SKYTRAK®

Operator & Safety Manual

Keep this manual with machine at all times.

Model 6036 Tier II

S/N 0160004110
thru
0160037778

3126021

Revised
February 24, 2009

JLG®
An Oshkosh Corporation Company

WARNING: Improper operation of this vehicle can cause injury or death. Only trained and authorized operators should operate this vehicle.

Before starting the engine, do the following:

1. **Read this owner/operators manual.**
2. **Read all the safety decals on the vehicle.**
3. **Clear the area of other persons.**

Learn and practice safe use of vehicle controls in a safe, clear area before you operate this vehicle on a worksite.

It is your responsibility to observe applicable laws and regulations and to follow manufacturer's instructions on vehicle operation and maintenance.

CALIFORNIA

Proposition 65 Warning

Diesel Engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

CALIFORNIA

Proposition 65 Warning

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

REVISION LOG

February, 2004 - A - Revised Manual

February 11, 2005 - B - Replaced all branding with JLG.

February 24, 2009 - C - Revised covers and page d. Added Transfer of Ownership page.

Revision Log

This manual is a very important tool! Keep it with the machine at all times.

The purpose of this manual is to provide owners, users, operators, lessors, and lessees with the precautions and operating procedures essential for the safe and proper machine operation for its intended purpose.

Due to continuous product improvements, JLG Industries, Inc. reserves the right to make specification changes without prior notification. Contact JLG Industries, Inc. for updated information.

Operator Qualifications

The operator of the machine must not operate the machine until this manual has been read, training is accomplished and operation of the machine has been completed under the supervision of an experienced and qualified operator. Operation within the U.S.A. requires training per OSHA 1910.178.

Operators of this equipment must possess a valid, applicable driver's license, be in good physical and mental condition, have normal reflexes and reaction time, good vision and depth perception and normal hearing. Operator must not be using medication which could impair abilities nor be under the influence of alcohol or any other intoxicant during the work shift.

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

- This Owner/Operator Manual
- Telehandler Safety Manual
- All instructional 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.

Modifications

Any modification to this machine must be approved by JLG.

This product must comply with all safety related bulletins. Contact JLG Industries, Inc. or the local authorized JLG representative for information regarding safety-related bulletins which may have been issued for this product.

JLG Industries, Inc. sends safety related bulletins to the owner of record of this machine. Contact JLG Industries, Inc. to ensure that the current owner records are updated and accurate.

JLG Industries, Inc. must be notified immediately in all instances where JLG products have been involved in an accident involving bodily injury or death of personnel or when damage has occurred to personal property or the JLG product.

FOR:

- Accident Reporting and Product Safety Publications
- Current Owner Updates
- Questions Regarding Product Applications and Safety
- Standards and Regulations Compliance Information
- Questions Regarding Product Modifications

CONTACT:

Product Safety and Reliability Department
JLG Industries, Inc.
13224 Fountainhead Plaza
Hagerstown, MD 21742
USA

or Your Local JLG Office
(Addresses on back cover)

In USA
Toll Free: 1-877-JLG-SAFE (1-877-554-7233)

Outside USA
Phone: +1-717-485-6591

E-mail
ProductSafety@JLG.com

Other Publications Available

Service Manual 8990416

Illustrated Parts Manual.....8990417

Table of Contents

The Manual

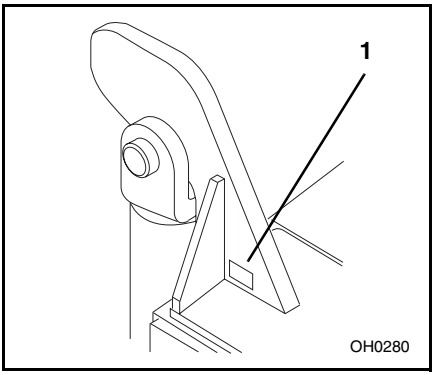
This Owners/Operators Manual provides the information you need to properly operate and maintain this vehicle.

IMPORTANT! *Before you operate this vehicle, read this manual completely and carefully so you will understand the safety instructions and the operation of the controls and safety equipment. You must comply with all* ***Danger****,* ***Warning****, and* ***Caution*** *notices. They are for your benefit.*

All reference to the right side, left side, front, or rear are given from the operator's seat looking in a forward direction.

Replacement Parts

For easy reference when ordering replacement parts or making service inquiries on this vehicle, record its model and serial number on the back cover of this manual. The serial number is stamped into the serial number plate (1) which is located on the vehicle's frame.



IMPORTANT! *The replacement of any part on this vehicle by anything other than a* JLG *authorized replacement part may adversely affect the performance, durability or safety of this vehicle and may void the warranty.* JLG *assumes no liability for unauthorized replacement parts which adversely affect the performance, durability or safety of this vehicle.*

Reports

IMPORTANT! *A Warranty Registration form must be filled out by the* JLG *Distributor, signed by the purchaser, and returned to* JLG *once the product is sold and/or put into service. This report activates the warranty period, assuring that your claims during the warranty period will be processed promptly. To guarantee full warranty service, make sure your* JLG *Distributor has returned the business reply card of this form to* JLG*.*

Disclaimer

JLG reserves the right to make changes on and to add improvements upon its products at any time without public notice or obligation. JLG also reserves the right to discontinue manufacturing any product at its discretion at any time.

NOTICE: Under OSHA rules, it is the responsibility of the employer to provide operator training. Successful completion and certification of Safety Training for Rough Terrain Forklifts is required. Operator Training Kits are available by calling Ken Cook Company at (414) 466-6060. An order form for these kits is available through our website, http://www.jlg.com.

The information in this manual does not replace any safety rules and laws used in your area. Before operating this vehicle, learn the rules and laws for your area. Make sure the vehicle has the correct equipment according to these rules and laws.

Your safety and the safety of others in the worksite depend significantly upon your knowlege and understanding of all correct operating practices and procedures for this vehicle.

	WARNING: **DO NOT** modify or alter (weld, drill, etc.) any part of this vehicle without consulting JLG. Modifications can weaken the structure creating a hazard that can cause death or serious personal injury.

Hazard Classification System

OP0330

This safety alert symbol is used with the following signal words to attract your attention to messages found within the manual and on hazard decals located on the vehicle. They are reproduced herein and pertain to proper operation and procedure messages contained throughout the manual. The message that follows the symbol contains important information about Safety. To avoid possible death or serious personal injury, carefully read and follow the messages! Be sure to fully understand the potential causes of death or injury.

Safety Practices

Signal Word

A signal word is a distinctive word located on hazard decals and used throughout this manual that alerts the viewer to the existence of and relative degree of the hazard.

DANGER:

The signal word "**DANGER**" indicates an imminently hazardous situation which, if not avoided, will result in death or serious personal injury.

WARNING:

The signal word "**WARNING**" indicates a potentially hazardous situation which, if not avoided, could result in death or serious personal injury.

CAUTION:

The signal word "**CAUTION**" indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

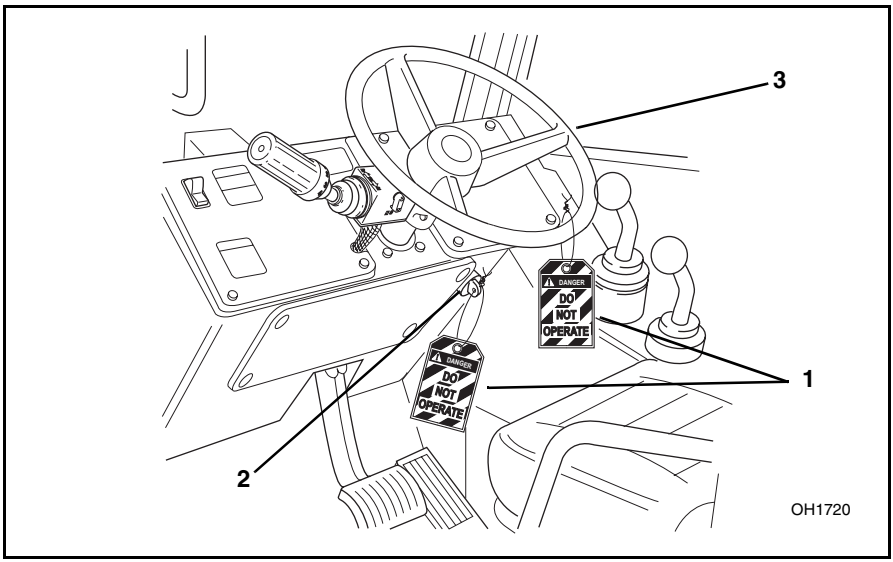
CAUTION:

The signal word "**CAUTION**", used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, may result in property damage.

For safe maintenance of the vehicle, read, understand and follow all DANGER, WARNING and CAUTION information.

Accident Prevention Tags

Before beginning any maintenance or service, place an Accident Prevention Tag (1) on both the starter key switch (2) and the steering wheel (3), stating that the vehicle should not be operated. Actual Accident Prevention Tags, which can be punched out and used, are included as the last page of this manual. Retain these Accident Prevention Tags for reuse at a later date.



New or Additional Operators

At the time of original purchase, the purchaser of this vehicle was instructed by the seller on its proper use. If this vehicle is to be used by an employee or is loaned or rented to someone other than the purchaser, make certain that the new operator is trained and authorized, in accordance with the OSHA regulations referenced on page 3, and reads and understands this Operators Manual before operating the vehicle.

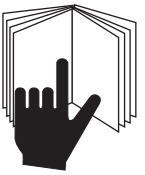
In addition, make sure that the new operator has completed a walk-around inspection of the vehicle, is familiar with all decals on the vehicle, and has demonstrated the correct use of all controls.

Instructional Symbols

The following symbol definitions will help you understand all hazard related decals and load charts used on this vehicle.

OP0330

Safety Alert Symbol

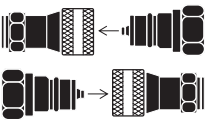


OH2100

Read Operator's Manual

OH2090

Fasten Seat Belt



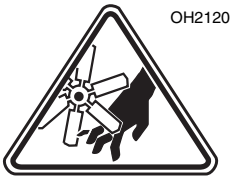
OH3100

This Symbol Signifies That Specific Attachments Must Only Be Used On Vehicles Equipped With Auxiliary Hydraulics. Always Connect Couplers.

Hazard Symbols


OH2110

Lead Acid Batteries Generate Explosive Gases


OH2120

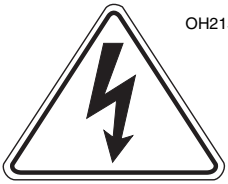
Rotating Fan Blades Can Cut


OH2130

Vehicle Tipover Can Crush


OH2300

Rotating Belts Can Cut Or Entangle


OH2150

Electrocution Can Cause Death Or Serious Injury


OH2140

Vehicle Roll Away Can Cause Death Or Serious Injury


OH3160

AVOID CRUSHING, Falling Off Vehicle Can Cause Death Or Serious Injury


OH3110

Swinging Loads Can Cause Vehicle Tipover Which Can Result In Death Or Serious Injury


OH2161

FALLING OFF ATTACHMENT Can Result In Death Or Serious Injury


OU1450

ENGINE EXPLOSION Can Result In Death Or Serious Injury

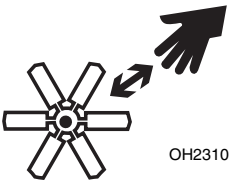
Avoidance Symbols

OH2320

Keep Lit Cigarettes Away

OH2330

Keep Flames and Ignition Sources Away



OH2310

Keep Away From Rotating Fan Blades

OU1520

Stop Operation At This Point

OH2270

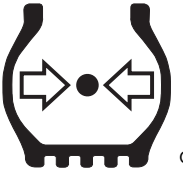
Do Not Travel With Boom Raised

OH2280

Do Not Raise Boom While On A Slope

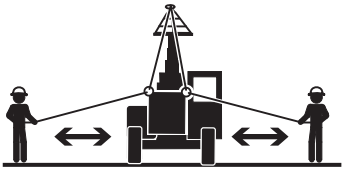
OU1510

Prohibition Symbol. DO NOT Operate



OH2290

Maintain Proper Air Pressure In Tire

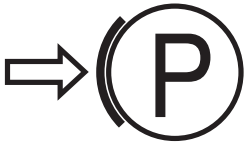


OH3120

To Avoid Vehicle Tipover ALWAYS:

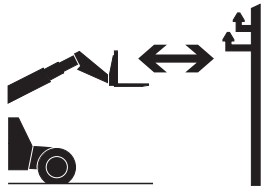
- **Travel Slowly**
- **Rig Properly**
- **Use Two Tethers**

Avoidance Symbols (cont'd)



OH2260

Engage Parking Brake



OH2250

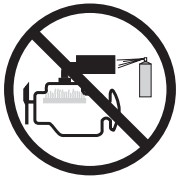
Keep Clear Of Power Lines

OH2240

Do Not Travel With Personnel In Work Platform

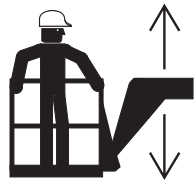
OH2230

Carry No Riders



OU1460

DO NOT Use Ether Or Other High Energy Starting Aids. Engine Equipped With Grid Heating System.



OH2170

Use Only Compliant Work Platforms To Raise Or Lower Personnel

OH2220

DO NOT JUMP

- **Brace Yourself and Stay With Vehicle**
- **Keep Seat Belt Fastened**
- **Hold On Firmly**
- **Lean Away From The Point Of Impact**

Personal Considerations

1. Seat Belt

Always fasten the seat belt before starting the engine.

2. Clothing and Safety Gear

DO NOT wear loose clothing or jewelry that can get caught on controls or moving parts. Wear protective clothing and personal safety gear issued or called for by job conditions.

3. Dismounting

DO NOT get off the vehicle until you:

- level the vehicle,
- ground the carriage,
- place the travel select lever in (N) NEUTRAL,
- place the neutral lock lever in (N) NEUTRAL LOCK,
- engage the parking brake switch,
- turn the engine OFF, if appropriate,
- unbuckle the seat belt,
- exit the vehicle using the hand holds.

OH1650

4. Chemical Hazards

A. Exhaust Fumes

Fumes from the engine exhaust can cause death or serious personal injury. **DO NOT** operate vehicle in an enclosed area without a ventilation system capable of routing the hazardous fumes outdoors.

B. Explosive Fuel

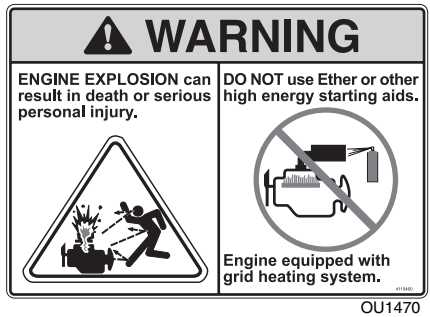
Engine fuel is ***flammable*** and can cause a fire and/or an explosion. Avoid danger by keeping sparks, open flames and smoking materials away from the vehicle and from fuel during refueling or when servicing the fuel system. Know where fire extinguishers are kept on the worksite and how to use them.

C. Ether or High Energy Starting Aids (Optional)

The engine utilizes a grid heating system inside the induction manifold for cold starting conditions.

> WARNING: This diesel engine uses a grid heating system inside the induction manifold. **DO NOT** use ether or any high energy fuels to assist starting. An explosion may cause death or serious personal injury or engine damage.

DO NOT use ether or any other high energy starting aids during cold starting. An engine explosion can result in death or serious personal injury.



OU1470

D. Hydraulic Fluid

DO NOT attempt to repair or tighten any hydraulic hoses or fittings while the engine is running or when the hydraulic system is under pressure. Fluid in the hydraulic system is under enough pressure that it can penetrate the skin causing death or serious personal injuries.

HOT HYDRAULIC FLUID WILL CAUSE SEVERE BURNS. Wait for fluid to cool down before disconnecting lines.

DO NOT use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks. Wear gloves to protect hands from spraying fluid.

Hydraulic fluid can cause permanent eye injury. Wear appropriate eye protection and stop engine. Relieve pressure before disconnecting lines by moving all joysticks back and forth through all functions.

If anyone is injured by or if any hydraulic fluid is injected into the skin, obtain medical attention immediately or gangrene may result.

E. Battery

The following WARNING is intended to supplement and does not replace the warnings and information provided on the battery by the battery manufacturer.

When jump starting the vehicle, carefully follow instructions found under “Jump Starting” on page 56.

OS0621

Keep sparks, flames and lit smoking materials away from the battery at all times. Lead acid batteries generate ***explosive*** gases. Severe chemical burns can result from improper handling of battery electrolyte. Wear safety glasses and proper protective gear when handling batteries to prevent electrolyte from coming in contact with eyes, skin or clothing.

Battery Electrolyte First Aid:

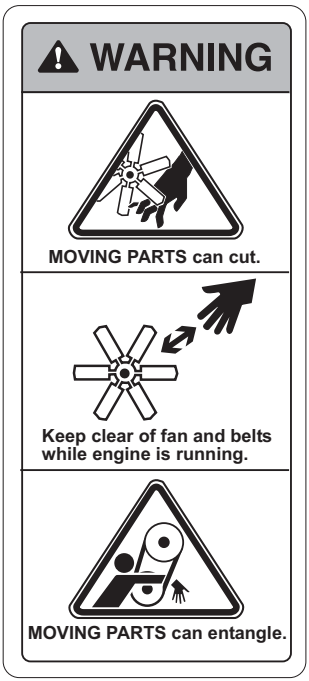
- **External Contact —** Flush with water.
- **Eyes —** Flush with water for at least 15 minutes and get medical attention immediately.
- **Internal Contact —** Drink large quantities of water. Follow with Milk of Magnesia, beaten egg or vegetable oil. Get medical attention immediately.

IMPORTANT! *In case of internal contact,* ***DO NOT*** *give fluids that would induce vomiting!*

5. Moving Parts Hazard

DO NOT place limbs near moving parts. Severing of any body part can result.

Turn OFF engine and wait until fan and belts stop moving before servicing.



OT0810

6. Lowering Boom or Falling Load Hazard

DO NOT get under a raised boom unless it is blocked up safely. Always empty the attachment of any load and block the boom up before doing any servicing that would require the boom to be raised.

NEVER allow anyone to walk or stand under the boom. A lowering boom or falling load can result in death or serious personal injury.

Operational Considerations

1. Preparation and Prevention

Know the location and function of all vehicle controls.

Make sure all persons are away from the vehicle and that the travel select lever is in the (N) NEUTRAL position and the Neutral Lock Lever is in the (N) NEUTRAL LOCK position with the parking brake switch engaged before starting the engine.

Holes, obstructions, debris and other worksite hazards can cause death or serious personal injury. Always walk around and look for these and other hazards before operating the vehicle in a new worksite.

Prevent accidents when you move the vehicle around the worksite. Know the rules for movement of people and vehicles on the worksite. Have a person act as a lookout for you. Follow the instructions of signals and signs.

DO NOT operate the vehicle unless all hazard and instructional decals are in place and readable. (Replace all missing, illegible, or damaged decals.)

2. Clearances

Look out for and avoid other personnel, machinery and vehicles in the area. Use a spotter if you do not have a clear view of conditions that affect clearances. Travel with the boom fully retracted and lowered as far as possible while still maintaining enough ground clearance for conditions.

Always check boom clearances carefully before driving underneath door openings, bridges, etc.

Always check for power lines when raising the boom. Beware of overhead wires. Contact with electrical power lines can result in electrocution. See “Electrocution Hazards” on page 15.

3. Visual Obstruction

Dust, smoke, fog, etc. can decrease vision and cause an accident. Always stop or slow the vehicle until the obstruction clears and the worksite is visible again. Have a lookout person assist you.

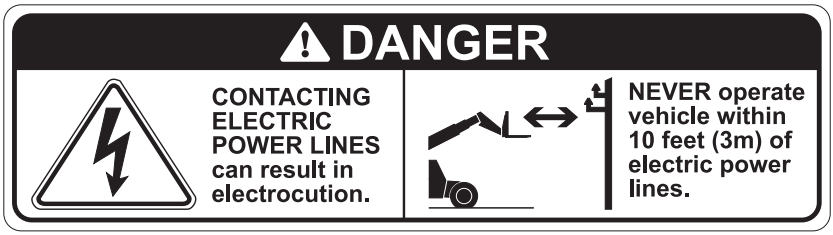
Where the load will obstruct the operator’s vision, it is recommended that the vehicle be operated in REVERSE, looking backwards in the direction of travel. Travel at a slower speed and get someone to direct you.

4. Underground Hazards

Know the location of all underground hazards before operating this vehicle in a new area or worksite. Electrical cables, gas and water pipes, sewer, or other underground objects can cause death or serious personal injury. Contact your local underground utility service or diggers hotline to mark all underground hazards.

5. Electrocution Hazards

NEVER operate this vehicle in an area where overhead power lines, overhead or underground cables, or other power sources may exist without first requesting that the appropriate power or utility company de-energize the lines, or take other suitable precautions.



OS0063

6. Elevating Personnel

Use only a compliant work platform meeting the ASME B56.6 standards for lifting and lowering personnel. **NEVER** transport personnel in a work platform for even the shortest distance.

Death or serious personal injury can occur if these rules are not obeyed. Riders can fall and be crushed or run over. Avoid accidents.

For other specific precautions, see “Elevating Personnel” on page 77.

OH3180

OU0620

7. Tip Over Hazard

OS0086

Traveling with the boom raised is dangerous and can cause tipover. Keep the boom as low as possible. Travel with extreme caution and at the slowest possible speed.

Keep the vehicle under control at all times. When negotiating turns, slow down and turn the steering wheel in a smooth sweeping motion. Avoid jerky turns, starts or stops. Reduce vehicle speed on rough ground and slopes.

DO NOT exceed the rated lift capacity of the vehicle as structural damage and unstable conditions will result.

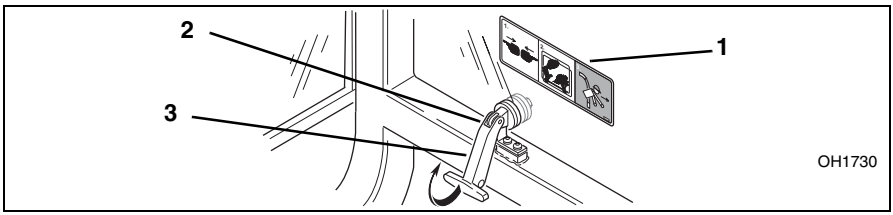
To ensure that the vehicle is positioned in the most stable condition before operating an attachment, use the frame sway control (frame tilt) to level the vehicle. The vehicle is level when the frame level indicator gauge reaches (0°) zero degrees.

If the vehicle cannot be leveled using the frame sway control, reposition the vehicle.

Frame swaying left or right with the boom raised above horizontal is dangerous. Always use the frame sway control to level the vehicle before raising the boom above horizontal, with or without a load. If the vehicle cannot be leveled using frame sway control, reposition the vehicle.

8. Emergency Exit Rear Window

The rear window (1) in the enclosed cab can be used as an emergency exit by removing the latch pin (2) located on the window latch (3). The window is then free to swing open.



9. Tire Pressure

OS0085

MAINTAIN proper tire pressures at all times. An underpressurized tire(s) adversely affects vehicle stability. If proper tire pressures are not maintained, this vehicle can tip over.

To ensure proper vehicle stability, check all four tire pressures before operating the vehicle.

10. Do Not Jump

OH3190

If a vehicle ever becomes unstable and starts to tip over:

- BRACE YOURSELF and STAY WITH THE VEHICLE,
- KEEP YOUR SEAT BELT FASTENED,
- HOLD ON FIRMLY and
- LEAN AWAY FROM THE POINT OF IMPACT.

Indecision and trying to escape from a tipping vehicle can result in death or serious personal injury.

11. Slopes

DO NOT park the vehicle on an incline and leave it unattended.

- Driving across a slope is dangerous, as unexpected changes in the slope can cause tipover. Ascend or descend slopes slowly and with caution.
- Ascend or descend slopes with the heavy end of the vehicle pointing up the slope.

NOTE: *The rear of the vehicle is normally considered the heavy end unless the carriage is fully loaded. In this case the front of the vehicle is now the heavy end.*

- Unloaded vehicles should be operated on all slopes with the carriage pointing down the slope.
- On all slopes, the load must be tilted back and raised only as far as necessary to clear the ground.
- When operating on a downhill slope, reduce travel speed and downshift to a low gear to permit compression braking by the engine and aid the application of the service brakes.

12. Falling Load Hazard

DO NOT exceed the total rated load capacity of the specific type fork being used. Each fork is stamped with a maximum load capacity. If the capacity is exceeded, forks may break. See “Fork Ratings” on page 76.

DO NOT downshift at a high ground speed. Sudden slowing can cause the load to drop off the forks.

13. Ventilation

DO NOT operate this vehicle in an area with flammable dust or vapors unless good ventilation has removed the hazard. Sparks from the electrical system and the engine exhaust can cause an explosion.

Carbon monoxide fumes from the engine exhaust can cause suffocation in an enclosed area. Good ventilation is very important when operating this vehicle.

Equipment Considerations

WARNING: **DO NOT** modify or alter (weld, drill, etc.) any part of this vehicle without first consulting JLG. Modifications can weaken the structure creating a hazard that can cause death or serious personal injury.

DO NOT by-pass or disconnect any electrical or hydraulic circuits. Consult the JLG Service Department or your local JLG Distributor if any circuit is malfunctioning.

DO check for frayed or cut seat belt webbing, damaged buckles or loose mounting brackets. Replace immediately if required.

ALWAYS wear a seat belt when operating the vehicle.

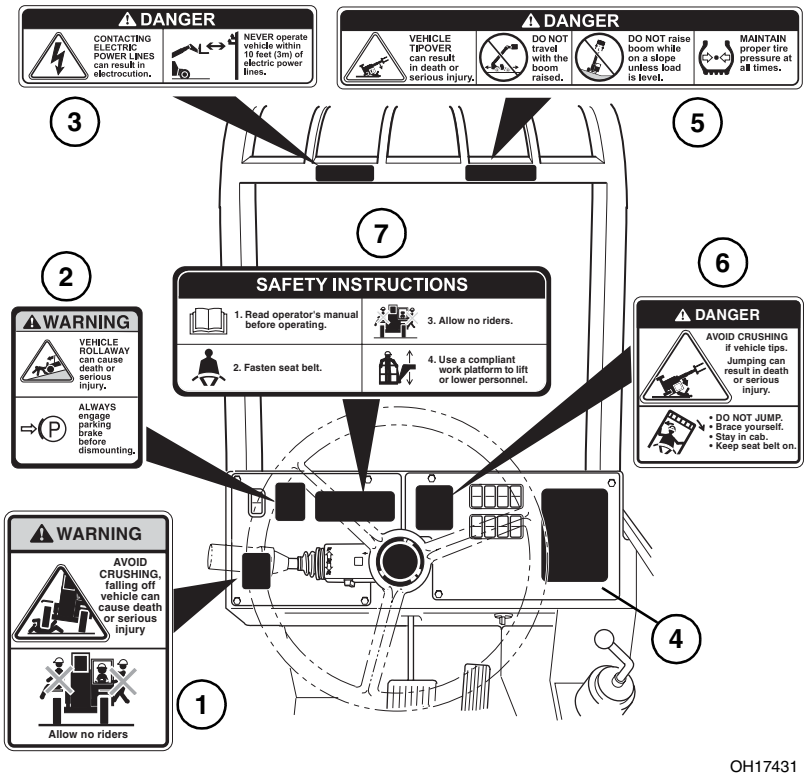
DO check tire pressure on all four tires. Add air if required.

DO check the condition of all four rims. Check for bent flanges and/or bead mounting areas.

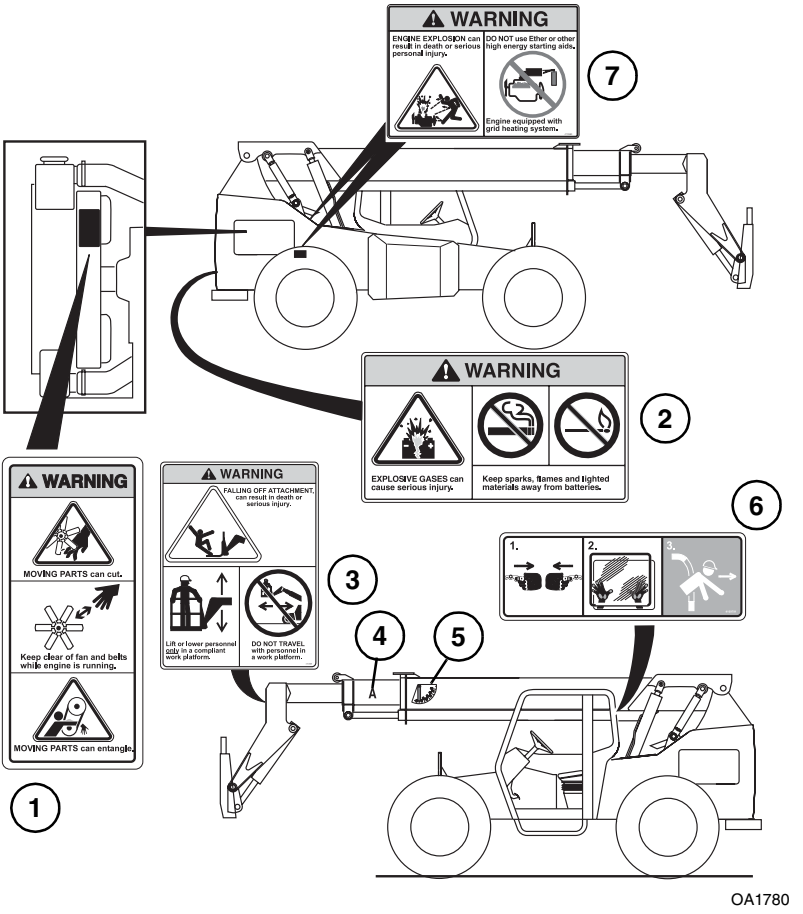
DO check the parking brake operation. Refer to the test procedures on page 165. Repair immediately if required.

DO keep all non-skid surfaces clean and free of debris. Replace if worn, damaged or missing.

DO check the condition of decals. Replace decals if missing, damaged or illegible. The following pages show the proper location of the decals.



Item	Part Number	Quantity	Decal Description
1	4110188	1	No Riders Warning
2	4110188	1	Vehicle Rollaway Warning
3	4108991	1	Electrocution Danger
4	7139452	1	Load Chart Booklet
5	4110137	1	Tipover Danger
6	4110187	1	Do Not Jump Danger
7	4110188	1	Safety Instructions



Item	Part Number	Quantity	Decal Description
1	4110184	2	Moving Parts Warning
2	4110172	1	Explosive Gases Warning
3	4110389	1	Elevating Personnel Warning
4	4107442	1	Boom Extend Letters
5	4105262	1	Boom Angle Indicator
6	4109791	1	Emergency Exit (Enclosed Cab Only)
7	4110460	2	Ether Starting Warning (Optional Grid Heater Cold Start Aid)

Operator Controls

Accelerator Pedal

Pressing down the accelerator pedal (8) increases engine and hydraulic speed of the vehicle. The pedal is spring-loaded to return to idle speed.

Service Brake Pedal

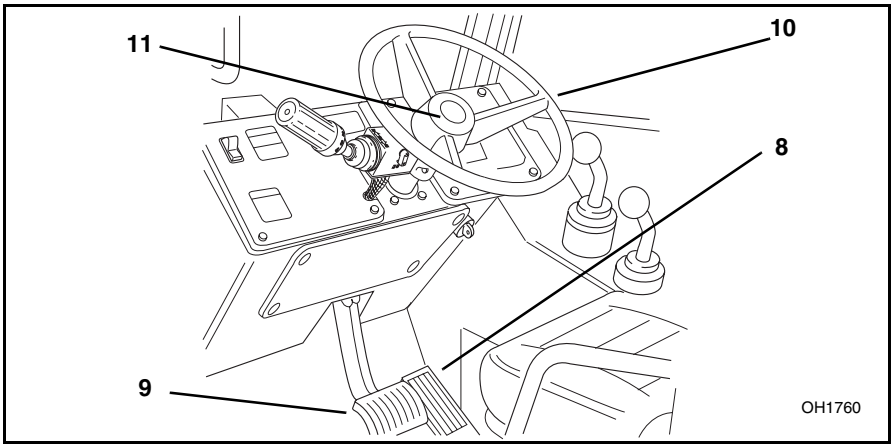
Pressing down the brake pedal (9) decreases the speed of the vehicle by applying the service brakes located in the axles. In the event of engine power loss, the service brake pedal can also be used for braking.

Steering Wheel

Turning the steering wheel (10) to the left or right steers the vehicle in the corresponding direction. Any one of the steering modes are selectable. Refer to “Steering Select Switch” on page 25.

Horn Button

Pressing the horn button (11) in the center of the steering wheel sounds the horn.



Operation

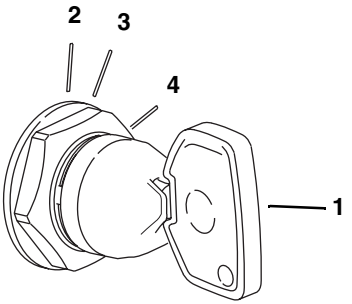
Ignition Switch

Using the ignition switch key (1), the switch may be turned clockwise from the OFF (2) position to the RUN (3) and START (4) positions. The START position is spring-loaded to return to the RUN position and must be manually held in place for starting.

OFF (2) position — The entire electrical system is shut down.

RUN (3) position — All controls and indicators are operable.

START (4) position — Engages starter motor to crank the engine when the parking brake switch is engaged and the transmission is in NEUTRAL.

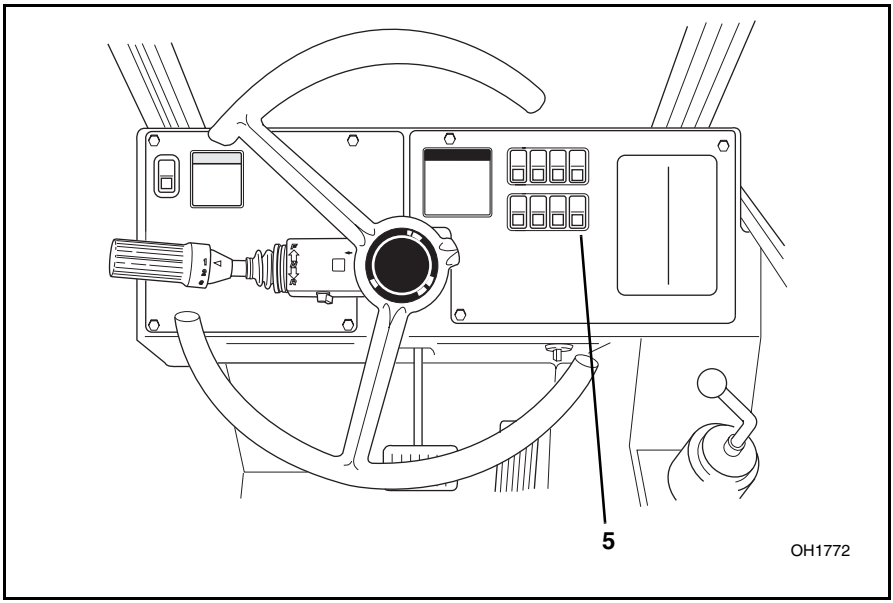


OT0680

Steering Select Switch

This vehicle has one steering select switch (5) with three positions. The switch is located in the lower switch bank on right side dash panel.

Refer to “Steering Modes” on page 62 for detailed information.



Park Brake Switch

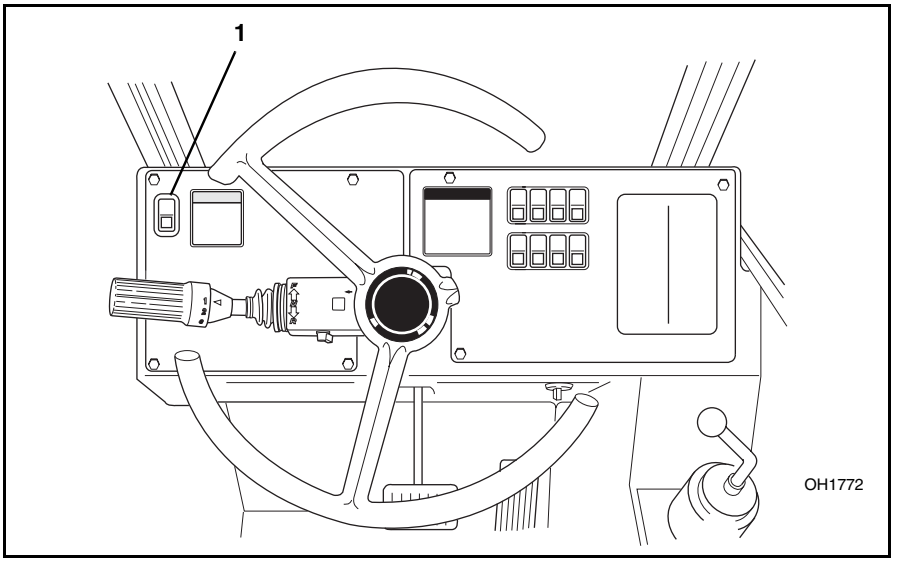
The Parking Brake Switch (1) has two positions:

⇨Ⓟ ENGAGED ..... toggle switch downward 

OS0121 ⇦Ⓟ DISENGAGED ..... toggle switch upward  OS1323

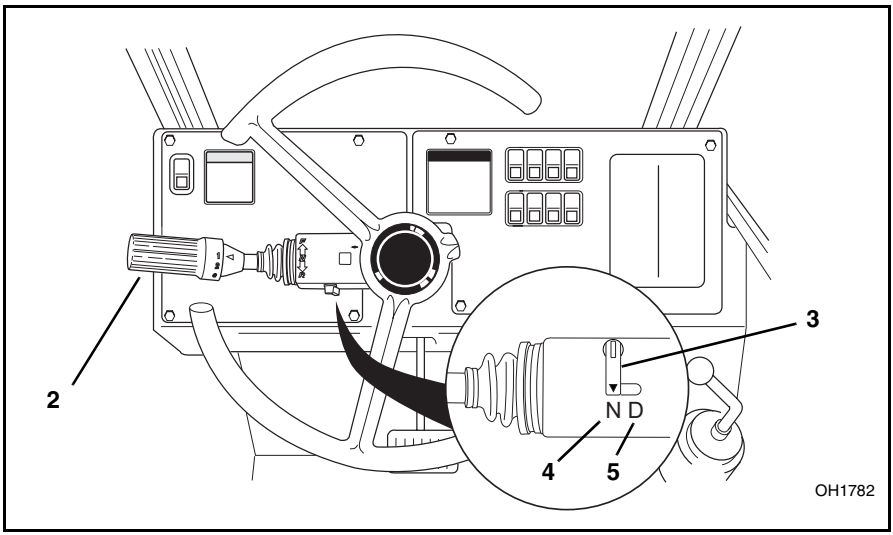
The Parking Brake Switch (1) must be ENGAGED to permit engine starting. A red LED, on the parking brake switch, and a light in the instrument cluster will indicate the brake is ENGAGED.

