Operators and Safety Manual

Models
522 & 522/4
622 & 622/4
824

10709977
(was) P09977

ANSI
INTRODUCTION

You are about to operate one of the finest forklifts available on the market today. However, to ensure that your forklift will provide dependable and safe service, the manufacturer must depend on you to read, understand and follow the instructions provided in this manual. Do not operate the forklift until you have read and fully understand these instructions.

Remember to use good safety practices to protect you and those around you.

WARRANTY

The Lull warranty is a separate document which will be provided along with this manual to the customer.

Proper registration is an important warranty requirement.

This manual provides information on the operation and maintenance necessary to keep your machine in good working order. Should, however, a defect or failure occur to the machine during the warranty period, contact your local dealer. Under no circumstances must the machine continue in service, for safety reasons and because serious damage may result.

REGISTRATION

The Warranty Registration card must be filled out by the dealer and returned to the Lull Corporation showing the date the machine went into service. And the Pre-Delivery Inspection Form must be signed by the customer when the machine is delivered.

NOTICE: This manual must remain with the machine at all times. Should it become damaged or lost, replace immediately.
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SAFETY ALERT SYMBOL

This Safety Alert Symbol means —

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

Safety is important to you because:

* Accidents disable and kill
* Accidents cost
* Accidents can be avoided

Lull has made every effort to provide information as complete and accurate as possible for its forklifts. However, because of owners requirements, equipment and control variations may exist between machines. Also, because of Lull's policy of continually striving to improve its product, occasional discrepancies may occur between machines and the description contained herein.
MACHINE FAMILIARITY

CAB LAYOUT (MODEL 522)

1. Forward, Neutral & Reverse Selector
2. Gear Selector
3. Steering Wheel
4. Boom Control
5. Carriage Tilt
6. Auxiliary
7. Frame Tilt
8. Power Assist Indicator Light
9. Level Indicator
10. Horn
11. Engine Oil Pressure
12. Engine Water Temperature
13. Hour Meter
14. Ammeter
15. Transmission Oil Temperature
16. Fuel Gauge
17. Ignition Switch
18. Foot Throttle
19. Parking Brake
20. Power Assist Switch
21. Differential Lock
22. Brake Pedal L.H.
23. Brake Pedal R.H.
1. Steering Wheel
2. Ignition Switch
3. Forward, Neutral & Reverse Selector
4. Gear Selector
5. Power Assist Indicator Light
6. Level Indicator
7. Horn
8. Hour Meter
9. Engine Oil Pressure
10. Transmission Oil Temp.
11. Ammeter
   (Oil & Fan Lights, Deutz)
13. Fuel Gauge
14. Boom Control
15. Foot Throttle
16. Parking Brake
17. Carriage Tilt
18. Auxiliary
19. Frame Tilt
20. Engine Oil Dipstick
21. Cold Start
22. Power Assist Switch
23. Differential Lock
24. Brake Pedal L.H.
25. Brake Pedal R.H.
CAB LAYOUT

(522)

Fuses

(622, 824)

Fuses
PRE-OPERATIVE EQUIPMENT CHECKLIST

Check The Equipment

---Check the tires for cuts, bulges and correct pressure
---Check service and parking brakes for proper operation
---Check the oil engine system
---Check forks for welds, cracks, wear and misalignment. Have repaired or replaced as necessary.

WARNING: Do not operate a machine whose forks have been repaired by welding.

---Check the hydraulic system
---Check coolant level
---Check wheel lugs
---Check transmission oil cooler and radiator for dirty fins. Radiator not applicable on air cooled Duetz engines.
---Check back-up alarm and horn.

PRE-OPERATIVE INSTRUCTIONS

For Safe Operation

For safe operation of this rough terrain forklift you must be a qualified and authorized operator. To be qualified, you must understand the written instructions supplied by the manufacturer, have training (including actual operation of this machine) and know the safety rules and regulations for the jobsite. A self-training course available from the Mason Contractor Association of America is highly recommended.

An operator must not use drugs or alcohol which can affect his alertness and coordination. An operator on prescription or over-the-counter drugs needs medical advice on whether or not he can safely operate these machines.

Know The Rules (1)

Most employers have rules governing operation and maintenance of equipment. Before you start work at a new location, check with your supervisor or the safety coordinator. Ask about rules you may be expected to obey.

Make sure you understand the rules covering traffic at your jobsite. Make sure you know what all signs, flags, and markings mean. Make sure you understand hand, flag, whistle, siren, or bell signals. Make sure you know when to use lights, turn signals, flashers and horn.

Protect Yourself (2)

Wear all the protective clothing and personal safety devices issued to you or called for by job conditions.

You may need:
---A hard hat
---Safety shoes
---Safety glasses, goggles, or face shield
---Heavy gloves
---Hearing protection
---Reflective clothing
---Wet weather gear
---Respirator or filter mask
Wear whatever is needed, don’t take chances. Learn where fire extinguishers and first-aid or emergency equipment are kept and where to get help in a hurry. Make sure you know how to use this equipment.

Mount Properly

Always use "three point contact", facing the machine when you enter or leave. ("Three point contact" means that 3 out of 4 arms and legs are in contact with the machine at all times during mount and dismount.)

Clean your shoes and wipe your hands before climbing on. Use handrails, grab-irons, ladders or steps (as provided) when mounting.

Never use control levers as a hand hold when climbing on or off. Never step on foot controls when mounting or climbing off.

Never enter a moving machine.
CAUTION

The following caution must be read and understood before operating the forklift. If there is any question about an item, or any item is not fully understood, see your supervisor for an explanation or contact Lull Corporation.

1. DO NOT OPERATE THIS MACHINE UNTIL YOU HAVE READ AND ARE THOROUGHLY FAMILIAR WITH THE OPERATOR’S MANUAL! ALWAYS KEEP THE OPERATOR’S MANUAL WITH THE MACHINE.

