TECHNICAL MANUAL

ENGINE INSTALLATION & REMOVAL VEHICLE (EIRV)

OPERATION & SAFETY MANUAL

NAVY MODEL
T56-A-14
T56-A-16
T56-A-425
T56-A-427

This Manual Supersedes AG-T56EV-IRM-000 Dated 1 January 2010

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Operation & Safety Manual

Original Instructions
Keep this manual with machine at all times.

Model
Engine Installation & Removal Vehicle (EIRV)

JLG P/N
31200420
CALIFORNIA PROPOSITION 65
BATTERY WARNING

Battery posts, terminals and related accessories contain lead and lead compounds, chemical known to the State of California to cause cancer and reproductive harm.

WASH HANDS AFTER HANDLING!

CALIFORNIA PROPOSITION 65
EXHAUST 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.
REVISION LOG


April 24, 2009 - B - Revised pages 2-3, 5-7 & 8-1.

May 18, 2009 - C - Revised pages 7-22, 9-2 & 9-3.

July 15, 2009 - D - Revised pages 1-10, 2-4, 2-5, 2-6, 3-2, 3-3, 3-12 thru 3-15, 4-5, 4-6 thru 4-8, 4-10 thru 4-14, 4-16, 4-17, 4-19, 4-20, 5-1 thru 5-5, 5-7 thru 5-14, 6-1, 6-4, 7-1, 7-29, 9-3 and 9-6.

January 1, 2010 - E - Revised covers and pages c, 1-3, 1-5, 1-6, 1-8, 2-1 thru 2-9, 3-1, 3-3, 3-8 thru 3-13, 3-15, 3-17, 3-20, 4-1 thru 4-9, 4-13, 4-15, 4-17, 5-1, 5-2, 5-4 thru 5-14, 6-1 thru 6-10, 7-1, 7-2, 7-4, 7-5, 7-7, 7-11 thru 7-14, 7-16, 7-17, 7-19 thru 7-29, 7-33 thru 7-39, 8-1, 8-3, 8-4, 8-5, 9-1 thru 9-5 & 9-8.

August 15, 2010 - F - Revised pages 2-4, 4-1, 4-4, 4-5, 7-10, 7-11, 7-27 & 7-28.
Read This First

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 Engine Installation & Removal Vehicle (EIRV):

- This Operation & Safety Manual
- 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.
Read This First

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

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E-mail:
ProductSafety@JLG.com

Other Publications Available
Service Manual..............................................................31200421
Illustrated Parts Manual.................................................31200422

31200420
# Table of Contents

## Revision Log

## Read This First

- Operator Qualifications ...................................................... b
- Modifications ........................................................................ b
- Other Publications Available ............................................. c

## Table of Contents

### Section 1 - General Safety Practices

1.1 Hazard Classification System .............................................. 1-1
   - Safety Alert System and Safety Signal Words .................. 1-1
1.2 General Precautions .......................................................... 1-1
1.3 Operation Safety ............................................................... 1-2
   - Electrical Hazards ....................................................... 1-2
   - Tip Over Hazard ......................................................... 1-3
   - Travel Hazard ........................................................... 1-6
   - Lifting Personnel ....................................................... 1-7
   - Driving Hazards on Slopes ....................................... 1-8
   - Pinch Points and Crush Hazards ................................. 1-9
   - Fall Hazard ............................................................... 1-11
   - Chemical Hazards ..................................................... 1-12

### Section 2 - Pre-Operation and Inspection

2.1 Pre-Operation Check and Inspection ................................... 2-1
2.2 Safety Decals .................................................................... 2-4
2.3 Walk-Around Inspection .................................................... 2-6
2.4 Warm-Up and Operational Checks ..................................... 2-8
   - Warm-Up Check ....................................................... 2-8
   - Operational Check .................................................... 2-8
2.5 Operator Cab .................................................................... 2-9
2.6 Doors/Windows ............................................................... 2-10
   - Cab Door ................................................................... 2-10
   - Cab Door Window ..................................................... 2-10
   - Rear Window Latch .................................................. 2-11
2.7 Fire Extinguisher ............................................................. 2-12

### Section 3 - Controls and Indicators

3.1 General ............................................................................ 3-1
3.2 Controls ........................................................................... 3-2
   - Dash Controls and Indicators ...................................... 3-4
   - Front Dash Panel ....................................................... 3-5
   - Ignition ....................................................................... 3-7
   - Engine Function Indicator Lights ............................... 3-8
   - Park Brake ............................................................... 3-9
Table of Contents

Parking Procedure.......................................................... 3-9
Transmission Control Lever.......................................... 3-10
Right Console .................................................................. 3-12
Boom Joystick Control (Default) - Mode 1.................... 3-13
Jib Position- Mode 2 ..................................................... 3-14
Frame Sway - Mode 3 .................................................. 3-15
Accessory Control Lever .............................................. 3-16
Load Moment Indicator ............................................. 3-17

3.3 Steer Modes ................................................................ 3-18
3.4 Stabil-Trak™ System.................................................. 3-19
Free Pivot Mode ........................................................... 3-19
Slow Pivot Mode ........................................................... 3-19
Locked Mode ................................................................ 3-19

3.5 Operator Seat .................................................................. 3-20
Adjustments .................................................................. 3-20
Seat Belt ....................................................................... 3-20

3.6 Boom Angle and Extension Indicators ......................... 3-21

Section 4 - Operation

4.1 Engine ........................................................................ 4-1
Starting the Engine ......................................................... 4-1
Cold Weather Starting Aids ............................................ 4-2
Battery Boosted Starting ................................................. 4-3
Slave Starting ................................................................. 4-4
Normal Engine Operation ............................................... 4-5
Shut-Down Procedure .................................................... 4-5

4.2 Operating with A Suspended Load................................. 4-6
Lift Load Safely ............................................................... 4-6
Picking Up a Suspended Load ....................................... 4-6
Transporting a Suspended Load .................................... 4-7
Leveling Procedure ......................................................... 4-7
Placing a Suspended Load ............................................. 4-8
Disengaging a Suspended Load .................................... 4-8

4.3 Loading and Securing for Transport ............................... 4-9
Transport ....................................................................... 4-9
Truck Transportability ..................................................... 4-10
Rail Transportability and GIC Clearance ......................... 4-11
Air Transport, C-17, C141, or C-5 Tiedowns .................... 4-12
C-17, C141 or C-5 Tiedowns - continued ....................... 4-13
Air Transport, C-130 Configuration ................................ 4-14
C-130 Configuration - continued ................................... 4-15
Marine Transportability .................................................. 4-16
External Transport/Slinging .......................................... 4-17
# Table of Contents

**Section 5 - Attachments**
- 5.1 Approved Attachments .................................................. 5-1
- 5.2 Unapproved Attachments ............................................... 5-1
- 5.3 Engine Installation & Removal Vehicle (EIRV)/Attachment/JIB Capacity ............................................... 5-2
- 5.4 Use of the Capacity Chart .................................................. 5-3
  - Capacity Indicator Locations ........................................ 5-3
  - Sample Capacity Chart .................................................. 5-4
  - Example ......................................................................... 5-5
- 5.5 Attachment Installation .................................................. 5-6
- 5.6 Attachment Removal ...................................................... 5-8
- 5.7 Attachment Operation .................................................... 5-10
  - Carriage with Hydraulic Jib ........................................... 5-11

**Section 6 - Emergency Procedures**
- 6.1 Towing a Disabled Product .............................................. 6-1
  - Short Distance Towing .................................................. 6-1
  - Long Distance Towing .................................................. 6-4
- 6.2 Emergency Retract/Lowering of Boom ................................ 6-8
  - Emergency Boom Retract/Lower Procedure (Boom Below 40°) .......................................................... 6-8
  - Emergency Boom Retract/Lower Procedure (Boom Above 40°) .......................................................... 6-9
- 6.3 Emergency Exit from Enclosed Cab ................................ 6-11

**Section 7 - Lubrication and Maintenance**
- 7.1 Introduction .................................................................... 7-1
- 7.2 General Maintenance Instructions ..................................... 7-2
- 7.3 Service and Maintenance Schedule ................................... 7-3
  - 10 & 1st 50 Hour Maintenance Schedule .......................... 7-3
  - 250 & 500 Hour Maintenance Schedule ............................ 7-4
  - 1000 & 2000 Hour Maintenance Schedule .......................... 7-5
- 7.4 Lubrication Schedule ...................................................... 7-6
  - 250 Hour Lubrication Schedule ........................................ 7-6
- 7.5 Operator Maintenance Instructions ................................... 7-7
  - Boom Wear Pad Lubrication ........................................... 7-7
  - Engine Cooling System .................................................. 7-8
  - Fuel System .................................................................... 7-9
  - Air Intake System ......................................................... 7-16
  - Engine Oil ........................................................................ 7-18
  - Hydraulic Oil ................................................................. 7-21
  - Tires .............................................................................. 7-24
  - Transmission Oil ............................................................ 7-27
Table of Contents

Battery ................................................................. 7-29
Fuse and Relay Replacement ............................... 7-30
Counterweight Removal/Installation .................. 7-37

Section 8 - Additional Checks
8.1 Stabil-Trak™ ...................................................... 8-1
8.2 Four Wheel Steer Indexing ................................. 8-3
8.3 Parking Brake Test Procedure ........................... 8-4
8.4 Load Moment Indicator System .......................... 8-5

Section 9 - Specifications
9.1 Product Specifications ........................................ 9-1
    Fluid and Lubrication Capacities ....................... 9-1
    Tires ................................................................... 9-3
    Weights ............................................................... 9-4
    Dimensions ......................................................... 9-5
    Electrical System ............................................... 9-6
    Engine Specifications ......................................... 9-8

Index

Inspection, Maintenance and Repair Log
SECTION 1 - GENERAL SAFETY PRACTICES

1.1 HAZARD CLASSIFICATION SYSTEM

Safety Alert System and Safety Signal Words

⚠️ DANGER ⚠️

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

⚠️ WARNING ⚠️

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

⚠️ CAUTION ⚠️

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

1.2 GENERAL PRECAUTIONS

⚠️ WARNING ⚠️

Before operation, read & understand this manual. Failure to comply with the safety precautions listed in this manual could result in machine damage, property damage, personal injury or death.
1.3 OPERATION SAFETY

Electrical Hazards

- This machine is not insulated and does not provide protection from contact or being near electrical current.
- **NEVER** operate the Engine Installation & Removal Vehicle (EIRV) in an area where overhead power lines, overhead or underground cables, or other power sources may exist without ensuring the appropriate power or utility company de-energizes the lines.
- Always check for power lines before raising the boom.
- Follow employer, local and governmental regulations for clearance from powerlines.
Section 1 - General Safety Practices

Tip Over Hazard

General

- For additional load requirements, refer to the appropriate capacity chart.

- Never use an attachment without the appropriate JLG approved capacity chart installed on the Engine Installation & Removal Vehicle (EIRV).
- Understand how to properly use the capacity charts located in cab.
- **DO NOT** exceed rated lift capacity.
- Be sure that the ground conditions are able to support the machine.

- **DO NOT** raise boom unless frame is level (0 degrees), unless otherwise noted on capacity chart.

- **DO NOT** level machine with boom/attachment above 4 ft (1.2 m).
  (AUS - **DO NOT** level machine with load more than 300 mm (11.8 in) above ground surface)
Section 1 - General Safety Practices

- **MAINTAIN proper tire pressure** at all times. If proper tire pressures are not maintained, this machine could tip over.
- Refer to manufacturer’s specifications for proper fill ratio and pressure requirements for tires equipped with ballast.

- Always wear the seat belt.
- Keep head, arms, hands, legs and all other body parts inside operator’s cab at all times.

If the Engine Installation & Removal Vehicle (EIRV) starts to tip over:

- **DO NOT JUMP**
- **BRACE YOURSELF and STAY WITH THE MACHINE**
- **KEEP YOUR SEAT BELT FASTENED**
- **HOLD ON FIRMLY**
- **LEAN AWAY FROM THE POINT OF IMPACT**

Trying to escape from a tipping machine could result in death or serious injury.
**Section 1 - General Safety Practices**

**Suspended Load**

- Tether suspended loads to restrict movement.
- Weight of all rigging (slings, etc.) must be included as part of load.
- Beware of wind. Wind can cause a suspended load to swing and cause dangerous side loads - even with tag lines.
- **DO NOT** attempt to use the Engine Installation & Removal Vehicle (EIRV) frame-leveling to compensate for load swing.
- Keep heavy part of load closest to attachment.
- Never drag the load; lift vertically.

**When driving with a suspended load:**
- Ensure the vehicle drive control is set to “Creep” mode.
- Start, travel, turn and stop slowly to prevent load from swinging.
- **DO NOT** extend boom.
- **DO NOT** raise the load more than 11.8 in (300 mm) above ground surface or the boom more than 45°.
- **DO NOT** exceed walking speed.
Section 1 - General Safety Practices

Travel Hazard

- Steering characteristics differ between steer modes. Identify the steer mode settings of the Engine Installation & Removal Vehicle (EIRV) being operated.
- **DO NOT** change steer modes while traveling. Steer modes must be changed while machine is stationary.
- Visually verify proper wheel alignment after each steer mode change.
- Ensure that adequate clearance is provided for both rear tail swing and front attachment swing.
- Look out for and avoid other personnel, machinery and vehicles in the area. Use a spotter if you DO NOT have a clear view.
- Before moving be sure of a clear path and sound horn.
- When driving, retract boom and keep boom/attachment as low as possible while maintaining visibility of mirrors and maximum visibility of path of travel.
- Always look in the direction of travel.
- Always check boom clearances carefully before driving underneath overhead obstructions. Position attachment/load to clear obstacles.
- When driving in high speed, use only front wheel steer (if steering modes are selectable).
**Section 1 - General Safety Practices**

**Lifting Personnel**

- When lifting personnel, **USE ONLY** a JLG approved personnel work platform, with proper capacity chart displayed in the cab.

- **DO NOT** drive machine from cab when personnel are in platform.
Driving Hazards on Slopes

To maintain sufficient traction and braking capabilities, travel on slopes as follows:

- When unloaded, the rear of the machine is the “heavy end.” Drive with attachment pointed downhill.
- When loaded, the front of the machine is the “heavy end.” Drive with the attachment pointed uphill.
- For additional travel requirements, refer to the appropriate capacity chart.
- To avoid overspeeding the engine and drivetrain when driving down slopes, downshift to a lower gear and use the service brake as necessary to maintain a slow speed. **DO NOT** shift into neutral and coast downhill.
- Avoid excessively steep slopes or unstable surfaces. To avoid tip over **DO NOT** drive across excessively steep slopes under any circumstances.
- Avoid turning on a slope. Never engage “inching” or shift to “Neutral” when going downhill.
- **DO NOT** park on a slope.
Section 1 - General Safety Practices

Pinch Points and Crush Hazards

Stay clear of pinch points and rotating parts on the Engine Installation & Removal Vehicle (EIRV).

- Stay clear of moving parts while engine is running.

- Keep clear of steering tires and frame or other objects.

- Keep clear from under boom.
Section 1 - General Safety Practices

- Keep clear of boom holes.

- Keep arms and hands clear of attachment tilt cylinder.

- Keep hands and fingers clear of carriage and jib.

- Keep others away while operating.
Section 1 - General Safety Practices

Fall Hazard

- Enter using the proper hand holds and steps provided. Always maintain 3-point contact when mounting or dismounting. Never grab control levers or steering wheel when mounting or dismounting the machine.
- **DO NOT** get off the machine until the shutdown procedure has been performed.

