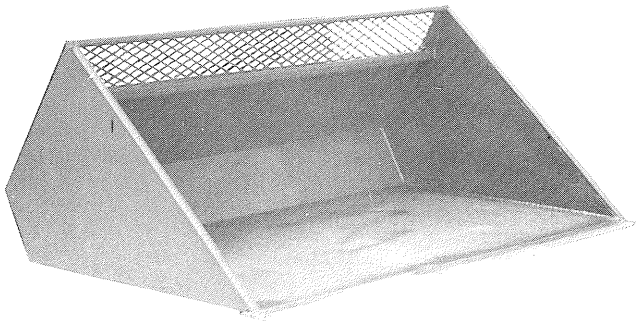


Fig. 10-5: 60″ Wide Produce Bucket

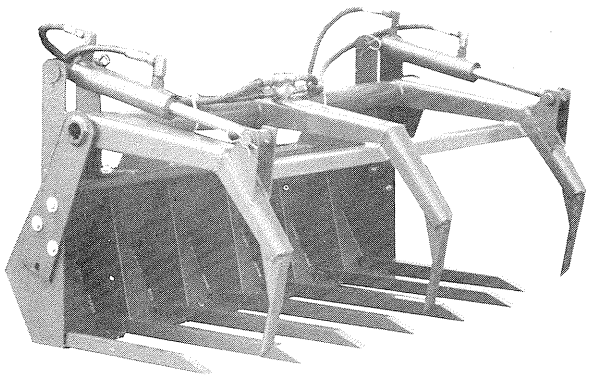


Fig. 10-6: Manure Fork with Mounted Grapple Fork

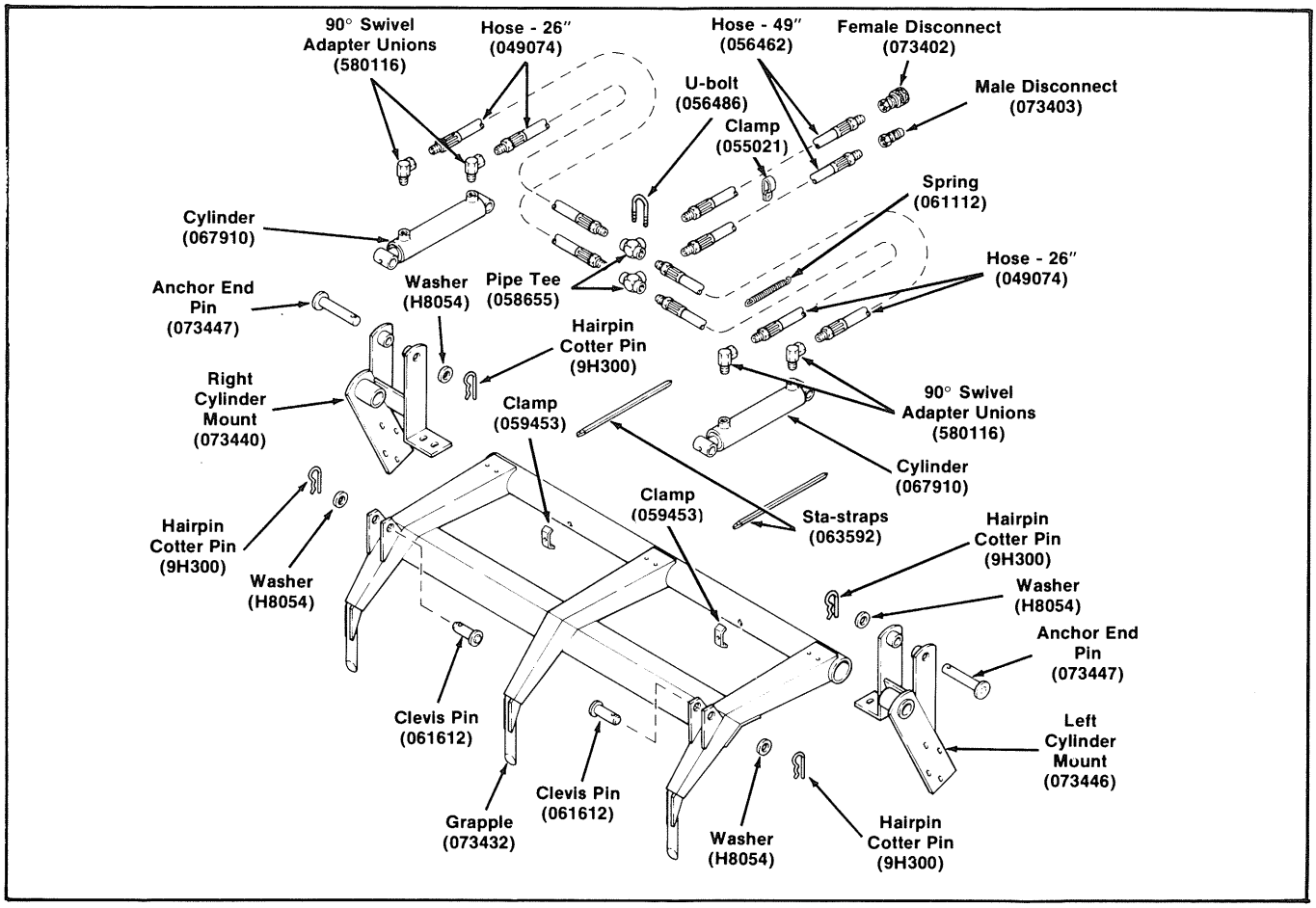


Fig. 10-7: Grapple Fork Exploded-part Assembly View

Grapple Fork (Fig. 10-6 & 10-7)

NOTE: To operate the Grapple Fork, the Loader MUST be equipped with either factory or field installed Front Auxiliary Hydraulics.

The Grapple Fork Kit (802279) is available for direct attachment (using holes already provided) onto a 54" wide Manure Fork or for optional attachment (using field installed mounting holes) onto a 54" wide Utility Bucket. The Kit includes the 3-Fork Grapple assembly, the Right and the Left Grapple Mounting Brackets with Bracket attaching hardware, (2) Dual-acting Cylinders with Anchor and Locking Pins, interconnecting Hoses and Fittings, a U-bolt and attaching hardware, and a Male Quick-disconnect and a Female Quick-disconnect Fittings. All of the components are assembled as shown making sure that the front Cylinder ports are Tee'd together and the rear Cylinder ports are Tee'd together and respectively terminated with the Male and the Female Quick-disconnects.

NOTE: When the Grapple is mounted onto a 54" wide Utility Bucket, use the Right and Left Grapple Mounting Brackets as templates to mark and drill the 10 total 17/32" diameter mounting holes in the top and sides of the Bucket.

Manure Fork (Fig. 10-6)

The 54" wide Manure Fork (802250) has (5) sharp-pointed 25" (635 mm) long inside Tines and (2) sharp-pointed 21" (533 mm) long outside Tines which are welded to the Support assembly.

Pallet Fork

A Pallet Fork Attachment (802257) is available for use only on the SL3410 model Skid Loader. It is a 4 piece assembly composed of a Lower Carriage, a Backrest Extension and (2) adjustable-position 30" (762 mm) long Forks. The Forks have built-in locking handles and pins which engage equally spaced holes in the Carriage.

AUXILIARY HYDRAULICS

The Front Auxiliary Hydraulics Kit is available for field installation (802252). A Skid Loader **MUST** be equipped with Auxiliary Hydraulics in order to operate a Grapple Fork, Backhoe or Posthole Auger. Refer to the Set-up & Assembly chapter for field installation details to equip the Loader with the Auxiliary Hydraulics Kit.

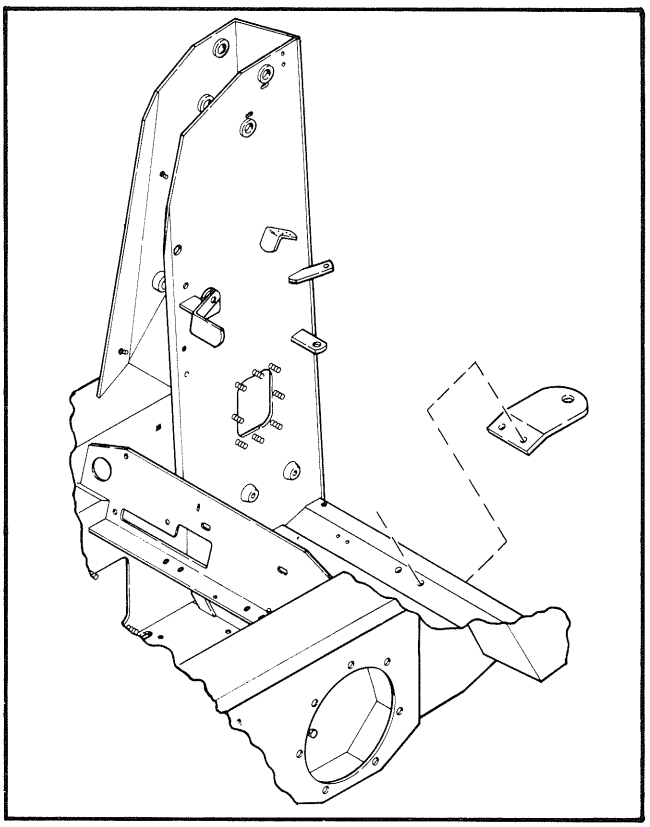


Fig. 10-8: Accessory Drawbar Attachment Detail

DRAWBAR KIT (Fig. 10-8)

The Skid Loader can be equipped with a field installed Drawbar Kit (802256). The Kit includes the Drawbar Plate and attaching fasteners. Mount the Drawbar in the position and direction shown using the holes already provided in the Loader Frame and Engine Air-Shroud; remove and discard original Shroud attaching hardware. Open the Hinged Rear Guard for access.

HORN KIT (Fig. 10-9)

When desired, the Skid Loader can be equipped with a field installed Horn Kit (802255). The Kit consists of a Pushbutton Switch, the Horn unit and color-coded inter-connection leads. To install the Horn Kit, proceed as follows:

1. Raise the Lift Arms, engage the Mechanical Lift Cylinder Lock and exercise the **MANDATORY SAFETY SHUTDOWN PROCEDURE** (page 8).

2. Install the Horn to the inside wall of the Left Chassis Riser. Use the hardware provided to attach the Horn.

3. After the Horn unit is mounted, make the single lead connection between the Horn and the Main Wire Harness which is down in the area of the Engine. **BE SURE** to route the lead so that it is **NOT** crushed or cut by the pivoting Arms or Cylinders. Refer to the appropriate Wiring Diagram in the Service chapter for color-coding identification.

NOTE: Refer to the illustration provided with Field mounting the Work & Warning Light Kit in the Set-up & Assembly chapter, for additional details.

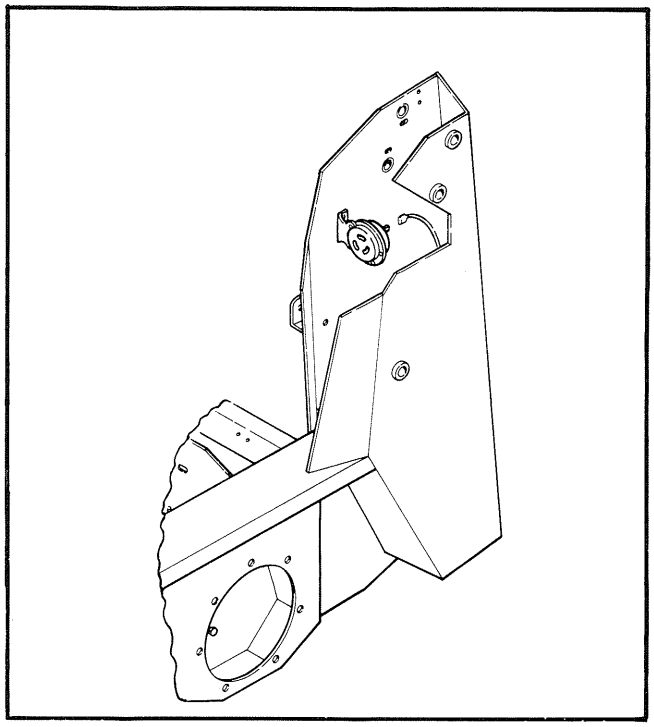


Fig. 10-9: Accessory Horn Detail

4. After the Horn unit is installed and wired, proceed to mount the Pushbutton Switch. Then, temporarily remove the Overhead Instrument and Control Panel by removing the Truss Head Machine Screws. After the Panel is detached, carefully lower it and turn it around for access to the wiring on the back.