2. WHEN TRAVELING, FORKS MUST BE AT OR BELOW EYE LEVEL POSITION. NEVER TRAVEL WITH BOOM RAISED. FAILURE TO LOWER BOOM BEFORE TRAVELING COULD CAUSE MACHINE TO TIP AND RESULT IN SERIOUS INJURY OR DEATH.

3. ALWAYS LIFT & CARRY LOADS WITHIN MANUFACTURER’S RECOMMENDED CAPACITY. REFER TO LOAD CHART ON RIGHT SIDE OF OPERATOR’S COMPARTMENT.

4. DO NOT USE THE MACHINE IF MALFUNCTIONING — REPAIR FIRST.

5. FAULTY MAINTENANCE, CARELESSNESS, LACK OF OPERATOR TRAINING, IMPROPER OPERATING PRACTICES, ETC. WILL AFFECT THE SAFETY AND CAPACITY OF THIS MACHINE.

6. ALWAYS LEVEL MACHINE BEFORE LIFTING A LOAD. IF LEVEL INDICATOR IS DAMAGED OR MISSING, REPLACE BEFORE USING MACHINE.

7. DO NOT USE FRAME TILT TO POSITION LOADS — LOWER LOAD TO A SAFE HEIGHT, REPOSITION MACHINE, LEVEL MACHINE AND RELIFT TO NEW POSITION.

8. WATCH FOR OVERHEAD OBSTRUCTIONS BEFORE AND WHILE MAKING A LIFT, ESPECIALLY ELECTRICAL WIRES. SERIOUS INJURY OR DEATH CAN RESULT FROM CONTACT WITH ELECTRICAL WIRES.

NOTE: This caution (in plaque form) is permanently attached to the forklift at the cab entrance and on the instrument panel.
NOTICE

The following notice must be read and understood before operating the forklift. If there is any question about an item, or any item is not fully understood, see your supervisor for an explanation or contact Lull Corporation.

1. DO NOT OPERATE THIS MACHINE UNTIL YOU HAVE READ AND ARE THOROUGHLY FAMILIAR WITH THE OPERATOR’S MANUAL! ALWAYS KEEP THE OPERATOR’S MANUAL WITH THE MACHINE.

2. WHEN TRAVELING WITH OR WITHOUT LOADS, THE FORKS MUST BE KEPT AT OR BELOW EYE LEVEL POSITION. TRAVELING WITH THE FORKS ABOVE EYE LEVEL MAY CAUSE THE MACHINE TO TIP OVER.

3. THIS MACHINE IS NOT EQUIPPED TO LIFT PERSONNEL. NEVER USE THIS MACHINE AS A WORK PLATFORM.

4. SERVICE THE MACHINE AS RECOMMENDED IN THE OPERATOR’S MANUAL AND THE LUBRICATION SCHEDULE.

5. TWICE DAILY, WITH THE FORKS NEAR GROUND ELEVATION, CYCLE TILT-FRAME CYLINDER AND FORK-CARRIAGE TILT CYLINDER THROUGH FULL STROKE IN EACH DIRECTION TO ELIMINATE AIR FROM THE CYLINDERS.

6. EVALUATE GROUND-BEARING CONDITIONS BEFORE MAKING LIFTS OR MOVING THE MACHINE.

7. DO NOT MODIFY OR ALTER THIS MACHINE WITHOUT THE MANUFACTURER’S PRIOR WRITTEN APPROVAL.

8. OPERATE ONLY WITH GUARDS AND SAFETY EQUIPMENT FUNCTIONING AND IN PLACE.

9. KEEP THE WORK AREA CLEAN OF DEBRIS.

10. NEVER LIFT LOADS HEAVIER THAN THE CAPACITY OF THE FORKS. FIND OUT FORK CAPACITY BEFORE USING MACHINE.

11. TIRES MUST BE CALCIUM CHLORIDE FILLED! REFER TO LUBRICATION SCHEDULE.

NOTE: This notice (in decal form) is permanently affixed to the forklift at the cab side panel.
OPERATOR SAFETY

The following are standard hand signals and instructions for fork lift signalmen.

FORKLIFT SIGNALS

1. STOP   2. RAISE LOAD   3. LOWER LOAD

4. TILT FORKS RIGHT   5. TILT FORKS LEFT   6. TILT FORKS UP

7. TILT FORKS DOWN   8. MOVE LOAD BACKWARD   9. MOVE LOAD FORWARD

INSTRUCTIONS TO SIGNAL MEN

1. Only one person to be signalman
2. Make sure the operator can see you and is able to acknowledge the signal given
3. Signalman must watch the load—the operator is watching you
4. Never raise or lower the load over other workmen, warn them to keep out of the way

WATCH FOR OVERHEAD LINES OR OTHER OBSTRUCTIONS.

NOTE: This instruction (in decal form) is permanently affixed to the forklift at the cab side panel.
1. Never carry passengers and never allow unqualified people to use your machine.

2. Never operate controls from outside the cab.

3. Never walk, or allow others to walk under raised boom

4. Always ensure there is sufficient overhead clearance for the boom.

5. Never operate in the vicinity of electrical power lines.
6. Never use the machine as a personnel lift.
7. Never lift a load using one fork.
8. Never attempt to discharge a load off the fork by stopping machine suddenly.
9. Never stack a load on uneven ground.
10. Never place loads that exceed the scaffold capacity.
11. Never subject scaffold to unnecessary "shock" loads.
12. Ensure that correct tire pressure and calcium chloride levels are maintained. (See specifications on pages 45 - 47).

13. Drive slow and keep the load as low as possible while maintaining a safe fork clearance with the ground.

14. Always be aware of load width.

15. Ensure that the load is stable and secure. Check to see there are no loose articles which may fall.

16. Drive carefully and avoid any sudden stops and changes of direction.

17. Always check the load charts before picking a load.
18. Never add unauthorized counterweight.
19. Always pick up load at its center of gravity.
20. Always lower boom, stop engine, set parking brake and turn key off before leaving operators compartment.
21. Avoid parking on slopes - if it is necessary, ensure parking brake is on and the wheels are chocked.
STARTING THE ENGINE

Look Out For Others

Before starting the engine, walk completely around the machine. Make sure no one is under it, on it or close to it. Let other workmen and bystanders know you are starting up and don't start until everyone is clear of the machine.