- **DO NOT** carry riders. Riders could fall off machine causing death or serious injury.
Section 1 - General Safety Practices

Chemical Hazards

Exhaust Fumes

- **DO NOT** operate machine in an enclosed area without proper ventilation.
- **DO NOT** operate the machine in hazardous environments unless approved for that purpose by JLG and site owner. Sparks from the electrical system and the engine exhaust can cause an explosion.
- If spark arrestors are required, ensure they are in place and in good working order.

Flammable Fuel

- **DO NOT** fill the fuel tank or service the fuel system near an open flame, sparks or smoking materials. Engine fuel is flammable and can cause a fire and/or explosion.

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.
- Stop engine and relieve trapped pressure. Fluid in the hydraulic system is under enough pressure that it can penetrate the skin.
- **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.
2.1 PRE-OPERATION CHECK AND INSPECTION

Note: Complete all required maintenance before operating unit.

**WARNING**

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

The pre-operation check and inspection, performed at beginning of each work shift or at each change of operator, should include the following:

1. **Cleanliness** - Check all surfaces for leakage (oil, fuel or battery fluid) or foreign objects. Report any leakage to the proper maintenance personnel.
2. **Structure** - Inspect the machine structure for dents, damage, weld or parent metal cracks or other discrepancies.
3. **Safety Decals** - Ensure all safety decals are legible and in place. Clean or replace as required. See page 2-4 for details.
5. **Walk-Around Inspection** - See page 2-6 for details.
6. **Fluid Levels** - Check fluids, including fuel, hydraulic oil, engine oil, transmission fluid and coolant. When adding fluids, refer to Section 7 - Lubrication and Maintenance and Section 9 - Specifications to determine proper type and intervals. Before removing filler caps or fill plugs, wipe all dirt and grease away from the ports. If dirt enters these ports, it can severely reduce component life.
7. **Attachments/Accessories** - Ensure correct capacity chart is installed on the Engine Installation & Removal Vehicle (EIRV). If provided, reference the Operation & Safety Manual of each attachment or accessory installed for specific inspection, operation and maintenance instructions.
Section 2 - Pre-Operation and Inspection

8. **Operational Check** - Once the walk-around inspection is complete, perform a warm-up and operational check (see page 2-8) of all systems in an area free of overhead and ground level obstructions. See Section 3 - Controls and Indicators for more specific operating instructions.

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**WARNING**

If Engine Installation & Removal Vehicle (EIRV) does not operate properly, immediately bring machine to a stop, lower load onto suitable supporting surface and stop the engine. Determine cause and correct before continued use.
Section 2 - Pre-Operation and Inspection

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Section 2 - Pre-Operation and Inspection

2.2 SAFETY DECALS

Ensure all DANGER, WARNING, CAUTION and instructional decals and proper capacity charts are legible and in place. Clean and replace as required.
Section 2 - Pre-Operation and Inspection

*LOCATED INSIDE ENGINE COVER
Section 2 - Pre-Operation and Inspection

2.3 WALK-AROUND INSPECTION

Note: Engine Installation & Removal Vehicle (EIRV) is issued without cab door and engine cover keys.

Begin your walk-around inspection at item 1, as noted below. Continue to your right (counterclockwise when viewed from top) checking each item in sequence.

INSPECTION NOTE: On all components, make sure there are no loose or missing parts, that they are securely fastened and no visible leaks or excessive wear exists in addition to any other criteria mentioned. Inspect all structural members including attachment for cracks, excessive corrosion and other damage.

1. **Boom Sections and Lift, Tilt, Extend/Retract, Compensating (Slave) Cylinders** -
   - Check front, top, side and rear wear pads for the presence of grease.
   - Pivot pins secure; hydraulic hoses undamaged, not leaking.

2. **Front Axle** - Steer cylinders undamaged, not leaking; pivot pins secure; hydraulic hoses undamaged, not leaking.
Section 2 - Pre-Operation and Inspection

3. **Wheel/Tire Assembly** - Properly inflated and secured; no loose or missing lug nuts. Inspect for worn tread, cuts, tears or other discrepancies.

4. **Mirrors** - Clean and undamaged.

5. **Cab and Electrical** -
   - General appearance; no visible damage.
   - Frame level indicator and window glass undamaged and clean.
   - Gauges, switches, joysticks, foot controls, lights and horn operational.
   - Fire extinguisher in place and charged.
   - Check seat belt for damage, replace belt if frayed or cut webbing, damaged buckles or loose mounting hardware.

6. **Wheel/Tire Assembly** - Properly inflated and secured; no loose or missing lug nuts. Inspect for worn tread, cuts, tears or other discrepancies.

7. **Stabil-Trak Cylinder** - Pins secure; hydraulic hoses undamaged, not leaking.

8. **Rear Axle** - Steer cylinders undamaged, not leaking; pivot pins secure; hydraulic hoses undamaged, not leaking.

9. **Wheel/Tire Assembly** - Properly inflated and secured; no loose or missing lug nuts. Inspect for worn tread, cuts, tears or other discrepancies.

10. **Engine Compartment** -
    - Drive belts, check condition and replace as required.
    - Battery cables tight, no visible damage or corrosion.
    - Engine cover properly secured.
    - Main Control Valve - See inspection note.

11. **Wheel/Tire Assembly** - Properly inflated and secured; no loose or missing lug nuts. Inspect for worn tread, cuts, tears or other discrepancies.

12. **Sway Cylinder** - Pins secure; hydraulic hoses undamaged, not leaking.

Section 2 - Pre-Operation and Inspection

2.4 WARM-UP AND OPERATIONAL CHECKS

Warm-Up Check

During warm-up period, check:
1. Heater, defroster and windshield wiper.
2. Check all lighting systems for proper operation.
3. Adjust mirror(s) for maximum visibility.

WARNING

CUT/CRUSH/BURN HAZARD. Keep engine cover closed while engine is running except when checking transmission oil level.

Operational Check

When engine warms, perform an operational check:
1. Service brake and parking brake operation.
2. Forward and reverse travel.
3. Each gear.
5. Steering in both directions with engine at low idle (steering lock to lock will not be reached). Check in each steering mode.
6. Horn and back-up alarm. Must be audible from inside operators cab with engine running.
7. All joystick functions - operate smoothly and correctly.
8. Emergency stop button - shuts machine off when depressed.
9. Operator seat interlock - shuts machine off when operator leaves the operator seat (ten second delay).
10. Perform any additional checks described in Section 8 - Additional Checks.
Section 2 - Pre-Operation and Inspection

2.5 OPERATOR CAB

The Engine Installation & Removal Vehicle (EIRV) is equipped with an enclosed Roll Over Protection Structure/Falling Object Protection Structure (ROPS/FOPS) cab.

WARNING

Never operate Engine Installation & Removal Vehicle (EIRV) unless the overhead guard and cab structure are in good condition. Any modification to this machine must be approved by JLG to assure compliance with ROPS/FOPS certification for this cab/machine configuration. If damaged, the CAB CANNOT BE REPAIRED. It must be REPLACED.
Section 2 - Pre-Operation and Inspection

2.6 DOORS/WINDOWS

Keep all windows and mirrors clean and unobstructed.

Cab Door

There are two door latches:

- Both door latches (1 - inside, 2 - outside) are a pull-to-release type.

Cab Door Window

- During operation the window (4) must either be latched open or closed.
- From inside the cab the window can be released using the window latch handle (5) by turning to release. Pivot the handle out of the way and swing window open.
- From outside the cab the window can be released using the window latch handle (3) by turning to release.
- Once open, secure window in place on outside of cab.
- During operation the lower door must be closed.
Section 2 - Pre-Operation and Inspection

Rear Window Latch

The rear window (1) can be partially opened and secured in place with the rear window latch.

- To open, grab the latch handle (2) and pull up, then push the window outward.
- To close and secure the window, pull the latch handle up and then inward.

Note: In an emergency situation, the operator can exit through the rear window opening by removing the latch pin (3) on the window latch. The window is then free to swing open.
Section 2 - Pre-Operation and Inspection

2.7 FIRE EXTINGUISHER

- Be familiar with the operation of the fire extinguisher located inside the operator cab under the rear window.
- Inspect and service the fire extinguisher regularly.
- Follow and obey the recommendations on the label.
SECTION 3 - CONTROLS AND INDICATORS

3.1 GENERAL
This section provides the necessary information needed to understand control functions.

Note: The manufacturer has no direct control over machine application and operation. The user and operator are responsible for conforming with good safety practices.

NOTICE

EQUIPMENT DAMAGE. When any of the front dash panel red warning lights illuminate, immediately bring machine to a stop, lower load onto suitable supporting surface and stop the engine. Determine cause and correct before continued use.
Section 3 - Controls and Indicators

3.2 CONTROLS

3. Front Dash Panel: See page 3-5.
4. Steering Wheel: Turning the steering wheel to the left or right steers the machine in the corresponding direction. Three steering modes are available. See “Steer Modes” on page 3-18.
5. Frame Level Indicator: Enables the operator to determine the left to right level condition of the Engine Installation & Removal Vehicle (EIRV).
7. Accessory Control Lever: See page 3-16.
8. Cab Circulation Fan: Located at the top right side of cab just above operator seat.
9. **Fan Control Switch**: A three position toggle switch is located on the fan mount. The fan can be operated at HIGH speed (switch down) or LOW speed (switch up).

10. **Boom Joystick**: See page 3-12.

11. **Engine Heater**: Two positions: Turn on to activate.

12. **Frame Sway Switch**: See page 3-12.

13. **Fine Mode Switch**: Two position switch ON/OFF. While in fine mode all functions operate at half speed for more precise movement/operation. See page 3-12.

14. **Load Moment Indicator**: See page 3-17.

15. **Horn**: Depress button to sound horn.

16. **Operator Seat Interlock Switch**: The operator lower seat cushion is equipped with an interlock switch. The machine will not start or operate without an operator sitting in the seat. If the operator’s weight is removed from the seat during operation, the machine will shut down after a ten second delay.

17. **Emergency Stop Switch**: Located on the left side of the operators seat base, push down to shut off power and stop engine.

18. **Ignition Switch**: See page 3-7.

19. **Accelerator Pedal**: Pressing down the pedal increases engine and hydraulic speed. The accelerator pedal is also used to activate the Cummins ECM diagnostic system. See page 3-8.

20. **Service Brake Pedal**: The further the pedal is depressed, the slower the travel speed. With service brake pedal depressed and boom angles above 40°, the locked mode of the Stabil-Trak system is activated.

**Section 3 - Controls and Indicators**

**Dash Controls and Indicators**

1. **Engine Function Indicator Lights**: See page 3-8 for details.
2. **Parking Brake Switch**: See page 3-9 for details.
3. **Steer Mode Selector**: Three positions: 4-wheel circle steer, 4-wheel crab steer and 2-wheel steer. See page 3-18 for details.
4. **Front Dash Panel**: See page 3-5 for details.
5. **All Function Creep Mode Switch**: Two position switch ON/OFF. Locks transmission into first gear and reduces power and speed in engine. This switch has a slide-lock to lock it into position.
6. **Rear Wheel Centering and Axle Service Indicator**: This dual indicator illuminates to indicate when rear wheels are centered (upper half) and when lubrication service (lower half) is due.
7. **Front Windshield Wiper**: Three position switch. Push bottom of switch to operate wiper at high speed. Move switch to middle position to operate wiper at low speed. Push top of switch to turn wiper off.
8. **Front Windshield Washer**: rocker switch is spring loaded to return to the OFF position when released. Press and hold the bottom of the switch to activate.
9. **Roof Wiper/Washer**: A two position switch, push once to turn wiper on, push and hold to pump washer fluid then release to return to the wiper only position.
10. **Work Lights**: Three positions: OFF, Boom Worklight and Boom & Rear Worklights. The ignition switch must be in RUN position to activate.
11. **Emergency Flashers**: Two position switch ON/OFF.
12. **Voltmeter**: Indicates alternator output and battery condition.
13. **Cab Heater/AC Controls**: Temperature control switch on left side, adjustable rotary switch. AC On/Off switch in center. Fan speed switch on right side, four position rotary switch.
Section 3 - Controls and Indicators

Front Dash Panel

1. **Fuel Gauge**: Indicates amount of fuel in fuel tank.
2. **Engine Air-Intake Heater Indicator**: Illuminates with ignition switch in the “RUN” position. Light goes out when start temperature is reached. At temperatures below 40°F (4°C), do not start until light goes out.
3. **Stabil-Trak “Slow Pivot” Mode Indicator**: Illuminates when Stabil-Trak system has been activated in the “Slow Pivot” mode. See page 3-19 for details.
4. **Engine Tachometer**: Indicates speed of engine in revolutions per minute (rpm).
5. **High Beam Indicator**: Illuminates while high beam lights are activated.
6. **Stabil-Trak “Locked” Mode Indicator**: Illuminates when Stabil-Trak system has been activated in the “Locked” mode. See page 3-19 for details.
7. **Turn Signal Indicator**: Illuminates and flashes while turn signals are activated in either direction or the hazard lights have been activated.
8. **Engine Coolant Temperature Gauge**: Monitors engine operating temperature. If temperature goes above 210°F (99°C) stop and idle engine, allowing time for cooling and shut-down.
9. **Hydraulic Oil Filter Indicator**: Illuminates when hydraulic oil filter requires maintenance.
10. **Low Brake Pressure Indicator**: Illuminates and buzzer sounds when service brake hydraulic system pressure drops below safe operating level. Shut-down engine immediately.
11. **Air Filter Indicator**: Illuminates when air filter(s) require maintenance.
12. **Hydraulic Oil Temperature Indicator**: Illuminates when hydraulic oil temperature is too high. Stop and idle engine, allowing time for cooling. If light remains on, shut-down engine.
13. **Hourmeter**: Records and indicates engine operating hours.
**Section 3 - Controls and Indicators**

14. **Transmission Temperature Indicator**: Illuminates and buzzer sounds when transmission oil temperature is too high. Stop and idle engine with transmission in Neutral, allowing time for cooling. If light remains on, shut-down engine.

15. **Park Brake Indicator**: Illuminates when park brake is applied. See page 3-9.

16. **Battery Charge Indicator**: Illuminates to indicate batteries at low charge or a weak or improperly functioning charging system.

17. **Engine Oil Pressure Indicator**: Illuminates and buzzer sounds when engine oil pressure is too low. Shut-down engine immediately.
Ignition Switch (1) may be turned clockwise from the OFF (2) position to the RUN (3) position and START (4) positions.

Note: Operator must be seated with seat belt fastened and Emergency Stop Switch pulled out to start machine.

- To rotate the switch to the START position, push the switch in and rotate to the START position. The START position is spring loaded to return to the RUN position and must be manually held in place for starting.
- OFF position (2) - The entire electrical system is shut down.
- RUN position (3) - All controls and indicators are operable.
- START position (4) - Engages starter motor to crank the engine when the parking brake switch is engaged and the transmission is in neutral.
Section 3 - Controls and Indicators

Engine Function Indicator Lights

This light (2) indicates any faults that arise in the engine during operation. The light contains a RED light (1) and an AMBER light (3).

- If the RED light (1) illuminates during operation, stop the engine immediately and diagnose the fault by activating the ECM diagnostic system.
- If the AMBER light (3) illuminates during operation, the engine diagnostic system has detected a fault within the engine. At next shutdown, diagnose the fault by activating the ECM diagnostic system.

Cummins ECM Diagnostic System Activation

1. With the engine OFF, turn the ignition switch to the RUN position. DO NOT start the engine.
2. Completely depress and release the accelerator pedal three times.

This will activate the system, both the AMBER and RED lights will come on momentarily and then both will begin to flash the code. If no faults are present, both lights will come on and stay on.