The parking brake may be used to stop in an EMERGENCY situation. However, use caution because the stop will be abrupt and the operator and the load may be jolted forward unexpectedly.



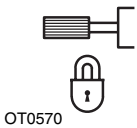
Neutral Lock Lever

The Travel Select Lever (2) is equipped with a neutral lock. The Neutral Lock Lever (3) locks the Travel Select Lever in NEUTRAL or unlocks the Travel Select Lever so that it can be moved into the FORWARD or REVERSE drive position.

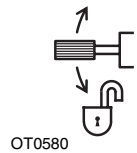


To lock the Travel Select Lever (2) in the NEUTRAL position, place the lever in the NEUTRAL position and move the Neutral Lock Lever (3) to the (N) NEUTRAL LOCK (4) position.

To unlock, move the Neutral Lock Lever (3) to the (D) DRIVE (5) position.



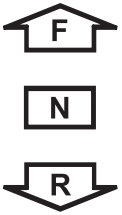
N = NEUTRAL LOCK.....all the way LEFT



D = DRIVE..... all the way RIGHT

Travel Select Lever

The Travel Select Lever (1) has three positions to select direction of travel:

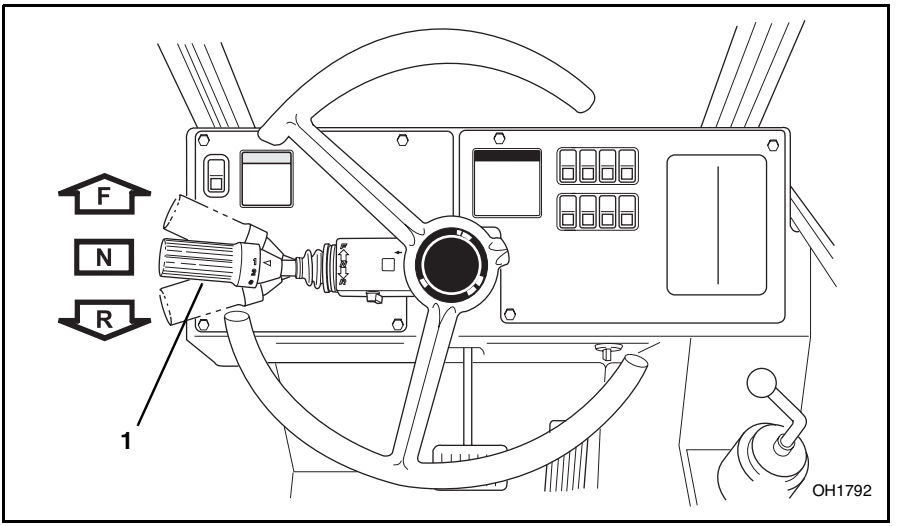


F = FORWARD .....all the way FORWARD

N = NEUTRAL .....CENTER position

R = REVERSE..... all the way REARWARD

OS0340



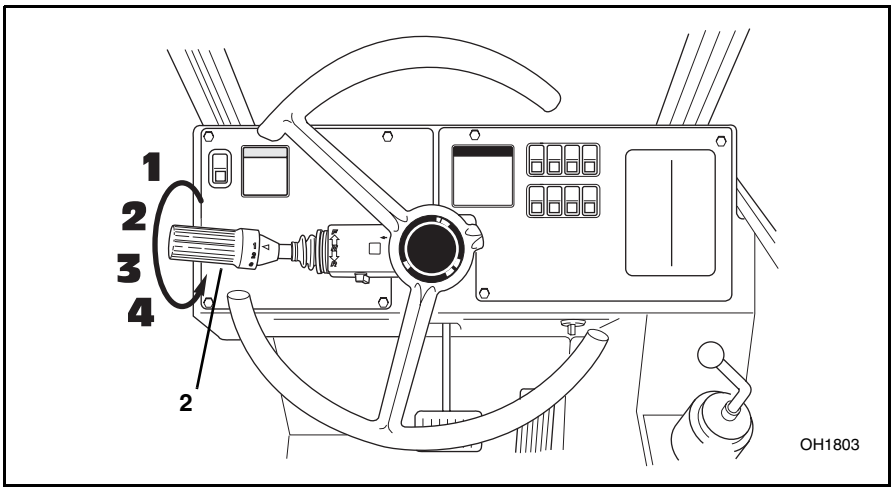
To change travel selections, move the lever FORWARD or REARWARD to the desired selection.

When the Travel Select Lever is shifted to REVERSE, the back-up alarm will automatically sound.

NOTE: *The Travel Select Lever must be in the (N) NEUTRAL position to permit engine starting.*

Gear Select Lever

The Gear Select Lever (2) has a twist grip handle with four positions. Vehicles have four forward gears and three reverse gears.



Use first gear for highest torque and pulling power. Use higher gears for higher ground speed. The recommendations listed in the table that follows are guidelines only. Always use good judgement when traveling with a load.

Recommended Gear/Speed for Various Load/Travel Conditions

Load Size	Surface	Gear	Speed
No Load	Smooth	4th*	0 to 20 mph (0 to 32 km/h)
	Improved	3rd	0 to 14 mph (0 to 23 km/h)
	Rough	2nd	0 to 6 mph (0 to 9,7 km/h)
Load up to 3,500 lbs (up to 1.588 kg)	Smooth	3rd	0 to 14 mph (0 to 23 km/h)
	Improved	2nd	0 to 6 mph (0 to 9,7 km/h)
	Rough	2nd	0 to 6 mph (0 to 9,7 km/h)
Load 3,500 to 6,000 lbs (1.588 to 2.721 kg)	Smooth	3rd	0 to 14 mph (0 to 23 km/h)
	Improved	2nd	0 to 6 mph (0 to 9,7 km/h)
	Rough	1st	0 to 3.5 mph (0 to 5,6 km/h)

*__NEVER__ travel in 4th gear when carrying a load.

Boom Control Lever

The boom control lever (1) is a joystick with variable motion from the center to control the boom functions:

Boom Raise.....move lever backward

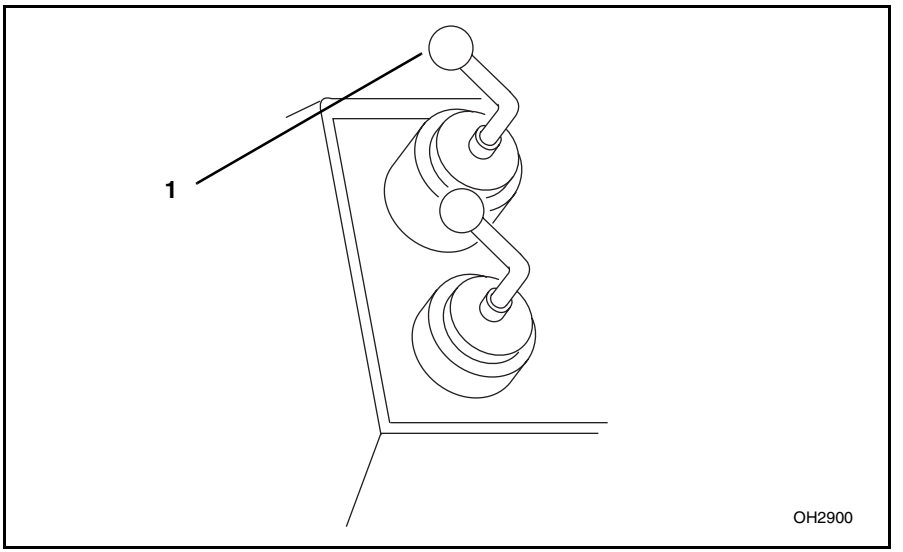
Boom Lower .....move lever forward

Boom Extend..... move lever to the right

Boom Retract ..... move lever to the left

Two boom functions can be accomplished at the same time by moving the lever into the proper quadrant. For example: moving the lever forward and to the left will lower and retract the boom simultaneously.

The speed of the function depends directly upon the amount of lever travel in the corresponding direction. Increasing the engine speed will also increase the function speed.



Attachment Tilt and Frame Sway Control Lever

The attachment tilt and frame sway control (2) is a joystick with four perpendicular motions from the center to control two attachment tilt functions and two frame sway functions:

OH0410

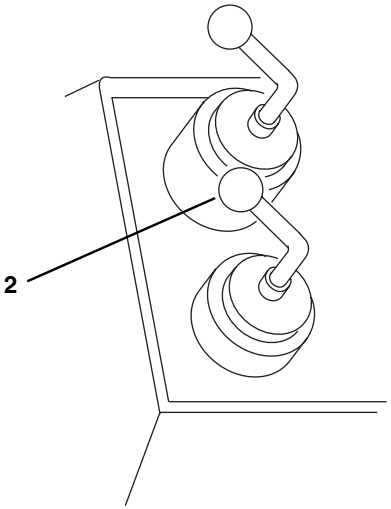
Frame Sway Left ..... move lever to the left

Frame Sway Right..... move lever to the right

Attachment Tilt Down.....move lever forward

Attachment Tilt Up .....move lever backward

The attachment is self leveling and will retain any set angle throughout boom raising, lowering, retracting or extending operations.



OH2900

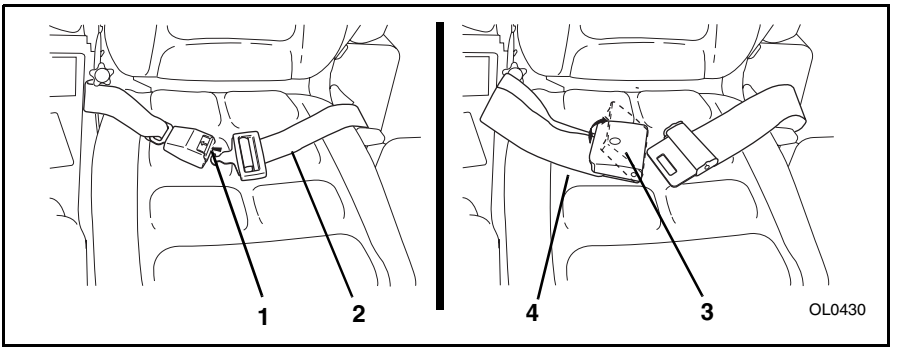
Seat Belt

WARNING: Serious bodily injury or death may result from failure to wear the seat belt installed on this vehicle. The seat belt is a critical component of the Operator's Protective Structure, and is provided for the operator's protection in case of vehicle upset. The seat belt MUST be worn whenever this vehicle is operated.

IMPORTANT! *Inspect the seat belt every time it is used, looking for cut or worn webbing, or any defect in the latch assembly. If any wear or damage is noted,* ***DO NOT*** *operate the vehicle until the seat belt is replaced.*

Before the engine is started, adjust the seat as required for position and comfort. Then adjust the seat belt as follows:

1. Grasp both free ends of the belt and make certain that the belt webbing is not twisted or entangled in any portion of the seat assembly.
2. With your back straight in the seat, couple both ends of the belt.
3. With the belt buckle as low on your body as possible, pull the free end of the belt to shorten it until it is tight across the lap.



4. To release the belt latch, depress the red button (1) on a 2 inch seat belt (2) or lift the black cover (3) of the buckle on a 3 inch seat belt (4) (dependant on belt style installed), and pull the free end from the buckle.

An optional 3 inch wide seat belt is available for those locations that require a 3 inch seat belt.

Operator's Seat Adjustment

The operator's seat (5) can be adjusted three ways:

A. Fore and Aft Adjustment

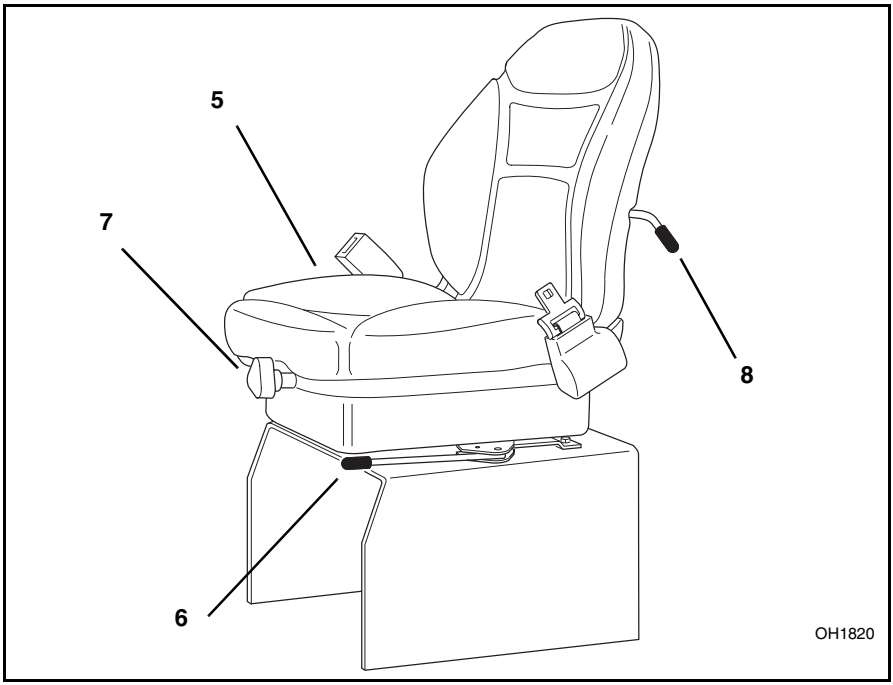
Pull the handle (6) outward to adjust the seat forward and backward. Release the handle to lock the seat in the desired position.

B. Suspension Adjustment

Turn the knob (7) on the front of the seat to adjust the suspension to correspond with the operator's weight. Turn clockwise to increase stiffness. Turn counter-clockwise to reduce the stiffness.

C. Backrest Angle Adjustment

The angle of the seat backrest can be adjusted to suit the operator. Move the lever (8) located on the left side of the seat backrest to adjust the angle.



Instruments and Indicators

Hourmeter

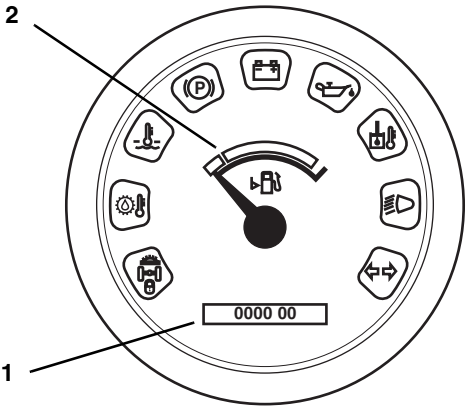
OS0260

The hourmeter (1) records engine operating hours and has a total readout of 9,999.99 hours. It is located at the lower portion of the instrument cluster on the right side of the dash.

Fuel Gauge

OH2470

The fuel gauge (2) indicates the quantity of fuel in the fuel tank. The gauge is located in the center of the instrument cluster on the right side of the dash. Capacity of the fuel tank is 37 gallons (140 liters) total capacity with a usable capacity of 35.6 gallons (135 liters).

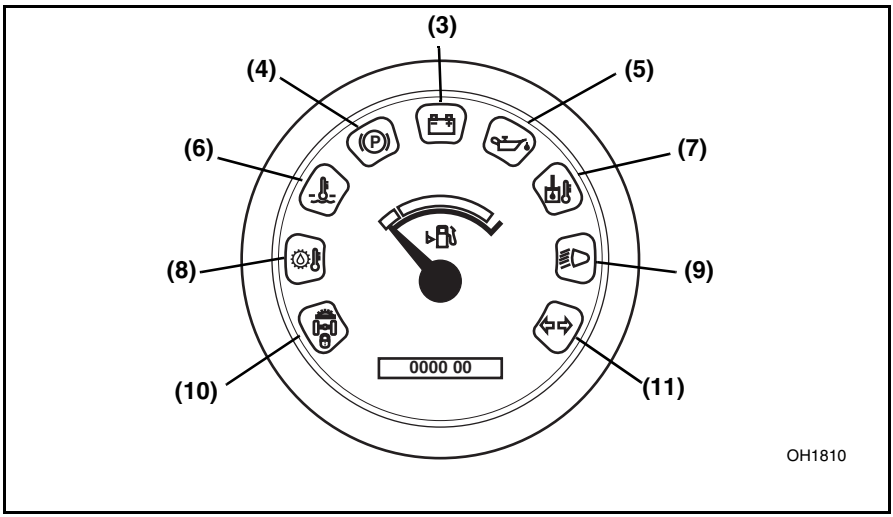


OH1810

Instrument Cluster Light Test

Test the bulbs in the instrument cluster before starting the engine.

Turn the ignition switch to the RUN position, ALL nine lights in the instrument cluster will come ON for a few seconds and then go out. Replace any bulbs that DO NOT come ON during this test. These lights will warn the operator if an abnormal condition should arise during operation and will also inform the operator when the road lights are on high beam or the turn signals are activated.



Position of corresponding lights:

- Alternator Charging Light (3)
- Park Brake Light (4)
- Engine Oil Pressure Light (5)
- Engine Coolant Temperature Light (6)
- Hydraulic Tank Temperature Light (7)
- Transmission Temperature Light (8)
- High Beam Light (9)
- Not Used (10)
- Turn Signal Light (11)

Function Indicator Lights

A. Park Brake Light

OH2480

The park brake light (1) illuminates any time the park brake is applied and the ignition switch is in the RUN position.

B. High Beam Light

(used with optional road light package only)


OH2490

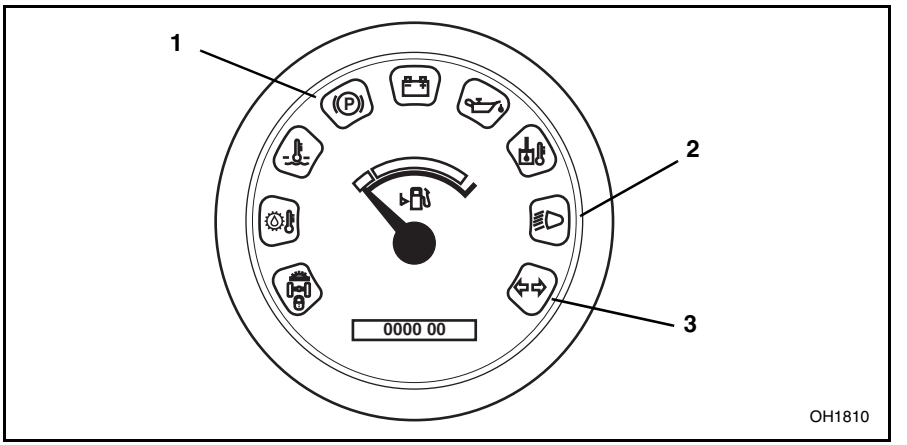
The high beam light (2) illuminates when the road option headlights are on full (high) beam and will turn OFF when the headlights are switched to low beam.

C. Turn Signal Light

(used with optional road light package only)


OH2510

The turn signal light (3) will illuminate and flash when the road option turn signals are activated in either direction or when the road option hazard lights are activated.



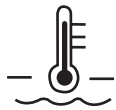
OH1810

Warning Indicator Lights

There are five additional indicator lights in the instrument cluster that will illuminate during critical circumstances. All five warning indicator lights demand immediate attention and vehicle servicing. In many cases, the vehicle should be shut down AS SOON AS PRACTICAL to prevent serious mechanical failure.

The five warning indicator lights are:

A. Engine Coolant Temperature Warning Indicator Light

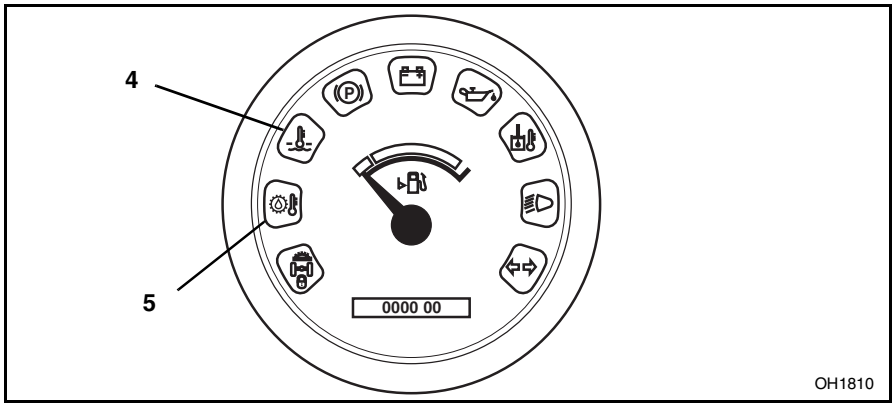

OH2520

The engine coolant temperature light (4) illuminates when the engine coolant temperature is too high; above 210° F (99° C). SHUT THE VEHICLE DOWN AS SOON AS PRACTICAL.

B. Transmission Temperature Warning Indicator Light

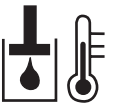

OH2530

The transmission temperature light (5) illuminates when the transmission oil temperature is too high; above 250° F (121° C). Stop the vehicle, place the travel select lever in (N) NEUTRAL and idle the vehicle, allowing time for cooling. If the light does not go out after two minutes, shut the vehicle down.



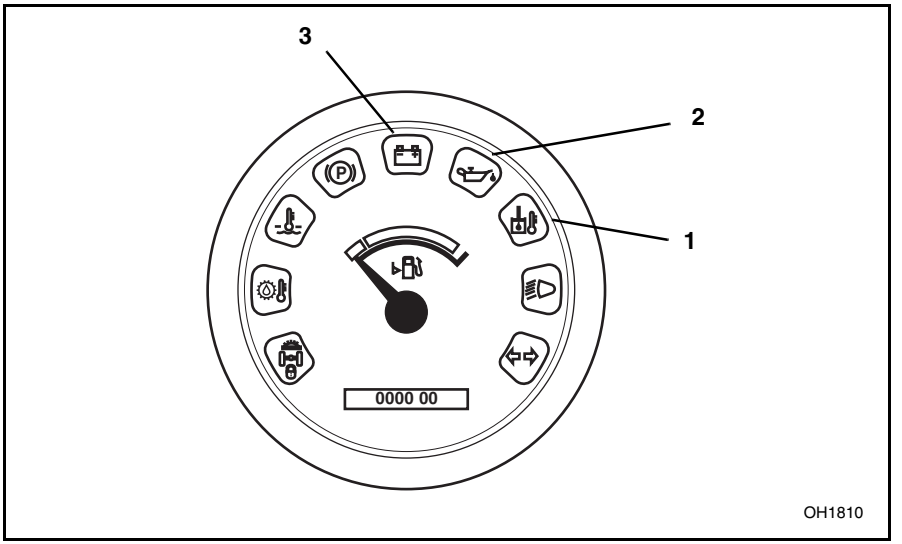
OH1810

C. Hydraulic Oil Temperature Warning Indicator Light



OH2540

The hydraulic oil temperature light (1) illuminates when the hydraulic oil temperature is too high; above 195° F (91° C). Stop and idle the engine, allowing time for cooling. If the light does not go out after five minutes, shut the vehicle down.



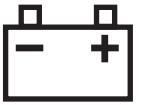
OH1810

D. Engine Oil Pressure Warning Indicator Light

OH2550

The engine oil pressure indicator light (2) will come ON during engine start-up and go OUT once the engine has started. This is normal. If the light comes ON while the engine is running, this indicates that the engine oil pressure is too low.
SHUT THE VEHICLE DOWN AS SOON AS PRACTICAL.

E. Alternator Charging Warning Indicator Light



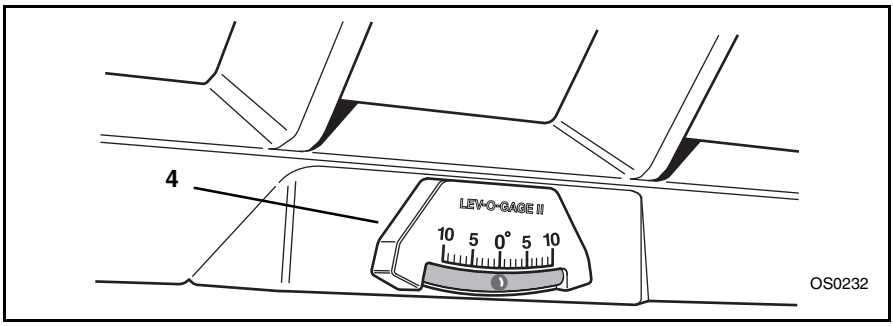
OH2560

The alternator charging light (3) illuminates when the charging system is not working properly. Service the engine alternator.

Frame Level Indicator

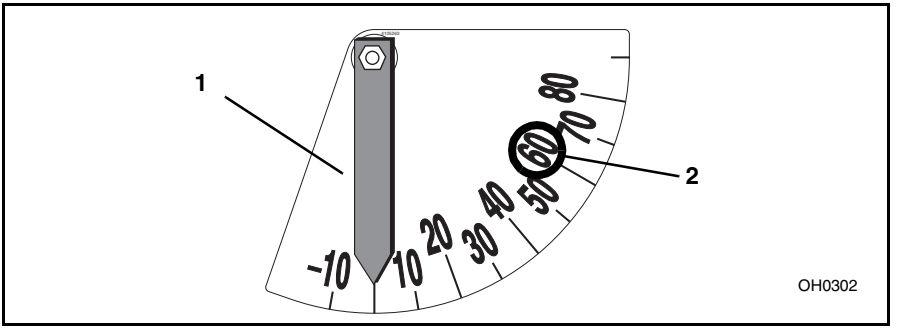
The indicator (4) is mounted on the top inside of the Operator's Protective Structure (cab). This is a bubble type indicator which allows the operator to tell if the vehicle has been positioned in a level condition. Always frame sway the vehicle either right or left until the indicator reads zero degrees (0°). If zero cannot be achieved, then reposition the vehicle until it is level before placing the load.

NOTE: *Maximum frame sway is 10° in either direction.*



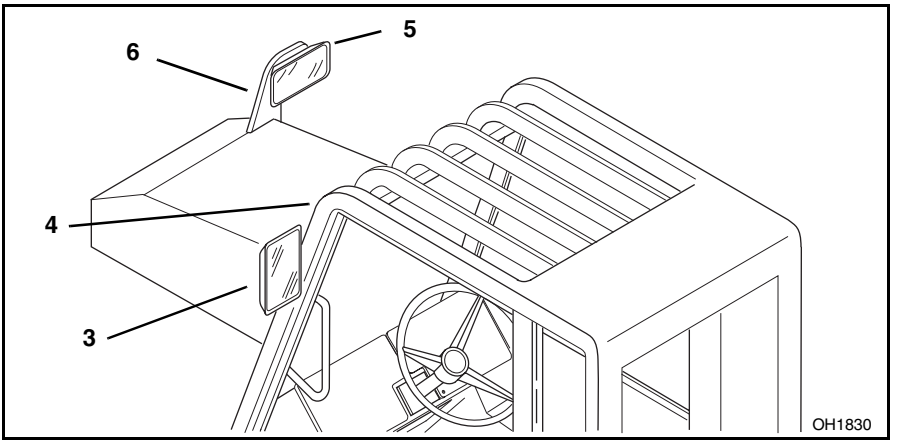
Boom Angle Indicator

The boom angle indicator is a plumb arrow (1) with angular graduations (2) from minus 10° to plus 80°. It is located on the left side of the boom and is visible from the operator's position. Use this indicator to determine the boom angle when reading the capacity chart (see "Using The Capacity Chart").



Rear View Mirrors

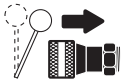
Two rear view mirrors are provided to aid the operator's rear vision. A rectangular flat lens mirror (3) is mounted on the upper left of the cab (4). A convex lens mirror (5) is mounted on the right side of the frame (6). Both mirrors are adjustable to obtain the best rear view by the operator.



Optional Controls

Auxiliary Attachment Control Lever

The auxiliary attachment control lever (7) controls the functions of an optional attachment that is mounted to the vehicle and requires a hydraulic supply for operation. Some of the optional attachments that require auxiliary hydraulics are: Side Tilt Carriage, Auger, Swing Carriage and 3 Foot Truss Boom w/Winch.


OH0431

When the control lever is moved to the right it will provide hydraulic system pressure through the female disconnect coupling for the auxiliary attachment. Hydraulic fluid will return to the tank through the male disconnect coupling.


OH0451

When the control lever is moved to the left it will provide hydraulic system pressure to the male disconnect coupling for the auxiliary attachment. Hydraulic fluid will return to the tank through the female disconnect coupling.

The control lever will provide the following typical functions for each specific attachment if they are connected properly. Operation will be reversed if incorrectly connected. We recommend reversing the disconnect couplings on the hoses that are supplied with the attachment if operation is reversed.

Side Tilt Carriage Operation:

- Lever right .....tilt right
- Lever left .....tilt left

Auger Operation:

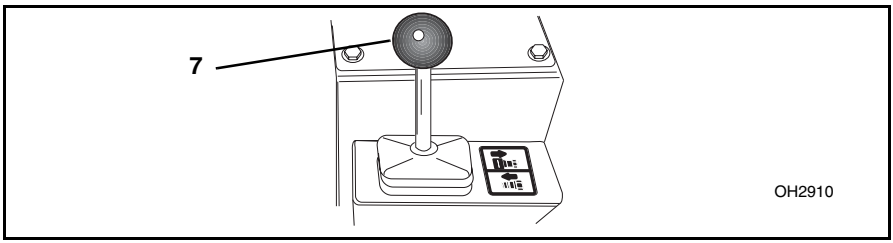
- Lever right .....auger dig
- Lever left .....auger retract

Swing Carriage:

- Lever right .....swing right
- Lever left .....swing left

3 Foot Truss Boom w/Winch

- Lever right .....cable extends
- Lever left .....cable retracts



OH2910

Worklight Switch (Front, Rear & Boom Worklights)

OH2570

This three position rocker switch (1) controls the front, rear and boom worklights. The switch (1) is located in the upper switch bank on the right side dash panel. These lights will only operate when the ignition switch is in the RUN position.

- Push the top of the switch in to turn all the worklights OFF.

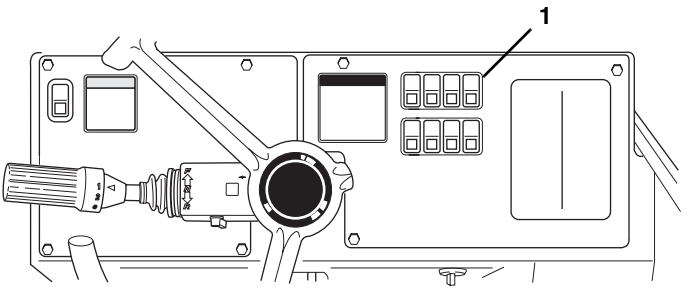
OH2591

- To turn the front and boom worklight ON, position the rocker switch to the center position.

OH2601

- Push the bottom of the switch in to turn all the worklights ON.

OH2611



OH1852

Beacon Light Switch

OH2580

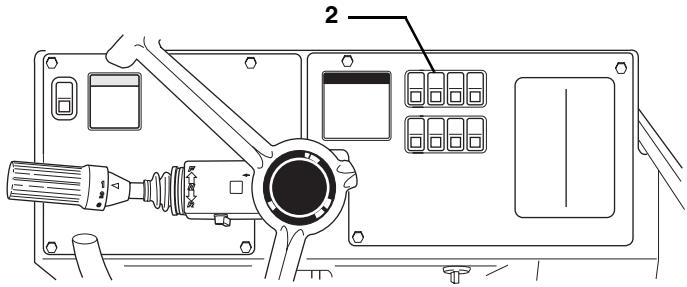
This rocker switch (2) turns the beacon light ON and OFF. The switch (1) is located in the upper switch bank on the right side dash panel. This light will only operate when the ignition switch is in the RUN position.

- Push the bottom of the switch in to turn the beacon light ON.

OH2611

- Push the top of the switch in to turn the beacon light OFF.

OH2591



OH1852

Worklight Switch (with Optional Road lights)

OH2620

This rocker switch (1) activates the worklight system. The switch (1) is located in the upper switch bank on the right side dash panel. This system will only operate when the ignition switch is in the RUN position. See “Parking Lights, Headlights & High/Low Beam Switch” on page 46 for operation of the road lights.

- Push the top of the switch IN to DEACTIVATE the entire worklight system.

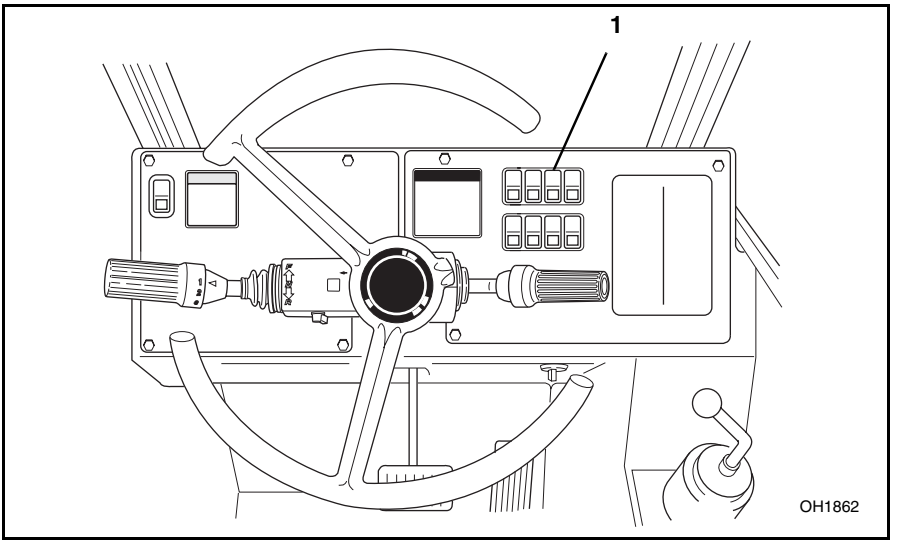
OH2591

- To ACTIVATE the boom worklight position the rocker switch to the center position.

OH2601

- Push the bottom of the switch IN to ACTIVATE the boom worklight and rear worklights.

OH2611



OH1862

Emergency Flashers

OS1920

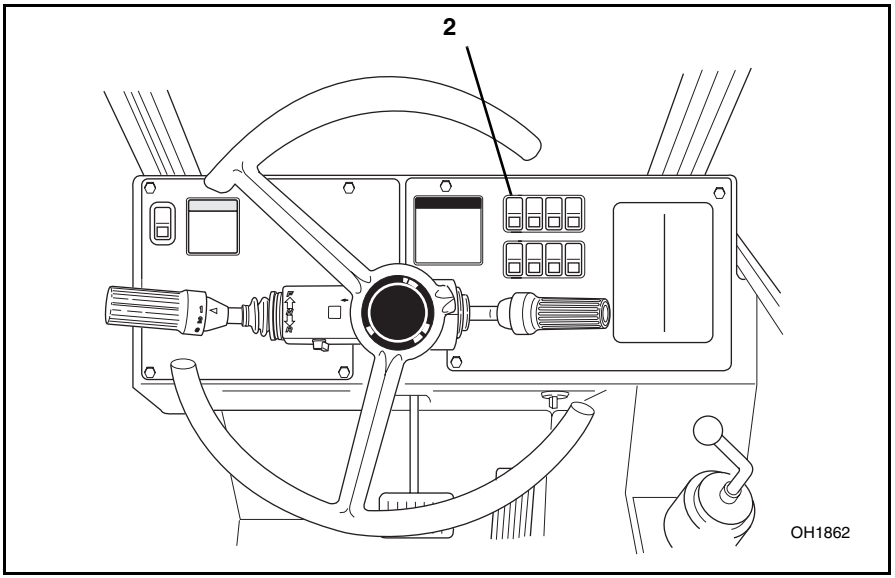
The emergency flashers switch (2) is located in the upper switch bank on the right side dash panel.

- To ACTIVATE the emergency flashers, push the bottom of the switch IN.

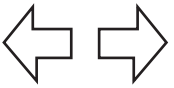
OH2611

- To DEACTIVATE the emergency flashers push the top of the switch IN.