Starting Procedure (Perkins) - 522

With transmission in neutral turn ignition key clockwise cranking the engine. (Do not crank the engine longer than 20 seconds. Wait 2 minutes before trying again.) NOTE: During cold weather, turn ignition key clockwise to heater (H) and hold for approximately 1-1/2 minutes before proceeding to crank the engine.

Starting Procedure (John Deere) - 622/824

With transmission in neutral turn ignition key clockwise cranking the engine. (Do not crank the engine longer than 20 seconds. Wait 2 minutes before you try again.) NOTE: During cold weather inject starting fluid ONLY while the engine is cold and cranking.

Starting Procedure (Deutz) - 622 Option

With transmission in neutral turn ignition key clockwise cranking the engine. When ambient temp is below 40° ether will automatically dispense into intake manifold. (Do not crank the engine longer than 20 seconds. Wait 2 minutes before you try again.)

After engine has been started, and the parking brake is on and transmission is in neutral, operate all hydraulic functions. (NOTE: Cold weather operation, progressively move each function a small distance back and forth until full cycle has been accomplished.) Level machine. Move frame tilt lever right to full cylinder travel then left to full cylinder travel then back to level. Raise boom to full cylinder travel and lower boom to full cylinder travel. Extend boom to full cylinder travel and retract boom to full cylinder travel. Tilt fork carriage down to full cylinder travel and back to full cylinder travel. Shut off engine, move all hydraulic levers. If any machine movement is detected advise your Supervisor.
OPERATING PROCEDURES

IT IS YOUR RESPONSIBILITY TO EVALUATE WORKING CONDITIONS AND ADJUST YOUR OPERATION ACCORDINGLY.

When traveling over rough terrain, soft ground, or wet/icy surfaces, slow down and shift to a lower gear.

Travel only at speeds that permit stopping in a safe manner.

WARNING: WHEN TRAVELING KEEP THE FORKS AS LOW AS POSSIBLE WHILE MAINTAINING SAFE CLEARANCE WITH THE GROUND.

Traveling

---Start and stop machine to check brakes
Note: DO NOT add fluid to brake reservoir, contact supervisor.
---Check parking brake by holding on hill. Tighten knob on handle to adjust. (See Parking Brake Lever, pg. 34).

Follow Safe Operating Practices

---Operate the controls smoothly - don't jerk the steering wheel or hydraulic controls.
---Avoid sudden stops, starts, turns or changes in direction.
---Never "cowboy" or play games with a forklift.
---Never attempt to work the controls except from operator's seat.
---Never leave the operator's seat without first lowering the forks to the ground, setting the parking brake, and placing controls in neutral.

WARNING: KEEP ALL PARTS OF YOUR BODY INSIDE THE OPERATOR'S COMPARTMENT WHILE OPERATING THE FORKLIFT.

LIFTING THE LOAD

Lift The Load Safely

If possible, plan to load, unload and turn on flat level ground. If ground is not level, use frame tilt to level machine (level indicator must be centered). If loads are to be rehandled several times, place stacking blocks under loads. For sideward equipped forklifts, center the forks and carriage before lifting. Inspect load to be lifted. Approach the load slowly and squarely with fork tips straight and level. If necessary, adjust pallet forks. Boom slowly forward and engage load. Position load equally on both forks. Boom forward until load touches the carriage (backrest).

Tilt the forks back to position the load for travel, then lift the load only enough to clear obstacles. Avoid erratic stops. Be sure there is sufficient clearance overhead and all around for lifting and traveling. Watch the machine's rear clearance when turning.

Transport The Load Safely

When traveling with a load, keep the forks tilted back with boom retracted and the load as close to the ground as possible.

WARNING: WHEN TRAVELING ALWAYS KEEP THE LOAD AS LOW AS POSSIBLE. NEVER CARRY LOAD ABOVE EYE LEVEL.

WARNING: FAILURE TO ABIDE BY THIS PRECAUTION COULD RESULT IN LOSS OF LOAD AND/OR THE FORKLIFT TIPPING OVER.

Avoid excessively steep slopes or unstable surfaces. If you must drive on a slope, Frame Level machine, keep the load low and proceed with extreme caution. Do not drive ACROSS excessively steep slopes under any circumstances.

WARNING: Travel on inclines, slopes, ramps and downgrades only as follows:
LOADED Forklift...with forks (and load) pointed uphill.
EMPTY Forklift...with forks pointed downhill.

Reduce speed and sound horn at blind intersections, exits and when approaching pedestrians.
OPERATING PROCEDURES

Slow down for turns, ramps, dips, uneven or slippery surfaces and in congested areas. Avoid driving over loose objects and holes in roadway surfaces to prevent losing the load or tipping the machine.

Avoid crossing ditches, curbs or exposed railroad tracks. If crossing cannot be avoided, keep the load low, travel very slowly, and proceed with caution. Avoid panic braking. Apply brakes smoothly for a controlled stop to prevent toppling the load.

As the load approaches the desired height, slow the lift speed to a minimum. Continue the lift until load is slightly higher than the landing point.

WARNING: DO NOT RAM A HYDRAULIC LIFT CYLINDER TO THE END OF ITS STROKE. THE RESULTING JOLT COULD SPILL THE LOAD.

SAFELY PLACING THE LOAD

Elevated or Overhead Placement

When stacking or placing a load to a high elevation, use extreme caution because there may be other workmen in the immediate area whom you cannot see. Make sure that bystanders are away from the area where the load can tip or fall.

Bring the forklift as close to the landing point as possible with the load held low - be sure the machine is positioned on firm level ground.

DO NOT raise the load for placement if the forks are tilted to one side. Level machine using frame tilt BEFORE the load is raised (level indicator must be centered).

Set the parking brake. Tilt carriage back sufficiently to cradle the load. Slowly and carefully raise the load.

CAUTION: As lift height increases, your depth perception decreases. Placing the load safely to a high elevation may require a signalman to guide you.