ECM Light Code Identification

1. The AMBER light will flash one time to identify the start of the code followed by a one or two second pause.
2. The RED light will flash the code sequence, pausing for one or two seconds between numbers.
3. The AMBER light will flash once after the RED light has flashed the code to signify the end of that fault code.

Contact your local Cummins dealer for an explanation of these codes or refer to the Cummins Engine Owners Manuals. The contact number for the Cummins Customer Assistance Center is: 1-800-343-7357.
### Section 3 - Controls and Indicators

#### Park Brake

This switch (1) controls the application and release of the park brake. Indicator light (2) illuminates to indicate brake is applied.

- Push switch up to disengage parking brake. With the engine running and the park brake switch in "OFF" position, park brakes are disengaged.
- Push switch down to engage parking brake. With switch in "ON" position, park brake is engaged and transmission will not engage forward or reverse.
- The parking brake switch must be engaged to permit engine starting.
- With boom angles greater than 40°, this switch activates the locked mode of the Stabil-Trak system.

---

**WARNING**

**MACHINE ROLL-AWAY HAZARD.** Always move park brake switch to "ON" position, lower boom to ground and stop engine before leaving cab.

---

**WARNING**

**CRUSH HAZARD.** Turning engine off, applying park brake, pressing emergency stop button, or standing up off seat while traveling will cause unit to stop abruptly and could cause load loss. Any may be used in an emergency situation.

---

#### Parking Procedure

1. Using service brake, stop the EIRV in an appropriate parking area.
2. Follow "Shut-Down Procedure" on page 4-5.
Transmission Control Lever

Direction of Travel Selection

Transmission control lever (1) engages forward or reverse travel.

- Push lever up for forward travel; pull lever down for reverse travel. Move lever to centered position for neutral.

Note: The transmission control lever must be in neutral to permit engine starting.

- Forward or reverse travel can be selected while in any gear.
- When traveling in reverse, the back-up alarm will automatically sound and a visual strobe will activate.
- Drive in reverse and turn only at slow rates of speed.

WARNING

TIP OVER/CRUSH HAZARD. Bring Engine Installation & Removal Vehicle (EIRV) to a complete stop before shifting transmission control lever. A sudden change in direction of travel could reduce stability and/or cause load to shift or fall.

Neutral Lock Lever (2) locks/unlocks the Transmission Control Lever.

- To lock the transmission control lever, place the lever in the neutral position and move the neutral lock lever to the left or (N) position
- To unlock, move the neutral lock lever to the right or (D) position.
Section 3 - Controls and Indicators

Gear Selection

Gear selection is located on the twist grip handle (3) of transmission control lever.

- Twist hand grip to select gear.
- Select the appropriate gear for the task being performed. **Use a lower gear when transporting a load.** Use a higher gear only when driving unloaded for longer distances.

**Note:** When traveling up a slope, shift to a lower gear as appropriate to avoid “lugging” the engine.

- Slow down prior to downshifting. Downshift only one gear at a time.
Section 3 - Controls and Indicators

Right Console

1. **Boom Joystick Control**: See page 3-13 for details.
2. **Engine Pre-Heat Switch**: Press to activate. Allows engine to be started in temperatures below -25°F (-32°C).
3. **Jib Extend/Retract Switch**: See page 3-14 for details.
4. **Frame Sway Switch**: See page 3-15 for details.
5. **Fine Mode Switch**: Two position switch ON/OFF. While in fine mode all functions operate at half speed for more precise movement/operation.

**Note**: When Jib Switch is activated, all other boom functions are disabled. Operator must de-activate switch to return to normal boom function.
The joystick (1) controls the boom movement with no buttons depressed.

- Move the joystick rearward to lift boom, move the joystick forward to lower boom.
- Move the joystick right to extend boom, move the joystick left to retract boom.

**WARNING**

**TIP OVER/CRUSH HAZARD.** Rapid, jerky operation of controls will cause rapid, jerky movement of the load. Such movements could cause the load to shift or fall or could cause the machine to tip over.
**Section 3 - Controls and Indicators**

**Jib Position- Mode 2**

---

**Jib Tilt Up/Down & Position Left/Right**

Press and hold the button (2) on the joystick.

- To shift hook right, move joystick to the right. To shift hook left, move joystick to the left.
- For jib tilt up, move joystick rearward. For jib tilt down, move joystick forward.

To activate Jib extend/retract, press the bottom of the jib switch (3) in.

- To extend, move joystick to the right. To retract, move joystick to the left.

*Note: When Jib Switch is activated, all other boom functions are disabled. Operator must de-activate switch to return to normal boom function.*
Section 3 - Controls and Indicators

Frame Sway - Mode 3

To activate frame sway, press the bottom of the Frame Sway switch (4) in. Press and hold the button (2) on the joystick. Move the joystick to the desired function.

- For frame sway right, move joystick to the right. For frame sway left, move joystick to the left.

A level indicator is located above the front cab window to permit operator to determine whether the Engine Installation & Removal Vehicle (EIRV) frame is level.

⚠️ WARNING

TIP OVER HAZARD. Always move boom as low as possible while allowing for best visibility of right hand mirror before leveling frame. Attempting to level machine with boom raised could cause it to tip over.
Section 3 - Controls and Indicators

Accessory Control Lever

The accessory control lever (1) operates the turn signals, parking lights and headlights.

Turn Signals

- Raise the lever (6) to activate the left turn signal.
- Lower the lever (7) to activate the right turn signal.
- The lever must be manually returned to the center position to deactivate either turn signal. The lever will not cancel automatically after a turn.

Parking lights and Headlights

- Turn the twist grip (2) of the lever counterclockwise to the first position (3) to turn on the parking lights.
- Turn the twist grip to the second position (4) to turn on the headlights.
- Pull the lever toward you to switch from low beam to high beam. When the high beam is ON the high beam indicator will illuminate.
- Turn the twist grip clockwise to the OFF position (5) to turn all lights off.
The Load Moment Indicator (1) provides a visual indication for forward stability limitations.

- Green LED (4) will illuminate when Load Moment Indicator power is on.
- LEDs progressively illuminate as a load is lifted. First green (2), then yellow (5) and finally red (6).
- The warning buzzer sounds and the red LED is illuminated as the Engine Installation & Removal Vehicle (EIRV) reaches its forward stability limitations.
- Overload Protection Function. When the red LED is illuminated the automatic overload protection function is activated. Boom extension and lower functions are disabled. Retract boom to re-enable functions.
- Test the Load Moment Indicator (3) at the beginning of each work shift. See Section 8 - Additional Checks.
Stop the EIRV before changing steering modes. Ensure steering alignment light is illuminated before switching steering modes. If indicator is not illuminated, refer to “Four Wheel Steer Indexing” on page 8-3

4-Wheel Circle Steer

2-Wheel Front Steer

4-Wheel Crab Steer
3.4 STABIL-TRAK™ SYSTEM

Free Pivot Mode
With boom below 40° (1), the Stabil-Trak system is in Free Pivot Mode. The rear axle pivots freely and frame sway functions normally. Both Stabil-Trak slow pivot (3) and lock (4) indicators will be off.

Slow Pivot Mode
With boom above 40° (2), the Stabil-Trak system is in Slow Pivot Mode when the service brake is not applied and the transmission is in gear. The rear axle will respond slowly to changes in terrain and frame sway functions normally. The Stabil-Trak slow pivot indicator (3) will illuminate.

Locked Mode
With boom above 40° (2), and activating one or more of the following functions, the Stabil-Trak system is in Locked Mode.

- Park brake switch engaged.
- Transmission control lever in Neutral.
- Service brake pedal depressed.

The rear axle is locked and the frame sway functions slower than normal. The Stabil-Trak lock indicator (4) will illuminate.
Section 3 - Controls and Indicators

3.5 OPERATOR SEAT

Adjustments

Prior to starting engine adjust seat for position and comfort as follows:

1. Turn the knob on the front of seat to adjust the suspension. Turn the knob clockwise to increase stiffness. Turn the knob counterclockwise to reduce stiffness.

2. Pull up on handle to move seat fore and aft.

3. Arm rest can be moved up or down for comfort.

4. A two inch seat belt is standard equipment.

Note: The operator seat is equipped with an emergency interlock switch. If a loss of pressure on the switch is detected, after a ten second delay an emergency shutdown will occur.

Seat Belt

Fasten seat belt as follows:

1. Grasp both free ends of the belt making certain that belt webbing is not twisted or entangled.

2. With back straight in the seat, couple the retractable end (male end) of the belt into the receptacle (buckle) end of the belt.

3. With belt buckle positioned as low on the body as possible, pull the retractable end of the belt away from the buckle until it is tight across the lap.

4. To release belt latch, depress red button on the buckle and pull free end from buckle.
3.6 BOOM ANGLE AND EXTENSION INDICATORS

- The boom angle indicator (1) is located on the left side of the boom. Use this indicator to determine the boom angle when using the capacity chart (see “Use of the Capacity Chart” on page 5-3).
- Boom extension indicators (2) are located on the left side of the boom. Use these indicators to determine boom extension when using the capacity chart (see “Use of the Capacity Chart” on page 5-3).
4.1 ENGINE

Starting the Engine

This machine can be operated under normal conditions in temperatures of 0°F to 104°F (-20°C to 40°C). Consult JLG for operation outside this range or under abnormal conditions.

1. Make sure battery shut-off switch in engine compartment is in the “ON” position.
   
   **Note:** Operator must be seated with seat belt fastened and Emergency Stop Switch pulled out to start machine.

2. Make sure all controls are in “Neutral” and all electrical components (lights, heater, defroster, etc.) are turned off. Set parking brake.

3. If equipped with engine block heater and temperature is below 40°F (4°C), turn the ignition switch to "RUN". Wait until the engine air-intake heater indicator light goes out.

4. Turn ignition switch to “START” to engage starting motor. Release ignition switch immediately when engine starts. If engine fails to start within 20 seconds, release ignition switch and allow starting motor to cool for a few minutes before trying again.

5. After engine starts, observe oil pressure gauge. If gauge remains on zero for more than ten seconds, stop engine and determine cause before restarting engine. Reference engine manual for minimum pressure at operating temperature.

6. Warm up at approximately 1/2 throttle until engine warms to normal temperature, 180°F to 190°F (82°C to 88°C).
   
   **Note:** Engine will not start unless transmission control lever is in “Neutral” and park brake switch is applied.

---

**WARNING**

**UNEXPECTED MOVEMENT HAZARD.** Always ensure that transmission control lever is in neutral and the service brake is applied before releasing park brake. Releasing park brake in either forward or reverse could cause the machine to move abruptly, causing an accident.
Section 4 - Operation

Cold Weather Starting Aids

Block Heater
This Engine Installation & Removal Vehicle (EIRV) is equipped with a block heater, the following applies:
• Grid heater is located inside the induction manifold.
• Grid heater is triggered by temperature sensor located on engine.
• At start-up, temperature sensor on engine will detect if grid heater is needed. Follow normal start-up procedure.
• A second battery is added for additional cold-cranking capacity.

CAUTION
ENGINE EXPLOSION. This Engine Installation & Removal Vehicle (EIRV) is equipped with cold start aid, do not use ether or any high energy fuels to assist starting.

Arctic Start Kit (-25°F to -40°F)
To operate arctic heater:
1. Ensure parking brake is applied.
2. Turn ignition switch to RUN position.
3. Activate engine preheat switch on right console.
4. Allow arctic heater to operate for approximately 30 minutes, then turn preheat switch to OFF position.
5. Start engine, refer to “Starting the Engine” on page 4-1.
6. Use the joystick to raise the boom until attachment is 6 in (152 mm) from ground, and then fully retract the boom.
7. Continue to hold the joystick in the boom retract position for 10 to 15 minutes. This operation warms the hydraulic oil by forcing it through the boom circuit relief valve.
8. Operate all hydraulic functions until warm oil has circulated through the cylinders.
9. Machine is now ready for normal operation.
Battery Boosted Starting

If battery-boost starting (jump-start) is necessary, proceed as follows:

- Never allow vehicles to touch.
- Ensure boosting vehicle engine is running.
- Connect the positive (+) jumper cable to positive (+) post of discharged battery.
- Connect the opposite end of positive (+) jumper cable to positive (+) post of booster battery.
- Connect the negative (-) jumper cable to negative (-) post on booster battery.
- Connect opposite end of negative (-) jumper cable to ground point on machine away from discharged battery.
- Follow standard starting procedures.
- Remove cables in reverse order after machine has started.

⚠️ WARNING

BATTERY EXPLOSION HAZARD. Never jump start or charge a frozen battery as it could explode. Keep sparks, flames and lighted smoking materials away from the battery. Lead acid batteries generate explosive gases when charging. Wear safety glasses.
Slave Starting

The battery slave receptacle (1) is located under the engine cover in front of the transmission. Ensure that both the disabled and booster vehicles are equipped with a slave receptacle.

1. Connect the slave cable to the booster vehicle slave receptacle.
2. Connect the other end of the slave cable to the disabled vehicle's slave receptacle.
3. Run the booster vehicle at a speed just above idle.
4. Follow the steps for “Starting the Engine” on page 4-1.
5. After starting the disabled vehicle, return the booster vehicle to idle.
6. Remove slave cable from the disabled vehicle first and then from the booster vehicle.

**WARNING**

**BATTERY EXPLOSION HAZARD.** Never slave start a frozen battery as it could explode. Keep sparks, flames and lighted smoking materials away from the battery. Lead acid batteries generate explosive gases when charging. Wear safety glasses.
Section 4 - Operation

Normal Engine Operation

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

• Be alert for unusual noises or vibration. When an unusual condition is noticed, park machine in safe position and perform shut-down procedure. Report condition to your supervisor or maintenance personnel.

• Avoid prolonged idling. If the engine is not being used, turn it off.

Shut-Down Procedure

When parking the Engine Installation & Removal Vehicle (EIRV), park in a safe location on flat level ground and away from other equipment and/or traffic lanes.

1. Apply the park brake.
2. Shift the transmission to “Neutral.”
3. Lower attachment to the ground.
4. Operate engine at low idle for 3 to 5 minutes.
5. Turn ignition switch to the “OFF” position.
6. Depress Emergency Stop Switch.
8. Block wheels (if necessary).
9. Move battery shut-off switch in engine compartment to the “OFF” position if machine will be in extended storage.
Section 4 - Operation

4.2 OPERATING WITH A SUSPENDED LOAD

Lift Load Safely

- You must know the weight and load center of every load you lift. If you are not sure of the weight and load center, check with your supervisor or with the supplier of the material.

![WARNING]

**WARNING**

TIP OVER HAZARD. Exceeding lift capacity of the Engine Installation & Removal Vehicle (EIRV) could damage the equipment and/or cause tip over.

- Know the rated load capacities (refer to Section 5 - Attachments) of the Engine Installation & Removal Vehicle (EIRV) to determine the operating range in which you can safely lift, transport and place a load.

Picking Up a Suspended Load

- Note the conditions of the terrain. Adjust travel speed and reduce amount of load if conditions warrant.
- Avoid lifting double-tiered loads.
- Make sure load is clear of any adjacent obstacles.
- **NEVER** operate without a proper and legible capacity chart in the operator cab for the Engine Installation & Removal Vehicle (EIRV)/attachment combination you are using.
- Ensure to always properly tether loads to restrict movement.
- Refer to “Use of the Capacity Chart” on page 5-3 for proper lifting guidelines in addition to the appropriate capacity chart on the machine.
- Only use approved lifting devices rated for the lifting of the load.
- Identify the proper lifting points of the load, taking into consideration the center of gravity and load stability.
Transporting a Suspended Load

- Travel in accordance with the requirements set forth in Section 1 - General Safety Practices and Section 5 - Attachments.

