



534B

GRADALL®/LOED

MATERIALS HANDLER OPERATION & LUBRICATION MANUAL

IMPORTANT

Read and understand this manual and the Gradall/Loed Materials Handler Safety Manual before starting, operating or performing maintenance procedures on this machine.

KEEP THESE MANUALS IN CAB.

AVERTISSEMENT!

Si vous ne lisez pas l'anglais, demandez a votre surveillant de vous donner les instructions de securite!

ATENCION!

Si no lee ingles, preguntele a su supervisor para las instrucciones de seguridad!

VORSICHT!

Wen Sie kein Englisch lesen, bitten Sie ihren Vorgesetzten um die Sicherheitsvorschriften!

Covers Units Starting Serial No. 844490
And Also Covers Unit No. 844474

IMPORTANT SAFETY NOTICE

Safe operation depends on reliable equipment and proper operating procedures. Performing the checks and services described in this manual will help to keep your Gradall Materials Handler in reliable condition and use of the recommended operating procedures can help you avoid accidents. Because some procedures may be new to even the experienced operator we recommend that this manual be read, understood and followed by all who operate the unit.

Danger, Warning and Caution notes in this manual and the Gradall Materials Handler Safety Manual will help you avoid injury and damage to the equipment. These notes are not intended to cover all eventualities; it would be impossible to anticipate and evaluate all possible applications and methods of operation for this equipment.

Any procedure not specifically recommended by The Gradall Company must be thoroughly evaluated from the standpoint of safety before it is placed in practice. If you aren't sure, contact your Gradall Materials Handler Distributor before operating.

Do not modify this machine without written permission from The Gradall Company.

NOTICE

The Gradall Company retains all proprietary rights to the information contained in this manual

The Company also reserves the right to change specifications without notice

The Gradall Company

406 Mill Avenue, S.W., New Philadelphia, Ohio 44663

INTRODUCTION

General

This manual provides important information to familiarize you with safe operating procedures and operator maintenance requirements for the Gradall Loed 534B Materials Handler.

If you have any questions regarding the materials handler, contact your Gradall Materials Handler Distributor.

Operator Qualifications

Operators of the materials handler must be in good physical and mental condition, have normal reflexes and reaction time, good vision and depth perception and normal hearing. He / she* must not be using medication which could impair his abilities nor be under the influence of alcohol or any other drug during the work shift.

The operator should also possess a valid, applicable driver's license and must have completed a course of training in the safe operation of this type of material handling equipment.

In addition, the operator must read, understand and comply with instructions contained in the following material furnished with the materials handler:

- This Operator's Manual
- Gradall Materials Handler Safety Manual
- All instruction decals and plates
- Any optional equipment instructions furnished

The operator must also read, understand and comply with all applicable Employer, Industry and Governmental rules, standards and regulations.

Regardless of previous experience operating similar equipment, the operator must be given sufficient opportunity to practice with the 534B Materials Handler in a safe, open area (not hazardous to people or property) to develop the skills and "feel" required for safe, efficient operation.

*Though no offense or discrimination is intended, only the masculine pronouns will be used throughout the remainder of this manual.

Orientation

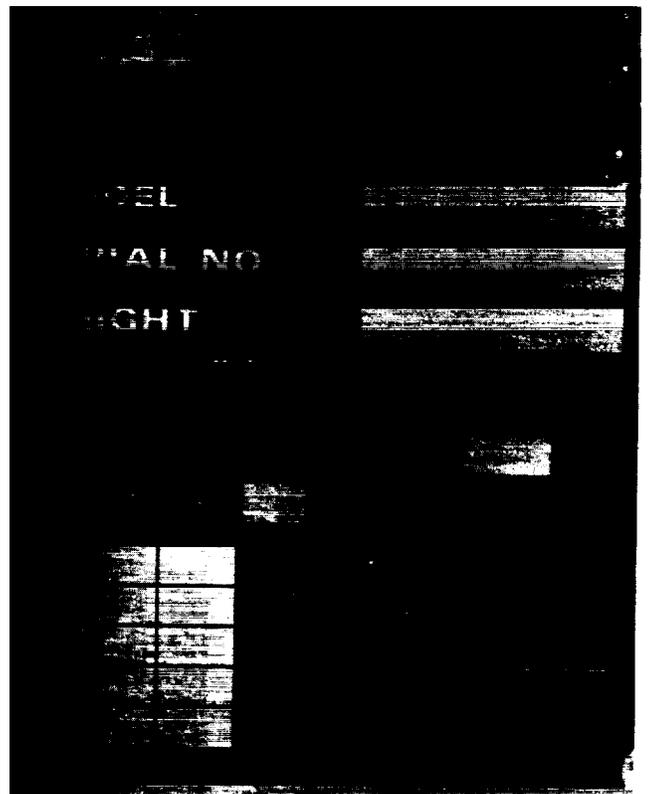
When used to describe location of components in the materials handler, the directions front, rear, right and left relate to the orientation of a person sitting in the operator's seat.

Related Manuals & Decals

Subpublications are furnished with the materials handler to provide information concerning safety, replacement parts, maintenance procedures, theory of operation and vendor components. Replacement manuals, decals and instruction plates can be ordered from your Gradall Materials Handler Distributor.

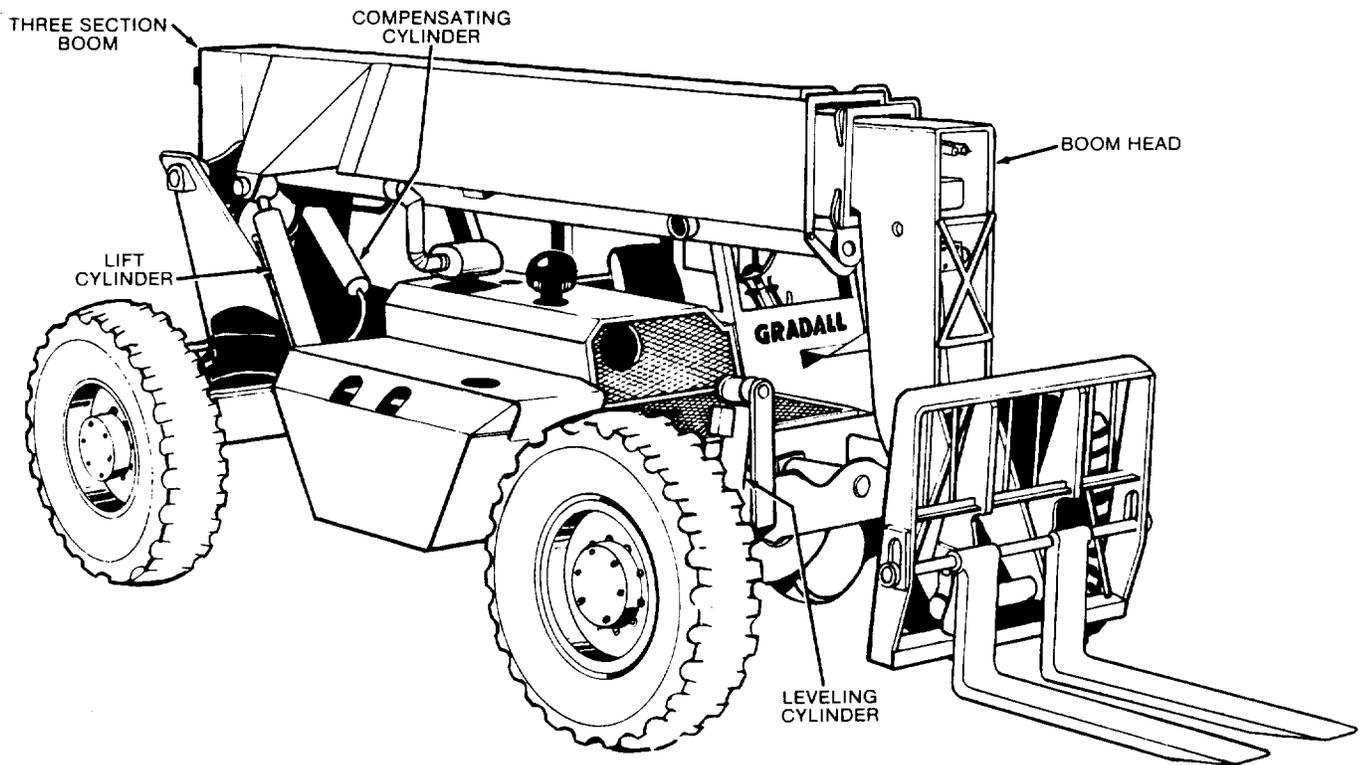
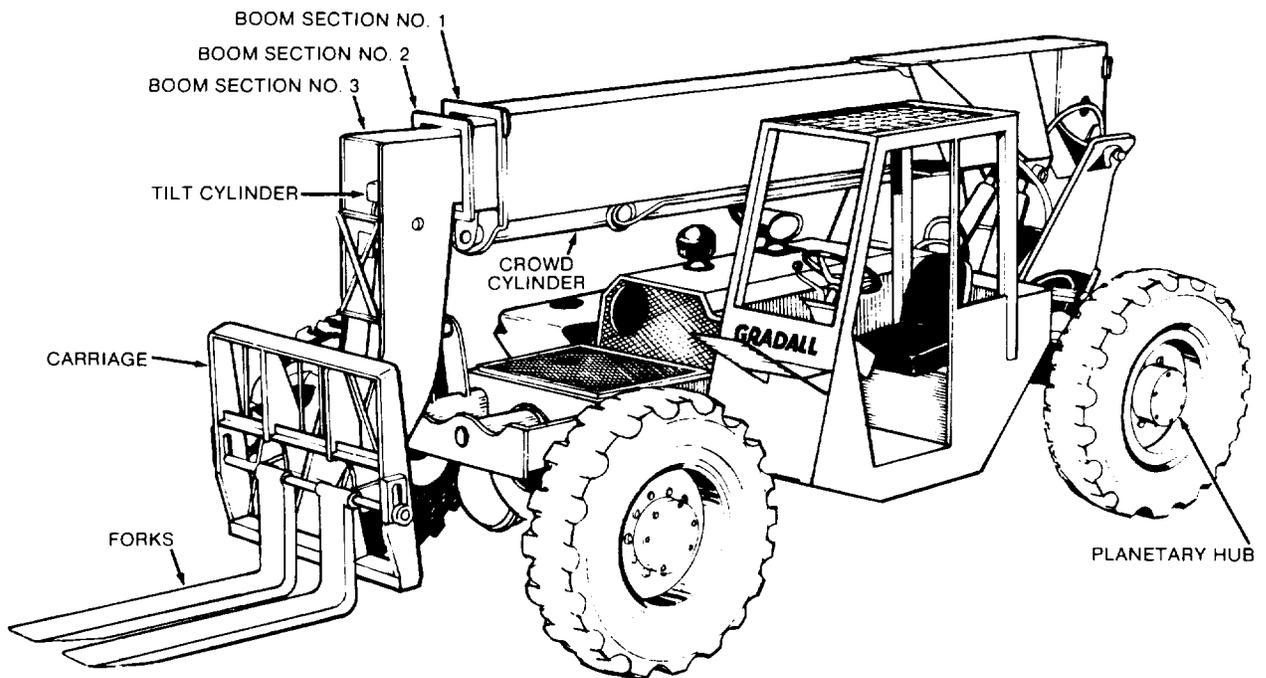
Serial Number Location