If there is any indication of instability during the lift (i.e. movement, leaning, swaying), stop immediately, lower the load, move the forklift to a more stable, level position.

Once the load is higher than the landing point, slowly and carefully proceed to place the load directly on the landing point.

WARNING: PLACE THE LOAD USING BOOM MOVEMENT ONLY. DO NOT TRAVEL WITH THE FORKLIFT. A FORKLIFT TRAVELING WITH A RAISED BOOM MAY BECOME UNSTABLE - RESULTING IN POSSIBLE LOSS OF LOAD AND/OR THE MACHINE TIPPING OVER.

Forks must be level and parallel to the landing surface before retracting them from under the load. Retract the forks using boom movement only. Immediately lower forks below eye level after clearing the landing point and before traveling with the forklift.

SAFE SHUTDOWN

Correct shutdown is important to safe operation. Follow these general steps:
---Come to a full stop.
---Set parking brake.
---Lower forks to the ground.
---Place controls in neutral.
---Idle engine for 1-3 minutes for gradual cooling.
---Shut off engine.
---Cycle hydraulic controls to eliminate residual pressure.
---Remove ignition key.
---Lock anti-vandalism covers and closures.
---Dismount.
---Block wheels if on a slope or incline.
LOAD CHARTS

Use angle and extension indicators along with load chart instructions to determine correct boom lifting capacities.

The load chart is displayed on the side panel of the forklift cab and is shown herein on page 19, 20, or 21.
Before lifting any load, read and understand the load chart instructions. Know the weight of the load to be lifted. While lifting and placing the load refer to and strictly follow load chart instructions.

⚠️ WARNING: FAILURE TO STRICTLY FOLLOW LOAD CHART INSTRUCTIONS COULD RESULT IN VEHICLE UPSET AND CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.
LOAD CHARTS

MODEL 522

MAXIMUM BOOM LOAD CAPACITIES
AT 24" LOAD CENTER.
FOR LIFT AND REACH POSITIONS IN
POUNDS/FEET
WITH METRIC CONVERSIONS

LULL
CORPORATION
ST. PAUL, MINNESOTA 55121

MANUFACTURER'S RECOMMENDED CAPACITY IS PER ANSI B56.6
STABILITY TESTS USING STANDARD HOMOGENEOUS CUBES 4' x 4' x 4'.

MANUFACTURER'S RECOMMENDED LOADS AND ANGLES SHOWN
ARE AT THE CENTER OF GRAVITY OF THE ABOVE CUBE.
CAPACITY ADJUSTMENTS MUST BE MADE FOR EXTENDED LOAD CENTERS
AND OTHER VARIATIONS OF LOAD SIZE ETC...
MODEL 622
HIGHLANDER III
MAXIMUM BOOM LOAD CAPACITIES AT 24" LOAD CENTER.
FOR LIFT AND REACH POSITIONS IN POUNDS/FEET
WITH METRIC CONVERSIONS

MANUFACTURER'S RECOMMENDED CAPACITY IS PER ANSI B56.6
STABILITY TESTS USING STANDARD HOMOGENEOUS CUBES 4' x 4' x 4'.

MANUFACTURER'S RECOMMENDED LOADS AND ANGLES SHOWN
ARE AT THE CENTER OF GRAVITY OF THE ABOVE CUBE.
CAPACITY ADJUSTMENTS MUST BE MADE FOR EXTENDED LOAD CENTERS
AND OTHER VARIATIONS OF LOAD SIZE ETC...
MODEL 824
MAXIMUM BOOM LOAD CAPACITIES AT 24" LOAD CENTER,
FOR LIFT AND REACH POSITIONS IN POUNDS/FEET
WITH METRIC CONVERSIONS

MANUFACTURER'S RECOMMENDED CAPACITY IS PER ANSI B56.6
STABILITY TESTS USING STANDARD HOMOGENEOUS CUBES 4' x 4' x 4'.

MANUFACTURER'S RECOMMENDED LOADS AND ANGLES SHOWN
ARE AT THE CENTER OF GRAVITY OF THE ABOVE CUBE.
CAPACITY ADJUSTMENTS MUST BE MADE FOR EXTENDED LOAD CENTERS
AND OTHER VARIATIONS OF LOAD SIZE ETC...
PERKINS' ENGINE (522)

Oil Filter

Engine Oil Drain

Fuel Filter

Oil Drain Plug

Fuel Water Trap

Oil Filter

Change the oil and oil filter after first 50 hours of operation and at 100 hour intervals thereafter.

Fuel Filter

1. Change the fuel filter canister at 500 hour intervals or once a year. If the engine is operated under difficult conditions, change the canister more often.

2. The fuel filter is provided with a drain plug. Once a week unscrew and remove the plug until all water has drained and replace plug.

Fuel Water Trap

The water trap is provided with a drain plug. Once a week unscrew and remove the plug until all water has drained and replace plug.
MAINTENANCE

Oil Add

Dipstick (accessible from cab)
Check Daily

Oil Filter

NOTE: Change the oil and oil filter after first 50 hours of operation and at 100 hour intervals thereafter.

Fuel Filter

NOTE: Change the element every 500 hours or once a year. If the engine is operated under difficult conditions, change the element more often.

To install a new fuel filter element:
1. Push tab (A) and pull tab (B) to disengage hook (C).
2. Disengage hook (D).
3. Remove spring (E).
4. Remove element (F).
5. Clean the filter body (G) and fuel tube (J).
7. Loosen bleed screw (H).
8. Pump the primer lever until fuel without bubbles flows from around the bleed screw.
9. Tighten bleed screw.
Fuel Filter
Change the fuel filter canister at 500 hour intervals or once a year. If the engine is operated under difficult conditions, change the canister more often.

Oil Filter
Change the oil and oil filter after first 50 hours of operation and at 100 hour intervals thereafter.
Fuel Primer

Fuel Primer
Primer Lever

Should the engine ever be run dry of fuel, or air is in the fuel system, use the Primer to pump fuel to injectors. DO NOT CRANK ENGINE UNTIL PRIMING IS COMPLETE. (See engine handbook for procedure)

Radiator
Radiator Drain Cock

EVERY SPRING AND FALL
Engine Coolant
Drain, flush, and fill the cooling system with correct coolant.