5. Using a sharp knife, make the Horn Button cutout in the Left Panel Decal for the Pushbutton by following the pattern already in the Panel as a guide.

6. Then, install the Pushbutton from the back of the Panel through the cutout and secure it.

7. Refer to the appropriate Wiring Diagram in the Service chapter and make the appropriate color-coded wire lead connections between the Pushbutton, Battery Power and the Harness.

8. After the Horn Pushbutton is mounted and wired, test its function with the Ignition Key turned to "on" or "accessory". After correct operation is verified, replace the Overhead Instrument and Control Panel to complete the Kit installation.

HYDRAULIC OIL HEATER KIT (Fig. 10-10)

The Skid Loader can be equipped with a field installed Reservoir Hydraulic Oil Heater Kit (071148). The heater operates on regular line cord 120 volt A.C., 60 hz connection to warm the oil in the Reservoir when the Loader is **NOT** running and is standing in below 0° F temperatures. To install the Reservoir Oil Heater Kit, proceed as follows:

1. Raise the Lift Arms, engage the Mechanical Lift Cylinder Lock and exercise the **MANDATORY SAFETY SHUTDOWN PROCEDURE** (page 8).

2. Using the Drain Plug in the bottom of the Reservoir, and a catch pan, drain at least enough oil out of the Reservoir to bring the level below the Heater Element mounting hole location on the front of the Reservoir.

3. After enough oil is drained-out, replace the Drain Plug and then remove the Pipe Plug which is in the Heater Element mounting hole.

4. Using pipe sealing compound on its threads, install the Element into the threaded hole.

5. With the Element installed, attach the Line Cord to complete the Heater Kit installation.

CAUTION: BEFORE plugging the Heater Element Cord into a grounded 120 volt A.C. outlet, BE SURE that the Loader is grounded, the Engine is OFF and Ignition Key is removed.

SOUND-DEADENING PACKAGE

A Sound-deadening Package is available for field installation only (802442). Installation details are furnished with the package of parts.

WORK & WARNING LIGHTS

A Work and Warning Light Kit is available for field installation only (802627). Refer to the Set-up & Assembly chapter for field installation details.

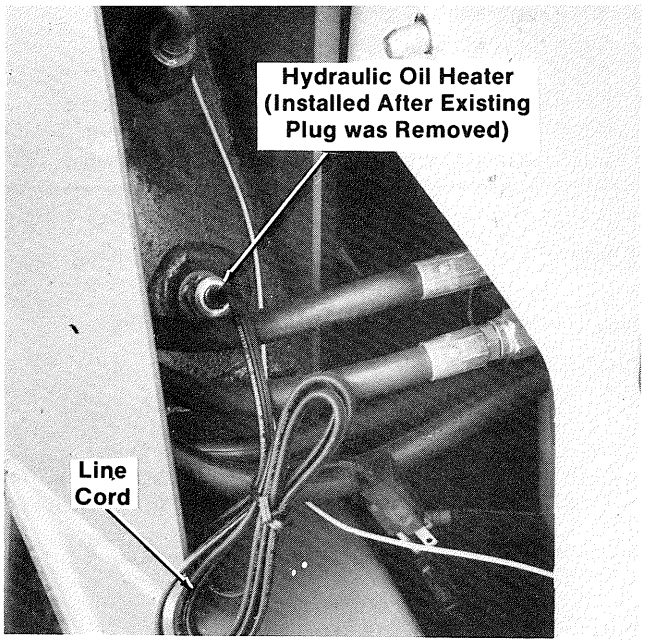


Fig. 10-10: Accessory Hydraulic Oil Heater Kit (Installed)

CHAPTER 11

DECAL LOCATIONS

GENERAL INFORMATION

Decal Locations information is provided to assist in the proper selection and application of new decals, in the event the original decal(s) become damaged or the machine is repainted. Refer to the listing for the illustration reference number, part number, description and quantity of each decal provided in the Kit. Refer to the appropriate illustration(s) for replacement location(s).

To insure proper selection of the correct replacement decals, compare all of the various closeup location photographs to your machine, before starting to refinish the unit. Then, circle each pictured decal (on or otherwise applicable to your machine) while checking-off its part number in the listing. After you have verified all the decals needed for replacement, place any extra unnecessary decals aside for disposal.

NOTE: Always order decals by the set number listed; do NOT order by separate part numbers. For various reasons, your unit may have some Warning decals which have been superceded by more current Warning, Caution or Danger decals. If such is the case, read the information in the decal on your machine and select the new decal from the Kit which expresses the same directives.

NEW DECAL APPLICATION

Surfaces **MUST** be free from dirt, dust, grease and other foreign material before applying the new Decal. To apply, remove the smaller portion of the decal backing paper and apply this part of the exposed adhesive backing to the clean surface while maintaining proper position and alignment. Peel the other portion of the backing paper off slowly while applying hand pressure to smooth-out Decal surface.

CAUTION: ALWAYS observe Safety Rules shown on Decals. If Decals become damaged, or if the unit is repainted, replace the Decals. If repainting, BE SURE that ALL Decals from the Kit(s) which apply to your machine, are affixed to your unit.

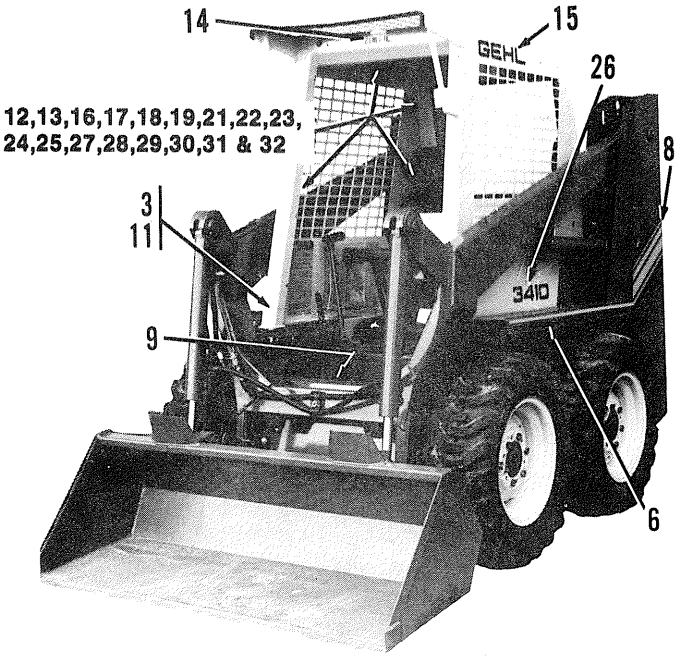
NOTICE

Order paint for refinishing machines from this list:

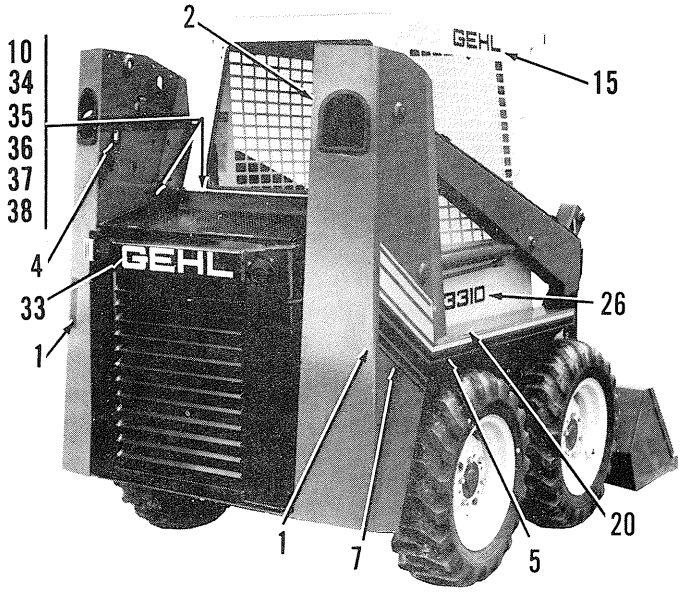
901225	One Gallon Blaze Paint
902872	One Quart Gray Paint
902873	One Quart Black Paint
610239	6 (12 oz.) Cans Blaze Spray Paint
902874	6 (12 oz.) Cans Gray Spray Paint
902875	6 (12 oz.) Cans Black Spray Paint

The Decal Set Number for the SL3310 and SL3410 Skid Loaders is 076600. The Set includes the following:

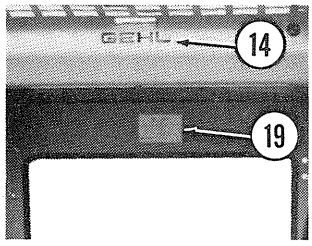
Ref. No.	Part Number	Description & Quantity
On Loader Frame or Lift Arms		
1	067493	Red Reflector Strip (2 Places)
2	072794	Decal - Hydraulic Oil Symbol
3	072795	Decal - Choke Symbol (3310 Only)
4	072796	Decal - Gasoline Symbol (3310 Only)
	072797	Decal - Diesel Fuel Symbol (3410 Only)
5	073077	Right Fender Stripe
6	073078	Left Fender Stripe
7	073079	Right Riser Stripe
8	073080	Left Riser Stripe
9	073151	CAUTION - Carry Load Low
10	076445	WARNING - Jump-starting Loader Engine
11	076713	Decal - Slow-Fast Symbol (3310 Only)
On Overhead Guard		
12	072853	Decal - Lift/Tilt T-Bar Operation
13	072854	Decal - Propulsion T-Bar Operation
14	073030	GEHL 1-13/32 x 5-11/32
15	073031	GEHL 3-5/8 x 14-3/8 (2 Places)
16	073075	Decal - Fast-Slow Symbol (3410 Only)
17	073076	Decal - Brake Symbol
18	073086	CAUTION - General Safety
19	073149	Decal - Overhead Guard (ROPS) Rating
20	073150	CAUTION - Safety Pin for Overhead Guard Locking
21	073152	CAUTION - Carry Load Low
22	073173	CAUTION - Mechanical Lift Cylinder Lock Operation
23	073391	CAUTION - Keep Operator's Manual Here
24	074433	WARNING - Keep Feet Inside
25	074434	CAUTION - Rapid Tach Handles
26	075989	3310 (2 Places)
	077608	3410 (2 Places)
27	076400	CAUTION - Operating Capacities
28	079361	CAUTION - Fasten Seat Belt & Lower Seat Bar
29	079720	CAUTION - Owner's Responsibility & Read Manual
On Instrument & Control Panel		
30	072935	Decal - Right Side of Panel
31	072937	Decal - Left Side of Panel (3310 Only)
	076517	Decal - Left Side of Panel (3410 Only)
32	076130	Decal - Middle of Panel
On Outside of Hinged Rear Guard		
33	073081	GEHL (Gray on Black)
On or Around Engine & Radiator		
34	056859	Decal - Factory Installed Coolant Mixture (3410 Only)
35	072793	Decal - Engine Oil Symbol
36	072798	Decal - Coolant Under Pressure Symbol (3410 Only)
37	072058	CAUTION - Close or Replace Guard (3310 Only)
On Underside of Louvered Engine Cover		
38	076401	Decal - Maintenance Schedule

