Operation & Safety Manual

Original Instructions -
Keep this manual with the machine at all times.

ES1930M Micro-Sized

PVC 1001

3122551400

August 14, 2026 - Rev C

ANSI

English (en-US)

⚠ WARNING

Operating, servicing and maintaining this vehicle or equipment can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle or equipment in a well-ventilated area and wear gloves or wash your hands frequently when servicing. For more information go to www.P65Warnings.ca.gov.

FOREWORD

The Mobile Elevating Work Platform (MEWP) models covered in this manual are designed and tested to meet or exceed various compliance standards. Please refer to the manufacturer's nameplate affixed to the subject MEWP for specific standard compliance information.

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.

Refer to www. JLG. com for Warranty, Product Registration, and other machine-related documentation.

This manual is originally written in English.

SAFETY ALERT SYMBOLS AND SAFETY SIGNAL WORDS



This is the Safety Alert Symbol. It is used to alert you to the potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

Indicates an imminently hazardous situation. If not avoided, will result in serious injury or death. This decal will have a red background.

⚠ WARNING

Indicates a potentially hazardous situation. If not avoided, could result in serious injury or death. This decal will have an orange background.

⚠ CAUTION

Indicates a potentially hazardous situation. If not avoided, may result in minor or moderate injury. It may also alert against unsafe practices. This decal will have a yellow background.

NOTICE

Indicates information or a company policy that relates directly or indirectly to the safety of personnel or protection of property.

⚠ WARNING

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.

NOTICE

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.

NOTICE

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

For:

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

Contact:

Product Safety and Reliability Department
JLG Industries, Inc.
13224 Fountainhead Plaza
Hagerstown, MD 21742
USA
or Visit www.jlg.com to find your local JLG office.

In USA:

Toll Free: 877-JLG-SAFE (877-554-7233)

Outside USA:

Phone: 240-420-2661
Fax: 301-745-3713
E-mail: ProductSafety@JLG.com

REVISION LOG

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May 5, 2025	A	Original Issue
October 13, 2025	B	Revision
August 14, 2026	C	Revision

Other Publications Available

Publication	Publication Number
Service & Maintenance Manual	3122551500
Illustrated Parts Manual	3122551600

Serial Number Plate Location

The serial number is stamped on a plate attached to the chassis on the front of the machine.

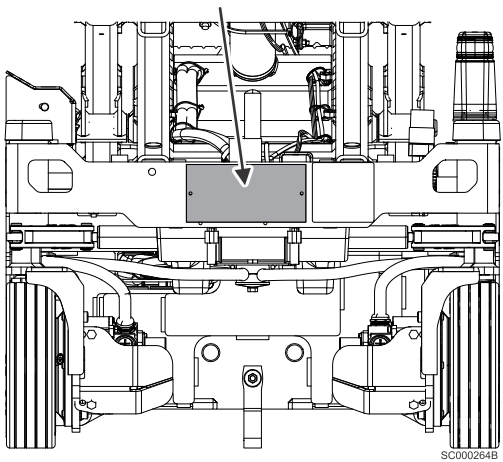


Figure 1. Serial Number Plate

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SECTION 1
Safety Precautions

1.1 GENERAL

This section outlines the necessary precautions for proper and safe machine usage and maintenance. It is mandatory that a daily routine is established based on the content of this manual to promote proper machine usage. A maintenance program, using the information provided in this manual and the Service & Maintenance Manual, must also be established by a qualified person and must be followed to ensure that the machine is safe to operate.

The owner/user/operator/lessor/lessee of the machine must not accept operating responsibility 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.

This section contains the responsibilities of the owner, user, operator, lessor, and lessee concerning safety, training, inspection, maintenance, application, and operation. If there are any questions with regard to safety, training, inspection, maintenance, application, and operation, please contact JLG Industries, Inc. (“JLG”).

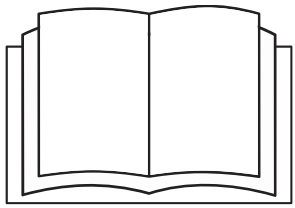
⚠ WARNING

Failure to comply with the safety precautions listed in this manual could result in machine damage, property damage, personal injury or death.

1.2 PRE-OPERATION

1.2.1 Operator Training and Knowledge

- Read, understand, and study the Operation & Safety Manual in its entirety before operating the machine. For clarification, questions, or additional information regarding any portions of this manual, contact JLG Industries, Inc.



- Only personnel who have received proper training regarding the inspection, application and operation of MEWPs (including recognizing and avoiding hazards associated with their operation) shall be authorized to operate a MEWP.

- Only properly trained personnel who have received unit-specific familiarization shall operate a MEWP. The user shall determine if personnel are qualified to operate the MEWP prior to operation.
- Read, understand, and obey all DANGERS, WARNINGS, CAUTIONS, and operating instructions on the machine and in this manual.
- Ensure that the machine is to be used in a manner which is within the scope of its intended application as determined by JLG.
- All operating personnel must have a thorough understanding of the intended purpose and function of the MEWP controls, including platform, ground and emergency descent controls.
- Read, understand, and obey all applicable employer, local, and governmental regulations as they pertain to your utilization and application of the machine.

1.2.2 Workplace Inspection

- Precautions to avoid all hazards in the work area must be taken by the user before and during operation of the machine.
- Do not operate or raise the platform from a position on trucks, trailers, railway cars, floating vessels, scaffolds or other equipment unless the application is approved in writing by JLG.
- Before operation, check work area for overhead hazards such as electric lines, bridge cranes, and other potential overhead obstructions.
- Check operating surfaces for holes, bumps, drop-offs, obstructions, debris, concealed holes, and other potential hazards.
- Check the work area for hazardous locations. Do not operate the machine in hazardous environments unless approved for that purpose by JLG.
- Ensure that the ground conditions are adequate to support the maximum tire load indicated on the tire load decals located on the chassis adjacent to each wheel. Do not travel on unsupported surfaces.
- This machine can be operated in nominal ambient temperatures of 0°F to 104°F (-20°C to 40°C). Consult JLG to optimize operation outside of this temperature range.
- When operating an internal combustion engine at high altitudes, a decrease in machine performance may occur due to a decrease in air density depending on engine aspiration type, temperature, and humidity, therefore JLG recommends not operating the machine higher than 6000 m above sea level without consultation with the engine suppliers. For electric machines, performance may diminish higher than 6000 m above sea level.

1.2.3 Machine Inspection

- Do not operate this machine until the inspections and functional checks as specified in the User Responsibilities, Machine Preparation, and Inspection section of this manual have been performed.

- Do not operate this machine until it has been serviced and maintained according to the maintenance and inspection requirements as specified in the machine's Service & Maintenance Manual.
- Ensure all safety devices are operating properly. Modification of these devices is a safety violation.

⚠ WARNING

Modification or major alteration of a MEWP shall be made only with the prior written permission from the manufacturer. Modification is defined as change(s) to a MEWP that affect the operation, stability, safety factors, rated load, or safety of the MEWP in any way.

- Do not operate any machine on which the safety or instruction placards or decals are missing or illegible.
- Check the machine for modifications to original components. Ensure that any modifications have been approved by JLG.
- Avoid accumulation of debris on platform floor. Keep mud, oil, grease, and other slippery substances from footwear and platform floor.

1.3 OPERATION

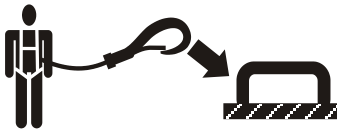
1.3.1 General

- Machine operation requires your full attention. Bring the machine to a full stop before using any device, i.e. cell phones, two-way radios, etc. that will distract your attention from safely operating the machine.
- Do not use the machine for any purpose other than positioning personnel, their tools, and equipment.
- Before operation, the user must be familiar with the machine capabilities and operating characteristics of all functions.
- Never operate a malfunctioning machine. If a malfunction occurs, shut down the machine. Remove the unit from service and notify the proper authorities.
- Do not remove, modify, or disable any safety devices.
- Never slam a control switch or lever through neutral to an opposite direction. Always return switch to neutral and stop before moving the switch to the next function. Operate controls with slow and even pressure.
- Do not allow personnel to tamper with or operate the machine from the ground with personnel in the platform, except in an emergency.
- Do not carry materials directly on platform railing unless approved by JLG.
- When two or more persons are in the platform, the operator shall be responsible for all machine operations.

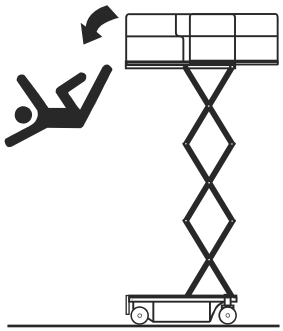
- Always ensure that power tools are properly stowed and never left hanging by their cord from the platform work area.
- Do not assist a stuck or disabled machine by pushing or pulling except by pulling at the chassis tie-down lugs.
- Fully lower platform and shut off all power before leaving machine.
- Remove all rings, watches, and jewelry when operating machine. Do not wear loose fitting clothing or long hair unrestrained which may become caught or entangled in equipment.
- Persons under the influence of drugs or alcohol or who are subject to seizures, dizziness or loss of physical control must not operate this machine.
- Hydraulic cylinders are subject to thermal expansion and contraction. This may result in changes to the platform position while the machine is stationary. Factors affecting thermal movement can include the length of time the machine will remain stationary, hydraulic oil temperature, ambient air temperature, and platform position.

1.3.2 Trip and Fall Hazards

- Prior to operation, ensure all gates and rails are fastened and secured in their proper position.



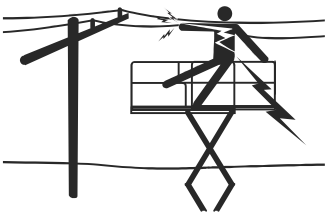
- JLG Industries, Inc. recommends that all persons in the platform wear a full body harness with a lanyard attached to an authorized lanyard anchorage point while operating this machine. For further information regarding fall protection requirements on JLG products, contact JLG Industries, Inc.
- Identify the designated lanyard anchorage point(s) at the platform and securely attach the lanyard. Attach only one (1) lanyard per lanyard anchorage point.
- Enter and exit only through gate area. Use extreme caution when entering or leaving platform. Ensure that the platform assembly is fully lowered. Face the machine when entering or leaving the platform. Always maintain “three point contact” with the machine, using two hands and one foot or two feet and one hand at all times during entry and exit.

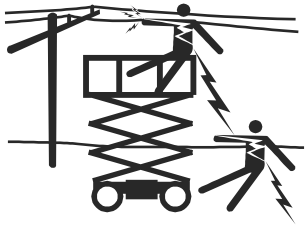


- Keep both feet firmly positioned on the platform floor at all times. Never position ladders, boxes, steps, planks, or similar items on unit to provide additional reach for any purpose.
- Never use the scissor arm assembly to gain access to or leave the platform.
- Keep oil, mud, and slippery substances cleaned from footwear and the platform floor.

1.3.3 Electrocution Hazards

- This machine is not insulated and does not provide protection from contact with or proximity to electrical current.
- It is not recommended to use the machine during lightning. To prevent injury or machine damage if lightning occurs during operation, lower the platform and shut down the machine in a safe and secure location.





- Maintain distance from electrical lines, apparatus, or any energized (exposed or insulated) parts according to the Minimum Approach Distance (MAD) as shown in *Table — Minimum Approach Distances (MAD), page 17*.
- Allow for machine movement and electrical line swaying.

Table 1. Minimum Approach Distances (MAD)

Voltage Range (Phase to Phase)	Minimum Approach Distance in Feet (Meters)
0 to 50 KV	10 (3)
Over 50K V to 200 KV	15 (5)

Table 1. Minimum Approach Distances (MAD) (continued)

Voltage Range (Phase to Phase)	Minimum Approach Distance in Feet (Meters)
Over 200 KV to 350 KV	20 (6)
Over 350 KV to 500 KV	25 (8)
Over 500 KV to 750 KV	35 (11)
Over 750 KV to 1000 KV	45 (14)
Note: This requirement shall apply except where employer, local or governmental regulations are more stringent.	

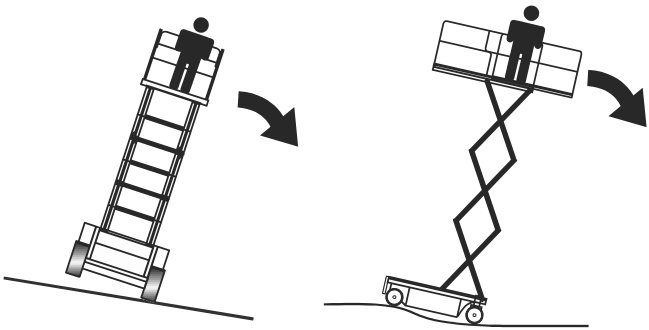
- Maintain a clearance of at least 10 ft (3 m) between any part of the machine and its occupants, their tools, and their equipment from any electrical line or apparatus carrying up to 50,000 volts. One foot additional clearance is required for every additional 30,000 volts or less.
- The MAD may be reduced if insulating barriers are installed to prevent contact, and the barriers are rated for the voltage of the line being guarded. These barriers shall not be part of (or attached to) the machine.
- The MAD shall be reduced to a distance within the designed working dimensions of the insulating barrier. This determination shall be made by a qualified person with respect to electrical transmission and distribution in accordance with the employer, local, or governmental requirements for work practices near energized equipment.

⚠ DANGER

Do not maneuver machine or personnel inside prohibited zone (MAD). Assume all electrical parts and wiring are energized unless known otherwise.

1.3.4 Tipping Hazards

- Ensure that the ground conditions are adequate to support the maximum tire load indicated on the tire load decals located on the chassis adjacent to each wheel. Do not travel on unsupported surfaces.
- The user must be familiar with the operating surface before driving. Do not exceed the allowable side slope and grade while driving.



- Do not elevate platform or drive with platform elevated while on or near a sloping, uneven, or soft surface.
- Ensure machine is positioned on a smooth, firm surface within the limits of the maximum operating slope before elevating platform or driving with the platform in the elevated position.
- Before driving on floors, bridges, trucks, and other surfaces, check allowable capacity of the surfaces.
- Never exceed the maximum platform capacity as specified on the platform. Keep all loads within the confines of the platform, unless authorized by JLG.
- Keep the chassis of the machine a minimum of 2 ft (0.6 m) from holes, bumps, drop-offs, obstructions, debris, concealed holes, and other potential hazards at the ground level.
- Do not push or pull any object with the machine.
- Never attempt to use the machine as a crane. Do not tie-off machine to any adjacent structure. Never attach wire, cable, or any similar items to platform.
- If the scissor arm assembly or platform is caught so that one or more wheels are off the ground, all persons must be removed before attempting to free the machine. Use cranes, forklift trucks, or other appropriate equipment to stabilize machine.
- Do not operate the machine when wind conditions, including gusts, exceed specifications shown in the Machine Specifications and Operator Maintenance section. Refer to *Table — Beaufort Scale (For Reference Only), page 21*. Factors affecting wind speed are; platform elevation, surrounding structures, local weather events, and approaching storms.
- Wind speed can be significantly greater at height than at ground level.
- Wind speed can change rapidly. Always consider approaching weather events, the time required to lower the platform, and methods to monitor current and potential wind conditions.

- Do not cover or increase surface area of the platform or the load. Do not carry large surface area items in the platform when operating outdoors. The addition of such items increases the exposed wind area of the machine. Increased areas exposed to wind will decrease stability.
- Do not increase the platform size with unauthorized modifications, deck extensions, or attachments.

⚠ WARNING

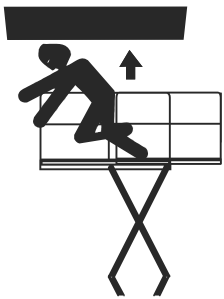
Do not operate the machine when wind conditions exceed specifications shown in the General Specifications section of this manual or as shown on the capacity placard on the platform billboard.

Table 2. Beaufort Scale (For Reference Only)

Beaufort Number	Wind Speed		Description	Land Conditions
	mph	m/s		
0	0	0-0.2	Calm	Calm. Smoke rises vertically
1	1-3	0.3-1.5	Light air	Wind motion visible in smoke
2	4-7	1.6-3.3	Light breeze	Wind felt on exposed skin. Leaves rustle
3	8-12	3.4-5.4	Gentle breeze	Leaves and smaller twigs in constant motion
4	13-18	5.5-7.9	Moderate breeze	Dust and loose paper raised. Small branches begin to move.
5	19-24	8.0-10.7	Fresh breeze	Smaller trees sway.
6	25-31	10.8-13.8	Strong breeze	Large branches in motion. Flags waving near horizontal. Umbrella use becomes difficult.
7	32-38	13.9-17.1	Near Gale/ Moderate Gale	Whole trees in motion. Effort needed to walk against the wind.
8	39-46	17.2-20.7	Fresh Gale	Twigs broken from trees. Cars veer on road.
9	47-54	20.8-24.4	Strong Gale	Light structure damage.

1.3.5 Crushing and Collision Hazards

- Approved head gear must be worn by all operating and ground personnel.
- Watch for obstructions around machine and overhead when driving. Check clearances above, on sides, and bottom of platform during all operations.



- During operation, keep all body parts inside platform railing.
- Keep hands and limbs out of the scissor arm assembly during operation and when elevated without safety prop engaged.

- Always post a lookout when driving in areas where vision is obstructed.
- Keep non-operating personnel at least 6 ft (1.8 m) away from machine during all operations.
- Under all travel conditions, the operator must limit travel speed according to conditions of ground surface, congestion, visibility, slope, location of personnel, and other factors.
- Be aware of stopping distances in all drive speeds. When driving in high speed, reduce drive speed before stopping. Travel grades in low speed only.
- Do not use high speed drive in restricted or close quarters or when driving in reverse.
- Exercise extreme caution at all times to prevent obstacles from striking or interfering with operating controls and persons in the platform.
- Ensure that operators of other overhead and floor level machines are aware of the MEWP's presence. Disconnect power to overhead cranes. Barricade floor area if necessary.
- Do not operate over ground personnel. Warn personnel not to work, stand, or walk under a raised boom or platform. Position barricades on floor if necessary.

⚠ WARNING

If driving machine with the platform control station from ground, do not hang the control box on any part of the machine while driving. Hold the control box and keep at least 3 ft (1 m) distance from machine.

1.4 TOWING, LIFTING, AND HAULING

- Never allow personnel in platform while towing, lifting, or hauling.
- This machine should not be towed, except in the event of emergency, malfunction, power failure, or loading/unloading. Refer to the Towing procedures section of this manual for emergency towing procedures.
- Ensure platform is fully retracted and completely empty of tools prior to towing, lifting or hauling.
- When lifting machine with a forklift, position forks only at designated areas of the machine. Lift with a forklift of adequate capacity.
- Refer to the Machine Controls, Indicators, and Operation section of this manual for lifting information.

1.5 MAINTENANCE

This sub-section contains general safety precautions which must be observed during maintenance of this machine. Additional precautions to be observed during machine

maintenance are inserted at the appropriate points in this manual and in the Service and Maintenance Manual. It is of utmost importance that maintenance personnel pay strict attention to these precautions to avoid possible injury to personnel or damage to the machine or property. A maintenance program must be established by a qualified person and must be followed to ensure that the machine is safe.

1.5.1 Maintenance Hazards

- Shut off power to all controls and remove the key to ensure that all moving parts are secured from inadvertent motion prior to performing any adjustments or repairs.
- Never work under an elevated platform until it has been fully lowered to the full down position, if possible, or otherwise supported and restrained from movement with appropriate safety props, blocking, or overhead supports.
- DO NOT attempt to repair or tighten any hydraulic hoses or fittings while the machine is powered on or when the hydraulic system is under pressure.
- Always relieve hydraulic pressure from all hydraulic circuits before loosening or removing hydraulic components.
- DO NOT use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks. Wear gloves to help protect hands from spraying fluid.



- Use only replacement parts or components that are approved by JLG. To be considered approved, replacement parts or components must be identical or equivalent to original parts or components.
- Never attempt to move heavy parts without the aid of a mechanical device. Do not allow heavy objects to rest in an unstable position. Ensure adequate support is provided when raising components of the machine.
- Use only approved non-flammable cleaning solvents.
- Do not replace items critical to stability, such as batteries or solid tires, with items of different weight or specification. Do not modify the MEWP in any way to affect stability.
- Refer to the Service & Maintenance Manual for the weights of critical stability items.

⚠ WARNING

Modification or major alteration of a MEWP shall be made only with the prior written permission from the manufacturer. Modification is defined as change(s) to a MEWP that affect the operation, stability, safety factors, rated load, or safety of the MEWP in any way.

1.5.2 Battery Hazards (Lead Acid/AGM)

- Always disconnect batteries when servicing electrical components or when performing welding on the machine.
- Do not allow smoking, open flame, or sparks near battery during charging or servicing.
- Do not contact tools or other metal objects across the battery terminals.
- Always wear hand, eye, and face protection when servicing batteries. Ensure that battery acid does not come in contact with skin or clothing.

⚠ CAUTION

Battery fluid is highly corrosive. Avoid contact with skin and clothing at all times. Immediately rinse any contacted area with clean water and seek medical attention.

- Charge batteries only in a well ventilated area.
- Avoid overfilling the battery fluid level. Add distilled water to batteries only after the batteries are fully charged.