CAUTION: Do not remove the radiator cap unless the engine is cool. Then loosen the cap slowly to the stop. Release all pressure before you remove the cap.

To drain the cooling system completely:
1. Open the radiator drain cock.
2. Open the cylinder block drain cock.
3. Remove the coolant drain plug of the engine oil cooler.

Engine Block Drain Cock

Fan Belt
Check and adjust alternator/fan belt tension. Replace belt if worn or damaged.

Strand tension gauge: Immediately after the engine stops (run the engine at least 5 minutes), check the belt tension. If tension is less than 50 lb. (223 N), let the engine cool 10 to 15 minutes. Then make tension 90 lb. (400 N).

If a tension gauge is not available: Apply a force of 20 lb. (89 N) halfway between the pulleys and adjust belt so movement is 3/4 in (19 mm).
Transmission

1. The transmission must be in the neutral position before starting the engine, or when the vehicle is parked and the engine is running.
2. If the oil temperature gauge (converter oil out temperature) rises above 250°F (121.1°C) stop the vehicle immediately. Shift to neutral and run the engine at 1000-1200 RPM. The temperature should drop rapidly to normal operating temperature. If the temperature does not drop, trouble is indicated. The trouble should be determined before the vehicle is operated again. Generally overheating is the result of working in too high a gear. Shifting to a lower gear may be necessary.

Transmission Oil Check And Fill

Trans Oil Check and Fill

1. The oil level must be checked daily with the engine running at idle and at operating temperature and the transmission in neutral.
2. When servicing the unit for the first time after vehicle installation and/or after repair, the unit is filled as follows:
   A. Fill unit with the recommended fluid to LOW mark on dipstick.
   B. Start engine and run at idle speed for two minutes.
   C. With the engine at idle speed, add quantity necessary to bring oil level to FULL mark on dipstick.
Transmission Filter (622 And 824)

Filter

Transmission Drain (622 And 824)

Drain Plug

Transmission Oil Filter And Drain

Model 522 - Drain transmission and replace the filter after first 50 hours of operation. Refill with the recommended fluid. Replace filter again after first 100 hours of operation. Drain and refill transmission and replace the filter at 500 hour intervals thereafter.

Models 622 and 824 - Drain transmission and replace the filter after first 20 hours of operation. Refill with the recommended fluid. Replace filter again after first 200 hours of operation. Drain and refill transmission and replace the filter at 500 hour intervals thereafter.
MAINTENANCE

HYDRAULIC OIL & FUEL TANK (522)

- Fuel Level Sender
- Fuel Fill
- Hydraulic Breather - Clean every 200 hours, Change every 1000 hours
- Hydraulic Filter/Fill (early production) - Remove cover and fill to level. Change filter after first 50 hours operation. Change fluid and filter at 1000 hour intervals thereafter.
- (later production) - Remove plug and fill thru opening in cover. Change filter after first 50 hours operation. Change fluid and filter at 1000 hour intervals thereafter. Also, monitor filter gauge weekly for filter condition. Change filter whenever indicator is in red zone with fluid warm and engine at full RPM.
- Fuel Drain
- Hydraulic Level - Check Daily
- Bottom
- Hydraulic Drain
HYDRAULIC OIL & FUEL TANK (622, 824)

Hydraulic Breather -
Clean every 200 hours
Change every 1000 hours

*Hydraulic Filter/Fill
Fuel Fill
Top
Fuel Level Sender

*Hydraulic Filter/Fill
(early production) -
Remove cover and fill to level.
Change filter after first 50 hours operation.
Change fluid and filter at 1000 hour intervals thereafter.

(later production) -
Remove plug and fill thru opening in cover.
Change filter after first 50 hours operation.
Change fluid and filter at 1000 hour intervals thereafter.
Also, monitor filter gauge weekly for filter condition. Change filter whenever indicator is in red zone with fluid warm and engine at full RPM.

Hydraulic Level -
Check Daily
Hydraulic Drain

Bottom
Fuel Drain
MAINTENANCE

DRIVE AXLE (522)

Planetary Hub

Drain

Fill and Level

Change after first 50 hours operation and at 1000 hour intervals thereafter.

Check every 200 hours

SAE-90-API-GL5

1-1/2 pints each hub

Differential

Fill

Change after first 50 hours operation and at 1000 hour intervals thereafter.

Check every 200 hours

SAE-90 Mobil Lub 46

9 Quarts (Approx.)
**MAINTENANCE**

**DRIVE AXLE (622, 824)**

**Planetary Hub**

- **Fill & Level**
  - Change after first 50 hours operation and at 1000 hour intervals thereafter.
  - Check every 200 hours.
  - SAE-90-API-GL5
  - 1-1/2 pints each hub.

**Differential**

- **Fill & Level**
- **Drain**
  - Change after first 50 hours operation and at 1000 hour intervals thereafter.
  - Check every 200 hours.
  - SAE-90-Mobil Lub 46
  - 9 Quarts (Approx.)
Power Assist Planetary Gear Hub
(522/4, 622/4 and 824)

Level

Fill/Drain

Change after first 50 hours operation and at 1000 hour intervals thereafter.

Check every 200 hours.

SAE-90 API GL-5

1 pint each hub
Parking Brake—Internal Disc (522)

Every 100 hours visually inspect cable and linkage. Adjust or replace as required.
Brake disc replacement requires Axle disassembly (See Hurth service manual).

To adjust parking brake for increased holding power, turn knob on brake lever handle clockwise.