OH2591



Turn Signals

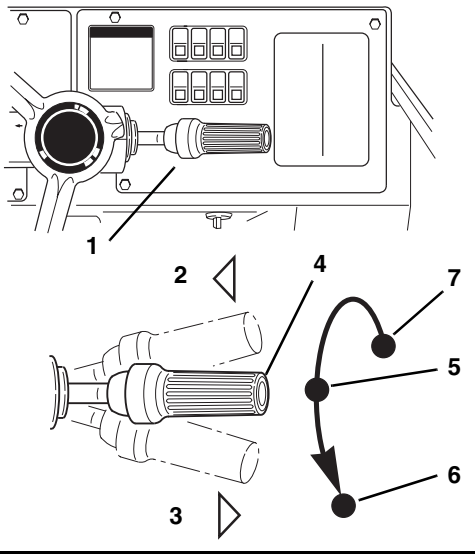


OH2510

The directional signals are ACTIVATED from the lever (1) on the right side of the steering wheel. To activate the left turn signal (2), raise the lever. To activate the right turn signal (3), lower the lever. To deactivate either directional signal, the lever must be manually returned to the center position. The lever will not cancel automatically after a turn. These lights will only operate when the ignition switch is in the RUN position.

Parking Lights, Headlights & High/Low Beam Switch

With the ignition switch in the RUN position use the turn signal switch (1) to control the high/low beam headlights, turn ON the parking lights and the headlights. Turn the twist grip end (4) of the turn signal switch counter-clockwise to the first position (5) to turn the parking lights ON. Turn the twist grip to the second position (6) to turn the headlights and parking lights ON. Turn the twist grip clockwise to the OFF position (7) to turn all the lights OFF. Pull the turn signal switch toward you to switch from low beam to high beam. When the high beam is ON the high beam indicator light will illuminate.



OH1872

Windshield Wiper Control

OS1930

This three position rocker switch (8) controls the speed of the windshield wiper. This switch (8) is located in the lower switch bank on the right side dash panel.

- To STOP the windshield wiper, push the top of the switch IN.

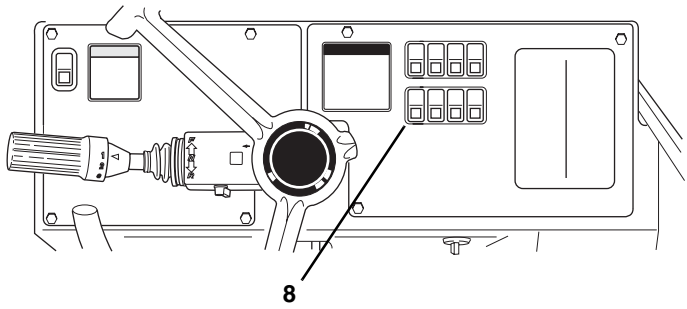
OH2591

- To OPERATE the windshield wiper at LOW speed, position the switch in the CENTER POSITION.

OH2601

- To OPERATE the windshield wiper at HIGH speed, push the bottom of the switch IN.

OH2611



OH1852

Skylight Wiper Control

OH1900

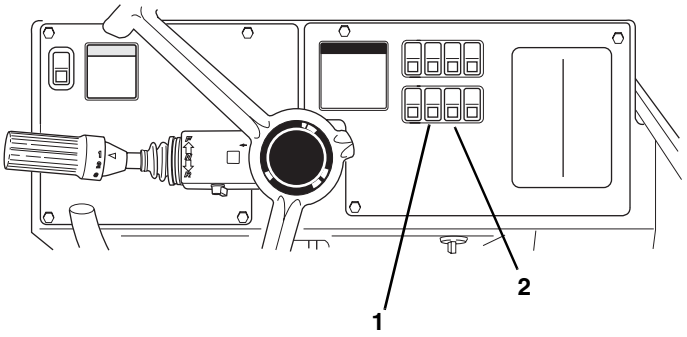
This rocker switch (1) turns the skylight wiper ON and OFF. This switch is located in the lower switch bank on the right side dash panel.

- Push the bottom of the switch IN to turn the skylight wiper ON.

OH2611

- Push the top of the switch IN to turn the skylight wiper OFF.

OH2591



OH1852

Windshield & Skylight Washer Control


OS1940


OH1910

This rocker switch (2) is spring loaded to return to the OFF position when released. This switch is located in the lower switch bank on on the right side dash panel.

- Pressing down on the bottom of the switch will dispense washer fluid to the windshield and skylight wiper at the same time. The switch must be held in place to activate the washer control.


OH2611

- Release the switch to deactivate the washer control.


OH2591

Cab Heater & Fan Control)


OS1950

The cab heater controls (1) are located directly below the switch banks on the right side dash panel. The control panel consists of: a variable speed fan control knob (2) and a temperature control knob (3).

Control of air flow to the windshield is made by opening, closing or redirecting the air vent louver on the front dash. The cab is heated by the heater unit positioned under the operators seat.

To heat the cab:

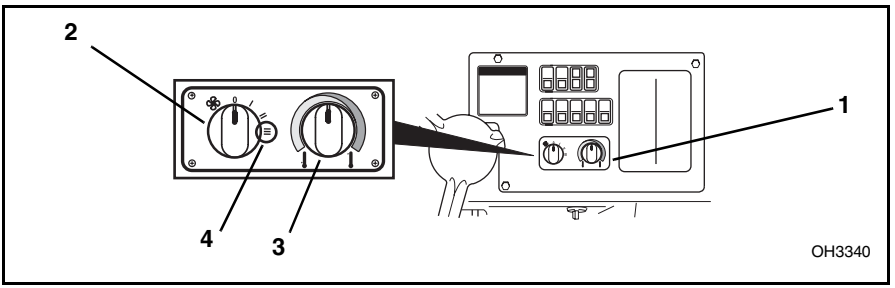

OS1950

- Turn temperature control knob (3) to far right position (RED = HOT),
- Direct desired air flow by adjusting vent louvers under the seat,
- Turn fan control (2) to “3” (4) to assure rapid warm-up.

To defrost the cab:


OA1390

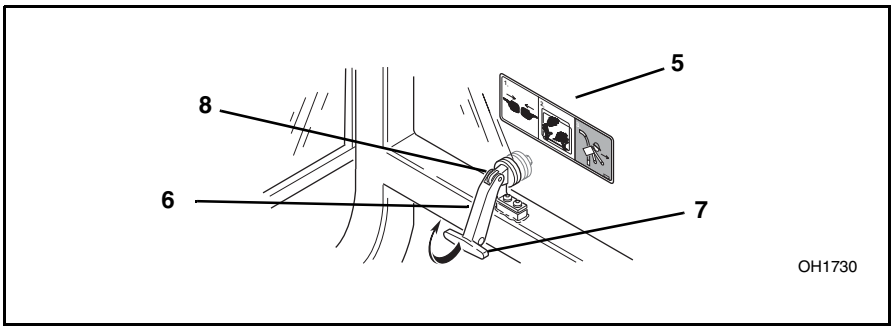
- Turn temperature control knob (3) to the far right position (RED = HOT),
- Direct desired air flow by adjusting vent louver on the front dash,
- Turn fan control (2) to “3” (4) to assure rapid defrost.



Rear Window Latch

The rear window (5) can be partially opened and secured in place with the rear window latch (6). To open the window, grab the latch handle (7) and pull up and then push the window outward. To close and secure the window, pull the latch handle forward and down.

NOTE: *In an emergency situation, the operator can exit through the rear window opening by removing the latch pin (8) on the window latch. The window is then free to swing open.*



Door Latches

(not pictured)

There are two door latches. The outside latch is a key lockable pull-to-release type. The inside latch is also a pull-to-release latch.

Door Window Latch

(not pictured)

The door window can be swung open by releasing the window from inside the cab. Swing the window all the way open and lock in place on the outside of the cab. To release the window from the open position, push up the release on the lower side of the outside hold or release using the release on the side wall of the cab below the left side window.

Pre-Operation Inspection

1. Check safety belt for damage. Check for frayed or cut seat belt webbing, damaged buckles or loose mounting brackets. Make any necessary repairs before operating the vehicle.
2. Check all four tires and rims for damage. Check for proper tire pressure, add air if required. Observe the condition of each tire looking specifically for punctures, cracks, cuts, gouges, bulges or any other damage. Check the condition of each rim for bent flanges or any other damage. Make any necessary repairs before operating the vehicle.
3. Check and add engine oil if required. This procedure is explained in greater detail on page 115.
4. Check and add transmission oil if required. This procedure is explained in greater detail on page 129.
5. Check the cooling system overflow bottle for coolant. Add coolant if required. This procedure is explained in greater detail on page 112. Remove any debris blocking the radiator cooling fins.
6. Check the hydraulic oil level sight glass and add hydraulic oil if required. This procedure is explained in greater detail on page 126.
7. Visually inspect the battery for cleanliness. Check the terminals for corrosion. Check the cable connections to ensure proper tightness.
8. Walk around the vehicle and check for oil leakage as well as damaged or missing parts. Make any necessary repairs before operating the vehicle.
9. Check ALL lighting systems (if so equipped) for proper operation.
10. Adjust rear view mirrors as required to obtain proper field of vision to the rear.
11. Test the back-up alarm and horn for proper operation.
12. Check condition of cab glass (if so equipped), looking for cracks or other damage.

Normal Starting

1. Enter the cab using the hand holds and adjust the seat for comfortable operation.
2. Adjust the mirrors to obtain the best rear view from the operator's position.

WARNING: **DO NOT** start the engine unless you are in the seat with the seat belt fastened around you. Death or serious personal injury could result if the belt is not securely fastened.

3. Fasten the seat belt.
4. Make sure the parking brake switch is ENGAGED.
5. Place the travel select lever in (N) NEUTRAL and move the neutral lock lever to NEUTRAL LOCK position.
6. Turn the ignition switch to the START position (fully clockwise) to crank the engine. Release the key when the engine starts. If the engine fails to start on the first try, wait until the engine and starter come to a complete stop before cranking the engine again.

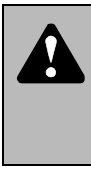
IMPORTANT! DO NOT *crank the starting motor continuously for more than 30 seconds. Stop cranking the starter and allow the starter to cool for 2 minutes before engaging the starter again.*

7. After the engine starts, run engine at partial throttle for 30 to 60 seconds before operating the vehicle. Return to idle before engaging the travel or range select lever.
8. Move the Neutral Lock Lever to the (D) DRIVE position before you start operating.
9. Disengage the parking brake switch before you start operating.

Cold Starting

The engine is equipped with a 120 volt 750 watt block heater. Block heaters are recommended when temperatures drop below 10° F (-12° C). Temperature ranges will vary when using different oil weights. Consult the engine manufacturer's manual for other variables.

FOR ENGINES EQUIPPED WITH OPTIONAL COLD STARTING AID



WARNING: This diesel engine uses a grid heating system inside the induction manifold. **DO NOT** use ether or any high energy fuels to assist starting. An explosion may cause death or serious personal injury or engine damage.

The engine is equipped with a grid heater inside the induction manifold. If the temperature drops below 40° F (4° C) the air-intake heater system will be activated when the ignition switch is turned to the RUN position. When the system is active the air-intake heater light will illuminate on the front dash. **DO NOT** turn the ignition switch to START until the air-intake heater light goes OFF.

At temperatures below -10° F (-12° C), operate the engine at moderate speeds for 5 minutes before full loads are applied.

1. Enter the cab using the hand holds and adjust the seat for comfortable operation.
2. Adjust the mirrors to obtain the best rear view from the operator's position.

WARNING: **DO NOT** start the engine unless you are in the seat with the seat belt fastened around you. Death or serious personal injury could result if the belt is not securely fastened.

3. Fasten the seat belt.
4. Make sure the parking brake switch is ENGAGED.
5. Place the travel select lever in (N) NEUTRAL and move the neutral lock lever to NEUTRAL LOCK position.

6. Turn the ignition switch to the START position to crank the starter.

IMPORTANT! DO NOT *crank the starting motor continuously for more than 30 seconds. Stop cranking the starter and allow the starter to cool for 2 minutes before engaging the starter again.*

7. As the engine starts, release the ignition switch to the RUN position. Depress the accelerator pedal enough to provide a smooth idle speed.
8. The engine oil pressure warning indicator light should go OFF within five seconds after starting. If the light remains ON, turn the ignition switch OFF immediately and check the oil level or change to a lighter weight oil. Consult the engine manufacturer's manual for alternative oils for cold weather operation.

Jump Starting

Jump starting at the battery or battery replacement is required when the battery is discharged to the point where the battery will not crank the starter.

WARNING: **NEVER** jump start the vehicle directly to the starter solenoid. Death or serious personal injury could result from the vehicle lurching forward or backward and running over the person attempting to jump start the vehicle directly to the starter.

WARNING: To avoid death or serious personal injury when jump starting with another vehicle, be certain that the two vehicles are not touching. Never jump start a frozen battery as it will explode. Keep sparks, flames and lighted smoking materials away from the battery. Lead acid batteries generate explosive gases when charging. Wear safety glasses when working near batteries.

The booster battery must be a 12 volt type. The vehicle used for jump starting must have a negative ground electrical system. To jump start the vehicle, proceed as follows:

1. Connect the positive (+) jumper cable to the positive (+) post of the discharged battery.
2. Connect the other end of the positive (+) jumper cable to the positive (+) post of the booster battery.
3. Connect one end of the negative (-) jumper cable to the negative (-) post of the booster battery.
4. Make the final cable connection to the furthest point from the battery.
5. Follow the steps in “Normal Starting” on page 53.
6. Remove the jumper cables in the reverse order of their connection (i.e. negative cable ground connection first, etc.).

Refueling

Make sure the vehicle is level to assure an accurate fuel level reading. The fuel tank is capable of holding 37 gallons (140 liters) of diesel fuel. The usable capacity of the fuel tank is 35.6 gallons (135 liters).

Fuel Types

OH0480

Use ASTM #2 diesel fuel with a minimum Cetane rating of 40. #2 diesel fuel gives the best fuel economy and performance under most operating conditions. Fuels with Cetane ratings higher than 40 may be needed in higher altitudes or extremely low ambient temperatures to prevent misfiring and excessive smoke.

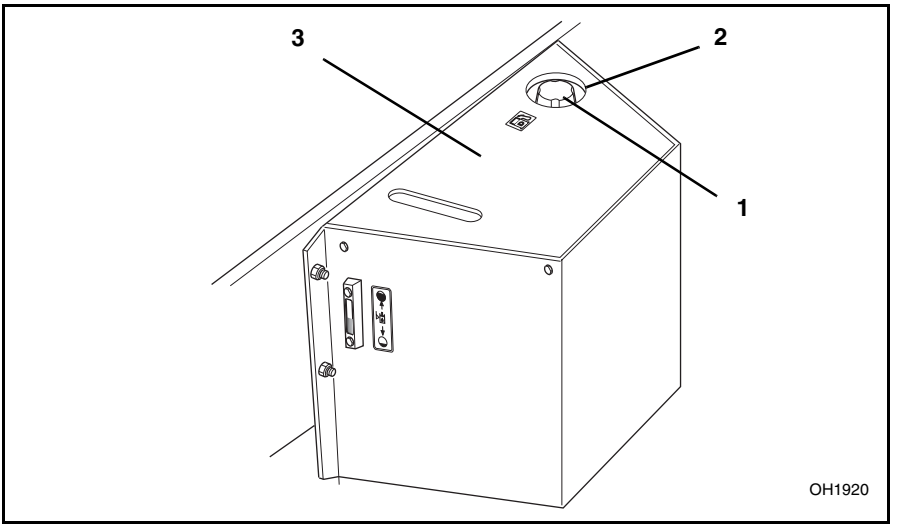
- When operating at temperatures above 32° F (0° C), use standard #2 diesel fuel.
- When operating at temperatures below 32° F (0° C), use a blend of #1 & #2 diesel fuels, most commonly known as “winterized” #2 diesel.

WARNING: Engine fuel is ***flammable*** and can cause a fire or an explosion. Keep sparks and open flames away from the vehicle and **DO NOT** use smoking materials while refueling.

Fuel Cap

Unlock the fuel cap (1) through the fuel cap access hole (2) in the cover on the hydraulic oil/diesel fuel reservoir (3).

Slowly remove the fuel cap from the fuel fill neck.



Fill fuel tank.

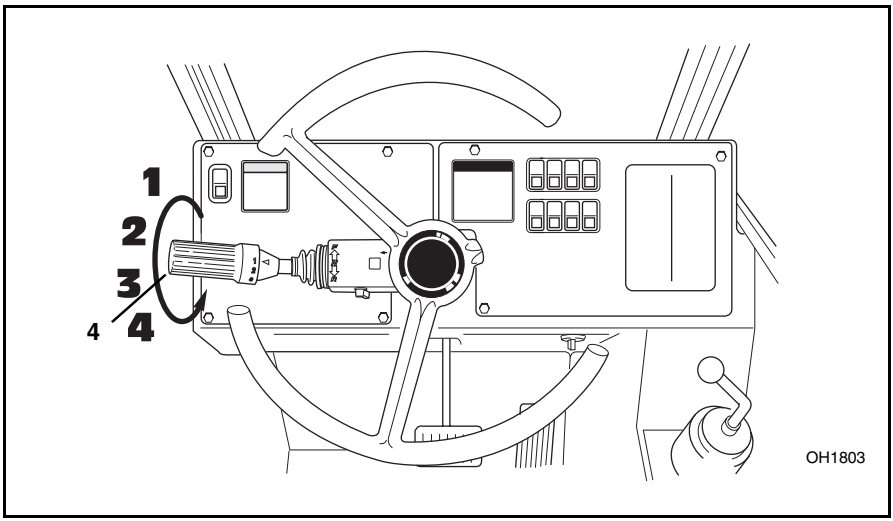
Reassemble the fuel cap onto the fill neck and turn to lock in place. Line up the locking tabs to reassemble a lock if desired.

Operating

Starting Travel

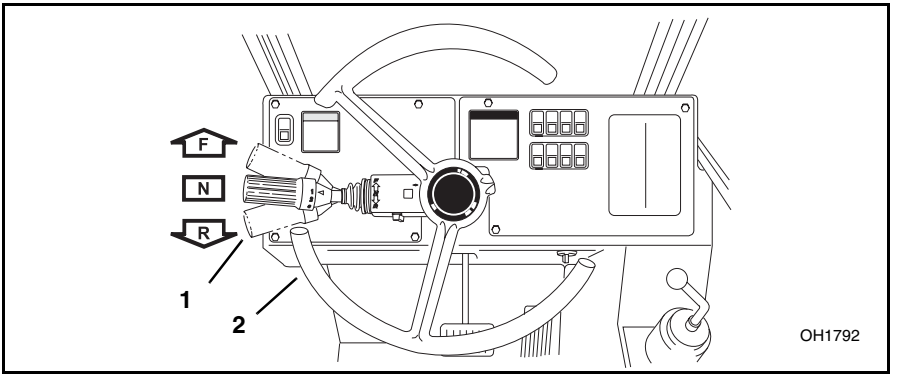
1. Enter the operator cab, fasten the seat belt, start the engine, apply the service brake pedal and disengage the parking brake switch. Place the Neutral Lock Lever in the (D) DRIVE position.
2. Rotate the twist grip (4) of the range select lever to 1st gear.
3. Move the travel select lever to (F) FORWARD to travel in a forward direction or to (R) REVERSE to travel backward.
4. Slowly remove your foot from the service brake pedal and press the accelerator pedal to start travel.

IMPORTANT! *Check for warning lights frequently during operation. Any abnormal indication should be corrected as soon as practical.*



Changing Travel Direction

1. Stop the vehicle by applying the service brakes.
2. Grasp the travel select lever (1), pull it toward the steering wheel (2), then move the lever up or down in the opposite direction; (R) REVERSE or (F) FORWARD.



Shifting Gears

1. Rotate the twist grip of the gear select lever to the next desired gear. The transmission has four forward gears and three reverse gears.
2. Use first gear for highest torque and pulling power. Use higher gears for higher ground speed. The recommendations listed in the table that follows are guidelines only. Always use good judgement when traveling with a load.

Recommended Gear/Speed for Various Load/Travel Conditions

Load Size	Surface	Gear	Speed
No Load	Smooth	4th*	0 to 20 mph (0 to 32 km/h)
	Improved	3rd	0 to 14 mph (0 to 23 km/h)
	Rough	2nd	0 to 6 mph (0 to 9,7 km/h)
Load up to 3,500 lbs (up to 1.588 kg)	Smooth	3rd	0 to 14 mph (0 to 23 km/h)
	Improved	2nd	0 to 6 mph (0 to 9,7 km/h)
	Rough	2nd	0 to 6 mph (0 to 9,7 km/h)
Load 3,500 to 6,000 lbs (1.588 to 2.721 kg)	Smooth	3rd	0 to 14 mph (0 to 23 km/h)
	Improved	2nd	0 to 6 mph (0 to 9,7 km/h)
	Rough	1st	0 to 3.5 mph (0 to 5,6 km/h)

*__NEVER__ travel in 4th gear when carrying a load.

NOTE: *Shifting to the next higher gear may be done while the vehicle is in motion.*

IMPORTANT! *When downshifting, allow the engine speed to slow down before shifting to the next lower gear.*

Stopping Travel

1. Apply the service brake pedal and downshift the vehicle to a lower gear if necessary to slow the vehicle until it comes to a complete stop.
2. Move the travel select lever to (N) NEUTRAL and engage the parking brake switch. For longer stops, place the neutral lock lever to NEUTRAL LOCK position and engage the parking brake switch.

Operation

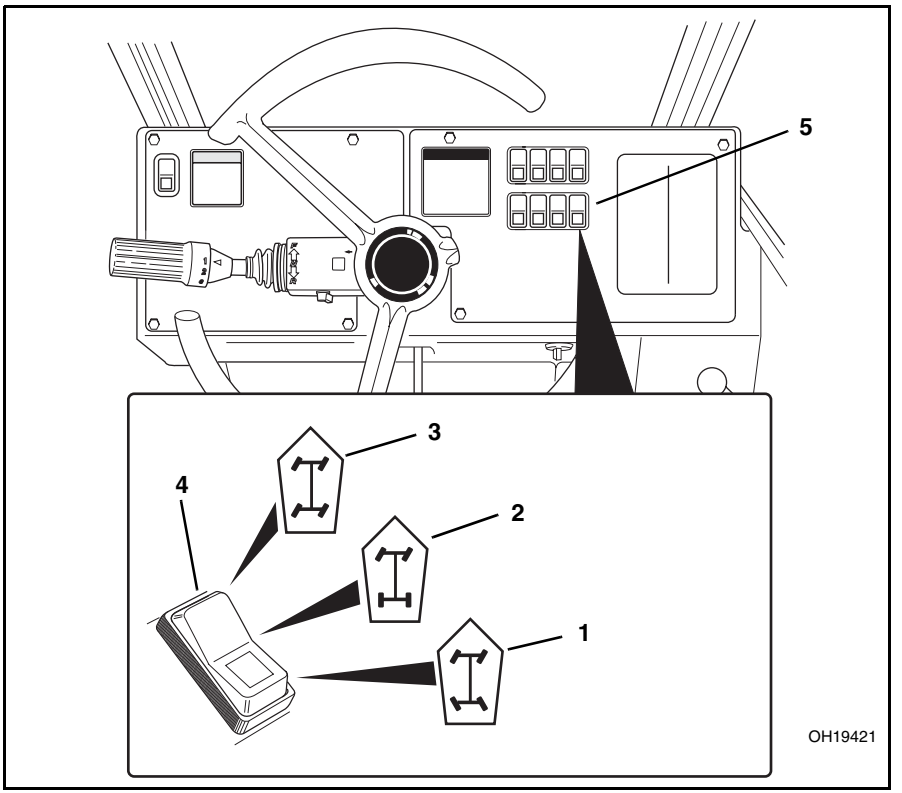
Steering Modes

***IMPORTANT! DO NOT** change steering modes unless you are at a complete stop and all four tires are in the "straight-ahead" position.*

The three steering modes are:

- Four Wheel Steering (1)
- Front Wheel Steering (2)
- Crab Steering (3)

The steering modes can be changed using a single rocker switch (4) located in the lower switch bank (5) on the right side dash panel.



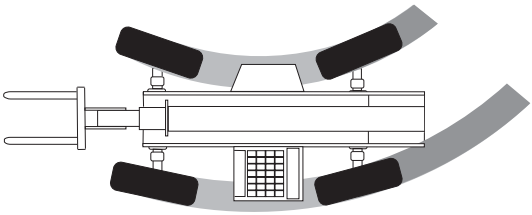
Four Wheel Steer Indexing

If the vehicle does not drive “straight,” the steering could be ”out of phase.” Perform the “Four Wheel Steer Indexing Procedure” on page 167 to synchronize the front and rear steering.

1. Four Wheel Steering

WARNING: **NEVER** use the Four Wheel Steering Mode when traveling at high speed. Rapid turning in this mode can cause tipover. Use only the Front Wheel Steering Mode at higher speeds and slow the vehicle when turning.

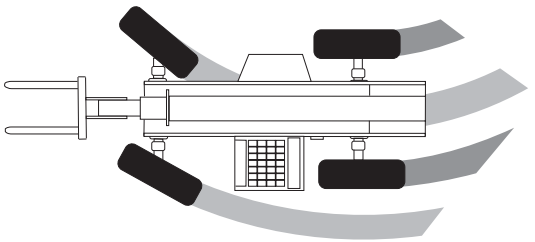
The front wheels will steer in the direction that the steering wheel is turned; the rear wheels will steer in the opposite direction. This steering mode allows an extremely short turning radius and enables the rear wheels to follow the tracking of the front wheels which can be an advantage in mud and sand conditions.



OH1660

2. Front Wheel Steering

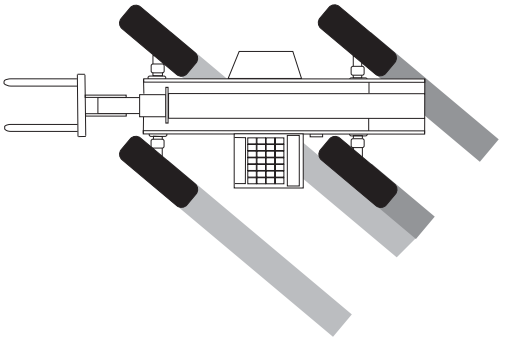
The front wheels will steer in the direction that the steering wheel is turned. The rear wheels will remain in a fixed forward position. This steering mode should be used when loading or unloading the vehicle from a trailer and for on-highway travel at higher speeds.



3. Crab Steering

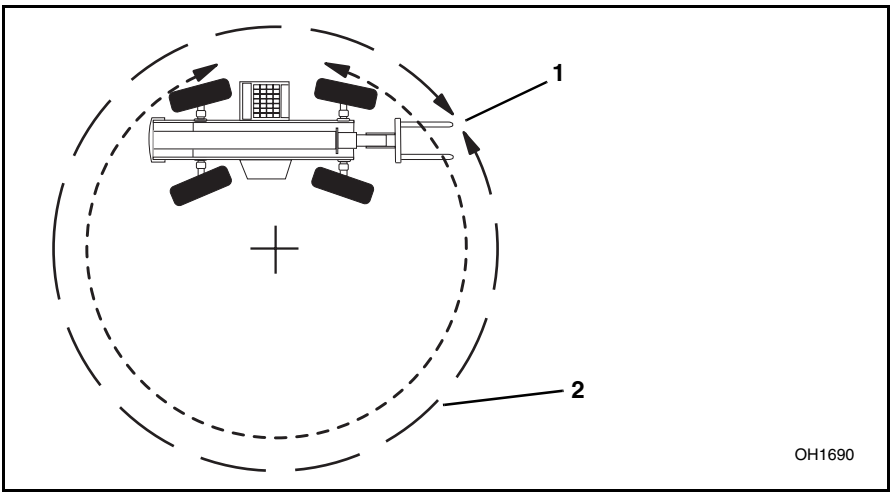
WARNING: **NEVER** use the Crab Steering Mode when traveling at high speed. Rapid turning in this mode can cause tipover. Use only the Front Wheel Steering Mode at higher speeds and slow the vehicle when turning.

All wheels will steer in the same direction that the steering wheel is turned. This steering mode allows the operator to move the vehicle “sideways” toward the landing point of a load. This is especially useful on a congested worksite in order to line up at the exact spot in front of the loading location.



4. Maximum Fork Sweep

CAUTION: **Allow for adequate clearance between the attachment and other objects when turning.**
The attachment (1) extends beyond the end of the vehicle. The operator must be aware of the maximum sweep (2) of the attachment when turning in order to avoid hitting personnel and other objects in the area.



Leveling Frame

When placing a load while on a slope, use the frame sway control to keep the vehicle level. The operator should observe the frame level indicator to assure that the vehicle is level at all times.

DANGER: Use of the frame sway control with the boom raised above horizontal can cause tipover resulting in death or serious personal injury. Always use the frame sway control to level the vehicle before raising the boom above horizontal. If the vehicle cannot be leveled using the frame sway control, reposition the vehicle.

Operation

Quick Attach

This vehicle is equipped with a quick attach system for easy attachment changing.

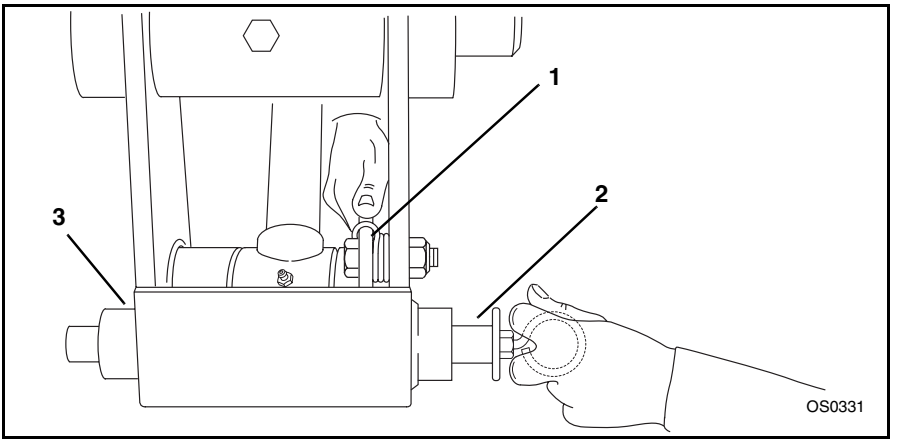
Attachment Removal

Be sure you are performing this procedure on level ground.

1. Place the travel select lever in (N) NEUTRAL, come to a complete stop, move the neutral lock lever to NEUTRAL LOCK position and engage the parking brake switch.
2. Extend the boom approximately 10 feet (3 meters) and tilt the carriage backward.
3. Exit the vehicle using the hand holds.

NOTE: *If you are removing a standard carriage with forks, spread the forks apart on the carriage shaft. This will provide the carriage adequate support to stand alone.*

4. Raise the quick attach pin lock lever (1) and pull out the pin (2) at the bottom of the quick attach link (3).



5. Return to the operators compartment, fasten the seat belt and lower the attachment to the ground in a level position. Tilt the attachment forward. This will rotate the quick attach link back away from the attachment.
6. Lower and then retract the boom until the attachment pivot pins have disconnected from the attachment.

Attachment Reconnect

Be sure you are performing this procedure on level ground.

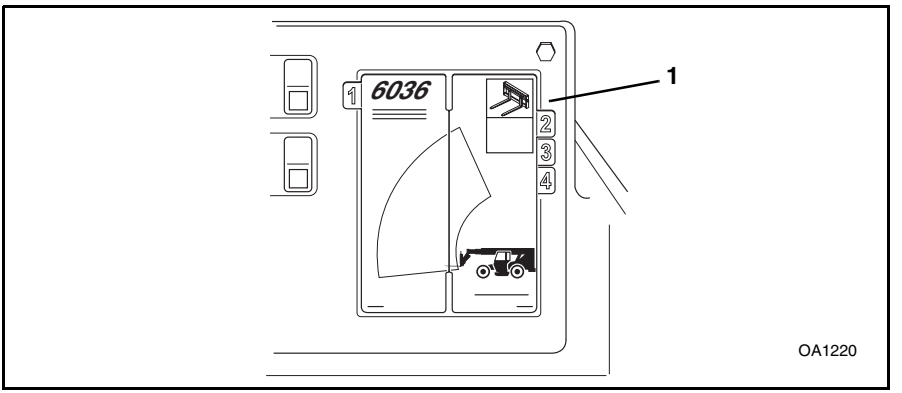
1. Position the vehicle directly behind the attachment to be mounted.
2. Tilt the quick attach backward.
3. Extend the boom approximately 10 feet (3 meters) and drive the vehicle forward until the attachment pivot pins are below and between the two hooks on the attachment.
4. Raise the boom until the attachment pivot pins have seated fully in the hooks of the attachment.
5. Tilt the attachment up slightly. The quick attach link should be tight against the rear of the attachment and the holes in the link and the attachment should be aligned.
6. Place the travel select lever in (N) NEUTRAL, move the neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and exit the vehicle using the hand holds.
7. Lift the quick attach lever. Insert the quick attach pin completely through the attachment and the quick attach link. Be sure that the quick attach lock lever has lowered and seated itself into the groove in the quick attach pin.

WARNING: **DO NOT** operate this vehicle unless you are in the seat with the seat belt fastened around you. Death or serious personal injury could result if the belt is not securely fastened.

8. Return to the cab, fasten the seat belt and resume operation.

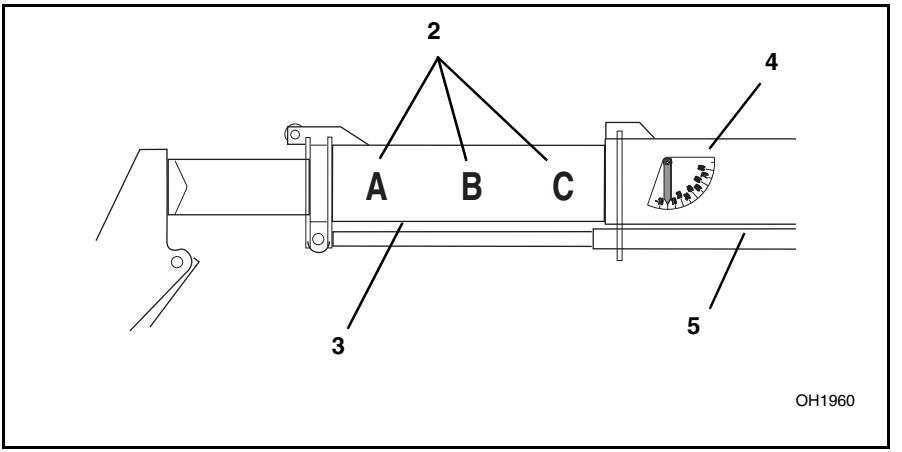
Using The Capacity Chart

The individual capacity charts are located inside a booklet (1) on the right side of the front dash. Capacity charts are provided to assist the operator in determining how far in front, how high and at what angle a specific load can be safely handled with this vehicle.



The vehicle is equipped with two indicators that will assist the operator in determining how to accurately use the capacity chart. These indicators are:

- Boom Extend Letters (2) on the intermediate boom (3)
- Boom Angle Indicator (4) on the outer boom (5)



As the boom is extended, boom extend letters will appear on the left side of the boom visible to the operator. The letters are graduated in four foot increments. These letters indicate the point of boom extension and correspond to the capacity chart. For example, when the letter “A” first appears, the boom is at the point of boom extension corresponding to the arc of line “A” throughout the entire capacity charts (page 71) through (page 75).

The boom angle indicator, located on the left side of the outer boom, indicates the angle of the boom and also corresponds with the angles indicated on the capacity chart.

To accurately use the capacity chart, the operator must first determine three important things:

1. Weight of the load being lifted.
2. Height of the structure where the load is to be placed.
3. Distance where the load will ultimately be placed in front of the front tires.

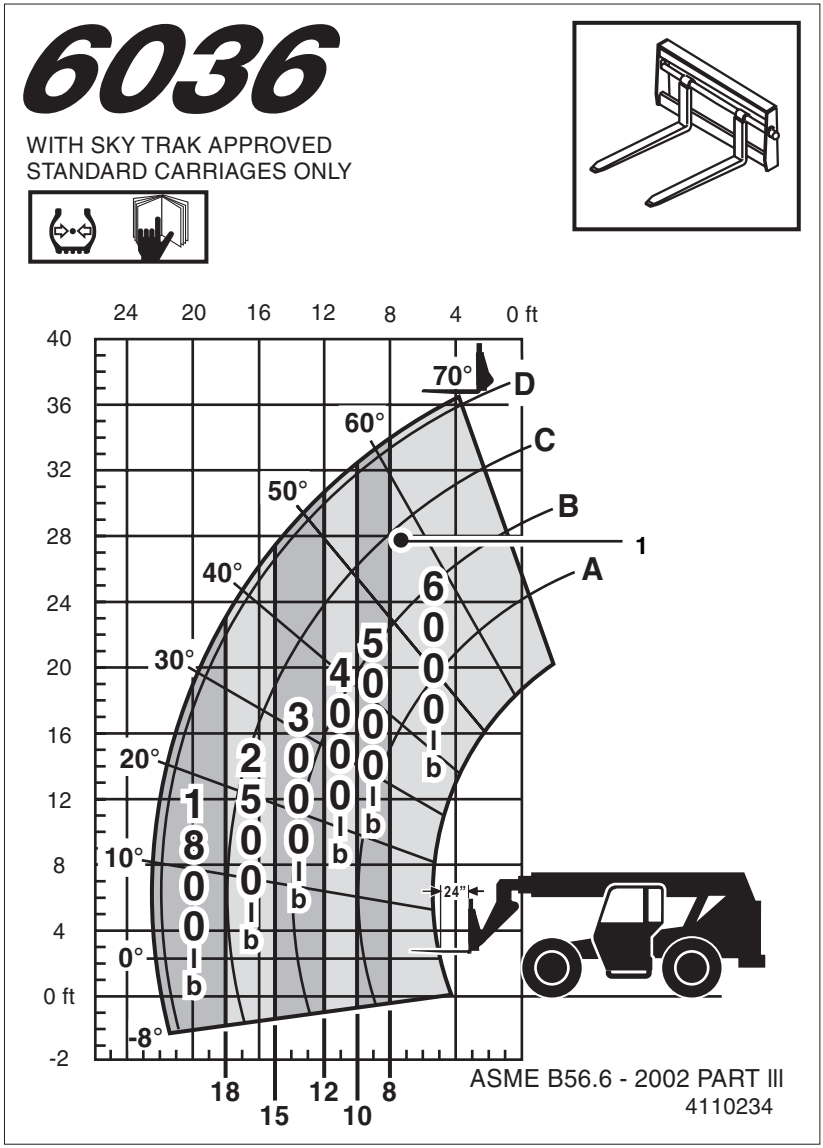
WARNING: **DO NOT** exceed rated capacities. Any attempt to lift or carry loads in excess of those shown on the capacity chart in the operator's compartment may cause vehicle tipover, loss of load or structural damage which could result in death or serious injury.