**Important things to remember:**
- Ensure the boom is fully retracted.
- Never raise the load more than 11.8 in (300 mm) above ground surface or the boom more than 45°.
- Do not allow attachment, rigging or load to come into contact with ground while transporting load or driving.
- The combination of side tilt and load could cause the Engine Installation & Removal Vehicle (EIRV) to tip over.
- Refer to “Use of the Capacity Chart” on page 5-3 for allowable ground conditions in addition to the appropriate capacity chart on the machine.
- The guide men and operator must remain in constant communication (verbal or hand) and be in visual contact with the operator at all times.
- If applicable, refer to “Use of the Capacity Chart” on page 5-3 for additional proper transporting guidelines.
- Never place the guide men between the suspended load and the Engine Installation & Removal Vehicle (EIRV).
- Only transport the load at walking speed, 0.9 mph (0.4 m/s), or less.

**Leveling Procedure**

1. Position machine in best location to lift or place load.
2. Apply parking brake and move transmission control lever to NEUTRAL.
3. Observe level indicator to determine whether machine must be leveled prior to lifting load.
4. Move boom so load is no more than 11.8 in (300 mm) above ground surface and/or boom is raised no more than 45°.
Section 4 - Operation

Placing a Suspended Load

Before placing any load be sure that:

- When precise placement of the load is required, set the machine controls in “Fine Mode”. Using the joystick feather between the quadrants, to ensure the load moves level to the location for load placement.
- Once load is within 6 in (152 mm) of landing point, use the jib extend/retract switch located on the right hand panel to complete placement. See “Carriage with Hydraulic Jib” on page 5-11 for details.
- The landing point can safely support the weight of the load.
- The landing point is level; front to back and side to side.
- Use the capacity chart to determine safe boom extension range. See “Use of the Capacity Chart” on page 5-3.
- Align load at the level load is to be placed, then position boom slowly until load is just above area where it is to be placed.
- Ensure that the guide men and operator remain in constant communication (verbal or hand) when placing the load.

Disengaging a Suspended Load

- Never place the guide men between the suspended load and the Engine Installation & Removal Vehicle (EIRV).
- Once at the destination of the load, ensure to bring the Engine Installation & Removal Vehicle (EIRV) to a complete stop and apply the park brake prior to disengagement of the lifting devices and the tethers.
4.3 LOADING AND SECURING FOR TRANSPORT

Transport

1. Level the EIRV prior to loading. Make use of all tiedown/lift point locations.
2. Using a spotter, load the EIRV with boom as low as possible.
3. Once loaded, apply parking brake and lower boom until boom or attachment is resting on deck. Move all controls to “Neutral,” stop engine and turn ignition switch to OFF position.
4. Secure machine to deck by passing chains through the designated tiedown points as shown in the figure.
5. Do not tiedown front of boom.

*Note:* The user assumes all responsibility for choosing the proper method 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 local, state or federal/provincial laws are followed.

**WARNING**

*EIRV SLIDE HAZARD.* Before loading EIRV for transport, make sure deck, ramps and wheels are free of mud, snow and ice. Failure to do so could cause EIRV to slide.
Section 4 - Operation

Truck Transportability

Refer to the following diagram.
Rail Transportability and GIC Clearance

Refer to the following diagram.
Section 4 - Operation

Air Transport, C-17, C141, or C-5 Tiedowns

Refer to the following diagrams.
Axle and Tire Data W/Attachment

<table>
<thead>
<tr>
<th>Axle</th>
<th>Rear</th>
<th>Front</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axle Load</td>
<td>17,740 lb</td>
<td>11,467 lb</td>
</tr>
<tr>
<td></td>
<td>(8.047 kg)</td>
<td>(5.201 kg)</td>
</tr>
<tr>
<td>Load/Tire</td>
<td>L-9,105</td>
<td>L-5,215</td>
</tr>
<tr>
<td></td>
<td>R-8,635 lb</td>
<td>R-6,252 lb</td>
</tr>
<tr>
<td></td>
<td>(L-4.129 kg)</td>
<td>(L-2.365 kg)</td>
</tr>
<tr>
<td>Footprint Area</td>
<td>123 in²</td>
<td>119 in²</td>
</tr>
<tr>
<td>@ 87 psi</td>
<td>(793 cm²)</td>
<td>(768 cm²)</td>
</tr>
</tbody>
</table>
Section 4 - Operation

Air Transport, C-130 Configuration

Refer to the following diagrams.
For axle weights and pallet weights refer to the following tables.

### 463L Pallet Data

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>463L Pallet Weight</td>
<td>290 lb</td>
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<tr>
<td>(131 kg)</td>
<td></td>
</tr>
<tr>
<td>Counterweight Assembly Weight</td>
<td>4,400 lb</td>
</tr>
<tr>
<td>(1,996 kg)</td>
<td></td>
</tr>
<tr>
<td>Total Weight</td>
<td>4,690 lb</td>
</tr>
<tr>
<td>(2,127 kg)</td>
<td></td>
</tr>
</tbody>
</table>

### Axle and Tire Data W/O Counterweight

<table>
<thead>
<tr>
<th>Axle</th>
<th>Rear</th>
<th>Front</th>
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</thead>
<tbody>
<tr>
<td>Axle Load</td>
<td>12,288 lb (5.573 kg)</td>
<td>12,494 lb (5.667 kg)</td>
</tr>
<tr>
<td>Load/Tire</td>
<td>L-6,325 R-5,975 lb (L-2.868 R-2.710 kg)</td>
<td>L-5,675 R-6,825 lb (L-2.574 R-3.095 kg)</td>
</tr>
<tr>
<td>Footprint Area @ 87 psi (6.0 bar)</td>
<td>101 in² (652 cm²)</td>
<td>105 in² (677 cm²)</td>
</tr>
</tbody>
</table>
Section 4 - Operation

Marine Transportability

Refer to the following diagram.
External Transport/Slinging

Refer to the following diagram.

- When lifting machine, it is very important that the lifting device and equipment is attached only to designated lifting points.
- Make adjustments to the lifting device and equipment to ensure the machine will be level when elevated. The machine must remain level at all times while being lifted.
- Ensure that the lifting device and equipment is adequately rated and suitable for the intended purpose. See Section 9 - Specifications for machine weight.
- Remove all loose items from machine prior to lifting.
- Lift machine with smooth, even motion. Set machine down gently. Avoid quick or sudden motions that could cause shock loads to machine and/or lifting devices.
SECTION 5 - ATTACHMENTS

5.1 APPROVED ATTACHMENTS

To determine if an attachment is approved for use on the specific machine you are using, perform the following prior to installation.

- The attachment model/option number on the attachment identification plate must match the attachment number on a capacity chart located in the operator cab.
- Hydraulically powered attachments must only be used on machines equipped with auxiliary hydraulics.
- Hydraulically powered attachments that require auxiliary electrics must only be used on machines equipped with auxiliary hydraulics and electrics.

If any of the above conditions are not met, do not use the attachment. The machine may not be equipped with the proper capacity chart or the attachment may not be approved for the model being used. Contact JLG or your local distributor for further information.

5.2 UNAPPROVED ATTACHMENTS

Do not use unapproved attachments for the following reasons:

- JLG cannot establish range and capacity limitations for “will fit,” homemade, altered, or other non-approved attachments.
- An overextended or overloaded Engine Installation & Removal Vehicle (EIRV) can tip over with little or no warning and cause serious injury or death to the operator and/or those working nearby.
- JLG cannot assure the ability of a non-approved attachment to perform its intended function safely.

WARNING

Use only approved attachments. Attachments which have not been approved for use with your Engine Installation & Removal Vehicle (EIRV) could cause machine damage or an accident.
Prior to installing the attachment verify it is approved and the EIRV is equipped with the proper capacity chart. See “Approved Attachments” on page 5-1.

To determine the maximum capacity of the EIRV and attachment, use the smallest of the following capacities:

- Capacity stamped on the attachment identification plate (1).
- Jib capacities and load centers are stamped on the attachment (2). This rating specifies the maximum load capacity that the jib can safely carry at the maximum load center. The load capacity indicated on the jib (2) applies to the jib only.
- Maximum capacity as indicated on the proper capacity chart. See “Approved Attachments” on page 5-1.
- When the load rating of the EIRV differs from the capacity of the attachment, the lower value becomes the overall load capacity.

Use the proper capacity chart to determine maximum capacity at various machine configurations.

**WARNING**

Never use an attachment without the appropriate JLG supplied capacity chart installed on the EIRV.
5.4 USE OF THE CAPACITY CHART

To properly use the capacity chart (see page 5-4), the operator must first determine and/or have the following:

1. A JLG approved attachment. See “Approved Attachments” on page 5-1.
2. The proper Capacity Chart(s).
3. Weight of the load being lifted.
4. Load placement information:
   a. HEIGHT where the load is to be placed.
   b. DISTANCE from the front tires of the EIRV where the load is to be placed.
5. On the capacity chart, find the line for the height and follow it over to the distance.
6. The number in the load zone where the two cross is the maximum capacity for this lift. If the two cross at a division between zones, the smaller number must be used.

The number in the load zone must be equal to or greater than the weight of the load to be lifted. Determine the limits of the load zone on the Capacity Chart and keep within these limits.

Capacity Indicator Locations
Section 5 - Attachments

Sample Capacity Chart

This number must match the model/option number stamped on the attachment ID Plate.

Note: This is a sample capacity chart only! DO NOT use this chart, use the one located in your operator cab.

WARNING

TIP OVER HAZARD. All loads shown on rated capacity chart are based on machine being on firm ground with frame level (see page 4-7); the jib being positioned evenly on carriage; the load being centered on hook; proper size tires being properly inflated; and the machine being in good operating condition.
Section 5 - Attachments

Example

You own an Engine Installation & Removal Vehicle (EIRV) with a jib carriage. You know this attachment may be used with his model since:

- The attachment model/option number matches the attachment number on the capacity chart.

Below are examples with various conditions you may encounter and whether or not the load may be lifted.

<table>
<thead>
<tr>
<th>Load Weight</th>
<th>Distance</th>
<th>Height</th>
<th>OK to Lift</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2300 lb (1043 kg)</td>
<td>27 ft (8.2 m)</td>
<td>8 ft (2.4 m)</td>
<td>Yes</td>
</tr>
<tr>
<td>2 4000 lb (1814 kg)</td>
<td>24 ft (7.3 m)</td>
<td>17 ft (5.1 m)</td>
<td>No</td>
</tr>
<tr>
<td>3 6000 lb (2722 kg)</td>
<td>20 ft (6 m)</td>
<td>20 ft (6 m)</td>
<td>No</td>
</tr>
<tr>
<td>4 6000 lb (2722 kg)</td>
<td>15 ft (4.5 m)</td>
<td>20 ft (6 m)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note: This is a sample capacity chart only! DO NOT use this chart, use the one located in your operator cab.
5.5 ATTACHMENT INSTALLATION

Be sure you are performing this procedure on level ground.

1. Position the vehicle 15 ft (4.6 m) directly behind the attachment to be mounted.

2. Tilt the quick attach backward.

3. Extend the boom approximately 10 ft (3 m) 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 transmission control lever in (N) neutral, move the neutral lock lever to the (N) neutral lock position, engage the parking brake switch and shut down the engine. Exit the vehicle using both hand holds.

7. Insert the quick attach pin (1) completely through the attachment and the quick attach link (2). Insert the spring clip (3) through the quick attach pin.
8. Remove the protective caps (4) from the quick disconnects.

9. Matching colors, connect the black then red quick disconnects (5) on the right side of the boom and attachment.

10. Matching colors, connect the black then red quick disconnects (6) on the left side of the boom and attachment.

11. In the event there is trapped pressure in one of the carriage hydraulic hoses, connect the quick disconnect(s) with a firm constant motion. This will allow the (specially designed) male quick disconnect to drain the trapped pressure through to the female quick disconnect and into the hydraulic system.

12. Return to the cab, fasten seat belt, start the engine and resume operation.
5.6 ATTACHMENT REMOVAL

Be sure you are performing this procedure on level ground.

**Note:** Ensure the jib of the carriage being removed is in a neutral position other than fully shifted inboard or outboard to minimize trapped hydraulic pressure.

1. Place the transmission control lever in (N) neutral, move the neutral lock lever to the (N) neutral lock position and engage the parking brake switch.

2. Extend the boom approximately 10 ft (3 m) and tilt the carriage backward.

3. Shut down the engine and exit the vehicle using both hand holds.

4. Remove the spring clip pin (8) from the quick attach pin (6) and pull the pin out of the bottom of the quick attach link (7).
5. Remove the red then black quick disconnects (6) on the left side of the boom and attachment.

6. Remove the red then black quick disconnects (5) on the right side of the boom and attachment.

7. Install the protective caps (4) on all four quick disconnects.

8. Return to operator compartment, fasten seat belt and start the engine. With engine running, lower attachment to the ground in a level position. Tilt the attachment forward, this will rotate the quick attach link back away from the attachment.

9. Lower and then retract the boom until the attachment pivot pins have disconnected from the attachment.
Section 5 - Attachments

5.7 ATTACHMENT OPERATION

- Capacities and range limits for the Engine Installation & Removal Vehicle (EIRV) change depending on the attachment in use.
- The EIRV is equipped with a carriage with hydraulic jib.

**NOTICE**

**EQUIPMENT DAMAGE.** Some attachments or load may contact the front tires or machine structure when the boom is retracted and the attachment is positioned. Machine or attachment damage may occur from contact.

**NOTICE**

**EQUIPMENT DAMAGE.** Avoid contact with any structure or object when lifting a load. Maintain clearance around boom structure and load. Failure to maintain clearance may result in attachment or machine structural damage.
Carriage with Hydraulic Jib

<table>
<thead>
<tr>
<th>Description</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carriage with Hydraulic Jib</td>
<td>6624115</td>
</tr>
</tbody>
</table>

Use Carriage with Hydraulic Jib Attachment Capacity Chart

To determine maximum capacity, refer to “Engine Installation & Removal Vehicle (EIRV)/Attachment/JIB Capacity” on page 5-2.

Suspend loads in accordance with requirements set forth in Section 1 - General Safety Practices and Section 4 - “Operating with A Suspended Load” on page 4-6.

The joystick (1) controls lift/lower and the extend/retract movement of the boom. Without depressing any buttons:

- Move joystick rearward to lift boom. Move joystick forward to lower boom.
- Move joystick right to extend boom. Move joystick left to retract boom.
**Section 5 - Attachments**

**Jib Position**

**Jib Tilt Up/Down and Position Left/Right**

Press and hold the button (2) on the joystick.

- To shift hook right, move joystick to the right. To shift hook left, move joystick to the left.
- For jib tilt up, move joystick rearward. For jib tilt down, move joystick forward.

**Jib Extend/Retract**

To activate Jib extend/retract, press the bottom of the jib switch (3).

- To extend, move joystick to the right. To retract, move joystick to the left.

**Note:** When Jib Switch is activated, all other boom functions are disabled. Operator must de-activate switch to return to normal boom function.

**Installation Procedure:**

- Refer to “Attachment Installation” on page 5-6.
Section 5 - Attachments

Pre Operation:
Prior to operation of jib, ensure there is no air in the system. This can be done as follows:
1. Extend and retract jib ten times.
2. Tilt and/or shift hook left and right.
3. Extend and retract jib ten times.
4. Check to see that hydraulic hoses are unobstructed and there are no oil leaks.
Attachment is now ready for use.