Specify Model and Serial Numbers when ordering parts and when discussing specific applications and procedures with your distributor. The model/serial number plate is located on the cab wall to the right of the operator's seat pedestal.



Nomenclature

The illustrations on page 3 include nomenclature applied to major components of the material handler. The term "handler" will be used throughout the balance of this manual in place of the words "materials handler".



SAFETY HIGHLIGHTS

Read and understand this manual, the Gradall Loed/Materials Handler Safety Manual and all instructional decals and plates before starting, operating or performing maintenance procedures on this equipment.

Most safety notes included in this manual involve characteristics of the Model 534B Loed/Materials Handler. Refer to the Gradall/Loed Materials Handler Safety Manual for safety precautions relating to general material handling procedures and practices.

Operators of this equipment must have successfully, completed a training program in the safe operation of this type of material handling equipment.

Regardless of previous experience operating similar equipment, the operator must be given sufficient opportunity to practice with the 534B Materials Handler in a safe open area (not hazardous to people or property) to develop the skills and “feel” required for safe, efficient operation.

Watch for these symbols; they are used to call your attention to safety notices.



This symbol indicates an extreme hazard which would result in high probability of death or serious injury if proper precautions are not taken.



This symbol indicates a hazard which could result in death or serious injury if proper precautions are not taken.



This symbol indicates a hazard which could result in injury or damage to equipment or property if proper precautions are not taken.

OPERATOR'S CAB

The standard cab is open on three sides and includes an overhead guard to provide protection from falling objects.

variations in operator size. The adjustment release/lock lever is located beneath front edge of seat. Wear seat belt at all times.

WARNING

Never operate the handler unless the overhead guard is in place and in good condition.

An optional windshield wiper is available for use with enclosed cabs. An ON/OFF control switch is located on the wiper motor.

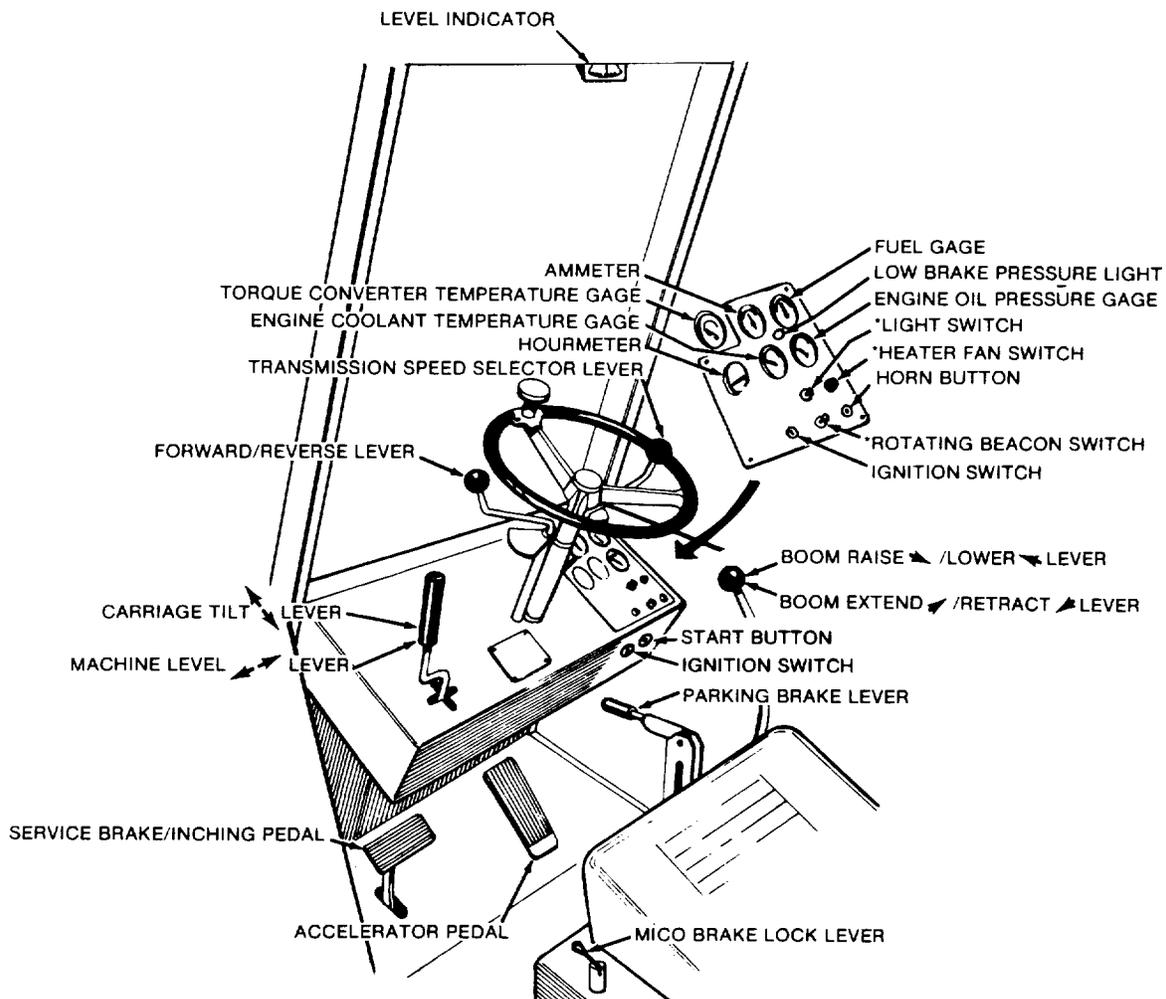
A fully enclosed cab with Plexiglass windows and a lockable door is available as an option. The cab door can be secured in the fully opened or closed position. Be sure the door is fully secured when operating the handler.

A variable speed defroster fan is available for use with enclosed cabs. An ON / OFF control switch and speed control are located on the base of the fan.

The operator's seat is equipped with a seat belt and includes fore and aft adjustment to compensate for

A variable speed heater fan is available for use with units equipped with a heater. An ON/OFF/SPEED CONTROL knob is located on the dashboard. Hot water to the heater can be controlled by a valve at the engine.

CONTROL AND INSTRUMENT IDENTIFICATION



* Items preceded by an asterisk are optional and may not be furnished on your handler.

CHECKS AND SERVICES BEFORE STARTING ENGINE

(To be performed at beginning of each work shift)



WARNING

Use extreme caution when checking items beyond your normal reach. Use an approved safety ladder.