1.5.3 Battery Hazards (Lithium-Ion)

- Do not tamper with, open, or attempt to service the battery. It contains no serviceable parts.
- Always disconnect batteries when servicing electrical components or when performing welding on the machine.
- Do not allow smoking, open flame, or sparks near battery during charging.
- Do not contact tools or other metal objects across the battery terminals.
- Charge batteries only in a well-ventilated area.
- Do not jumpstart the battery.
- Do not use any additional external heating sources.
- Only use the JLG-installed charger to charge the batteries. Do not substitute this charger for a different charger.

1.6 LONG-TERM STORAGE

- Prior to long-term storage of machines (placed into storage for periods greater than 3 months) with an internal combustion engine, refer to the engine manufacturer’s guidance regarding fuel degradation.
- For long-term storage of battery-electric machines, store machines in a cool, dry place away from direct sunlight and heat sources. Avoid storing batteries in a fully discharged or fully charged state.

SECTION 2
User Responsibilities, Machine Preparation, and Inspection

2.1 PERSONNEL TRAINING

The Mobile Elevating Work Platform (MEWP) is a personnel handling device, so it is necessary that it be operated and maintained only by trained personnel.

2.1.1 Operator Training

Operator training must cover:

1. Reading and understanding the Operation and Safety Manual.
2. Thorough understanding of the intended purpose and function of the MEWP controls, including platform, ground, and emergency descent controls.
3. Control labels, instructions, and warnings on the machine.
4. Applicable regulations, standards, and safety rules.
5. Use of approved fall protection equipment.
6. Enough knowledge of the mechanical operation of the machine to recognize a malfunction or potential malfunction.
7. The safest means to operate the machine where overhead obstructions, other moving equipment, and obstacles, depressions, holes, and drop-offs exist.
8. Means to avoid the hazards of unprotected electrical conductors.
9. Selection of the appropriate MEWP and available options for the work to be performed considering specific job requirements, with involvement from the MEWP owner, user, and/ or supervisor.
10. The responsibility of the operator to ensure all platform occupants have a basic level of knowledge to work safely on the MEWP, and to inform them of applicable regulations, standards, and safety rules.
11. The requirement for familiarization in addition to training.

2.1.2 Training Supervision

Training must be delivered by a qualified person in an open area free of hazards until the trainee has demonstrated the ability to safely control and operate the machine.

2.1.3 Operator Responsibility

The operator must be instructed that they have the responsibility and authority to shut down the machine in case of a malfunction or other unsafe condition of either the machine or the job site.

2.1.4 Machine Familiarization

Note: Responsibilities for familiarization may vary by region.

Only properly trained personnel who have received unit-specific familiarization shall operate a MEWP. The user shall determine if personnel are qualified to operate the MEWP prior to operation. The user shall ensure that after familiarization, the operator operates the MEWP for a sufficient period of time to achieve proficiency. When authorized by the user, self-familiarization can be achieved, if authorized, by a properly trained operator reading, understanding and following the manufacturer's operator's manual.

Prior to user's authorization of an operator to use a specific model of MEWP, the user shall ensure the operator is familiarized on the following:

1. Location of the manual storage compartment and the requirement to ensure the required manual(s) are present on the MEWP;
2. Purpose and function of the machine controls and indicators at the platform and ground control stations;
3. Purpose, location, and function of the emergency controls;
4. Operating characteristics and limitations;
5. Features and devices;
6. Accessories and optional equipment.

2.2 PREPARATION, INSPECTION, AND MAINTENANCE

The following table covers machine inspections and maintenance required by JLG Industries, Inc. Consult local regulations for further requirements for MEWPs. The frequency of inspections and maintenance must be increased as necessary when the machine is used in a harsh or hostile environment, if the machine is used with increased frequency, or if the machine is used in a severe manner.

Table 3. Inspection and Maintenance Table

Type	Frequency	Primary Responsibility	Service Qualification	Reference
Pre-Start Inspection	Before using each day; or whenever there is an Operator change	User or Operator	User or Operator	Operation & Safety Manual
Pre-Delivery Inspection (See Note)	Before each sale, lease, or rental delivery	Owner, Dealer, or User	Qualified JLG Mechanic	Service & Maintenance Manual and applicable JLG inspection form

Table 3. Inspection and Maintenance Table (continued)

Type	Frequency	Primary Responsibility	Service Qualification	Reference
Frequent Inspection (See Note)	In service for 3 months or 150 hours, whichever comes first or Out of service for a period of more than 3 months or Purchased used	Owner, Dealer, or User	Qualified JLG Mechanic	Service & Maintenance Manual and applicable JLG inspection form
Annual Machine Inspection (See Note)	Annually, no later than 13 months from the date of prior inspection	Owner, Dealer, or User	Factory-Trained Service Technician (Recommended)	Service & Maintenance Manual and applicable JLG inspection form
Preventive Maintenance	At intervals as specified in the Service & Maintenance Manual	Owner, Dealer, or User	Qualified JLG Mechanic	Service & Maintenance Manual
Note: Inspection forms are available from JLG. Use the Service & Maintenance Manual to perform inspections.				

NOTICE

JLG Industries, Inc. recognizes a factory-trained service technician as a person who has successfully completed the JLG Service Training School for the specified JLG product model.

2.3 PRE-START INSPECTION

The Pre-Start Inspection should include each of 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. Report this to the proper maintenance personnel.

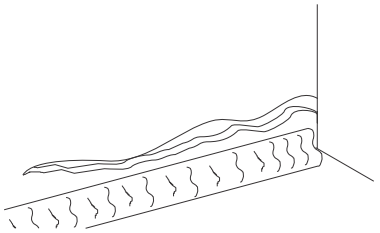


Figure 2. Parent Metal Crack

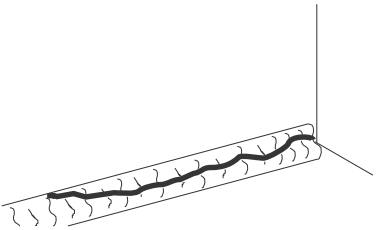


Figure 3. Weld Crack

3. **Decals and Placards** – Check all for cleanliness and legibility. Ensure none of the decals and placards are missing. Ensure all illegible decals and placards are cleaned or replaced (refer to Safety Decals for more information).

4. **Operation & Safety Manuals** – Ensure that a copy of the Operation & Safety Manual, AEM Safety Manual (ANSI markets only), and ANSI Manual of Responsibilities (ANSI markets only) is enclosed in the weather resistant storage container.

5. **Walk-Around Inspection** – Perform as instructed in the Walk-Around Inspection.

6. **Battery** – Charge as required.

7. **Hydraulic Oil Level** – Check the hydraulic oil level in the pump reservoir, add as required (refer to Hydraulic Oil Check Procedure for more information).

8. **Accessories/Attachments** – Refer to the Accessories section in this manual or the accessory installed upon the machine for specific inspection, operation, and maintenance instructions.

9. **Function Check** – Once the Walk-Around Inspection is complete, perform a functional check of all systems in an area free of overhead and ground level obstructions. Refer to Machine Controls, Indicators, and Operation for more specific instructions on the operation of each function.

10. **Platform Gate** – Keep gate and surrounding area clean and unobstructed. Ensure the gate closes properly and is not bent or damaged. Keep gate closed at all times except when entering/exiting the platform and loading/unloading materials.

11. **Lanyard Attach Points** – JLG Industries, Inc. recommends personnel in the platform wear a full body harness with a lanyard attached to an authorized lanyard anchorage point.

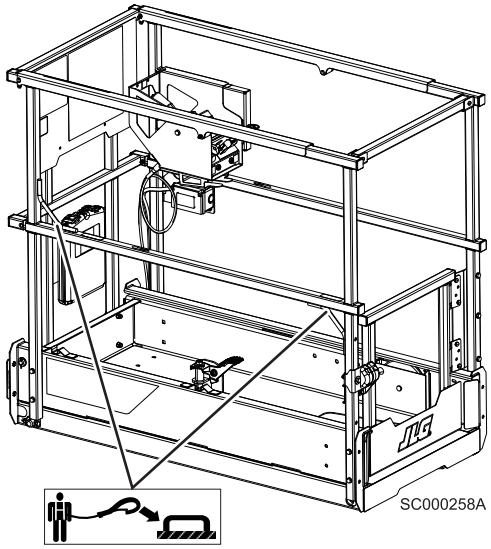


Figure 4. Lanyard Attach Points

⚠ WARNING

If the machine does not operate properly, turn off the machine immediately! Report the problem to the proper maintenance personnel. Do not operate the machine until it is declared safe for operation.

2.4 WALK-AROUND INSPECTION

Begin the Walk-Around Inspection at item 1 as noted on the Inspection Diagram. Continue checking each item in sequence for the conditions listed in the following checklist.

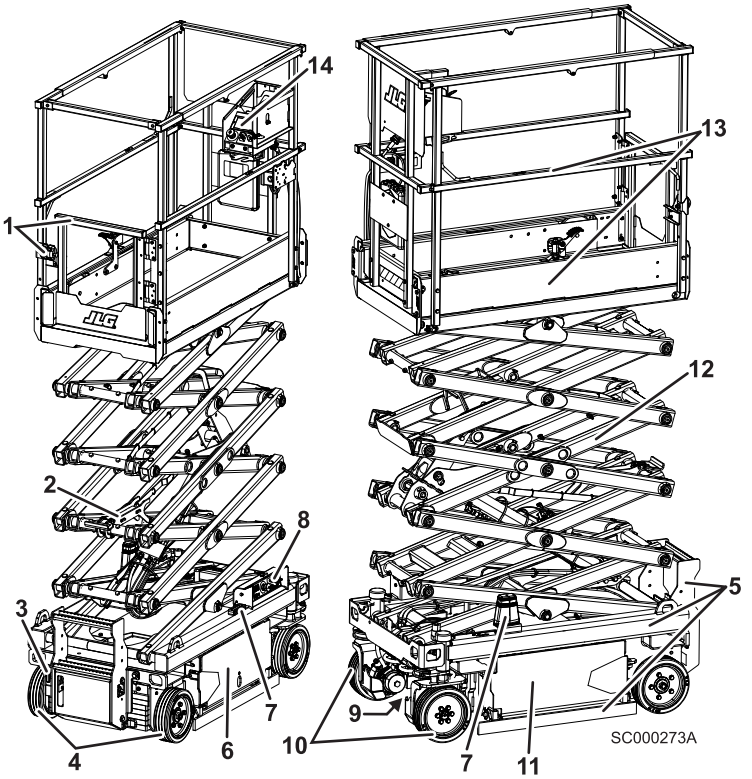


Figure 5. Inspection Diagram

⚠ WARNING

To avoid possible injury, be sure machine power is off. Do not operate until all malfunctions have been corrected.

NOTICE

Do not overlook visual inspection of chassis underside. Checking this area may result in discovery of conditions that could cause extensive machine damage.

Note: On all components, ensure there are no loose or missing parts, they are securely fastened, and no visible damage, leaks, or excessive wear exists in addition to any other criteria mentioned.

1. **Gate Assembly/Magnetic Gate Latch** — Refer to Inspection Note.
2. **Safety Prop** — Refer to Inspection Note.
3. **Platform Manual Descent Control** — Refer to Inspection Note.

4. **Rear Wheels, Tires, and Brake** — Wheel bolts properly secured. Inspect wheels for damage and corrosion. Refer to Inspection Note.

5. **Frame/Chassis/Ladder** — Ensure pothole protection (PHP) components on frame are in place, undamaged, not bent or worn. Side compartment doors open and close properly. Refer to Inspection Note.

6. **Hydraulic Pump/Motor, Control Valve Installation** — No unsupported wires or hoses; no damaged or broken wires. Refer to Inspection Note.

7. **Beacon(s)** — Refer to Inspection Note.

8. **Ground Control Station** — Placard secure and legible, control switches return to neutral position when activated and released, emergency stop switch functions properly. Control markings legible.

9. **Static Strap** — Not shown: on the underside of the machine towards the front. Refer to Inspection Note.

10. **Front Wheels, Tires, and Drive Motors** — Wheel bolts properly secured. Inspect wheels, steer linkage, and steer cylinder for damage and corrosion. Refer to Inspection Note.

11. **Battery Compartment** — Refer to Inspection Note.

12. **Scissor Arm Stack Assembly, Pivot Pins, Slide Wear Pads, Lift Cylinder** – Refer to Inspection Note.

13. **Platform/Rail Assembly** — Deck extension slides in and out and locks in place properly. All fold-down rail pins in place and secure. Refer to Inspection Note.

14. **Platform Control Station** — Ensure that the control console is firmly secured in the proper location. Placards secure and legible, control lever and switches return to neutral when activated and released, and emergency stop switch function properly, required manual(s) in storage box.

2.5 FUNCTION CHECK

From the **ground control station** with no load in the platform:

1. Make sure the key selector switch and platform lift switch operate properly.

2. Make sure all machine functions are disabled when the emergency stop button is pressed in.

3. With the platform raised a few feet (1 m), make sure the manual descent control (T-handle located at rear of machine to the left of the ladder) lowers the platform. Refer to Platform Manual Descent Control for more information.

4. Verify the pothole protection bars are fully lowered when the platform is raised.

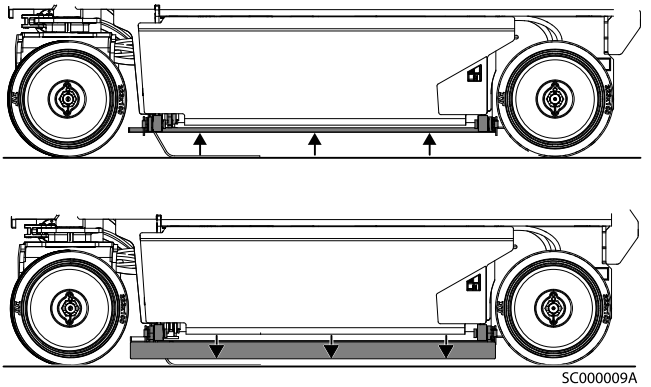


Figure 6. Pothole Protection Bars Raised/Lowered

From the **platform control station**:

1. Make sure the control console is firmly secured in the proper location.
2. Make sure all guards protecting switches are in place.
3. Operate all switch functions, drive/lift mode select switch, and horn button.
4. Operate all platform joystick functions to ensure proper operation of drive, lift, steer, and enable trigger switch.
5. Make sure all machine functions stop when function control is released or when joystick trigger is released.
6. Make sure all machine functions are disabled when the emergency stop button is pressed in.
7. With the platform elevated on a smooth, firm, level surface with no overhead obstructions, drive the machine to verify the high drive cutout speed limit is engaged at the height indicated in the table below. Make sure drive speed reduces from high speed to a slower speed.

Table 4. High Drive Speed Cutout Height

High Drive Speed Cutout Height	Drive Speed Reduction
40.5 in (1 m)	3.0 mph — 0.5 mph (4.8 kph — 0.8 kph)

With the **platform in the stowed position**:

1. Drive the machine on a grade, not to exceed the rated gradeability, and stop to make sure the drive motor brakes hold.
2. Check the tilt indicator light to verify proper operation. The light should be illuminated if tilted beyond allowed settings shown in the table below.

Note: When the tilt indicator warning is activated, drive and lift up functions are disabled and the platform must be fully lowered (stowed) to drive.

Table 5. Maximum Allowable Operating Slope

Mode	Tilt Setting (Front to Back)	Tilt Setting (Side to Side)	Maximum Platform Elevation
Indoor Mode	3.0°	2.5°	Stowed — 15 ft (Stowed — 4.6 m)
		2.0°	15 ft — 17 ft (4.6 m — 5.2 m)
		1.5°	17 ft — Full Height (5.2 m — Full Height)
Outdoor Mode	3.0°	2.5°	Stowed — 11 ft (Stowed — 3.3 m)
		2.0°	11 ft — 13 ft (3.3 m — 4 m)
		1.5°	13 ft — 15 ft (4 m — 4.6 m)

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SECTION 3
Machine Controls, Indicators, and Operation

3.1 GENERAL

NOTICE

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

This section provides the necessary information needed to understand machine controls and indicators.

⚠ WARNING

Do not raise platform unless the machine is on a smooth, firm surface, within the limits of the maximum operating slope, free of obstructions and holes.

To avoid serious injury, do not operate machine if any control levers or toggle switches controlling platform movement do not return to the off or neutral position when released.

If the platform does not stop when a control switch or lever is released, use the emergency stop switch to stop the machine.

3.2 DESCRIPTION

This machine is a Mobile Elevating Work Platform (MEWP) used to position personnel, along with their necessary tools and materials at work locations.

This MEWP has a primary operator control station in the platform. From this control station, the operator can drive and steer the machine in both forward and reverse directions, and raise and lower the platform.

The machine can be driven on a smooth, firm surface within the limits of the maximum operating slope from an elevated platform position. Refer to Machine Specifications in this manual for specific requirements.

The machine also has a ground control station that can override the platform control station. Ground controls operate lift up and down functions only. Except for performing inspections and function checks, ground controls are to be used only in an emergency to lower the platform to the ground should the operator in the platform be unable to do so.

3.3 OPERATING CHARACTERISTICS AND LIMITATIONS

3.3.1 Placards

Important points to remember during operation are provided at the control stations by DANGER, WARNING, CAUTION, NOTICE, IMPORTANT and INSTRUCTION placards. This information is placed at various locations for the express purpose of alerting personnel of potential hazards constituted by the operating characteristics and limitations of the machine. See foreword for definitions of placard safety signal words.

3.3.2 Capacities

Raising platform above horizontal with or without any load in platform is based on the following criteria:

1. Machine is positioned on a smooth, firm surface within the limits of the maximum operating slope.
2. Load is within manufacturer's rated capacity.
3. All machine systems are functioning properly.

3.3.3 Stability

This machine, as originally manufactured by JLG and operated within its rated capacity on a smooth, firm surface, within the limits of the maximum operating slope, provides a stable aerial platform for all platform positions.

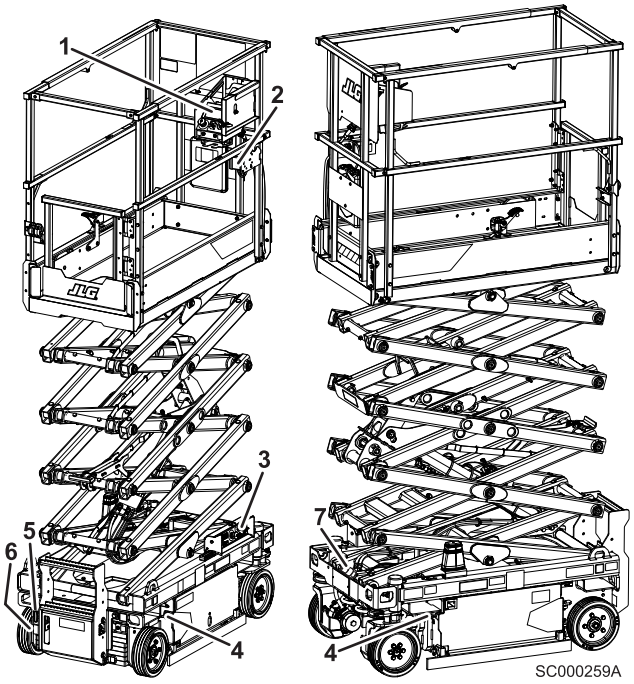
3.4 PLATFORM LOADING

The platform maximum rated load capacity is shown on a placard located on the platform billboard and is based upon the machine positioned on a smooth, firm surface within the limits of the maximum operating slope. Refer to *Section – Machine Specifications* for the maximum platform capacity.

The platform is entered through an entry gate at the rear of the platform. Keep entry gate closed at all times except when entering/exiting the platform and loading/unloading materials.

Note: It is important to remember that the load should be evenly distributed on the platform. The load should be placed near the center of the platform when possible.

3.5 MACHINE CONTROLS LOCATION



1. Platform Control Station
2. AC Plug (Platform AC Receptacle Outlet Box)
3. Ground Control Station
4. Side Compartment Door Latch
5. Platform Manual Descent
6. AC Plug (Battery Charger Input)
7. AC Plug (for Platform AC Receptacle Outlet Box)

Figure 7. Machine Controls

3.6 BATTERY CHARGING

3.6.1 Operation

Note: Park the machine in a well-ventilated area before charging.

⚠ CAUTION

Only plug the charger into a properly installed and grounded outlet. Do not use ground adaptors or modify plug. Do not touch non-insulated portion of output connector or non-insulated battery terminal.

Do not operate charger if the AC supply cord is damaged or if the charger has received a sharp blow, been dropped, or otherwise damaged in anyway.

Always disconnect the charger AC supply before making or breaking the (POS/NEG) connections to the battery.

Do not open or disassemble charger.

⚠ WARNING

If the machine is equipped with lithium-ion batteries:

Do not use an additional battery heater or heater blanket in cold weather conditions.

Only use the JLG-installed 24 V charger, which has been rated specifically for this machine and battery type, to charge the batteries. Do not substitute this charger for a different charger. Doing so will void the machine warranty.

If any damage to the batteries is discovered during machine inspection, discontinue use immediately. Do not use the machine until the issue has been inspected and corrected by a qualified mechanic.

The battery charger AC input plug is located at the rear left corner of the machine. A cutout is present on the ladder in order to view the charger LEDs.