Operation:
• When securing loads to the hook, always use the spring-loaded hook and crossover supplied with the jib. Ensure the clasp is closed securely prior to lifting the load.
• Jib maximum permitted operating pressure is 3800 psi (262 bar).
• Weight of rigging must be included as part of total load being lifted.

Inspection and Maintenance:
In order to keep the jib in good condition, inspection and maintenance should be performed periodically. Refer to “Maintenance Schedule” on page 5-14.
• Inspect daily for signs of structural damage, cracks or leaks. Any damage or leaks found should be reported to the person in charge and repaired prior to returning to service.
• Refer to the vehicle service manual for detailed maintenance and troubleshooting information.
### Section 5 - Attachments

#### Maintenance Schedule

<table>
<thead>
<tr>
<th>Description</th>
<th>10 Hrs</th>
<th>50 Hrs</th>
<th>1000 Hrs</th>
<th>2000 Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Hydraulic hoses undamaged, not leaking</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Grease top and bottom of jib</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Check for leaking connectors</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4 Check wear strips for signs of wear</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>5 Check for and remove accumulated dirt in the sleeve</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>6 Check for cylinder head leaks</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

*Note: Intervals shown are for normal conditions and usage. Adjust intervals for abnormal usage and conditions.*
SECTION 6 - EMERGENCY PROCEDURES

6.1 TOWING A DISABLED PRODUCT

The following information assumes the Engine Installation & Removal Vehicle (EIRV) cannot be moved under its own power.

- Towing the vehicle improperly can result in damage to the vehicle drivetrain.
- **DO NOT** attempt to tow a Engine Installation & Removal Vehicle (EIRV) that is loaded or the boom/attachment is raised above 4 ft (1.2 m).
- **ALWAYS** use a vehicle of sufficient capacity to tow the Engine Installation & Removal Vehicle (EIRV). Tow vehicle must be capable of providing braking for both vehicles.

### Short Distance Towing

If it is necessary to tow the Engine Installation & Removal Vehicle (EIRV) a short distance, 100 ft (30 m) or less to avoid a potentially hazardous situation, prepare the vehicle for towing as follows:

1. Remove the load from the vehicle.
2. Fully retract the boom. Position the attachment approximately 24 in (610 mm) above the ground. Refer to “Emergency Retract/Lowering of Boom” on page 6-8 for proper procedure if required.
3. Open the engine cover. Allow the hydraulic oil to cool.
4. Block all four wheels.

**WARNING**

** UNEXPECTED MOVEMENT HAZARD. ** Block all four wheels when preparing the vehicle for towing to prevent any unexpected movement.

5. Turn the ignition switch to the ON position (with the engine not running), release the park brake (park brake switch OFF).

**Note:** *With the ignition switch in the ON position, the low brake pressure buzzer will sound continuously until the towing operation is complete and ignition switch turned to the OFF position.*
6. Locate the emergency towing pressurizing valve (1) located on the engine mounting bracket.

7. Use the handle (3) on the emergency towing valve to pump pressure into the system. Watch the pressure gauge (2) while pumping pressure into the park brake system. Do not exceed 650 psi (45 bar).

**NOTICE**

**EQUIPMENT DAMAGE.** Do not exceed 650 psi (45 bar) when pressurizing the park brake. Damage to brake seals may occur by applying too much pressure.

8. Turn the steering wheel until the front tires are pointed in a straight ahead position.
Section 6 - Emergency Procedures

9. Open the rear door. Connect the steer cylinder crossover tow hoses (4) together. The two hoses are located inside the rear of the frame.

10. Remove the dust cap (5) from the male quick disconnect (6) on one crossover hose. Remove the dust cap (7) from the female quick disconnect (8) on the other crossover hose. Couple the quick disconnects together. Close the rear door.

11. With the crossover hoses (4) coupled together, the rear wheels will be free to steer, "tracking" as the vehicle is being towed.

12. Clear the area of any unnecessary personnel.

13. Have an operator seated in the seat.

14. The vehicle can now be towed out of the way using the pintle hook provided on the rear of the machine.

15. Carefully remove the blocks from all four wheels.

16. Before returning the vehicle to service, disconnect the steer cylinder crossover hoses (4). Re-install both dust caps (5 & 7). Perform the "Four Wheel Steer Indexing" on page 8-3.

**WARNING**

CUT/CRUSH HAZARD. Do not open the rear door with the air conditioner switch in the ON position and the fan switch turned to the ON position.

CUT/CRUSH HAZARD. Do not tow at speeds over 10 mph (16 km/h).

UNEXPECTED VEHICLE MOVEMENT HAZARD. Always disconnect the steer cylinder crossover hoses before resuming normal operation. Failure to disconnect the crossover hoses will result in the inability to steer the rear wheels. If the vehicle is driven in this condition, control of the rear wheels will be unpredictable.
Section 6 - Emergency Procedures

Long Distance Towing

If it is necessary to tow the vehicle a long distance to a repair facility, prepare the vehicle for towing as follows;

1. Remove the load from the vehicle.

2. Ensure that the tow vehicle is of sufficient capacity and is capable of providing braking for both vehicles.

3. Fully retract the boom. Position the attachment approximately 24 in (610 mm) above the ground. Refer to “Emergency Retract/Lowering of Boom” on page 6-8 for proper procedure if required.

4. Open the engine cover. Allow the hydraulic oil to cool.

5. Block all four wheels.

WARNING

UNEXPECTED MOVEMENT HAZARD. Block all four wheels when preparing the vehicle for towing to prevent any unexpected movement.

6. Remove the four bolts (9) and two straps (10) securing the bearing crosses to the front and rear axle input yokes (11).

7. Secure the unattached ends of the driveshafts (12) in the hanger hooks (13) provided underneath the frame of the machine. Rotate the hanger hooks into position to hold the driveshaft. The hanger hooks have spring tension applied to hold them in position.

8. Turn the ignition switch to the ON position (with the engine not running), release the park brake (park brake switch OFF).
Note: With the ignition switch in the ON position, the low brake pressure buzzer will sound continuously until the towing operation is complete and ignition switch turned to the OFF position.

9. Locate the emergency towing pressurizing valve (1) located on the engine mounting bracket.

10. Use the handle (3) on the emergency towing valve to pump pressure into the system. Watch the pressure gauge (2) while pumping pressure into the park brake system. **DO NOT** exceed 650 psi (45 bar).

**NOTICE**

**EQUIPMENT DAMAGE.** Do not exceed 650 psi (45 bar) when pressurizing the park brake. Damage to brake seals may occur by applying too much pressure.

11. Turn the steering wheel until the front tires are pointed in a straight ahead position.
12. Open the rear door. Connect the steer cylinder crossover tow hoses (4) together. The two hoses are located inside the rear of the frame.

**WARNING**

**CUT/CRUSH HAZARD.** Do not open the rear door with the air conditioner switch in the ON position and the fan switch turned to the ON position.

13. Remove the dust cap (5) from the male quick disconnect (6) on one crossover hose. Remove the dust cap (7) from the female quick disconnect (8) on the other crossover hose. Couple the quick disconnects together. Close the rear door.

14. With the crossover hoses (4) coupled together, the rear wheels will be free to steer, “tracking” as the vehicle is being towed.

15. Clear the area of any unnecessary personnel.

16. Have an operator seated in the seat.

17. The vehicle can now be towed out of the way using the tow lugs provided.

**WARNING**

**CUT/CRUSH HAZARD.** Do not tow at speeds over 20 mph (32 km/h).

18. Carefully remove the blocks from all four wheels.
Section 6 - Emergency Procedures

19. Before returning the vehicle to service, disconnect the steer cylinder crossover hoses (4). Re-install both dust caps (5 & 7).

**WARNING**

**UNEXPECTED VEHICLE MOVEMENT HAZARD.** Always disconnect the steer cylinder crossover hoses before resuming normal operation. Failure to disconnect the crossover hoses will result in the inability to steer the rear wheels. If the vehicle is driven in this condition, control of the rear wheels will be unpredictable.

20. Re-install the ends of the driveshafts (12) to the front and rear axle input yokes (11) using the straps (10) and bolts (9) removed in step 6. Torque the M12 bolts to 156 lb-ft (212 Nm). Rotate the driveshaft hanger hooks (13) out of the way and install the driveshafts to the front and rear axles.

Section 6 - Emergency Procedures

6.2 EMERGENCY RETRACT/LOWERING OF BOOM
Secure the Engine Installation & Removal Vehicle (EIRV) using the following procedures:

1. Clear the area around the EIRV of all personnel.
2. Engage the parking brake. Place the transmission control lever in "NEUTRAL".
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 area.

![WARNING]

CRUSH HAZARD. DO NOT get under raised boom unless the boom is blocked up. Section off a large area under the boom with string or tape to restrict personnel from entering this potentially dangerous area.

Emergency Boom Retract/Lower Procedure (Boom Below 40°)
In case of an emergency, engine or hydraulic failure, with the boom below 40°, a Service Kit is available which can be used to safely retract then lower the boom.

Note: For information on the Emergency Boom Retract/Lower (Below 40°) Service Kit and instructions, contact the local JLG Authorized Service Center (ASC) or the JLG Military Service Support Department at:
Phone: 1-866-554-7782
E-mail: militarysupport@jlg.com.
Emergency Boom Retract/Lower Procedure (Boom Above 40°)

In case of an emergency, engine or hydraulic failure, with the boom above 40° and carriage with hydraulic jib attached, an emergency operation selector valve can be used to safely retract then lower the boom.

**Boom Retract**

*Note: Boom retraction is subject to gravitational limitations and can be accomplished only with the carriage in place and the boom angle above 40°.*

1. Locate the hand pump and emergency operation selector valve under the engine cover.
2. To retract the boom, pull the red knob on the valve upward and rotate 90° to lock into position.
3. Operate the hand pump, building pressure until the boom begins to retract. Maximum pressure to release is 1200 psi (83 bar).
4. When boom is fully retracted, return the emergency operation selector to its original position.
Section 6 - Emergency Procedures

Boom Lower

Note: The boom should be retracted before lowering. See “Boom Retract” on page 6-9.

1. Open the rear door.

2. Locate the RED “T” handle (1) for emergency boom lowering inside the access opening on the right side.

3. Pull the “T” handle to lower boom.

4. When boom is to the desired level, release handle.

WARNING

TIP OVER HAZARD. To be used for retracting then lowering load only. Extending/lifting load could damage the equipment and/or cause tip over.
6.3 EMERGENCY EXIT FROM ENCLOSED CAB

- The rear window in the enclosed cab can be used as an emergency exit by removing the latch pin (1) on the window latch (2). The window is then free to swing open.
Section 6 - Emergency Procedures

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7.1 INTRODUCTION

Service the vehicle in accordance with the maintenance schedule on the following pages.

**Note:** General information and a maintenance schedule for the carriage with hydraulic jib is included in the attachment section of this manual.

The maintenance chart (2) and lubrication (1) decals are located inside the engine cover and contain general service instructions that must be followed to keep this product in good operating condition. The Operation & Safety Manual and Service Manual contain more detailed service information with specific instructions.
Section 7 - Lubrication and Maintenance

7.2 GENERAL MAINTENANCE INSTRUCTIONS

Prior to performing any service or maintenance on the Engine Installation & Removal Vehicle (EIRV), read, understand and comply with “Section 1 - Safety Practices” in the EIRV Service Manual. Also follow the shut-down procedure on page 4-5 unless otherwise instructed.

- Ensure the EIRV is level, for proper fluid readings.
- Clean lubrication fittings before lubricating.
- After greasing the EIRV, cycle all functions several times to distribute lubricants. Perform this maintenance procedure without attachment installed.
- Apply a light coating of engine oil to all linkage pivot points.
- Intervals shown are for normal usage and conditions. Adjust intervals for abnormal usage and conditions.
- Drain engine and gear cases after operating when oil is hot.
- Check all lubricant levels when lubricant is cool, with the exception of the transmission fluid. For ease of filling hydraulic reservoir, use a funnel with a hose or flexible tube for best results.

Note: Be certain to check boom chain adjustment every 250 hours and adjust as required. Chain damage can occur if chain is not adjusted properly.

WARNING

CUT/Crush/Burn HAZARD. Do not perform service or maintenance on the machine with the engine running, with the exception of the transmission level check.
7.3 SERVICE AND MAINTENANCE SCHEDULE

10 & 1st 50 Hour Maintenance Schedule

EVERY

10

- Drain Fuel/Water Separator
- Check Engine Coolant Level
- Check Engine Oil Level
- Check Hydraulic Oil Level
- Check Tire Pressure
- Check Transmission Oil Level
- Additional Checks - Section 8
- Check Boom Wear Pad Lubrication

1st

50

- Change Engine Oil & Filter
- Change Transmission Filter
- Change Hydraulic Filter
- Check Wheel Lug Nut Torque
- Check Boom Chain Tension
- Change Axle Oil
- Change Wheel End Oil
- Change Transfer Case Oil
Section 7 - Lubrication and Maintenance

250 & 500 Hour Maintenance Schedule

**EVERY 250X**
- Change Engine Oil and Filter
- Check Transfer Case Oil Level
- Check Wheel End Oil Levels
- Check Axle Oil Level
- Change Fuel Filter
- Check Boom Chain Tension
- Air Filter Vacuator Valve
- Lubrication Schedule
- Lubricate Boom Wear Pads

**EVERY 500X**
- Change Air Filter
Section 7 - Lubrication and Maintenance

1000 & 2000 Hour Maintenance Schedule

- Change Axle Oil
- Change Wheel End Oil
- Check Boom Wear Pads
- Check Boom Chain Tension
- Change Transfer Case Oil
- Change Transmission Oil & Filter
- Change Hydraulic Fluid & Filters
- Check Fan Belt
- Check Air Intake System
- Check Axle Brake Discs
- Lubricate Boom Chains

- Change Engine Coolant
Section 7 - Lubrication and Maintenance

7.4 LUBRICATION SCHEDULE

250 Hour Lubrication Schedule
Section 7 - Lubrication and Maintenance

7.5 OPERATOR MAINTENANCE INSTRUCTIONS

Boom Wear Pad Lubrication

A. Lubricate Boom Wear Pads

The boom has been factory lubricated for proper wear pad break-in and will normally require further periodic lubrication. After replacing any wear pad(s), or after prolonged periods of inoperation, light lubrication of the boom wear surfaces with a factory authorized grease is recommended to keep the boom wear surfaces lubricated properly. Light lubrication of the boom wear surfaces is also recommended in salt air climates, and when the machine is stored, to help prevent rusting.

Boom Wear Pad Lubricant .................. Lube-A-Boom Grease - NLGI Grade 2 (Gray)

Note: Keeping the boom wear pads properly lubricated is also necessary for manual operation of the “Emergency Boom Lowering Procedure” (See Section 6), to work properly.
A. Engine Coolant Level Check

1. Perform “Shut-Down Procedure” on page 4-5.
2. Open engine cover.
3. Check coolant level 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.
4. If coolant is low, remove overflow bottle cap (2) and add coolant as required.
5. Replace overflow bottle cap.
6. Close and secure engine cover.
Fuel System

A. Fuel Level Check

1. Check fuel gauge (1) located on instrument panel in cab.
2. If fuel is low, proceed to fuel source and perform "Shut-Down Procedure" on page 4-5.
3. Locate fuel tank (2), turn fuel tank cap (3) and remove from filler neck. Add diesel fuel as needed.
4. Replace fuel tank cap.