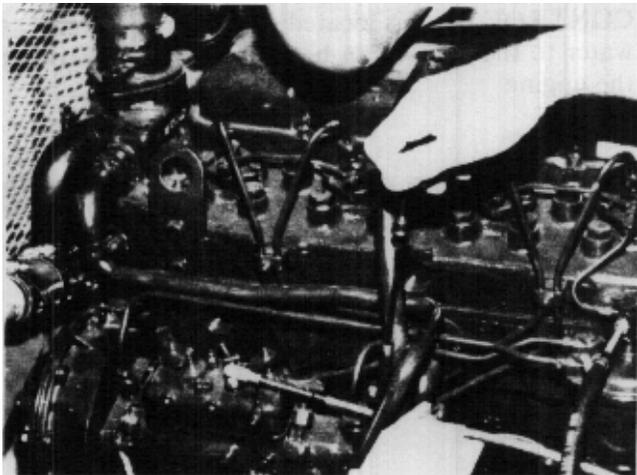
Before removing filler caps or fill plugs, wipe all dirt and grease away from the ports. If dirt is allowed to

enter these ports, it can shorten the life of o-rings, seals, packings and bearings.

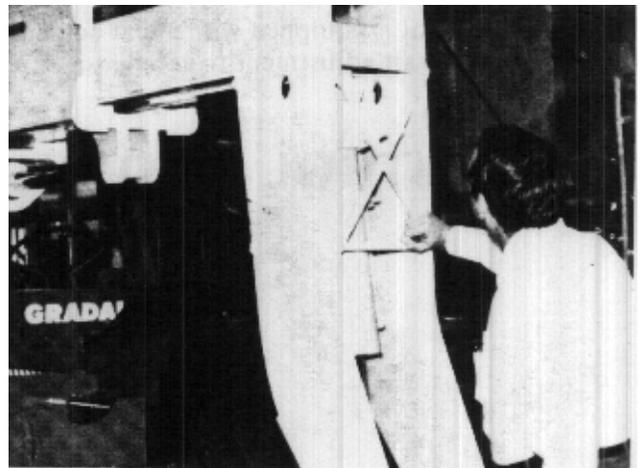
When adding fluids or changing filter elements, refer to the lubrication section of this manual to determine the proper type to be used.

If spark arrestors are required, be sure they are in place and in good working order.

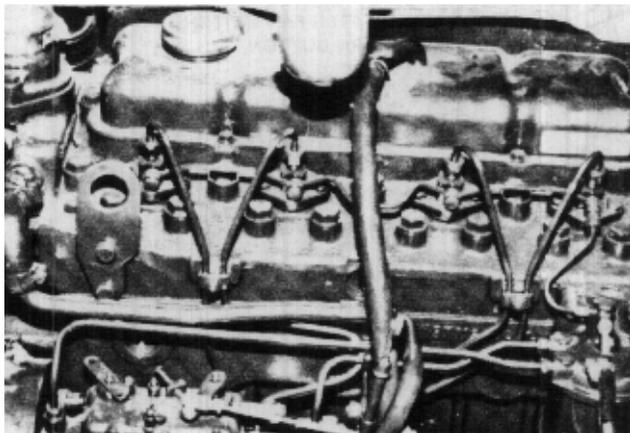
Complete all required maintenance before operating unit.



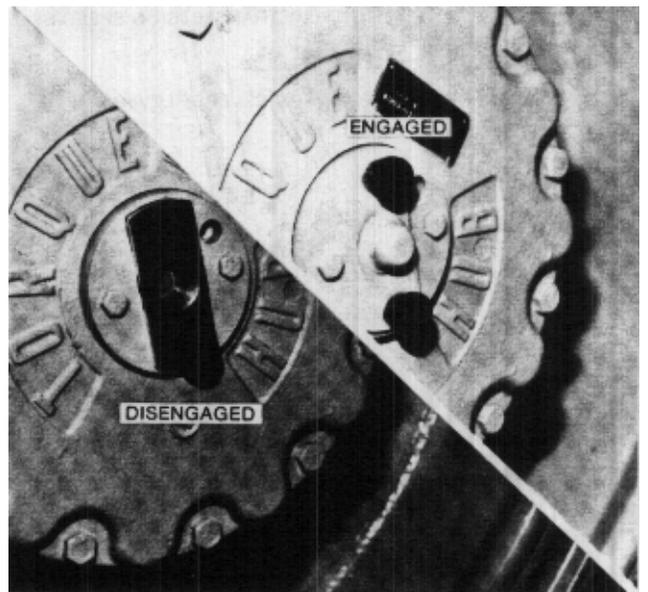
Service the unit in accordance with the lubrication and maintenance schedule.



Inspect all structural members, including attachment, for signs of damage.



Inspect unit for obvious damage, vandalism and needed maintenance. Check for signs of fuel, lubricant, coolant and hydraulic leaks. Open all access doors and look for loose fittings, clamps, components and attaching hardware. Replace hydraulic lines that are cracked, brittle, cut or show signs of abrasion.



Check to be sure rear planetary hubs are properly set for the type of travel expected.

ENGINE OPERATION

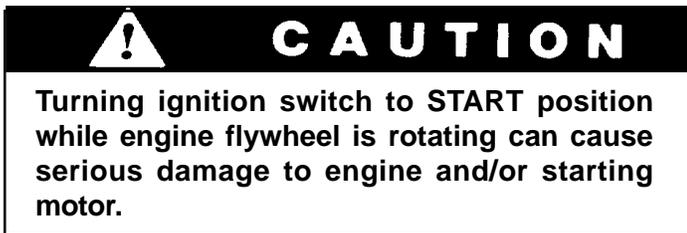
NOTE: If engine is being started at beginning of work shift be sure to perform all “CHECKS AND SERVICES BEFORE STARTING ENGINE” (Page 6).

Starting Engine

1. Check to be sure that all controls are in neutral and that all electrical components (lights, heater, defroster, etc.) are turned off. Set parking brake.
2. Insert ignition key and turn clockwise to ON position. Low brake pressure light should glow and continue to glow until brake system accumulator is fully charged.
3. Depress accelerator pedal approximately 1/4 to 1/3 of travel from top.

installed ether starting aid, fully raise and depress starting aid knob one time only before cranking engine. If you use a different starting aid, be sure to follow manufacturer's instructions carefully. Excessive ether may damage engine.

4. Turn ignition key clockwise to on position and depress start button to engage starting motor. Release button immediately when engine starts. If engine fails to start within 20 seconds, release button and allow starting motor to cool for a few minutes before trying again.
5. After engine starts, observe oil pressure gage. If gage remains on zero for more than ten seconds, stop engine and determine cause. Correct cause of malfunctioning before restarting engine. Normal engine oil pressure should be in range of 35 - 50 psi (241 - 345 kPa).
6. Warm up engine at approximately 1/2 throttle until engine coolant temperature reaches operating range of 180 - 200°F (82 - 93°C.).



NOTE: If temperature requires the use of a starting aid, and if your handler is equipped with a factory-

Cold Weather Starting Aids

Diesel engine ignition is accomplished by heat generated when fuel/air mixture is compressed within the cylinders. Because this heat may be insufficient to start a cold engine in cold weather, the use of starting aids has become common practice.

Because of the wide variety of starting aids available it would be impractical to attempt to provide

specific instructions for their use in this manual. Carefully follow instructions furnished with your starting aid.

If you use a starting aid employing ether or a similar substance pay particular attention to manufacturer's warnings.

Normal Engine Operation

Observe gages frequently to be sure all engine systems are functioning properly.

The ammeter shows the charge/discharge rate of the battery charging system. With the engine running, a discharge reading (-) or a continuing high charge reading (+) indicates a problem in the battery charging system.

Be alert for unusual noises or vibration. When an unusual condition is noticed, stop machine in a safe position and shut off engine. Determine cause and correct problem before continuing.

Avoid prolonged idling. Idling causes engine temperature to drop and this permits formation of heavy carbon deposits and dilution of lubricating oil by incompletely burned fuel. If the engine is not being used, turn it off.



continued...

Stopping the Engine

Operate engine at idle speed for a few minutes before turning it off. This allows engine coolant and lubricating oil to carry excessive heat away from critical engine areas.

Do not “gun” engine before shut down; this practice causes raw fuel to remove oil film from

cylinder walls and dilute lubricant in crankcase.

To stop engine, allow engine to run at idle for a few minutes and then turn key counterclockwise to stop position. Be sure to remove key from ignition switch before leaving cab.

WARM UP & OPERATIONAL CHECKS

(To be performed at beginning of each work shift)

Complete all required maintenance before operating unit

The safety, efficiency and service life of your unit will be increased by performing the operational checks listed below. Items preceded by an asterisk (*) are optional and may not be furnished on your machine. **Check items during warm-up period.**

- *1. Heater, defroster and windshield wiper
- *2. Operating lights and rotating beacon
3. Low brake pressure light - should go out with engine running above idle
4. Ammeter - should show low charging rate after charging system has replaced starting drain

When engine warms to operating range, check the following items:

5. Service brake, parking brake and Mico brake lock.

6. Forward and reverse travel in all gears
7. “Inching” travel - should be smooth through full pedal travel
8. Horn and back-up alarm
9. All boom and attachment functions - full stroke
- 10 Hydraulic Filter Condition Indicator - observe torque converter temperature gage after starting normal operation. When needle has been in operating range for an hour or so, stop handler in a safe area and set parking brake. With engine running, check hydraulic filter condition indicator. When yellow flag fills indicator window, filter is clogged and hydraulic oil is bypassing filter. Filter must be changed before reaching bypass condition (change before yellow flag reaches midpoint of window).