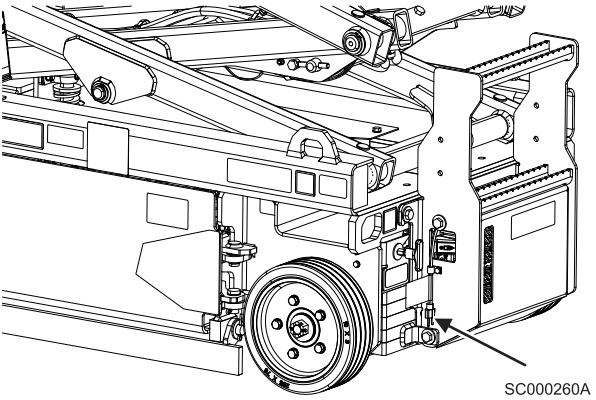


Figure 8. Battery Charger AC Input Plug

1. Connect the charger AC input plug to a grounded outlet using a 3 wire heavy duty extension cord.

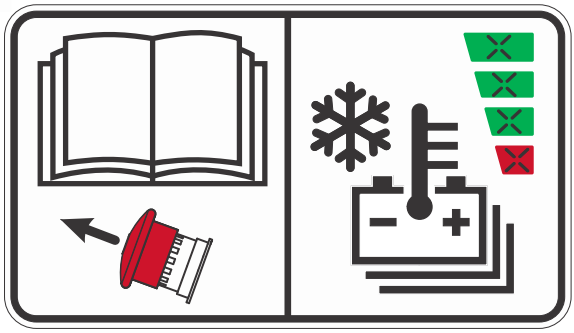
2. After connecting the charger to an AC outlet at the start of the charging cycle, verify normal operation of the LED indicators on the charger. Refer to Charger Indicator LEDs for more information.

Note: Current battery charge state can also be seen on the platform control station panel LEDs or the MDI indicator (if equipped) on the ground control station when machine is powered up.

3. The batteries are fully charged when all three green LED indicators on the platform control station or MDI battery charger status panel are illuminated.

Note: If the charger is left plugged in, the charger will automatically restart a complete charge cycle if the battery voltage drops below a minimum voltage, or if 30 days has elapsed.

3.6.2 Lithium-Ion Batteries (If Equipped)



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Machine operation may be limited if the lithium-ion battery is too cold.

Temperature	Functions	Behavior
Normal Battery Temperature (32°F/0°C)	Full machine operation	—
Chilled Battery Temperature (-10°F/-23°C)	Machine lift and drive functions operate at creep speed	Battery heater will activate. The system fault indicator will flash and an active DTC will appear for the battery heater. Once battery reaches normal temperature, full machine operation is restored.
Very Cold Battery Temperature (-22°F/-30°C)	Machine will not lift or drive	Battery heater will activate. The system fault indicator will flash, an active DTC will appear for the battery heater, and the battery charge indicators on the platform control box will flash simultaneously. Once the battery achieves an internal temperature permitting machine operation at creep speed, the platform and ground alarms will sound three times, and the battery charge indicators will show the current state of charge.

Note: For machines equipped with lithium-ion batteries, if the machine is being used, stored, or sitting overnight in a cold environment, plug in the machine to keep the batteries full and warm. If it is not plugged in, the batteries may be cold and will need to warm up before the machine can fully function. The battery heater is operational when the machine is powered on (both emergency stop switches pulled out and the keyswitch positioned to either ground or platform) or when the machine is charging.

If the machine is equipped with lithium-ion batteries, battery charging is a function of the battery cell temperature. Refer to the table below for details.

Table 6. Battery Heater Ranges (Lithium-Ion Only)

Cell Temperature Range			
Temperature Range Limits		Lithium-Ion with Heater	
Temp °C	Temp °F	Charge	Discharge
> 0	> 32	Yes	Yes
> -18	> 0	Yes *	Yes *
> -35	> -31	Yes *	No

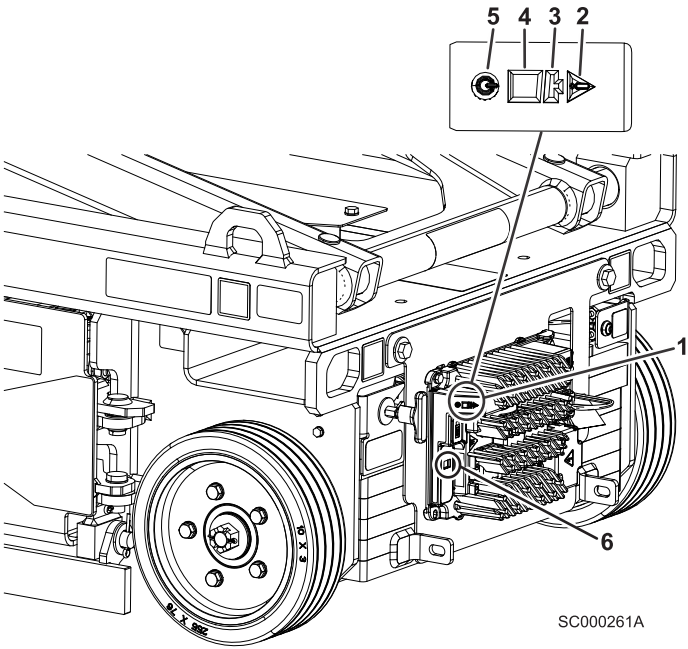
* The battery heater turns on while charging at a cell temperature below 41°F (5°C) and shuts off at 59°F (15°C).

Note: The battery heater will raise the temperature of the battery at a rate of approximately 2°F (1°C) per minute.

Note: In order for the battery heater to operate, the battery state-of-charge must be 5% or greater if the machine is not actively charging. If the machine is actively charging, the battery heater is able to operate at any time.

3.6.3 Delta-Q (650 W) Charger Indicator LEDs

Note: Some components are removed for illustrative clarity.



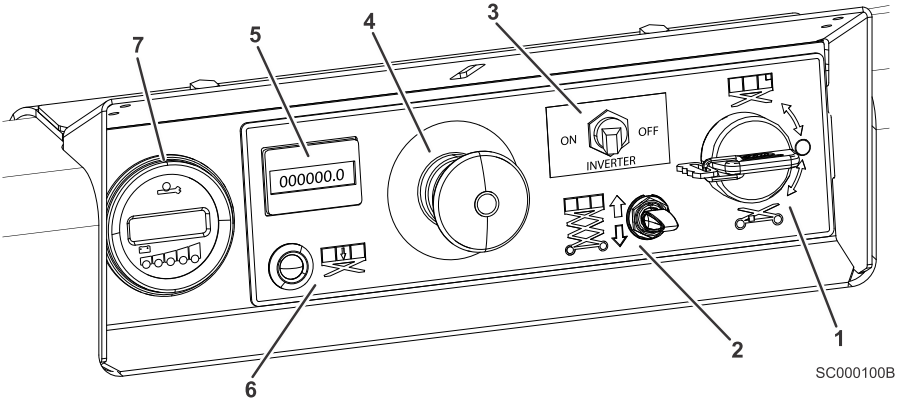
1. Charge Indicator LED Panel
2. Fault Indicator LED (Red or Amber)
3. Battery Charging LED 1 (Green)
4. Battery Charging LED 2 (Green)
5. AC Power LED (Blue)
6. Seven Segment Display

- **AC Power On:** blue LED (**5**) solid
- **Low State of Charge:** green LED 2 (**4**) flashing, green LED 1 (**3**) off
- **High State of Charge:** green LED 2 (**4**) solid, green LED 1 (**3**) flashing
- **Charge Complete:** green LED 2 (**4**) and green LED 1 (**3**) solid
- **Fault Indicator:** red LED (**2**) solid, (**6**) displays a “F”
- **External Error Condition Caution:** amber LED (**2**) flashing, (**6**) displays an “E”

- **Battery Heater Active:** red LED (**2**) solid, green LED 2 (**4**) flashing, (**6**) displays an “H”

Note: If the seven segment display shows an “F” or “E,” consult the service manual for more information.

3.7 GROUND CONTROL STATION



1. Ground/Platform/Off Key Selector Switch

2. Platform Lift/Lower Switch

3. Inverter On/Off Switch (If Equipped)

4. Ground Emergency Stop Switch

5. Hourmeter

6. Overload Indicator

7. Multifunction Digital Indicator (MDI) (If Equipped)

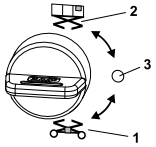
3.7.1 Ground Control Station Functions

Ground Emergency Stop Switch
Power is turned on by pulling the switch out, and is turned off by depressing switch. A two-position, red, mushroom-shaped emergency stop switch, when positioned to on with the key selector switch positioned to ground, furnishes operating power to the ground control station key switch. In addition, the switch can be used to turn off power to the function controls in the event of an emergency.

⚠ WARNING

Do not operate from ground control station with personnel in the platform except in an emergency.

Ground/Platform/Off Key Selector Switch



The key selector switch on the ground control station directs electrical power to the desired control station.
With the switch turned to the ground position (**1**), power is supplied to the controls at the ground control station. When the switch is turned to the platform position (**2**), power is supplied to the controls at the platform control station. The switch should be set to the off position (**3**) when not using machine or parking the machine overnight.

Hourmeter

The machine is equipped with an hourmeter to indicate the number of hours the machine has been operated.



Inverter On/Off Switch (If Equipped)

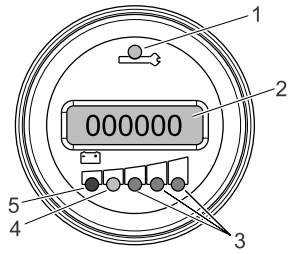
When switched on the inverter converts the DC voltage stored in the on-board batteries to AC voltage for use at the AC receptacle outlet mounted on the platform rail.

MDI (If Equipped)

The multifunction digital indicator (MDI) displays a battery discharge indicator (BDI), a system distress LED, and a LCD display showing diagnostic trouble codes (DTC) when a functional problem occurs with the machine.
When a problem occurs and a DTC is displayed:

- LED wrench icon (**1**) illuminates.
- A three to five digit DTC will display on the LCD display (**2**) below the wrench icon.

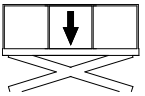
Note: When more than one DTC exists, each DTC will be displayed on the LCD for three seconds before changing to the next DTC. Once the last active DTC is displayed, the display will recycle indefinitely until the DTCs are corrected.



1. System Fault LED Indicator (red LED)
2. DTC Display
3. 100% Battery Charge Indicator (green)
4. Battery Charge Low Indicator (yellow)
5. Battery Re-Charge Indicator (red)

Also located on the MDI are battery discharge indicators (BDI) (**3**, **4**, **5**). The three green LEDs indicate the level of charge (voltage) remaining in the batteries.
BDIs display under normal operating conditions. When a DTC exists other than 00x DTCs, the BDI LEDs are not displayed. Additionally, when the platform is elevated and the machine is driving in creep mode, the turtle icon is displayed.

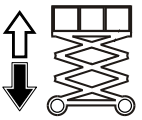
Overload Indicator (LSS)
The overload indicator indicates when the platform has been overloaded. An audible alarm will also signal when the platform is overloaded.



Note: If the overload indicator is illuminated, further elevation will be prevented. Reduce the weight in the platform to not exceed the rated workload indicated on the capacity decal, then the controls will work again.

Note: When ambient temperatures are below freezing, the LSS will have a reduction in available capacity. This will trigger the LSS before achieving the maximum allowable capacity.

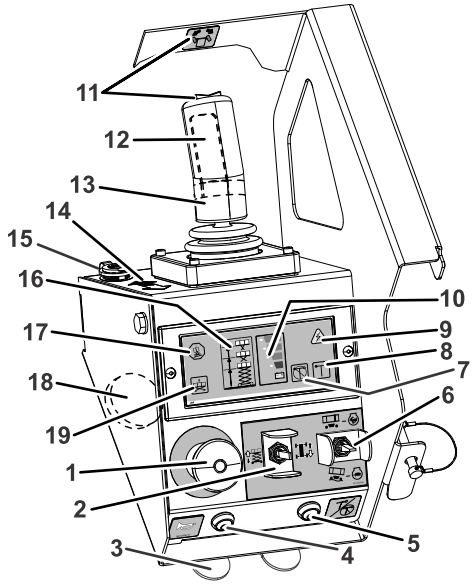
Platform Lift/Lower Switch
A three-position momentary contact lift control switch provides raising and lowering of the platform from the ground control station.



Note: There will be a brief delay between switch activation and movement of the platform.

When operating platform from the ground controls, activate the lift/lower switch to up position and hold to raise platform, or down position and hold to lower an elevated platform. Release to stop all movement.

3.8 PLATFORM CONTROL STATION



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1. Emergency Stop Switch

2. Lift/Drive Select Switch

3. Mobile Phone Cradle

4. Horn Button

5. Indoor/Outdoor Operation Mode Switch

6. Drive Speed Select Switch

7. Indoor Mode Capacity Indicator

8. Outdoor Mode Capacity Indicator

9. System Fault Indicator

10. Battery Discharge Indicator

11. Steer Control Switch and Decal

12. Trigger Enable Switch

13. Joystick Controller

14. Black/White Directional Arrow

15. USB Port

16. Variable Tilt - Platform Restricted Height Indicator

17. Tilt Indicator

18. Alarm

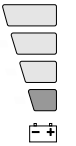
19. Overload Indicator (LSS)

3.8.1 Platform Control Station Functions

Alarm
This alarm mounted on the front of the platform control station will sound for various machine conditions or warnings such as a system ready chirp or if the machine tilt warning is activated.

Arm Guards (If Equipped)
If the machine is equipped with electronic arm guards, the platform will stop lowering at a predetermined height and the machine's beacons will flash at a different rate to warn ground personnel. The machine can continue lowering after a three second delay and re-engaging the lowering function. Once the lowering function is re-engaged an audible alarm will sound. After a 1.5 second delay, the platform will continue lowering.

Battery Charge Indicator
The battery charge indicator displays the current charge status of the onboard batteries.



- Red LED flashing = batteries depleted
- Red LED on solid = batteries low
- Red LED on and green LEDs on = batteries full charge

Drive/Lift/Steer Joystick Control
Trigger (Enable) Switch - This trigger switch is located on the back of the joystick controller. It acts as an enable and must be depressed before operating the drive, steer, and lift functions. When released, the function in operation will stop.
The speed on all selected functions is proportionally controlled by the distance from the neutral (center) position of the joystick controller.

Note: Once the trigger switch is pressed, the operator has five seconds to begin operating a function. After five seconds, the trigger switch must be released and pressed again to operate a joystick function.

Note: If the machine is also equipped with a footswitch, press the footswitch in conjunction with the trigger (enable) switch located on the joystick controller. Power is removed from the platform controls when the footswitch is released.

Steer Switch - The steer switch is a thumb-operated switch located at the top of the joystick controller handle. Pressing the switch to the right will steer the wheels to the right. Pressing the switch to the left will steer the wheels to the left.

Joystick Controller - This controls drive and lift.

Emergency Stop Switch

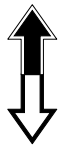
Note: Both the ground and platform emergency stop switches must be set to on in order to operate the machine.

When power is directed to the platform from the ground control station, the platform emergency stop switch is turned on by pulling the switch out (on), and is turned off by pushing the switch in (off). The two-position, red, mushroom-shaped emergency stop switch functions to provide power to the platform control station and also to turn off power to machine functions in the event of an emergency.

NOTICE

Always position emergency stop switch to off position (pushed in) when machine is not in use.

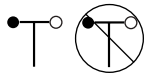
Forward/Reverse/Lift/Lower Direction Arrow
This decal indicates the proper direction to mount the platform control box, with the black arrow pointing to the front of the machine. The black/white arrow also indicates the direction to move the joystick control per the lift/drive selector switch decal for the lift and the drive select functions.



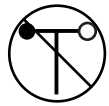
Horn
This push-button switch, when pressed, permits the operator to warn job site personnel when the machine is operating in the area.



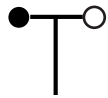
Indoor/Outdoor Operation Indicator
The Indoor (GREEN) indicator and the Outdoor (YELLOW) indicator displays which mode the machine is currently set to operate in.



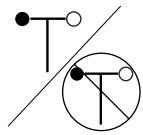
The Indoor Operation Indicator displays when Indoor Operation mode is selected. Indoor Mode is to be used in areas defined for INDOOR USE.



The Outdoor Operation Indicator displays when Outdoor Operation mode is selected. Outdoor Mode is to be used in areas defined for OUTDOOR USE.



Indoor/Outdoor Operation Mode Switch
This button will toggle between the indoor/outdoor operation modes.



Note: INDOOR USE is use of a MEWP in areas shielded from wind so that there is no wind. OUTDOOR USE is use of a MEWP in an environment that can be exposed to wind.

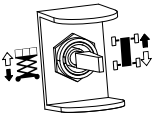
Prior to selecting Indoor Mode, ensure the machine will be used in an area that is shielded from wind so that there is no wind.

CE/UKCA machines only: To switch from one mode to another, the platform must be in the stowed position. If the mode switch is pressed while the machine is elevated, the indicator will flash but the machine state will not change.

⚠ WARNING

Do not operate the machine in INDOOR MODE while in OUTDOOR USE. Follow all information on the platform capacity decal for the selected operating mode. Failure to comply could result in machine tip over, personal injury, or death.

Lift/Drive Select Switch

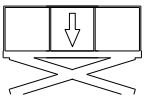


Note: When selecting between the lift and drive functions the joystick control must be returned to the neutral position for approximately 1/2 second before the function change is operable.

This toggle switch is used to select operation of either the drive or lift function. After selecting a function, the joystick controller must be used in order to activate that function. Only change the function selected with the joystick in the neutral position. Otherwise, the function selected will not change until the joystick is returned to the neutral position.

Overload Indicator (LSS)

The Overload Indicator indicates when the platform has been overloaded. An audible alarm will also signal when the platform is overloaded.



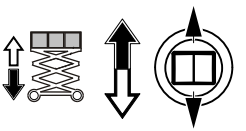
Note: If the Overload Indicator is illuminated, further elevation will be prevented. Reduce the weight in the platform to not exceed the rated workload indicated on the capacity decal, then the controls will work again.

Note: When ambient temperatures are below freezing, the LSS will have a reduction in available capacity. This will trigger the LSS before achieving the maximum allowable capacity.

Mobile Phone Cradle

Provides an enclosed area for mobile phones in the platform.

Raising and Lowering Platform

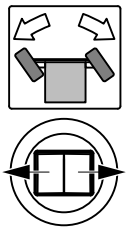


1. If the machine was shut down, place the key selector switch to the platform position.
2. Position both emergency stop switches to the on position.
3. Position the lift/drive select switch to lift.
4. Squeeze and hold the trigger switch, and move the joystick back (platform up - white arrow direction) or move the joystick forward (platform down - black arrow direction) and hold until desired elevation is reached. Releasing the trigger switch or moving the joystick back to its center position will stop the function being operated.

Steering

On the platform control station, position the lift/drive select switch to the drive position.

To steer the machine, engage trigger switch and the thumb operated steer rocker-switch on the joystick handle. Press to the right for steering right, or to the left for steering left. When released, the switch will return to the center-off position and the wheels will remain in the previously selected position. To return the wheels to the center position, the switch must be activated in the opposite direction until the wheels are centered.



Steering And Traveling

1. Place key selector switch at the ground control station to platform operation.
2. Position both emergency stop switches to the on position.

⚠ WARNING

Do not drive with platform raised except on a smooth, firm surface, within the limits of the maximum operating slope, free of obstructions and holes.

To avoid loss of travel control or upset on grades and side slopes, do not drive machine on grades or side slopes exceeding those specified in Section 6.

Before driving, locate the decals with the black/white orientation arrows on the chassis and the platform controls. Move the joystick in the direction of the black or white arrow that matches the color of the arrow on the chassis for the intended direction of travel.

If the tilt indicator warning light/alarm is activated while driving with platform raised, lower platform completely and drive to a smooth, firm surface, within the limits of the maximum operating slope.

System Fault Indicator

When this indicator light is flashing, a system fault has occurred, possibly stopping machine operation.

Check the MDI indicator (if equipped) on the ground control station to see if a DTC is displayed.

If the code cannot be cleared by the operator, the machine will require service by a qualified JLG mechanic.



Tilt Indicator Warning Light and Alarm

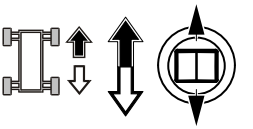
A red warning light on the control panel illuminates and an audible alarm sounds when the chassis is at or beyond the tilt cutout settings.



⚠ WARNING

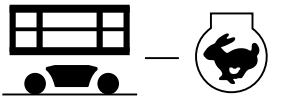
If the tilt indicator warning light/alarm is activated when platform is raised, lower platform and drive to a smooth, firm surface, within the limits of the maximum operating slope.

Traveling Forward And Reverse
Position the platform lift/drive select switch to drive/steer position. Squeeze the trigger switch on front of the joystick and move the joystick forward to drive forward, or backward to drive in reverse. The drive system is proportional: for additional drive speed, push the joystick further from the neutral position in the direction of travel. Releasing the trigger switch or returning the joystick to center will stop machine movement.

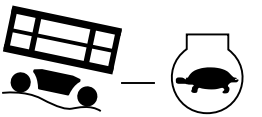


Note: To ensure proper operation of the desired platform function, move the joystick in the direction of the black or white arrow that matches the color of the arrow on the chassis for the intended direction of travel.

Drive Speed Select Switch
The two position speed switch controls high or low range drive speed. High speed would be used in unobstructed open, flat, and level work areas. Low speed would be used in close work areas with obstacles, other machinery or personnel to avoid.

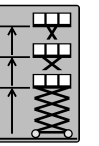


Note: Drive speed will automatically be reduced to low drive when the platform is raised above the stowed position, regardless of speed switch position.