Note: Replenish diesel fuel at end of each work shift to minimize condensation.
Section 7 - Lubrication and Maintenance

B. Drain Fuel/Water Separator

1. Perform “Shut-Down Procedure” on page 4-5.
2. Open the engine cover.
3. Loosen drain cock (1) on underside of fuel filter (2) and allow all water to drain into a glass until clear fuel is visible. Tighten drain cock.
4. Close and secure the engine cover.
Section 7 - Lubrication and Maintenance

C. Change Fuel Filter

1. Perform “Shut-Down Procedure” on page 4-5.
2. Open the engine cover.
3. Clean around the remote mounted fuel filter head (3).
4. Loosen the drain cock on the underside of fuel filter and allow enough fuel to drain into a container to relieve fuel pressure in the fuel system.
5. Unscrew the fuel filter and dispose of properly.
6. Clean the gasket surface (4) and replace the o-ring.
7. Fill new filter with clean No. 2 diesel fuel. Alternate fuels can also be used. They are: JP-5, JP-8 or Jet A-1.
8. Lubricate the o-ring seal with clean fuel as identified in step 6.
9. Install the fuel-filled filter and hand tighten.

**NOTICE**

**EQUIPMENT DAMAGE.** Do not overtighten the fuel filter. Mechanical over-tightening may distort the threads or damage the sealing ring.

10. Close and secure the engine cover.

**Note:** Controlled venting is provided at the injection pump through the fuel drain manifold. Small amounts of air introduced by changing the fuel filter will be vented automatically as long as the filter is filled with fuel prior to installation.
D. Replace In-line Fuel Strainer

1. Perform “Shut-Down Procedure” on page 4-5.

2. Open the engine cover.

3. The fuel strainer (1) is located down line from the engine lift pump (2) and under the air cleaner mounting bracket. Loosen the two hose clamps (3) that secure the strainer in place.

4. Loosen the drain cock on the underside of fuel filter and allow enough fuel to drain into a container to relieve fuel pressure in the fuel system.

5. Remove the old strainer and dispose of properly.

6. Install the new strainer with arrow (4) pointing toward the lift pump.

7. Assemble the hoses to the strainer and tighten the hose clamps.

8. Remove air from the fuel system (see “E. Bleeding Fuel System” on page 7-13).

9. Close and secure the engine cover.

Note: Controlled venting is provided at the injection pump through the fuel drain manifold. Small amounts of air introduced by changing the fuel filter will be vented automatically as long as the filter is filled with fuel prior to installation.
Section 7 - Lubrication and Maintenance

E. 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.

![Diagram of fuel system components]

**WARNING**

**FIRE HAZARD.** 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.

**NOTICE**

**EQUIPMENT DAMAGE.** 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, open the vent screw (5) located on the filter head on the engine block.

2. Operate the hand plunger (6) on the lift pump (2) until fuel flowing from fitting is free of air.

3. Tighten the vent screw (5) and torque to 7 lb-ft (9 Nm).
4. To vent the high pressure fuel lines (7), loosen one fitting (8) at the injector (9).

5. Turn the ignition switch 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.

- **CAUTION**
  - PRESSURE HAZARD. Do not energize the starter solenoid or crank the engine for more than 15 seconds at a time. Wait 2 minutes between engagements.

- **WARNING**
  - PRESSURE HAZARD. Fuel can spray when venting high pressure lines. Keep clear of spraying fuel.

6. Tighten the fitting. Torque to 22 lb-ft (30 Nm).

7. Repeat steps 4 thru 6 for each fitting until the engine runs smooth.
Section 7 - Lubrication and Maintenance

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Section 7 - Lubrication and Maintenance

Air Intake System

A. Air Filter Check

1. Perform “Shut-Down Procedure” on page 4-5.
2. Open the engine cover.
3. Locate air cleaner (1) and remove dust from vacuator valve (2) by squeezing bottom of valve to allow loose particles to fall out.

Note: Only remove canister cover to service the elements as restriction indicator indicates. Excessive access to check an element can lead to premature element failure.
Section 7 - Lubrication and Maintenance

B. Element Change

If Air Filter Restriction Indicator remains on after start up or illuminates while operating machine perform the following:

1. Unlock air cleaner cover (3), turn counterclockwise and remove from air cleaner canister (4).
2. Remove outer primary element (5) and inspect for damage. Damaged elements should not be reused.
3. Thoroughly clean the interior of the air cleaner canister and vacuator valve.
4. Replace inner safety element (6) after every third primary element change. If replacing the inner safety element at this time, carefully slide the element out and replace with new element.
5. Slide the new primary element over the inner element making sure the sealing edge is flush with the base of the air cleaner.
6. Position air cleaner cover in place, turn clockwise and lock into position.
7. Close and secure the engine cover.

Note: An inner safety element should never be washed or reused. Always install a new element.
A. Engine Oil Level Check

1. Perform “Shut-Down Procedure” on page 4-5.
2. Open the engine cover.
3. Remove dipstick (1) and check oil mark. The oil should be between the full (2) and add (3) marks within the crosshatched area of the dipstick.
4. Replace dipstick.
5. If oil is low, remove oil fill cap (4) and add motor oil to bring oil up to the full mark in the crosshatch area.
6. Replace oil fill cap.
7. Close and secure the engine cover.

Note: Refer to the “Recommended Engine Oil/Temperature Range” below for the type of oil recommended for specific temperature ranges.

**Recommended Engine Oil / Temperature Range**
B. Engine Oil and Filter Change

1. Operate engine until warm (approximately 5 minutes).
2. Perform “Shut-Down Procedure” on page 4-5.
3. Unlatch and open engine cover.
4. Place a receptacle under the engine oil pan drain hose (5). The hose is located under the engine up behind the hydraulic oil reservoir.
5. Lift the petcock lever (6) up and turn counterclockwise to OPEN and drain the oil from the engine oil pan.
6. Allow oil to drain completely. Dispose of used oil properly.
7. Remove the oil filter (7) and dispose of properly. The oil filter is remotely mounted on a bracket under the frame. Access the filter from under the vehicle.
8. Clean the filter sealing surface.
9. Apply a thin coat of clean engine oil to the new filter mating surface.
10. Install new oil filter and hand tighten. Use an oil filter wrench or strap to tighten the filter down another 1/4 to 1/2 turn.
Section 7 - Lubrication and Maintenance

11. Turn oil drain petcock lever (6) clockwise and lock into the CLOSED position. The petcock lever is spring loaded and will lock in the CLOSED position.

12. Remove the engine oil fill cap (4) and add oil. Refer to “A. Engine Oil Level Check” on page 7-18 for proper oil use. Engine oil capacity with filter change is 11.5 qt (11 L).

13. Reinstall oil fill cap (4). Start engine and allow to run for several minutes.

14. Shut off engine. Wait several minutes and check the oil level on the dipstick (1). Add oil if necessary.

C. Engine Oil Sample Point

1. Unlatch and open the engine hood.

2. Locate the oil sample valve (8) on the mounting bracket next to the remote fuel filter.

3. After oil sample has been taken, close and latch the engine hood.
A. Hydraulic Oil Level Check

1. Be sure all cylinders are fully retracted and machine is level.
2. Perform “Shut-Down Procedure” on page 4-5.
3. Open the engine cover.
4. Check level of hydraulic fluid in tank at the sight gauge (1) on the hydraulic tank. The oil level should be in the upper 2/3 to 3/4 of the sight gauge.
5. If hydraulic oil is low, remove oil fill cap (2). Add hydraulic fluid to bring oil up to the upper 2/3 to 3/4 of the sight gauge.

**NOTICE**

*EQUIPMENT DAMAGE.* Do not overfill. Do not add hydraulic fluid through the hydraulic oil tank breather (3).

6. Replace hydraulic oil fill cap.
7. Close and secure engine cover.
Section 7 - Lubrication and Maintenance

B. Hydraulic Oil & Filter Change

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

The hydraulic filter must be changed anytime the hydraulic oil filter restriction warning indicator light on the front dash panel comes ON.

1. Be sure all cylinders are fully retracted and machine is level.
2. Perform “Shut-Down Procedure” on page 4-5.
3. Open the engine cover. Allow hydraulic oil to cool.

4. Clean around the hydraulic filter head (1). Loosen but do not remove the nuts (2) that secure the filter head to the hydraulic tank (3).
Section 7 - Lubrication and Maintenance

5. Rotate and remove the filter head (4).

6. Remove the seal (5) and the element (6) from the filter head (4). Dispose of used element properly.

7. Clean the filter head sealing surface.

8. Place a receptacle under the drain plug (7). Remove the drain plug and allow oil to drain. Dispose of used oil properly.

9. Re-install drain plug (7) into the reservoir.

10. Re-install top seal (5) and push a new filter element (6) all the way onto the filter head (4) until it seats. Slide the assembly into the reservoir and secure.

11. Remove the fill cap (8) and fill with hydraulic fluid until the oil level is in the upper 2/3 to 3/4 of the sight gauge (9) when oil is cold and all cylinders are retracted. Reservoir capacity is 28.5 gallons (108 liters).

**NOTICE**

**EQUIPMENT DAMAGE.** Do not overfill. Do not add hydraulic fluid through the hydraulic oil tank breather (3).

12. Replace the oil fill cap.

13. Close and secure engine cover.

14. Run vehicle and operate all hydraulic functions. Cycle all modes of controls to purge air from system.

15. Check for leaks.
Section 7 - Lubrication and Maintenance

Tires

A. Tire Air Pressure Check

1. Perform “Shut-Down Procedure” on page 4-5.
2. Remove valve stem cap.
3. Check tire pressure.
4. Add air if required.
   Full Tire Pressure ................................................................. 87 psi (600 kPa)
5. Replace valve stem cap.

B. Tire Damage

For pneumatic tires, JLG recommends that when any cut, rip or tear is discovered that exposes sidewall or tread area cords in the tire, measures be taken to remove the JLG product from service immediately. Arrangements must be made for replacement of the tire or tire assembly.

For polyurethane foam filled tires, JLG recommends that when any of the following are discovered, measures must be taken to remove the product from service immediately. Arrangements must be made for replacement of the tire or tire assembly.

- A smooth even cut through the cord piles which exceeds 3 in (7.5 cm) in total length.
- Any tears or rips (ragged edges) in the cord plies which exceeds 1 in (2.5 cm) in any direction
- Any punctures which exceed 1 in (2.5 cm) in diameter.

If a tire is damaged but within the above noted criteria, the tire must be inspected daily to ensure the damage has not propagated beyond the allowable criteria.
Section 7 - Lubrication and Maintenance

C. Tire and Wheel Replacement

Note: The specified size and star rating for this vehicle is 15.5R25, L-2, 2 Star. Make sure any replacement tire is of the same size and star rating.

JLG recommends a replacement tire to be the same size, ply and brand as originally installed. Refer to the appropriate parts manual for ordering information. If not using a JLG approved replacement tire, JLG recommends that replacement tires have the following characteristics:

- Equal or greater ply/load rating and size of original.
- Tire tread contact width equal or greater than original.
- Wheel diameter, width and offset dimensions equal to the original.
- Approved for the application by the tire manufacturer (including inflation pressure and maximum tire load).

Unless specifically approved by JLG, do not replace a foam filled or ballast filled tire assembly with a pneumatic tire. Due to size variations between tire brands, when selecting and installing a replacement tire ensure both tires on the axle are the same.

The rims installed have been designed for stability requirements which consist of track width, tire pressure and load capacity. Size changes such as rim width, center piece location, larger or smaller diameter, etc., without written factory recommendations, may result in unsafe condition regarding stability.
Section 7 - Lubrication and Maintenance

E. Wheel Installation

Torque lug nuts after first 50 hours and after each wheel installation.

**Note:** *If machine is equipped with directional tire assemblies, the wheel and tire assemblies must be installed with the directional tread pattern “arrows” facing in the direction of forward travel.*

1. Install wheel lug washers.
2. Start all nuts by hand to prevent cross threading. **DO NOT** use a lubricant on threads or nuts.
3. Tighten lug nuts in an alternating pattern as indicated in figure. Torque to 430-470 lb-ft (583-637 Nm).

---

**WARNING**

**TIP OVER HAZARD.** Lug nuts must be installed and maintained at the proper torque to prevent loose wheels, broken studs and possible separation of wheel from the axle.
A. Transmission Oil Level Check

1. Apply park brake, shift transmission to "Neutral" and lower attachment to the ground.
2. Open the engine cover.
3. Check transmission oil level with engine at idle and oil at normal operating temperature.
4. Remove the transmission dipstick (1) and check oil level. The oil level should be within the full range.
5. If oil is low, add fluid to bring oil up to the full mark.
6. Replace transmission dipstick.
7. Close and secure engine cover.
Section 7 - Lubrication and Maintenance

B. Transmission Oil & Filter Change

1. Perform “Shut-Down Procedure” on page 4-5.

2. Open the engine cover. Allow the engine and transmission to cool.

3. Place a receptacle under the transmission drain plug (1). Remove plug and drain used oil. Dispose of properly.

4. Clean and re-install the drain plug.

5. Remove the filter (2) and dispose of properly. Clean the mating surface where the filter mounts.

6. Apply a thin film of clean oil to the new filter gasket. Carefully install a new filter.

7. Remove the dipstick (3) and fill with oil approximately 12 qt (11.4 L). Re-install the dipstick.

8. Check the transmission level and add oil as required to bring oil up to the full mark on dipstick.

9. Close and secure engine cover.
A. Battery Check

1. Perform “Shut-Down Procedure” on page 4-5.
2. Open the engine cover.
3. The batteries (1) are located under the main frame, one on each side of the frame. Remove the wing nuts (2) from the carriage bolts (3). Remove the battery box covers (4).
4. Visually inspect the batteries (1). Check terminals for corrosion. Rotate upper battery to access lower battery. Replace battery if it has a cracked, melted or damaged case.

**WARNING**

**BURN HAZARD.** Use proper protective gear to protect eyes and skin when checking batteries.

5. Close and secure engine cover.
**Section 7 - Lubrication and Maintenance**

**Fuse and Relay Replacement**

**A. Fuses and Relays (Fuse Block)**

The fuse and relay block is mounted inside the right side console (1). To gain access, remove the cover plate (2) from the right side console, then remove the plastic cover (3) from fuse and relay block. Refer to the following chart for the locations of fuses and relays within the fuse block.