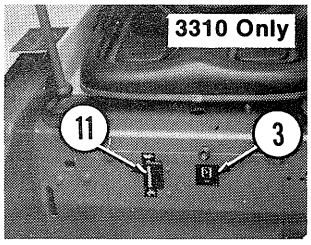


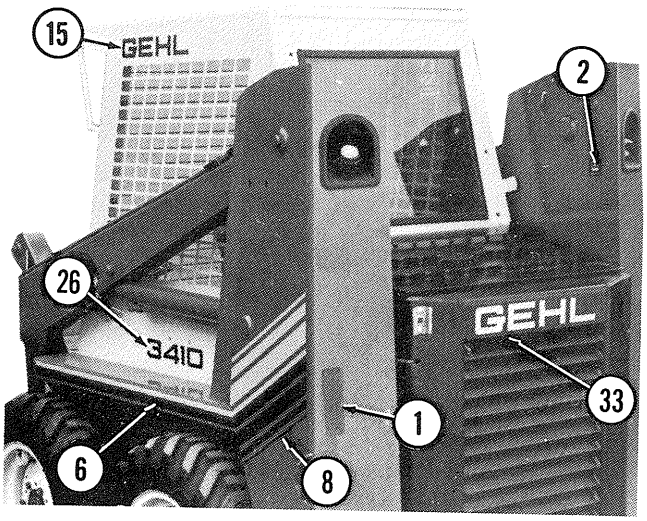
Front Master



Rear Master



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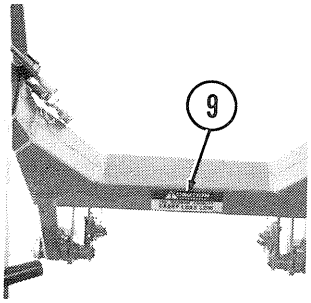
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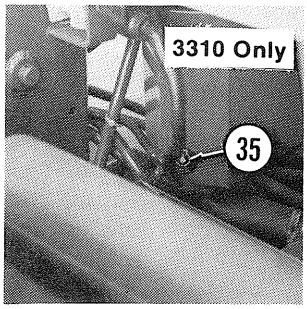
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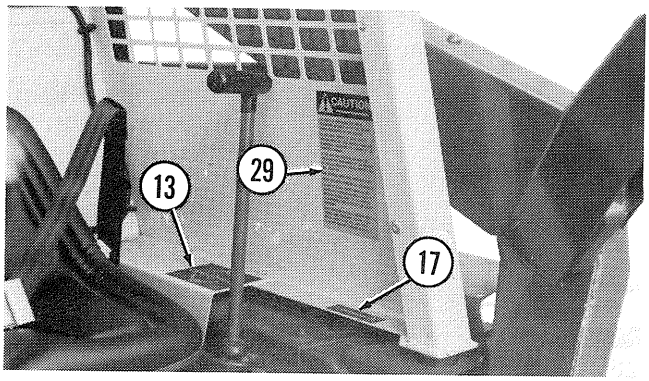
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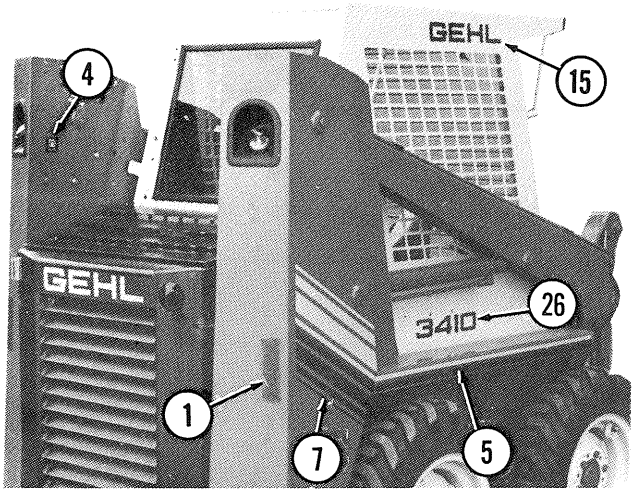
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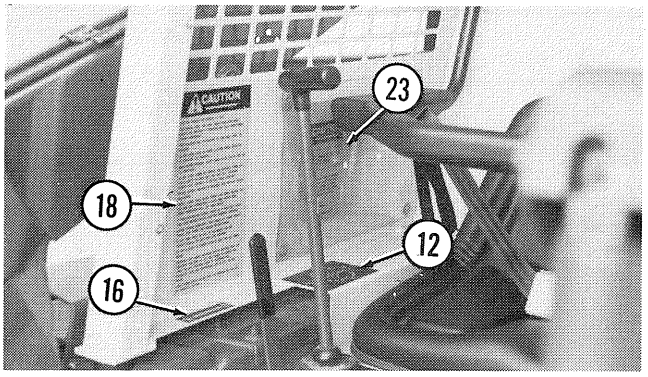
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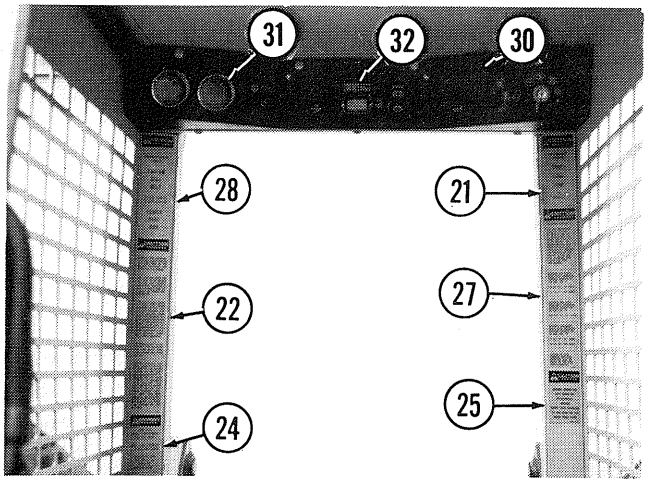
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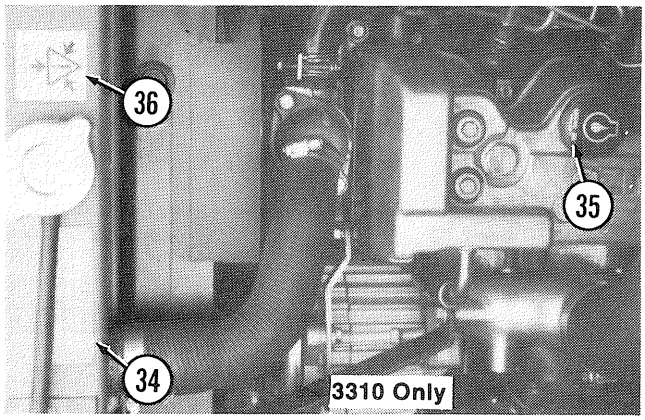
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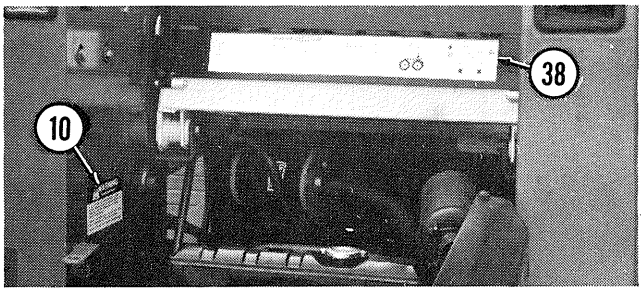
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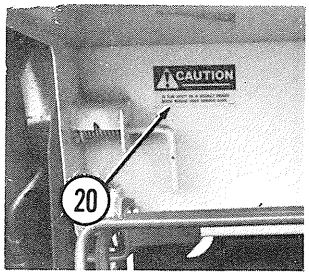
CAUTION
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CHAPTER 12
TROUBLESHOOTING

NOTE: This Troubleshooting guide presents problems, causes and remedies beyond the extent of loose, worn or missing parts and is developed in consideration of the Loader being in otherwise good operating condition. Refer to the Index for chapter and topic page number references.

ELECTRICAL SYSTEM

PROBLEM	CAUSE	REMEDY
Starter will **NOT** crank.	Starter circuit fuse is blown.	Replace Starter 20 ampere fuse.
	Battery connections are loose or corroded, Starter Solenoid is defective or Seat-actuated Electrical Switch is **NOT** operating properly.	Clean the Battery terminals and cables and retighten them or replace Solenoid or readjust Seat-actuated Switch per detail in Adjustments chapter.
Battery will **NOT** recharge.	Terminals or cables are loose or corroded, Battery is defective, Alternator (or Regulator) is defective.	Clean the Battery terminals and cables and retighten them or replace Battery. Alternator output can be checked by dealer.
Entire Electrical System does **NOT** function.	Fuse in Starter Circuit is blown.	Replace Fuse with new 20 ampere fuse.
Gauges and Instrument Panel Switches do **NOT** work.	Fuse in Instrument Panel is blown.	Replace with new 10 ampere fuse.

ENGINE

Engine will **NOT** turn over.	Battery connections are loose or corroded.	Clean the Battery terminals and retighten them.
	Battery is discharged or defective.	Recharge Battery (refer to Battery topic in Service chapter) or replace Battery.
	Driver is **NOT** sitting on Seat or Safety Seat-actuated Switch is **NOT** functioning or properly set.	Sit on Seat and start Engine. Refer to Seat-actuated Switches topic in Adjustments chapter for readjustment details.
	Wire lead connections to and from Ignition Switch, Safety Seat-actuated Switches, etc., are loose or disconnected.	Check all terminals and connections for loose termination or broken leads.
	Starter or pinion is faulty.	See Engine manual or contact dealer for directives.
Engine overheats.	Crankcase oil is too full or too low.	Add or remove oil.
	Engine is overloaded.	Operate Loader at 1/2 to full Throttle.
	(SL3410 Only) Cooling System is low on water.	Add water or coolant.
	Cooling System air circulation is blocked.	Remove restriction.
	(SL3410 Only) Fan Shroud improperly positioned.	Readjust Radiator so that the Fan is 1/3 to 1/2 of the way Shrouded.
	Grade of oil improper or dirty.	Drain and replace with proper grade of oil or new oil.
	Exhaust is restricted.	Remove restriction when cool.
	(SL3310 Only) Engine out of timing.	Refer to Engine Manual.

ENGINE (Con't.)

PROBLEM	CAUSE	REMEDY
Engine turns-over but will **NOT** start.	Battery is weak or drained.	Check Battery charge; if after recharged it still does **NOT** hold a charge, replace it.
	Engine cranking speed is too slow.	Battery requires recharging or in cold temperatures, pre-warm Engine and Hydraulic oils.
	Fuel Shut-off Solenoid is **NOT** energizing Pump.	Check electrical connections and voltage to Shut-off Solenoid.
	Causes and Remedies for 3410 model ONLY.	
	Fuel Tank is empty.	If Tank was run dry, system will require de-aerating; see Engine Manual.
	Pump is **NOT** pumping fuel.	Refer to Engine Manual.
	Intake Manifold is **NOT** warm enough.	Operate Glow Plugs longer before attempting to start Engine.
	Air or moisture in fuel line.	Bleed system per details in Engine Manual.
	Causes and Remedies for 3310 model ONLY.	
	Fuel Tank is empty.	Check for faulty Fuel Gauge Sender or refill Tank.
	Distributor timing is off.	Tming should be reset to 16 to 20 BTDC with the marks on flywheel.
	Breaker Points are improperly gapped.	Replace or reset Points; gap to 0.016 to 0.020".
	Fuel **NOT** reaching the Carburetor.	Check Fuel Filter for blockage; clean or replace; check Fuel Pump.