Parking Brake Disc & Caliper (622, 824)

Parking Brake Caliper Adjustment
With brake released adjust caliper till pads contact disc, then back-off nut approx. 1/4 turn.
Replace pads when thickness becomes 1/8" or less.
Every 100 hours visually inspect cable, caliper, brake pads and disc. Adjust or replace as required.
Battery Location and Check

1. Batteries located in front of engine.
2. Check fluid levels every 200 hours.

Filter Dirt Indicator - Change When Red Is Showing

Air Cleaner Dirt Indicator (522 shown)
Wear Pads

Located on top front of outer boom and bottom rear of inner boom. When inspecting for wear, replace pad when thickness becomes 3/8" or less. If clearance between pad and boom exceeds 1/8", shim as required to achieve 1/16" to 1/8" clearance.

Refer to parts manual for shim sizes available.
Main Boom Pivot

Grease Fitting (Both Sides)

Lubricate these Zerk Fittings Daily With Multi-Purpose Lithium Grease (Under Dusty or Severe Operation - Service At Half Intervals)

(522)

Grease Fitting (Both Sides)

(622, 824)
LUBRICATION

Hoist Pivots (522)

Lower

Upper

Grease Fittings

Lubricate these Zerk fittings daily with multi-purpose lithium grease (under dusty or severe operation - service at half intervals)

Hoist Pivots (622, 824)

Lower

Upper

Grease Fittings (both sides)
LUBRICATION

Carriage Tilt Cylinder

Upper Pivot

Lower Pivot (824)

Grease Fitting

Grease Fitting

Grease Fitting (Carriage Pivot)

Lower Pivot (522, 622)

Grease Fitting

Lubricate these Zerk Fittings Dailj;
With Multi-Purpose Lithium Grease
(Under Dusty or Severe Operation -
Service At Half Intervals)
LUBRICATION

Front

Boom Rollers

Rear

Boom Rails
DO NOT GREASE

Grease Fittings

Grease Fitting (Both Sides)

Lubricate these Zerk Fittings Daily
With Multi-Purpose Lithium Grease
(Under Dusty or Severe Operation - Service At Half Intervals)

(522) Steering Axle Pivot (622, 824)

Grease Fittings

Grease Fittings
Lubricate these Zerk Fittings Daily With Multi-Purpose Lithium Grease (Under Dusty or Severe Operation - Service At Half Intervals)
Steering Cylinder and Spindle Pivots

Inner

Grease Fitting (Both Sides)

Outer

Grease Fittings (Both Sides)

Steering Axle Hub (522, 622)

Grease Fitting (Both Sides)

Lubricate these Zerk Fittings Weekly With Multi-Purpose Lithium Grease (Under Dusty or Severe Operation - Service At Half Intervals)
LUBRICATION

Drive Shaft and Universals

At Axle

At Transmission

Grease Fittings

Lubricate these Zerk Fittings Weekly
With Multi-Purpose Lithium Grease
(Under Dusty or Severe Operation -
Service At Half Intervals)

Brake Pedal Pivots

Grease Fittings
### SPECIFICATIONS

#### MODEL 522

**LUBRICATION SERVICE SCHEDULE**

<table>
<thead>
<tr>
<th>Description</th>
<th>Daily</th>
<th>Weekly</th>
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<td>Power Assist Hub</td>
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</table>

CR = Change Fluid or Replace Filter
C = Check

*First Hours of Operation

The above service intervals are for operation under normal conditions. Under severe conditions service intervals must be shortened accordingly.

### CAPACITIES

<table>
<thead>
<tr>
<th>Description</th>
<th>Type of Fluid</th>
<th>Capacity</th>
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<tbody>
<tr>
<td>Hydraulic Tank &amp; System</td>
<td>Amoco Rykon MV or Equivalent</td>
<td>42 Gallons</td>
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<tr>
<td>Fuel Tank</td>
<td>Diesel Fuel</td>
<td>37 Gallons</td>
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<td>Cooling System</td>
<td>Ethylene Glycol</td>
<td>18 Quarts</td>
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<td>Permanent Coolant</td>
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<tr>
<td>Transmission</td>
<td>Allison C-3</td>
<td>20 Quarts</td>
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<td>MIL-L-2104 Grade.10</td>
<td>Drain &amp; Refill 7.5 Quarts</td>
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<td>SAE-90 Mobil Lub 46</td>
<td>9 Quarts</td>
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<td>SAE-90-API-GL5</td>
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<td>Engine Crank Case Oil</td>
<td>See Engine Manual</td>
<td>9 Quarts Min.</td>
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<td>With Filter</td>
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<td>11 Quarts Max.</td>
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### SPECIFICATIONS

#### MODEL 622 AND 824

**LUBRICATION SERVICE SCHEDULE**

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</table>

CR = Change Fluid or Replace Filter  
C = Check  
*First Hours of Operation

The above service intervals are for operation under normal conditions. Under severe conditions service intervals must be shortened accordingly.

### CAPACITIES

<table>
<thead>
<tr>
<th>Description</th>
<th>Type of Fluid</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic Tank &amp; System</td>
<td>Amoco Rykon MV or</td>
<td>45 Gallons</td>
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<td>Equivalent</td>
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<td>Fuel Tank</td>
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<td>Ethylene Glycol</td>
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<td>Permanent Coolant</td>
<td></td>
</tr>
<tr>
<td>Transmission</td>
<td>Allison C-3</td>
<td>20 Quarts</td>
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<td>MIL-L-2104 Grade 10</td>
<td>Drain &amp; Refill 7.5 Quarts</td>
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<td>SAE-90-Mobile Lub 46</td>
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<td>SAE-90-API-GL5</td>
<td>1.5 Pints</td>
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<td>Power Assist Hub</td>
<td>SAE-90-API-GL5</td>
<td>1 Pint</td>
</tr>
<tr>
<td>Engine Crank Case Oil</td>
<td>See Engine Manual</td>
<td>9 Quarts (622)</td>
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<tr>
<td>With Filter</td>
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<td>15 Quarts (824)</td>
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<td>10 Quarts (Deutz)</td>
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# SPECIFICATIONS