<table>
<thead>
<tr>
<th>No.</th>
<th>Volt</th>
<th>Circuit Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>12 Volts</td>
<td>Transmission Control</td>
</tr>
<tr>
<td>E2</td>
<td>12 Volts</td>
<td>Ignition</td>
</tr>
<tr>
<td>E3</td>
<td>12 Volts</td>
<td>Neutral Start</td>
</tr>
<tr>
<td>E4</td>
<td>12 Volts</td>
<td>Creep Mode</td>
</tr>
<tr>
<td>E5</td>
<td>-</td>
<td>Open</td>
</tr>
<tr>
<td>E6</td>
<td>12 Volts</td>
<td>Stability Lock</td>
</tr>
<tr>
<td>E7</td>
<td>12 Volts</td>
<td>Boom Proximity</td>
</tr>
<tr>
<td>E8</td>
<td>-</td>
<td>Open</td>
</tr>
<tr>
<td>E9</td>
<td>12 Volts</td>
<td>Cab Power</td>
</tr>
<tr>
<td>E10</td>
<td>-</td>
<td>Open</td>
</tr>
</tbody>
</table>
### Section 7 - Lubrication and Maintenance

<table>
<thead>
<tr>
<th>No.</th>
<th>Amp</th>
<th>Color</th>
<th>Circuit Protected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40 Amp</td>
<td>Orange</td>
<td>Open Cab Vehicle Main</td>
</tr>
<tr>
<td>2</td>
<td>15 Amp</td>
<td>Blue</td>
<td>Ignition Control</td>
</tr>
<tr>
<td>3</td>
<td>7.5 Amp</td>
<td>Brown</td>
<td>Transmission Direction</td>
</tr>
<tr>
<td>4</td>
<td>7.5 Amp</td>
<td>Brown</td>
<td>ECM Ignition</td>
</tr>
<tr>
<td>5</td>
<td>20 Amp</td>
<td>Yellow</td>
<td>Ignition Power</td>
</tr>
<tr>
<td>6</td>
<td>7.5 Amp</td>
<td>Brown</td>
<td>Transmission Gear</td>
</tr>
<tr>
<td>7</td>
<td>10 Amp</td>
<td>Red</td>
<td>Stability Circuit</td>
</tr>
<tr>
<td>8</td>
<td>10 Amp</td>
<td>Red</td>
<td>Dash</td>
</tr>
<tr>
<td>9</td>
<td>7.5 Amp</td>
<td>Brown</td>
<td>Lighting Control</td>
</tr>
<tr>
<td>10</td>
<td>7.5 Amp</td>
<td>Brown</td>
<td>Logic Panel</td>
</tr>
<tr>
<td>11</td>
<td>7.5 Amp</td>
<td>Brown</td>
<td>Jib Side Shift Left</td>
</tr>
<tr>
<td>12</td>
<td>7.5 Amp</td>
<td>Brown</td>
<td>Jib Side Shift Right</td>
</tr>
<tr>
<td>13</td>
<td>3 Amp</td>
<td>Violet</td>
<td>LMI (Load Moment Indicator)</td>
</tr>
<tr>
<td>14</td>
<td>3 Amp</td>
<td>Violet</td>
<td>ECM Indicator Light</td>
</tr>
<tr>
<td>15</td>
<td>40 Amp</td>
<td>Orange</td>
<td>Closed Cab Main</td>
</tr>
<tr>
<td>16</td>
<td>10 Amp</td>
<td>Red</td>
<td>Front Wiper</td>
</tr>
<tr>
<td>17</td>
<td>25 Amp</td>
<td>Clear</td>
<td>Heater Fan</td>
</tr>
<tr>
<td>18</td>
<td>7.5 Amp</td>
<td>Brown</td>
<td>Roof Wiper</td>
</tr>
<tr>
<td>19</td>
<td>7.5 Amp</td>
<td>Brown</td>
<td>Rear Wiper</td>
</tr>
<tr>
<td>20-28</td>
<td>-</td>
<td>-</td>
<td>Open</td>
</tr>
</tbody>
</table>
There is a separate fuse holder inside the right side console containing three fuses (3, 4 & 5). This fuse holder is located in the cab wire harness. To gain access, remove the screws that secure the cover plate to the right side console then remove the cover (1) from the fuse holder (2).

There are seven relays (6 thru 12) mounted to the side of the cab to the upper right of the main fuse block. The flasher (13) is mounted to the same bracket as the relays. Refer to the following chart for the fuses and relays:

<table>
<thead>
<tr>
<th>No.</th>
<th>Amp/Volt</th>
<th>Color</th>
<th>Circuit Protected</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>10 Amp</td>
<td>Red</td>
<td>Fuse - Arctic Heater</td>
</tr>
<tr>
<td>4</td>
<td>25 Amp</td>
<td>Clear</td>
<td>Fuse - High beams, work lights, backup alarm, backup strobe light, horn fuse</td>
</tr>
<tr>
<td></td>
<td>25 Amp</td>
<td>Clear</td>
<td>Fuse - Turn signals, daytime running lights, brake lights, low beams, dome light and cabin fan</td>
</tr>
<tr>
<td></td>
<td>7.5 Amp</td>
<td>Brown</td>
<td>Fuse - Horn</td>
</tr>
<tr>
<td>5</td>
<td>-</td>
<td>-</td>
<td>Open</td>
</tr>
<tr>
<td>6</td>
<td>24 Volt</td>
<td>-</td>
<td>Relay - Work Light Power</td>
</tr>
<tr>
<td>7</td>
<td>24 Volt</td>
<td>-</td>
<td>Relay - High Beam Power</td>
</tr>
<tr>
<td>8</td>
<td>12 Volt</td>
<td>-</td>
<td>Relay - Brake Light</td>
</tr>
<tr>
<td>9</td>
<td>12 Volt</td>
<td>-</td>
<td>Relay - Light Power</td>
</tr>
<tr>
<td>10</td>
<td>-</td>
<td>-</td>
<td>Open</td>
</tr>
<tr>
<td>11</td>
<td>12 Volt</td>
<td>-</td>
<td>Relay - Normal Lights Ignition</td>
</tr>
<tr>
<td>12</td>
<td>12 Volt</td>
<td>-</td>
<td>Relay - Reverse Signal</td>
</tr>
<tr>
<td>13</td>
<td>12 - 48 Volt</td>
<td>-</td>
<td>Flasher Module</td>
</tr>
</tbody>
</table>
There is one 125 amp fuse (14) that protects the cold start grid heater located under the engine hood and mounted on a bracket on the engine panel.

1. Open the engine cover.
2. Open the protective cover (15).
3. Remove two hex nuts (17) and lockwashers (18) securing the fuse (14) and wires to the fuse holder (16). 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 (18) and hex nuts (17). Torque the hex nuts to 7-9 lb-ft (10-12 Nm).
5. Snap the protective cover back in place.
6. Close and secure engine cover.
D. ECM Fuses (Under Engine Cover)

The two fuse holders (1) that protect the ECM diagnostic system, are located under the engine hood and are tie wrapped to the wire harness on the top of the engine bell housing. One holder contains three 7.5 amp (Brown) fuses and the other contains three 10 amp (Red) fuses.

1. Open the engine cover.
2. Locate the two fuse holders. Remove the plastic protective cover (2) from the holder (1).
3. Remove the failed fuse from the holder and replace with a new fuse.
4. Reassemble the plastic cover onto the fuse holder and securely snap the cover back in place. Replace any tie wraps that were removed, securing the fuse holders to the wire harness.
5. Close and secure engine cover.
There are two 125 amp fuses (3) located on the bottom side of the equalizer (4). They are located on the 12V and 24V positive terminals of the equalizer. These fuses protect the circuits of the equalizer. You will require a small telescoping mirror to check these fuses.

If one of these fuses blow, the fuse along with the mounting hardware will need to be replaced.

1. Remove the blown fuse and associated hardware. Discard all items.
2. Insert the new capscrew (5) through the tab (6) on the equalizer (4).
3. Place a flat washer (7) and new fuse (3) onto the capscrew. Position fuse as required to best see the clear window.
4. Place the positive cable (8) onto the capscrew.
5. Place the nylon shoulder washer (9) onto the capscrew and place against the positive cable with the hub toward the cable.
6. Secure in place with a flat washer (10), lockwasher (11) and hex nut (12). Torque the hex nut to a maximum of 100 lb-in (11 Nm).
There is a 12 volt relay (1) and one 15 Amp fuse (2) located inside the rear door (3). The relay controls the fan on the air conditioner condenser and the fuse protects the fan motor.

1. Open the rear door. The relay is mounted to the fan shroud.

2. Remove the protective cover (4) from the fuse holder (5) to gain access to the 15 amp (blue) fuse.

3. Replace fuse or relay as required.

4. Close and secure rear door.
Countweight Removal/Installation

Removal

1. Park the machine on a firm, level surface, level the machine, fully extend the boom, level the boom, place the transmission control lever in (N) NEUTRAL, engage the park brake, shut the engine OFF.

2. Place a Do Not Operate Tag on both the ignition switch and steering wheel, stating that the machine should not be operated.

3. Remove the counterweight lifting cable assembly from the machine toolbox.

Note: The machine toolbox is located under the cab, the access door is behind the cab entry step.

4. Attach one of the cable assembly shackles to each of the eyelets (1) at the front of the boom. Secure the shackles in place with the supplied pins.

5. Run the two remaining shackles over top of the boom and over the pulleys (2) to the rear of the machine. Install one shackle to the counterweight lifting eye on the left side of the counterweight. Install the shackle in place with the supplied pin. Install the remaining shackle to the right side of the counterweight (3).
Section 7 - Lubrication and Maintenance

**NOTICE**

**EQUIPMENT DAMAGE.** Ensure the cables stay routed properly over frame pulleys throughout the removal procedure.

6. Start the machine and slowly and carefully extend the boom slightly to remove slack in the cables. Extend the boom until the weight of the counterweight is supported by the cables and not by the counterweight pins. **DO NOT** lift the counterweight at this time.

**WARNING**

**CRUSH/PINCH POINT HAZARD.** Counterweight assembly weighs 4400 lb (1996 kg). Keep out from underneath counterweight assembly. Do not stick fingers or hands in holes for counterweight pins.

7. When the weight of the counterweight is supported by the cables, remove the two counterweight-to-frame support pins.

8. Carefully retract the boom to lower the counterweight (4) to the ground.

9. Remove the cable assembly shackles from the counterweight and the boom.
   Replace the cable assembly in the tool box.
Section 7 - Lubrication and Maintenance

Installation

1. Maneuver the machine so the rear of the machine is centered on the counterweight assembly. Lower and retract the boom, place the transmission control lever in (N) NEUTRAL, engage the park brake and shut the engine OFF.

2. Place a Do Not Operate Tag on both the ignition switch and steering wheel, stating that the machine should not be operated.

3. Remove the counterweight lifting cable assembly from the tool box.

4. Attach one of the cable assembly shackles to each of the eyelets at the front of the boom. Install the shackles in place with the supplied pins.

5. Run the remaining shackles over the top of the boom and over the pulley to the rear of the machine. Install one shackle to the counterweight lifting eye on the left side of the counterweight. Install the shackle in place with the supplied pin. Install the remaining shackle to the right side of the counterweight.

**WARNING**

**CRUSH/PINCH POINT HAZARD.** Counterweight assembly weighs 4400 lb (1996 kg). Keep out from underneath counterweight assembly. Do not stick fingers or hands in holes for counterweight pins.

6. Start the machine and slowly and carefully extend the boom until the counterweight is lifted into position. Have an assistant line the counterweight into place as the weight is being lifted. Secure the counterweight to the machine with two counterweight-to-frame support pins, secure in place with lock pins.

7. Slowly and carefully retract the boom until there is slack in the cable assembly lines.

8. When the weight of the counterweight is supported by the pins, remove the cable assembly shackles from the counterweight and boom eyelets. Replace the cable assembly in the tool box.

**NOTICE**

**EQUIPMENT DAMAGE.** Ensure the cables stay routed properly over frame pulleys throughout the removal procedure.
8.1 STABIL-TRAK™

A. Stabil-Trak Indicator Test

Stabil-Trak system operates in three modes. The slow pivot and locked modes will be tested in this procedure. In slow pivot mode the Stabil-Trak slow pivot indicator illuminates. In locked mode the Stabil-Trak lock indicator illuminates. If indicator does not illuminate the test was not performed properly or Stabil-Trak system is not functioning correctly and the test should be stopped immediately. Refer to “Section 11 - Stabil-Trak™ System” of the Service Manual for troubleshooting information.

To check the indicator, perform the following:

A. Slow Pivot Mode
1. Test Stabil-Trak system with vehicle on a level surface and boom fully retracted, no load.
2. Depress service brake pedal (5) and shift transmission into forward (6).
3. Raise the boom above 40° (2). Release service brake pedal.
4. Stabil-Trak system slow pivot mode will be activated and indicator (4) will illuminate.
5. Depress service brake pedal and lower boom below 40° (1).

B. Locked Mode
1. Test Stabil-Trak system with vehicle on a level surface and boom fully retracted, no load.
2. Depress service brake pedal and shift transmission to neutral.
Section 8 - Additional Checks

4. Stabil-Trak system locked mode will be activated and indicator (7) will illuminate.
5. Depress service brake pedal and lower boom below 40°.
6. Depress service brake pedal (5) and shift transmission into forward.
7. Raise the boom above 40°.
8. Stabil-Trak system locked mode will be activated and indicator (7) will illuminate.
9. Lower boom below 40°.
10. Engage park brake switch (3).
12. Raise the boom above 40°.
13. Stabil-Trak system locked mode will be activated and indicator (7) will illuminate.
14. Lower boom below 40°.
8.2 FOUR WHEEL STEER INDEXING

A. 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. Select the four wheel steer mode (1) with the steer mode selector (3).
2. Turn the steering wheel (4) all the way to the right until it reaches the stop.
3. Select the front wheel steer mode (2) with the steer mode selector (3).
4. Turn the steering wheel (4) to the left, about one complete revolution.
5. Select the four wheel steer mode (1) with the steer mode selector (3).
6. Turn the steering wheel (4) all the way to the right until it reaches the stop. This will ensure the rear wheels are fully against the right stop.
7. Select the front wheel steer mode (2) with the steer mode selector.
8. Turn the steering wheel (4) all the way to the right until it reaches the stop.
9. Select the four wheel steer mode (1) with the steer mode selector.
10. Turn the steering wheel (4) to the left, until the wheels are pointing straight ahead.
11. Drive the vehicle forward a short distance to check the wheel tracking.

The vehicle should now be properly indexed in Four Wheel Circle Steering. If the wheels are still out-of-phase, repeat the above procedure.
Section 8 - Additional Checks

8.3 PARKING BRAKE TEST PROCEDURE

To check that the parking brake system is functioning properly, perform the following:

Note: Perform tests in (1) FIRST gear only.

**WARNING**

**UNEXPECTED MOVEMENT HAZARD.** Do not operate this vehicle unless you are in the seat with the seat belt fastened.

**Test 1- Parking Brake Activation**

1. With the vehicle unloaded, disengage the parking brake.
2. Move the transmission select lever to (F) FORWARD.
3. Move the unit slowly in a forward direction (approximately 1 mph [1.6 km/h]).
4. Engage the parking brake. The unit should stop abruptly.

**Test 2- Park Brake Hold Performance**

1. With the rated load of 6,000 lb (2,722 kg) on the jib, drive the vehicle forward up a 15% grade (15 ft rise over 100 ft run).
2. Stop the vehicle using the service brakes, apply the park brake, shift the transmission into (N) NEUTRAL.
3. Take foot off the service brake pedal. The vehicle should not move.
4. Apply the service brakes, shift the transmission into (R) REVERSE, move the park brake switch to the OFF position and back down off the grade.
5. Repeat “Test 2” by backing up the grade and checking the park brake holding performance.

If the parking brake does not pass these tests, do the following:

- **Immediately** remove the vehicle from service.
- Block all four wheels.

**WARNING**

**UNEXPECTED MOVEMENT HAZARD.** Block all four wheels to prevent any unexpected movement.

- Place the accident prevention tags on the ignition switch and the steering wheel.
- Service the parking brake immediately or contact the local JLG Authorized Service Center (ASC) to repair the system.
Section 8 - Additional Checks

8.4 LOAD MOMENT INDICATOR SYSTEM

A. Load Moment Indicator System Test

The Load Moment Indicator is intended to continuously monitor the forward stability of the Engine Installation & Removal Vehicle (EIRV). To check this feature, perform the following:

1. **Fully retract and level boom, with no load. Do not raise the boom during this test.**

2. Level frame using level in cab.

3. Press the test button on the Load Moment Indicator display. This will cause all LEDs to flash on and an audible warning to sound. This indicates that the system is functioning properly.