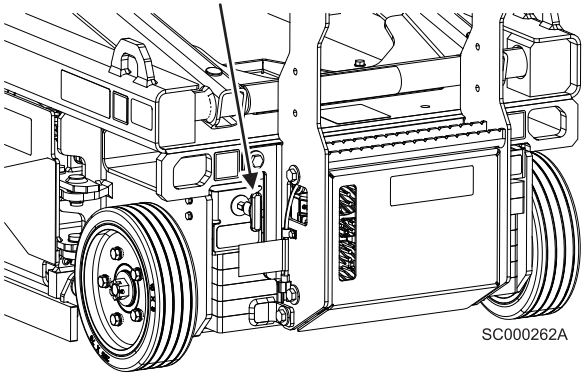
USB Port
Provides a USB port in the platform.

Variable Tilt - Platform Restricted Height Indicator
This indicator shows the maximum allowable platform elevation when the machine is within the limits of the variable tilt envelope. When activated, allowable platform height will be shown in one of three height ranges, depending on the amount of tilt detected by the machine's tilt sensor. Refer to the Tilt Activation Setting table in Section 2 for tilt angle - platform operating height restrictions.



3.9 PLATFORM MANUAL DESCENT CONTROL

Use the platform manual descent control in the event of total power failure to lower the platform using gravity. The manual descent control T-handle is located on the left rear corner of the machine beside the ladder.



To lower the machine:

1. Locate the manual descent control red T-handle.
2. Grasp the T-handle and slowly pull out to lower the scissor arms/platform. When the platform is lowered to desired level, allow the T-handle to return to its closed position.

⚠ WARNING

Keep hands and arms out of the path of the scissor arms and platform while lowering.

3.10 PLATFORM EXTENSION

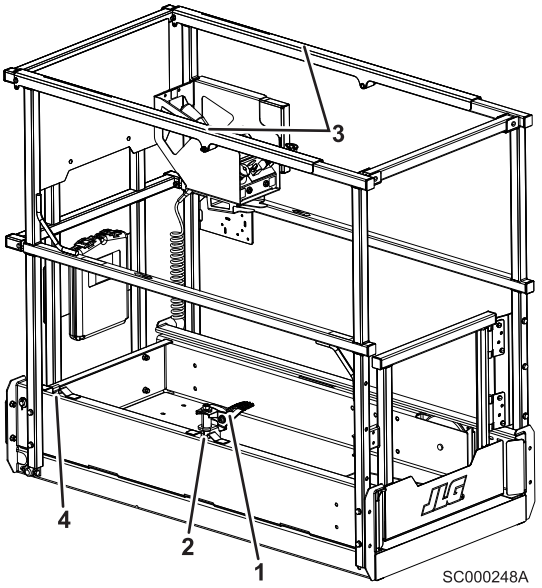
This machine is equipped with an extension deck that allows the operator better access to certain work areas. The deck extension adds length to the front of the platform.

⚠ WARNING

For maximum capacity of the deck extension, see Machine Specifications section or refer to the capacity placard on the platform billboard.

⚠ CAUTION

Do not lower without completely retracting the platform extension.



To extend the deck:

1. Press foot down on locking mechanism lever (**1**) until it clears the rear platform extension lock (**2**).
2. While holding the lever, grasp the top handrails (**3**) and push forward until the locking mechanism pin locks into the forward platform extension lock (**4**).

To retract the deck:

1. Press foot down on locking mechanism lever (**1**) until it clears the forward platform extension lock (**4**).
2. Grasp the top handrails (**3**) and pull back until it the locking mechanism pin locks into the rear platform extension lock (**2**).

3.11 GRADE AND SIDE SLOPE

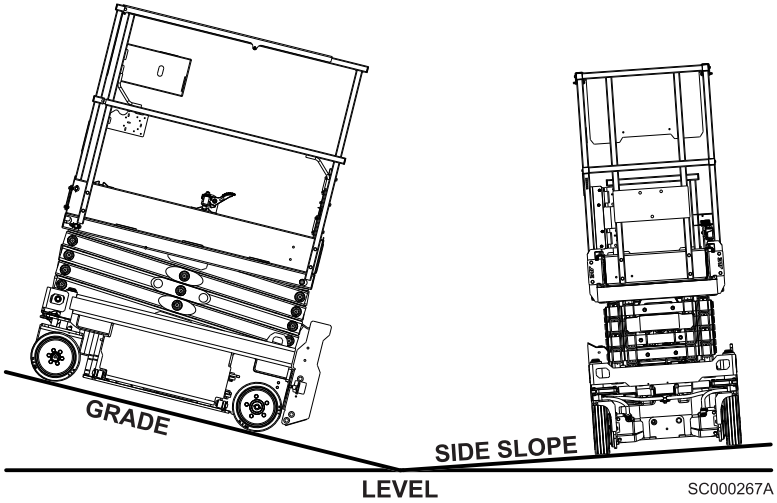


Figure 9. Grade and Side Slope Defintion

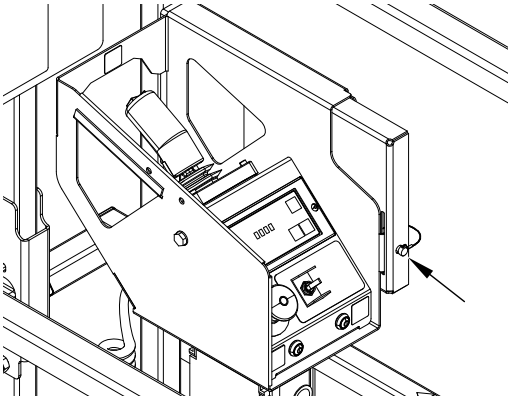
3.12 PARKING AND STOWING MACHINE

1. Drive the machine to a well-protected and well-ventilated area.
2. Ensure the platform is fully lowered.

NOTICE

When the machine is shut down for overnight parking or battery charging, the emergency stop and power select switches must be positioned to off to prevent draining the batteries.

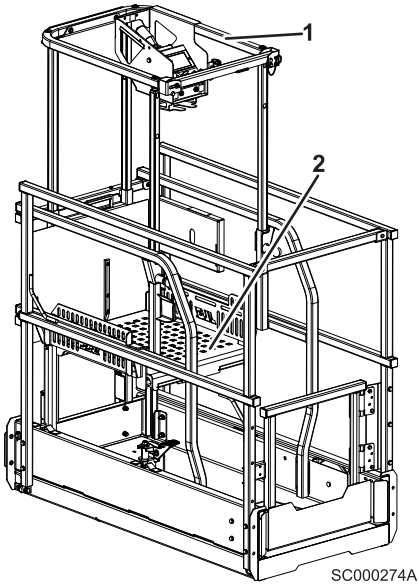
3. At the ground control station, turn the platform - ground selector key switch to OFF and remove the key to disable the machine and prevent unauthorized use.
4. At the ground control station, depress emergency stop switch to the off position.
5. If necessary, cover the platform control box, instruction placards, caution and warning decals so that they will be protected from hostile environment.
6. Chock at least two wheels when parking the machine for an extended period of time.



Note: For added protection, the platform control station can be secured to its mounting plate.
Additionally, the side compartment doors can be secured by placing a padlock through the holes provided just below the door latch on each door.

3.13 FIXED RAILS WITH INTEGRATED MID-RAIL DECK (IF EQUIPPED)

The machine may be equipped with a mid-rail deck device integrated into the rails and platform design. It consists of a fold-out deck and a retractable handrail installed on the middle rail of the platform. Platform functions may be operated when an operator is standing on the mid-rail deck.



1. Retractable Handrail
2. Mid-Rail Deck

Figure 10. Component Identification

Note: This device is only available in ANSI and CSA markets.

3.13.1 Preparation and Inspection

NOTICE

Use this device only on approved models.

- Inspect the device for loose or missing parts and any visible damage or excessive wear. Make sure all parts are securely fastened.
- Inspect decals for cleanliness and legibility. Replace any missing or illegible decals.

3.13.2 Platform Capacity

NOTICE

When equipped with the integrated mid-rail deck, machine capacity and specifications will vary from values indicated on the serial number plate. Refer to the capacity decal on the machine or the Platform Capacities table in section 6 for additional information.

3.13.3 Operation

⚠ WARNING

Do not store tools or other objects on this device.

⚠ WARNING

Personnel in the platform must wear a full body harness with a lanyard attached to an authorized lanyard anchorage point at all times while using the device. Do not use the handrail as a lanyard attachment point.

⚠ WARNING

Only one person at a time may use the device.

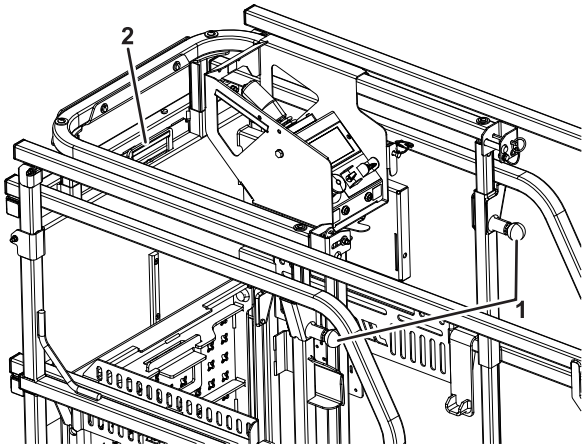
⚠ WARNING

Make sure mid-rail deck release pins are fully inserted and deck is fully supported prior to use. Make sure the handrail is in the up position and all spring pins are fully inserted prior to use.

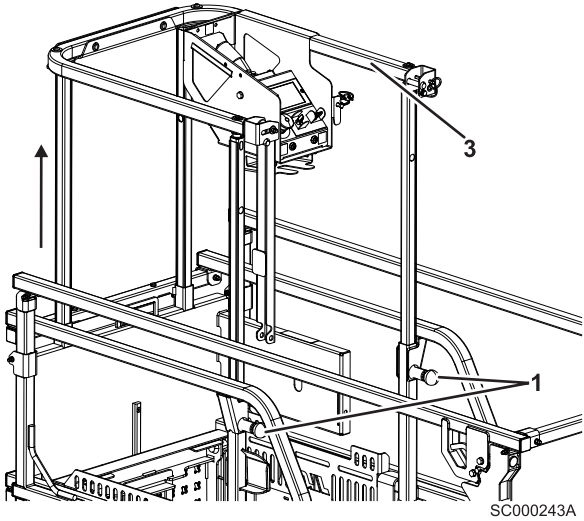
NOTICE

Make sure the device is in the stowed position when it is not in use.

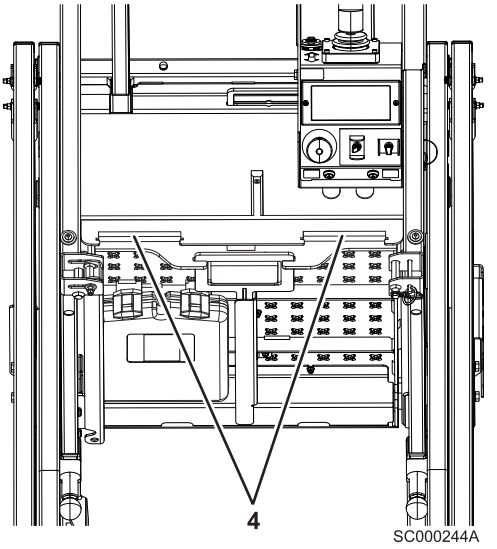
1. If platform functions will be operated while an operator is standing on the mid-rail deck, move the platform control box to the top right rail of the retractable handrail. If not, move the platform control box to another location while the mid-rail deck is set up for use.



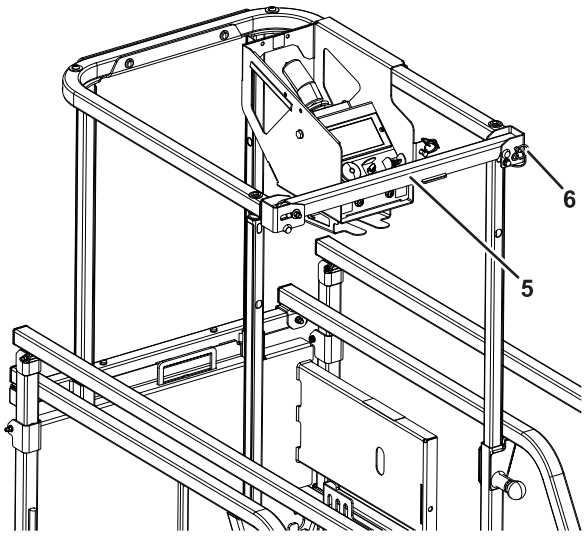
2. Pull and turn both spring knobs (**1**) a quarter turn. Pull the yellow handle (**2**) at the top of the platform billboard to release the handrail's internal spring pins.



3. Raise the handrail (**3**) until the handrail's internal spring pins lock into place with an audible click. Pull and turn both spring knobs (**1**) a quarter turn to re-engage and lock them.



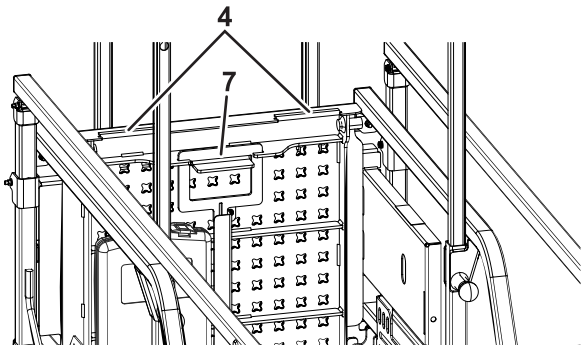
4. Lift up the deck using the lifting points (**4**) until it reaches the top of the inner deck rail and the deck's internal spring pins lock into place with an audible click. Lower the deck until it rests on the deck holds at mid-rail. The inner rails will guide the deck into place.



5. Once the operator enters the deck area, lift up the drop rail (**5**) and secure with the pin (**6**). It may be necessary to push the drop rail slightly forward while lifting it to clear the front of the pin before securing.

⚠ WARNING

Use caution when entering/exiting the deck. The drop rail must be secured with the pin whenever an operator is standing on the deck.



6. To stow the deck, lift it up to the vertical position using the lifting points (**4**). Pull the yellow handle (**7**). Lower the deck until it rests in the stowed position. The inner rails will guide the deck into place.

7. To lower the handrail, pull and turn both spring knobs (**1**) a quarter turn. Pull the yellow handle (**2**) at the top of the platform billboard to release the handrail's internal spring pins.

8. Lower the handrail (**3**) until the handrail's internal spring pins lock into place with an audible click. Pull and turn both spring knobs (**1**) a quarter turn to re-engage and lock them.

9. Return the platform control box to its original location.

3.13.4 Options/Accessories Relationship

The integrated mid-rail deck may be incompatible with other options or accessories available to the machine. Refer to the following table for more information.

Table 7. Options/Accessories Relationship Table

Compatible Options/Accessories(1)	Incompatible Options/Accessories
Anti-Vandalism Package, Inverter, Footswitch, Gate Latch, Perimeter Lights	SkySense
(1) Any accessory not listed under "COMPATIBLE WITH" is assumed to be incompatible.	

3.14 MACHINE LIFTING AND TIE DOWN

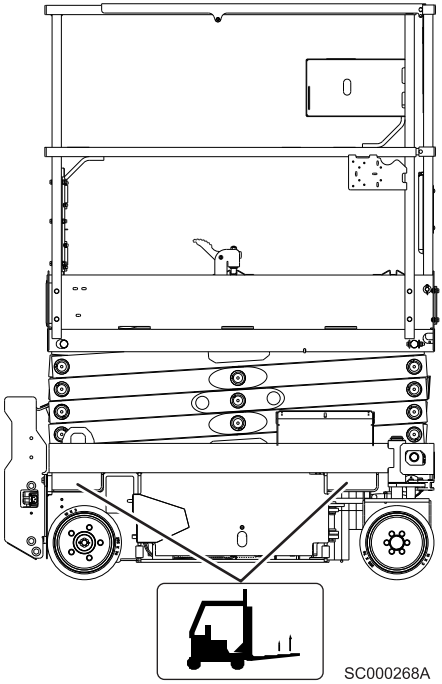


Figure 11. Forklift Pocket Locations

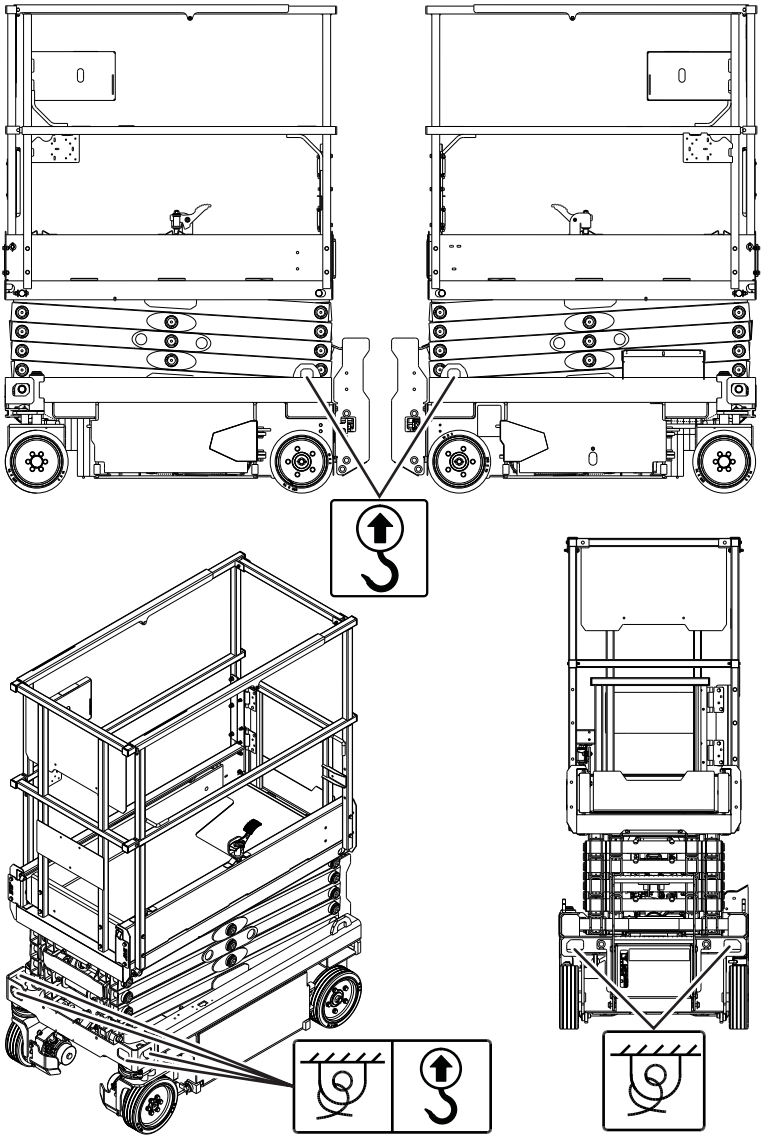


Figure 12. Lifting/Tie-Down Lug Locations

3.14.1 Lifting

The machine may be lifted using a forklift truck. Lift only using the built-in forklift pockets on the side of the machine and only with the platform in the stowed position. First adjust the width of the lifting tines to fit the machine forklift pockets. Then slide the lifting tines into the forklift pockets and carefully lift machine.

The machine can also be lifted using a spreader bar and four equal length straps or chains capable of supporting the full gross weight of the machine. Lift only using the two lifting lugs at the rear of the frame and the two lifting lugs at the front of the machine.

3.14.2 Tie Down

When transporting the machine, fully lower the platform (stowed position) and secure the machine to the truck or trailer deck. Use the tie-down lugs at the front of the machine and the two tie-down lugs at the rear of the machine.

3.15 TOWING

It is not recommended to tow this machine except in the event of an emergency such as a machine malfunction or total machine power failure. In the event of an emergency, the machine is equipped with a push button to release the brakes for towing.

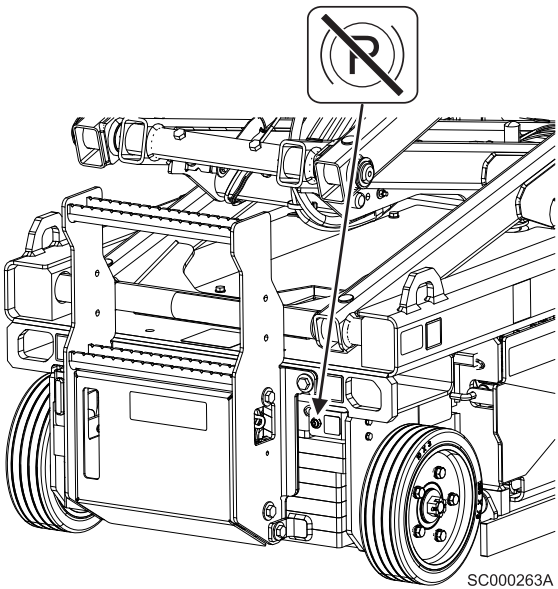


Figure 13. Brake Release Button

1. Lower the platform to the stowed position. Chock wheels or secure machine with tow vehicle.

2. At the ground control station, pull out the emergency stop switch and position the key selector switch to ground mode.