HYDRAULIC LIFT AND BUCKET

No response to Lift Arm or Bucket.	Gear pump damaged.	Inspect Gear Pump internally or Drive Shaft.
	System Valve Relief **NOT** functioning.	Check pressure at Cylinder.
	Oil flow to pump blocked.	Inspect Suction Hose and Reservoir.
Lift Arm does **NOT** raise. Bucket works properly.	Seat-actuated Switch Relay or Solenoid **NOT** functioning.	Check Electrical connections to Switch, Relay and Solenoid.
	First Spool in System Valve leaking.	Check flow and pressure to Lift Cylinder.
Hydraulic Cylinder action slow.	Badly worn System Pump.	Check pressure and flow.
Lift Arm does **NOT** maintain raised position with T-bar in neutral.	Oil leaking past Cylinder packing.	Check condition of Piston Rings and Cylinder bore.
	Oil leaking past spool in valve.	Check spool and valve body for score or cracks. Replace Control Valve if necessary.
	Leaking lines on fittings between Control Valve and Cylinders.	Inspect for leaks.
Tilt Cylinder is slow, inoperative or leaks down.	Oil is leaking past the Cylinder Packing.	Check Piston Rings and Cylinder Bore.
	Oil is leaking past the Valve Spool.	Inspect Spool for dirt and, if necessary, replace Valve if Spool is damaged.

HYDROSTATIC DRIVE

PROBLEM	CAUSE	REMEDY
No response from either hydrostatic Drive or Lift/Tilt System.	Oil too heavy.	Allow longer warm-up. Replace with proper viscosity (weight) oil.
	Oil supply too low.	Check for low oil level in reservoir. Add oil if necessary.
	Reservoir strainer plugged.	Remove Reservoir Cover and clean strainer. Also, inspect Reservoir for foreign object plugging system.
	Drive disconnected.	Check for broken or worn Coupling and replace if necessary.
	Sheared Spline or broken Shaft in Tandem pump assembly.	Check Splined Shaft on pump closest to Engine. Replace Shaft if broken or if Splines are sheared.
Traction Drive will **NOT** operate in either direction.	Hand Brake on.	Disengage Hand Brake.
	Oil too heavy.	Allow longer warm-up.
		Replace with proper viscosity (weight) oil.
	Tow valves turned for towing.	Return valves to normal operating position.
	Control linkage disconnected.	Check linkage connections at T-bar and drive pump pivot arms. Reconnect linkage if necessary.
	Low or no drive pump charge pressure.	Check charge pressure. Pressure should be 60-150 PSI.
	Charge pump gears worn or damaged.	Replace gerotor gears.
	Charge pump relief valve damaged.	Replace drive pump adapter assembly (includes relief valves).
	Charge pump key sheared.	Replace key.
	Super-charge valve malfunctioning.	Check charge inlet pressure. Pressure should be 12-20 PSI. If necessary, replace super charge valve in reservoir cover.
	All four drive pump relief valves malfunctioning.	Inspect and clean valves. If necessary, replace relief valves.
	Both primary drive chains disconnected.	Reconnect and adjust chains.
	Worn drive motor sprockets or sheared motor shaft splines.	Replace sprockets or motor shafts.
Drive wheels do **NOT** turn in proper direction for T-bar movement.	One or both drive motors mounted upside-down.	Remount motors with small drain port in proper position.
	Hydraulic lines between pumps and motors connected to wrong ports.	Reconnect hydrualic lines to proper ports on motors and/or pumps.

HYDROSTATIC DRIVE (Con't.)

PROBLEM	CAUSE	REMEDY
Right side does **NOT** drive in either direction. (Left side operates normally).	Right side primary drive chain disconnected.	Reconnect or replace chain.
	Excessive leakage in right drive motor.	Remove motor drain line and measure leakage. Repair or replace motor if defective.
	Excessive leakage in rear pump.	Remove pump drain line and measure leakage. Repair or replace rear pump.
	Worn drive motor sprockets or sheared motor shaft spline.	Replace sprockets or motor shaft.
	Key missing on rear pump Pivot Arm and Pivot Arm is loose on Control Shaft.	Replace key. Torque hexagon head cap screws on coupler 35-40 ft-lbs.
	Both pump relief valves of rear pump malfunctioning.	Switch relief valves with front pump valves and test for proper right side operation. If this corrects problem, clean or replace defective relief valves.
	Damaged check valves.	Disassemble rear pump and check for damaged or faulty check valves. If necessary, clean or replace valves.
Right side does **NOT** operate in forward direction.	Malfunction of relief valve on right side of rear pump.	Switch relief valve with that from the left side of rear pump. Problem should switch to reverse direction. If necessary, clean or replace faulty valve.
	Control linkage to rear pump misadjusted (too short).	Readjust linkage.
	Key missing in rear pump Pivot Arm and Pivot Arm rotated clockwise on Pump Control Shaft.	Replace key. Torque hexagon head cap screws on coupler 35-40 ft-lbs.
	Damaged check valve on right side of rear pump.	Disassemble and check if valve is faulty or damaged. Repair or replace valve if necessary.
Right side does **NOT** operate in reverse direction.	Malfunction of relief valve on left side of rear pump.	Switch relief valve with that from the right side of rear pump. Problem should switch to forward direction. If necessary, clean or replace faulty valve.
	Control linkage to rear pump misadjusted (too long).	Readjust linkage.
	Key missing in rear pump Pivot Arm and Pivot Arm rotated counterclockwise on Pump Control Shaft.	Replace key. Torque hexagon head cap screws on couplder 35-40 ft-lbs.
	Damaged check valve on left side of rear pump.	Disassemble and check if valve is faulty or damaged. Repair or replace valve if necessary.

HYDROSTATIC DRIVE (Con't.)

PROBLEM	CAUSE	REMEDY
Left side does **NOT** drive in either direction. (Right side operates normally).	Left side primary drive chain disconnected.	Reconnect or replace chain.
	Excessive leakage in left drive motor.	Remove motor drain line and measure leakage. Repair or replace motor if defective.
	Excessive leakage in front pump.	Remove pump drain line and measure leakage. Repair or replace front pump.
	Worn drive motor sprockets or sheared motor shaft spline.	Replace sprocket or motor shaft.
	Key missing on front pump Pivot Arm and Pivot Arm is loose on Pump Control Shaft	Replace key. Torque hexagon head cap screws on coupler 35-40 ft-lbs.
	Both pump relief valves of front pump malfunctioning.	Switch relief valves with rear pump valves and test for proper left side operation. If this corrects problem, clean or replace defective relief valves.
	Damaged check valves.	Disassemble front pump and check for damaged or faulty check valves. If necessary, clean or replace valves.
Left side does **NOT** operate in forward direction.	Malfunction of relief valve on right side of front pump.	Switch relief valve with that from the left side of front pump. Problem should switch to reverse direction. If necessary, clean or replace faulty valve.
	Control linkage to front pump adjustment too short.	Readjust linkage.
	Key missing in front pump Pivot Arm and Pivot Arm rotated clockwise on Pump Control Shaft.	Replace key. Torque hexagon head cap screws on coupler 35-40 ft-lbs.
	Damaged check valve on front pump	Disassemble and check if valve is faulty or damaged. Repair or replace valve if necessary.
Left side does **NOT** operate in reverse direction.	Malfunction of relief valve on left side of front pump.	Switch relief valve with that from the right side of front pump. Problem should switch to reverse direction. If necessary, clean or replace faulty valve.
	Control linkage to front pump adjustment too long.	Readjust linkage.
	Key missing in front pump Pivot Arm and Pivot Arm rotated counterclockwise on Pump Control Shaft.	Replace key. Torque hexagon head cap screws on coupler 35-40 ft-lbs.
	Damaged check valve on left side of front pump.	Disassemble and check if valve is faulty or damaged. Repair or replace valve if necessary.

HYDROSTATIC DRIVE (Con't.)

PROBLEM	CAUSE	REMEDY
Hydrostatic (drive) system is noisy.	Oil too heavy.	Allow longer warm-up. Replace with proper viscosity (weight) oil.
	Air in system.	Check for low oil level in reservoir. Add oil if necessary.
	Loose connection to charge inlet.	Tighten fittings.
	Internal pump or motor damage.	Remove motor and pump drain lines and measure leakage. Repair or replace motors or pumps if defective.
Hydrostatic drive overheating.	Traction system overloaded continuously.	Improve efficiency of operation.
	Lift and Tilt system overloaded continuously.	Improve efficiency of operation.
	Unit operated in high temperature area with no air circulation.	Reduce duty cycle and improve air circulation.
Neutral is difficult to maintain.	Control linkage ball joints loose at T-bar or drive pump pivot arms.	Check and retighten or replace components.
	Control linkage misadjusted.	Readjust linkage.
	Key missing or loose in one or both drive pump Pivot Arms.	Inspect and, if necessary, replace key(s), or worn parts.
	Friction bars do not hold T-bar in neutral.	Tighten bolts so about 1/4 to 3/8 of the thread is showing on each bolt.
	Detent in friction bar worn.	Replace friction bar.
Sluggish response to acceleration.	Air in system.	Check for low oil in reservoir. Add oil if necessary.
	Low drive pump charge pressure.	Check charge pressure. Pressure should be 60-150 PSI.
		Repair gerotor, charge relief or super charge valve.
	Super-charge valve malfunctioning.	Check charge inlet pressure. Pressure should be 12-20 PSI. If necessary, replace super charge valve in reservoir cover.
	Internal motor or pump damage.	Remove motor and pump drain lines and measure leakage. Repair or replace motors and pumps if necessary.
	Engine not responding to load.	Troubleshoot and adjust engine.
Gradual turn to left produces hesitation and jerky movement.	Coupler connecting two drive pump shafts is binding.	Remove tandem pump. Split two drive pumps and adjust coupler.

CHAPTER 13

SERVICE

GENERAL INFORMATION

CAUTION: BEFORE proceeding to perform any Service routines on the Skid Loader or unless expressly instructed to the contrary, exercise the MANDATORY SAFETY SHUTDOWN PROCEDURE (page 8). After Service has been performed, BE SURE to restore all Guards, Shields and Covers to their original positions BEFORE resuming Loader operation.

NOTE: All Service routines, with the exception of those described under the major topic titled "Dealer Services", are understood to be owner-operator responsibilities. Those "Dealer Services" should only be attempted by (or under the direction of) an authorized GEHL Skid Loader dealer. All Operator Services described under the 10 hour, 100 hour, 200 hour and 500 hour subtopics, are also referred to by a Decal which is affixed to the underside of the Engine Access Cover. Refer to the Lubrication chapter of this manual for lubrication information.

This Service chapter details procedures to follow for making routine maintenance checks, adjustments and replacements. The majority of the procedures are also referred to in both the Troubleshooting and Maintenance Log chapters of this manual. For Engine related adjustments and servicing procedures, **BE SURE** to refer to the separate Engine manual provided.

DEALER SERVICES

NOTE: The following areas of internal component service, replacement and operating adjustments should only be attempted by (or under the direction of) an authorized GEHL Skid Loader dealer.

Hydrostatic Pumps & Motors

The Hydrostatic Pumps are coupled directly to each other and to the Engine Crankshaft. All service routines, related to the internal components of the Pumps, are precise and critical to proper operation. The Hydrostatic Motors are also very sophisticated devices which require special know-how and tools for servicing.

NOTE: If either the Hydrostatic Pumps or the Motors are suspected of faulty operation, contact your GEHL dealer for further information and directives.