CAUTION

Continued operation with hydraulics fluid by-passing the filter (yellow flag showing) can cause severe damage to hydraulic system components.

General

The brake system furnished on The handler includes a service brake, parking brake and Mico lock.

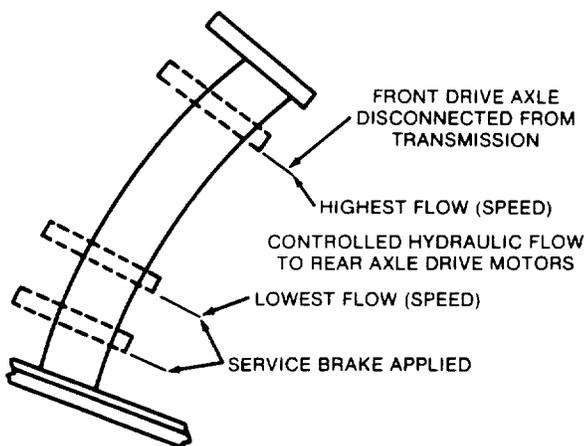
Because service braking and “inching” (slow travel) functions overlap, some features of inching will be discussed here. Refer to Drive Train Section for additional information on inching travel.

Inching Travel

Overlap between service braking and inching occurs because the same foot pedal controls both functions and also because both functions control travel speed. However, the methods of controlling travel speed are quite different: service braking involves a controlled stopping force applied to the front wheels while inching involves a controlled driving force applied to the rear wheels.

The service brake/inching pedal has three separate functions:

1. It disconnects front drive axle from transmission.
2. It controls hydraulic flow to rear axle drive motors (hydraulic flow regulates speed).
3. It applies service brake.



As illustrated, the three functions occur in sequence as service brake/inching pedal is depressed from top to bottom of stroke.

WARNING
Practice inching/braking in a safe, open area until you are thoroughly familiar with response of machine to pedal travel.

Service Brakes

The power-assisted hydraulic service brake is applied only to front wheels of handler.

When the service brake/inching pedal is depressed far enough to actuate the service brake master cylinder, brake fluid flows to wheel cylinders to apply service brake. At the same time, pilot pressure is applied to a piston within master cylinder to intensify (boost) pressure to wheel cylinders.

WARNING
Though it is possible to stop the handler without the power assist feature, very heavy foot pressure is required and stopping distance will be significantly greater.

Mico Lock

The Mico Lock can be used to reduce operator fatigue by temporarily locking a service brake application on using a hand lever rather than holding brake pedal.

WARNING
Never use Mico Lock as a parking brake. The brake application will bleed off after a short time and allow the machine to roll.

To Apply Mico Lock

1. Check to be sure Mico Lock lever is pushed forward to release position (lever horizontal).
2. Depress service brake pedal fully and hold.
3. Pull Mico Lock lever back to lock position (lever vertical) and then release brake pedal.

To Release Mico Lock

Release Mico Lock by pushing lever forward to release position (lever horizontal).

Parking Brakes

The parking brake locks the front axle by means of a cable actuated brake caliper acting on a brake disc attached to the axle input yoke.

Parking brake tension can be increased by turning knob at end of lever clockwise.

To apply the parking brake, pull parking brake lever to rear (toward vertical position).

To release parking brake, push parking brake lever forward (to horizontal position).



WARNING

Always apply parking brake before leaving cab. Neither leaving the unit in gear nor applying the Mico Lock will prevent unit from rolling. Refer to page 17 for parking procedure.

STEERING SYSTEM

Ninety degree rear wheel power steering is provided to reduce operator fatigue and to permit high maneuverability in close quarters.

It is important that the operator practice maneuvering the handler in a safe, open area until he becomes thoroughly familiar with steering response and clearance required for tailswing and load when turning.



WARNING

Be alert for any increase in effort needed to steer. If any difference is noted, notify maintenance personnel immediately for correction. If power assist feature should fail for any reason IT WOULD BECOME VERY DIFFICULT TO STEER. For this reason it is extremely important that you NEVER TURN ENGINE OFF WHILE TRAVELING.

In the event power steering fails, stop as soon as possible. Do not drive unit until problem has been corrected.

General

The drive train provides two and four wheel drive and includes the engine, torque converter, transmission, propel shaft and front and rear driving axles.

Inching travel is directly related to drive train functions and will be discussed in this section.

Two & Four Wheel Drive

The drive train is designed to provide two wheel drive (front axle driving) or four wheel drive (both front and rear axles driving).

Under certain conditions, changing from four wheel drive to two wheel drive may cause a difference in the way the machine responds to steering, braking and drive controls. Always be aware of which travel mode you are using.

There are two ways to disengage rear wheel drive:

1. Shift to third gear (rear axle drive is engaged only in first and second gears)
2. Disengage rear planetary hubs (refer to Rear Drive Axle heading in this section)

NOTE: Rear drive axle can also be disengaged in response to overload in associated electrical circuitry causing automatic reset type circuit breaker to trip (open). Breaker will close again in approximately ten seconds.

Torque Converter

There are no operator controls for the torque converter. It functions automatically to permit starting from a standstill in any transmission speed range.

An oil temperature gage is provided to indicate operating temperature of torque converter/transmission. Normal operating temperature is 180 - 200°F. (82 - 93°C.). If overheating occurs, attempt to lower temperature by traveling in a lower gear. If necessary, stop and allow torque converter to cool with engine running and gear selector in neutral. Be sure radiator fins are clean.

CAUTION

Continued operation of overheated torque converter/transmission can cause serious damage to these components.

Transmission

The transmission provides three speed ranges for both forward and reverse travel.

Gear	1st	2nd	3rd	3rd*
mph	2.8	6.0	15.9	17.9
kmph	4.5	9.6	25.6	28.8

*With rear planetary hubs disengaged

There are three operator controls for the transmission:

1. Gear Selector Lever (for 1st, 2nd and 3rd gears)
2. Direction Selector Lever (for forward, neutral and reverse)
3. Service Brake/Inching Pedal (refer to Inching Travel heading in this section)

To Operate Transmission:

1. Release parking brake and hold handler in position using service brake.
2. Move gear selector to appropriate speed range (1st, 2nd or 3rd gear). The gear selector may be shifted while traveling. When traveling downhill, use the same gear needed to travel up the hill.

WARNING

Never shift gear selector or direction selector to cause a sudden change of travel speed or direction. Such a change could cause load to shift or machine to tip over. Reversing direction while traveling can also damage transmission.

3. Move direction selector to forward or reverse position as required.
4. Release service brake and depress accelerator to attain appropriate speed.
5. Stop handler by releasing accelerator and applying service brake.
6. Move direction selector to neutral position.
7. Apply Mico Lock or parking brake as appropriate.

Front Driving Axle

The front driving axle includes a differential and planetary drive hubs and is powered by a propeller shaft from the transmission. The service brake/inching pedal is the only operator control for the front axle (refer to Inching travel Heading).

Rear Driving Axle

The rear driving axle includes planetary hubs which are powered by hydraulic motors mounted on the inner face of the hubs. Hydraulic flow to drive motors is provided only in first and second gear speed ranges. Drive motors are free-floating in third gear.



CAUTION

Continuous driving for two miles or more in third gear, with rear driving hubs engaged, can damage hydraulic drive motors.

To Disengage Rear Driving Hubs:

1. Apply parking brake and remove key from ignition switch.
2. Remove thumb screws from keeper pin plate.
3. Remove and rotate plate per photo on pg. 6 (cup out - engaged - cup in - disengaged).
4. Secure plate using thumb screws.
5. Repeat procedure for other hub.

To Engage Rear Driving Hubs: Repeat procedure.

NOTE: If machine is moved with keeper pin plate removed, input shaft pin will pop out.

Hydraulic flow to rear axle drive motors is controlled electrically. An automatic reset type breaker is included to prevent damage from overload. **If circuit breaker trips (opens) rear axle drive will be inoperative for approximately ten seconds until breaker resets. Notify maintenance personnel if circuit breaker trips repeatedly.**

To determine whether circuit breaker has tripped, attempt to move machine using inching travel. If machine does not respond to inching travel pedal circuit breaker is open.

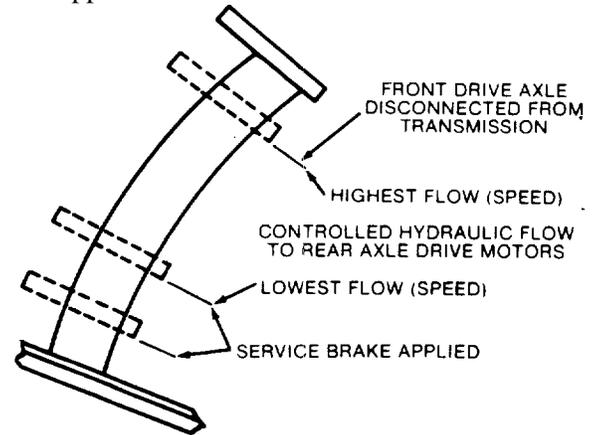
Inching Travel

Inching travel is provided to permit very slow travel while maintaining high engine speed for other functions. Because inching travel depends on hydraulic flow to rear axle drive motors, inching

travel functions only in first and second gears. There is no hydraulic flow to drive motors in third gear.