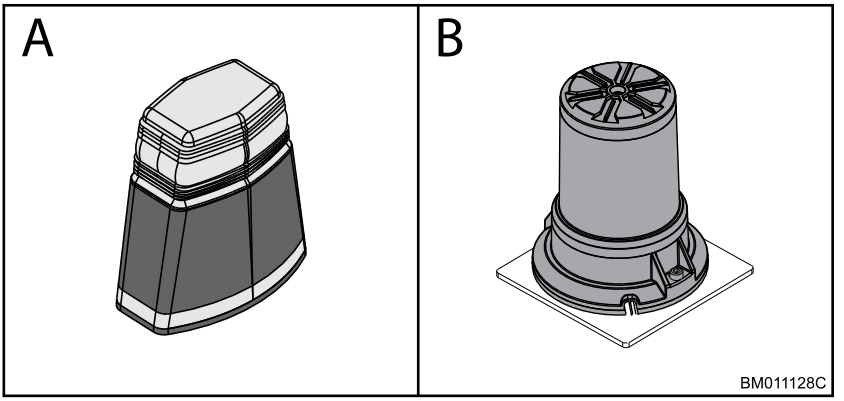
3. Press and hold the yellow button at the right rear of the machine for one second to release the brakes. The alarm will sound.

4. To reset the brakes, press the yellow button again, or press the emergency stop switch.

3.16 LEAK CONTAINMENT

The Leak Containment system features custom-fit trays to capture leaks and drips from machine components.

3.17 BEACONS



A. LED Motion / Amber Beacon (CS550)

B. Beacon

Note: Image for reference only. Beacon design may vary based on beacon type, machine model and installation location.

3.17.1 ClearSky® LED Motion / Amber Beacon (CS550)

The ClearSky® CS550 is installed on ClearSky Smart Fleet™ equipped machines.

The CS550 can function as a machine beacon using multiple colors and flash patterns for communication and identification purposes. In addition to amber, colors include: red, blue, green, cyan, and white. The ClearSky Smart Fleet mobile app can command visual alerts or audible alarms to assist in machine identification.

The CS550 also functions as a visible connectivity point for ClearSky Smart Fleet. Refer to the ClearSky Smart Fleet section for more information.

3.17.2 Amber Beacon

This amber-colored beacon flashes in a consistent pattern to alert those nearby that the machine power is on. The device may also use different flash patterns to identify specific machine alerts.

3.18 CLEARSKY SMART FLEET™

ClearSky Smart Fleet™ integrates on-machine hardware with web-based software and a mobile app to provide fleet management data and analytics. Personnel with the appropriate permissions can access telematics and machine identification data using a dashboard visible in the ClearSky Smart Fleet web portal or the ClearSky Smart Fleet mobile app. (Navigation and visual configuration may vary between the web portal or mobile app.)

Features include machine monitoring such as fuel level and battery charge, remote analyzer tasks including diagnostic trouble codes or system alerts, and access control (if available) restrictions.

Refer to the Access Control and Beacons sections of this manual for more information. Visit the ClearSky section of the JLG website for more resources and information about accessing web portal or mobile app data.

3.19 ACCESS CONTROL - CLEARSKY SMART FLEET™ (IF EQUIPPED)

NOTICE

Operator access to the machine may be placed into a restricted state remotely.

If a modification to a restricted state is required, contact the ClearSky Smart Fleet™ account owner. Only authorized personnel can make changes from within the web portal or mobile app.

This machine may be equipped with ClearSky Smart Fleet Access Control. Using the ClearSky Smart Fleet mobile app or web portal (remotely or locally), the machine can be placed into restricted states that limit machine functionality for all operators.

By using this machine, the operator acknowledges Access Control functionality, including restricted states, and accounts for it in their safe use plan.

Restricted states may include:

1. Speed Restricted — Machine drive speed is restricted to low speed and lift speed is reduced.
2. Speed and Function Restricted — Machine drive speed is restricted to low speed and the platform is restricted to a fully-lowered position. In this state, once the platform is fully lowered, it is not permitted to leave that defined position.
3. Locked Out — Machine has been locked out and will not operate (including engine start, if applicable).

Note: Restricted functionality may occur if the CS550 (ClearSky® LED Motion / Amber Beacon) is damaged or removed. A protective cage is available through JLG.

Machines equipped with ClearSky Smart Fleet Access Control are also equipped with the CS550. Refer to the ClearSky Smart Fleet and Beacons sections of this manual for more information.

At time of publication, Access Control is not available for CE/UKCA markets.

3.20 SAFETY DECALS

3.20.1 Safety Decal Locations

Note: Exact size and placement of decals may vary based on machine configuration and market. Some components may be removed for illustrative clarity.

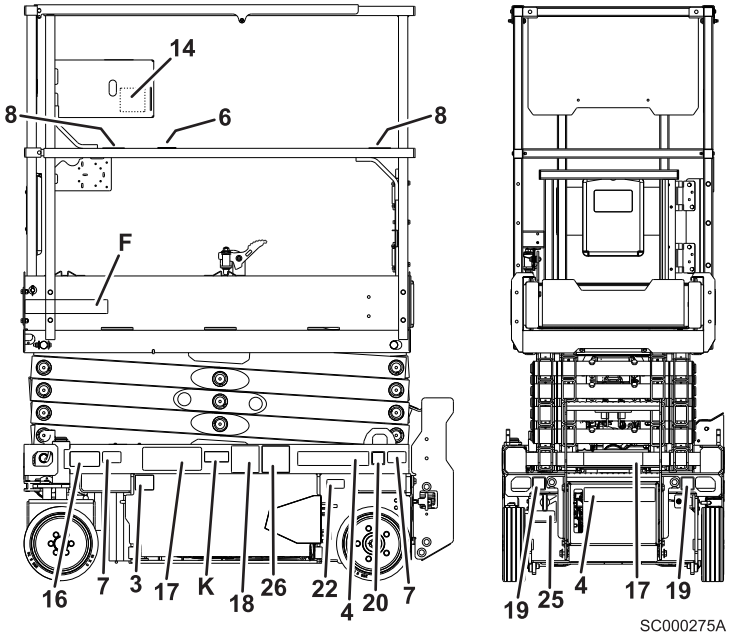


Figure 14. Decals — View 1

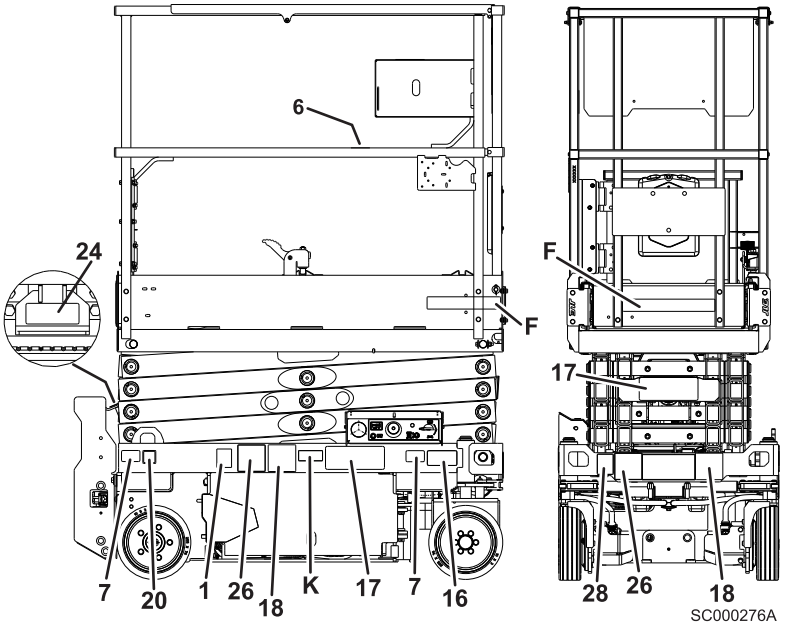


Figure 15. Decals — View 2

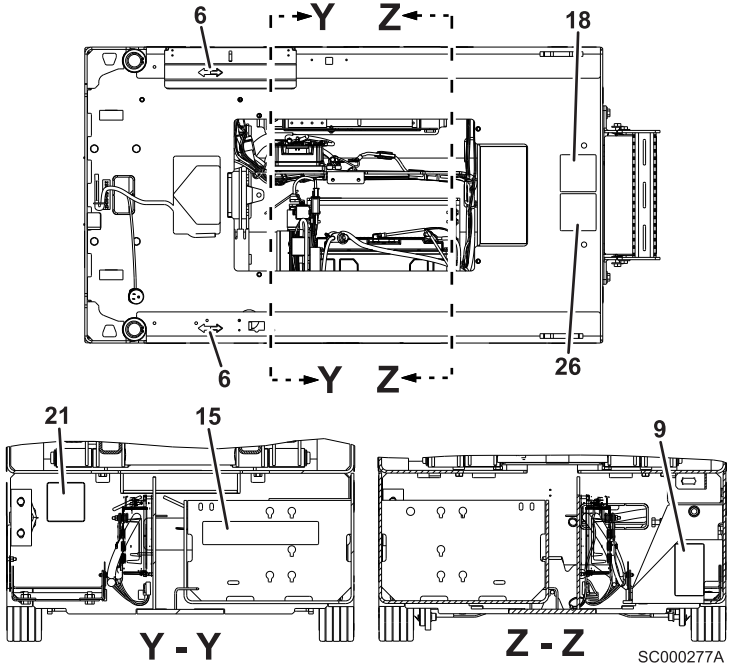
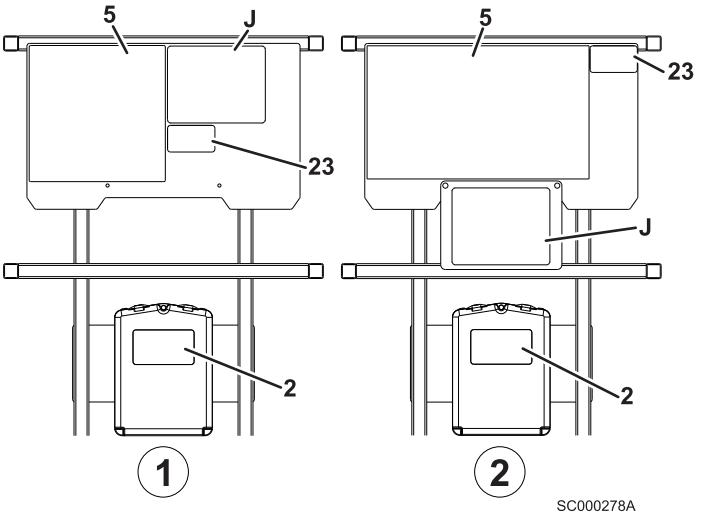
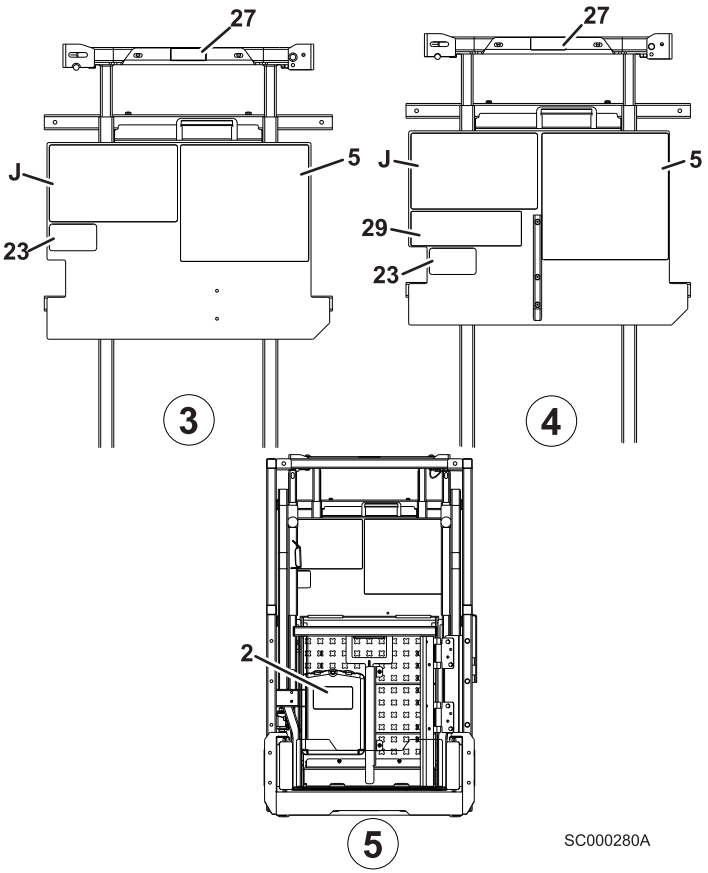


Figure 16. Decals — View 3



1. ANSI (Standard Machine)
2. CSA (Standard Machine)

Figure 17. Decals — View 4



3. ANSI (Machines Equipped with Mid-Rail Deck)

4. CSA (Machines Equipped with Mid-Rail Deck)

5. Manual Box (Machines Equipped with Mid-Rail Deck)

Figure 18. Decals — View 5

3.20.2 Safety Decal Legends

Table 8. Safety Decal Legend — Standard Machines

Item	ANSI English	English/French
1	1701504	1701504
2	1701640	1701640
3	1702155	1702155
4	1703813	1704340
5	1703816	1704684

Table 8. Safety Decal Legend — Standard Machines (continued)

Item	ANSI English	English/French
6	1703819	1703819
7	1704016	1704016
8	1704277	1704277
9	1704412	1704412
14	1001132359	1001132359
15	1001146794	1001146794
16	1001162864	1001162864
17	1001211777	1705311
18	1001211779	1001211779
19	1001212290	1001212290
20	1001212291	1001212291
21	1001223055	1001223971
22	1001228370	1001228370
23	1001231801	1001231801
24	1001237899	1001237899
25	1001248126	1001248126
26	—	1001215749
F	4420051	4420051
J	1001265839	1001265839
K	1001324377	1001324377

Table 9. Safety Decal Legend — Machines Equipped with Integrated Mid-Rail Deck

Item	ANSI English	English/French
1	1701504	1701504
2	1701640	1701640
3	1702155	1702155
4	1703813	1703813
5	1001325311	1001325311
6	1703819	1703819
7	1704016	1704016
8	1704277	1704277

Table 9. Safety Decal Legend — Machines Equipped with Integrated Mid-Rail Deck (continued)

Item	ANSI English	English/French
9	1704412	1704412
14	1001132359	1001132359
15	1001146794	1001146794
16	1001162864	1001162864
17	1001211777	1705311
18	1001211779	1001211779
19	1001212290	1001212290
20	1001212291	1001212291
21	1001223055	1001223971
22	1001228370	1001228370
23	1001231801	1001231801
24	1001237899	1001237899
25	1001248126	1001248126
26	—	1001215749
27	1001322732	1001322732
28	1001323999	1001323999
29	—	1001326514
F	4420051	4420051
J	1001324376	1001324376
K	1001324377	1001324377

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SECTION 4
Emergency Procedures

4.1 GENERAL

This section explains the steps to be taken in case of an emergency situation during operation.

4.2 INCIDENT NOTIFICATION

JLG Industries, Inc. must be notified immediately of any incident involving a JLG product. Even if no injury or property damage is evident, JLG must be contacted by telephone and provided with all necessary details.

- USA: 877-JLG-SAFE (554-7233)
- EUROPE: (32) 0 89 84 82 20
- AUSTRALIA: (61) 2 65 811111
- E-mail: productsafety@jlg.com

Failure to notify the manufacturer of an incident involving a JLG Industries product within 48 hours of such an occurrence may void any warranty consideration on that particular machine.

NOTICE

Following any incident, thoroughly inspect the machine. Do not elevate the platform until it is certain that all damage has been repaired and that all controls are operating correctly. Test all functions first from the ground control station then from the platform control console.

4.3 EMERGENCY OPERATION

4.3.1 Use of Ground Controls

NOTICE

Know how to use the ground controls in an emergency situation.

Ground personnel must be thoroughly familiar with the machine operating characteristics and the ground control functions. Training should include operation of the machine, review and understanding of this section and hands-on operation of the controls in simulated emergencies.

4.3.2 Operator Unable to Control Machine

If the platform operator is unable to operate or control the machine:

1. Other personnel should operate the machine from ground controls only as required.
2. Only qualified personnel on the platform may use the platform controls. DO NOT CONTINUE OPERATION IF CONTROLS DO NOT FUNCTION NORMALLY.
3. Rescue equipment can be used to remove the platform occupant(s). Cranes and forklifts can be used to stabilize motion of the machine.

4.3.3 Platform Caught Overhead

If the platform becomes jammed or snagged in overhead structures or equipment, do the following:

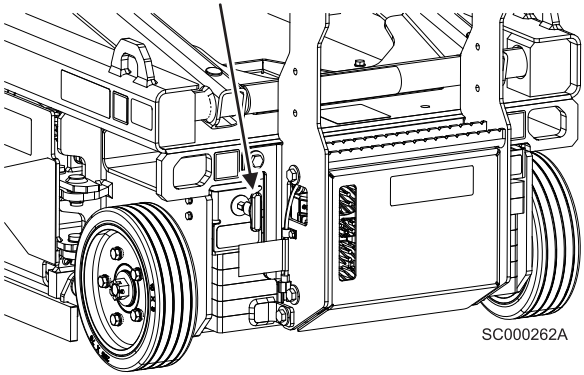
1. Shut off the machine.
2. Rescue all people in the platform before freeing the machine. Personnel must be out of the platform before operating any controls on the machine.
3. Use cranes, forklifts or other equipment to stabilize motion of the machine to prevent a tip over as required.
4. From the ground controls, carefully free the platform from the object.
5. Once clear, restart the machine and return the platform to a safe position.
6. Inspect the machine for damage. If the machine is damaged or does not operate properly, turn off the machine immediately. Report the problem to the proper maintenance personnel. Do not operate the machine until it is declared safe for operation.

4.3.4 Righting of Tipped Machine

A fork truck of suitable capacity or equivalent equipment should be placed under the elevated side of the chassis, with a crane or other suitable lifting equipment used to lift the platform while the chassis is lowered by the forklift or other equipment.

4.4 PLATFORM MANUAL DESCENT CONTROL

Use the platform manual descent control in the event of total power failure to lower the platform using gravity. The manual descent control T-handle is located on the left rear corner of the machine beside the ladder.



To lower the machine:

1. Locate the manual descent control red T-handle.
2. Grasp the T-handle and slowly pull out to lower the scissor arms/platform. When the platform is lowered to desired level, allow the T-handle to return to its closed position.

⚠ WARNING

Keep hands and arms out of the path of the scissor arms and platform while lowering.

4.5 LITHIUM-ION BATTERY (IF EQUIPPED)

Immediate actions to take if the lithium-ion battery is emitting visible gasses, fumes, smoke, or fire:

1. Do not operate the machine. Evacuate the immediate area surrounding the machine.

⚠ WARNING

Do not breathe in or contact fumes, smoke, or fire coming from a lithium-ion battery. They are extremely hot and toxic.

2. Use only a Class D fire extinguisher to extinguish a lithium-ion battery fire. Do not use water. Class A, B, or C fire extinguishers may be used on other components.
3. If required, contact local emergency response authorities to assist in mitigation.

Actions to take after the lithium-ion battery is involved in an incident or has concluded emitting visible gasses, fumes, smoke, or fire:

1. Once the battery surface temperature has dropped to ambient temperature, do not operate the machine.

2. Use only qualified personnel trained to handle damaged lithium-ion batteries utilizing the correct personal protective equipment (PPE) in accordance with employer, federal, state, and local regulations.

⚠ CAUTION

Do not contact residues from a lithium-ion battery fire without proper PPE. Residues may be toxic.

3. Move any damaged batteries or machine to an isolated area in accordance with employer, federal, state, and local regulations.

4.6 CLEARSKY SMART FLEET™ - LOCKED OUT STATE

The machine may be placed into a Locked Out state remotely through ClearSky Smart Fleet.

If the CS550 (ClearSky® LED Motion / Amber Beacon) is removed from a machine or disconnected from the control system through damage, the machine may also be placed into a Locked Out state.

NOTICE

Contact the ClearSky Smart Fleet™ account owner if the machine is in a Locked Out state.

SECTION 5
Accessories

5.1 AVAILABLE ACCESSORIES

Table 10. Available Accessories

Accessory	Market		
	ANSI (USA Only)	ANSI	CSA
Anti-Vandalism Package	x	x	x
DC/AC Power Inverter	x		
Magnetic Gate Latch	x	x	x
Perimeter Lights	x	x	x
SkySense	x	x	x
Collision Avoidance-Compatible SkySense	x	x	x
Collision Avoidance	x	x	x
Pipe Racks	x	x	x
Panel Carrier	x	x	x

Table 11. Options/Accessories Relationship Table

Accessory	Compatible With (Note 1)	Incompatible With
Anti-Vandalism Package	All	—
DC/AC Power Inverter	All	—
Magnetic Gate Latch	All	—
Perimeter Lights	All	—
SkySense	Anti-vandalism package, inverter, magnetic gate latch, perimeter lights,	Collision avoidance-compatible SkySense, collision avoidance, pipe racks, panel carrier
Collision Avoidance-Compatible SkySense	Fixed rails with integrated mid-rail deck, anti-vandalism package, magnetic gate latch, perimeter lights, inverter	Panel carrier, pipe racks
Collision Avoidance	Fixed rails with integrated mid-rail deck, anti-vandalism package, magnetic gate latch, inverter, perimeter lights	Panel carrier, pipe racks

Table 11. Options/Accessories Relationship Table (continued)

Accessory	Compatible With (Note 1)	Incompatible With
Pipe Racks	Fixed rails with integrated mid-rail deck, anti-vandalism package, inverter, magnetic gate latch, perimeter lights	Collision avoidance-compatible SkySense, collision avoidance, panel carrier
Panel Carrier	Fixed rails with integrated mid-rail deck, anti-vandalism package, inverter, magnetic gate latch, perimeter lights	Collision avoidance-compatible SkySense, collision avoidance, pipe racks
Note 1: Any accessory not listed under "Compatible With" is assumed to be incompatible.		