Reading The Capacity Chart

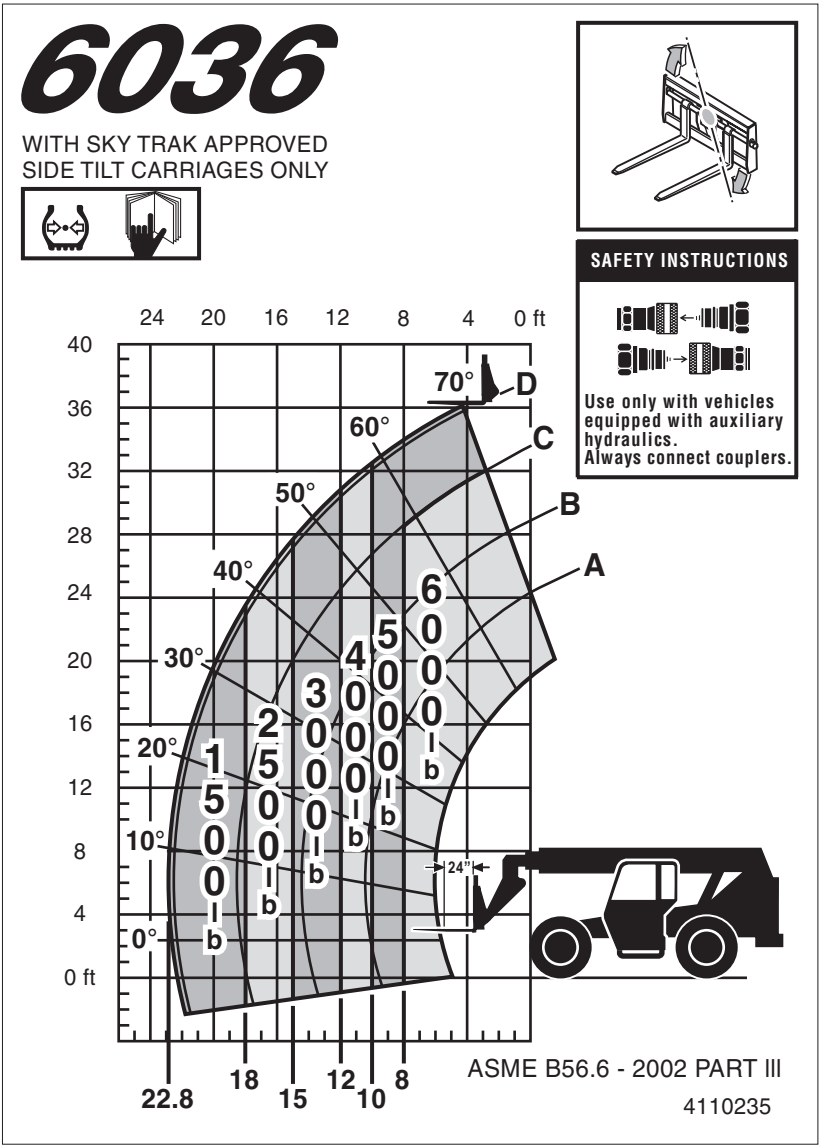
Example:

1. The operator has placed the load onto the forks, fully retracted the boom, positioned the vehicle perpendicular to the structure and leveled the vehicle. Refer to the load placement example (1).
2. The operator then determines that:
   - The load weight is 6,000 pounds (2.721 kg).
   - The height of the structure the load is to be placed upon is 28 feet (8,5 meters) from ground level.
   - The distance where the load will ultimately be placed in front of the vehicle is 8 feet (2,4 meters) from the front of the front tires.
3. After applying the height of the structure and the distance of load placement away from the vehicle to the capacity chart, the operator knows that it will be safe to place the load if the boom extend letter “B” has appeared and the boom angle indicator reading does not go below approximately 55°. This condition is however, a maximum limit for this weight, height and distance away from the vehicle. The operator should move the vehicle closer to the structure to assure that the vehicle will not exceed the maximum limits for placing the load.

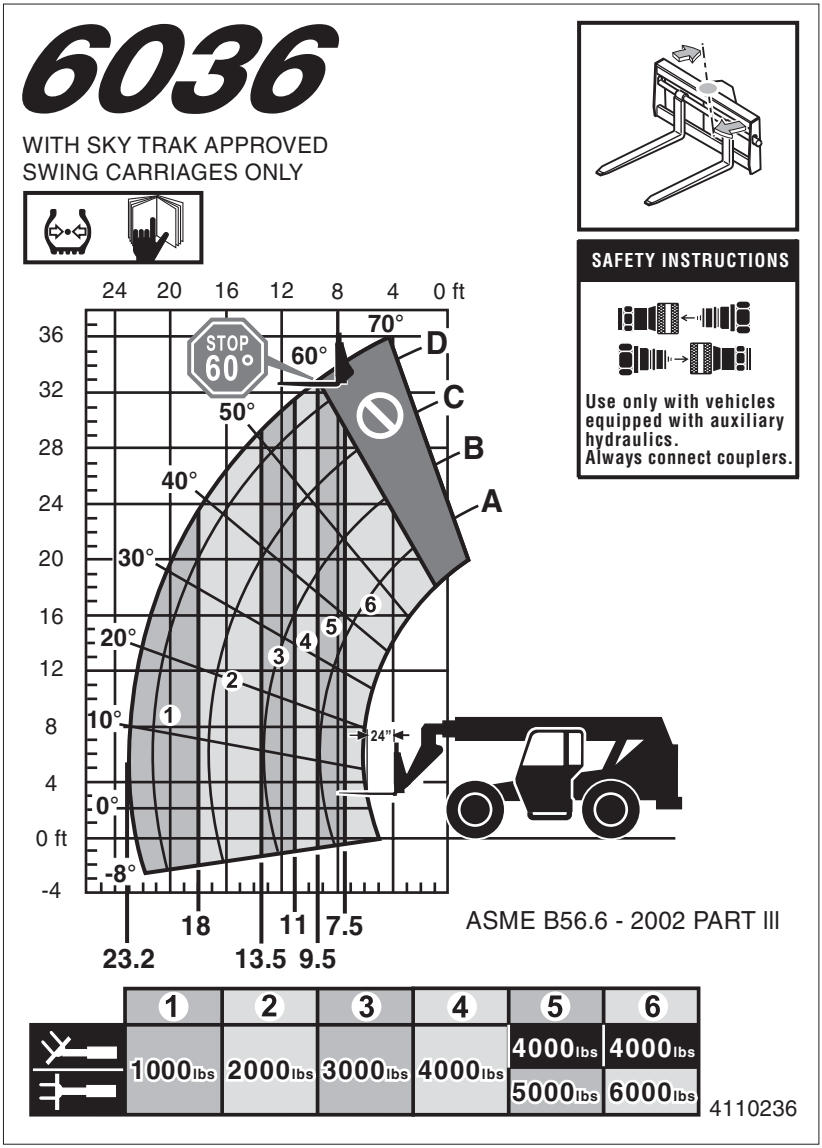
Standard Carriage Capacity Chart



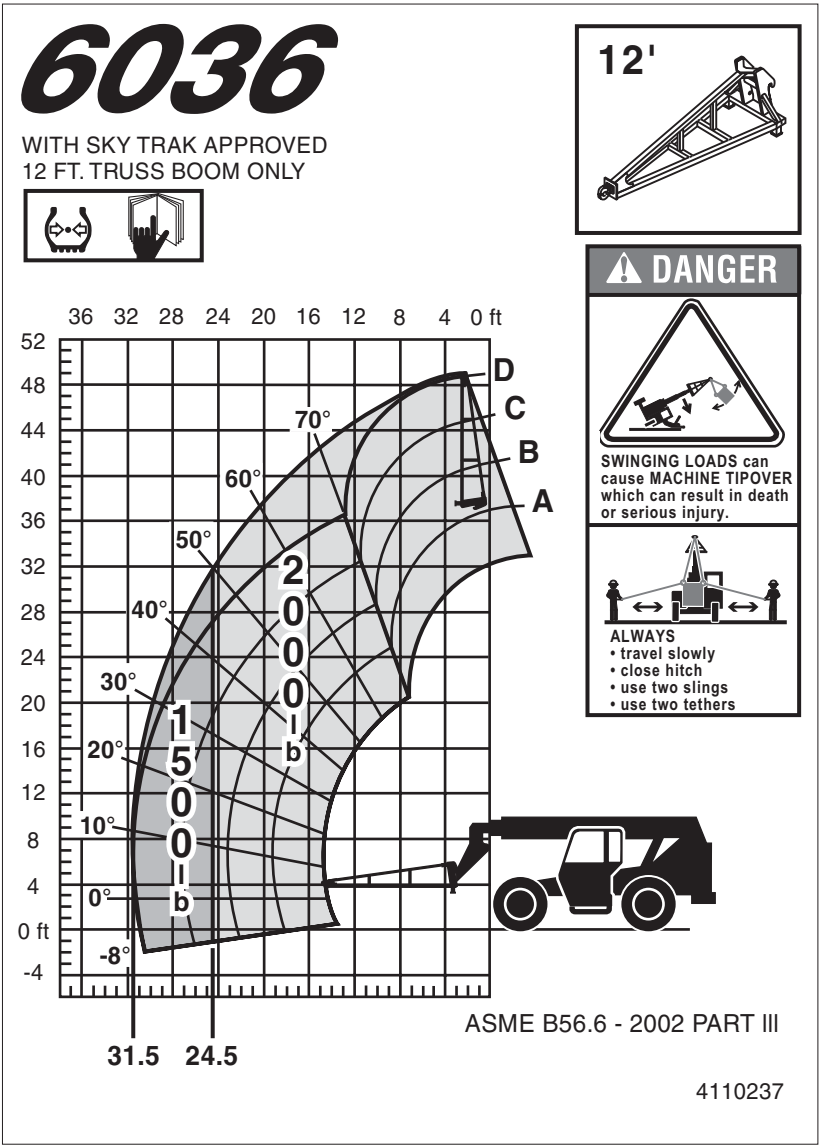
Side Tilt Carriage Capacity Chart



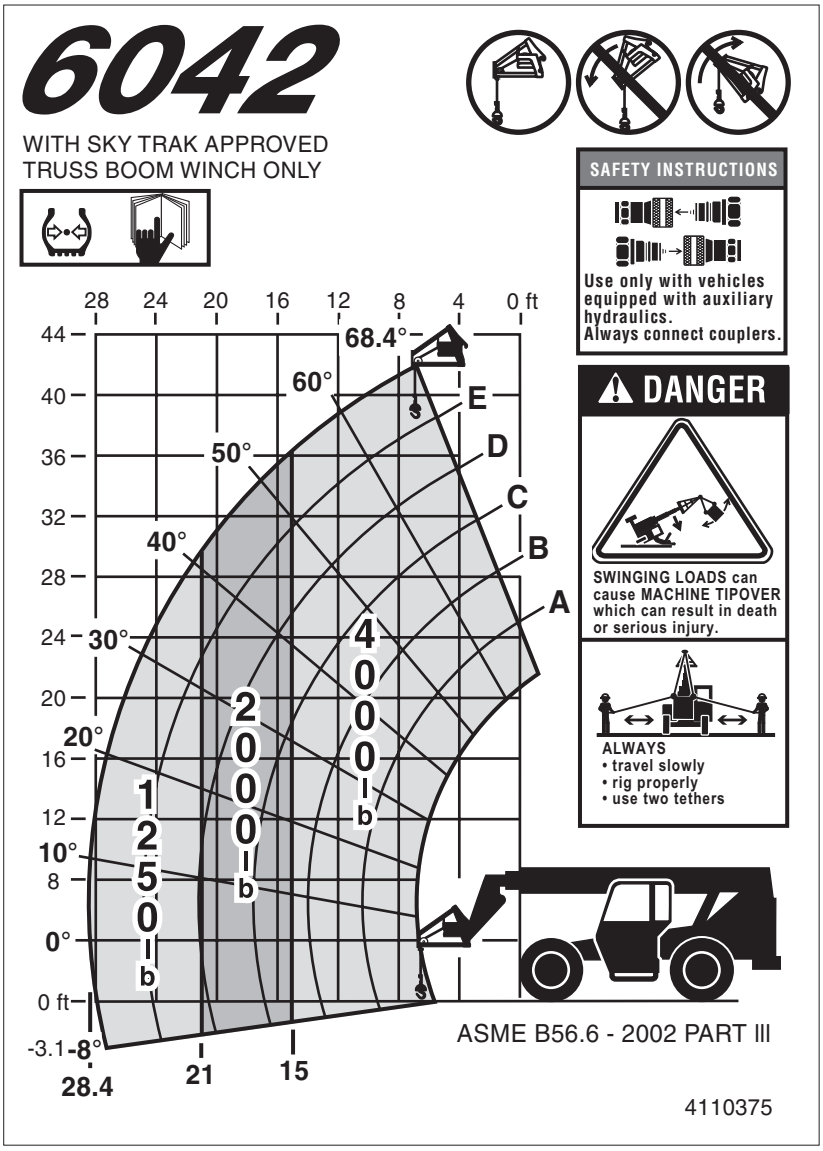
Swing Carriage Capacity Chart



12 Foot Truss Boom Capacity Chart



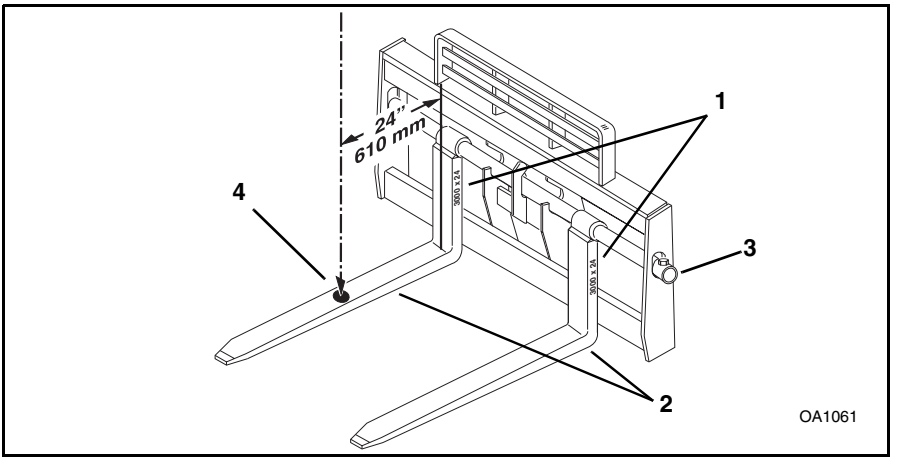
3 Foot Truss Boom w/Winch Capacity Chart



Fork Ratings

All approved forks for this vehicle are marked with a maximum load capacity rating. This rating (1) is stamped on the left edge of the fork (2) just below the fork pivot shaft (3). The rating is listed in U.S. pounds and based upon a 24" (610 mm) load center. This rating specifies the maximum load capacity that the individual fork can safely carry at a maximum load center (4) of 24" (610 mm).

Since forks are always used in multiples, the total rating of any combination of forks will be the sum of their rated capacity. Other than block forks, all forks should be used in matched pairs. Block forks should be used in matched sets.



WARNING: **DO NOT** exceed the total rated capacity of the specific pair of forks being used. Forks can break causing loss of load and possible death or serious personal injury to the operator or personnel in the area. If the total rated capacity of the forks exceeds the capacity of the vehicle, the vehicle capacity should not be exceeded.

The maximum load capacity for this vehicle is 6,000 pounds (2.721 Kg). The matched pair or set of forks used on this vehicle should have total load ratings which equal or exceed 6,000 pounds (2.721 Kg). When the load rating of the vehicle differs from the load capacity of the forks, the lower value becomes the overall load capacity.

How To Pick, Carry & Place A Load

To pick a load, tilt the carriage forward so the forks hang freely on the fork shaft. Move the forks inward or outward on the fork shaft so that they are aligned with the openings in the pallet. Tilt the carriage back and extend the boom slowly so the forks slide into the openings in the pallet. Raise the boom so that the load is lifted.

To carry a load, position the boom so that the load is as low as possible and the travel area is visible to the operator.

Use the capacity chart to determine safe boom extension range for the applicable load. To place a load, align the forks at the level the load is to be placed and then extend the boom slowly until the load is just above the area where it is to be placed. Lower the boom until the pallet rests in position and the forks are free to retract. Retract the forks slowly from under the load.

Elevating Personnel

This vehicle is designed to lift and transport materials and should not be used to elevate personnel except as explained in this section. Only equipment designed and approved for elevating personnel should be used.

If the vehicle must be used to elevate personnel, use only a compliant work platform. Refer to “Defining Platforms For Elevating Personnel” on page 77 for requirements. When using a work platform, the following precautions must be taken:

WARNING: Use only a compliant work platform to lift or lower personnel. **Never** drive the vehicle with the work platform in a raised position or with personnel on board, even for a short distance.

Defining Platforms For Elevating Personnel

The requirements for platforms shall include the following:

1. The platform floor must have a slip resistant surface not more than 8" (200 mm) above the normal load supporting surface of the forks.
2. The platform floor dimensions shall not exceed:
   a. Two times the load center distance as listed on the load chart that is attached to the vehicle. This floor dimension is measured parallel to the longitudinal center plane of the vehicle.

b. Width of the platform shall not be wider than the width of the vehicle, measured across the load bearing tires plus 10" (250 mm) on each side.

c. Minimum space requirements for each person on the platform shall not be less than 18" (450 mm) in either direction.

3. The platform shall have a 4" (100 mm) minimum high toe plate around the perimeter of the platform. The toe plate may be omitted at the access opening.

4. Protection must be provided for the personnel on the work platform from any pinch points or moving parts while in their normal working position on the platform.

5. Information prominently indicated on the work platform shall include:

   a. Maximum work load including personnel and equipment.

   b. Weight of the empty platform.

6. Provide a means to securely mount and attach the platform so it can:

   a. Only be centered laterally on the vehicle and retained against the vertical face of the forks, carriage or the lifting mechanism.

   b. Prevent the platform from inadvertent pivoting.

7. The platform must have a restraining means such as a guardrail or a means of securing personnel such as a body belt or lanyard for each occupant of the platform.

8. The guardrail or similar structure shall have a nominal height to the platform floor of 42" (1066 mm) around the perimeter of the platform and include a midrail. The guardrail openings may be used to provide alternate access openings provided the opening can be easily made by hinging or removing sections, but must be easily put back into original position when alternate openings are no longer required.

9. The guardrail shall be capable of withstanding a concentrated horizontal force of 200 lb (890 N) applied at the point of least resistance without permanent deformation.

10. A body belt and lanyard is to have an attaching point for freedom of movement, and its length is to limit free fall to 5 feet (1500 mm) measured from the point of attachment to the operator. The complete system shall be capable of withstanding three consecutive drop tests to simulate a 250 lb (113 kg) person falling 6 feet (1800 mm) without allowing the test weight to fall free to the ground. A deceleration device may be included.
11. Lanyards, when provided, shall be arranged so as not to cause a tripping hazard.
12. Body belts, when provided, should have a width of at least 1.75 in. (44 mm).
13. Structural safety factor - all load supporting structural elements of the work platform shall have a structural safety factor of not less than 2 to 1 based on the minimum yield strength of materials used.

Capacity Limitations

The combined mass (weight in pounds) of the platform, load and personnel shall not exceed one-third (33%) of the capacity of the related load center position indicated on the capacity chart. Refer to “Using The Capacity Chart” on page 68.

Preparation and Set-up

WARNING: **Never** allow anyone to alter or modify any part of the work platform. Any modification to the platform which could result in serious personal injury to anyone on the platform.

1. **DO NOT** alter or modify the work platform in any manner.
2. Make sure that the work platform is securely attached to the quick attach or forks. Follow the platform manufacturer’s instructions.
3. Make sure the platform, carriage and forks are secured to prevent them from pivoting from side to side.
4. On side tilt or swing carriages, the carriage must be centered and/or leveled horizontally and vertically. The hydraulic system quick disconnects must also be disconnected and plugged and the carriage securely fastened to prevent any tilting or side to side swinging motion.
5. Ensure the vehicle has a firm footing and is level.

6. Be sure the vehicle is in a level position (side to side) before any operation is begun. Use the frame sway to level the vehicle. If the vehicle cannot be leveled, reposition the vehicle.
7. Place the travel select lever in the (N) NEUTRAL position and move the neutral lock lever to the NEUTRAL LOCK position.
8. Engage the parking brake switch. Blocking the wheels is also recommended.
9. Level the platform in both the side-to-side and front-to-back directions before use.
10. Before lifting or lowering personnel, be sure the vehicle lifting mechanism operates smoothly through the entire lifting and lowering of the platform and maintains its self leveling function. The vehicle must operate smoothly both empty and loaded.
11. Be sure any lift limiting devices and latches are functioning properly.
12. Any body belt, lanyard or deceleration devices which have sustained any deformation or damage must be replaced before using the work platform again.
13. Before elevating personnel, the area around and under the work platform should be marked to warn anyone on the ground that overhead work is being done.
14. Protection must be provided for the personnel on the work platform from any pinch points or moving parts while in their normal working position on the platform.
15. Provide any overhead protection device as required by worksite conditions or if requested by the user of the platform.

Elevating Personnel

WARNING: **Never** operate the Attachment Tilt function to tilt the platform forward or rearward when elevating with personnel aboard. Death or serious personal injury could result.

DANGER: **Never** operate this or any equipment in an area in which overhead or underground cables or power sources exist without first requesting that the appropriate power company or utility company de-energize the lines or take other suitable precautions.

1. Make sure there are no overhead obstructions or electrical wires above the platform before lifting.
2. A trained operator must operate the controls from the operators compartment and must remain with the vehicle at all times. Using extreme caution, lift and lower personnel smoothly and only at their request. The operator should move the platform up and down only in response to instruction from personnel on the platform. If the operator must move the platform, the operator must alert the personnel aboard the platform before moving.
3. Personnel aboard the work platform must maintain a firm footing at all times.
4. Be certain the personnel and related equipment on the platform do not exceed the available space of the platform.
5. The platform shall be lowered to the ground level for personnel to enter or exit the platform through the appropriate platform access opening. Personnel must not climb on any part of the vehicle or over the platform guardrails in an attempt to enter or exit the platform.
6. Always position the platform in the travel position (approximately one foot above ground level) before moving the vehicle.

NOTE: *Make sure that required restraining equipment such as railings, chains, cable, body belts with lanyards, etc. are in place and properly used. Never use railings, planks, ladders, etc. on the platform for the purpose of achieving additional reach or height.*

Using Other Attachments

Numerous attachments, marketed by JLG are available for this vehicle. The capacity charts attached to this vehicles dash are to be used with JLG approved attachments only. Hydraulically powered attachments must only be used on vehicles equipped with auxiliary hydraulics.

IMPORTANT! *This vehicle is intended for the function of lifting only. This vehicle is not designed to PULL, TOW or DRAG other objects.*

JLG makes no representations or warranties, expressed or implied, as to the design, manufacture or fitness for use with this vehicle of any third party source attachment. This vehicle is not intended to be used and should not be used with an attachment that would alter the center of gravity or stability of this vehicle. JLG assumes no liability for any third party attachment that would alter the center of gravity or stability.

IMPORTANT! DO NOT *use unapproved attachments.*

Following is a list of some of the attachments available through JLG for this vehicle model:

- 48" Standard Carriage
- 60" Standard Carriage
- 72" Standard Carriage
- 1-1/4 Cubic Yard Bucket

The standard capacity chart on page 71 is applicable for the above listed attachments.

The attachments listed below are supplied with their own individual capacity chart:

- 48, 60 & 72" Side Tilt Carriage (page 72).
- 52 & 72" Swing Carriage (page 73).
- 12 Foot Truss Boom (page 74).
- 3 Foot Truss Boom w/winch (page 75)

Hydraulically actuated attachments also have a maximum hydraulic pressure rating. Ensure that the maximum rated hydraulic pressure of the attachment is equal to or slightly greater than 3,000 psi (206,8 bar), which is the maximum pressure of the vehicle's auxiliary hydraulics at the quick disconnect couplers.

Shut-Off

1. Bring the vehicle to a complete stop using the service brakes.
2. Park the vehicle on level ground.

WARNING: To prevent death or serious personal injury, be certain to lower the boom, engage the parking brake switch, and shut off the engine prior to exiting the vehicle.

3. Place the travel select lever in (N) NEUTRAL, move the neutral lock lever to NEUTRAL LOCK position and engage the parking brake switch.
4. Lower the boom and ground the carriage.
5. Turn the ignition key to the OFF position and remove the key.

Towing A Disabled Vehicle

Towing a disabled vehicle should only be attempted after exhausting all other options. Every effort should be made to repair the vehicle and move it under its own power. Towing the vehicle improperly can result in damage to the vehicle drivetrain.

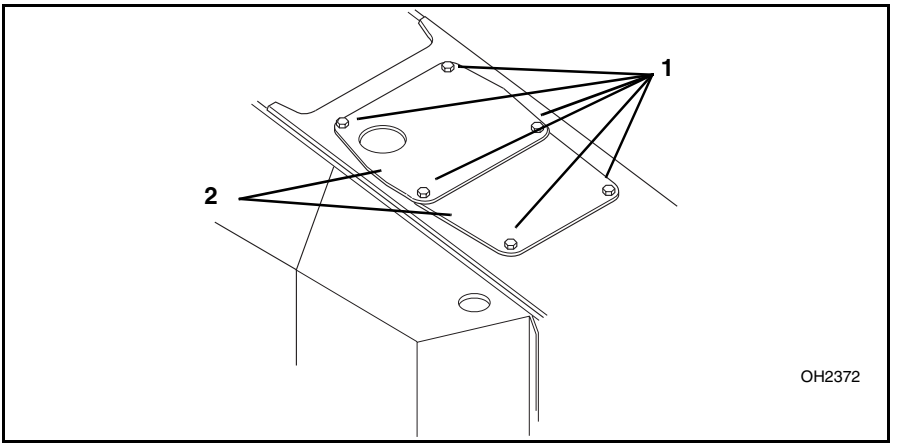
IMPORTANT! *In the event the vehicle is disabled and cannot be moved under engine power, the situation must be properly evaluated and dealt with on an individual basis. Contact your local* JLG *Distributor or the* JLG *Service Department at (877) 554-5438 or (717) 485-6657 for specific instructions for your particular situation.*

If it is necessary to tow the vehicle a short distance to avoid a potentially hazardous situation such as being in an unsafe area on the worksite or on a roadway, prepare the vehicle for towing as follows:

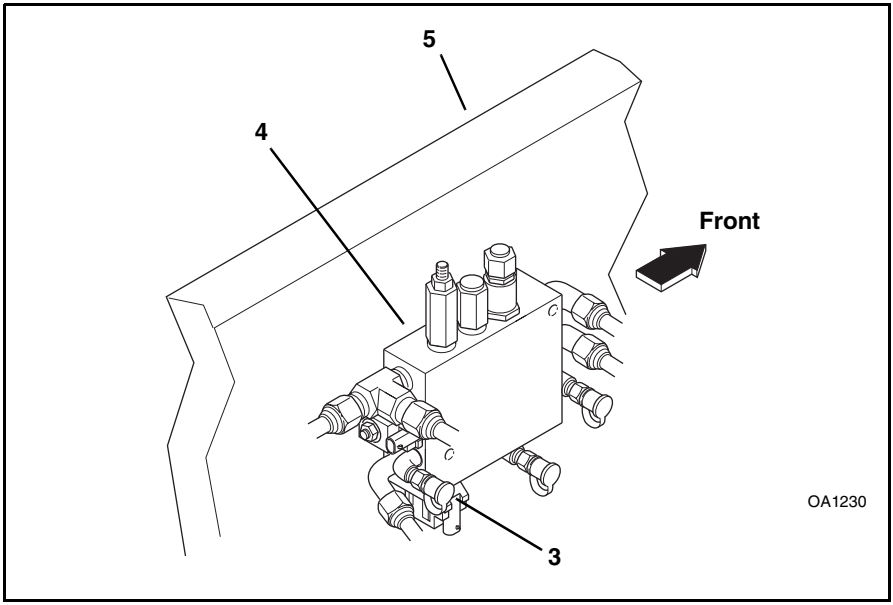
1. Remove the load from the vehicle.

> WARNING: **BLOCK ALL FOUR WHEELS.** Failure to do so could result in death or serious injury from vehicle roll-away.

2. **Block all four wheels** to help prevent the vehicle from moving after the parking brake is disabled.
3. Remove the six hex nuts, lockwashers and flat washers (1) securing the transmission covers (2) to the frame. Remove the covers.



4. Position the towing vehicle in place. Attach any chains needed to secure the disabled vehicle.
5. Attach a remote portable hydraulic pressurizing unit to the parking brake gauge port (3) on the secondary function manifold (4) mounted on the inside wall of the frame (5) on the left side next to the transmission.



6. Turn the key switch to the ON position (with the engine not running), release the park brake (park brake switch OFF), and have an operator seated in the seat.

	CAUTION: DO NOT exceed 575 psi (40 bar) when pressurizing the park brake. Applying too much pressure may damage the brake seals.

7. Pressurize the park brake with the pressurizing unit. Close the pump needle valve on the pressurizing unit.

8. Clear the area of all unnecessary personnel.
9. Carefully remove the wheel blocks from each of the four tires. Tow the vehicle to a secure location.

IMPORTANT! *Without engine power, service braking power is reduced. Only the rear service brakes will function when the brake pedal is depressed. Steering is not possible and the vehicle will only travel in the direction that the wheels were last turned.* ***Tow or push the vehicle at a very slow speed!***

Emergency Boom Lowering

This section discusses emergency boom lowering procedures:

Part I *In case of loss of engine power or hydraulic pump failure.*

Part II *In case of hydraulic line failure.*

Part I

Loss of Engine Power or Hydraulic Pump Failure

IMPORTANT! *In the event of total loss of engine power or hydraulic pump failure with an elevated load, the situation must be properly evaluated and dealt with on an individual basis. Contact your local* JLG *Distributor or the* JLG *Service Department at (877) 554-5438 or (717) 485-5161 for specific instructions for your particular situation.*

In any event, the vehicle should be secured until the situation has been properly evaluated. Secure the vehicle by following the procedures below:

1. Clear the area around the vehicle of all personnel.
2. Place the travel select lever in (N) NEUTRAL, move the neutral lock lever to NEUTRAL LOCK position and engage the parking brake switch.
3. Block all four wheels.
4. Section off a large area under the boom with string or tape to restrict any personnel from entering this potentially dangerous area.

WARNING: **DO NOT** get under a raised boom unless the boom is blocked up. Always block the boom before doing any servicing that requires the boom to be up.

5. Temporarily block up or support the outer boom so it cannot be lowered.
6. If the load is in a position where it can be removed safely, completely remove the load from the carriage and/or attachment, otherwise leave the load in place.
7. Place an accident prevention tag on both the ignition switch and steering wheel. Refer to “Accident Prevention Tags” on page 5. Actual accident prevention tags can be found as the last page of this manual. If you do not have a safety tag, tape over the ignition switch.

Emergency Operations

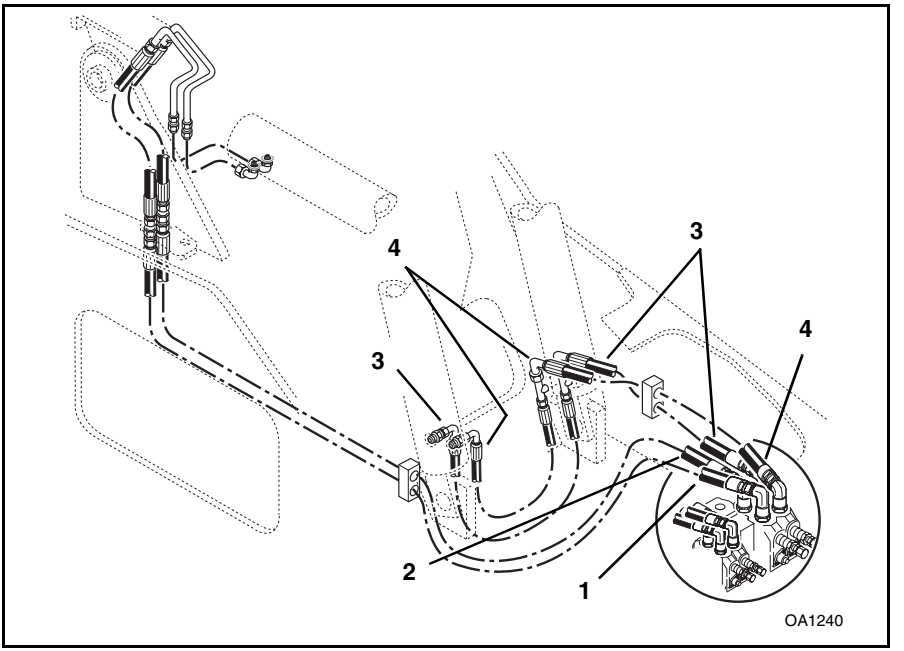
Part II - Hydraulic Line Failure

In case of hydraulic line failure, there are step-by-step procedures available to assist you in safely retracting and then lowering the boom. Read Part II from start to finish before performing any of these procedures so you fully understand the process and the danger involved. If you are unsure about any part of these procedures contact your local JLG Distributor or the JLG Service Department.

Every attempt should be made to repair the hydraulic line failure and to retract and then lower the boom in its normal fashion. We realize this is not always possible. Step-by-step procedures are also available when the boom must be retracted and lowered immediately and replacement parts are not available. Only resort to Steps 3 & 4 when absolutely necessary.

IMPORTANT! *Be aware that the boom must first be retracted and then lowered to avoid vehicle tipover.*

In any case of hydraulic line failure, it is critical to correctly identify which hydraulic line has failed. Identify the hydraulic line that has failed: Boom Retract line (1), Boom Extend line (2), Boom Lift line (3) and Boom Lower line (4). Use the table on page 89 to determine which Step to follow to retract and lower the boom.



	NORMAL STEPS		EMERGENCY STEPS
HYDRAULIC LINE THAT FAILED	FOLLOW THIS STEP IF PARTS ARE AVAILABLE	FOLLOW THIS STEP IF PARTS ARE NOT AVAILABLE	 OP0330 FOLLOW THIS STEP AS A LAST RESORT
BOOM **LIFT** LINES (LIFT CYLINDERS TO CONTROL VALVE)	STEP 1	STEP 2	
BOOM **LOWER** LINES (LIFT CYLINDERS TO CONTROL VALVE)	STEP 1		STEP 3
BOOM **EXTEND** LINE	STEP 1	STEP 2	
BOOM **RETRACT** LINE	STEP 1		STEP 4

STEP 1

1. Clear the area of any unnecessary personnel.
2. Place the travel select lever in (N) NEUTRAL, move the neutral lock lever to NEUTRAL LOCK position and engage the parking brake switch.
3. Block all four wheels.

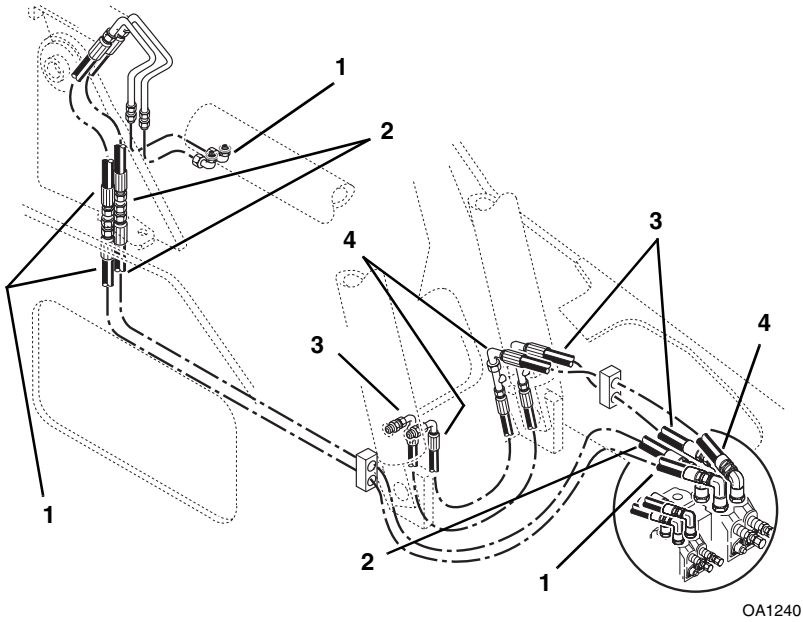
WARNING: **DO NOT** get under a raised boom unless the boom is blocked up. Always block the boom before doing any servicing that requires the boom to be up.

4. If the load is in a position where it can be removed safely, completely remove the load from the carriage and/or attachment; otherwise, leave the load in place.
5. Temporarily block up or support the outer boom.

WARNING: Wear protective clothing and proper eye protection when working with or around hydraulic oil. Wait for hydraulic oil to cool before attempting to repair the failure. Hot hydraulic oil can cause severe burns and other serious injury.