Inching travel is controlled by the service brake/inching travel pedal. This pedal has three separate functions:

1. It disconnects front drive axle from transmission.
2. It controls hydraulic flow to rear axle drive motors (hydraulic flow equals speed).
3. It applies service brake.



As illustrated, the three functions occur in sequence as pedal is depressed from top to bottom of stroke.

To Engage Inching Travel:

1. Depress service brake/inching travel pedal approximately 1-1/2 inches to disengage front driving axle from transmission. At this point rear drive motors are receiving full flow and travel speed will not have changed.
2. Continue to depress pedal to reduce speed - the more pedal travel, the less speed.
3. To stop, depress pedal fully.

OR

To resume normal travel release service brake/inching travel pedal. Depress accelerator pedal to attain appropriate speed.

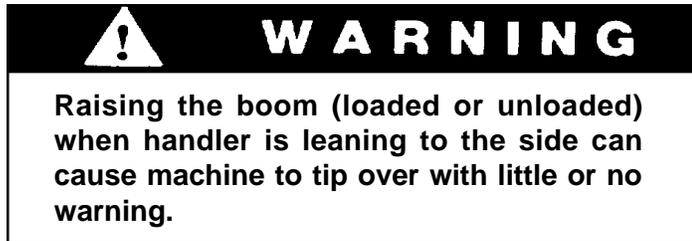


WARNING

Practice inching/braking in a safe, open area until you are thoroughly familiar with response of machine to pedal travel

Leveling

The handler is designed to permit tilting main frame eight degrees to left or right to compensate for uneven ground conditions.



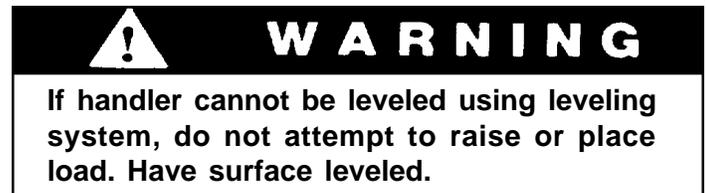
A level indicator is located on upper portion of front window frame to permit operator to determine that machine is or is not level.

The rear axle pivots at the midpoint of the main frame to help assure that wheels will remain in contact with ground. A hydraulic cylinder provides a rigid connection between front axle and main frame to help assure a solid work platform and permit tilting main frame to left or right.

NOTE: The frame leveling function is provided only to level the machine before lifting or placing a load. Do not attempt to use leveling feature to turn on or travel across a slope.

To Level Handler:

1. Position machine in best location to lift or place load and apply brake.
2. Observe level indicator to determine whether machine must be leveled. Note position of indicator for later realignment.
3. If necessary, position boom in carry position and move carriage tilt/machine level lever to left or right to level machine. Move lever to left to lower left side of frame or move lever to right to lower right side frame.
4. Lift or place load as appropriate.
5. Retract and lower boom to carry position.
6. Realign frame to position noted in step 2.



Boom

The three section hydraulically operated boom provides maximum reach of 36 feet above horizontal at 70° elevation and 21 feet forward of forward edge of front tires at 0° elevation (measured to heel of standard forks mounted on standard carriage). Boom travel extends from 4° below horizontal to 70° above horizontal.

Raise boom by pulling boom lever to rear and lower boom by pushing boom lever forward.

Boom extension and retraction is accomplished by a hydraulic crowd cylinder anchored at rear of boom section no. 1 and at front of boom section no. 2 and also by a cable and push beam arrangement within the boom sections. **Extension or retraction of boom section no. 2 is always equaled by a corresponding movement of boom section no.**

3.

A hydraulic cylinder is located within the boom head to tilt the fork carriage or other attachment back and forth as required.

The tilt cylinder is controlled by carriage tilt/machine level lever. Push lever forward to tilt attachment down or pull lever to rear to tilt attachment up.

Extend boom by moving boom lever to right and retract boom by moving boom lever to left.

A compensating cylinder is pinned to main frame and to base of boom section no. 1. As boom is raised, oil is transferred from rod end of compensating cylinder to rod end of attachment tilt cylinder. Lowering boom causes transfer of oil from barrel end of compensating cylinder to barrel end of attachment tilt cylinder. This transfer of oil causes extension and retraction of tilt cylinder to maintain angle of attachment as boom is raised and lowered.

All cylinders related to boom (attachment tilt, raise/lower and extend/retract) are protected by pilot operated check valves which prevent load from falling in event of a broken hydraulic hose or tube.

Attachments

Although the carriage/fork combination is most frequently used, a number of other attachments are available for use with the handler. can be provided for light duty work. A truss boom is available to extend maximum reach and height and can be fitted with a winch when required. Consult your Gradall/Loed Materials Handler Dealer for information on attachments designed to solve special material handling problems.

Attachment Capacities

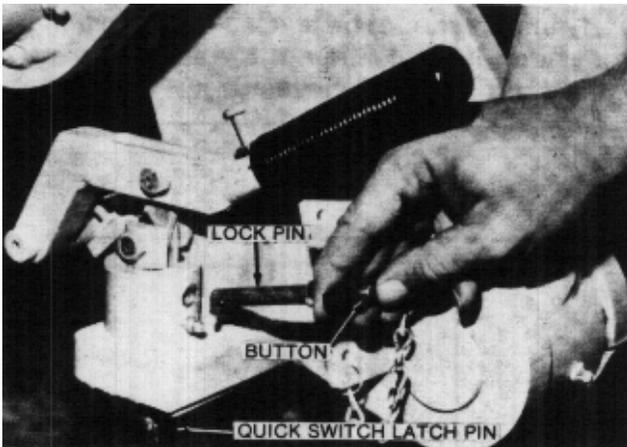
The Rated Capacity Chart, located on left side of dashboard, indicates maximum capacities for handlers equipped with standard carriage/fork combination. These capacities apply only to standard carriage fork combination and cannot be used for other attachments.

A serial number plate is attached to all attachments and indicates maximum capacity for that attachment. **However, the capacity shown on this plate may be incorrect in relation to your machine.**

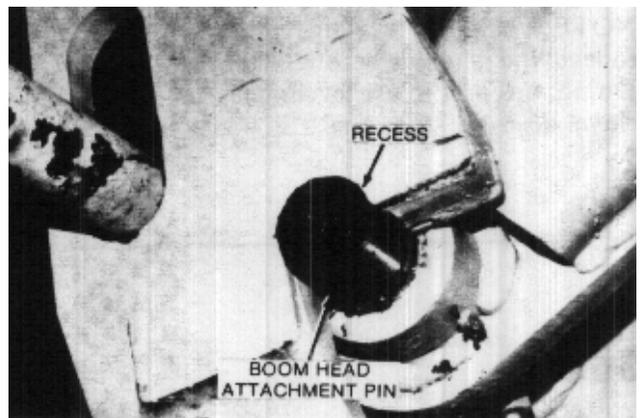
Refer to Attachment Capacity Plate, located below Serial Number Plate on right cab wall, for correct maximum capacity for all attachments furnished with your machine. If attachment in question is not listed on this plate, contact factory for maximum capacity.

Refer to Operating Procedures and Techniques section for instructions on proper use of information shown on capacity plates.

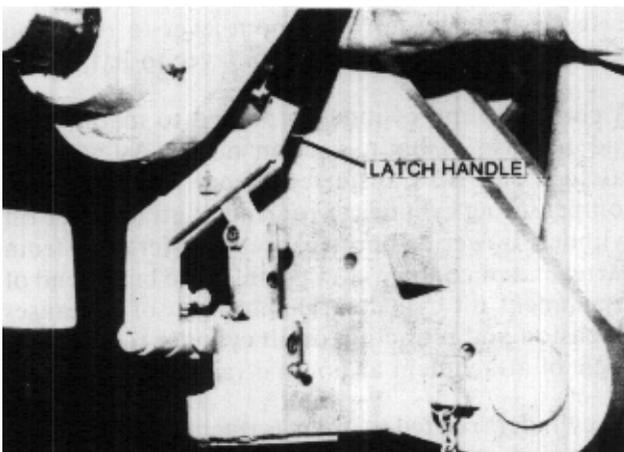
Attachment Installation



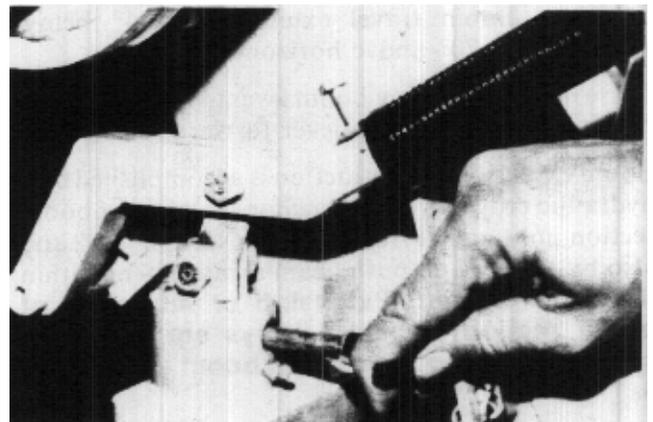
1. Depress button and remove lock pin from quick switch latch pin.