5.2 ANTI-VANDALISM PACKAGE

The Anti-Vandalism Package consists of two lockable covers for the Platform and Ground Control Stations that prevent unauthorized use of the machine. Locks are not provided with this kit. This accessory is available for both control stations.

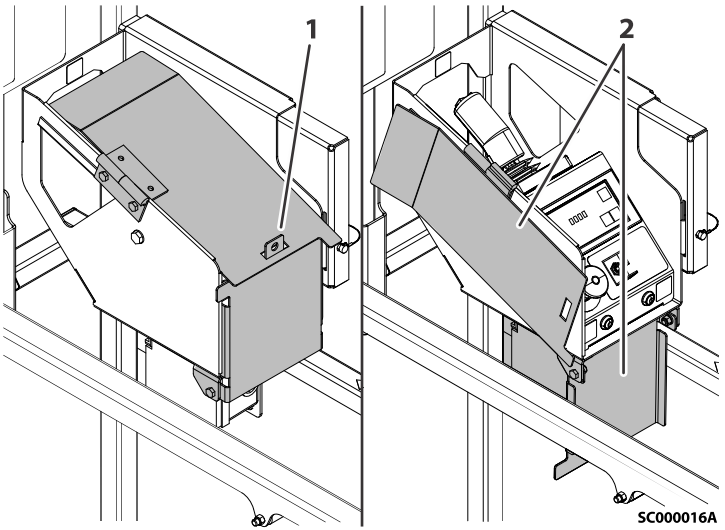


Figure 19. Platform Control Station

1. Lock Position (Covers Closed)
2. Covers Open

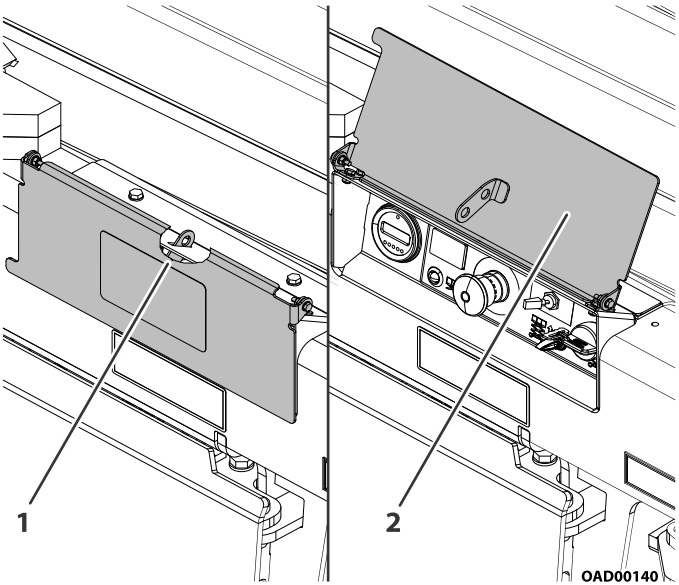


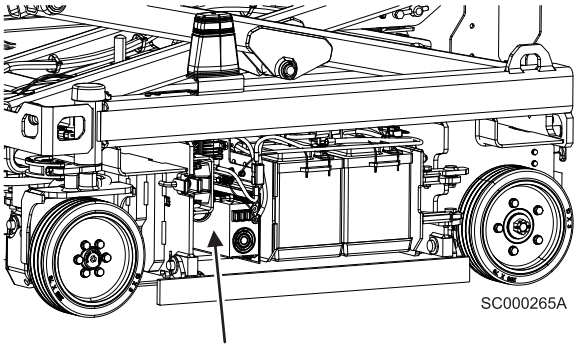
Figure 20. Ground Control Station

1. Lock Position (Cover Closed)
2. Cover Open

5.3 DC/AC POWER INVERTER

The DC to AC power inverter converts DC voltage from the onboard system batteries to AC voltage for use at the platform AC output receptacle.

The inverter module is located inside the battery compartment next to the batteries.



Note: Some components are removed for illustrative clarity.

Figure 21. Inverter Module Location

5.3.1 Specifications

Specification	Value
Electrical System Voltage (DC)	24 V
Power Inverter	Power Bright
DC Input	
DC Input Voltage	20 – 30 V DC
Operating Temperature	-4°F to 104°F (-20°C to 40°C)
AC Output	
Output Power (Continuous)	1000 W
Output Power (Surge)	2000 W
Output Power (AC)	8.33 A
Output Voltage (AC)	120 V ± 10%
Output Frequency	60 Hz
Type	Modified sine wave
Protection (Output Reverse DC Polarity)	3 x 20 A replaceable fuse

5.3.2 Safety Precautions

⚠ DANGER

This accessory may cause shock or electrocution if used improperly. Treat inverter output the same as commercial ac power.

- This inverter will only operate from a 24 V power source. Do not attempt to connect the inverter to any other power source, including any AC power source.
- Do not allow water or other liquids to contact the inverter.
- Do not use appliances with damaged or wet cords.
- Route appliance cords and extension cords to prevent accidental pinching, crushing, abrading, and tripping hazards.
- Do not use the inverter near flammable materials or in any locations that may accumulate flammable fumes or gases. This is an electrical device that can briefly spark when electrical connections are made or broken.

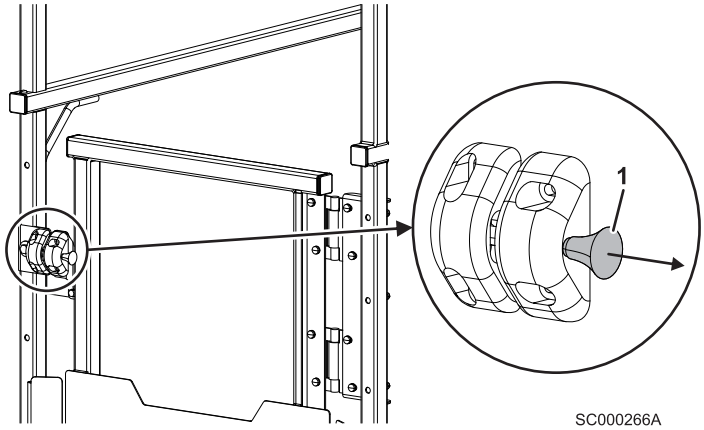
5.3.3 Operation

1. Set the inverter ON/OFF switch to the ON position at the ground control station.
2. Only plug in tools or appliances rated within the maximum output wattage at the platform AC receptacle mounted on the platform.

5.4 MAGNETIC GATE LATCH

The magnetic gate latch ensures the platform gate latches securely when the gate is closed.

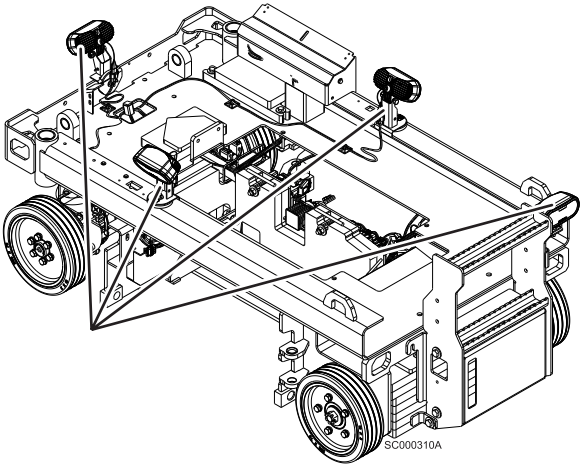
5.4.1 Operation



Pull the latch (**1**), then open the gate.

Figure 22. Magnetic Gate Latch

5.5 PERIMETER LIGHTS



The perimeter lights accessory consists of four LED lamps mounted to the chassis.

5.6 SKYSENSE®

5.6.1 General Information

⚠ WARNING

SkySense is not intended to replace or reduce the need for the operator to be aware of the environment around the machine. Hazards that will cause serious injury or death may not be prevented or reduced by SkySense. The operator must always look in the direction of travel, avoid power lines, avoid obstacles that could strike the machine or persons in the platform, and follow all instructions on machine placards and in this manual.

The operator must not rely on SkySense as a substitute for following the instructions and warnings on machine placards and in this manual.

NOTICE

Read and understand these instructions in their entirety before operating the machine.

NOTICE

SkySense is intended to assist the operator. SkySense may not detect certain objects depending on shape, type of material, or orientation of the object to the sensors. It is the operator's responsibility to be aware of their surroundings at all times.

Note: SkySense is not active when operating the machine from the ground controls.

5.6.2 Preparation and Inspection

Pre-Operation Inspection:

1. Inspect each of the SkySense tubes for dents, cracks, or other damage.
2. Inspect each SkySense sensor for any damage to the housing or sensor.

To test the SkySense system:

1. Ensure there are no obstructions within 10 feet around or above the platform and the machine is on a smooth, firm surface within the limits of the maximum operating slope.
2. From the platform control console, lift and lower the platform.
3. Place a hand or object above one of the sensors, then lift up the platform. Platform movement should stop, the LED indicator should be red, and the alarm should sound. If the alarm is muted, the mute button light should be red.
4. Release the joystick and enable switch.
5. Place a hand or object above one of the sensors. Press the override button on the notification unit and lift the platform. The platform should lift, the LED indicator should be red, and the alarm should sound. If the alarm is muted, the mute button light should be red.
6. Remove hand or object from the sensor zone, then release the joystick and enable switch. Lower the platform to stowed.
7. Lift the platform with no hand or object above the sensor. The platform should lift without interruption.
8. Lower the platform to stowed.

5.6.3 Operation

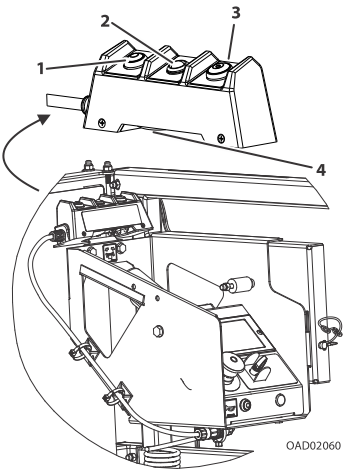
SkySense slows a machine's function speed to creep speed when it is a certain distance away from an object, known as the "warning zone." If the machine continues to approach the object and moves into the "stop zone," SkySense stops all machine functions.

For proportional functions that are activated by the joystick, the size of the warning zone varies based on the amount of joystick activation. The stop zone always activates at the same distance from the object regardless of the joystick's position.

SkySense is active during the following functions:

- Lift Up
- Drive Forward
- Drive Reverse

5.6.4 Notification Assembly



1. Override Button
2. Bi-color LED
3. Indicator Speaker OFF
4. Indicator Speaker (Underneath Unit)

5.6.5 LED Indicator

A bi-color LED indicator on the platform control box signals Sky- Sense activity.

- **No LED:** Normal operation.
- **LED Flashing Yellow:** Machine is in SkySense warning zone and will reduce to elevated drive height speed. Flash frequency correlates to closeness of the object.
- **LED Red:** Machine is in SkySense stop zone and all machine functions will cease.

- **LED Flashing Red:** SkySense sensor is obstructed or damaged. Obstructions must be removed and proper function verified. Damaged sensors must be replaced.

5.6.6 SkySense Alarm

Activation of SkySense is also signalled by an audible alarm that indicates SkySense activity when reaching the warning or stop zones.

In the warning zone, the audible alarm will pulse and increase in frequency as the machine moves closer to the object. In the stop zone, the alarm will sound a continuous tone.

Additionally, when the machine is in the stop zone, the platform control panel audible alarm will sound, indicating activation of the SoftTouch system. Reset the system by releasing the trigger switch.

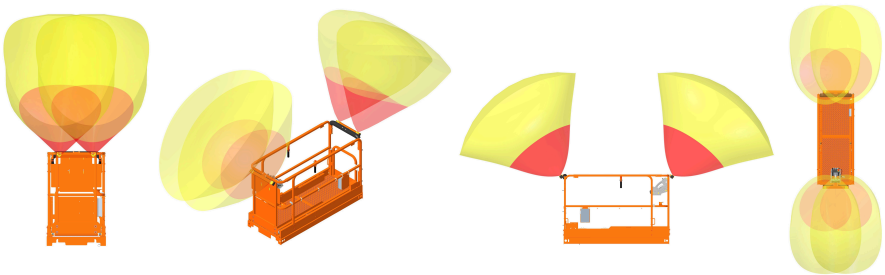
Audible SkySense alarms can be muted, although LEDs will continue to light.

5.6.7 Override Button

The yellow override button allows operators to bypass normal SkySense operation in order to move closer to an object within the stop zone.

When the operator overrides SkySense via the override button to get closer to a work surface, the machine will maintain creep speed and flash the appropriate indicator color based on location in either the warning or stop zones.

5.6.8 SkySense Coverage Areas



Level One

Note: Sensor Cones shown are approximations for reference only.

5.7 COLLISION AVOIDANCE-COMPATIBLE SKYSENSE®AND COLLISION AVOIDANCE

5.7.1 General Information

NOTICE

Collision Avoidance-Compatible SkySense and Collision Avoidance are designed to operate within the machine's default personality settings. Adjusting machine personality settings from the default values shown in the machine's Service & Maintenance manual could affect the stop distances and machine response times of these accessories.

Two versions of SkySense are available. Collision Avoidance-Compatible SkySense is identified by a decal located on the control module box. These instructions are applicable to Collision Avoidance-Compatible SkySense and its complementary accessory Collision Avoidance.

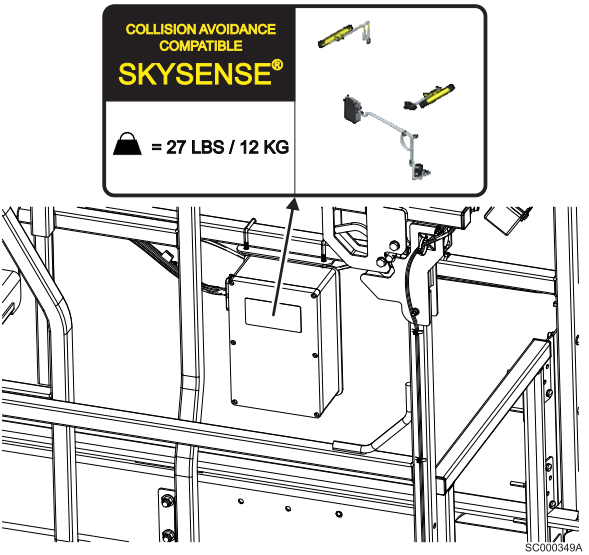


Figure 23. Collision Avoidance-Compatible SkySense Decal Location

⚠ WARNING

Collision Avoidance-Compatible SkySense and Collision Avoidance are not intended to replace or reduce the need for the operator to be aware of the environment around the machine. Hazards that will cause serious injury or death may not be prevented or reduced by these systems. The operator must always look in the direction of travel, avoid power lines, avoid obstacles that could strike the machine or persons in the platform, and follow all instructions on machine placards and in this manual.

The operator must not rely on these systems as a substitute for following the instructions and warnings on machine placards and in this manual.

NOTICE

Read and understand these instructions in their entirety before operating the machine.

NOTICE

Collision Avoidance-Compatible SkySense and Collision Avoidance are intended to assist the operator. These systems may not detect certain objects depending on size, shape, type of material, or orientation of the object to the sensors. It is the operator's responsibility to be aware of their surroundings at all times.

Note: Collision Avoidance-Compatible SkySense and Collision Avoidance are not active when operating the machine from the ground controls.

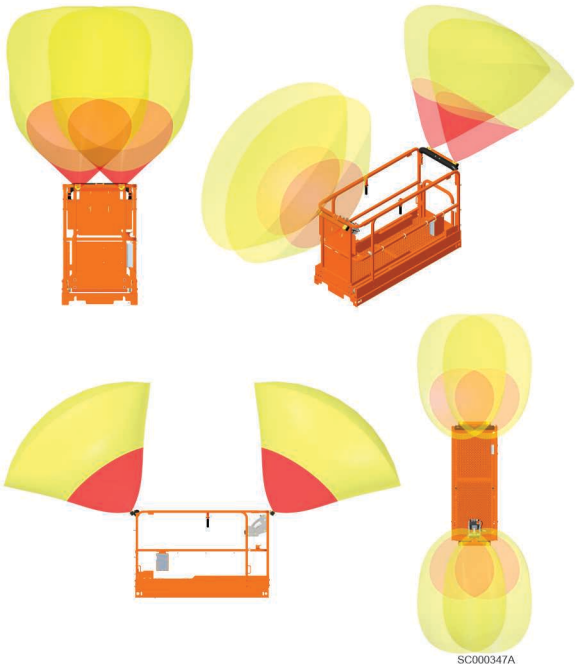


Figure 24. Collision Avoidance-Compatible SkySense Sensor Coverage Areas

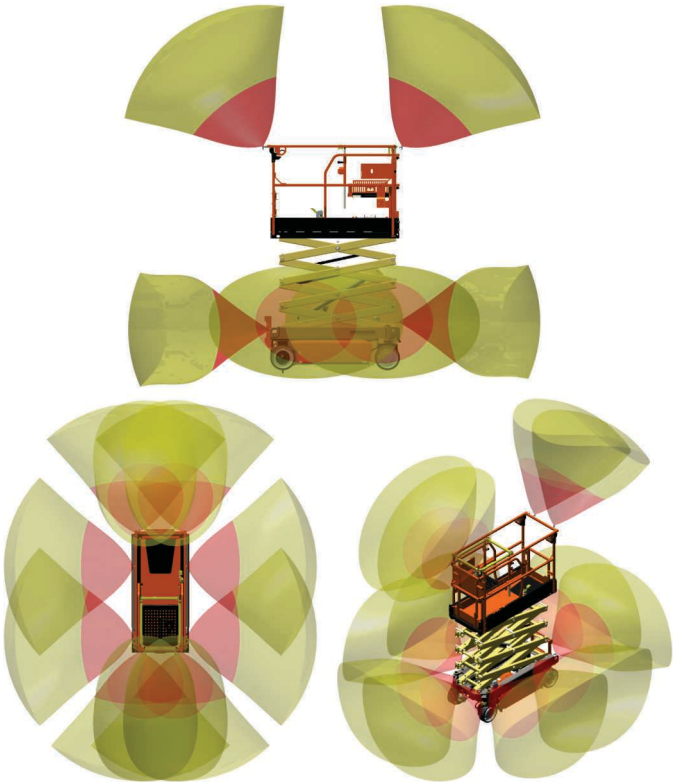


Figure 25. Collision Avoidance Sensor Coverage Areas

Note: Sensor cones shown are approximations for reference only.

Collision Avoidance-Compatible SkySense® uses sensors mounted to the platform rails to detect objects at platform level. Collision Avoidance uses sensors mounted to the chassis to detect objects at chassis level.

When an object enters the warning zone (shown by the yellow cones), the applicable system reduces the affected function to creep speed. When an object enters the stop zone (shown by the red cones), the system prevents the affected function or direction from continuing toward the object. Other functions or directions may remain available, subject to applicable machine interlocks.

For proportional joystick functions, the warning-zone distance changes with joystick input. The stop-zone distance does not change with joystick input. It may differ by machine model based on the default personality settings stored in the machine.

Depending on the machine configuration, the applicable system operates during:

- Lift Up
- Drive Forward
- Drive Reverse

- Lift Down *

* Lift down is available only when the extension deck is fully retracted and latched in the stowed position.

5.7.2 Pre-Operation Inspection

Note: Perform the test before using the machine each day or whenever there is an operator change.

Note: On all components, make sure there are no loose or missing parts, all parts are securely fastened, no visible damage or excessive wear exists.

1. Inspect each of the sensor tubes for dents, cracks, or other damage.
2. Inspect each sensor for any damage to the housing or sensor.
3. Inspect cables for any damage and verify connections are secure.

5.7.3 Pre-Operation Test

Note: Perform the test before using the machine each day or whenever there is an operator change.

⚠ WARNING

If the machine does not operate properly, turn off the machine immediately. Report the problem to the proper maintenance personnel. Do not operate the machine until it is declared safe for operation.

Collision Avoidance-Compatible SkySense Test

1. Make sure there are no obstructions within 10 feet around or above the platform and the machine is on a smooth, firm surface within the limits of the maximum operating slope.
2. From the platform control station, lift and lower the platform.
3. Place a hand or object above one of the sensors at the platform level, then lift up the platform. Platform movement should stop, the LED indicator should be red, and the alarm should sound. If the alarm is muted, the mute button light should be red.
4. Release the joystick and enable switch.
5. Place a hand or object above one of the sensors at the platform level. Press and hold the override button on the notification unit and lift the platform. The platform should not lift, the LED indicator should be red, and the alarm should sound. If the alarm is muted, the mute button light should be red.
6. Remove hand or object from the sensor zone, then release the joystick and enable switch. Lower the platform to stowed.

7. On the notification assembly, triple click the override button. Confirm the alarm chirps and the LED indicator flashes red and yellow. Place a hand or object above one of the sensors at the platform level then lift up the platform. The platform should lift. The system will automatically reset after a preset period of time.

8. Remove hand or object from the sensor zone, then release the joystick and enable switch. Lower the platform to stowed.

9. Lift the platform with no hand or object above the sensor. The platform should lift without interruption.

10. For this step, confirm the alarm button is not muted (#3 on the notification assembly — red LED appears solid when alarm is muted; no LED appears when alarm is unmuted). Place a hand or object above one of the sensors at platform level then lift up the platform. Confirm the alarm sounds. Press the alarm mute button and confirm the red LED appears. Lift up the platform and confirm no alarm sounds.