6. Replace the failed hydraulic line with a new part.
   - Boom Retract Line (1)
   - Boom Extend Line (2)
   - Boom Lift Line (3)
   - Boom Lower Line (4)
7. Check the hydraulic oil level, add oil if needed.
8. Remove the blocking or support from the outer boom.
9. Return to the cab, fasten your seat belt and start the engine.
10. Tilt the carriage and/or attachment upward if necessary for clearance before retracting the boom.
11. Slowly retract the boom.
12. Slowly lower the boom and ground the carriage and/or attachment.

13. Shut off the engine.
14. Completely remove the load from the carriage and/or attachment if you haven't already done so.
15. Return to the cab, fasten your seat belt and start the engine.
16. Cycle the lift/lower and extend/retract cylinders several times to bleed air from the system. Check for leaks.
17. Recheck the hydraulic oil level. Add oil if necessary.



STEP 2

USE IN CASE OF:

BOOM LIFT LINE FAILURE (Lift Cylinders to Control Valve)

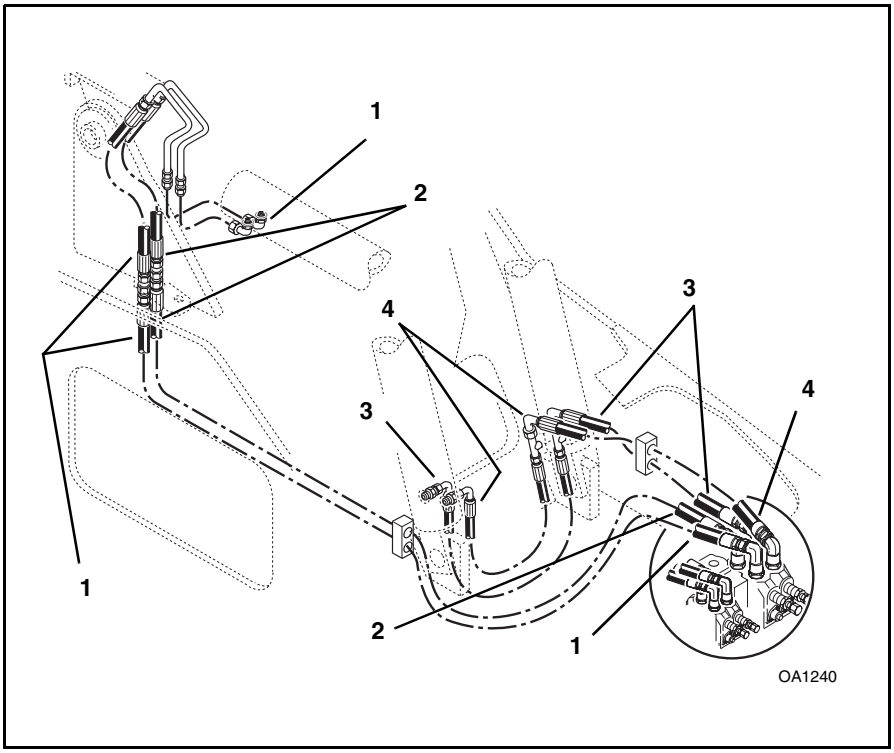
BOOM EXTEND LINE FAILURE

1. Clear the area of any unnecessary personnel.
2. Place the travel select lever in (N) NEUTRAL, move the neutral lock lever to NEUTRAL LOCK position and engage the parking brake switch.
3. Block all four wheels.

WARNING: Wear protective clothing and proper eye protection when working with or around hydraulic oil. Wait for hydraulic oil to cool before attempting to repair the failure. Hot hydraulic oil can cause severe burns and other serious injury.

4. Place a container under the failed hose to catch any hydraulic oil that may escape during this procedure.
5. Return to the cab, fasten your seat belt and start the engine.
6. Slowly retract the boom.
7. Slowly lower the boom and ground the carriage and/or attachment.
8. Shut off the engine.
9. Completely remove the load from the carriage and/or attachment.
10. Place an accident prevention tag on both the ignition switch and steering wheel. Refer to “Accident Prevention Tags” on page 5. Actual accident prevention tags can be found as the last page of this manual. If you do not have a safety tag, tape over the ignition switch.
11. Have the vehicle serviced immediately. Replace any failed hydraulic lines with new parts.
    - Boom Retract Line (1)
    - Boom Extend Line (2)
    - Boom Lift Line (3)
    - Boom Lower Line (4)

12. Return to the cab, fasten your seat belt and start the engine.
13. Cycle the lift/lower cylinder several times to bleed air from the system. Check for leaks.
14. Recheck the hydraulic oil level. Add oil if necessary.
15. Transfer any waste oil to a container with a cover and label as used oil. Dispose of properly.



STEP 3

BOOM LOWER LINE FAILURE (Lift Cylinders to Control Valve)

1. Clear the area of any unnecessary personnel.
2. Place the travel select lever in (N) NEUTRAL, move the neutral lock lever to NEUTRAL LOCK position and engage the parking brake switch.
3. Block all four wheels.

WARNING: **DO NOT** get under a raised boom unless the boom is blocked up. Always block the boom before doing any servicing that requires the boom to be up.

4. Temporarily block up or support the outer boom.
5. If the load is in a position where it can be removed safely, completely remove the load from the carriage and/or attachment; otherwise, leave the load in place.
6. Place a 10 gallon (40 liter) container under the vehicle to catch any hydraulic oil that will escape during this procedure.

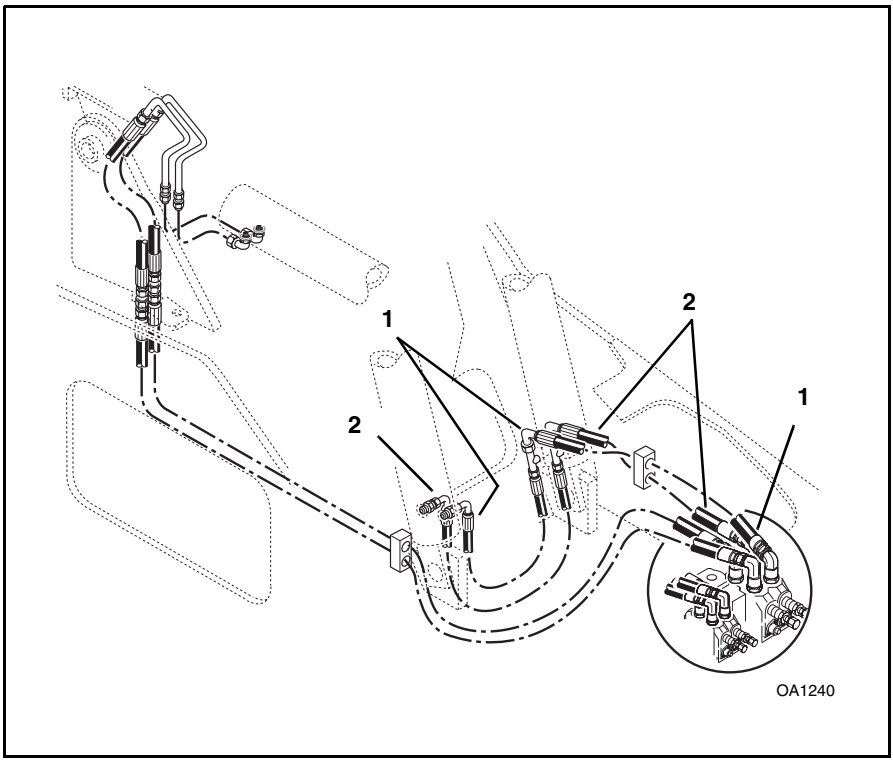
WARNING: Wear protective clothing and proper eye protection when working with or around hydraulic oil. Wait for hydraulic oil to cool before attempting to repair the failure. Hot hydraulic oil can cause severe burns and other serious injury.

NOTE: *If a replacement hose is not available, the adjacent boom lift line (2) can be used to replace the failed boom lower line (1).*

7. Remove the individual failed boom lower line (1) from the circuit.
8. Remove and temporarily reposition the adjacent boom lift line (2) in place of the failed boom lower line (1).

IMPORTANT! *Once either boom lift line is removed and the boom is retracted during the remaining steps, hydraulic oil will drain out of the base end of the boom cylinder. The escaping oil should be deflected by some means (the failed hose could be used) directing the oil into the drain container.*

9. Check the hydraulic oil level and add oil if needed.
10. Remove the blocking or support from the outer boom.
11. Return to the cab, fasten your seat belt and start the engine.



IMPORTANT! *Have the vehicle serviced and hoses replaced as soon as the boom has been lowered and the vehicle is in a secure location.*

12. Tilt the carriage and/or attachment upward if necessary for clearance before retracting the boom.
13. **SLOWLY RETRACT** the boom.
14. **SLOWLY LOWER** the boom and ground the carriage.
15. Completely remove the load from the carriage and/or attachment if you haven't already done so.
16. Have the vehicle serviced immediately.
17. Replace any faulty hydraulic lines.
18. Return to the cab, fasten your seat belt and start the engine.
19. Cycle the lift/lower cylinder several times to bleed air from the system. Check for leaks.
20. Transfer the waste oil to a container with a cover and label as used oil. Dispose of properly.
21. Recheck the hydraulic oil level. Add oil if necessary.

STEP 4

BOOM RETRACT LINE FAILURE

1. Clear the area of any unnecessary personnel.
2. Place the travel select lever in (N) NEUTRAL, move the neutral lock lever to NEUTRAL LOCK position and engage the parking brake switch.
3. Block all four wheels.

WARNING: **DO NOT** get under a raised boom unless the boom is blocked up. Always block the boom before doing any servicing that requires the boom to be up.

4. If the load is in a position where it can be removed safely, completely remove the load from the carriage and/or attachment, otherwise leave the load in place.
5. Place a 10 gallon (40 liter) container under the vehicle to catch any hydraulic oil that will escape during this procedure.

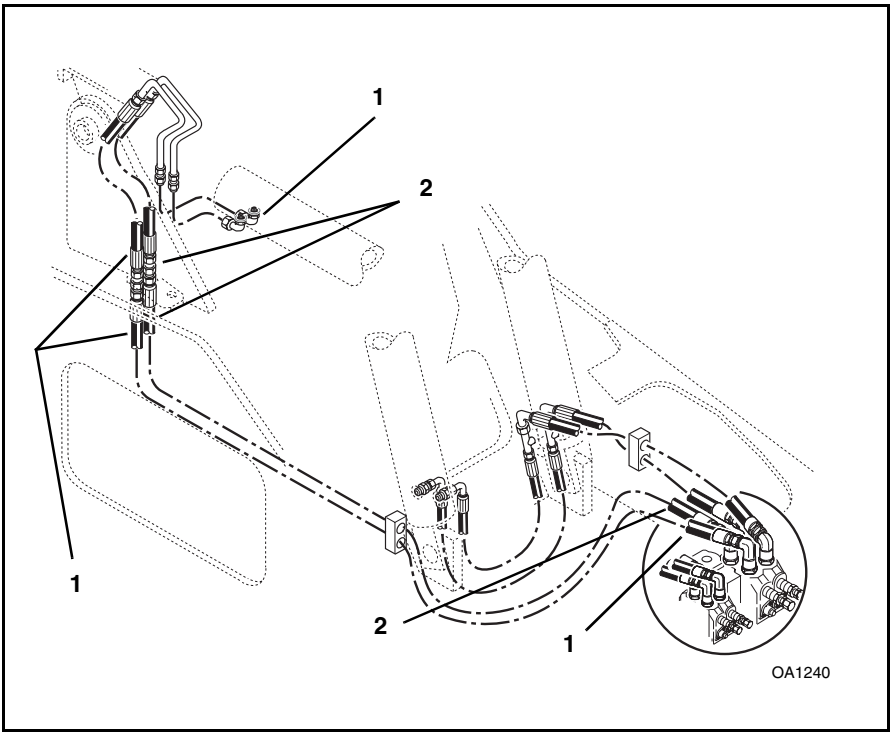
WARNING: Wear protective clothing and proper eye protection when working with or around hydraulic oil. Wait for hydraulic oil to cool before attempting to repair the failure. Hot hydraulic oil can cause severe burns and other serious injury.

NOTE: *If a replacement hose is not available, the adjacent boom extend line (2) can be used to replace the failed boom retract line (1).*

6. Remove the failed boom retract line (1) from the circuit.
7. Remove and temporarily reposition the adjacent boom extend line (2) in place of the failed boom retract line (1).

IMPORTANT! *During the remaining steps, hydraulic oil will drain out of the base end of the boom cylinder. The escaping oil should be deflected by some means (the failed hose could be used) directing the oil into the drain container.*

8. Check the hydraulic oil level and add oil if needed.
9. Return to the cab, fasten your seat belt and start the engine.
10. Tilt the carriage and/or attachment upward if necessary for clearance before retracting the boom.
11. **SLOWLY RETRACT** the boom.
12. **SLOWLY LOWER** the boom and ground the carriage and/or attachment.
13. Completely remove the load from the carriage and/or attachment if you haven't already done so.
14. Have the vehicle serviced immediately.
15. Replace any faulty hydraulic lines.
16. Return to the cab, fasten your seat belt and start the engine.
17. Cycle the extend/retract cylinder several times to bleed air from the system. Check for leaks.
18. Transfer the waste oil to a container with a cover and label as used oil. Dispose of properly.
19. Recheck the hydraulic oil level. Add if necessary.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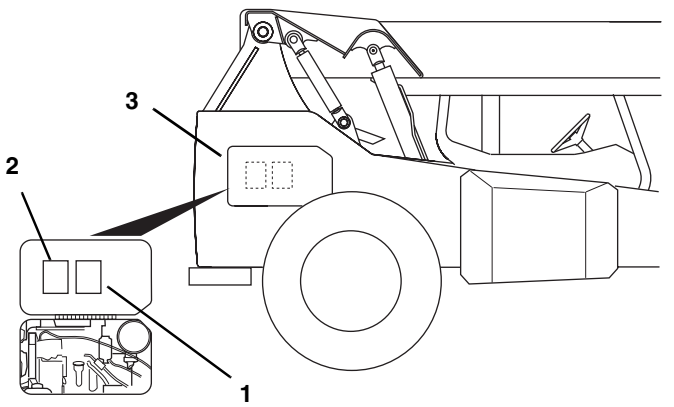
General Maintenance

This section of the manual contains a maintenance schedule and checklist with references to pertinent procedures and instructions. To prevent problems before they occur, follow the maintenance schedule.

NOTE: *The Lubrication (1) and Maintenance Chart (2) decals are located inside the right side engine cover (3). They contain a general maintenance schedule that should be followed to maintain the vehicle in good operating condition. The same schedule information is presented in this manual, except it contains a more detailed account of how to perform these specific maintenance operations.*



OA1250

WARNING: **DO NOT** perform service or maintenance on the vehicle with the engine running, with the exception of the transmission level check. Contact with moving parts can cause death or serious personal injury.

NOTE: *The engine side cover props can be manually pinned in the open position. To manually pin the cover in the open position, line up the holes in the slide halves of the prop and insert a 1/4" bolt or pin through the lined up holes. To close the engine side covers, push the cover all the way up to release the locks and then lower down to the closed position.*

Maintenance Schedule And Checklist

10 Hour Intervals

OH1980

	Drain Fuel/ Water Separator	Check Engine Coolant Level	Check Engine Oil Level	Check Hydraulic Oil Level	Check Transmission Oil Level	Check Tire Pressure
Paragraph Ref.	5A	3A	4A	7B	8A	12A

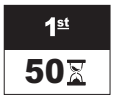
OF1190

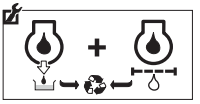
	Air Filter Restriction Indicator
Paragraph Ref.	2A

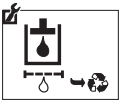
General Maintenance

At First 50 Hours of Use

OA1540

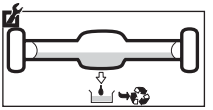
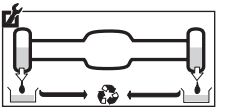
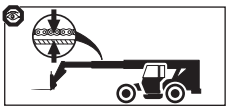






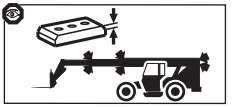

	Change Engine Oil and Filter	Change Transmission Filter	Change Hydraulic Filter	Check Wheel Lug Nut Torque
Paragraph Ref.	4B	8B	7C	12B

OH2000

	Change Axle Oil	Change Wheel End Oil	Check Boom Chain Tension
Paragraph Ref.	9B	11B	15A

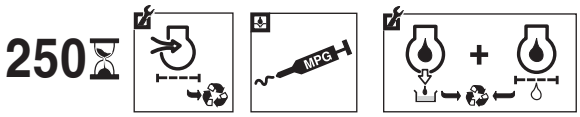
50 Hour Intervals




OH2010

	Inspect Wear Pads	Lubricate Pivot Points
Paragraph Ref.	15E	1

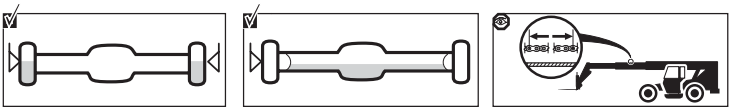
250 Hour Intervals



OH2021

	Change Air Filter	Lubricate Pivot Points	Change Engine Oil and Filter
Paragraph Ref.	2B	1	4B

OA1460



	Check Wheel End Oil Level	Check Axle Oil Level	Inspect Extend Chains
Paragraph Ref.	11A	9A	15C

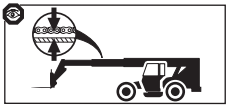
500 Hour Intervals

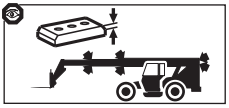
OH3150

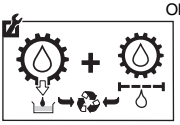
	Change Fuel Filter
Paragraph Ref.	5B & 5C

1000 Hour Intervals

1000

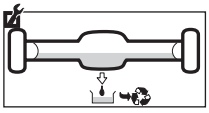


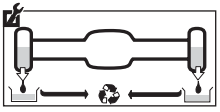


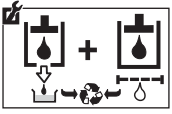


OH2040

	Check Boom Chain Tension	Inspect Wear Pads	Change Transmission Oil And Filter
Paragraph Ref.	15A	15E	8B

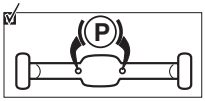






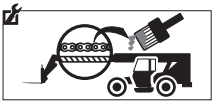
OH2050

	Change Axle Oil	Change Wheel End Oil	Change Hydraulic Oil And Filter
Paragraph Ref.	9B	11B	7C



OH2061

	Check Fan Belt	Check Air Intake System	Lubricate Pivot Points	Check Axle Brake Discs
Paragraph Ref.	6A	2C	1	10A



OA1470

	Lubricate Boom Chains
Paragraph Ref.	15D

2000 Hour Intervals

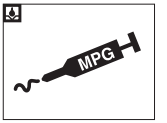
OH2070

	Change Engine Coolant
Paragraph Ref.	3B

1. Lubrication Points

OH2680

Lubricate the following grease fittings using Multi-Purpose Grease (MPG) <u>every 50 hours:</u>



OS1750

A. Carriage pivot pins ..... (2 points)

B. Attachment tilt cylinder pins ..... (2 points)

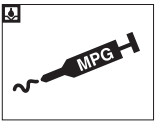
C. Boom attachments ..... (all points)

D. Extend Chain Sheave ..... (1 point)

E. Retract Chain Sheave ..... (1 point)

OH2710

Lubricate the following grease fittings using Multi-Purpose Grease (MPG) <u>every 250 hours:</u>



OS1750

F. Hydraulic cylinder pins ..... (10 points)

G. Drive shaft slip joints ..... (3 points)

H. Boom pivot pin ..... (2 points)

I. Axle U-Joints ..... (8 points)

J. Axle pivot pins ..... (4 points)

OH2690

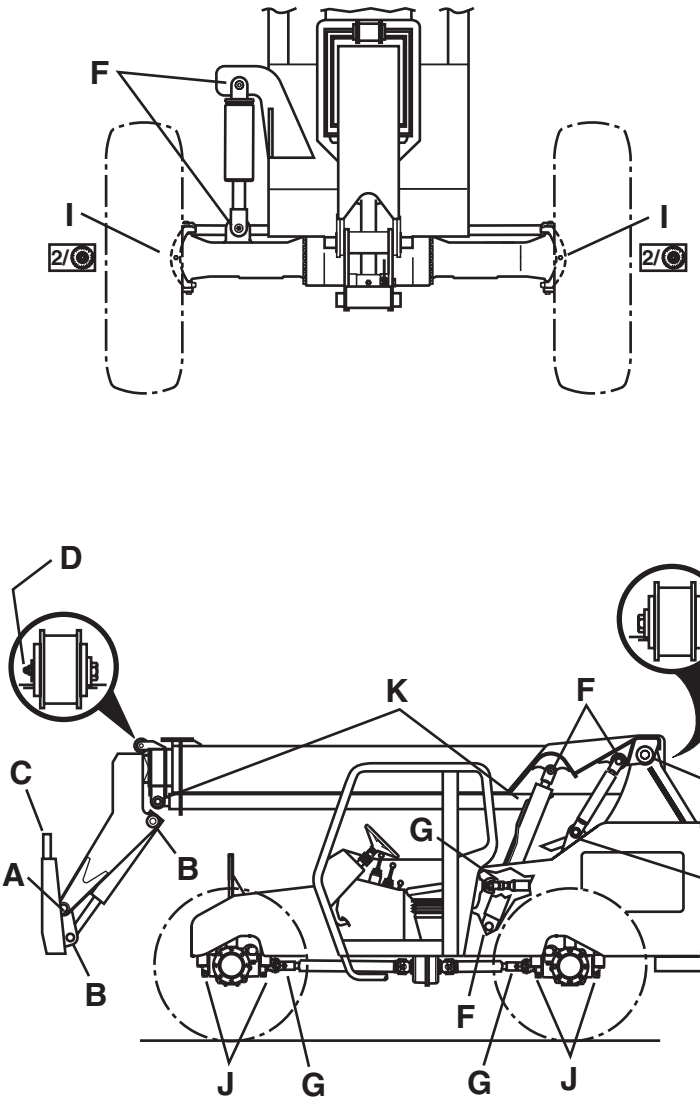
Lubricate the following grease fittings using Multi-Purpose Grease (MPG) <u>every 1000 hours:</u>

OS1750

K. Extend cylinder pins ..... (2 points)

NOTE: *Shorten the lubrication interval on all lube points when operating in severe conditions.*

Lubrication Points



2. Air Cleaner & Restriction Indicator

NEVER operate the vehicle without the air cleaner assembly and both filters in place.

A. Filter Check

(10 Hour Intervals)

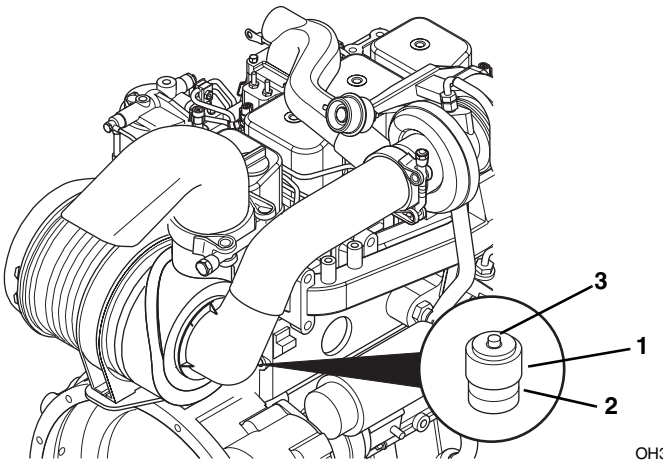
OH2660

OF1190

1. Ground the carriage, place the travel select lever in (N) NEUTRAL, move the neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and shut off the engine.
2. Unlock and open the left rear engine access door to access air cleaner restriction indicator (1). Check indicator. If red band (2) has appeared, filter must be replaced.

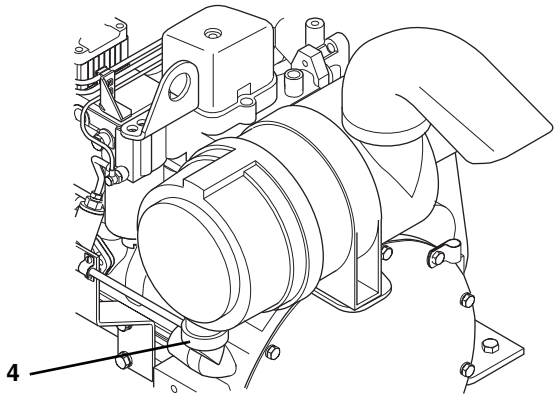
NOTE: *Depress button* (3) *on top of indicator to reset indicator after servicing element.*

IMPORTANT! *Only remove canister cover to service the elements as restriction indicator indicates or during scheduled maintenance intervals. Excessive access to check an element can lead to premature element failure and increase the possibility of dirt entering the engine.*



OH3370

3. Remove dust from vacuator valve (4) by squeezing bottom of vacuator to allow loose particles to fall out. Replace elements, if required, as described in paragraph 2B.



B. Element: Change

(As Restriction Indicator Indicates or 250 Hour Intervals)

Outer Primary Element

All air cleaner manufacturers agree that attempting to clean or wash an element increases the chance for element damage. It is highly recommended that you consider the value of cleaning an element against the risks which could lead to engine damage. Adopt the policy that all elements should be replaced with new and not cleaned.

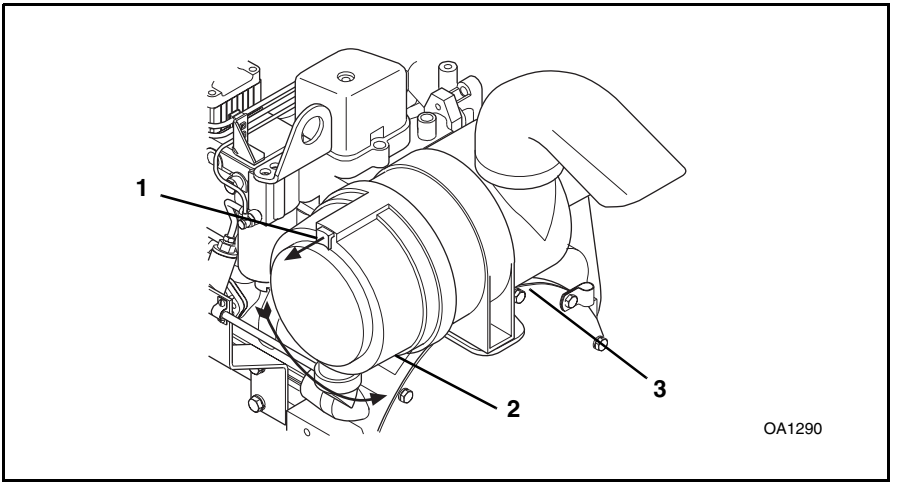
Inner Safety Element

An inner safety element should never be washed or reused. Always install a new element. Replace inner safety elements after every third primary element change. **DO NOT** remove an inner safety element until you have thoroughly cleaned the inside of the air cleaner canister. This will prevent dirt, which could damage the engine, from entering the induction manifold.

	CAUTION: **NEVER** run the engine with only the inner safety element installed. Severe engine damage will result from dust entering the engine.

To change elements:

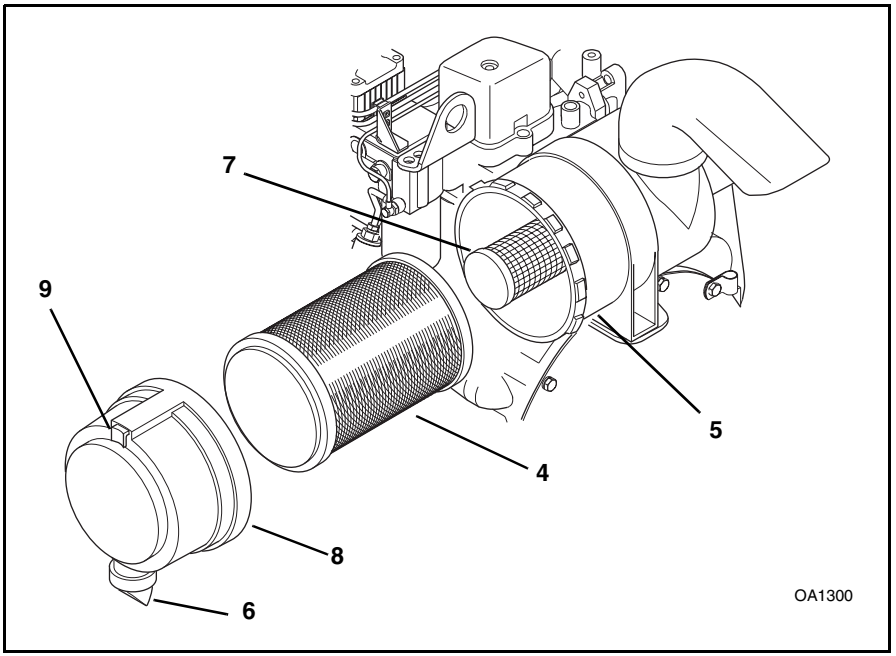
1. Pull the air cleaner cover lock (1) OUT, turn the air cleaner cover (2) counter-clockwise and remove cover from air cleaner canister (3).



2. Remove the primary element (4). Inspect element for damage. Damaged elements should not be reused.
3. Thoroughly clean the interior of the air filter canister (5) and vacuator valve (6).
4. If replacing the inner safety element (7) at this time, carefully slide the inner safety element out. Always discard this element and replace with a new element.
5. Slide the new primary element over the inner safety element making sure the sealing edge is flush with the base of the air cleaner.

IMPORTANT! *DO NOT apply any type of petroleum product to the sealing surface of the filter in an attempt to get a more positive seal. This will cause sealing surface damage and allow dirt to by-pass the filter. Use liquid dishwashing soap (Ivory, Dawn, etc.) on the seal of the filter only.*

6. Position canister cover (8) in place, turn clockwise to lock into position and secure in place by pushing the air cleaner cover lock (9) all the way in.



C. Air Intake System-Inspection

(1000 Hour Intervals)

OH2690

OT0880

Inspect the intake piping for cracked hoses, loose clamps or punctures which can allow dirt or debris to enter the combustion chamber. If dirt or debris are allowed to enter the combustion chamber, they can severely damage the engine. If necessary, tighten or replace parts to prevent air intake system leakage.

3. Engine Cooling System

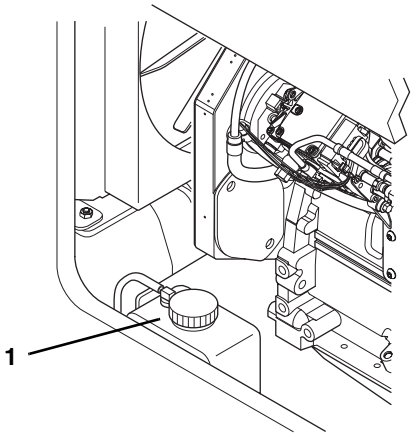
A. Engine Coolant Level Check

(10 Hour Intervals)

OH2660

OS0800

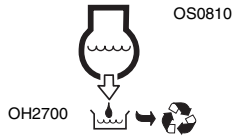
1. Level the vehicle, ground the carriage, place the travel select lever in (N) NEUTRAL, move neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and shut off the engine.
2. Unlock and open the right rear engine access door. Check level of coolant in overflow bottle (1). When coolant is hot, bottle should be 1/2 to 3/4 full. When coolant is cool, bottle should be 1/4 to 1/2 full. Add coolant as required through the overflow bottle (50/50 mixture of ethylene glycol and water). Close and lock access door.



OH3410

B. Drain And Flush Radiator

(2000 Hour Intervals)



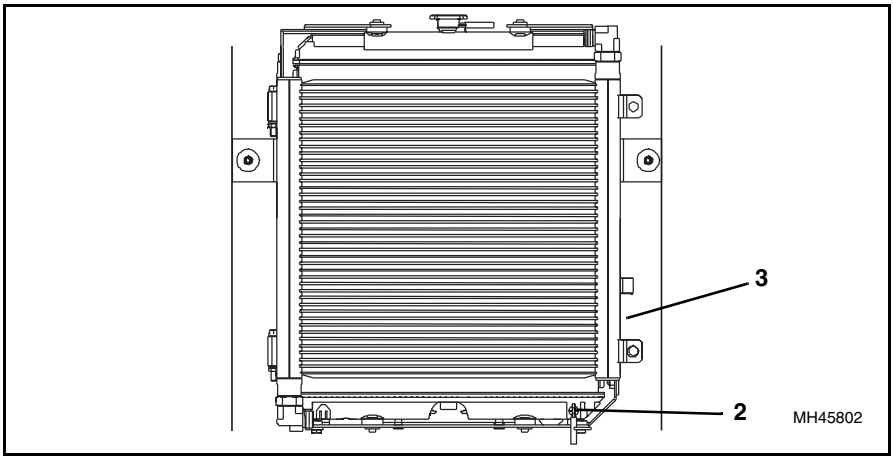
1. Level the vehicle, ground the carriage, place the travel select lever in (N) NEUTRAL, move neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and shut off the engine.

> **WARNING:** **DO NOT** attempt this procedure when the engine is hot. Wait for the engine, muffler and tailpipes to cool down before proceeding. Failure to do so could result in severe burns.

2. Unlock and open the rear radiator access door. Allow time for the engine to cool down before proceeding. Draining and flushing the engine cooling system while the engine is still hot can cause cracks in the engine block.

> **WARNING:** **NEVER** remove the radiator cap while the engine is hot. The cooling system is under pressure. Hot coolant can cause severe burns or eye injury. Wear protective clothing and safety glasses.

3. Remove radiator cap and open the petcock (2) on the lower right side of radiator (3).



NOTE: *Use the hose attached to the petcock to allow draining directly into a container.*

4. Allow coolant to drain from the radiator. Detach line from bottom of coolant overflow bottle and drain bottle.
5. Flush system with clean water and drain again.

NOTE: *On vehicles equipped with a cab heater option, a shut off valve is installed at the engine inlet. Disconnect hose from shut off valve to drain the heater.*

6. Transfer the coolant into a properly labelled container. Dispose of properly.
7. Reconnect line to bottom of overflow bottle and close petcock on the radiator. Reconnect heater hose.
8. Fill radiator completely with 50/50 mixture of ethylene glycol and water. Total System Capacity is 4 gallons (15 liter). Add coolant to overflow bottle until bottle is about 1/2 to 3/4 full. This “overfilling” will compensate for any air in the cooling system.
9. Clean dirt and debris from radiator fins and core, if required.
10. Start engine and run vehicle to normal operating temperature and then shut OFF the engine. While the engine is cooling, check for leaks.
11. Allow engine to cool to ambient temperature. Check radiator coolant level and top off completely. Replace radiator cap.
12. Overflow bottle should be 1/4 to 1/2 full. If it is not, add coolant to overflow bottle. Close and lock all access doors.

4. Engine Oil And Filter

Engine Oil Recommendations

The use of quality engine oil combined with the appropriate oil and filter change intervals are critical factors in maintaining engine performance and durability.

Use 15W40 motor oil that at least meets the manufacturers minimum recommended oil specifications as defined in their operator manual.

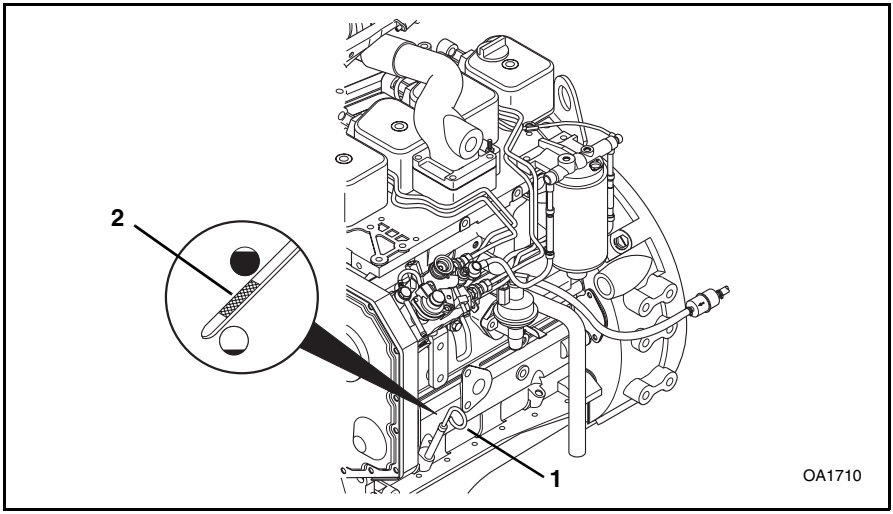
A. Oil Level Check

(10 Hour Intervals)

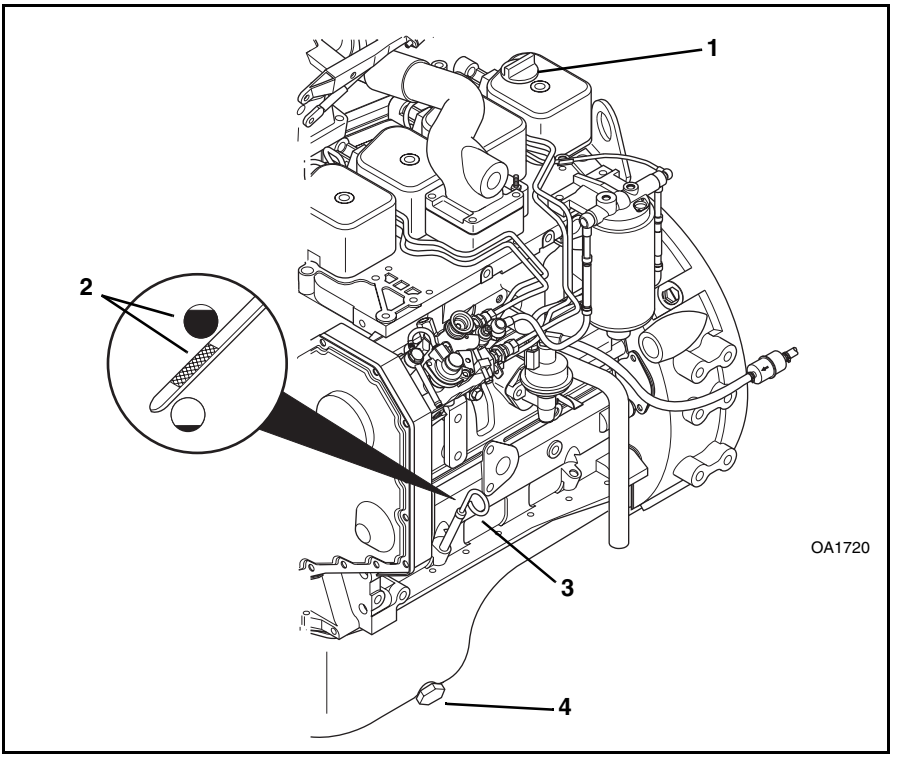
OH2660

OS0820

1. Level the vehicle, ground the carriage, place the travel select lever in (N) NEUTRAL, move neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and shut off the engine.
2. Unlock and open right rear engine access door.
3. Remove dipstick (1) and check mark on dipstick. Oil should be within the crosshatched area (2).