3. Position boom head attachment pin fully in recess of attachment. Tilt upward slightly to assure full engagement.



2. Raise handle to retract latch pin fully.



4. Depress handle fully to engage latch pin in attachment and install lock pin in latch.

OPERATING PROCEDURES & TECHNIQUES

This section highlights some common procedures and discusses areas which may be new to even the experienced operator.

Hydraulic Controls

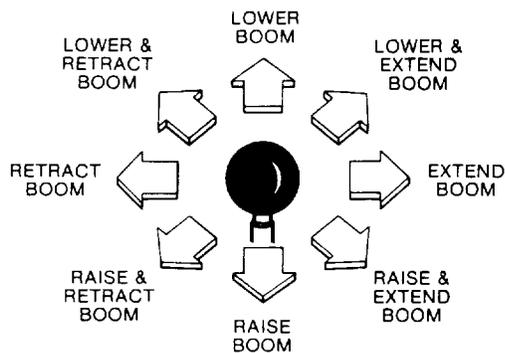
All boom and attachment movements are governed by hydraulic controls. Rapid, jerky operation of hydraulic controls will cause rapid, jerky movement of the load. Such movements can cause the load to shift or fall or may cause the machine to tip over.

Feathering

Feather is a technique of control operation used for smooth load handling. To feather controls, move control lever very slowly until load begins to move, then gradually move lever further until load is moving at desired speed. Gradually move lever toward neutral as load approaches destination. Continue to reduce load speed to bring load to a smooth stop. Feathering effect can be increased by lowering engine speed at beginning and near end of load movement.

Boom Control Lever

The boom control lever can be positioned to cause individual boom movements or combinations of boom movements as illustrated.



With boom raised above horizontal, forks can be inserted under a load by moving boom control lever forward and to the right until forks move forward horizontally.

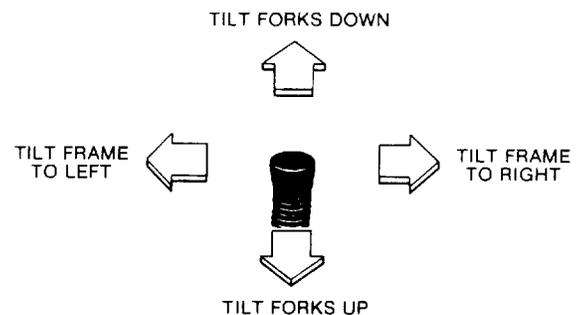
With boom raised above horizontal, forks can be removed from a load by moving boom control lever back and to the left until forks move rearward horizontally.

With boom lowered below horizontal, forks can be inserted under a load by moving boom control lever back and to the right until forks move forward horizontally.

With boom lowered below horizontal forks can be removed from a load by moving boom control lever forward and to the left until forks move rearward horizontally.

The closer the boom to horizontal, the less boom raise/lower movement required for inserting and removing forks.

Carriage Tilt/Machine Level Lever



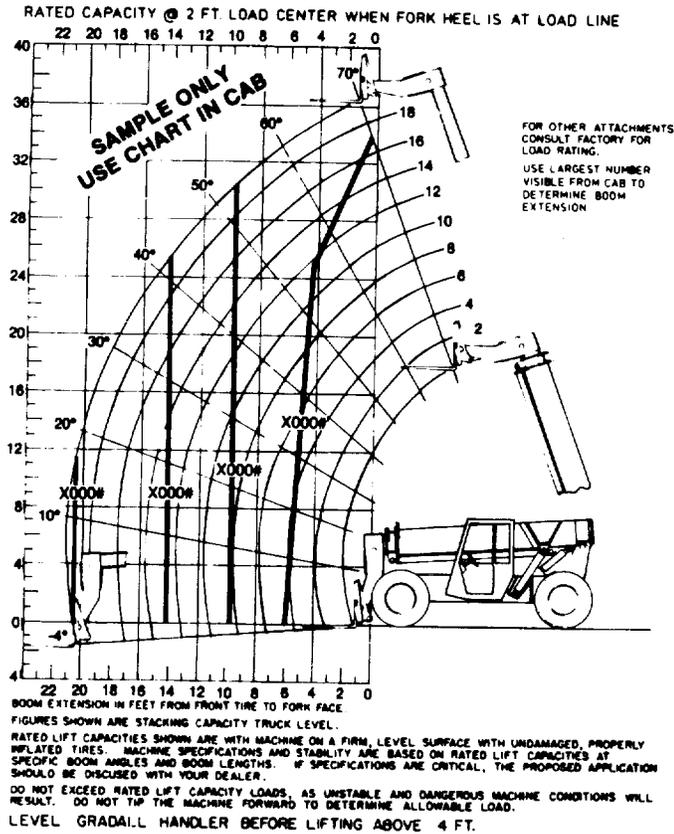
Move lever forward to tilt forks down and move lever to rear to tilt forks up.

Move lever to left to tilt main frame to left and move lever to right to tilt frame to right.

! WARNING

Always move boom to carry position (horizontal or below) before leveling frame. Attempting to level machine with boom raised may cause it to tip over.

Rated Capacity Chart



Boom Extension

Numbers across bottom of chart (0' to 22') and numbers parallel to boom (2' to 18') represent boom extension as measured from fully retracted position to extended position. These numbers do not reflect total boom length, only the number of feet of extension from fully retracted position.

Number decals on boom section number two (4, 8, 12, 16 and 20) relate directly to boom extension. The largest number which can be read from operator's seat indicates total boom extension.

Boom extension relates to dimension "D" shown on serial number plate.

Boom Angle

Numbers at ends of angled lines (4° to 70°) represent angle of boom to horizontal as measured from horizontal plane at ground level. Maximum angles are 4° below horizontal with boom fully lowered to 70° above horizontal with boom fully raised.

A boom angle indicator is located on left side of boom section number one to show boom angle. Be sure machine is level from front to rear or indicator will provide incorrect reading.

Load Center

Loads shown on rated capacity chart are based on the load center being two feet above and two feet forward of surfaces of horizontal forks as indicated by dimensions "B" and "C" on serial number plate.

The load center of a load is the center of gravity of the load. For regularly shaped loads of the same material, such as a pallet of blocks, the center of gravity can be located by measuring the load to find its center. For irregular loads, or loads of dissimilar materials, keep the heaviest part of the load as close to the heel of the forks as possible.

In all cases, the load center must be centered between the forks.

Load Limits

Some capacities shown on the rated capacity chart are based on machine stability and some are based on hydraulic lift capacity. The "common sense" or "feel" an experienced operator might apply in regard to "tipping loads" **DOES NOT APPLY to hydraulic load limits.** Exceeding load limits can cause a relief valve to open allowing the load to fall, or in some cases, the machine to tip over.

General

The rated capacity chart, located on left side of dashboard, indicates maximum load capacities for handlers equipped with standard carriage/fork combination. These capacities apply only to the standard carriage/fork combination and cannot be used for other attachments.

! WARNING

All loads shown on rated capacity chart are based on machine being on firm, level ground; the forks being positioned evenly on carriage; the load being centered on forks; proper size tires being properly inflated; and the handler being in good operating condition. Machines having 8000 pound capacity must have tires properly filled with calcium chloride.

Elevation:

Numbers at left side of chart (-4' to 40') represent elevation at heel of horizontal fork as measured from level ground. Maximum elevation with boom fully raised and extended is 36 feet. Elevation relates to dimension "A" shown on serial number plate located on right cab wall.



WARNING

Never use “tipping” method to determine safe lifting capacity. This could cause the load to fall or the machine to tip over.

Material Handling Bucket Capacity

Lift capacity for a material handling bucket, if furnished with the handler, is shown on the Attachment Capacity plate located on right cab wall below Serial Number plate. If part number on bucket does not match part number on Attachment Capacity plate, contact factory for proper bucket lift capacity.

The bucket lift capacity is based on machine being on firm, level ground; proper size tires being properly inflated; and the handler being in good operating condition.

Because maximum bucket rated lift capacity is

based on hydraulic limitations, the maximum load may be handled anywhere within reach of machine.

Truss Boom/Winch Capacity

Lift capacity for a truss boom or a truss boom/winch combination. If furnished with the handler, is shown on the Attachment Capacity plate. If the part number shown on the boom does not match the part number shown on Attachment Capacity plate, contact factory for proper boom lift capacity.

The truss boom lift capacity is based on machine being on firm level ground; proper size tires being properly inflated; the handler being in good operating condition; and the load being suspended vertically from the boom.

Side loads or swinging loads can cause structural damage and may cause the machine to tip over.

Because maximum truss boom lift capacity is based on hydraulic limitations, the maximum rated load may be handled anywhere within reach of the machine.

PARKING

1. Position unit in a safe, level parking area.



WARNING

Parking brake may not hold machine on a grade.