11. Lower the platform to stowed and press the alarm mute button to return to normal alarm operation.

12. Lift the platform. Extend the extension deck, then lift down the platform. The platform should not lower, the LED should flash red, and the alarm should produce a small chirp.

13. Return the extension deck to the stowed position and lower the platform.

If the machine is equipped with Collision Avoidance, proceed to the following steps. It may be easier to complete this portion of the test by standing at ground level next to the machine while holding the platform control station.

Collision Avoidance Test

1. Make sure there are no obstructions within 10 feet around or above the platform and the machine is on a smooth, firm surface within the limits of the maximum operating slope. Make sure the wheels are centered (pointing straight in the direction of travel).

2. Place a hand or object in front of the front sensor at the chassis level, then drive the machine forward. The machine should not move, the LED indicator should be red, and the alarm should sound. If the alarm is muted, the mute button light should be red.

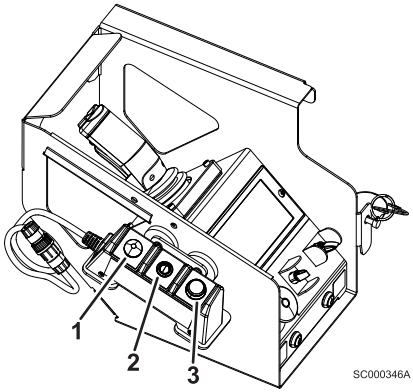
3. Release the joystick and enable switch.

4. Place a hand or object in front of the front sensor at the chassis level. Press and hold the override button on the notification unit, then drive the machine forward. The machine should not move forward, the LED indicator should be red, and the alarm should sound. If the alarm is muted, the mute button light should be red.

5. Remove hand or object from the sensor zone, then release the joystick and enable switch.

6. Drive the machine forward with no hand or object in front of the sensor. The machine should move without interruption.

5.7.4 Operation



1. Override Button
2. LED Indicator
3. Alarm Mute Button
4. Alarm Speaker (Underneath Unit) (not shown)

Figure 26. Notification Assembly

The notification assembly is attached magnetically to the control station and can be repositioned as needed.

Override Button

Press and hold the override button to bypass normal system operation in order to move closer to an object within the zones.

When the operator bypasses normal system operation via the override button to get closer to a work surface, the machine will maintain creep speed and flash the appropriate indicator color based on location in either the warning or stop zones.

The system can be temporarily disabled to allow operators to maneuver through certain locations, such as a doorway, by triple-clicking the override button. The LED will flash red and yellow and the audible alarm will pulse to alert operators the system is disabled. The system will automatically reactivate after a preset period of time.

LED Indicator

A bi-color LED indicator on the platform control box signals system activity.

- **No LED:** Normal operation.
- **LED flashing yellow:** Machine is in the warning zone and will reduce to elevated drive height speed. Flash frequency correlates to closeness of the object.
- **LED red:** Machine is in the stop zone and all machine functions will cease.

- **LED flashing red:** A sensor is obstructed or damaged; obstructions must be removed and proper function verified; damaged sensors must be replaced. Extension deck is out of the stowed position.
- **LED flashing red and yellow:** The system is temporarily disabled and will reactivate after a preset period of time.

System Alarm

Activation of the system is also signalled by an audible alarm that indicates system activity when reaching the warning or stop zones.

In the warning zone, the audible alarm will pulse and increase in frequency as the machine moves closer to the object. In the stop zone, the alarm will sound a continuous tone.

Additionally, when the machine is in the stop zone, the platform control panel audible alarm will sound. Reset the system by releasing the trigger switch.

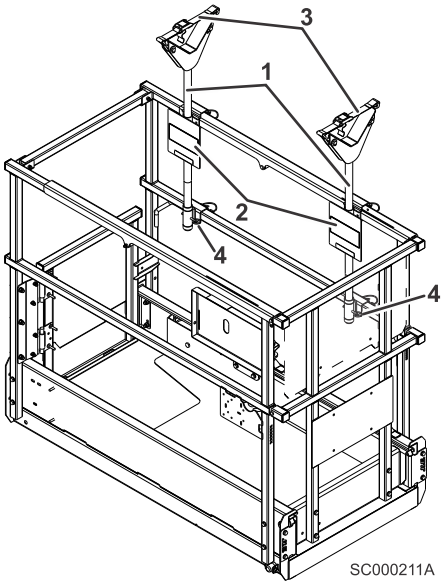
The alarm produces a small chirp when the system is temporarily disabled by triple-clicking the override button, or if the lift down function is attempted with the extension deck out of the stowed position.

Audible system alarms can be muted, although LEDs will continue to light.

5.8 PIPE RACKS

Pipe Racks store pipe or conduit inside the platform in order to prevent rail damage and optimize platform utility. The accessory consists of two racks attached to the platform handrail with adjustable straps that secure the load in place.

Note: This accessory is rated for INDOOR USE only. INDOOR USE is use in areas shielded from wind so that there is no wind.



1. Pipe Racks (Working Position)
2. Capacity Decals
3. Tie-Down Straps
4. Locking Pins

Note: Some components hidden for illustrative clarity.

5.8.1 Safety Precautions

⚠ WARNING

This accessory affects overall platform capacity. Refer to capacity decals and adjust accordingly. Weight in racks plus weight in platform must not exceed rated capacity.

NOTICE

Retract platform extension before attaching pipe racks and loading material.

NOTICE

Maximum weight in racks is 45 kg (100 lb) evenly distributed between racks. Maximum length is 4 m (13 ft).

- Do not exit platform over rails or stand on rails.
- Do not drive the machine without material secured.

- Use this accessory on approved models only.
- Return racks to the stowed position when not in use.

5.8.2 Preparation and Inspection

- Ensure both racks are mounted and securely fastened to inside of platform rails.
- Check for missing or damaged components. Replace if necessary.

5.8.3 Operation

1. To prepare racks for loading, remove locking pins, rotate each rack 90 degrees from stowed to working position, then secure with locking pins.
2. Place material onto racks with weight evenly distributed between both racks. Do not exceed the rated capacity stated on the decal.
3. Route the tie-down straps at each end across loaded material and tighten.
4. To remove material, loosen and remove tie-down straps, then carefully remove material from racks.

Note: Reinstall tie-down straps across any remaining material before continuing machine operation.

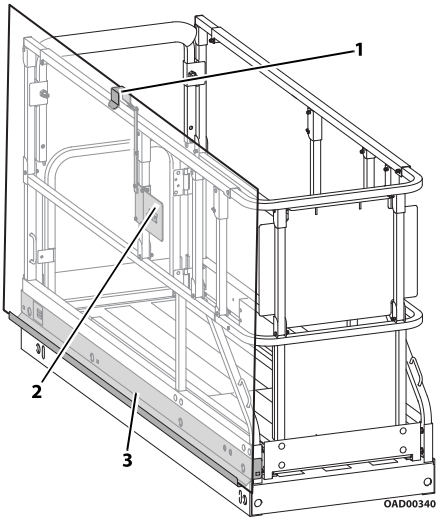
5. When not in use, remove locking pins, rotate racks 90 degrees to the stowed position, then secure locking pins.

5.9 PANEL CARRIER

The Panel Carrier can transport flat sheets or panels to an elevated site by positioning them in a channel on the outside of the platform. It consists of a carrier tray that runs parallel to the length of the platform and an adjustable bracket mounted to the handrail to hold material in place.

The panels can measure up to 4 ft x 8 ft (1.22 m x 2.4 m), or approximately 32 ft sq. (3 m sq.).

Note: This accessory is rated for INDOOR USE only. INDOOR USE is use in areas shielded from wind so that there is no wind.



1. Adjustable Bracket
2. Capacity Decal (on back)
3. Carrier Tray

5.9.1 Safety Precautions

⚠ WARNING

Multiple material-handling accessories can be installed but only one may be loaded at a time unless approved by JLG Industries, Inc.

⚠ WARNING

This accessory affects the overall platform capacity. Refer to the capacity decal and adjust accordingly.

⚠ WARNING

When the carrier tray is loaded, the increase of area exposed to wind will decrease stability. Refer to the decal for maximum panel size and wind speed.

- Ensure no personnel are beneath the platform.
- Do not exit the platform over the rails, or stand on the rails.
- Remove the tray when not in use.

5.9.2 Preparation and Inspection

- Ensure all components are secured to the platform.
- Check for any missing or damaged components. Replace if necessary.
- Check for loose nuts and bolts. If necessary, torque according to the Torque Chart specifications in the Service Manual.
- Replace any missing or illegible decals.
- Replace any torn or frayed straps.

5.9.3 Operation

1. Attach the carrier tray to the outside of the platform.
2. Load the Panel Carrier with material and secure with the adjustable bracket.
3. Position the panel to its desired location.
4. Remove the carrier tray when finished.

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SECTION 6
Machine Specifications and Operator Maintenance

6.1 GENERAL

This section of the manual provides additional necessary information to the operator for proper operation and maintenance of this machine.

The maintenance portion of this section is intended as information to assist the machine operator to perform daily maintenance tasks only and does not replace the more thorough Preventive Maintenance and Inspection Schedule included in the Service & Maintenance Manual.

6.2 MACHINE SPECIFICATIONS

6.2.1 Operating Specifications

Specification	Value
Maximum Platform Height	
Indoor	18.5 ft (5.6 m)
Outdoor	15 ft (4.6 m)
Gross Machine Weight	
ANSI/ANSI Export/CSA	2,978 lb (1351 kg)
Maximum Stowed Travel Grade (Gradeability)	24% (13.5°)
Maximum Stowed Travel Grade (Side Slope)	5° (8.75%)
Maximum Tire Load	1,380 lb (626 kg)
Maximum Ground Bearing Pressure	170 psi (12 kg/cm^2)
Turning Radius	
Inside	0 in (0 cm)
Outside	55 in (140 cm)
Drive Speed — Stowed	3.0 mph (4.8 kph)
Drive Speed — Elevated	0.5 mph (0.8 kph)
High Drive Speed Cutout Height	40.5 in (1 m)
Platform Lift Up Time (Rated Load)	20 — 25 sec

Specification	Value
Platform Lift Down Time (Rated Load)	20 — 26 sec
Hydraulic Pressures	
Main Relief	3000 psi (207 bar)
Maximum Steer Relief	700 psi (48 bar)
Electrical System Voltage	24 V
Ground Clearance	
PHP Deployed	1 in (2.5 cm)
PHP Retracted	2.4 in (6 cm)
Breakover Angle	11.8°
Ambient (Operating) Temperature	Refer to Figure — Hydraulic Oil Operating Temperature

6.2.2 Dimensions

Dimension	Telescope Rails/Dual Rails	Fixed Rails with Integrated Mid-Rail Deck
Machine Height (Stowed)	78 in (198 cm)	78.3 in (199 cm)
Machine Height (Elevated)	22.25 ft (6.8 m)	24 ft (7.3 m) (with Retractable Handrail Deployed)
Machine Length		
Extension Retracted	58.2 in (148 cm)	58.2 in (148 cm)
Extension Deployed	80 in (203 cm)	80 in (203 cm)
Extension Deck Length	21.7 in (55 cm)	21.7 in (55 cm)
Machine Width	29.9 in (76 cm)	29.9 in (76 cm)
Wheelbase	42.3 in (107 cm)	42.3 in (107 cm)

6.2.3 Platform Capacity

Table 12. Standard Machines

Specification	Indoor Mode[2]	Outdoor Mode[2]
Maximum Occupants	2 persons	1 person
Maximum Platform Capacity[1]	500 lb (227 kg)	500 lb (227 kg)
Platform Deck Extension Capacity	254 lb (115 kg)	254 lb (115 kg)

Table 12. Standard Machines (continued)

Specification	Indoor Mode[2]	Outdoor Mode[2]
Maximum Allowable Wind Speed	0 mph (0 m/s)	28 mph (12.5 m/s)
Maximum Horizontal Side Force[3]	90 lb (400 N)	45 lb (200 N)
[1] Maximum Platform Capacity includes platform and platform extension.		
[2] INDOOR USE is use of a MEWP in areas shielded from wind so that there is no wind. OUTDOOR USE is use of a MEWP in an environment that can be exposed to wind.		
[3] Platform fully extended at maximum capacity.		

Table 13. Machines Equipped with Integrated Mid-Rail Deck

Specification	Value
Market	ANSI, CSA
Maximum Platform Capacity[1]	500 lb (227 kg)
Maximum Capacity Allowed on Platform Extension	254 lb (115 kg)
Maximum Capacity Allowed on Mid-Rail Deck	254 lb (115 kg)
Maximum Platform Height[2]	
Indoor	Full Height
Outdoor	15 ft (4.6 m)
Maximum Persons Allowed in Platform[2, 3]	
Indoor (with Mid-Rail Deck stowed/not in use)	2
Indoor (with Mid-Rail Deck deployed/in use)	1
Outdoor	1
Maximum Side Force[2, 4]	
Indoor (with one person in the platform)	45 lb (200 N)
Indoor (with two persons in the platform	90 lb (400 N)
Outdoor	45 lb (200 N)
Maximum Operating Wind Speed[2]	
Indoor	0 mph (0 m/s)
Outdoor	28 mph (12.5 m/s)
[1] Maximum Platform Capacity includes platform and platform extension.	

Table 13. Machines Equipped with Integrated Mid-Rail Deck (continued)

Specification	Value
[2] INDOOR USE is use of a MEWP in areas shielded from wind so that there is no wind. OUTDOOR USE is use of a MEWP in an environment that can be exposed to wind.	
[3] Only one person at a time may use the mid-rail deck.	
[4] Platform fully extended at maximum capacity.	

6.2.4 Maximum Allowable Operating Slope

Mode	Tilt Setting (Front to Back)	Tilt Setting (Side to Side)	Maximum Platform Elevation
Indoor Mode	3.0°	2.5°	Stowed — 15 ft (Stowed — 4.6 m)
		2.0°	15 ft — 17 ft (4.6 m — 5.2 m)
		1.5°	17 ft — Full Height (5.2 m — Full Height)
Outdoor Mode	3.0°	2.5°	Stowed — 11 ft (Stowed — 3.3 m)
		2.0°	11 ft — 13 ft (3.3 m — 4 m)
		1.5°	13 ft — 15 ft (4 m — 4.6 m)

6.2.5 Tires

Specification	Value
Size	10 in x 3 in (255 mm x 76 mm)
Wheel Bolt Torque (M10 x 1.5 Bolt)	43 ft.lb. (58 Nm)

6.2.6 Fluid Capacities

Component	Value
Hydraulic Tank	1 gal (3.8 L)
Hydraulic System	1.45 gal (5.5 L)

6.2.7 Batteries (Lead Acid, AGM)

Specification	Lead Acid (Trojan)	AGM (Discover)	AGM (Vision)
Voltage (24V System - Series)	12V per battery	12V per battery	12V per battery
Amp Hour Rating (@ 20 hr)	130 Ah	120 Ah	115 Ah
Reserve Capacity (@ 25 A)	225 min	228 min	230 min
Weight	66 lb (30 kg)	71 lb (32 kg)	71 lb (32 kg)

6.2.8 Batteries (Lithium-ion)

Specification	Value
Voltage	24 V
Amp Hour Rating	90 Ah
Energy	2.30 kWh
Weight	45 lb (20.4 kg)
Charge Operating Temperature	-31°F to 131°F (-35°C to 55°C)
Discharge Operating Temperature	0°F to 131°F (-18°C to 55°C)

6.2.9 Battery Charger

Specification	Value
Electrical System Voltage (DC)	24 V
Battery Charger	Delta-Q (650 W)
Input	
AC Input Voltage	85 - 270 V AC
Nominal AC Input Voltage	100 - 240 V AC
Input Frequency	50 - 60 Hz
Maximum AC Input Current	7.5 A
Ingress Protection	IP66
Operating Temperature	-40°F to 149°F (-40°C to +65°C)
Output	
Nominal DC Output Voltage	24 V

Specification	Value
Maximum DC Output Voltage	36 V
Maximum DC Output Current	27.1 A
Maximum Interlock Current	1 A @ 24 V
Protection	
Output Reverse Polarity	Electronic Protection-Auto Reset
Output Short Circuit	Current Limited
AC Overload	Current Limited
DC Overload	Current Limited

6.3 HYDRAULIC OIL SPECIFICATIONS

Table 14. Hydraulic Oil SAE Viscosity Grade Operating Temperature Ranges

Hydraulic System Operating Temperature Range	SAE Viscosity Grade
0° to 180°F (-18° to 83°C)	10W
0° to 210° F (-18° to 99°C)	10W–20, 10W–30
50° to 210°F (10° to 99°C)	20W–20

Hydraulic oils require anti-wear qualities of at least API Service Classification GL-3 and sufficient chemical stability for mobile hydraulic system service. JLG Industries recommends the use of standard UTTO.

Aside from JLG recommendations, it is not advisable to mix oils of different brands or types, as they may not contain the same required additives or be of comparable viscosities. If use of hydraulic oil other than standard UTTO is desired, contact JLG Industries for proper recommendations.

Machine operation using non-JLG approved hydraulic fluids or operation outside of the temperature boundaries outlined in the hydraulic fluid operation charts may result in premature wear or damage to components of the hydraulic system.

Machines may be equipped with biodegradable and non-toxic hydraulic oil. This is a fully synthetic hydraulic oil that possesses the same anti-wear and rust protection characteristics as mineral oils, but will not adversely affect the ground water or the environment when spilled or leaked in small amounts.

When temperatures remain consistently below 20° F (-7° C), JLG Industries recommends the use of a premium cold weather hydraulic fluid (viscosity grade 32).

Table 15. Hydraulic Oil Properties and Classifications

Fluid	Properties		Base				Classifications		
Description	Viscosity at 40° C *	Viscosity Index	Mineral Oils	Vegetable Oils	Synthetic	Synthetic Polyol Esters	Readily Biodegradable**	Virtually Non-toxic †	Fire Resistant ‡
Shell Spirax S4 TXM — Recommended	**67**	**146**	**X**						
Mobilfluid 424 — *Optional*	60	134	X						
Shell Tellus S2 VX32 — Recommended	**32**	**142**	**X**						
Mobil DTE 10 Excel 32 — *Optional*	32	161	X						
Shell Naturelle HF-E32 — Recommended	**31**	**192**		**X**			**X**	**X**	
Mobil EAL Envirosyn H32 — *Optional*	34	146		X			X	X	

* cSt, Typical
** Readily biodegradeable classification indicates one of the following:

CO2 Conversion > 60% per EPA 560/6-82-003
CO2 Conversion > 80% per CEC-L-33-A-93

† Virtually Non-toxic classification indicates a LC50 > 5000 ppm per OECD 203
‡ Fire Resistant classification indicates Factory Mutual Research Corp. (FMRC) Approval

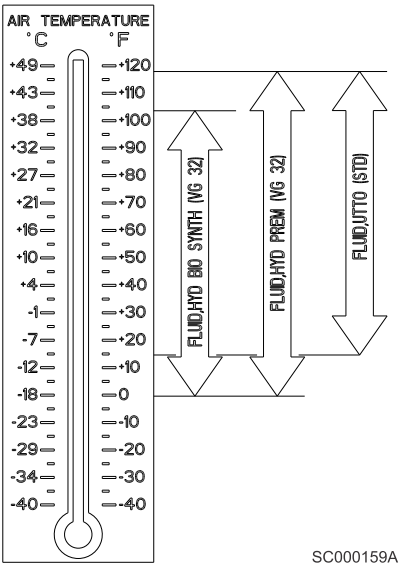


Figure 27. Hydraulic Oil Operating Temperature

6.4 HYDRAULIC OIL CHECK PROCEDURE

To ensure proper operation of the machine, the hydraulic oil must be checked daily.

Check the hydraulic oil level only when the machine is in the stowed position. Make sure the hydraulic oil has warmed to operating temperature before checking the reservoir.

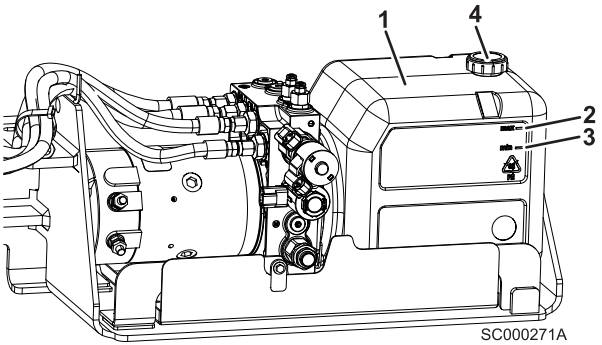


Figure 28. Hydraulic Oil Tank

1. Open the hydraulic compartment door and locate the hydraulic tank (**1**).
2. Locate the lines indicating the maximum and minimum levels of hydraulic oil (**2** and **3**) in the reservoir. Make sure the level of oil is between the two lines.
3. If the level of oil in the reservoir is below the minimum level (**3**), more oil is needed. Wipe all dirt and debris from the filler/filter cap (**4**) and surrounding area.

4. Remove filler cap and add proper grade of oil. Fill until oil level is close to the maximum level (**2**). Do not overfill.

Note: Take precautions so impurities (dirt, water, etc.) cannot enter the hydraulic system while filler/filter cap is removed.

Note: Recommended lubrication intervals are based on machine operations under normal conditions. For machines used in multi-shift operations and/or exposed to hostile environments or conditions, lubrication frequencies must be increased accordingly.