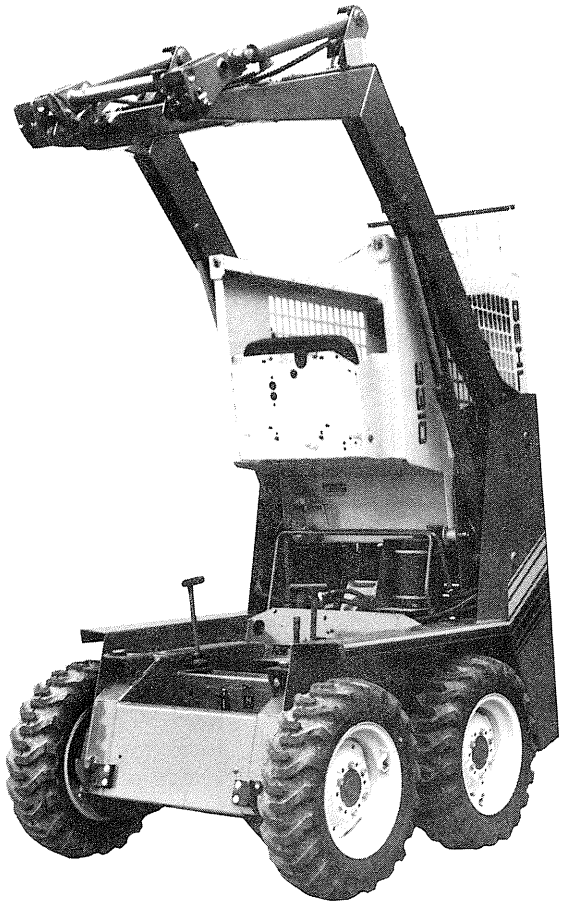

Fig. 13-1: Overhead Guard Rolled-back for Service Access

Hydraulic System Pump (Figs. 13-1 & 13-2)

The Hydraulic System Pump is coupled directly to the Front Hydrostatic Pump. This Pump would likewise require special tools and know-how for internal component servicing. However, if faulty operation is suspected and confirmed through conversation with your dealer, the Hydraulic System Pump can be detached and taken to the dealer for service. To remove the Pump, proceed as follows:

1. Raise the Lift Arms and (following proper procedures) engage the Mechanical Lift Cylinder Lock. With the Lift Arms raised, exercise the **MANDATORY SAFETY SHUTDOWN PROCEDURE (page 8).**
2. Unbolt, roll-back and lock the Overhead Guard and remove the Hydraulic Pump Access Cover by removing the attaching fasteners.
3. Drain the Hydraulic Oil Reservoir to a level below the Suction Line port of the Reservoir.
4. Clearly and accurately identify the Hose connections to the Hydraulic System Pump and then, remove the connections from the Pump.

5. After the Hose connections are removed, the Hydraulic System Pump can be uncoupled from the Front Hydrostatic Pump and the Hydraulic System Pump can be taken to the dealer for service or replacement.

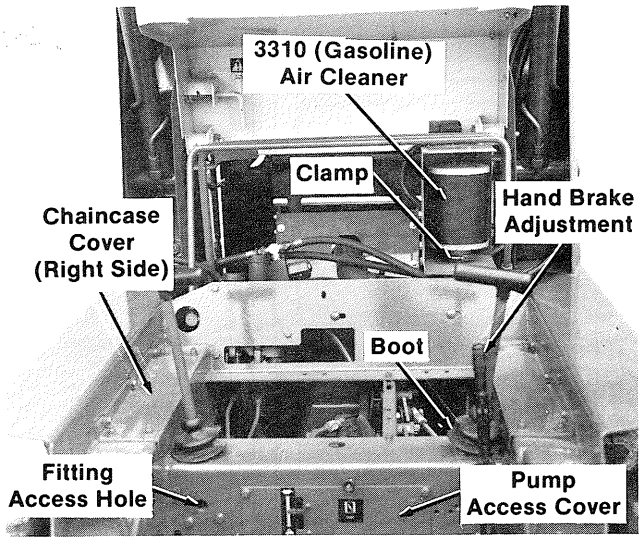

Fig. 13-2

Control Valves

Internal component service on both the Systems Control Valve, for the Lift and the Tilt Cylinders and control circuits, and the Auxiliary Hydraulics Control Valve (on units with field installed Auxiliary Hydraulics connections) should only be attempted by (or under the direction of) an authorized GEHL dealer. Either Valve can be removed from the Loader and taken to the dealer for service or replacement. **BE SURE** to mark and clearly identify all Hose and Linkage connections, before disconnecting them from the Valve. Access to either Valve is gained by locking the Lift Arms in the raised position and unbolting, rolling-back and locking the Overhead Guard.

Cylinders

All Hydraulic Cylinders used on the Skid Loader are appropriately designed with particular strokes, diameters and hose connection provisions unique to the Skid Loader's application requirements. In addition, internal Cylinder component service and replacement requires special know-how and tools. Any one of the four Hydraulic Cylinders can be conveniently removed from the Loader and taken to the dealer for service or replacement. To remove a Cylinder, first make sure that the Lift Arms are lowered and in contact with the Loader Frame. Next, sit on the Seat and turn the Ignition Key to the "ON" position; do **NOT** start the Engine. Then, push the Lift/-Tilt T-Bar forward to relieve pressure from the backs of the Lift Cylinders and the Solenoid Valve. Then, after exercising the **MANDATORY SAFETY SHUTDOWN PROCEDURE** (page 8), disconnect the Hydraulic Hose connections. Next, remove the Rod end Anchor Pin and lastly remove the Cylinder end Anchor Pin. New Cylinder installation or repaired Cylinder replacement is in reverse sequence of removal.

Hydraulic Hoses & Tubing (Fig. 13-3)

Numerous hydraulic Hoses, Tubes and Fittings are used to interconnect the various hydraulic and hydrostatic components shown in the hydraulic system diagram. Refer to the diagram for faulty component, Hose or Fitting identification. Contact the dealer for troubleshooting and service parts references, as required.

Electrical Components (Figs. 13-4 & 13-5)

Electrical system diagrams are provided for both model Skid Loaders which include the Ignition System, electrical components, Gauges, Indicators and Switches (both standard and accessory). The diagram provides a guide for troubleshooting and service parts references, as required.