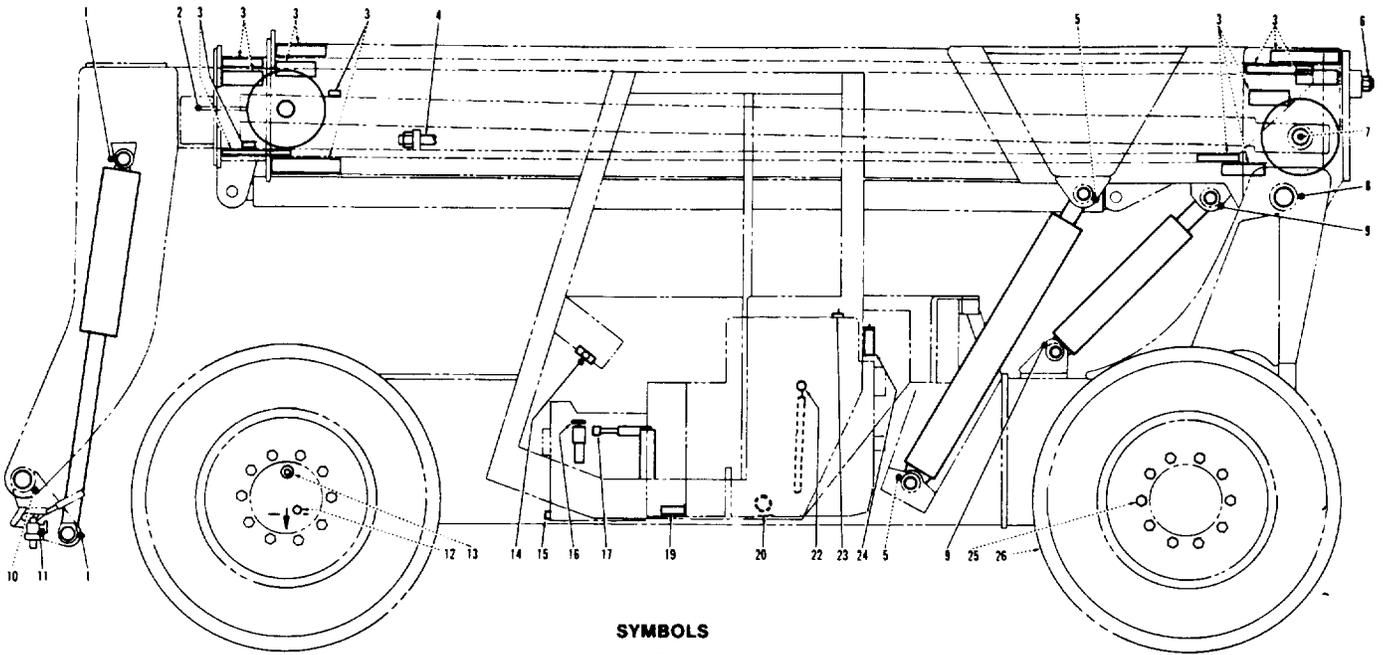
2. Apply parking brake and chock wheels.
3. Retract and lower boom fully.

4. Turn off all electrical accessories.
5. Allow engine to cool at idle speed for a few minutes and then turn off. Remove ignition key.
6. Fill fuel tank to minimize condensation.
7. Disconnect battery if unit is in an area where tampering seems possible.
Lock cab (if so equipped).

STORAGE

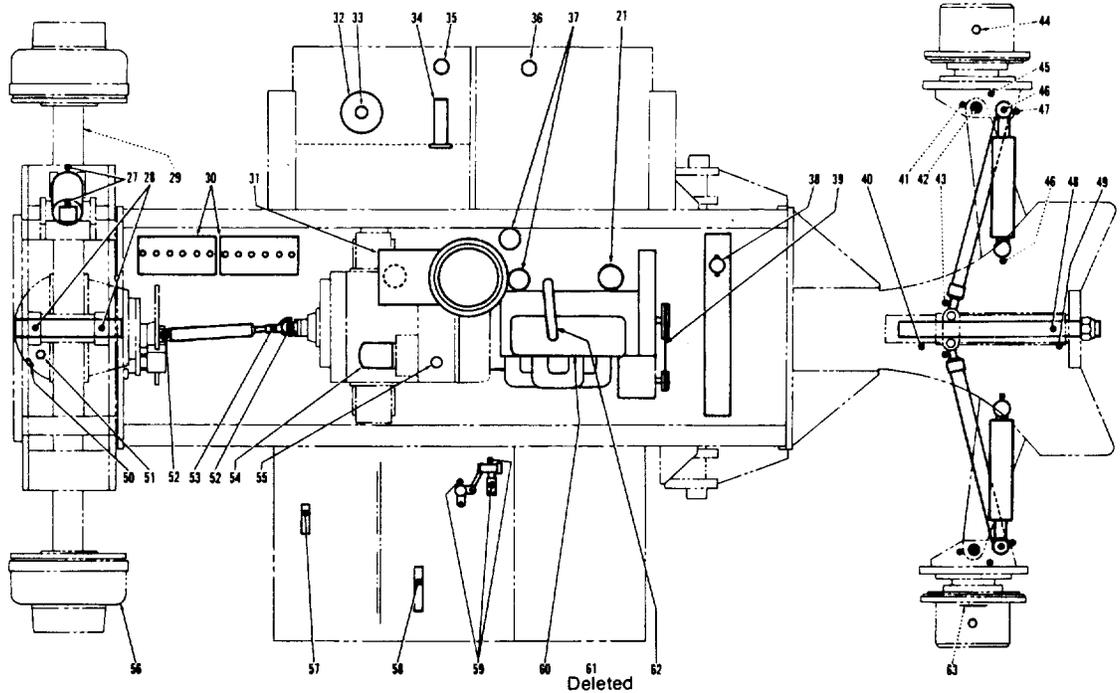
1. Clean and inspect machine thoroughly and perform all required maintenance.
2. Coat all cylinder rods with a good grade of grease or rust preventative.
3. Park machine in a dry enclosure and remove batteries.
4. Prepare engine in accordance with engine manufacturer's instructions.

LUBRICATION & MAINTENANCE DIAGRAM



SYMBOLS

- = Fitting
- = Other Service



Lubricate Notes

- Lubricate points indicated by dotted leaders on both sides of unit.
- Intervals shown are for normal (8 hour day) usage and conditions. Adjust intervals for abnormal usage and conditions.
- See recommended lubricants (page 20).
- Apply a light coating of engine oil to all linkage pivot points.
- Clean lubrication fittings before lubricating.
- Clean filter and air cleaner housing using diesel fuel. Dry components thoroughly using a lint free cloth.
- Check lubricant levels when lubricant is cool.
- Drain engine and gear cases only after operation when lubricant is hot.