4. If oil is low, remove oil fill cap (1) and add 15W40 motor oil that at least meets the manufacturers minimum recommended oil specifications as defined in their operator manual to bring oil up to the FULL mark (2) in the crosshatched area. Add oil through the opening under the boom. Replace oil fill cap and dipstick (3). Close and lock access door.

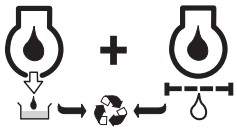


B. Oil And Filter Change

(First 50 Hours)
(250 Hour Intervals)

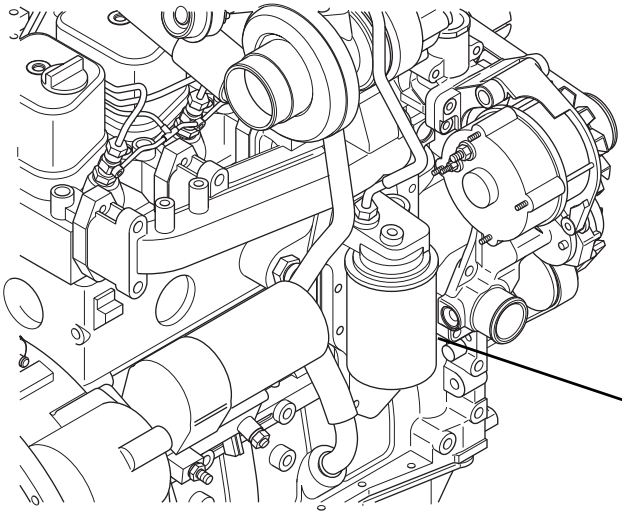
OH2670

OH2710



OS0830

1. Operate the engine until warm (approximately 5 minutes).
2. Level the vehicle, ground the carriage, place the travel select lever in (N) NEUTRAL, move neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and shut off the engine.
3. Place receptacle under engine oil pan drain.
4. Remove drain plug (4) from engine oil pan.
5. Allow oil to drain completely into a receptacle. Transfer the oil to a container with a cover and label the container as used oil. Dispose of the used oil at an approved recycling facility.
6. Unlock and open the left engine access door. Remove oil filter (5). A strap or chain filter wrench may be required.

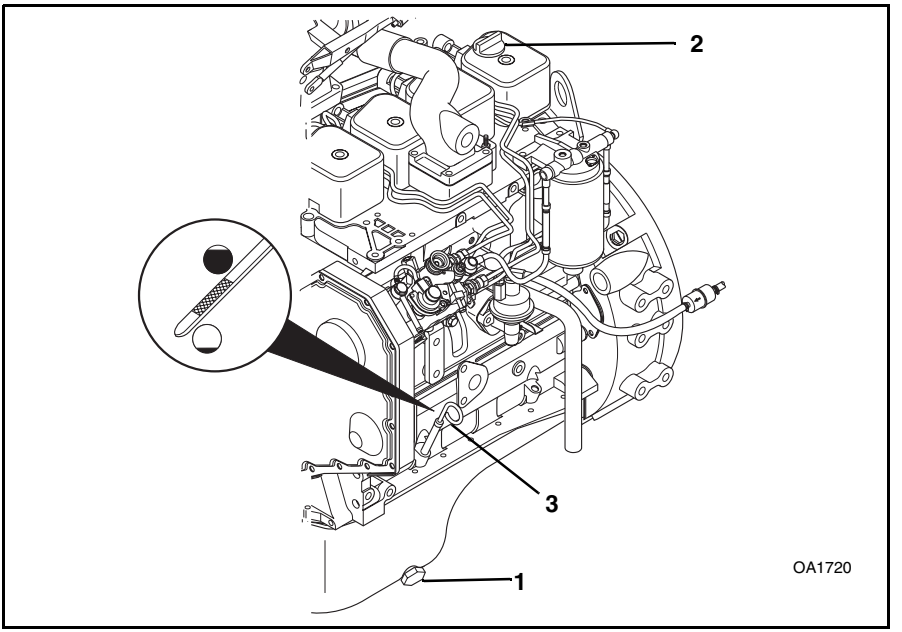


OA1730

7. Clean filter sealing surface. Make sure the o-ring seal from the filter comes off the sealing surface.

NOTE: *The filter o-ring may stick to the filter head. Make sure the old o-ring is removed before installing the new filter.*

8. Apply a thin coat of clean engine oil to seal on new filter.
9. Install the new oil filter and hand tighten 1/2 turn after initial contact.
10. Install the drain plug (1) into the oil pan and tighten securely.
11. Unlock and open right side engine access door.
12. Remove oil fill cap (2) and add 15W40 motor oil that at least meets the manufacturers minimum recommended oil specifications as defined in their operator manual. (Reference engine manufacturer's manual for recommended oil types to be used in various temperature limits.) Fill oil through the opening under the boom. DO NOT over fill. Engine oil capacity with filter change is 10.5 qts. (10 liters).
13. Reinstall the oil fill cap (2). Start engine and run for several minutes.
14. Stop engine. Let the oil drain back for a few minutes. Check oil level on dipstick (3) and check for leaks at filter and drain plug. Tighten as necessary.
15. Add oil to bring oil level up to the FULL mark in the crosshatched area. Replace dipstick and oil fill cap. Close and lock access door.

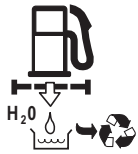


5. Engine Fuel System

A. Drain Water From Fuel Water Separator/Filter

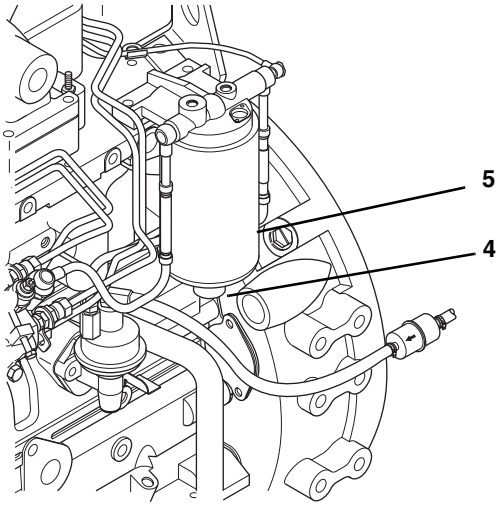
(10 Hour Intervals)

OH2660



OS0851

Unlock and open the right rear engine access door. Loosen drain valve (4) on under side of the water separator/filter (5) and allow all water to drain into a container until clear fuel is visible. Dispose of properly. Tighten drain valve (4) after draining. Close and lock right engine access door.



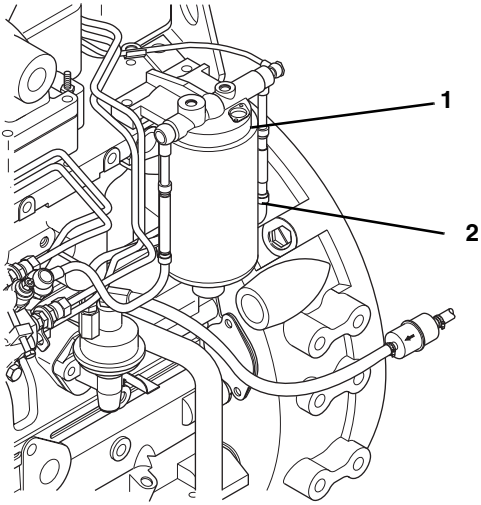
OA1700

B. Change Fuel Filter

(500 Hour Intervals)

The fuel filter must be changed at shorter intervals with evidence of water or contaminated fuel.

1. Unlock and open the right rear engine access door.
2. Clean around the fuel filter head (1).
3. Unscrew the fuel filter (2) and dispose of properly.
4. Clean the gasket surface of the filter head and replace the o-ring.



5. Fill the new fuel filter with clean No. 2 diesel fuel.
6. Lubricate the o-ring seal with clean No. 2 diesel fuel.
7. Install the fuel-filled filter and hand tighten. **DO NOT** overtighten.

NOTE: *Mechanical over-tightening may distort the threads or damage the sealing ring.*

8. Close and lock the right rear engine access door.

Controlled venting is provided at the injection pump through the fuel drain manifold. Small amounts of air introduced by changing the fuel filter element will be vented automatically as long as the element was filled with fuel prior to installation.

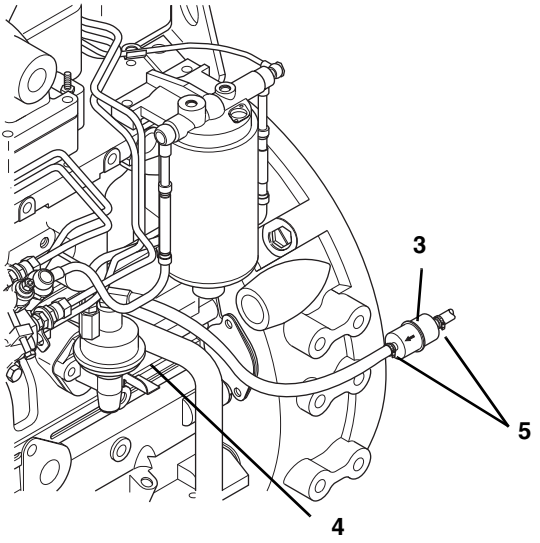
C. Replace In-line Fuel Strainer

(250 Hour Intervals)

500

OT1150

1. Unlock and open the right rear engine access door.
2. The in-line fuel strainer (3) is located down line from the engines lift pump (4). Loosen the two hose clamps (5) that secure the strainer in place.
3. Remove the old in-line fuel strainer and dispose of properly.
4. Install the new in-line fuel strainer (3) with arrow pointing toward the lift pump (4).
5. Assemble the hoses to the in-line fuel strainer and tighten the hose clamps.
6. Remove air from the fuel system (see “Bleeding Fuel System” on page 122).
7. Close and lock the right rear engine access door.



OA1700

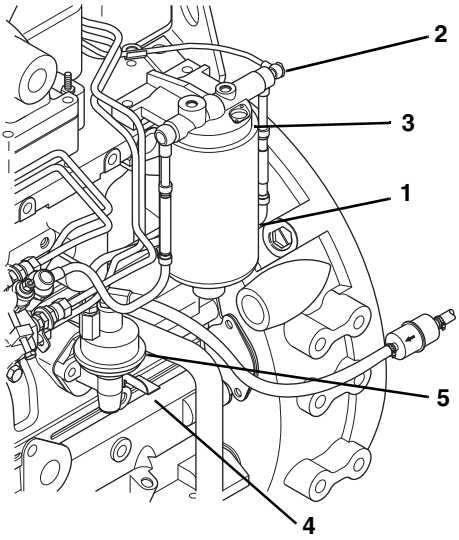
D. Bleeding Fuel System

Air must be vented from the fuel system whenever any component between the fuel tank and the injection pump has been disconnected, or when the system has been emptied or run out of fuel.

WARNING: **DO NOT** bleed the fuel system of a hot engine. Doing so could create a fire hazard. Allow the engine to cool before bleeding the fuel system.

IMPORTANT! DO NOT *attempt to start the engine until the injection pump has been filled and primed with fuel. Serious damage to the lift pump will result due to lack of proper lubrication.*

1. To vent the low pressure lines and fuel filter (1), open the vent screw (2) located on the filter head (3).
2. Operate the hand plunger (4) on the lift pump (5) until fuel flowing from the fitting is free of air.
3. Tighten the vent screw (2) and torque to 7 lb-ft (9 Nm).



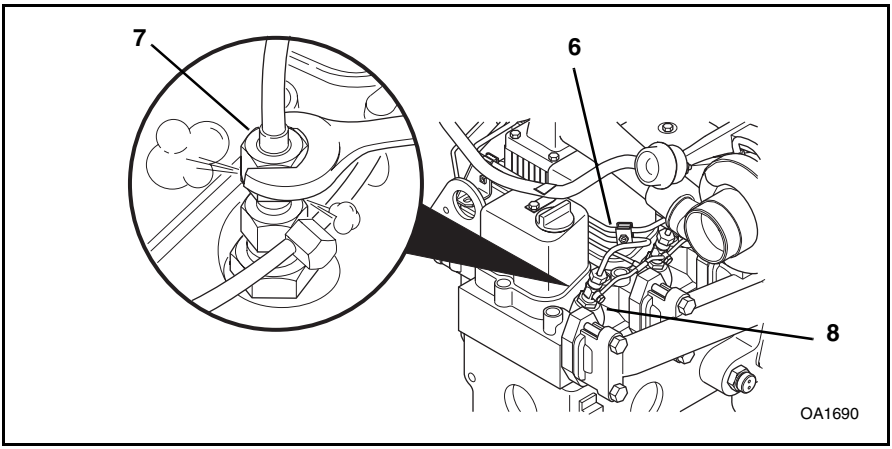
OA1700

The process to vent the high pressure fuel lines (6) involves energizing the starter motor to rotate the crankshaft which will, in turn, pump any unwanted air from the fuel lines.

CAUTION: When using the starting motor to vent the fuel system, **DO NOT** energize the starter solenoid or crank the engine for more than 15 seconds at a time; wait two minutes between engagements.

WARNING: **KEEP CLEAR** of spraying fuel. Fuel can spray when venting high pressure lines. The fuel pressure is sufficient to penetrate the skin and cause serious bodily injury. Wear protective clothing and safety glasses.

1. To vent the high pressure fuel lines (6), loosen one fitting at the injector (7).
2. Turn the ignition key to the START position and crank the engine for a maximum of 15 seconds or until fuel, free of air, comes out of the injector fitting (8).
3. Tighten the fitting. Torque to 22 lb-ft (30 Nm).
4. Repeat steps 1 through 3 for each fitting until the engine runs smoothly.
5. With the engine running, visually check for leaks. Turn ignition switch OFF.



6. Engine Fan Belt

A. Engine Fan Belt Check

(1000 Hour Intervals)

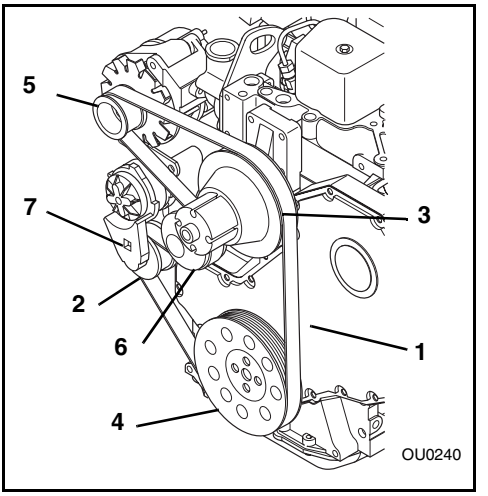
1000

OH2690 OS08802

1. Ground the carriage, place the travel select lever in (N) NEUTRAL, move the neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and shut off the engine.
2. Unlock and open the left engine access door.
3. Inspect the fan belt (1). Replace if cracked or frayed.
4. This engine is equipped with an automatic belt tensioner (2). Inspect the tensioner bearing. Spin the bearing and check for rough spots under hand pressure.
5. Spin the fan and check for wobble or excessive play. Maximum play should be .006 inch (0,15 mm).
6. To install the fan belt (1); first position the belt over the fan pulley (3), crankshaft pulley (4), alternator pulley (5) and onto the tensioner pulley (2).

NOTE: *To hold the tensioner pulley toward the center of the engine, insert a 3/8" breaker bar into the square hole (7) in the tensioner arm.*

7. Then, while holding the tensioner (2) toward the center of the engine, slide the belt over the water pump pulley (6). Release the tensioner pulley to apply tension on the belt.
8. Close and lock the left engine access door.



7. Hydraulic Oil and Filter

A. Hydraulic System Oil

OH2630

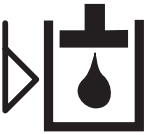
Hydraulic system oil can be either a hydraulic oil meeting the requirements of ISO Grade 46 or a 10W motor oil meeting the requirements of U.S. Ordinance Specifications MIL-L-2104C. See table below.

ISO Grade 46 Hydraulic Oil	MIL-L-2104C 10W Motor Oil*
Gulf Harmony 46 AW	Castrol Deusol CRD
Amoco Rykon 46	Esso Essolube D-3HP
Mobil DTE-25	Esso Essolube XD-3
Arco Duro AW S-215	Castrol Agricastrol HDD
Shell Tullus 46	Shell Rimula CT
Benz Petraulic 46-7C	Shell Rimula X
Sun Sunvis 821 WR	Shell Rimula TX
Chevron AW 46	* 5W20 Motor Oil may be substituted for -30° F to 70° F (-34 to 21° C) only
Texaco Rando HD 46	
Citgo Pacemaker XD-46	

B. Hydraulic Oil Level Check

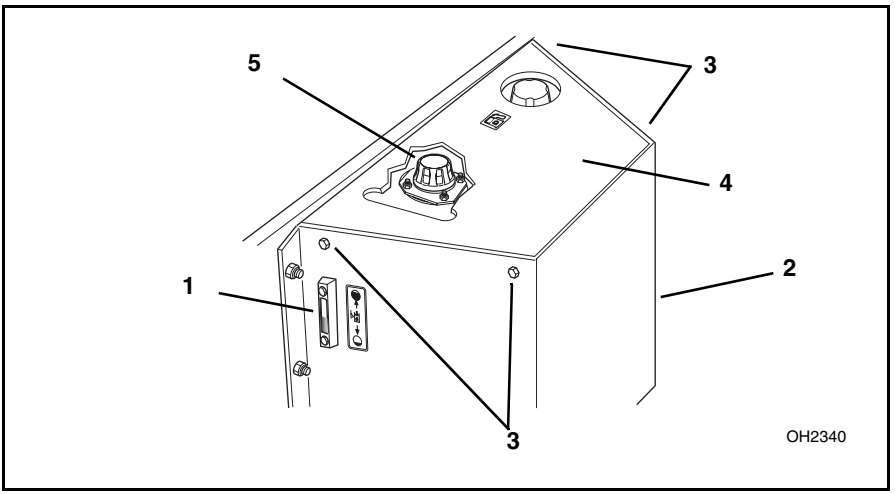
(10 Hour Intervals)

OH2660



OS0660

1. Be sure all cylinders are fully retracted and oil is at room temperature.
2. Level the vehicle, ground the carriage, place travel select lever in (N) NEUTRAL, move the neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and shut OFF the engine.
3. Check level of hydraulic oil in tank at the sight gauge (1) on the back side of the hydraulic tank (2).
4. The oil level should be visible in the gauge window.
5. If it is not, add ISO-46 or MIL-L-2104C oil (see table on page 125).
   a. Remove the four capscrews (3) holding the hydraulic oil tank cover (4) to the tank, remove the cover.
   b. Turn the hydraulic oil cap (5) and remove from the filler neck. Add hydraulic oil as needed. The hydraulic oil level should be within 1/2 inch of the upper mark on the sight gauge.
6. Install hydraulic oil cap (5). Reposition the cover (4) on the tank (2) and secure in place with the four capscrews (3).



C. Hydraulic Oil & Filter Change

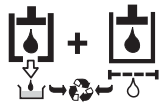
(First 50 Hours)
(Filter Only)

OH2670

OT08402

(1000 Hour Intervals)
(Oil & Filter)

OH2690

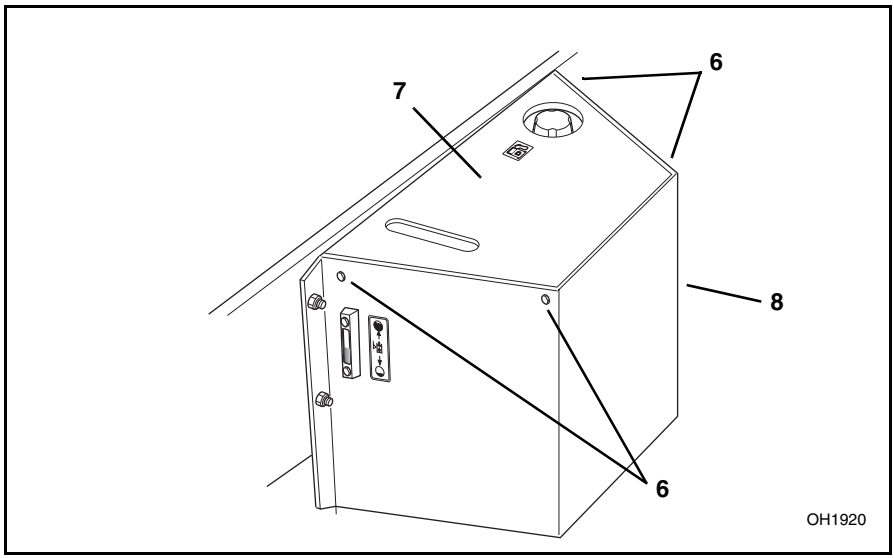


OS08402

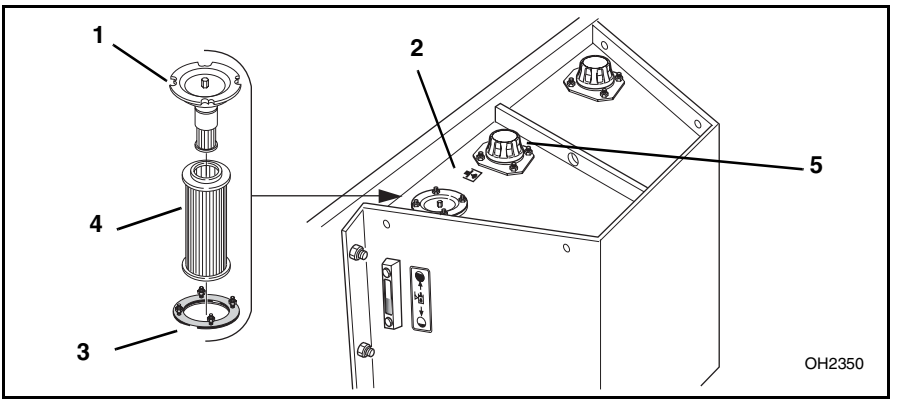
Change the hydraulic oil filter after the first 50 hours of operation and change the hydraulic oil and filter every 1000 hours of operation thereafter.

Other than the 1000 hour interval, the hydraulic oil must be changed when a hydraulic component has contaminated the system.

1. Level the vehicle, ground the carriage, place travel select lever in (N) NEUTRAL, move the neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch.
2. Fully retract all cylinders and shut OFF the engine.
3. Remove the four capscrews (6) holding the hydraulic oil tank cover (7) to the tank (8), remove the cover.



4. Clean area around filter head (1). Loosen but do not remove the nuts that secure the filter head to the hydraulic tank (2).
5. Rotate and remove the filter head (1).
6. Remove the seal (3) and the element (4) from the filter head (1). Dispose of properly.
7. Clean the filter head sealing surfaces.
8. Place a receptacle under the hydraulic reservoir magnetic drain plug. The receptacle must be large enough to hold 38 gallons (144 liters) of oil. Remove magnetic drain plug and allow oil to drain into receptacle. Clean loose particles attached to the drain plug. Transfer the oil to a container with a cover and label the container as used oil. Dispose of properly.
9. Re-install magnetic drain plug into the reservoir.
10. Re-install the top seal (3) and push a new filter element (4) all the way onto the filter head (1) until it seats. Slide the assembly into the reservoir and secure.
11. Remove reservoir cap (5) and fill the reservoir with ISO-46 or MIL-L-2104C Oil (see table on page 125) until the oil level is filled to the minimum oil level as described on page 126. Reservoir capacity is 32.2 gals. (122 liter).
12. Reassemble the hydraulic oil tank cover and tighten the hardware securely.
13. Run vehicle and operate all hydraulic functions. Cycle all modes of controls to purge air from the system.
14. Check for leaks.



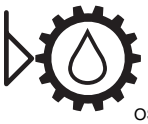
8. Transmission Oil and Filter

APPROVED UNIVERSAL TRACTOR FLUIDS	
JOHN DEERE	JDM J20C (HY-GARD)
FORD / NEW HOLLAND	ESN-M2C134-D (HYDRAULIC OIL134)
MASSEY FERGUSON	M-1141 (PERMATRAN III)
CHEVRON	CHEVRON 1000 THF

A. Transmission Oil Level Check

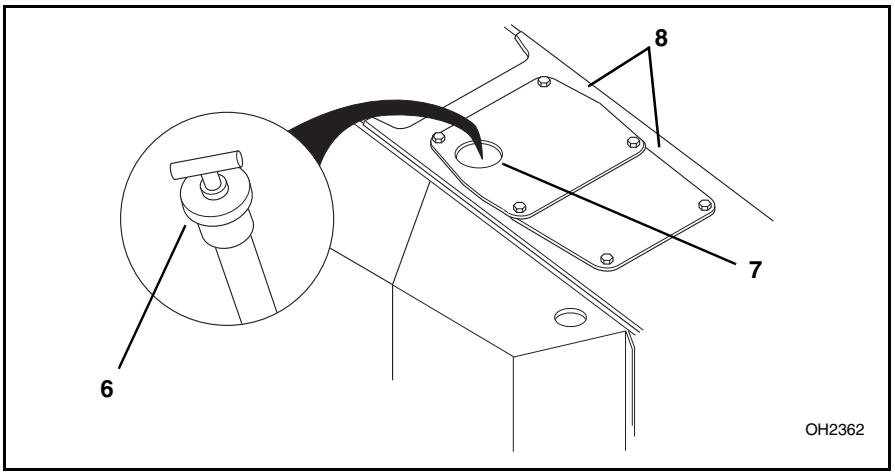
(10 Hour Intervals)

OH2660



OS0890

1. Level the vehicle, ground the carriage, place travel select lever in (N) NEUTRAL, move neutral lock lever to NEUTRAL LOCK position and engage the parking brake switch.
2. Check oil level with engine running at idle and oil at normal operating temperature.
3. Remove transmission dipstick (6) through access hole (7) in transmission covers (8) and check reading.
4. Add Universal Tractor Fluid to transmission as required to bring up to full mark.

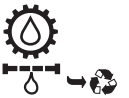


OH2362

B. Transmission Oil & Filter Change

(First 50 Hours)
(Filter Only)

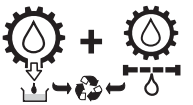
OH2670



OT08302

(1000 Hour Intervals)
(Oil & Filter)

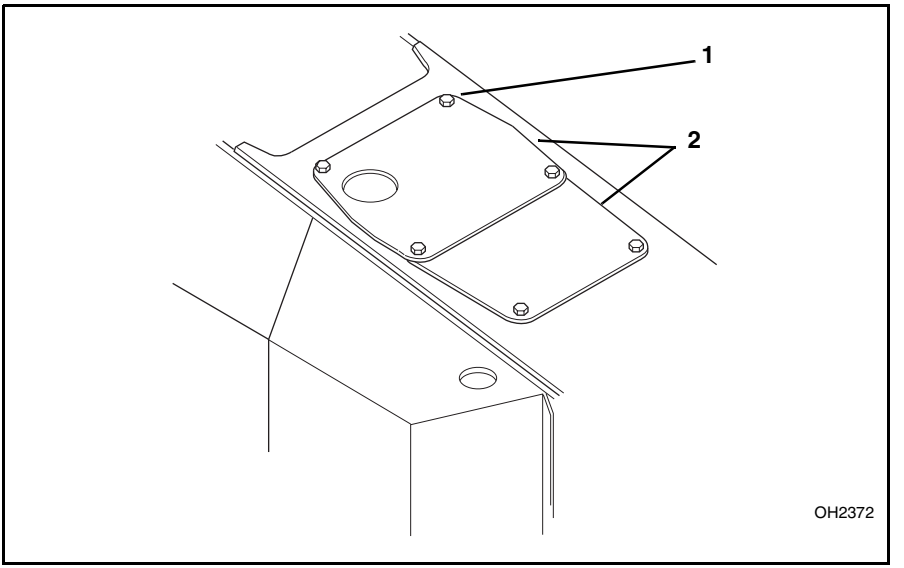
OH2690



OS09502

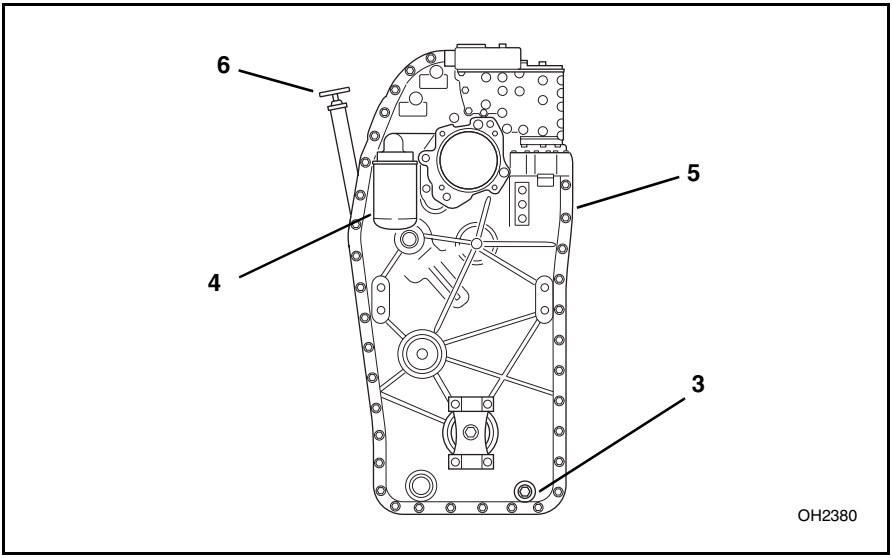
Change the transmission oil filter after the first 50 hours of operation and change the transmission oil and filter every 1000 hours of operation thereafter.

1. Level the vehicle, ground the carriage, place travel select lever in (N) NEUTRAL, move neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and shut OFF the engine.
2. Remove the six hex nuts, lockwashers and flat washers (1) securing the transmission covers (2) to the frame. Remove the covers.



OH2372

3. Allow the transmission to cool.
4. Place a receptacle under the transmission drain plug (3). Remove the drain plug and allow the Universal Tractor Fluid to drain into the receptacle. Transfer the used oil into a suitable container with a cover and label the container as used oil. Dispose of properly.
5. Clean and re-install the drain plug (3) into the transmission housing.
6. Remove the filter (4) from the filter mount on the front side of the transmission (5). Dispose of the filter properly. Clean the mating surface where the filter mounts.
7. Apply a thin film of clean Universal Tractor Fluid to the new filter gasket. Carefully install a new filter.



8. Remove the dipstick (6) and fill with Universal Tractor Fluid approximately 2.6 gallons (9,8 liters). Re-install the dipstick.
9. Check the transmission level and add Universal Tractor Fluid as required following the procedures outlined in “Transmission Oil Level Check” on page 129.
10. Reassemble the transmission covers and secure in place with the six hex nuts, washers and lockwashers. Tighten securely.

9. Axle Oil

A. Axle Oil Level Check

(250 Hour Intervals)

250

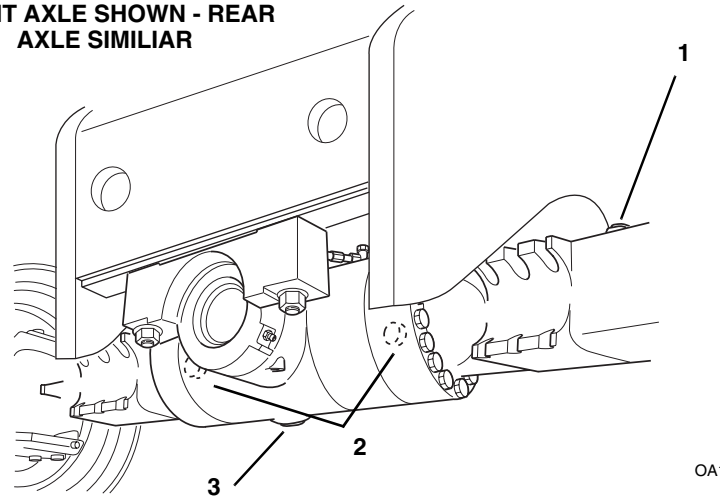
OH2710

OT0460

APPROVED UNIVERSAL TRACTOR FLUIDS	
JOHN DEERE	JDM J20C (HY-GARD)
FORD / NEW HOLLAND	ESN-M2C134-D (HYDRAULIC OIL134)
MASSEY FERGUSON	M-1141 (PERMATRAN III)
CHEVRON	CHEVRON 1000 THF

1. Level the vehicle, ground the carriage, place the travel select lever in (N) NEUTRAL, move neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and shut off the engine.
2. Clean the area around the axle fill plug (1) and the axle level plugs (2) on the opposite side of the axle and remove the plugs from the axle housing.
3. Add Universal Tractor Fluid to bring the oil level up and even with the plug holes. See chart of approved fluids above.
4. Re-install the axle fill plug (1) and axle level plugs (2).

FRONT AXLE SHOWN - REAR AXLE SIMILIAR



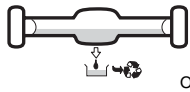
OA1320

B. Axle Oil Change

(First 50 Hours)
(1000 Hour Intervals)

OH2670

OH2690


OT0440

NOTE: *At the 1000 Hour Interval Oil Change also inspect the brake disc wear. Refer to "Brake Disc Inspection" on page 134 and follow the inspection procedure. After brake disc inspection is complete, reassemble the level plugs using new o-rings.*

1. Level the vehicle, ground the carriage, place the travel select lever in (N) NEUTRAL, move neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and shut off the engine.
2. Clean the area around the axle drain plug (3), the axle fill plug (1) and the axle level plugs (2).
3. Place a receptacle under the axle drain plug. Remove the plug from the axle housing and allow the oil to drain completely.
4. Transfer the oil to a container with a cover and label the container as used oil. Dispose of properly.
5. Clean off the axle drain plug and re-install. Remove the axle fill plug and the axle level plugs from the axle housing. Check brake disc wear at this time. Refer to "Brake Disc Inspection" on page 134.
6. Fill the axle with Universal Tractor Fluid through the axle fill hole until the oil level is even with both axle level holes (2). See chart of approved fluids on page 132. The axle capacity is 12.2 quarts (11,5 liters). Fill axle slowly, the oil has to run across the differential. Allow time for the oil to run across the differential. Axle level is correct when oil is up to both level plugs.
7. Reassemble the level plugs (2) using new o-rings.
8. Re-install the axle fill plug (1) into axle housing.

10. Brake Disc Inspection

A. Brake Disc Wear Check

(1000 Hour Intervals)

OH2690

MT2830

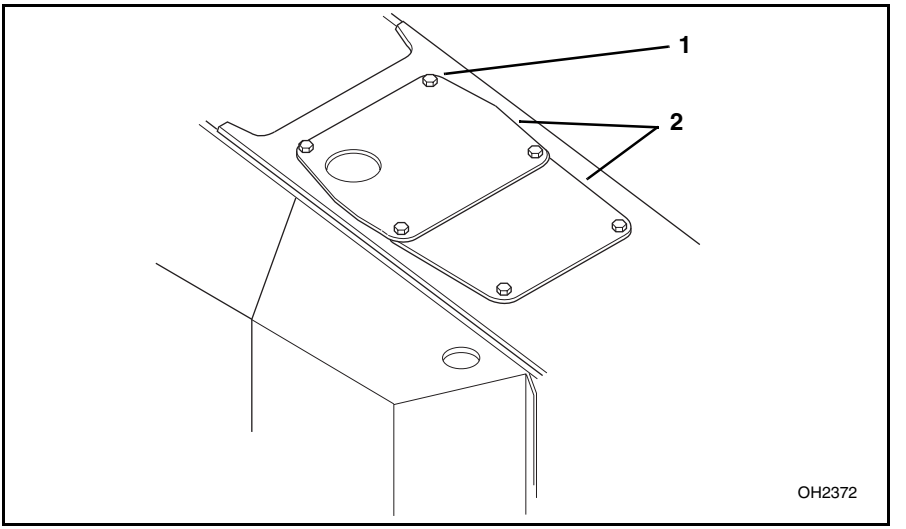
Check the brake discs for wear every 1,000 hours of operation or yearly.

If the brake discs require service due to wear, the axle should be checked, serviced and repaired only by experienced service technicians who are aware of all safety instructions and particular component features.