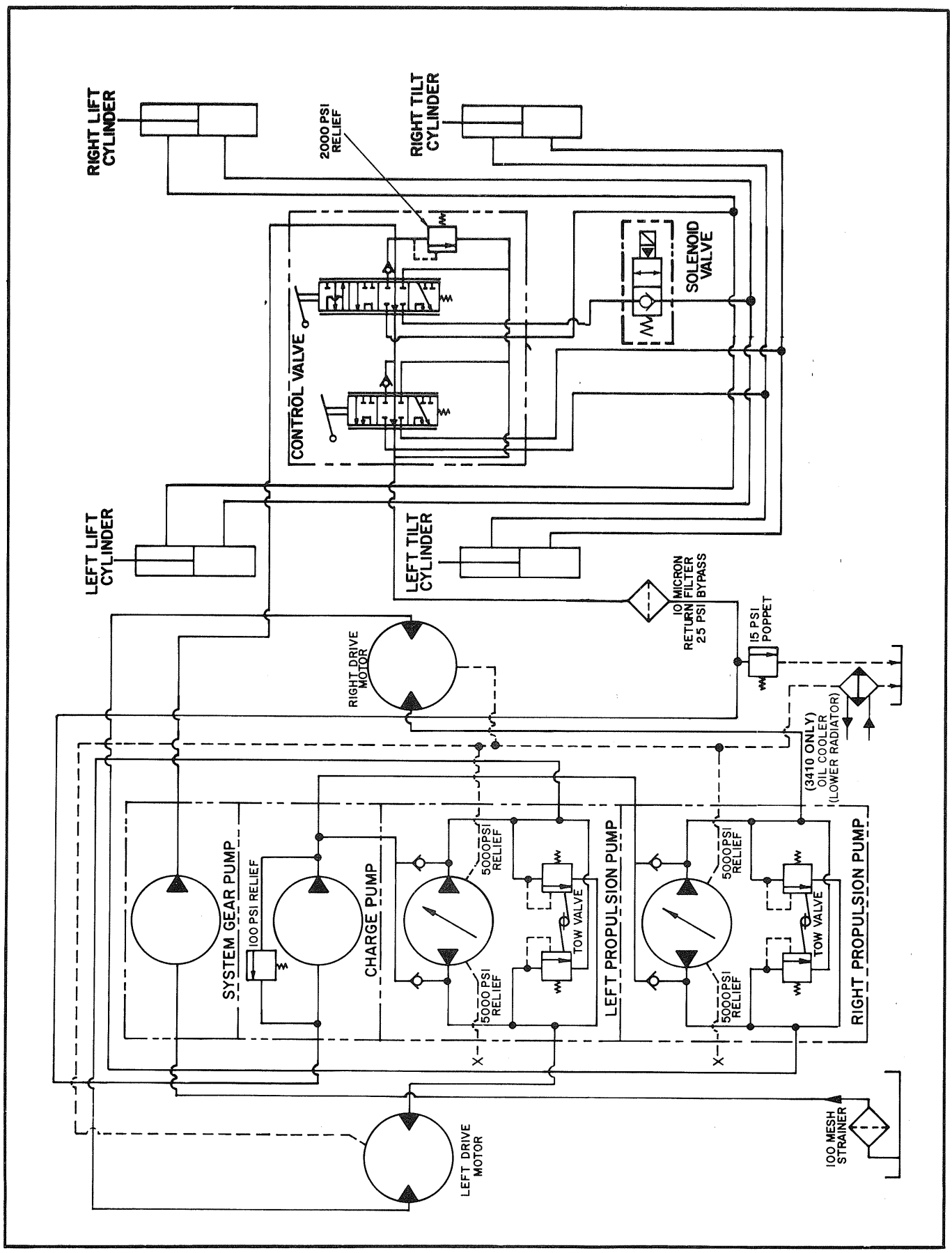

Fig. 13-3: Hydraulic System Diagram

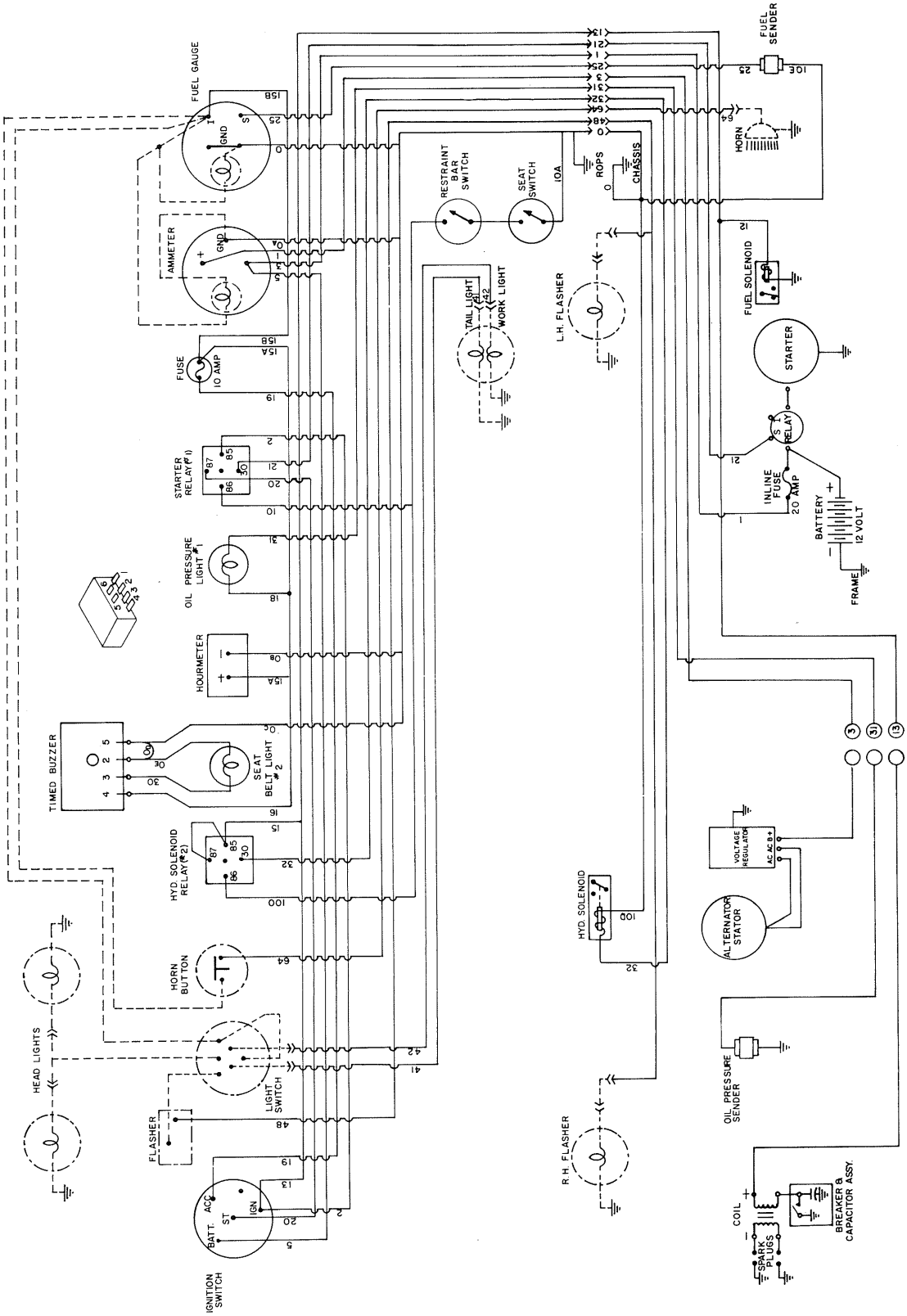

Fig. 13-4: SL3310 Electrical System Diagram

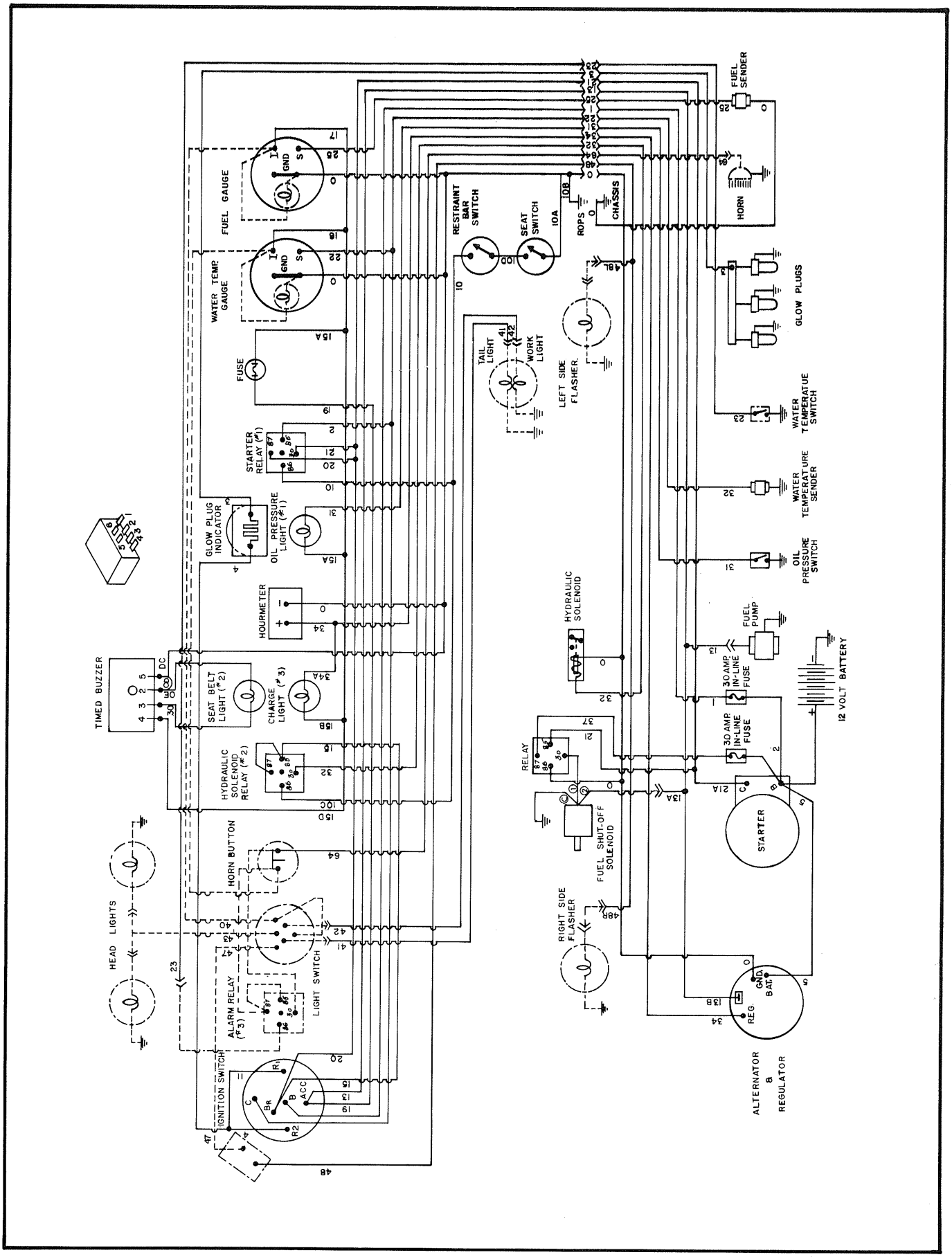

Fig. 13-5: SL3410 Electrical System Diagram

OPERATOR SERVICES

10 Hour or Daily Services

All of the following services should be performed after every 10 hours of operation or at least once a day.

Lift Arms, Hydro-lock & Cylinder Pivots

Lubricate the Grease Fittings provided at all six (6) Lift Arm and Hydro-lock pivot points and at all eight (8) Hydraulic Cylinder pivot points.

Engine Oil Level Check (Figs. 13-6 & 13-7)

The Engine Cankcase oil level is conveniently checked with the Dipstick provided. The Dipstick is located on the top left front corner of the Engine with access gained by opening the Hinged Rear Guard. Markings on the Dipstick represent both full and low (add oil) levels. Refer to the Engine Oil & Filter subtopic, under the 100 Hour Services topic, for details on where to add oil into the Crankcase.

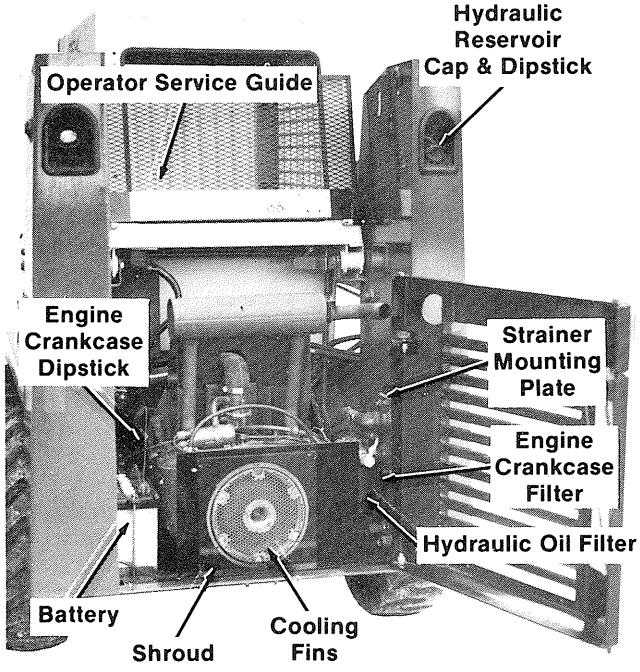

Fig. 13-6

Hydraulic Oil Level Check (Figs. 13-6 & 13-7)

A Cap with integral Dipstick is provided on the Hydraulic Reservoir which is housed in the Right Chassis Riser. The Dipstick bears a single oil level mark. Refer to the Lubrication chapter for oil recommendations and to the Hydraulic Reservoir Oil subtopic, under the 500 Hour or One Year topic, for draining and replacement information.

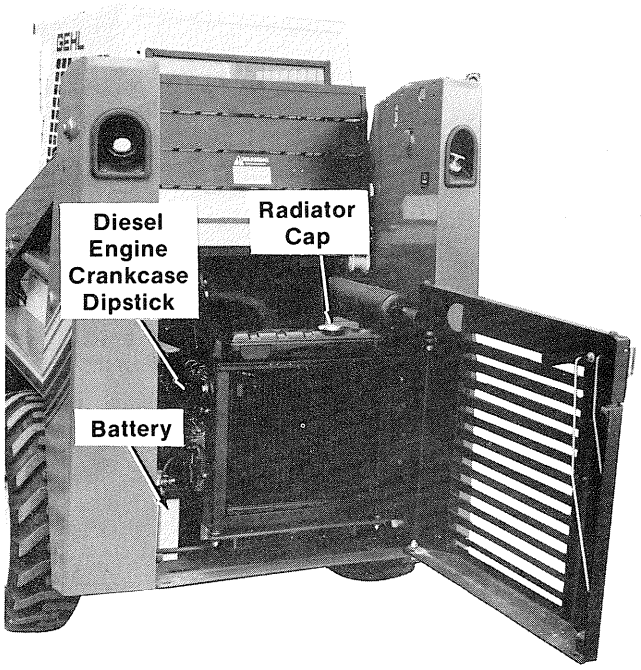

Fig. 13-7: SL3410 Engine & Radiator

Cleaning Cooling Fins (SL3310 Only) (See Fig. 13-6)

On the SL3310 model, air is drawn into the Cooling Shroud by Fins provided on the Flywheel. The Air Screen and Cooling Fins **MUST** be kept clean and unobstructed at all times. Never operate the Engine with the Cooling Shroud and Baffles removed as this could cause improper air circulation and resultant Engine overheating. Keep the components clean by directing compressed air down on the Engine, beneath the Intake and Exhaust Manifolds, so that any build-up of dust and chaff will be blown out towards the rear.

NOTE: When the Loader is being operated in extremely dusty surroundings, clean the Cooling Fins more frequently.

Radiator Coolant Level Check (SL3410 Only) (Fig. 13-7)

The Radiator Coolant level for the SL3410 (diesel) model Skid Loader **MUST ALWAYS** be checked when the Engine is cool. Access to the Radiator Cap is obtained by opening the Engine Access Cover. Maintain the Coolant level just below the neck of the Filler Hole. Refer to your Engine Manual for antifreeze recommendations and to the Radiator Flushing & Antifreeze Replacement topic, under the 500 Hour or One Year topic, for draining and Coolant replacement details.

WARNING: Do NOT remove the Radiator Cap when the Engine is HOT, running or Coolant is extremely HOT and under pressure. Wait for the Engine to cool BEFORE relieving the pressure and removing the Radiator Cap.

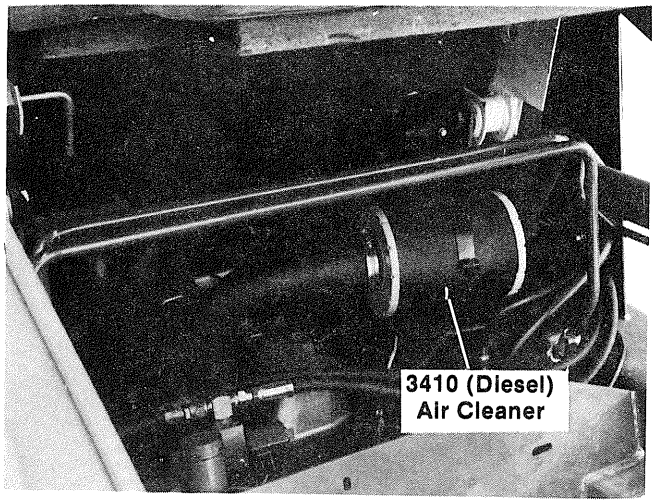

Fig. 13-8: 3410 Air Cleaner Access View

100 Hour Services

Air Cleaner Cleaning or Replacement (Fig. 13-8 & See Fig. 13-2)

The Air Cleaner can be removed and cleaned or replaced, as necessary. Access is gained by unbolting, rolling-back and locking the Overhead Guard. To remove the Air Cleaner, loosen the Clamp which is securing it. After the Air Cleaner is removed, it can be washed (as many as 6 times) and reused. Cover the clean air side of the assembly and wash it in a low-sudsing detergent. After it is washed, it should be rinsed thoroughly and left to drip dry; do **NOT** attempt to use compressed air to speed-up drying as this could damage the internal structure. After about 6 washings, a new Air Cleaner should be installed. The part number for the Air Cleaner is 075986.