Daily or Every 10 Hours				At End of First Week			
	Lube Symbol	No. of Points		Lube Symbol	No. of Points		
1.	Carriage Tilt Cylinder Pivots	CG	2	*3	Front Boom Slide Bearings (check retaining bolt torque)	-	12
2.	Boom Extension Cable Sheave	CG	1	13.	Front Hub Drain Plugs (drain and refill)	GO	2
3.	Boom Slide Bearings (extend boom fully and coat all wear paths on boom sections 2 and 3 - retract and extend boom fully three times and wipe excess grease from bearings)	CG	8	15.	Transmission Drain Plug (drain and refill)	ATF	1
5.	Boom Hoist Cylinder Pivots	CG	2	32.	Hydraulic Filter (replace)	-	1
7.	Boom Retraction Cable Sheave	CG	1	44.	Rear Hub Fill/Level/Drain Plugs (drain and refill - refill with plug at 3 or 9 o'clock position)	GO	2
8.	Boom Pivot	CG	1	50.	Front Axle Differential (drain and refill)	GO	1
9.	Compensating Cylinder Pivots	CG	2	54.	Transmission Filter (replace)	-	1
10.	Boom Head/Carriage Pivot	CG	2	Every 2 Weeks or 100 Hours			
14.	Carriage Tilt/Machine Level Lever Pivot	CG	1	*3	Boom Slide Bearings (front lower - check for wear & shim or replace as req'd - no wear permitted past bevel - check upper rear bearings when lower front bearings require service - shims are 1/16" thick)	-	4
16.	Transmission Dipstick (check level & replenish as req'd)	ATF	1	17	Parking Brake (check for proper adjustment turn lever knob clockwise to increase tension)	-	1
22.	Engine Dipstick (check level & replenish as req'd - item 23 is filler port)	EO	1	20	Engine Crankcase Dram Plug (drain and refill to level)	EO	1
26.	Tires (inspect for damage)	-	4	21	Engine Oil Filter (replace)	-	1
27.	Leveling Cylinder Pivots	CG	2	31	Engine Air Cleaner (clean elements and check to be sure vacuator (rubber cone on bottom) is clear and undamaged)	-	1
28.	Front Axle Pivot	CG	2	52	Drive Shaft Universal Joints	CG	2
33.	Hydraulic Filter Condition Indicator (check with oil at operating temperature - replace filter as req'd)	-	1	53	Drive Shaft Spline	CG	1
35.	Hydraulic Reservoir (check level & replenish as req'd)	HF	1	62	Engine Crankcase Breather Tube (check to be sure it's clear)	-	1
36.	Fuel Tank (fill daily after shut down)	DF	1	Every 5 Weeks or 250 Hours			
38.	Radiator (check level and replenish as req'd using proper coolant)	-	1	*25	Wheel Lug Nuts (check torque - should be 300 - 310 lb-ft on front/325 - 335 lb-ft on rear)	-	40
40.	Rear Axle Pivot (front bearing)	CG	1	*29	Front Axle (check mounting bolt torque - should be 545 - 600 lb-ft)	-	8
41.	King Pins (upper)	CG	2	54	Transmission Filter (replace)	-	1
42.	King Pins (lower)	CG	2	Every 3 Months or 500 Hours			
43.	Tie Rods (inner pivot)	CG	2	15	Transmission Drain Plug (drain and refill to level)	ATF	1
45.	Planetary Hub	CG	2	19	Transmission Screen (clean)	-	1
46.	Steering Cylinder Pivots	CG	4	32	Hydraulic Filter (replace)	-	1
47.	Tie Rod Pivots (outer)	CG	2	*35	Hydraulic Fluid (have hydraulic oil tested)	-	1
48.	Idle Arm Pivot	CG	1	36	Fuel Tank (drain sediment)	-	1
49.	Rear Axle Pivot (rear bearing)	CG	1	37	Engine Fuel Filter (replace)	-	1
56.	Service Brake Adjustment (check for minimum of 1" space between fully depressed brake pedal and floor)	-	1	55	Transmission Breather (clean)	-	1
57.	Accelerator Pedal Pivot (under cab)	-	1	*60	Engine Intake & Exhaust Valves (adjust)	-	-
58.	Brake/Inching Travel Pedal Pivot (under cab)	CG	1	Every 6 Months or 1000 Hours			
59.	Boom Lever Linkage (under cab)	CG	1	13	Front Planetary Hub Drain Plugs (drain and refill to level)	GO	2
61.	Deleted	CG	3	31	Engine Air Cleaner (replace element)	-	1
Weekly or Every 50 Hours				44	Rear Planetary Hub Drain Plugs (drain and refill to level)	GO	2
*4	Boom Retraction Cable (inspect cable and replace if damaged - extend boom about 15 feet and check tension - should be torqued to 75 ft/lbs)	-	1	50	Front Axle Differential Plug (drain and refill to level)	GO	1
*6	Boom Extension Cable (inspect cable and replace if damaged - extend boom fully and then retract a few feet and check tension - should be torqued to 75 ft/lbs)	-	1	51	Front Axle Differential Breather (clean)	-	1
11	Quick Switch Latch	CG	1	Every Year or 2000 Hours			
12	Front Planetary Hub Level Plugs (check level with arrow pointing down as shown - replenish as req'd) - 2	-	2	34	Hydraulic Reservoir Suction Screen (clean)	-	1
24	Brake Master Cylinder Reservoir (under cover behind cab - check level and replenish as req'd)	BF	1	*35	Hydraulic System (drain and refill to level)	HF	1
26	Tires (check pressure and adjust as req'd - 55 psi) (on 8000 pound unit, thump check tires for 90% fill of calcium chloride mixture)	-	4	36	Fuel Tank Breather/Cap (clean)	-	1
30	Batteries (check electrolyte level & replenish as req'd)	-	2	38	Engine Cooling System (drain, flush and refill)	-	1
*39	Engine Drive Belts (check condition and tension - adjust or replace as req'd)	-	2	*63	Rear Axle Wheel Spindle Snap Rings. (inspect & replace as req'd.)	-	2

*To be performed by qualified maintenance personnel in accordance with service manual instructions.

Recommended Lubricants & Capacities

Application	Symbol	When Used	Grade	Specifications	Capacities**	
					English	Liters
Engine Crankcase	EO (engine oil)	All year	10W-30	-	12 quarts	7.8
Engine Cooling System	50% water/50% anti-freeze	All year	Permanent	-	24 quarts	22.7
Transmission	ATF (automatic trans. fluid)	All year	-	ATF-FM DEXRON	20 quarts	18.9
Fuel Tank	DF (diesel fuel)	All year	#2	A.S.L.E. No. H-215*	40gallons	151.4
Hydraulic System	HF (Hydraulic fluid)	All year	-	A.P.I. GL-5	40 gallons	151.4
Differential	GO (multi-purpose lubricant)	All year	EP 80-90	A.P.I. GL-5	8 quarts	8.4
Front Planetary Hubs	GO (multi-purpose lubricant)	All year	EP 80-90	A.P.I. GL-5	2.5 quarts	1.3
Rear Planetary Hubs	GO (multi-purpose lubricant)	All year	EP 80-90	H-152	44 ounces	1.5
Boom Bearing Paths	CG (ectreme pressure lube)	All year	EP2	H-152	-	-
Grease Fitting	CG (ectreme pressure lube)	All year	EP2	Type A-SAE J-1730C	-	-
Brake master Cylinder	BF (brake fluid)	All year	-		-	-

*Specific hydraulic fluid specifications are shown below.

**Capacities are approximate - check level to be sure.

Hydraulic Fluid Specifications:

Grade, ASTM	215	Viscosity:		Carbon Residue, Rams, wt%	0.4
Grade, AGMA	1	SUS at 100° F	215	Zinc, wt%	0.08
Gravity, °API	31.0	SUS at 210° F	48.0	Rust Test. ASTM D 665 A&B	Pass
Color, ASTM	2.0	Viscosity Index	105	Oxidation Test. ASTM D 943.	
Flash Point, COC, °F	440	Aniline Point, °F	222	hours to Neut. No of 2.0	2500
Fire Point, COC, °F	490	Foam Test, ASTM	Pass	Emulstion Test, ASTM D 1401,	
Pour Point, °F	-30	Neutralization Number	1.4	minutes to pass at 130° F	10
				Copper Corrosion, 3 hr at 212° F	1B

Tire Specifications

Standard: 13:00 x 24 - 12 ply rating - 55 psi

Optional for front only: 15:50 x 25 - 12 ply rating - 55 psi

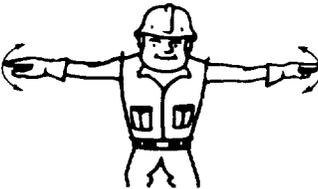
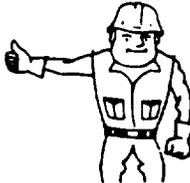
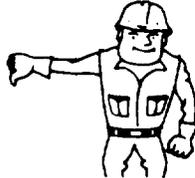
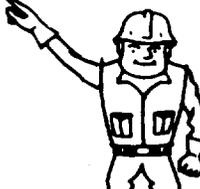
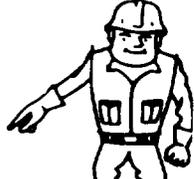
Model 534B-8 (8000 pound rating) must have tires filled to 90% of capacity with calcium chloride mixture (49 gallons of water and 245 pounds of calcium chloride per tire).

HAND SIGNALS

Standard Signals - When handler work conditions require hand signals, they shall be provided or posted conspicuously for the use of both signalman and operator. No handler motions shall be made unless signals are clearly understood by both signalman and operator.

Special Signals - When signals for auxiliary equipment functions or conditions not covered are required, they shall be agreed upon in advance by the operator and signalman.

Instructions - When it is desired to give instructions to the operator other than provided by the established signal system, all handler motions shall first be stopped.

 <p>EMERGENCY STOP - With both arms extended laterally, hands open downward, move arms back and forth.</p>	 <p>STOP - With either arm extended laterally, hand open downward, move arm back and forth.</p>	 <p>RAISE BOOM - With either arm extended horizontally, fingers closed, point thumb upward.</p>	 <p>LOWER BOOM - With either arm extended horizontally, fingers closed, point thumb downward.</p>
 <p>EXTEND TELESCOPIC BOOM - With both hands clenched, point thumbs outward.</p>	 <p>RETRACT TELESCOPIC BOOM - With both hands clenched, point thumbs inward.</p>	 <p>RAISE LOAD VERTICALLY - With either forearm vertical, forefinger pointing up, move hand in small horizontal circle.</p>	 <p>LOWER LOAD VERTICALLY - With either arm extended downward, forefinger pointing down, move hand in small horizontal circle.</p>
 <p>MOVE LOAD OUT HORIZONTALLY - With either arm extended, hand raised and open toward direction of movement, move hand in direction of required movement.</p>	 <p>MOVE LOAD IN HORIZONTALLY - With either arm extended, hand raised and open toward direction of movement, move hand in direction of required movement.</p>	 <p>TILT FORKS UP - With one arm held at side, extend other arm upward at about 45°.</p>	 <p>TILT FORKS DOWN - With one arm held at side, extend other arm downward at about 45°.</p>
 <p>CLOSE BUCKET - Hold one hand closed and stationary. Rotate other hand in small vertical circle with forefinger pointing horizontally at closed hand.</p>	 <p>OPEN BUCKET - Hold one hand open and stationary. Rotate other hand in small vertical circle with forefinger pointing horizontally at open hand.</p>	 <p>MOVE SLOWLY - Place one hand motionless in front of hand giving motion signal. (Raise load slowly is shown.)</p>	 <p>THIS FAR TO GO - With hands raised and open inward, move hands laterally, indicating distance to go.</p>
 <p>STOP ENGINE - Draw thumb or forefinger across throat.</p>			

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