A. Front Axle

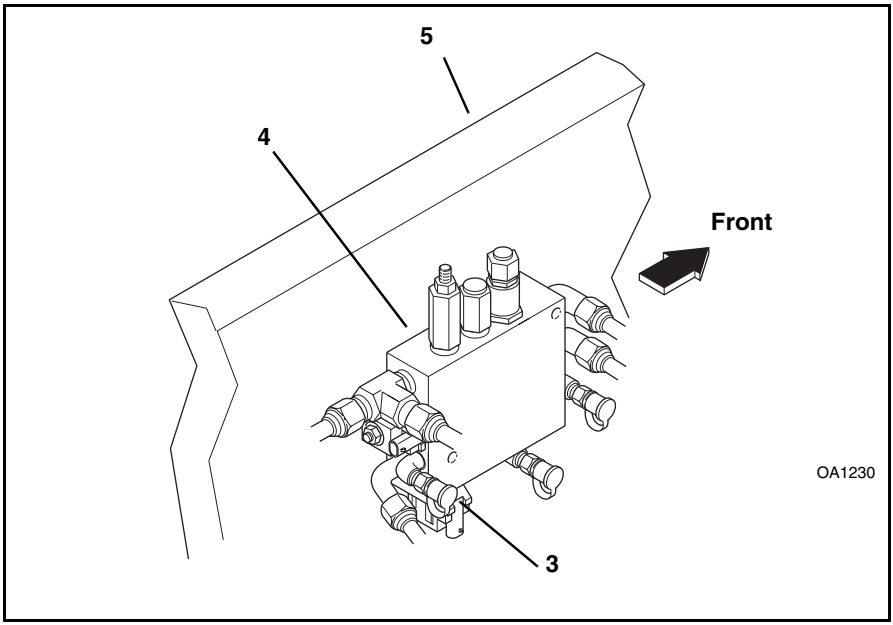
WARNING: **BLOCK ALL FOUR WHEELS.** Failure to do so could result in death or serious injury from vehicle roll-away

1. **Block all four wheels** to help prevent the vehicle from moving after the parking brake is disabled.
2. Remove the six hex nuts, lockwashers and flat washers (1) securing the transmission covers (2) to the frame. Remove the covers.



OH2372

3. Attach a remote portable hydraulic pressurizing unit to the parking brake gauge port (3) on the secondary function manifold (4) mounted on the inside wall of the frame (5) on the left side next to the transmission.

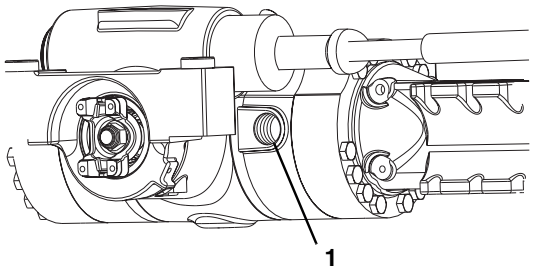


4. Turn the key switch to the ON position (with the engine not running), release the parking brake (park brake switch OFF), and have the operator seated in the seat.

	CAUTION: DO NOT exceed 575 psi (40 bar) when pressurizing the park brake. Applying too much pressure may damage the brake seals.

5. Pressurize the parking brake with the pressurizing unit. Close the needle valve on the pressurizing unit.
6. Working through the level plug hole (1), carefully use a screwdriver to spread the brake discs apart.

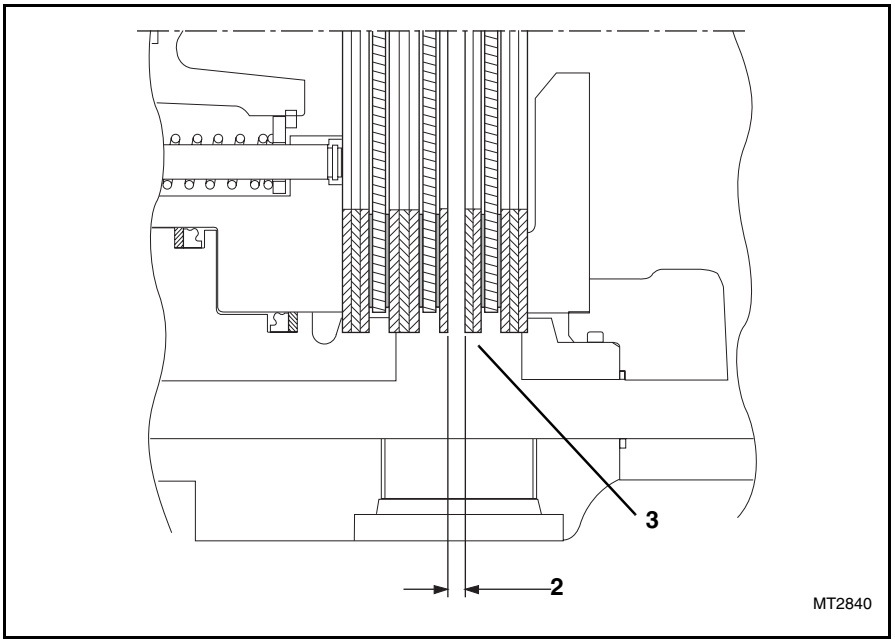
IMPORTANT! *DO NOT damage the surfaces of the brake discs when spreading the brake discs.*



7. Using a feeler gauge, check the gap (1) between the brake discs (2). If the gap is greater than .167" (4,25 mm), replace the brake discs.

NOTE: *If the brake discs are worn beyond .167" (4,25 mm), the brake disc must be replaced on both sides of the axle at the same time.*

8. Repeat steps 6 and 7 for the other side of the axle.
9. Continue with step 6 of “B. Axle Oil Change” on page 133.



B. Rear Axle

1. Working through the level plug hole (1), carefully use a screwdriver to spread the brake discs apart.

IMPORTANT! *DO NOT damage the surfaces of the brake disks when spreading the brake disks.*

2. Using a feeler gauge, check the gap (2) between the brake discs (3). If the gap is greater than .167" (4,25 mm), replace the brake discs.

NOTE: *If the brake discs are worn beyond .167" (4,25 mm), the brake disc must be replaced on both sides of the axle at the same time.*

3. Repeat steps 1 and 2 for the other side of the axle.
4. Continue with step 6 of “B. Axle Oil Change” on page 133.

11. Wheel End Oil

WARNING: **DO NOT** perform service or maintenance on this vehicle with the engine running. Contact with moving parts can cause death or serious personal injury.

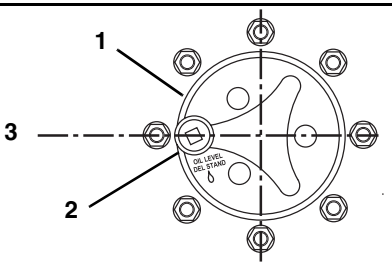
APPROVED UNIVERSAL TRACTOR FLUIDS	
JOHN DEERE	JDM J20C (HY-GARD)
FORD / NEW HOLLAND	ESN-M2C134-D (HYDRAULIC OIL134)
MASSEY FERGUSON	M-1141 (PERMATRAN III)
CHEVRON	CHEVRON 1000 THF

A. Wheel End Oil Level Check

(250 Hour Intervals)

250

1. Position the vehicle on level ground, move the vehicle forward or backward enough to ensure that the lower edge of the wheel end (1) fill/drain plug hole (2) is positioned horizontally (3).
2. Ground the carriage, place the travel select lever in (N) NEUTRAL, move neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and shut off the engine.
3. Clean the area around the wheel end fill/drain plug (2). Slowly remove the plug. Check the oil level.
4. Add Universal Tractor Fluid to bring the oil level up and even with the plug hole (2). See the above chart for approved fluids.
5. Clean and re-install the wheel end fill/drain plug (2).

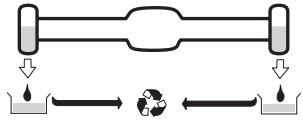


B. Wheel End Oil Change

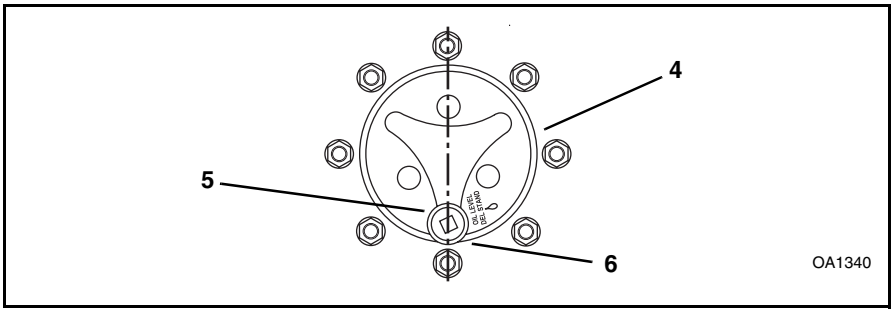
(First 50 Hours)
(1000 Hour Intervals)

OH2670

OH2690


OT0450

1. Position the vehicle on level ground, move the vehicle forward or backward enough to ensure that the wheel end (4) fill/drain plug (5) is in the 6 o'clock position (6).



OA1340

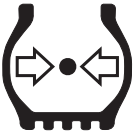
2. Ground the carriage, place the travel select lever in (N) NEUTRAL, move neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and shut off the engine.
3. Clean the area around the wheel end fill/drain plug (5). Slowly loosen the plug. Hold a receptacle under the wheel end and remove the plug from the wheel end.
4. Allow the oil to drain completely into the receptacle. Transfer the oil to a container with a cover and label the container as used oil. Dispose of properly.
5. Reposition the vehicle so the wheel end fill/drain plug is positioned horizontally.
6. Fill the wheel end with Universal Tractor Fluid to the level of the drain plug. See chart of approved fluids on page 138. Wheel end capacity is approximately 0.95 quarts (0,9 liters).
7. Clean and re-install the wheel end fill/drain plug (5).

12. Wheels and Tires

A. Tire Air Pressure Check

(10 Hour Intervals)

OH2660



OS0900

DANGER: **LOW TIRE PRESSURE** can result in tipover. **MAINTAIN** proper tire pressure at all times.

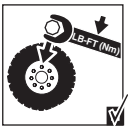
Check all four tires:

1. Remove the valve stem cap.
2. Check tire pressure using a good quality gauge. You cannot tell if a tire is properly inflated simply by looking at it.
3. Add air if required. Fill the tire(s) to:
   - Standard Tire 13.00 -24 (12 Ply) ..... 55 psi (379 kPa)
   - Optional Rock Tire 15.5-25 (12 Ply) ... 55 psi (379 kPa)
4. **DO NOT** overinflate.
5. Replace the valve stem cap.

B. Wheel Lug Nut Torque Check

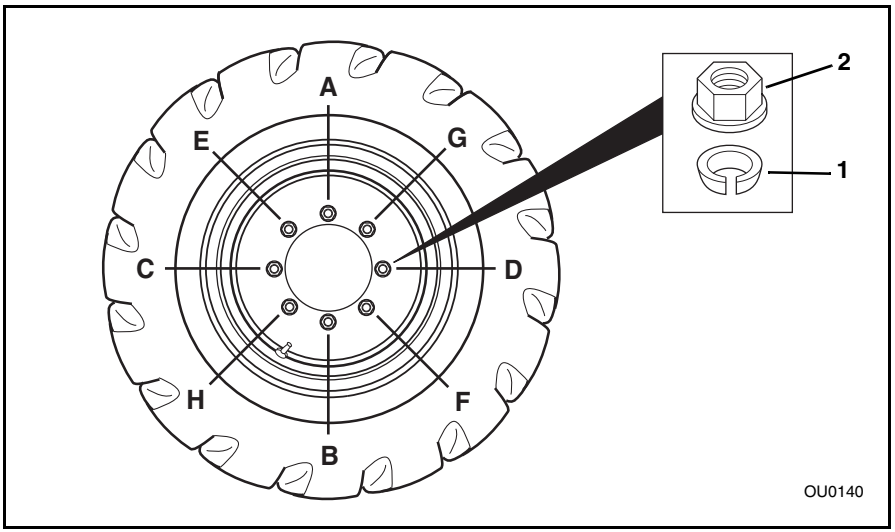
(First 50 Hours)

OH2670



OA1550

1. Wire brush the area around the lug nuts if necessary. There are separate lockwashers (1) under the lug nuts (2). Be sure the lockwashers are installed under each lug nut.
2. Using the torque sequence (A thru H) from the chart below, alternately check the torque of each of the eight lug nuts. The recommended torque should be 430-470 lb-ft (583-637 Nm).



OU0140

C. Replacing Tires

WARNING: Mis-matched tire sizes and PLY ratings may compromise vehicle stability and may result in vehicle tipover.

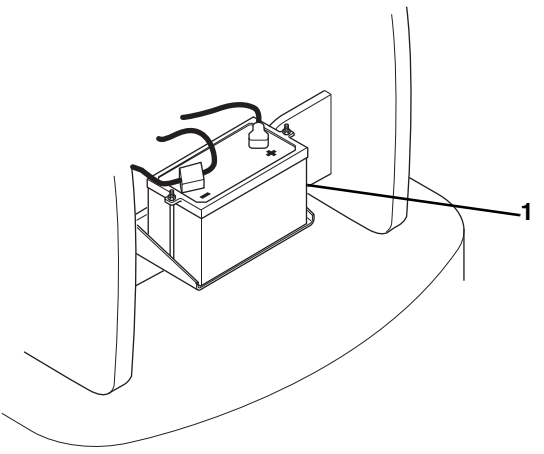
IMPORTANT! *The standard tire size and ply rating for this vehicle is: 13.00 - 24 12 ply. Make sure any replacement tire including optional tires, are of the same size and ply or star rating.* ***DO NOT*** *use lower PLY or star rated tires on this vehicle.*

13. Battery

WARNING: Lead-acid batteries produce flammable and potentially explosive gases. To avoid personal injury when checking, testing or charging batteries:
- **DO NO**T use smoking materials near batteries.
- Keep arcs, sparks and open flames away from batteries.
- Provide ventilation and wear safety glasses.

The battery in this vehicle is a maintenance free type battery. It is shipped in the vehicle filled with electrolyte and charged. A warning indicator light will illuminate on the display panel when the alternator is no longer able to charge the battery. To service the battery:

1. Level the vehicle, ground the carriage, place the travel select lever in (N) NEUTRAL, move neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and shut off the engine.
2. Unlock and open the rear door. The battery (1) is located inside the frame directly below the radiator and oil cooler.
3. Wearing safety glasses, visually inspect the battery. Check terminals for corrosion. Replace the battery if it has a cracked, melted or damaged case.
4. Close and lock rear door.



WARNING: Fluid in electric storage batteries contains sulfuric acid which is **POISON** and can cause **SEVERE CHEMICAL BURNS**. Avoid all contact of fluid with eyes, skin or clothing. Use protective gear when handling batteries. **DO NOT** tip a battery beyond a 45° angle in any direction. If contact does occur, follow the First Aid suggestions that follows.

Battery Electrolyte First Aid:

- **External Contact —** Flush with water.
- **Eyes —** Flush with water for at least 15 minutes and get medical attention immediately.
- **Internal Contact —** Drink large quantities of water. Follow with Milk of Magnesia, beaten egg or vegetable oil. Get medical attention immediately.

IMPORTANT! *In case of internal contact,* ***DO NOT*** *give fluids that would induce vomiting!*

Battery Charging

WARNING: **DO NOT** charge a frozen battery, it may explode and cause serious injury. Let the battery thaw out before putting on a battery charger.

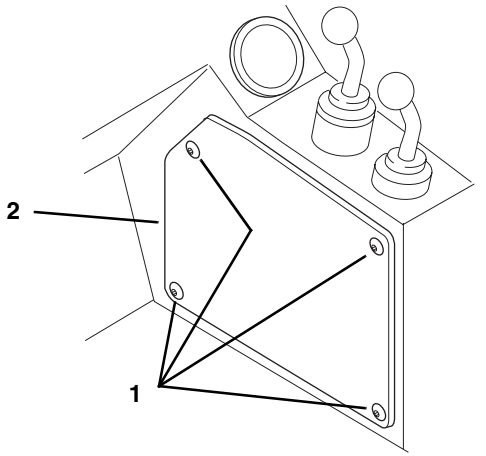
Under normal conditions, the engine alternator will have no problem keeping the battery or batteries charged. The only condition in which the battery may cause a problem is when it has been completely discharged for an extended period of time. Under this condition, the alternator may not be able to recharge the battery. A battery charger will be required for recharging.

Before using a battery charger, an attempt can be made to recharge the battery using the engine alternator by first starting the vehicle and letting the engine run. See “Jump Starting” instructions on page 56.

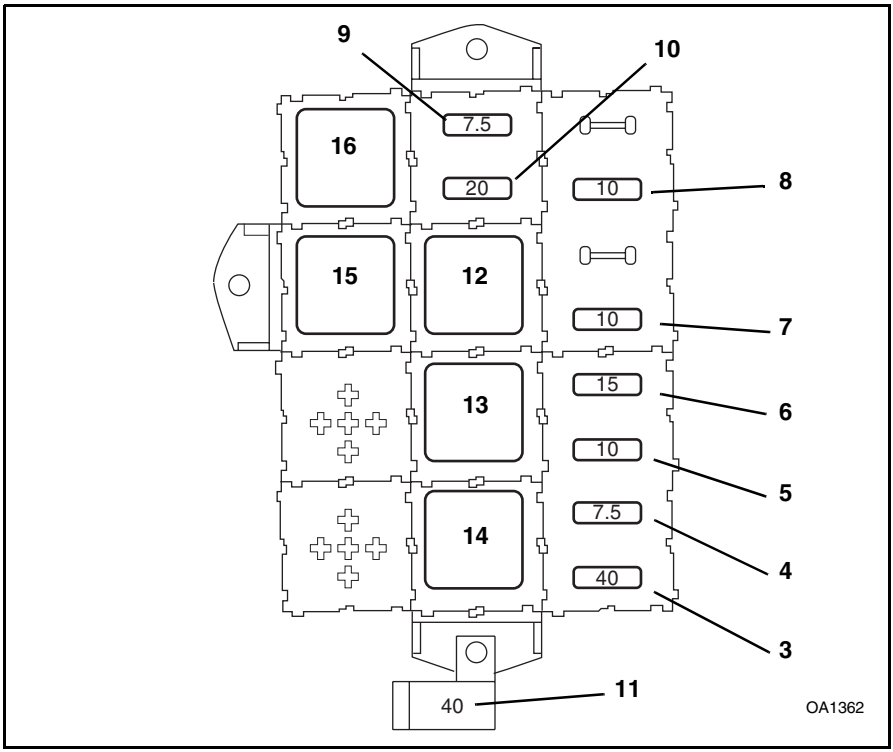
14. Fuse and Relay Replacement

The fuses and relays in this vehicle protect the electrical system. The fuses most often fail if there is a short or grounded wire in the applicable circuit. The fuses will have to be replaced if they fail. If fuses continually fail, check the system for shorts, grounds or defective electrical components.

The fuses and relays are mounted inside the right side console in the operators cab. To gain access, remove the screws (1) that secure the access panel (2) in place. Refer to the following page for the locations of fuses and relays within the fuse block.



OH2430

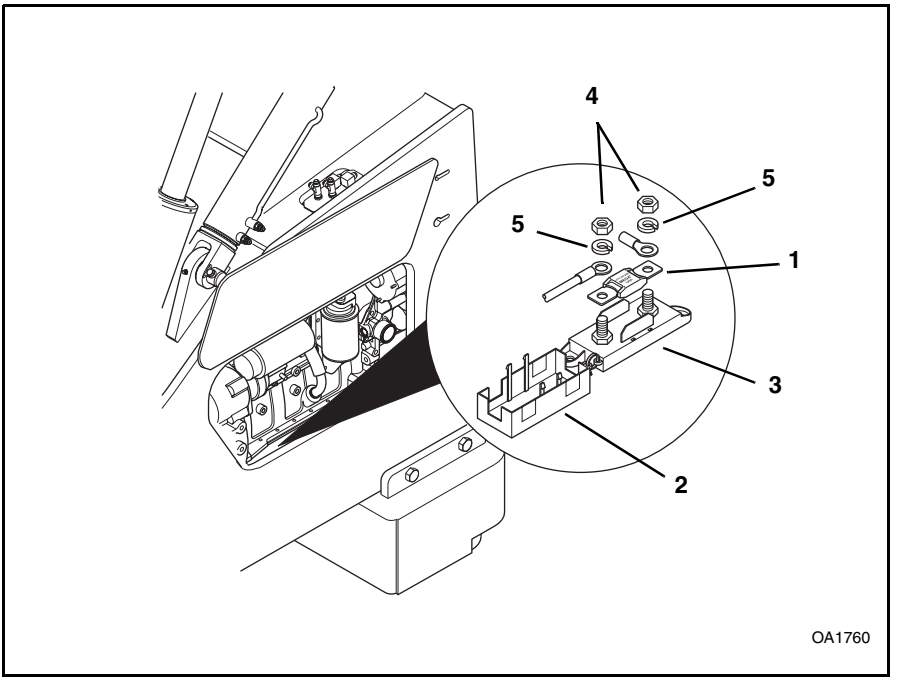


No.	Amp/Volt	Color	Circuit Protected
3	40 Amp	Orange	Main
4	7.5 Amp	Brown	Light Switch Relay
5	10 Amp	Red	Instrument Cluster
6	15 Amp	Blue	Horn/Heater
7	10 Amp	Red	Steer Select Switch
8	10 Amp	Red	Optional Washer/Wiper
9	7.5 Amp	Brown	Transmission
10	20 Amp	Yellow	Optional Lights
11	40 Amp	Orange	Optional Road/Work Lights
12	12 Volt	–	Park Brake Disengage Relay
13	12 Volt	–	Neutral Start Relay
14	12 Volt	–	Backup Relay
15	12 Volt	–	Light Switch Relay
16	12 Volt	–	Optional Headlight Switch Relay

Cold Start Grid Heater Fuses (Optional)

The two 125 amp fuses (1) that protect the cold start grid heater are located inside the frame on the left side.

1. Unlock and open the left engine access door.
2. To access the fuses, open the protective covers (2). Allow the covers to rotate on the tethers on the holder (3).
3. Remove the two hex nuts (4) and lockwashers (5) securing the fuse (1) and wires to the fuse holder (3). Remove the fuse and replace with a new fuse.
4. Place the new fuse and then the wires onto the studs of the holder. Secure the fuse and wires in place with the lockwashers (5) and hex nuts (4). Torque the hex nuts to 7-9 lb-ft (10-12 Nm).
5. Snap the protective cover back in place. Be sure the cover snaps securely in place on the holder.
6. Close and lock the left side engine access door when complete.



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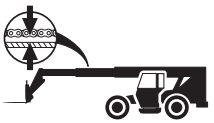
15. Boom Chains and Wear Pads

A. Boom Chain Tension Check

(First 50 Hours)
(1000 Hour Intervals)

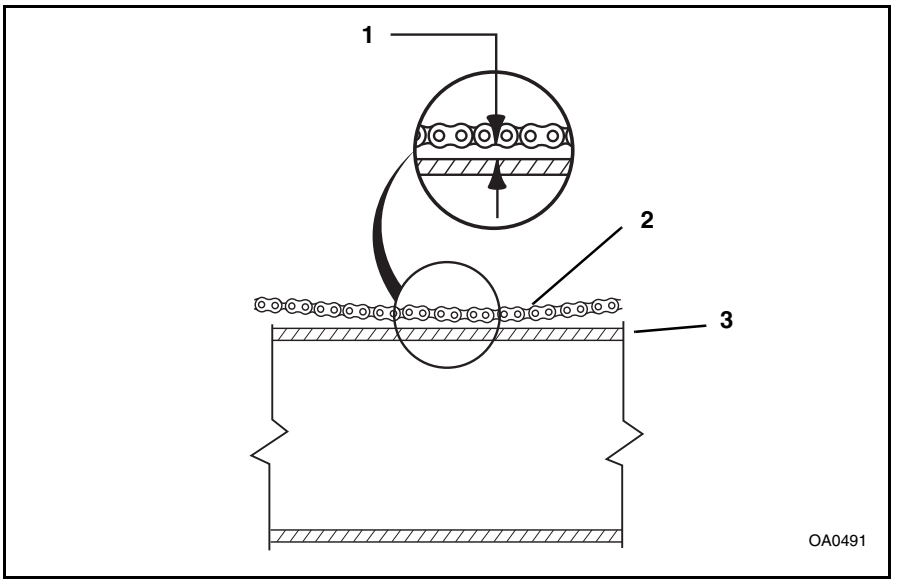
OH2670

OH2690


OH2390

Check the boom chain tension by measuring the top boom extend chain sag.

1. Park the vehicle on level ground. Place the travel select lever in (N) NEUTRAL, move neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and raise the boom to a horizontal (level) position.
2. Fully extend the boom, then retract it 2" (51 mm) (one inch per section). Turn the vehicle OFF.
3. Measure the sag (1) in the top boom extend chains (2) between the bottom of the chains and the top of the intermediate boom (3) at their closest point. Acceptable boom chain sag is between 1.5" (38 mm) and 2.5" (64 mm). If the measurement is less than 1.5" (38 mm) or more than 2.5" (64 mm), the boom chains need to be adjusted.

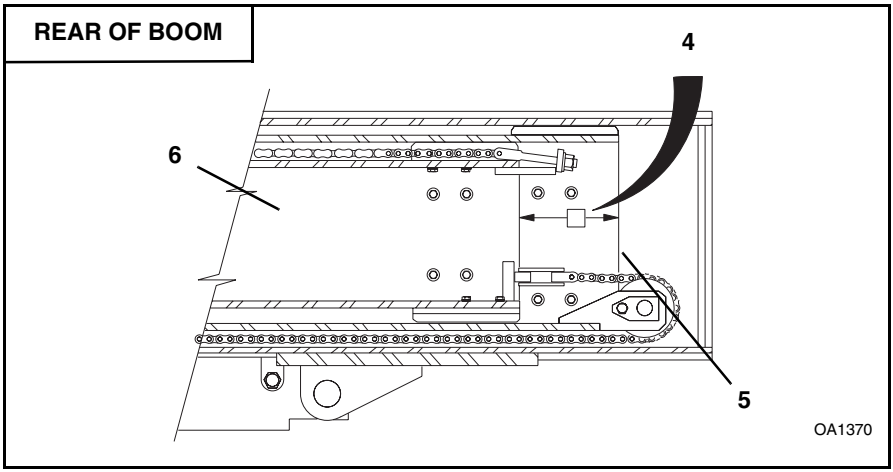


OA0491

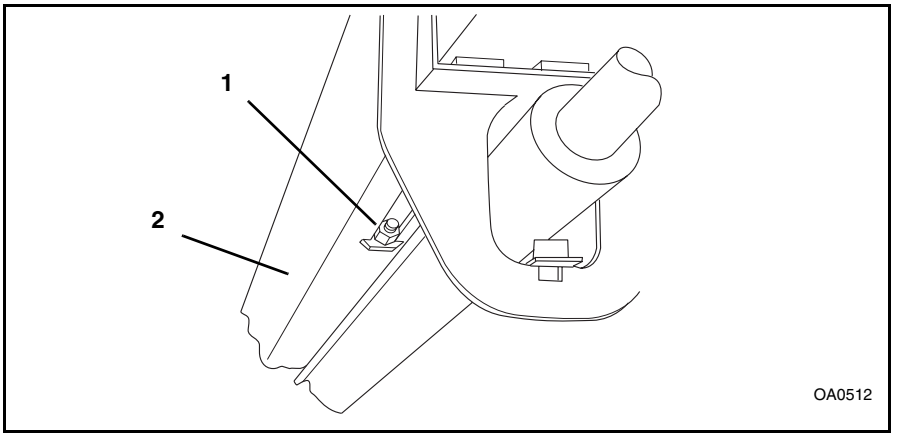
Before making any adjustments to the extend chains, check the following measurement at the rear of the boom.

4. Start the vehicle, retract the boom completely and turn the vehicle OFF.
5. Go to the back of the vehicle and remove the rear cover from the back of the boom.
6. Check the measurement (4) from the top rear edge of the intermediate boom (5) to the top rear edge of the inner boom (6). This measurement should be in the range of 8.00" (203 mm) to 8.5" (216 mm).

NOTE: *If the measurement is less than 8.0" (203 mm) the boom may require extensive adjustment and/or repair. Contact your local* JLG *Distributor.*



7. If the measurement is more than 8.5" (216 mm), tighten the retract chain locknut (1) located on the bottom of the outer boom (2).



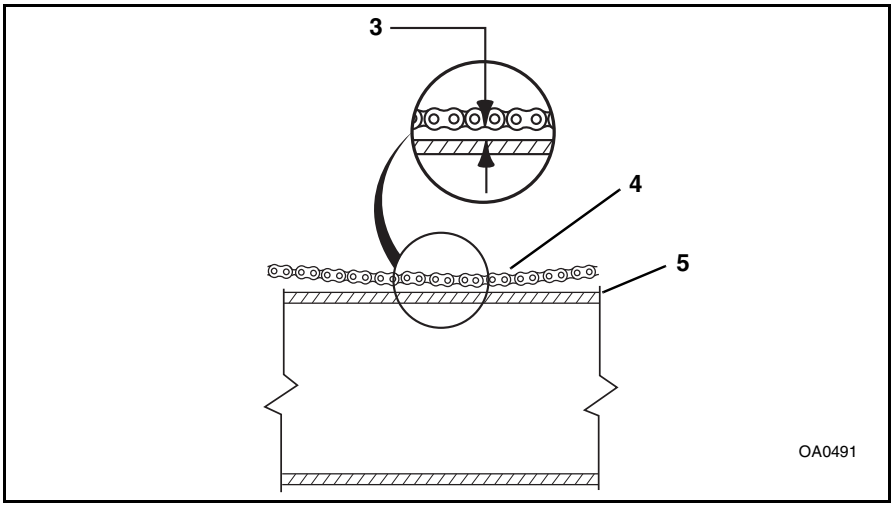
8. Start the vehicle and cycle the boom in and out several times. Then with the boom horizontal, retract the boom completely. Turn the vehicle OFF.
9. Recheck the measurement at the rear of the boom between the top rear edge of the intermediate boom and the top rear edge of the inner boom. If the measurement is still more than 8.5" (216 mm), repeat steps 7 and 8.

NOTE: *If, by adjusting the retract locknut, you cannot get the measurement within the range of 8.0" (203 mm) to 8.5" (216 mm), the boom may require extensive adjustment and/or repair. Contact your local* JLG *Distributor.*

If the measurement is within the range of 8.0" (203 mm) to 8.5" (216 mm) measure the top boom extend chain sag again.

10. Start the vehicle and cycle the boom in and out several times. With the boom horizontal, fully extend the boom and then retract it 2" (51 mm) (one inch per section). Turn the vehicle OFF.

11. Measure the sag (3) in the top boom extend chains (4) between the bottom of the chains and the top of the intermediate boom (5) at their closest point. Acceptable boom chain sag is between 1.5" (38 mm) and 2.5" (64 mm). If the measurement is less than 1.5" (38 mm) or more than 2.5" (64 mm), the top boom chains need to be adjusted. See “Top Boom Chain Tension Adjustment” on page 152.

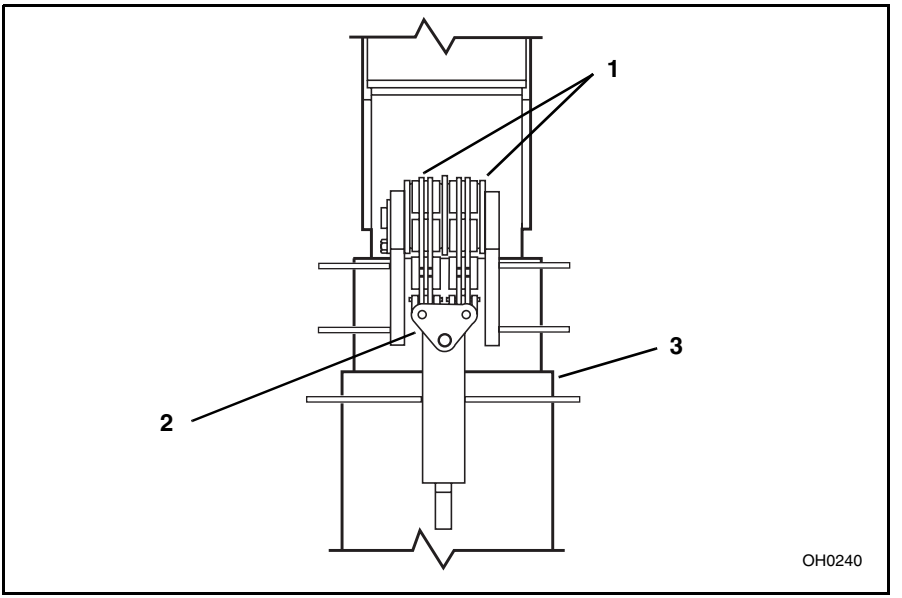


B. Top Boom Chain Tension Adjustment

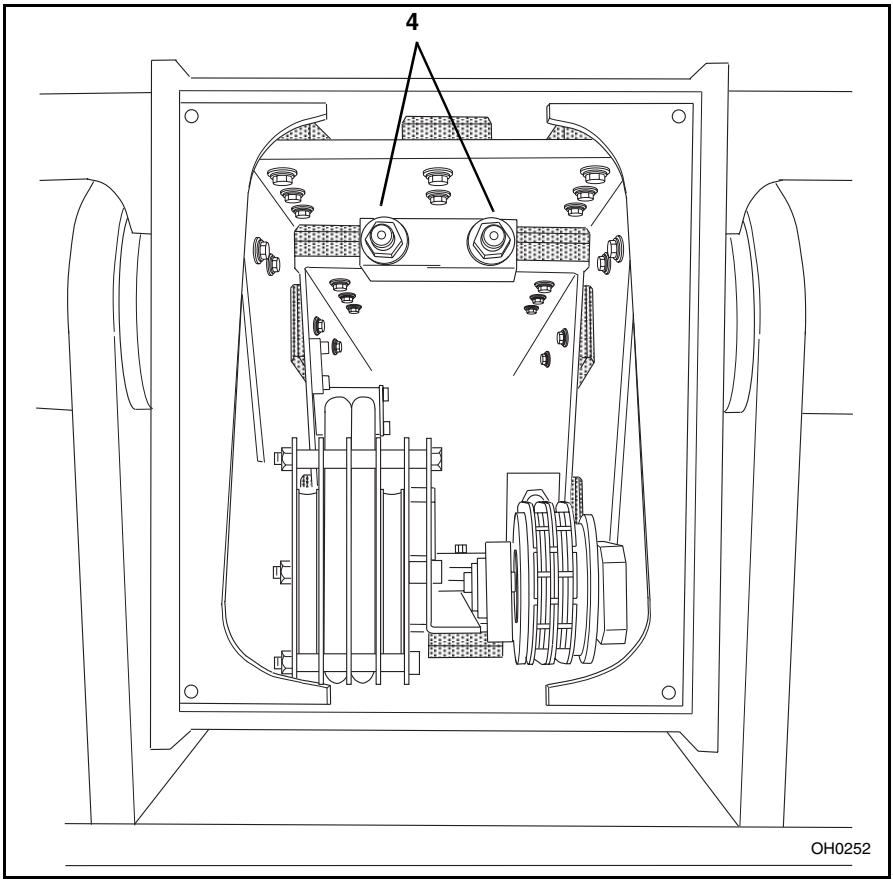
(As required)

NOTE: *Always perform the "Boom Chain Tension Check" starting on page 148 before adjusting the boom chain tension.*

1. Park the vehicle on level ground. Place the travel select lever in (N) NEUTRAL, move neutral lock lever to NEUTRAL LOCK position, engage the parking brake switch and raise the boom to a horizontal position. Retract the boom completely and turn the vehicle OFF.
2. Adjust the top extend boom chains (1) by tightening the locknuts (4) located at the rear of the boom. Be sure each locknut is tightened equally so that each chain maintains the same tension.



3. Equal chain tension can be checked by the position of the yoke (2) on the outer boom (3). The front of the yoke should be parallel with the front edge of the boom.



4. Start the vehicle and cycle the boom in and out several times. With the boom horizontal, fully extend the boom and then retract it 2" (51 mm) (one inch per section). Turn the vehicle OFF.
5. Measure the chain sag. Acceptable boom chain sag is between 1.5" (38 mm) and 2.5" (64 mm). If the chain sag is less than 1.5" (38 mm), repeat steps 1 through 5 until the sag is within the acceptable range.

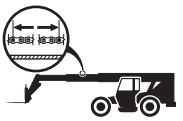
NOTE: *If the top boom extend chain sag cannot be adjusted within the acceptable range of 1.5" (38 mm) to 2.5" (64 mm), the boom may require extensive adjustment and/or repair. Contact your local* JLG *Distributor.*

6. Replace the rear outer boom cover.

C. Boom Chain Inspection

(250 Hour Intervals)

OH2710



OA1490

WARNING: Worn pins, stretched or cracked links or corrosive environments can cause chain failure. A chain failure could result in uncontrolled boom movement, loss of load or vehicle instability and could cause death or serious injury and/or property damage.

Under normal operating conditions the boom chains will need to be inspected every 250 hours of operation. The retract chains need to be exposed and inspected every 1000 hours of operation. Refer to the Service Manual for the proper procedure. Environmental conditions and dynamic impulse/shock loads can drastically affect normal operating conditions and require more frequent inspection intervals.

Environments in which material handling vehicles operate can vary widely from outdoor moisture to temperature to mildly corrosive or highly corrosive industrial atmospheres, in addition to abrasive exposures such as sand and grit. Some effects can be as follows:

- Moisture - Corrosive rusting reduces chain strength by pitting and cracking.
- Temperature - Low temperature reduces chain strength by embrittlement. Going in and out of cold storage results in moisture from condensation.
- Chemical Solutions or Vapors - Corrosive attack on the chain components and/or the mechanical connections between the chain components. Cracking can be (and often is) microscopic. Going from microscopic cracking to complete failure can be either abrupt or may require an extended period of time.
- Abrasives - Accelerated wearing and scoring of the articulating members of the chain (pins and plates), with a corresponding reduction in chain strength. Due to the inaccessibility of the bearing surfaces (pin surfaces and plate apertures), wear and scoring are not readily noticeable to the naked eye.