Alternator Belt Tension & Condition Checks (SL3410 Only)

On the SL3410 model Loader only, the Alternator Drive Belt can be checked by first opening the Engine Access Cover and Hinged Rear Guard. Refer to the Adjustments chapter for tension adjustment procedures. To replace a Belt, loosen (but do **NOT** remove) the Alternator Bracket Bolt and Pivot Bolt and release Belt tension. Remove the worn Belt and replace it. Refer to the Adjustments chapter for retensioning details. To obtain a new Alternator Drive Belt, specify part number 5-13671-156-0.

Battery (See Figs. 13-6 & 13-7)

The Skid Loader uses a low maintenance 12 volt D.C. wet-cell Battery. Access to the Battery is gained through the Hinged Rear Guard.

Cleaning Terminals & Cable Connections

The top of the Battery **MUST** always be kept clean. Always keep the Vent Caps tightly secured. Clean the Battery with a brush dipped in an alkaline solution (ammonia or baking soda and water). After the foaming has stopped, flush the top of the Battery with clean water. If the terminals and Cable connection Clamps are corroded or have a build-up, disconnect the Cables and clean the terminals and clamps with the same alkaline solution.

Jump-starting a Discharged Battery

CAUTION: The only safe method of jump-starting a discharged Battery is for two people to carryout the following procedure. This is necessary in order to remove the jumper cables without leaving the Operator's Compartment with the Engine running.

If the Loader Battery becomes discharged and fails to have sufficient power to start the Loader Engine, jumper cables can be used to obtain starting assistance.

WARNING: Do NOT attempt to jump-start the Loader Battery if it is frozen; this may cause it to rupture or explode. Closely follow the procedures in the order listed to avoid personal injury.

NOTE: BE SURE that the jumper battery is also a 12 volt battery.

1. Turn the Ignition Keys of both vehicles to "off" and make sure that both vehicles are in "neutral" and **NOT** touching each other.

2. If Filler Caps are provided, remove the Caps and make sure that the Electrolyte solution is up to the proper level. In addition, if Filler Caps are provided, place a clean cloth over the uncapped Filler Holes to prevent the Electrolyte solution from boiling-over.

CAUTION: If acid contacts your skin, eyes or clothing, flush the area immediately with large amounts of water.

3. Make the positive (+) jumper cable connections between both vehicle Batteries.

4. Connect one end of the negative (—) jumper cable connection to the Skid Loader Frame or Engine Block.

WARNING: NEVER attempt to make the jumper cable connections directly to the Starter Solenoid of the Loader. ALWAYS make the connections to the positive (+) Loader Battery terminal and to the Loader Frame (ground). The last jumper cable connection made should ALWAYS be the negative (—) cable connection to the jumper vehicle negative (—) battery terminal.

5. Make the last jumper cable connection (the other side of the negative cable which is onto the Loader Frame) to the negative (—) terminal of the jumper vehicle battery.

NOTE: Twist the jumper cable clamps a couple of times on the battery terminals to insure a good electrical path for conducting current.

6. Proceed to start the Loader. If it does **NOT** start immediately, start the jumper vehicle engine to avoid excessive drain on the booster battery.

7. After the Loader is started and running smoothly, have the second person remove the jumper cables from the jumper vehicle battery and then from the Loader Battery while making sure **NOT** to short the cables together.

Allow sufficient time for the Skid Loader Alternator to build up a charge in the Battery before attempting to operate the Loader or to shut the Engine off. **BE SURE** to discard the cloths and replace the Vent Caps (if removed originally).

NOTE: If Loader Battery discharging becomes a recurring problem, have the Battery checked for a possible dead cell(s) or troubleshoot the electrical system for possible short circuits or damaged insulation.

Recharging a Weak Battery

WARNING: Do NOT attempt to recharge a frozen Battery; this may cause it to rupture or explode. Do NOT attempt to recharge the Battery in an area of sparks or near an open flame. For safest recharging methods and to protect the Battery, BE SURE to use a "trickle-charge" type recharger.

If the Loader Battery becomes run-down and weak, it may be desirable to recharge it with a plug-in 120 volt A.C. "trickle-type" recharger unit. Follow the operating instructions given with the unit and exercise all prescribed precautions of the manufacturer. **BE SURE** also to remove the Filler Caps (if so equipped) and cover the uncapped Filler Holes.

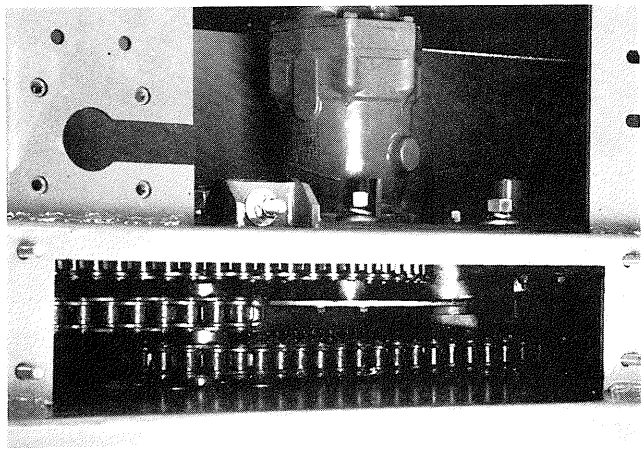

Fig. 13-9: Left Side Drive Chaincase with Cover & Gasket Removed

Drive Chains Tension Check (Fig. 13-9 & See Fig. 13-2)

To gain access into the Chaincases for Drive Chain tension checks and adjustments, the Overhead Guard **MUST** be unbolted, rolled back and locked. Remove the Chaincase Covers by loosening and removing the (7) fasteners which secure each Cover. Refer to the Adjustments chapter for additional information on actual tension adjustment procedures.

Engine Oil & Filter Change

The Engine Crankcase oil and screw-on type Filter (611990 for the 3310 or 078855 for the 3410) should be replaced after every 100 hours of operation. For access to the Crankcase Drain Plug, unbolt and remove the Bellyplate Access Cover. Refer to the Engine Manual for draining and replacement details and to the Lubrication chapter of this manual for viscosity specifications. Crankcase oil is installed through the Dipstick Tube.

Check Breaker Point Gap (SL3310 Only)

Refer to your Engine Manual for procedures and details to follow for checking the Breaker Point Gap.

T-Bar Pivots (See Fig. 13-2)

After every 100 hours of operation, lubricate the Grease Fitting provided on the Pivot of each T-bar. An access hole is provided for greasing the Fitting on the Lift/Tilt Control T-bar Pivot and, access to the Propulsion Control T-bar Pivot Grease Fitting is gained by temporarily raising the Rubber Boot.

Tire Pressure Check

Skid Loaders can be equipped with either 5.70 x 15 4-ply Tires or 27 x 8.50 x 15 4-ply Flotation Tires. The recommended inflation pressures for the two types of Tires are 42 PSIG (294 kPa) for the 5.70 x 15 Tires and 35 PSIG (245 kPa) for the Flotation Tires. Proper Tire pressure should be equally maintained for all four Tires to enhance operating stability and extend Tire life.

When Skid Loader Tires are replaced, **BE SURE** that there is **NOT** too much tread difference between Tires on the same sides of the Loader. Always replace Tires with the same size furnished as original equipment; replacement Tires **MUST** be purchased locally.

Tightening Wheel Lug Bolts

The Lug Bolts, which secure the Wheels to the Skid Loader Axle Spindles, have a 9/16" National Fine thread requiring 90 ft-lb (124.5 N-m) of torque to properly tighten them.

200 Hour or 6 Month Services

Radiator Flushing & Antifreeze Replacement (SL3410 Only) (See Fig. 13-7)

The Radiator on SL3410 models only is accessible when the hinged Rear Guard is unlatched and swung-open. A Drain Valve is provided in the bottom of the Radiator to conveniently drain the Radiator. Using a garden hose, direct water through the Radiator Cap opening to flush-out the coils. After the Radiator is flushed, close the Drain Valve and replenish the antifreeze. Refer to the Engine Manual for coolant recommendations.

Spark Plugs & Breaker Points Replacement (SL3310 Only)

Refer to your Engine Manual for procedures and details for Spark Plug replacement or regapping and for Breaker Points replacement. Order part number 604104 to obtain the Tune-up Kit which contains Points and a Condensor.

Cleaning Engine Breather Valve (SL3310 Only)

Refer to your Engine Manual for procedures and details for cleaning the Engine Breather Valve.

Checking Engine Static Timing (SL3310 Only)

Refer to your Engine Manual for procedures to follow for making a static timing check.

Hand Brake Adjustment (See. Fig. 13-2)

NOTE: Normal Hand Brake adjustment details are covered in the Adjustments chapter.

The Hand Brake Handle itself has an adjustment built into it which should be used, as necessary, for maintaining the original (factory set) tension in the Disc Brake assemblies. Through the course of normal operation and Brake Handle readjustments, the Handle will be turned to the limit of its adjustment. At this time, the Handle adjustment should be returned to the opposite limit of its rotation and the Adjustment Screw on each Disc Brake assembly should be rotated to relocate the Disc Pads closer to the Discs. Then, the Handle can once again be used to make appropriate operating readjustments. After the Adjustment Screw on each Disc assembly has been readjusted two times, the disc assemblies will require removal from the Loader and the Disc Pads **MUST** be replaced. Access to the Adjustment Screws on both Disc assemblies is gained by unbolting, rolling-back and locking the Overhead Guard. To enable removing the Disc Brake assemblies, the Lift Arms **MUST** be locked in the raised position, the Overhead Guard **MUST** be rolled-back and locked, the Chaincase Covers **MUST** be removed and the Chaincase oil **MUST** be drained.

NOTE: NEVER adjust Brake tension so that there is a constant drag on the Disc Pad when the Brake Handle is in the disengaged position.

Hydraulic Oil Filter Element Replacement (See Fig. 13-6)

After every 200 hours of operation or at least after every 6 months of Skid Loader operation, the Hydraulic Oil Filter Element should be removed and a new spin-on Element should be installed. Access to the Element is gained by unlatching and opening the Hinged Rear Guard. **BE SURE** to allow the Hydraulic Oil to warm-up sufficiently before removing and replacing the Element. Drain the oil out to a level which is at least below the point where the Filter attaches to the Reservoir.

NOTE: For replacement Hydraulic Oil Filter Element, specify GEHL part number 076030.

Linkage Ball Joints

Ball Joint style pivoting connectors are used on both T-bar Control linkage connections and Optional Auxiliary Front Hydraulics Control linkage connections. Access to the Ball Joint connections is appropriately gained by either unbolting, rolling-back and locking the Overhead Guard or by opening the Engine Access Cover. All Ball Joint pivots should be lubricated with a couple of drops of oil to help maintain freedom of movement. At the same time the Joints are lubricated, all locking Nuts should be tightened.

Universal Joint (SL3310 Only)

After every 200 hours or 6 months of operation, the 3 Grease Fittings on the Universal Joint, which couples the Engine to the Hydrostatic Pumps, should be lubricated. Access to the Universal Joint is gained by unbolting, rolling-back and locking the Overhead Guard. Temporarily remove the 4 bolts and detach the Guard covering the Joint. As indicated in the **CAUTION** decal, **BE SURE** to replace the Guard before operating the Loader.

500 Hour or 1 Year Services

Axle Bearings (Fig. 13-10)

After every 500 hours or once a year, remove each Wheel and Tire and lubricate each Axle Bearing Fitting.