## MODEL 522

<table>
<thead>
<tr>
<th>TIRES</th>
<th>SIZE</th>
<th>WATER FILL</th>
<th>CALCIUM FILL</th>
<th>PRESSURE</th>
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<tbody>
<tr>
<td>FRONT</td>
<td>16:90 x 24 - 10 Ply</td>
<td>52 GALS.</td>
<td>182 LBS.</td>
<td>28 PSI</td>
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<td>REAR</td>
<td>14:00 x 17.5 - 8 Ply</td>
<td>19 GALS.</td>
<td>67 LBS.</td>
<td>60 PSI</td>
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## ENGINE

Perkins Model 4.236  
Inline 4 Cylinder  
Diesel  
236 Cu. In. Displacement  
81 H.P. At 2600 RPM  
High RPM 2600  
Low Idle RPM 700

## TRANSMISSION

Clark Model HR18000  
3 Speed Powershift Transmission  
With Torque Converter  
3 Speeds Forward  
3 Speeds Reverse

## ELECTRICAL SYSTEM

| Battery 6 Volt - 2 Each  
Alternator  
Headlights - 12 Volt  
Tail/Brake Lights - 12 Volt  
Front Turn Signals - 12 Volt  
Rotating Beacon - 12 Volt  
Work Lights - 12 Volt  
Fuses | 900 AMP (Total)  
12 Volt  
#4913 Seal Beam  
#1157 Bulb  
#1156 Bulb  
#4416 Seal Beam  
#4913 Seal Beam  
30 AMP |

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SPECIFICATIONS

MODEL 622

<table>
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<tr>
<th>TIRES</th>
<th>SIZE</th>
<th>WATER FILL</th>
<th>CALCIUM FILL</th>
<th>PRESSURE</th>
</tr>
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<tbody>
<tr>
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<td>21L x 24 - 12 Ply</td>
<td>74 GALS.</td>
<td>259 LBS.</td>
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<td>64 GALS.</td>
<td>224 LBS.</td>
<td>35 PSI</td>
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<td>REAR</td>
<td>15:00 x 19.5 - 10 Ply</td>
<td>25 GALS.</td>
<td>87 LBS.</td>
<td>70 PSI</td>
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ENGINE

John Deere 4239D
Inline 4 Cylinder
Diesel
239 Cu. In. Displacement
78 H.P. At 2500 RPM
High RPM 2500
Low Idle RPM 700

ENGINE

Deutz F4L912
Inline 4 Cylinder
Air Cooled Diesel
236 Cu. In. Displacement
70 H.P. At 2400 RPM
High RPM 2400
Low Idle RPM 700

TRANSMISSION

Funk Model 4013E4PFA
3 Speed Powershift Transmission
With Torque Converter
3 Speeds Forward
3 Speeds Reverse

ELECTRICAL SYSTEM

<table>
<thead>
<tr>
<th>Battery 6 Volt - 2 Each</th>
<th>900 AMP (Total)</th>
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<tbody>
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<td>Alternator</td>
<td>12 Volt</td>
</tr>
<tr>
<td>Headlights - 12 Volt</td>
<td>#4913 Seal Beam</td>
</tr>
<tr>
<td>Tail/Brake Lights - 12 Volt</td>
<td>#1157 Bulb</td>
</tr>
<tr>
<td>Front Turn Signals - 12 Volt</td>
<td>#1156 Bulb</td>
</tr>
<tr>
<td>Rotating Beacon - 12 Volt</td>
<td>#4416 Seal Beam</td>
</tr>
<tr>
<td>Work Lights - 12 Volt</td>
<td>#4913 Seal Beam</td>
</tr>
<tr>
<td>Fuses</td>
<td>30 AMP</td>
</tr>
</tbody>
</table>

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SPECIFICATIONS

MODEL 824

<table>
<thead>
<tr>
<th>TIRES</th>
<th>SIZE</th>
<th>WATER FILL</th>
<th>CALCIUM FILL</th>
<th>PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRONT</td>
<td>16:00 x 24 - 12 Ply</td>
<td>.59 GALS.</td>
<td>207 LBS.</td>
<td>32 PSI</td>
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<tr>
<td>REAR</td>
<td>15:00 x 19.5 - 10 Ply</td>
<td>25 GALS.</td>
<td>87 LBS.</td>
<td>70 PSI</td>
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ENGINE

John Deere 4239T
Inline 4 Cylinder
Turbocharged Diesel
239 Cu. In. Displacement
109 H.P. At 2500 RPM
High RPM 2500
Low Idle RPM 700

TRANSMISSION

Funk Model 4013E4PFA
3 Speed Powershift Transmission
With Torque Converter
3 Speeds Forward
3 Speeds Reverse

ELECTRICAL SYSTEM

Battery 6 Volt - 2 Each
Alternator
Headlights - 12 Volt
Tail/Brake Lights - 12 Volt
Front Turn Signals - 12 Volt
Rotating Beacon - 12 Volt
Work Lights - 12 Volt
Fuses

900 AMP (Total)
12 Volt
#4913 Seal Beam
#1157 Bulb
#1156 Bulb
#4416 Seal Beam
#4913 Seal Beam
30 AMP

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# FLUID PRESSURES

## TRANSMISSION PRESSURE

REFER TO TRANSMISSION SERVICE MANUAL

### HYDRAULIC PRESSURE

<table>
<thead>
<tr>
<th></th>
<th>522</th>
<th>622</th>
<th>824</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOOM LIFT &amp; EXTEND RELIEF</td>
<td>2600</td>
<td>2900</td>
<td>2900</td>
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<tr>
<td>CARRIAGE TILT VALVE SECTION - DOWN</td>
<td>2100</td>
<td>2550</td>
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### STEERING HYDRAULIC PRESSURE

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### BRAKE PRESSURE

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<tbody>
<tr>
<td>BEFORE SERIAL NUMBER 133</td>
<td></td>
<td></td>
<td>1800</td>
</tr>
<tr>
<td>AFTER SERIAL NUMBER 132</td>
<td></td>
<td></td>
<td>1100</td>
</tr>
<tr>
<td>BEFORE SERIAL NUMBER 348</td>
<td></td>
<td></td>
<td>1100</td>
</tr>
<tr>
<td>AFTER SERIAL NUMBER 347</td>
<td></td>
<td></td>
<td>700</td>
</tr>
<tr>
<td>AFTER SERIAL NUMBER 101</td>
<td></td>
<td>700</td>
<td>800</td>
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### DIFFERENTIAL LOCK PRESSURE