Following are some examples of dynamic shock loading which can impose abnormal loads above the endurance limit of a leaf chain.

- High velocity movement of load, followed by sudden, abrupt stops.
- Carrying loads in suspension over irregular surfaces such as railroad tracks, potholes, and rough terrain.
- Attempting to “inch” loads which are beyond the rated capacity of the vehicle.

The above load cycles and environmental conditions make it impossible to predict chain life. It is therefore necessary to conduct frequent inspections until replacement life can be predicted.

The boom chain’s normal life expectancy can be expressed as a maximum percent of elongation. This is generally 3%. As the chain flexes back and forth over the sheave, the bearing joints (pins and inside link plates) gradually incur wear due to articulation.

Inspection Guidelines

1. Park the vehicle on level ground. Place the travel select lever in (N) NEUTRAL, place the neutral lock lever in the (N) NEUTRAL LOCK position, engage the parking brake switch and raise the boom to a horizontal (level) position.
2. Fully extend the boom until the extend chain is taut. Shut the engine off.

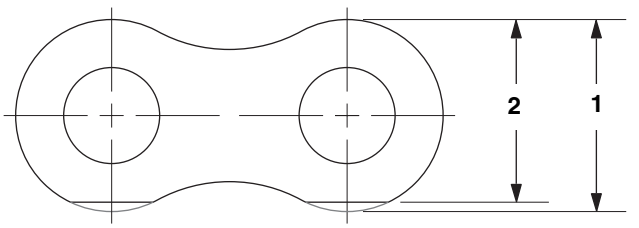
   The extend chains will be visible for inspection with the vehicle in this state. The retract chain can be visually inspected, at the rear of the boom, as the boom is slowly retracted.

   While doing the chain inspection, check all chain clevis ends for distortion or cracking and sheaves for bearing wear or grooving from the chain.
3. Inspect the retract chains every 1000 hours of operation. Refer to the Service Manual for proper procedure.
4. Inspect the chains for the following conditions:

Edge Wear

Check the chain for wear on the link plate edges caused by running back and forth over the sheave. The maximum reduction of material should not exceed 5%. This can be compared to a normal link plate height by measuring a portion of chain that does not run over the sheave.

The new chain link measures .713" (18 mm) (1). If the measurement of the worn chain is less than .677" (17 mm) (2), the chain should be replaced.



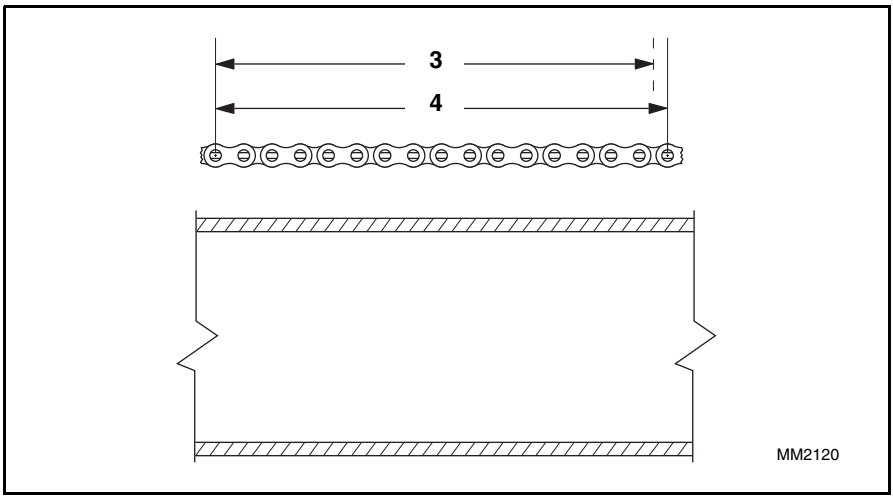
Elongation

When the original length (3) of 12.00" (305 mm) per foot of new chain has elongated from wear to a length (4) of 12.36" (313 mm), the chain should be discarded and replaced.

It is important to measure the chain in the section that moves over the sheaves because it receives the most frequent articulation. Measuring the chain near its clevis terminals could give an inaccurate reading. The ends of the chains, near the clevis terminal, will not have flexed as frequently, if at all, as nearer the middle of the chains.

Measure across a span of 17 pins at the center of the extend chain. Measure from pin center to pin center. Because the retract chain is inside the boom you will not be able to measure the chain. Refer to the Service Manual for inspection procedure of the retract chain.

The maximum measurement allowed is 12.36" (313 mm). If the measurement is more than 12.36" (313 mm), the chain should be replaced.



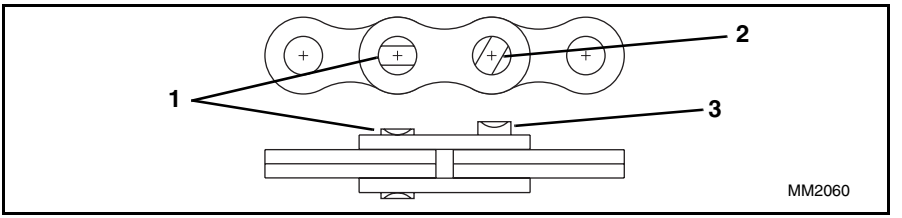
Turning or Protruding Pins

Highly loaded chain, operating with inadequate lubrication can generate abnormal frictional forces between pin and link plates. When chain is allowed to operate in this condition, a pin or series of pins, can begin to twist out of a chain, resulting in failure.

Examine the pin head rivets to determine if the “VEE” flats are still in correct alignment (1). Chain with rotated/displaced heads (2) or abnormal pin protrusion (3) should be replaced immediately.

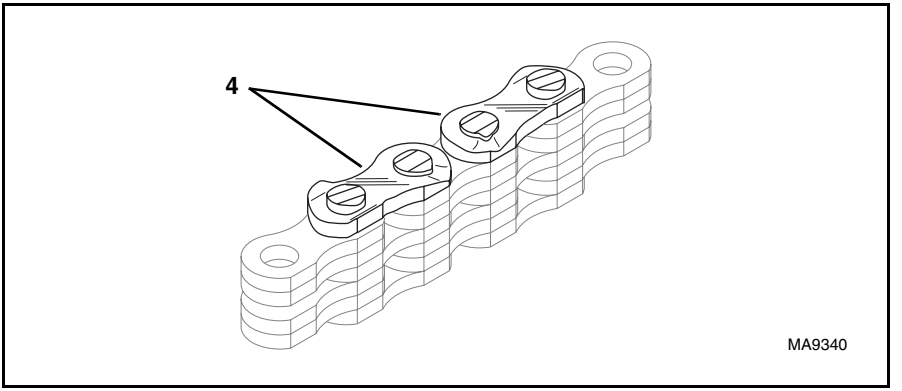
DO NOT attempt to repair the chain by welding or driving the pin(s) back into the chain. Once the press fit integrity between outside plates and pins has been altered, it cannot be restored.

Any wear pattern on the pin heads or the sides of the link plates indicates misalignment in the system. This condition damages the chain as well as increases frictional loading and should be corrected.



Distorted or Battered Link Plates

Distorted or battered link plates (4) on a leaf chain can cause tight joints and prevent flexing.



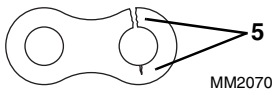
Cracked Plates

Inspect the chains very carefully, front and back as well as side to side, for any evidence of cracked plates. If any one crack is discovered, the chain should be replaced in its entirety.

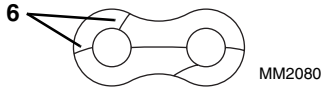
It is important, however to determine the cause of the crack before installing a new chain so the condition does not repeat itself.

The types of cracks are:

- **Fatigue Cracking** - Fatigue cracks (5) are a result of repeated cyclic loading beyond the chain's endurance limit.



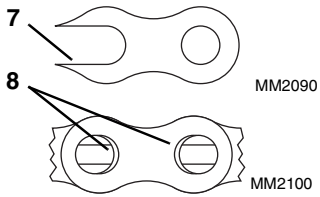
- **Stress Corrosion Cracking** - The outside link plates are particularly susceptible to stress corrosion cracking (6).



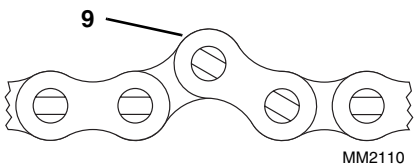
- **Corrosion Fatigue Cracking** - Corrosion fatigue cracks are very similar to fatigue cracks in appearance. Corrosion fatigue is the combined action of an aggressive environment and cyclic stress.

Other Modes of Failure

- **Ultimate Strength Failure** - These types of failures are caused by overloads far in excess of the design load. Either fractured plates (7) or enlarged holes (8) can occur. If either of these failures occurs, the chain should be replaced immediately.



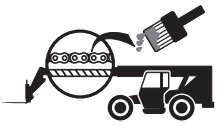
- **Tight Joints** - All joints in the chain should flex freely. Tight joints (9) resist flexing.
If the problem is caused by dirt or foreign substance packed in the joints, clean and lubricate thoroughly before re-installing the chain.
If the problem is caused by corrosion and rust or bent pins, replace the chain.



D. Chain Lubrication

(1000 Hour Intervals)

OH2690


OA1510

After inspection and before being returned to service, chains must be lubricated with a quality chain lubricant (“LUBRIPLATE” Chain & Cable Fluid, “LPS3” or equivalent).

The lubricant must penetrate the chain joint to prevent wear. Applying lubricant to the external surfaces will prevent rust, but the chains should be articulated to make sure the lubricant penetrates to the working surfaces between the pins and links.

To prepare the chain for lubrication, the chain plates should be brushed with a stiff brush or wire brush to clear the space between the plates so that lubricant can penetrate to the working surfaces.

Lubricant may be applied with a narrow paint brush or directly poured on, but the chain should be well flooded with lubricant and the boom should be extended and retracted to be sure that the lubricant penetrates to the working surfaces. All surplus lubricant should be wiped away from the external surfaces. DO NOT use a solvent for this wiping operation.

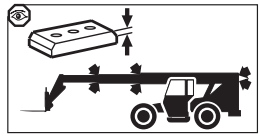
Regular application of lubricant is necessary to make sure that all working surfaces are adequately lubricated. In extremely dusty conditions, it may be necessary to lubricate the chains more often.

Lubrication of chains on vehicles working consistently in extreme hot or cold conditions requires special consideration. It is important that a reputable lubrication specialist, a JLG Distributor or the vehicle distributor be consulted for guidance.

E. Wear Pad Inspection

(50 Hour Intervals)

OH2680



OH2400

Visually inspect boom wear pads between the boom sections at the rear and front of the boom for excessive wear at every 50 hour interval.

The average expected life of boom pads will vary depending upon vehicle use, weight of loads, operating conditions, and the location of boom pads inside the boom.

If the vehicle is used continuously and the weights of the loads are at or near maximum capacity, or if you are operating in very dusty or dirty conditions, the boom pads will wear much faster. The pads that are under the most stress from the weight of the load will also wear faster than other pads. For example the lower pads at the front of the boom and the upper pads at the rear of the boom are under far more stress than the pads attached to any other surface of the boom. Consequently the lower pads at the front and the upper pads at the rear will require service more often.

F. Wear Pad Replacement

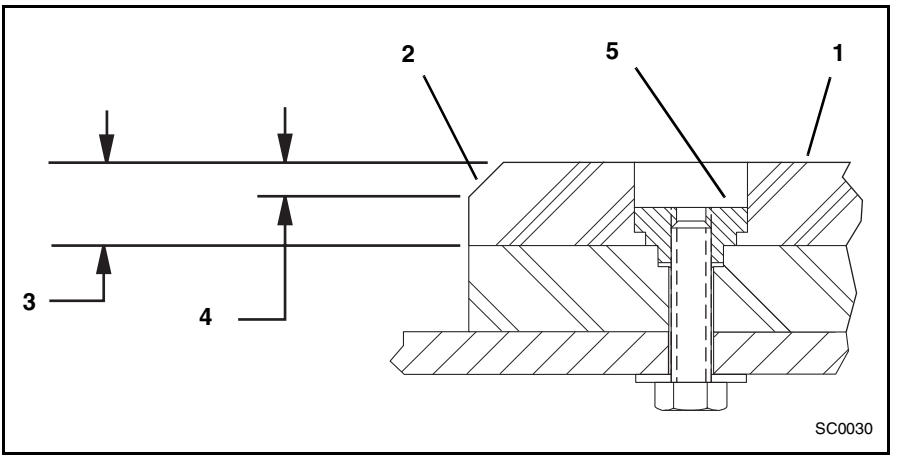
(As Wear Pad Indicators Indicate)

Each boom pad (1) is manufactured with a convenient wear pad indicator (2). This is the angled cut (2) at each end of all wear pads (1). The total thickness (3) of a new wear pad is .625" (16 mm). The angled cut will provide a total wear thickness (4) of .25" (6 mm). This will leave approximately .375" (10 mm) of total unused base material.

The pads must never be worn past the angled cut indicator because the metal pad insert (5), that holds the pads in place, will begin to wear into the boom pad sliding surfaces. If the pad wears past this point, the metal insert in the pad will begin to gouge the boom plate surfaces. Contact your local JLG Distributor.

Replacement of boom wear pads must be performed by a JLG Distributor when the wear pads indicate.

IMPORTANT! *The boom has been factory lubricated for proper wear pad break-in and will normally not require further lubrication. However, after replacing any wear pad(s) or after prolonged periods of inoperation, light lubrication with "LPS3" or "LUBRIPLATE" chain or cable fluid (or equivalent) of the boom wear surfaces is recommended to keep the wear pads and boom wear surfaces lubricated properly. Light lubricating of the boom wear surfaces is also recommended in salt air climates, after cleaning with pressure washer using solvents or when the vehicle is to be put in storage, to prevent rusting.*



Storage and Transport

Storage

A. Before Storing

Perform the following steps prior to placing the vehicle in storage:

1. Clean the entire vehicle.
2. Lubricate all grease fittings as described in “Lubrication Points” on page 106.
3. Prepare the engine for storage (refer to the engine manual).
4. Apply rust inhibiting lubricant to all exposed hydraulic cylinder rods.
5. Disconnect the battery cables. Remove the battery or batteries from the vehicle and store in a dry place where they are not subject to temperatures near or below freezing.
6. If the ambient temperature is expected to drop below freezing at anytime during the storage period, make sure the engine coolant is either completely drained from the radiator and engine block or that the amount of anti-freeze in the system is adequate to keep the coolant from freezing.
7. Preferably, store the vehicle inside where it will remain dry. If it must be stored outside, park it on lumber laid on flat level ground or on a concrete slab and cover with a tarp.

B. Removing From Storage

After removing the vehicle from storage and before operating it, perform the following steps:

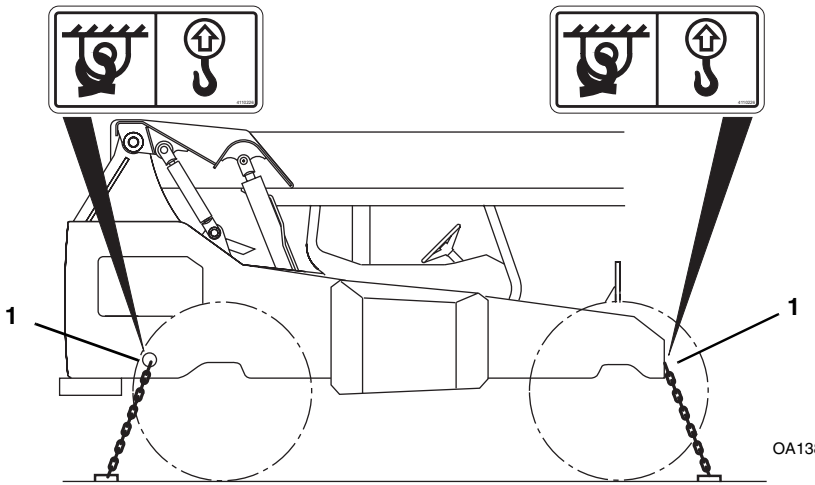
1. Reinstall a properly charged battery or batteries. Secure the hold-down bracket and attach cables.
2. Change the engine oil and filter to remove condensation or other residuals.
3. If the vehicle has been stored for two years or more, drain the coolant from the engine block and radiator and refill with a 50/50 mixture of fresh anti-freeze and water. For detailed information, see “Drain and Flush Radiator” on page 113.
4. Wipe off any rust inhibiting lubricant that was applied to vehicles hydraulic cylinder rods prior to storing.
5. Refer to “Maintenance Schedule And Checklist” on page 101. Perform all the maintenance checks listed under the 10 Hour Intervals.

6. Review and familiarize yourself and any other operator with all the safe and proper operating procedures contained in this manual.

Transport

When transporting the vehicle, make use of all four tiedown/lift point locations (1) on the vehicles frame.

TIE DOWN/LIFT POINT LOCATIONS



NOTE: *The user assumes all responsibility for choosing the proper method of transportation, and the proper selection and use of transportation and tie-down devices, making sure the equipment used is capable of supporting the weight of the vehicle being transported and that all manufacturer's instructions and warnings, regulations and safety rules of their employer, the Department of Transportation and/or any other state or federal laws are followed.*

Parking Brake/Transmission De-Clutch Test Procedures

To check that the parking brake/transmission de-clutch system is functioning properly, perform the following tests.

IMPORTANT! *These tests should be performed in (1) FIRST gear only.*

WARNING: **DO NOT** operate this vehicle unless you are in the seat with the seat belt fastened around you. Death or serious personal injury could result if the belt is not securely fastened.

Test 1 - Transmission De-Clutch

Step 1

a. Place the vehicle on a level surface.
b. Clear the area in front and behind the vehicle of any obstacles.
c. Fasten your seat belt.
d. Turn the key and start the engine.
e. With the parking brake applied, move the range select lever to (1) FIRST gear.
f. Move the travel select lever to (F) FORWARD.
g. Depress the throttle pedal fully. The unit should not move.

Step 2

a. Remove your foot from the throttle pedal.
b. Move the travel select lever to (R) REVERSE.
c. Depress the throttle pedal fully. The unit should not move.
d. Remove your foot from the throttle pedal.
e. Move the travel select lever to (N) NEUTRAL.

Test 2 - Transmission De-Clutch/Parking Brake Activation

a. Disengage the parking brake.
b. Move the travel select lever to (F) FORWARD.
c. Move the unit **slowly** in a forward direction (approximately 1 mph [1,6 km/h]).
d. Engage the parking brake. The unit should stop abruptly.

Test 3 - Park Brake Hold Performance

a. With the rated load of 6,000 lbs (2.721 Kg) on the forks, drive the vehicle forward up a 15% grade (15 ft. rise over 100 ft. run).

b. Stop the vehicle using the service brakes, apply the park brake, shift the transmission into NEUTRAL (N).

c. Take your foot off the service brake pedal. The vehicle should not move.

d. Apply the service brakes, shift the transmission into REVERSE (R), move the park brake switch to the OFF position and back down off the grade.

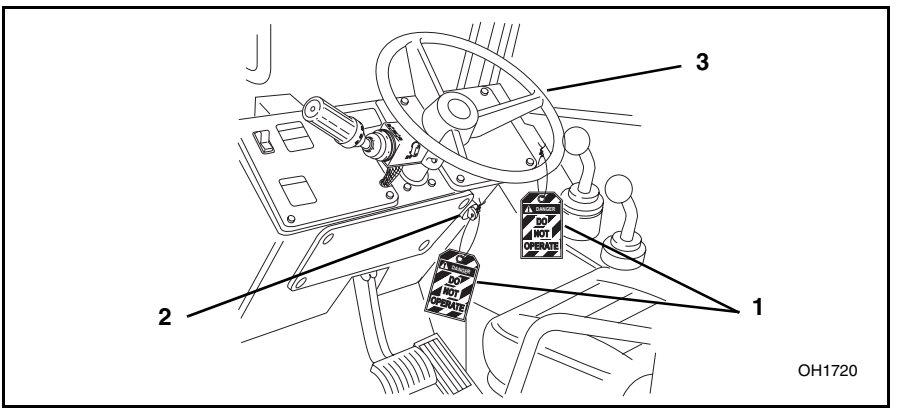
e. Repeat “Test 3” by backing up the grade and checking the park brake holding performance.

If the parking brake or transmission de-clutch does not pass these tests, do the following.

1. **Immediately** remove the vehicle from service.

WARNING: **BLOCK ALL FOUR WHEELS.** Failure to do so could result in death or serious personal injury from vehicle roll away.

2. Block all four wheels to prevent the vehicle from moving.
3. Place the accident prevention tags (1) on the ignition switch (2) and the steering wheel (3).
4. Service the parking brake immediately or contact your local **Sky Trak** Distributor to repair the system.

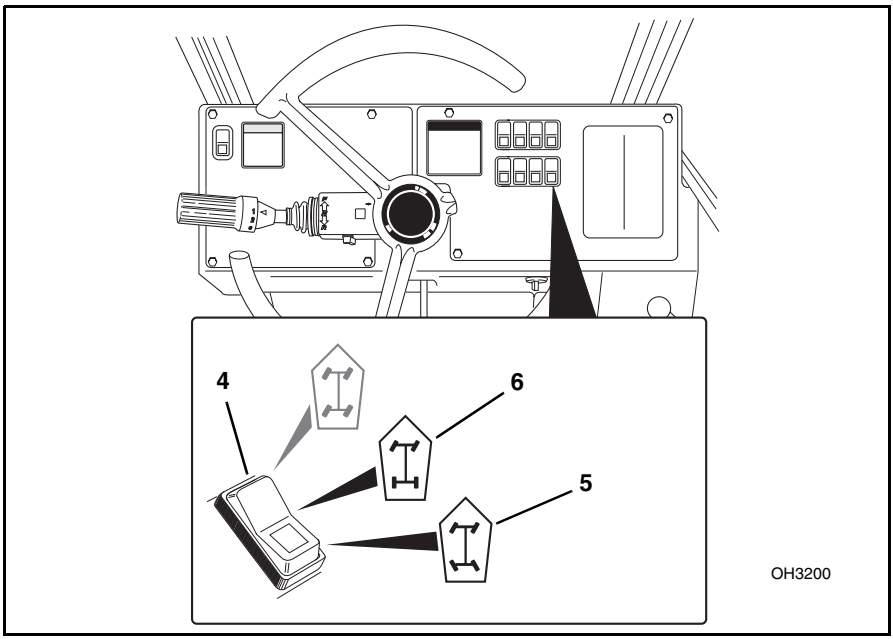


Four Wheel Steer Indexing Procedure

If the vehicle does not drive “straight,” the steering could be out-of-phase. Perform the following Four Wheel Steer Indexing Procedure to synchronize the front and rear steering.

1. With the steering select switch (4) in the Four Wheel Steer position (5), turn the steering wheel full left.
2. While holding the steering wheel full left, toggle the steer select switch to the Front Wheel Steer position (6) and steer the front wheels back to center.
3. Toggle the steer select switch back to Four Wheel Steer position (5) and turn the steering wheel full left.
4. Toggle the steer select switch back to Front Wheel Steer position (6) and steer the front wheels full left.
5. Toggle the switch to the Four Wheel Steer position (5) and return to center.

The vehicle should now be properly indexed in Four Wheel Steering. If the wheels are still out-of-phase, repeat the above procedure.



Fluid & Lubrication Capacities

Engine Crankcase Oil:

Capacity with Filter Change ..... 10.5 quarts (10 liters)

Filter Capacity ..... 0.85 quart (0,8 liters)

Type of Oil 15W40

Fuel Tank:

Total Capacity ..... 37 gallons (140 liters)

Usable Capacity ..... 35.6 gallons (135 liters)

Type of Fuel

Below 32° F (0° C) ..... Winterized #2 Diesel

Above 32° F (0° C) ..... Standard #2 Diesel

Cooling System:

Cooling System Capacity (w/o heater) ..... 4 gallons (15 liters)

Overflow Bottle Capacity ..... 3.0 quarts (2,8 liters)

Type of Coolant ..... 50/50 ethylene glycol and water

Hydraulic System:

System Capacity ..... 57.5 gallons (217,6 liters)

Reservoir Capacity to Full Mark ..... 32.2 gallons (122 liters)

Type of Oil .....ISO Grade 46 Hydraulic Oil or MIL-L-2104C 10W Motor Oil

(See Chart On page 125)

Transmission:

Capacity with filter change ..... 12.5 quarts (11,8 liters)

Type of Fluid ..... Universal Tractor Fluid (see chart on page 129)

Axles:

Differential Housing Capacity.....12.2 quarts (11,5 liters)

Type of Fluid.....Universal Tractor Fluid (see chart on page 132)

Wheel Ends:

Wheel End Capacity .....0.95 quarts (0,9 liters)

Type of Fluid.....Universal Tractor Fluid (see chart on page 138)

Tires

Air Pressure:

Standard Tire13.00 - 24, 12 ply (minimum) .....55 psi (379 kPa)

Optional Rock Tire 15.5 - 25, 12 ply .....55 psi (379 kPa)

Tire Ballast (Minimum per Tire):

Optional Foam Filled Tire 13.00 - 24, 12 ply..... 775 lb (351 Kg)

Wheel Lug Nut Torque: ..... 430-470 lb-ft (583-637 Nm)

Tire Footprint Area (w/full load):

Standard Tires: 13.00 - 24, 12 ply..... 150 sq. in. (968 cm^2)

Optional Rock Tire 15.5 - 25, 12 ply ..... 212 sq. in. (1.368 cm^2)

Maximum Ground Pressure (w/full load):

Standard Tires: 13.00 - 24, 12 ply.....87 psi (600 kPa)

Weights

Basic Vehicle:

Model 6036 Curb Weight (with Open Cab) ..... 20,095 lbs (9.115 Kg)

Model 6036 Curb Weight (with Enclosed Cab) ..... 20,295 lbs (9.206 Kg)

Maximum Rated Capacity:

Model 6036 ..... 6,000 lbs (2.721 Kg)

Vehicle Dimensions

With Standard 13.00 - 24 Tires:

(A) Length (less forks) ..... 217 inches (5.512 mm)

(B) Width ..... 98 inches (2.489 mm)

(C) Height ..... 100 inches (2.540 mm)

(D) Wheelbase ..... 113 inches (2.870 mm)

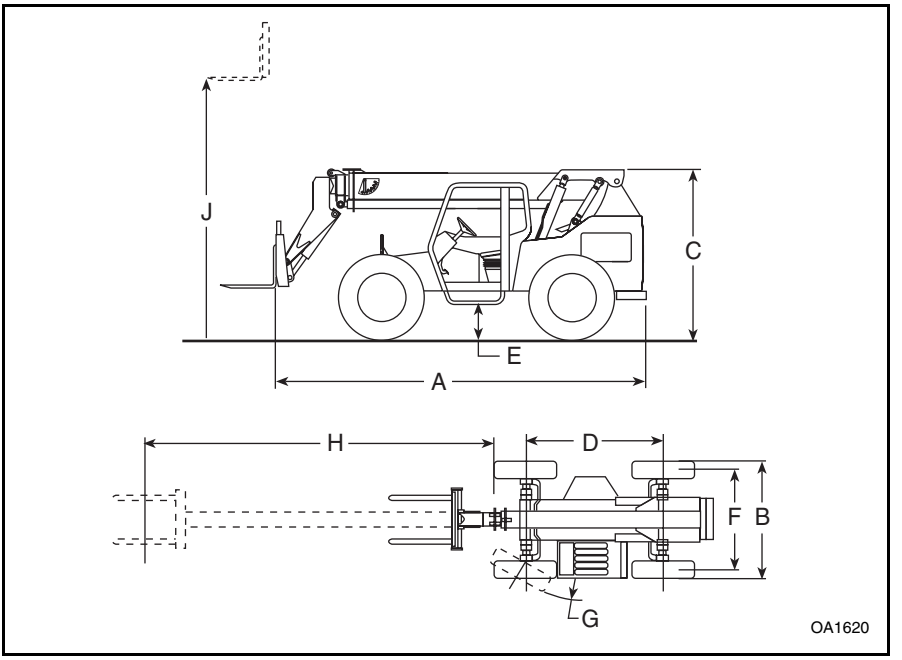
(E) Ground Clearance ..... 16 inches (406 mm)

(F) Tread Center ..... 84 inches (2.134 mm)

(G) Turn Clearance ..... 13 feet (4,0 meters)

(H) Max. Forward Reach ..... 22 feet 4 inches (6,8 meters)

(J) Maximum Lift Height ..... 36 feet 1 inch (11 meters)



Electrical System

Rating: ..... 12V DC Negative Ground

Number of Batteries:

Without Optional Cold Start Aid ..... One

With Optional Cold Start Aid ..... Two

Type of Batteries:

Maintenance Free .....850 Cold Cranking Amps (Each Battery)

Series of Batteries:..... Series 27

Fuse Ratings:

Main ..... 40 Amp

Light Switch Relay ..... 7.5 Amp

Instrument Cluster ..... 10 Amp

Horn/Heater ..... 15 Amp

Steer Select Switch..... 10 Amp

Optional Washer/Wipers ..... 10 Amp

Optional Lights ..... 20 Amp

Transmission ..... 7.5 Amp

Optional Road/Work Lights ..... 40 Amp

Relay Ratings:

Park Brake Disengage 12V

Optional Headlight Switch..... 12V

Light Switch..... 12V

Neutral Start..... 12V

Backup 12V

Grid Heater Fuse Ratings (Optional):

125 Amp..... Qty. 2

Engine

Cummins:

Model.....B4.5T-99C Turbo Charged

Horsepower ..... 99 hp @ 2500 rpm

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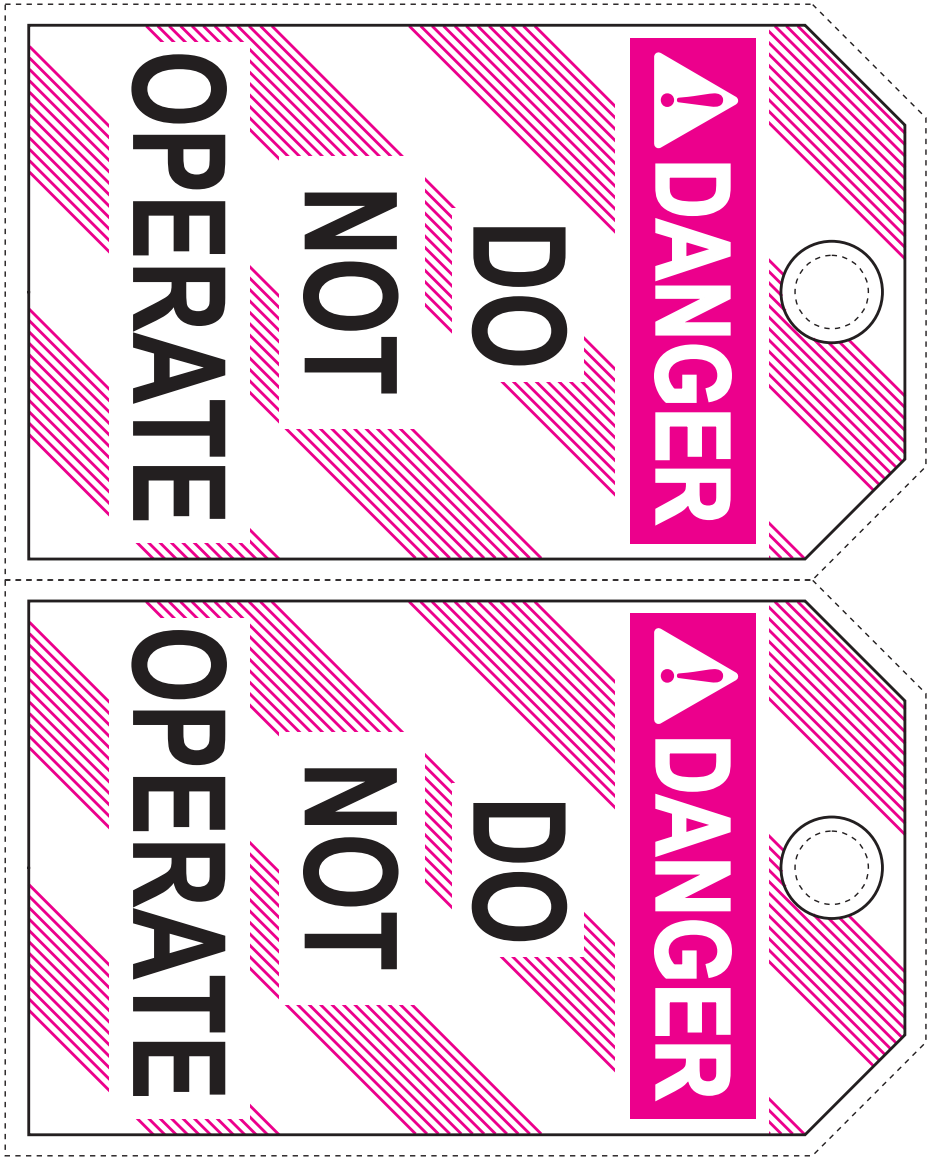
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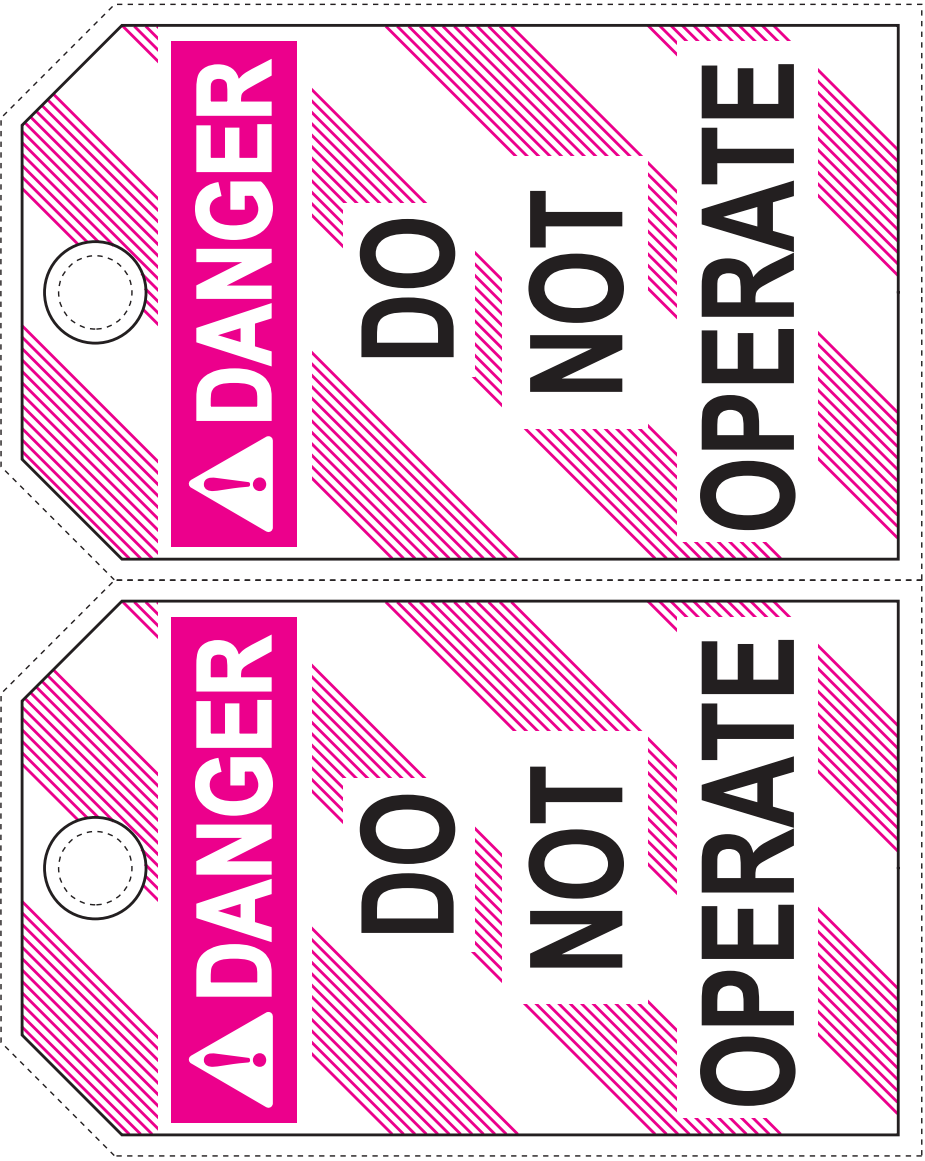
Accident Prevention Tags



An Oshkosh Corporation Company

TRANSFER OF OWNERSHIP

To Product Owner:

If you now own but ARE NOT the original purchaser of the product covered by this manual, we would like to know who you are. For the purpose of receiving safety-related bulletins, it is very important to keep JLG Industries, Inc. updated with the current ownership of all JLG products. JLG maintains owner information for each JLG product and uses this information in cases where owner notification is necessary.

Please use this form to provide JLG with updated information with regard to the current ownership of JLG products. Please return completed form to the JLG Product Safety & Reliability Department via facsimile or mail to address as specified below.

Thank You,
Product Safety & Reliability Department
JLG Industries, Inc.
13224 Fountainhead Plaza
Hagerstown, MD 21742
USA
Telephone: +1-717-485-6591
Fax: +1-301-745-3713

NOTE: Leased or rented units should not be included on this form.

Mfg. Model: _____

Serial Number: _____

Previous Owner: _____

Address: _____

_____

Country: _____ **Telephone: (_____)** _____

Date of Transfer: _____

Current Owner: _____

Address: _____

_____

Country: _____ **Telephone: (_____)** _____

Who in your organization should we notify?

Name: _____

Title: _____

SKYTRAK®

JLG®

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