4. If the test result is not achieved, the system is not functioning properly and the vehicle must be removed from service and repaired before continued operation.
Section 8 - Additional Checks

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SECTION 9 - SPECIFICATIONS

9.1 PRODUCT SPECIFICATIONS

Fluid and Lubrication Capacities

Engine Crankcase Oil
Capacity with Filter Change .......................................................... 11.5 quart (11 liter)

Type of Oil
Above 23° F (-5° C) ........................................................................... 15W40
23° F (-5° C) to -25° F (-32° C) ..................................................... 5W30
Below -25° F (-32° C) ....................................................................... 0W30
Oil Meeting MIL-PRD-2104G Specifications is Also Acceptable

Fuel Tank
Capacity .................................................................................... 38.5 gallon (146 liter)

Type of Fuel
Below 32° F (0° C) ................................................................ Winterized #2 Diesel
Above 32° F (0° C) ................................................................ Standard #2 Diesel

Cooling System
System Capacity (without heater) ................................................... 5.7 gallon (21.7 liter)
Overflow Bottle Capacity .............................................................. 3.0 quart (2.8 liter)
Type of Coolant ............................................................................. 50/50 ethylene glycol & water

Hydraulic System
System Capacity ........................................................................... 41.3 gallon (156 liter)
Reservoir Capacity to Full Mark .................................................. 28.5 gallon (108 liter)

Type of Oil
14° F (-10° C) & Above .................................................. MIL-PRD-2104G Grade 10 Hydraulic Oil
125° F (50° C) & Below.................................................. DEXRON III (Automatic Transmission Fluid)

Transmission
Capacity with filter change .......................................................... 14 quart (13.25 liter)

Type of Oil
Above 125° F (50° C) .................................................. MIL-PRD-2104G Grade 15W40
14° F (-10° C) to 125° F (50°C) ............................................. MIL-PRD-2104G Grade 10W30
...............(Universal Tractor Fluid)
Below 14° F (-10° C) .................................................. DEXRON III (Automatic Transmission Fluid)

Filter Capacity ................................................................. 1 quart (1 liter)
Section 9 - Specifications

Axles

Differential Housing Capacity (Front Axle) ........................................ 9.5 quart (9 liter)
Differential Housing Capacity (Rear Axle) ........................................ 10.5 quart (9.94 liter)

Type of Oil
    Above 100° F (38° C) ........................................... MIL-PRD-2104G Grade 15W40
    Below 100° F (38° C) ......................................... MIL-PRD-2104G Grade 10W30
    .................................................................................. (Universal Tractor Fluid)

Wheel End Capacity (Front Axle) .................................................. 1.7 quart (1.6 liter)
Wheel End Capacity (Rear Axle) ................................................... 1.3 quart (1.2 liter)

Type of Oil
    Above 100° F (38° C) ........................................... MIL-PRD-2104G Grade 15W40
    Below 100° F (38° C) ......................................... MIL-PRD-2104G Grade 10W30
    .................................................................................. (Universal Tractor Fluid)

Transfer Case

Capacity ................................................................. 1.5 quart (1.4 liter)

Type of Oil ............................................................. MIL-I-2105GL-5 Grade 80W90 w/ep properties
### Section 9 - Specifications

#### Tires

**Pressure**

15.5R25, L-2, (2 star minimum)

- Full Tire Pressure: 87 psi (600 kPa)

#### Wheel Lug Nut

- Torque: 430-470 lb-ft (583-637 Nm)

#### Tire Footprint Area

- **87 PSI**

  - Boom fully retracted (carriage with hydraulic jib and no load):
    - 15.50R25: 50 in\(^2\)
  
  - Area established under max tip condition (carriage with hydraulic jib and rated load):
    - 15.50R25: 209 in\(^2\)

#### Maximum Ground Pressure

- Boom fully retracted (carriage with hydraulic jib and no load):
  - 15.50R25: 173 PSI

- Pressure established under max tip condition (carriage with hydraulic jib and rated load):
  - 15.50R25: 185 PSI
Section 9 - Specifications

Weights

Basic Vehicle
Gross Vehicle Weight (no attachment).................................27,946 lb (12.676 kg)
Shipping Weight (with carriage with hydraulic jib)............29,210 lb (13.249 kg)
Carriage with Hydraulic Jib .........................................................1,264 lb (573 kg)

Maximum Rated Capacity
Carriage with Hydraulic Jib ......................................................6,000 lb (2.721 kg)
**Section 9 - Specifications**

### Dimensions

- **Height**: 93.6 in (2377 mm)
- **Width**: 101 in (2565 mm)
- **Wheelbase**: 131 in (3327 mm)
- **Length less Jib**: 250 in (6350 mm)
- **Ground Clearance**: 15.1 in (383 mm)
- **Tread Center**: 84 in (2,134 mm)
- **Maximum Lift Height**: 42 ft 6 in (12,95 m)
- **Maximum Forward Reach**: 30 ft 7 in (9,3 m)
Section 9 - Specifications

Electrical System

Rating: ................................................................. 12/24 DC Negative Ground
Number of Batteries: ........................................................................ Two
Type: ................................................................. Maintenance Free (1225 Cold Cranking Amps)
Series of Batteries: .......................................................................... HASP-FT
Alternator Rating: ........................................................................... 24 Volt - 70 Amp
Battery Equalizer Rating: ................................................................. 12/24/Volt

Fuse Ratings (Fuse Block):
Open Cab Vehicle Main ........................................................................ 40 Amp
Ignition Control .................................................................................. 15 Amp
Transmission Direction ........................................................................ 7.5 Amp
ECM Ignition ..................................................................................... 7.5 Amp
Ignition Power ................................................................................... 20 Amp
Transmission Gear ............................................................................. 7.5 Amp
Stability Circuit .................................................................................. 10 Amp
Dash ................................................................................................... 10 Amp
Lighting Control .................................................................................. 7.5 Amp
Logic Panel ......................................................................................... 7.5 Amp
Jib Side Shift Left ............................................................................... 7.5 Amp
Jib Side Shift Right ............................................................................. 7.5 Amp
LMI (Load Moment Indicator) .............................................................. 3 Amp
ECM Indicator Light ........................................................................... 3 Amp
Closed Cab - Main ............................................................................. 40 Amp
Front Wiper ....................................................................................... 10 Amp
Heater Fan ........................................................................................ 25 Amp
Roof Wiper ....................................................................................... 7.5 Amp
Rear Wiper ....................................................................................... 7.5 Amp
Section 9 - Specifications

Relay Ratings (Fuse block):
- Transmission Control ................................................................. 12 Volt
- Ignition .......................................................................... 12 Volt
- Neutral Start ........................................................................ 12 Volt
- Creep Mode ........................................................................... 12 Volt
- Stability Lock ................................................................. 12 Volt
- Boom Proximity ................................................................ 12 Volt
- Cab Power ........................................................................ 12 Volt

Fuse & Relay Ratings (Right Side Console):
- Horn ........................................................................... 7.5 Amp
- Normal Lights ................................................................. 25 Amp
- Hi Beams/Fan ..................................................................... 25 Amp
- Work Light Power Relay ................................................... 24 Volt
- High Beam Power Relay ...................................................... 24 Volt
- Brake Light Relay ............................................................... 12 Volt
- Light Power Relay ................................................................. 12 Volt
- Normal Lights Ignition Relay ........................................ 12 Volt
- Reverse Signal Relay ......................................................... 12 Volt
- Flasher Module ...................................................................... 12 Volt

Fuse Ratings (Under Engine Cover):
- Battery Equalizer (12V Positive) ............................................. 125 Amp
- Battery Equalizer 24V Positive .............................................. 125 Amp
- ECM Fuses (Qty. 3) ................................................................. 7.5 Amp
- ECM Fuses (Qty. 3) ................................................................. 10 Amp
- Cold Start Grid Heater Fuse (Qty. 1) ..................................... 125 Amp

Fuse & Relay Ratings (Inside Rear Door):
- Air Conditioner Condenser Fan Motor .................................. 15 Amp
- Air Conditioner Condenser Fan Relay .................................. 12 Volt
Section 9 - Specifications

Engine Specifications

Tubocharged Cummins:

Model......................................................................................................QSB4.5-30-T
Displacement............................................................................................ 275CID (4.5 liter)
Horsepower .................................................................................................. 110 hp @ 2500 rpm
Peak Torque ............................................................................................... 305 ft lb @ 1500 rpm
Low Idle ...................................................................................................... 1050 rpm (± 50 rpm)
High Idle* ................................................................................................... 2750 rpm (± 100 rpm)

*(Note: Engine manufacturer’s high idle setting is locked and sealed and is not to be disturbed.)
# Index

| A | Accessory Control Lever .......... 3-16 |
| A | Additional Checks ................... 8-1 |
| A | Air Intake System .................. 7-16 |
| A | Attachment                         |
| A | Approved ................................ 5-1 |
| A | Installation ........................ 5-6 |
| A | Operation ................................ 5-10 |
| A | Removal ................................ 5-8 |
| A | Unapproved ................................ 5-1 |
| A | Attachments ................................ 5-1 |
| A | Axles .................................. 9-2 |
| B | Battery ................................ 7-29 |
| B | Battery Boosted Starting ............ 4-3 |
| B | Boom Indicator                     |
| B | Angle .................................. 3-21 |
| B | Extension ................................ 3-21 |
| B | Boom Wear Pad Lubrication .......... 7-7 |
| C | Capacities ................................ 9-1 |
| C | Capacity ................................ 5-2 |
| C | Capacity Chart                     |
| C | Example ................................ 5-5 |
| C | Sample ................................ 5-4 |
| C | Capacity Indicator Locations ........ 5-3 |
| C | Carriage with Hydraulic Jib .......... 5-11 |
| C | Maintenance Schedule ............... 5-14 |
| C | Chemical Hazards .................... 1-12 |
| C | Cold Weather Starting Aids ........ 4-2 |
| C | Controls ................................ 3-2 |
| C | Cooling System ........................ 9-1 |
| C | Counterweight .......................... |
| C | Removal/Installation .................. 7-37 |
| D | Decals ................................ 2-4 |
| D | Dimensions ................................ 9-5 |
| D | Disengaging a Suspended Load ....... 4-8 |
| D | Driving Hazards on Slopes .......... 1-8 |
| E | Electrical Hazards .................. 1-2 |
| E | Electrical System ................... 9-6 |
| E | Emergency Exit from Enclosed Cab . 6-11 |
| E | Emergency Procedures ............... 6-1 |
| E | Emergency Retract/Lowering of Boom Above 40°.............. 6-9 |
| E | Emergency Retract/Lowering of Boom Below 40° ............. 6-8 |
| E | Engine ................................ 4-1, 9-8 |
| E | Function Indicator Lights .......... 3-8 |
| E | Normal Operation .................... 4-5 |
| E | Starting ................................ 4-1 |
| E | Engine Cooling System .............. 7-8 |
| E | Engine Crankcase Oil ................. 9-1 |
| E | Engine Oil ................................ 7-18 |
| F | Fall Hazard ................................ 1-11 |
| F | Four Wheel Steer Indexing Procedure ........................................ 8-3 |
| F | Fuel System ................................ 7-9 |
| F | Fuel Tank ................................ 9-1 |
| F | Fuse and Relay Replacement .......... 7-30 |
| G | General Maintenance .................. 7-2 |
| H | Hazard Classification System ....... 1-1 |
| H | Hydraulic Oil ......................... 7-21 |
| H | Hydraulic System .................... 9-1 |
| I | Ignition ................................ 3-7 |
| J | Jib ..................................... 5-11 |
| J | Joystick ................................. |
| J | Boom (Mode 1) ........................ 3-13 |
| J | Frame Sway (Mode 3) .................. 3-15 |
| J | Jib Position (Mode 2) ............... 3-14 |

31200420
## Index

**L**
- Leveling Procedure ................................... 4-7
- Lifting Personnel ........................................ 1-7
- Load Moment Indicator .................................. 3-17
- Test .................................................................. 8-5
- Lubrication and Maintenance ..................... 7-1
- Lubrication Schedule
  - 250 Hour .................................................. 7-6

**O**
- Operating with a Suspended Load ... 4-6
- Operation .................................................... 4-1
- Operational Check ....................................... 2-8
- Operator Cab .............................................. 2-9
- Operator Maintenance Instructions .. 7-7
- Operator Seat .............................................. 3-20

**P**
- Park Brake .................................................. 3-9
- Test Procedure ........................................... 8-4
- Parking Procedure ...................................... 3-9
- Picking Up a Suspended Load ............... 4-6
- Pinch Points and Crush Hazards ........ 1-9
- Placing a Suspended Load ..................... 4-8
- Pre-Operation Check and Inspection ................. 2-1

**S**
- Safety Decals ........................................... 2-4
- Safety Practices ......................................... 1-1
- Safety Signal Words .................................. 1-1
- Seat Belt ................................................... 3-20
- Service and Maintenance Schedule
  - 10 Hour .................................................. 7-3
  - 1000 Hour ............................................. 7-5
  - 1st 50 Hour ........................................... 7-3
  - 2000 Hour ............................................. 7-5
  - 250 Hour ................................................ 7-4
  - 50 Hour .................................................. 7-4
  - 500 Hour ................................................ 7-4
- Shut-Down Procedure ................................ 4-5
- Slave Starting .......................................... 4-4
- Specifications ........................................... 9-1
- Stabil-Trak System ..................................... 3-19
  - Test ...................................................... 8-1
- Steer Modes ............................................. 3-18

**T**
- Tip Over Hazard ...................................... 1-3
- Tires ......................................................... 7-24, 9-3
  - Air Pressure .......................................... 7-24
  - Damage................................................. 7-24
  - Replacement......................................... 7-25
- Towing
  - Long Distance ..................................... 6-4
  - Short Distance .................................... 6-1
- Transfer Case .......................................... 9-2
- Transmission ........................................... 9-1
- Transmission Control Lever
  - Direction of Travel .................................. 3-10
  - Gear Selection ....................................... 3-11
- Transmission Oil ................................. 7-27
- Transport ................................................ 4-9
- Transporting a Suspended Load .......... 4-7
- Travel Hazard ........................................... 1-6

**W**
- Walk-Around Inspection ........................... 2-6
- Warm-Up Check ......................................... 2-8
- Weights ................................................... 9-4
- Wheel Installation .................................... 7-26
- Wheel Lug Nut ......................................... 9-3
- Wheel Replacement ................................... 7-25
## Inspection, Maintenance and Repair Log

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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: __________________________________________
**Hand Signals**

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<th>Signal</th>
<th>Description</th>
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<tr>
<td>Emergency Stop</td>
<td>With both arms extended laterally, hands open downward, move arms back and forth.</td>
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<tr>
<td>Stop</td>
<td>With either arm extended laterally, hand open downward, move arm back and forth.</td>
</tr>
<tr>
<td>Stop Engine</td>
<td>Draw thumb or forefinger across throat.</td>
</tr>
<tr>
<td>Raise Boom</td>
<td>With either arm extended horizontally, fingers closed, point thumb upward.</td>
</tr>
<tr>
<td>Lower Boom</td>
<td>With either arm extended horizontally, fingers closed, point thumb inward.</td>
</tr>
<tr>
<td>Move Slowly</td>
<td>Place one hand motionless in front of hand giving motion signal. (Raise load slowly shown)</td>
</tr>
<tr>
<td>Extend Boom</td>
<td>With both hands clenched, point thumbs outward.</td>
</tr>
<tr>
<td>Retract Boom</td>
<td>With both hands clenched, point thumbs inward.</td>
</tr>
<tr>
<td>THIS FAR TO GO</td>
<td>With hands raised and open inward, move hands laterally, indicating distance to go.</td>
</tr>
<tr>
<td>Tilt Forks Up</td>
<td>With one arm held at side, extend other arm upward at about 45 degrees.</td>
</tr>
<tr>
<td>Tilt Forks Down</td>
<td>With one arm held at side, extend other arm downward at about 45 degrees.</td>
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**Special Signals** - When signals for auxiliary equipment functions or conditions not covered are required, they shall be agreed upon in advance by the operator and signalman.
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<tr>
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