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<tbody>
<tr>
<td>AFTER SERIAL NUMBER 101</td>
<td>275</td>
<td></td>
<td>275</td>
</tr>
<tr>
<td>AFTER SERIAL NUMBER 348</td>
<td></td>
<td>275</td>
<td></td>
</tr>
</tbody>
</table>
OPTIONS

OPTIONAL EQUIPMENT

1. 74" Carriage
2. 50" Tilt Carriage
3. 74" Tilt Carriage
4. Fork Positioning Carriage
5. Forks
6. 10 Ft. Truss Boom
7. Hydraulic Winch
8. Concrete Hopper 1/2 Yd. or 3/4 Yd.
9. Utility Bucket
10. Roadway Light Package
11. Worklights
12. Spotlight
13. Boom Lights
14. Rear Drive Power Assist (522, 622)

The Following Options Require Lubrication

Tilt Carriage

Grease Fittings

Lubricate these Zerk Fittings Daily
With Multi-Purpose Lithium Grease
(Under Dusty or Severe Operation - Service At Half Intervals)
Fluid Fill And Level
Change oil after approx. 50 hours' operation and at 1000 hour intervals thereafter.
Maintain level using SAE grade 90 gear oil.
To: JLG, Gradall, Lull and Sky Trak 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 (717) 485-6573 or mail to address as specified on the back of this form.

Thank you,
Product Safety & Reliability Department
JLG Industries, Inc.
1 JLG Drive
McConnellsburg, PA 17233-9533
Telephone: (717) 485-5161
Fax: (717) 485-6573

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

Mfg. Model: ____________________________________________
Serial Number: __________________________________________
Previous Owner: __________________________________________
Address: ________________________________________________
City: __________________________ State: ________________________
Zip: ________________ Telephone: ( _______ ) ______________________
Date Of Transfer: __________________________________________
Current Owner: ____________________________________________
Address: ________________________________________________
City: __________________________ State: ________________________
Zip: ________________ Telephone: ( _______ ) ______________________
Who in your organization should we notify?
Name: ___________________________________________________
Title: ____________________________________________________
# JLG Worldwide Locations

<table>
<thead>
<tr>
<th>JLG Locations</th>
<th>Address</th>
<th>Phone</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>JLG Australia</td>
<td>P.O. Box 5119, 11 Bolwarra Road, Port Macquarie, N.S.W. 2444, Australia</td>
<td>(61) 2 65 81111</td>
<td>(61) 2 65 810122</td>
</tr>
<tr>
<td>JLG UK</td>
<td>Unit 12, Southside, Bredbury Park Industrial Estate, Bredbury, Stockport, SK6 2SP, England</td>
<td>(44) 870 200 7700</td>
<td>(44) 870 200 7711</td>
</tr>
<tr>
<td>JLG Germany</td>
<td>Max Planck Strasse 21, D-27721 Ritterhude/Ihpholz, Bei Bremen, Germany</td>
<td>(49) 421 693 500</td>
<td>(49) 421 693 5035</td>
</tr>
<tr>
<td>JLG Italia</td>
<td>Via Po, 22, 20010 Pregnana Milanese - MI, Italy</td>
<td>(39) 02 9359 5210</td>
<td>(39) 02 9359 5845</td>
</tr>
<tr>
<td>JLG Brazil</td>
<td>Rua Eng. Carlos Stevenson, 80-Suite 71, 13092-310 Campinas-SP, Brazil</td>
<td>(55) 19 3295 0407</td>
<td>(55) 19 3295 1025</td>
</tr>
<tr>
<td>JLG Netherlands</td>
<td>Jupiterstraat 234, 2132 HJ Pooldorp, The Netherlands</td>
<td>(31) 23 565 5665</td>
<td>(31) 23 557 2493</td>
</tr>
<tr>
<td>JLG Norway</td>
<td>Sofeimyrveien 12, N-1412 Sofienyr, Norway</td>
<td>(47) 6682 2000</td>
<td>(47) 6682 2001</td>
</tr>
<tr>
<td>JLG Poland</td>
<td>Ul. Krolewskia 00-060 Warsawa, Poland</td>
<td>(48) 91 4320 245</td>
<td>(48) 91 4358 200</td>
</tr>
<tr>
<td>JLG Europe</td>
<td>Kilmartin Place, Tannochside Park, Uddingston G71 5PH, Scotland</td>
<td>(44) 1 698 811005</td>
<td>(44) 1 698 811055</td>
</tr>
<tr>
<td>JLG Germany</td>
<td>Unit 1, 24 Industrial Complex, Herman Street, Meadowdale, Germiston, South Africa</td>
<td>(27) 11 453 1334</td>
<td>(27) 11 453 1342</td>
</tr>
<tr>
<td>JLG Sweden</td>
<td>Enkopingsvagen 150, Box 704, SE - 175 27 Jarfalla, Sweden</td>
<td>(46) 8 506 59500</td>
<td>(46) 8 506 59534</td>
</tr>
<tr>
<td>JLG USA</td>
<td>1 JLG Drive, McConnellsburg PA. 17233-9533, USA</td>
<td>(717) 485-5161</td>
<td>(717) 485-6417</td>
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<tr>
<td>JLG Latin America</td>
<td>Rua Eng. Carlos Stevenson, 80-Suite 71, 13092-310 Campinas-SP, Brazil</td>
<td>(55) 19 3295 0407</td>
<td>(55) 19 3295 1025</td>
</tr>
<tr>
<td>JLG Spain</td>
<td>Plataformas Elevadoras JLG Iberica, S.L., P.I. Castellbisbal Sur, 08755 Castellbisbal, Spain</td>
<td>(34) 93 77 24700</td>
<td>(34) 93 77 11762</td>
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<tr>
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