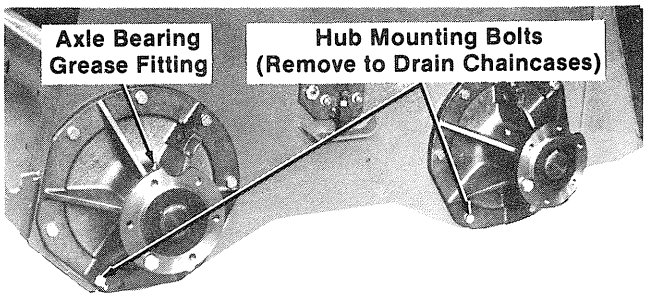

Fig. 13-10

Chaincase Oil Replacement (Fig. 13-10)

After every 500 hours of operation or at least once a year, the oil in both Chaincases should be drained and new oil should be installed. A convenient method of draining the oil is to first raise and properly block the Loader up off its Tires (using the procedure outlined in the beginning of the Adjustments chapter). Then, remove the front or rear Wheels from both sides of the Loader. Then, remove a Wheel Hub mounting Bolt from each Hub (one which is at the lowest point of the Chaincase Housing) to allow the oil to drain out. Once the oil is drained, replace the Wheel Hub Bolts (using Loctite® or equivalent sealing compound) and install a gallon (3.8 liters) of fresh oil into each Chaincase through the Chaincase Access Cover openings.

Retorquing Engine Mounting Hardware

All Engine and Bracket mounting hardware should be kept properly secured at all times. At 500 hour intervals or at least once a year, the Engine mounting hardware should be checked and retorqued, if necessary.

Fuel Filter Replacement

The Skid Steer is equipped with an in-line disposable Fuel Filter. Order a replacement Fuel Filter by part number 600449 for the 3310 or 078856 for the 3410.

Hydraulic Reservoir Oil Replacement (See Fig. 13-6)

The Hydraulic System oil is contained in the Reservoir (and the Hoses of the System). The Reservoir is built into the Right Chassis Riser and a Socket Head Drain Plug is provided in the bottom of the Riser for draining the oil. Refer to the Lubrication chapter for oil types and viscosity information. **BE SURE** to replace and tightly secure the Drain Plug before installing new oil through the Dipstick Hole at the top of the Reservoir.

Hydraulic Tank Strainer Cleaning (Fig. 13-11 & See Fig. 13-6)

The Hydraulic Oil Strainer is located inside the Hydraulic Reservoir. The oil **MUST** be drained out of the Reservoir before attempting to service the Strainer. Access for Strainer removal is gained by unlatching and opening the hinged Rear Guard. To remove the Strainer, detach the (8) fastners which secure the Hydraulic Oil Filter assembly Mounting Plate into the Right Riser. Then, carefully (so as **NOT** to damage the Gasket and Hose connections) remove the assembly to get at the Strainer. Then, unscrew and remove the Strainer. Use a Filter Cleaner solution (mixed to manufacturer's specifications) and soak the Element for about 15 to 30 minutes. After the Element is soaked, thoroughly rinse-off all residue and solution with clean water from a faucet or garden hose. Then, use clean dry air pressure to blow the Element dry. Once the Element is thoroughly dry, it can be replaced in reverse order of disassembly. To order a replacement Strainer Element, specify GEHL part number 055013. **BE SURE** also to clean the Band Magnet on the Strainer.

Radiator Flushing & Antifreeze Replacement (SL3410 Only) (See Fig. 13-7)

The Radiator on SL3410 models only is accessible when the hinged Rear Guard is unlatched and swung-open. A Drain Valve is provided in the bottom of the Radiator to conveniently drain the Radiator. Using a garden hose, direct water through the Radiator Cap opening to flush-out the coils. After the Radiator is flushed, close the Drain Valve and replenish the antifreeze. Refer to the Engine Manual for coolant recommendations.

Valve Tappets (SL3310 Only)

After 500 hours of operation, the Engine Valve Tappets should be adjusted. Contact your GEHL dealer for additional directives.

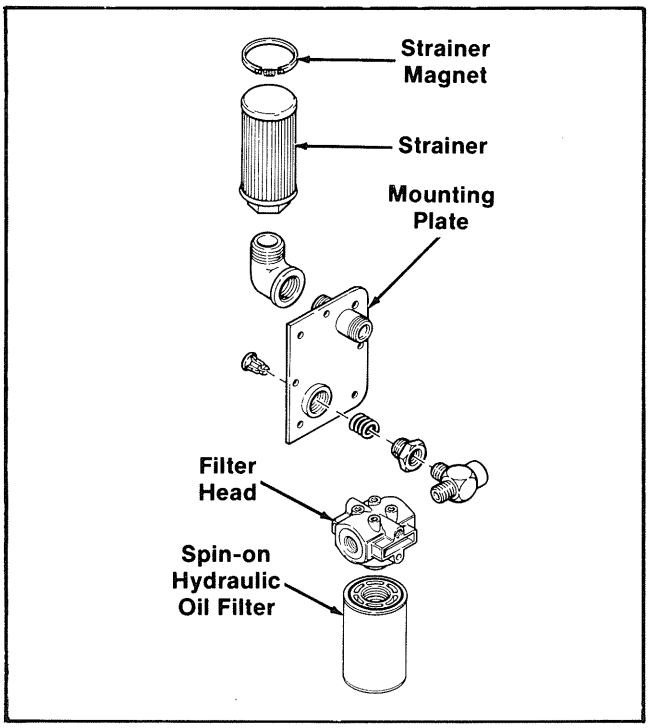

Fig. 13-11

CHAPTER 14

MAINTENANCE LOG

COMPONENT & SERVICE REQUIRED	PROCEDURE AND/OR CHAPTER TOPIC REFERENCE (Check Pg. # in Index)
Service Every 10 Hours or Daily	
Lubricate Lift Arm and Cylinder Pivots	Refer to **Lubrication** chapter
Check and replenish Engine Crankcase oil	Refer to Engine Manual
Check and replenish Hydraulic Reservoir oil	Refer to **Service** chapter
Clean 3310 Engine Cooling Fins or replace 3410 Radiator Coolant	Refer to **Service** chapter
Record Hourmeter Reading After Servicing	

COMPONENT & SERVICE REQUIRED	PROCEDURE AND/OR CHAPTER TOPIC REFERENCE (Check Pg. # in Index)
Service Every 100 Hours	
Clean or replace Air Cleaner	Refer to **Service** chapter
Check condition and tension of 3410 Alternator Belt	Refer to **Service** chapter
Clean Battery Terminals and Connections and check and replenish electrolyte level	Refer to **Service** chapter
Check and readjust Drive Chain tension	Refer to **Service** and **Adjustment** chapters
Drain Engine Crankcase oil, replace Filter and oil	Refer to Engine Manual and **Lubrication** chapter
Check 3310 Engine Breaker Point gap	Refer to Engine Manual
Lubricate T-Bar Pivots	Refer to **Service** chapter
Check Tire Pressure and retighten Wheel Lug Bolts	Refer to **Service** chapter
Record Hourmeter Reading After Servicing	
Service Every 200 Hours or 6 Months	
Replace or regap 3310 Engine Spark Plugs and replace Breaker Points	Refer to **Service** chapter and Engine Manual
Clean and backflush 3410 Radiator Fins	Refer to **Service** chapter
Clean 3310 Engine Breather Valve	Refer to Engine Manual
Check 3310 Engine Static Timing	Refer to Engine Manual
Adjust Hand Brake	Refer to **Service** chapter
Replace Hydraulic System Filter Element	Refer to **Service** chapter
Oil and retorque Linkage Ball Joints	Refer to **Service** chapter
Lubricate Fittings on 3310 Universal Joint	Refer to **Service** chapter
Record Hourmeter Reading After Servicing	

COMPONENT & SERVICE REQUIRED	PROCEDURE AND/OR CHAPTER TOPIC REFERENCE (Check Pg. # in Index)
Service Every 500 Hours or 1 Year	
Remove Wheels and Lubricate Axle Bearings	Refer to **Service** chapter
Drain and replenish oil in both Chaincases	Refer to **Service** and **Lubrication** chapters
Retorque Engine mounting hardware	Refer to **Service** chapter
Replace Engine Fuel Filter	Refer to **Service** chapter
Drain and replace Hydraulic Reservoir oil	Refer to **Service** and **Lubrication** chapters
Remove and clean Hydraulic Tank Strainer	Refer to **Service** chapter
Adjust 3310 Engine Valve Tappets	Contact GEHL Dealer for directives

Record Hourmeter Reading After Servicing													

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INDEX (Cont.)

TECHNICAL PUBLICATION ORDER FORM

(Remove At Perforation & Mail-in)

Machine Model Number & Description	Manual Description	Quantity* Desired	Form Number	Replaces
3310/3410 Skid Loader	Operator's			
3310/3410 Skid Loader	Service Parts			
3010/4010 Backhoes	Operator's			
Customer Complete, Address, Tear-out & Mail-in**			Office Records Only	

* Indicate number of manuals desired.

** Multiply the quantity desired by $3.50 (U.S. Funds) and enclose check or money order for that amount to expedite processing and shipment.

_____

Amount Enclosed

Make check or money order payable to:
Gehl Company
143 Water Street
West Bend, WI 53095

_____

Name or Establishment Title

_____

Street Address, Rural Route or Post Office Box Number

_____

City, State and Zip Code

INTENTIONALLY BLANK
(To Be Removed As Technical Publication
Order Form)

TORQUE SPECIFICATIONS FOR STANDARD MACHINE HARDWARE

SIZE	SAE GRADE #2				SAE GRADE #5				SAE GRADE #8			
	DRY		LUB.		DRY		LUB.		DRY		LUB.	
8 - 32	19	In. Lbs.	14	In. Lbs.	30	In. Lbs.	22	In. Lbs.	41	In. Lbs.	31	In. Lbs.
8 - 36	20	"	15	"	31	"	23	"	43	"	32	"
10 - 24	27	"	21	"	43	"	32	"	60	"	45	"
10 - 32	31	"	23	"	49	"	36	"	68	"	51	"
1/4 - 20	66	"	50	"	9	Ft. Lbs.	75	"	12	Ft. Lbs.	9	Ft. Lbs.
1/4 - 28	76	"	56	"	10	"	86	"	14	"	10	"
5/16 - 18	11	Ft. Lbs.	9	Ft. Lbs.	17	"	13	Ft. Lbs.	25	"	18	"
5/16 - 24	12	"	9	"	19	"	14	"	25	"	20	"
3/8 - 16	20	"	15	"	30	"	23	"	45	"	35	"
3/8 - 24	23	"	17	"	35	"	25	"	50	"	35	"
7/16 - 14	32	"	24	"	50	"	35	"	70	"	55	"
7/16 - 20	36	"	27	"	55	"	40	"	80	"	60	"
1/2 - 13	50	"	35	"	75	"	55	"	110	"	80	"
1/2 - 20	55	"	40	"	90	"	65	"	120	"	90	"
9/16 - 12	70	"	55	"	110	"	80	"	150	"	110	"
9/16 - 18	80	"	60	"	120	"	90	"	170	"	130	"
5/8 - 11	100	"	75	"	150	"	110	"	220	"	170	"
5/8 - 18	110	"	85	"	180	"	130	"	240	"	180	"
3/4 - 10	175	"	130	"	260	"	200	"	380	"	280	"
3/4 - 16	200	"	150	"	300	"	220	"	420	"	320	"
7/8 - 9	170	"	125	"	430	"	320	"	600	"	460	"
7/8 - 14	180	"	140	"	470	"	360	"	660	"	500	"
1 - 8	250	"	190	"	640	"	480	"	900	"	680	"
1 - 12	270	"	210	"	710	"	530	"	1000	"	740	"

Multiply in Lbs. by (0.113) or Ft. Lbs. by (1.355) for metric Nm

NOTE: These torque values are to be used for all GEHL hardware excluding: locknuts, self-tapping screws, thread forming screws, and sheet metal screws. Unless otherwise noted, all torque values must meet this specification.

GEHL®

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