6.5 SAFETY PROP

Engage the machine's red safety prop before conducting maintenance that requires an elevated armstack. The safety prop is located at the rear of the machine in the armstack.

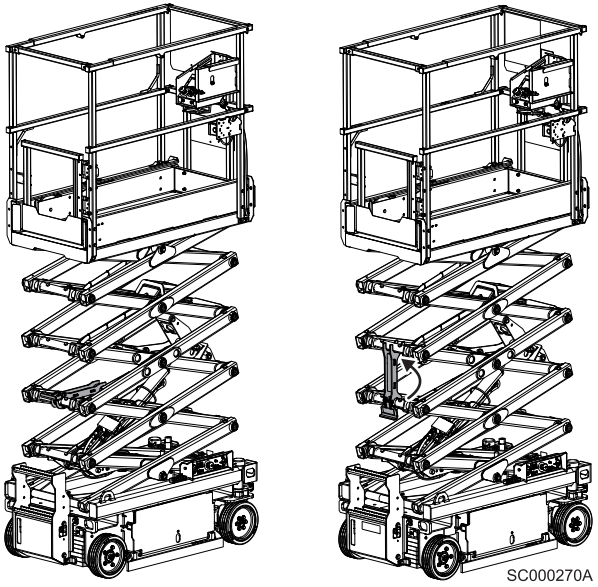


Figure 29. Safety Prop Disengaged/Engaged

To engage the safety prop:

1. From the ground control station, raise the platform approximately 6.5 ft (2 m) .
2. At the rear of the machine, pull the red safety prop into the vertical position.
3. Lower the platform until the crossbar above the prop rests on the prop.
4. Verify all downward movement stops when the safety prop is engaged.

To disengage the safety prop:

1. From the ground control station, raise the platform enough to release the safety prop.
2. Push in the safety prop.
3. Lower the platform to the stowed position.

6.6 BATTERY QUICK-DISCONNECT

Machines equipped with the battery quick disconnect allow all machine power to be easily disconnected at the battery without removing battery cables from the battery posts. To disconnect power, locate the RED quick-disconnect connector on top of the batteries inside the battery compartment and pull halves apart.



6.7 BATTERY MAINTENANCE AND CHARGING (LEAD ACID/AGM)

⚠ WARNING

To avoid injury from an explosion, do not smoke or allow sparks or a flame near battery during servicing. Always wear eye and hand protection when servicing batteries.

6.7.1 Battery Charging (Daily)

⚠ WARNING

When battery charger is to be used, charging harness must be plugged into a grounded receptacle. If receptacle is not grounded and a malfunction should occur, the machine could cause serious electrical shock.

For increased battery life:

- Batteries should be kept at highest state of charge permitted by availability at job site and machine use. Charge batteries before they reach 20% state of charge. Avoid completely discharging the batteries.
- Fully charge the batteries each day the machine is used.
- Charge the batteries at available times between use. Flooded lead acid/AGM batteries do not develop a charging memory.
- If applicable, be sure the battery fluid covers the battery plates before charging. To avoid overflow, do not top off the fluid level until after charging.

⚠ CAUTION

When adding distilled water to the batteries, non-metallic containers and/or funnels must be used. Add water until electrolyte covers plates. Do not charge batteries unless electrolyte covers the plates.

Note: To avoid electrolyte overflow, add distilled water to batteries after charging. When adding water to the battery, fill only to level indicated or 3/8" above separators.

6.7.2 Battery Maintenance (Quarterly)

⚠ CAUTION

When adding distilled water to the batteries, non-metallic containers and/or funnels must be used. Add water until electrolyte covers plates. Do not charge batteries unless electrolyte covers the plates.

Note: To avoid electrolyte overflow, add distilled water to batteries after charging. When adding water to the battery, fill only to level indicated or 3/8" above separators.

1. Open battery compartment cover to allow access to battery terminals and vent caps.
2. Remove all vent caps and inspect electrolyte level of each cell. Electrolyte level should be to the ring approximately one inch from top of battery. Fill batteries with distilled water only. Replace and secure all vent caps.
3. Remove battery cables from each battery post one at a time, negative first. Clean cables with acid neutralizing solution (e. g., baking soda and water or ammonia) and wire brush. Replace cables and/or cable clamp bolts as required.
4. Clean battery post with wire brush then reconnect cable to post. Coat non-contact surfaces with mineral grease or petroleum jelly.
5. When all cables and terminal posts have been cleaned, ensure all cables are properly positioned and do not get pinched. Close battery compartment cover.
6. Power up machine and verify it functions properly.

6.8 BATTERY MAINTENANCE AND CHARGING (LITHIUM-ION)

NOTICE

Do not tamper with, open, or attempt to service the battery. It contains no serviceable parts.

6.8.1 Battery Charging

- Only use the JLG-installed 24 V charger, which has been rated specifically for this machine and battery type, to charge the batteries. Do not substitute this charger for a different charger.
- Charge batteries in a well-ventilated area. Avoid charging in extreme temperatures.
- Charge the batteries to 100% whenever possible.
- Avoid deep discharges (below 10%).
- Charge batteries regularly, even if the machine is not in use, to maintain optimal performance.

Note: If the machine is being used, stored, or sitting overnight in a cold environment, plug in the machine to keep the batteries full and warm. If it is not plugged in, the batteries may be cold and will need to warm up before the machine can fully function.

6.8.2 General Maintenance

⚠ WARNING

If any damage to the batteries is discovered during machine inspection, discontinue use immediately. Do not use the machine until the issue has been investigated and corrected by a qualified mechanic.

- Do not tamper with, open, or attempt to service the battery. It contains no serviceable parts.
- Periodically inspect batteries for signs of swelling, discoloration, smoke, dents, damage, or smells. If any abnormalities are detected, discontinue use immediately and notify a qualified mechanic.
- Keep battery contacts clean and free of dust and debris to ensure a good connection and efficient charging.
- For long-term storage, store machines in a cool, dry place away from direct sunlight and heat sources. Avoid storing batteries in fully discharged or fully charged states for extended periods. Store batteries at 30-50% state of charge.

- Avoid exposing batteries to extreme temperatures
- Routinely use and charge the battery. Idle batteries can lose capacity over time. Perform a full charge and discharge cycle every 6 to 12 months to maintain proper state of charge calibration and cell balancing.
- Do not exchange lithium-ion batteries for a different type of battery. Using incompatible devices can cause damage to the machine.
- Monitor battery performance regularly. Unusual drops in performance or capacity can indicate the need for maintenance or replacement.

6.9 TIRES AND WHEELS

6.9.1 Tire Wear and Damage

The tire and rim assemblies installed on machines have been approved by the tire manufacturer for applications in which those products are intended to be used. The tire and rims installed on each product model have been designed for stability requirements, which consist of track width, tire compound, and load capacity. Tire changes such as rim width, centerpiece location, larger or smaller diameter, tire compound, etc., without written manufacturers approval, could result in an unsafe condition regarding stability.

The tires and rims installed on machines are to be inspected daily as part of the daily walk-around inspection. JLG requires that the daily walk-around inspection be performed at each operator change during a shift and at each shift change.

6.9.2 Wheel and Tire Replacement

JLG recommends that any replacement tire be the same size and brand as originally installed on the machine or offered by JLG as an approved replacement. Please refer to the JLG Parts Manual for the part number of the approved tires for a particular machine model.

If any of the following is discovered during tire inspection, measures must be taken to remove the JLG product from service immediately. Arrangements must be made for replacement of the tire(s) or tire assembly(s). Both tires/wheels on the same axle must be replaced:

- If the overall diameter of the tire is less than one of the following: 255 x 76 Tire – 9.5 in (243 mm) minimum
- If any uneven wear is discovered.
- If the metal wheel is visible at any point through the tread area of the tire.

- If more than one discrepancy exists in any quadrant of the wheel (within 90 degrees of one another).

A tire with significant damage in the tread area or sidewall requires immediate evaluation before placing the machine into service. If a cut, tear, chunk, or other discrepancy exceeds any one or more of the following dimensions, the tire must be replaced:

- 3.0 in. (76 mm) long
- 0.75 in. (19 mm) wide
- 0.75 in. (19 mm) deep

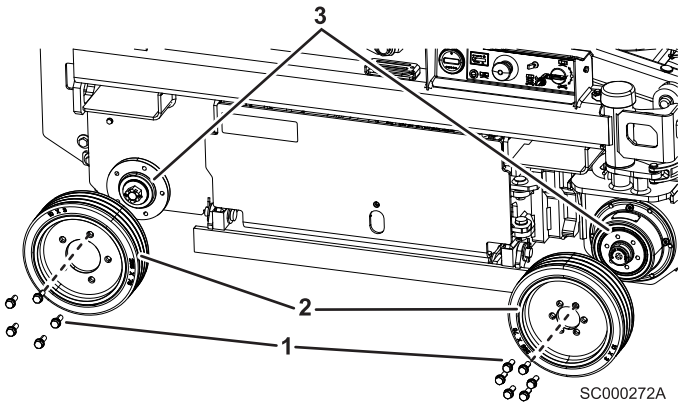
6.9.3 Wheel Installation

It is extremely important to apply and maintain proper wheel mounting torque.

⚠ WARNING

Wheel bolts must be installed and maintained at the proper torque to prevent loose wheels, a broken bolt, and possible separation of wheel from the axle.

Tighten the wheel mounting bolts to the proper torque to prevent wheels from coming loose. Use a torque wrench to tighten.



1. Wheel Bolts
2. Tire/Wheel Assembly
3. Hub

1. Install wheel (**1**) onto hub (**2**).
2. Start mounting bolts (**3**) by hand to prevent cross threading. DO NOT use a lubricant on threads.

3. Tighten bolts in the following sequence:

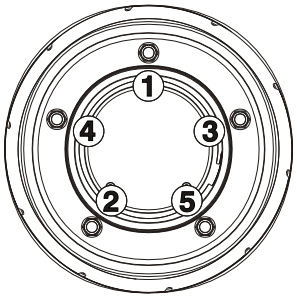


Figure 30. Wheel with Five Bolts

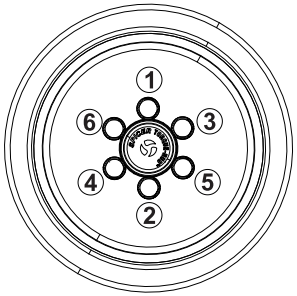


Figure 31. Wheel with Six Bolts

4. Tighten bolts in stages. Following the recommended sequence, tighten each bolt per wheel torque of 58 Nm (43 ft.lb.).

5. Wheel mounting bolts should be torqued after the first 50 hours of operation and after each wheel removal. Check torque every 3 months or 150 hours of operation.

6.10 RADIO FREQUENCY (RF) INFORMATION

Note: The ClearSky Smart Fleet™ CS550 connectivity module antenna is internal to the assembly. The CS550 connectivity module complies with the wireless certification regulations in the regions of sale. Machines equipped with ClearSky Smart Fleet telematics must be received by countries that are certified to have ClearSky Smart Fleet. For a full listing of ClearSky Smart Fleet certified countries, please refer to the ClearSky webpage on the JLG website.

6.10.1 Federal Communications Commission (FCC)

FCC Interference Statement

ClearSky CS550 has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

> (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice Regarding Radio Frequency Radiation Exposure

ClearSky CS550 complies with the FCC radio frequency exposure limits prescribed for mobile use (i.e,. antennas are greater than 20 cm from a person's body) in an uncontrolled environment. Consequently, a person within 20 cm (8 in) of a CS550 that is connected to machine battery power could expose that person to RF energy in excess of what has been established by the FCC RF exposure guidelines.

6.10.2 Innovation, Science and Economic Development (ISED)

Radio Frequency Interference Requirements

The ClearSky CS550 Class B digital apparatus complies with Canadian ICES-003. [Canada Compliance Label: CAN ICES-3 (B)/NMB-3(B)]

This device complies with Industry Canada license-exempt RSS standard (s). Operation is subject to the following two conditions:

> (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Notice Regarding Radio Frequency Radiation Exposure

ClearSky CS550 complies with the ISED radio frequency exposure limits prescribed for mobile use (i.e,. antennas are greater than 20 cm from a person's body) in an uncontrolled environment. Consequently, a person within 20 cm (8 inches) of a CS550 that is connected to machine battery power could expose that person to RF energy in excess of what has been established by the ISED RF exposure guidelines.

6.10.3 European Union Conformity (CE)

CE Interference Statement

JLG Industries, Inc. declares that the radio equipment ClearSky Smart Fleet CS550 Connectivity Module complies with Directive 2014/53/EU. Full details can be found on the declaration of conformity. The CS550 is intended to be mounted on JLG machines and has integrated beacon functionality. Additionally, it provides telematics data via WiFi or Cell, and provides local diagnostic data exchange with a mobile device connected via WiFi and BLE. Mobile device software is obtained through Google Play Store or Apple App Store.

Frequencies of Operation [and maximum power output]:

- LTE Cat M1: 700/750/800/850/900/1700/1800/1900/2100 MHz [23 dBm±2 dB]
- 2G GPRS: 900MHz [Class 4, 33 dBm ±3 dB], 1800MHz [Class 1, 30 dBm ±3 dB]
- 2G EGPRS: 900MHz [Class E2, 27 dBm ±3 dB], 1800MHz [Class E2, 26 dBm ±3 dB]
- WiFi (IEEE 802.11b/g/n): 2400-2483.5 MHz [18 dBm e.i.r.p]
- Bluetooth (BLE, Mesh 1.0 and proprietary GATT): 2400-2483.5 MHz [12.1 dBm e.i.r.p]
- GNSS (receive only: GPS, GLONASS, BeiDou, Galileo): 1575.42MHz, 1561.098MHz, 1602MHz

Ensure at least 20 cm separation distance is maintained between user's body and CS550 module to meet Maximum Permissible Exposure (MPE) restrictions for RF exposure.

Contact: JLG EMEA B.V., Polaris Avenue 63, 2132 JH Hoofddorp, Netherlands

6.11 DIAGNOSTIC TROUBLE CODES (DTC)

NOTICE

The DTC codes listed in the following table are not a complete listing of machine DTCs. This listing shows only those DTCs that an operator may be able to correct due to operating error.

The DTC table is sorted in groups by the first two digits. These digits represent the number of flashes the system distress indicator lamp will flash on the platform indicator panel when a fault occurs.

The more detailed three to five digit code numbers in the DTC column of the table are only indicated on a JLG handheld diagnostic analyzer connected to the machine, or on the ground control station - MDI indicator, if equipped.

To troubleshoot multiple DTCs, start with the DTC with the higher first two digits.

If a correction is made during a check, conclude the check by cycling the machine power off then back on, using the emergency stop switch.

NOTICE

Should a fault occur which cannot be corrected by the operator, the problem must be referred to a mechanic qualified to repair the machine.

DTC	Help Message	Alarm	Flash Code	Action	Trigger
001	EVERYTHING OK	None	None	• No Motion restrictions	• Platform Mode and no Faults are active.
002	GROUND MODE OK	None	None	• No Motion restrictions	• Ground Mode and no Faults are active.
003	ALARM SOUNDING – TILTED & ABOVE ELEVATION	PF: Continuous	None	• No Motion restrictions	• Platform is elevated and chassis is not level
004	DRIVING AT CUTBACK – ABOVE ELEVATION	None	None	• Drive State = CREEP	• Platform is elevated and the machine is in the drive mode of operation
005	DRIVE & LIFT UP PREVENTED TILTED & ELEVATED	PF: Continuous	None	• Drive State = PREVENTED Lift Up State = PREVENTED	• Driving and lift up are not possible since the platform is elevated and the chassis is not level.
006	LIFT UP PREVENTED – MAX HEIGHT ZONE A	None	None	• Lift Up State = PREVENTED	• The vehicle has reached the maximum height allowed by the Indoor/ Outdoor selection and further lift up motion is not possible.
007	DRIVING AT CUTBACK – POT-HOLE STILL ENGAGED	None	None	• Drive State = CREEP	• While stowed, drive speed is reduced (due to lower ground clearance) since the control system detected that the pot-hole protection mechanism is deployed (failed to retract). • Clear the obstacle blocking the pot-hole protection mechanism, repair the mechanical problem, re-adjust the pot-hole limit switches, or repair the wiring to correct the problem. • Alternately, there may be difficulty with the Elevation Angle Sensor that causes the Control System to improperly believe the platform is stowed.

DTC	Help Message	Alarm	Flash Code	Action	Trigger
008	FUNCTIONS LOCKED OUT – SYSTEM POWERED DOWN	None	None	• Enter Safe Mode Lift Down State = PREVENTED	• A period of time elapsed without activity and the Control System entered a low-power state to preserve battery charge (2 hours). Cycle the Ground EMS in Ground Mode or the Platform EMS in Platform Mode to re-enable the vehicle. • Two hours without Drive Forward, Drive Reverse, Lift Up, Lift Down, Steer Left, or Steer Right. • Timer resets if user changes Platform Mode / Ground Mode
009	DRIVE PREVENTED – ELEVATED ABOVE DRIVE CUTOUT HEIGHT	None	None	• DriveState = PREVENTED	• The Drive Cutout functionality is enabled, and the Platform is Elevated above the Calibrated Cutout Height.
0067	BATTERY LOW SOC - REDUCED SPEEDS	None	None	• DriveState = CREEP • LiftUpState = CREEP	The battery state of charge is low and machine speeds are slowed to alert the operator to charge the machine. • The Ground Module measured VB SOC_ALL less than LowVoltageStart when {MACHINE SETUP-> BATTERY = LITHIUM}.
0068	BATTERY HEATER ACTIVE - REDUCED SPEEDS	None	None	• DriveState = CREEP • LiftUpState = CREEP	The battery heater is active so machine speeds are limited. • The Ground Module measured HEATER STATUS = ON when {MACHINE SETUP-> BATTERY = LITHIUM}.
0069	BATTERY REGEN LIMITED - REDUCED SPEEDS	None	None	• DriveState = CREEP	The battery regen capability is reduced due to temperature or high SOC so drive speeds are limited. • 1000ms (constant data adjustable delay) has elapsed since the BMS heartbeat reports operational AND The Ground Module measured REGEN CURRENT LIMIT = 0 when {MACHINE SETUP-> BATTERY = LITHIUM}.

DTC	Help Message	Alarm	Flash Code	Action	Trigger
0070	BATTERY LOW SOC – INVERTER DISABLED	None	None	Inverter = DISABLED	The battery state of charge is low so the inverter is disabled to alert the operator to charge the machine. • The Ground Module measured VB SOC_ALL less than 25% when V3-14 INV SW switch is active and {MACHINE SETUP-> BATTERY = LITHIUM}.
211	POWER CYCLE	None	2_1	• No Motion restrictions	• This Help Message is issued at each power-up. This serves to indicate which messages have been recorded in the failure log since the last power-up event.
212	KEYSWITCH FAULTY	None	2_1	• Force to GroundMode	• Both the Ground Select and Platform Select signals are energized, which means there is an issue with the keyswitch or one of the lines are shorted to battery.
221	FUNCTION PROBLEM – HORN PERMANENTLY SELECTED	None	2_2	• Horn Prevented	• Horn Switch in the Platform Control Box was closed during power- up. Release or repair the switch to clear the message.
2210	TRIGGER CLOSED TOO LONG WHILE IN NEUTRAL	None	2_2	• TriggerState = FALSE therefore • DriveState = PREVENTED • LiftUpState = PREVENTED • LiftDownState = PREVENTED	• Trigger Switch on the Platform Control Box was closed for more than five seconds while the Joystick (accelerator) was in the neutral position (centered). Release switch or repair the switch / wiring to clear the difficulty.
222	FUNCTION PROBLEM – INDOOR / OUTDOOR PERMANENTLY SELECTED	None	2_2	• Previously selected Indoor / Outdoor Mode maintained	• Indoor / Outdoor Switch in the Platform Control Box was closed during power-up. Release or repair the switch to clear the message.

DTC	Help Message	Alarm	Flash Code	Action	Trigger
223	FUNCTION PROBLEM – DRIVE & LIFT ACTIVE TOGETHER	None	2_2	• MoveState = LIFT • DriveState = PREVENTED • LiftUpState = PREVENTED • LiftDownState = PREVENTED	• The Drive - Lift Selector Switch indicates that both functions are selected simultaneously. Repair the wiring or switch to clear the message.
2232	FUNCTION PROBLEM – DRIVE & LIFT BOTH OPEN	None	2_2	• MoveState = LIFT • DriveState = PREVENTED • LiftUpState = PREVENTED • LiftDownState = PREVENTED	• In PlatformMode, the Drive - Lift Selector Switch indicates that neither function is selected. Repair the wiring or switch to clear the message.
224	FUNCTION PROBLEM – STEER LEFT PERMANENTLY SELECTED	None	2_2	• DriveState = PREVENTED	• Steer Left Switch in the Platform Control Box was closed during power-up. Release or repair the switch to clear the message.
225	FUNCTION PROBLEM – STEER RIGHT PERMANENTLY SELECTED	None	2_2	• DriveState = PREVENTED	• Steer Right Switch in the Platform Control Box was closed during power-up. Release or repair the switch to clear the message.
228	FUNCTION LOCKED OUT – ACCELERATOR NOT CENTERED	None	2_2	• DriveState = PREVENTED • LiftUpState = PREVENTED • LiftDownState = PREVENTED	• Selected function (Drive or Lift) is not allowed because the joystick (accelerator) was not centered at power-up. Return joystick to center momentarily.

DTC	Help Message	Alarm	Flash Code	Action	Trigger
229	FUNCTION PROBLEM – TRIGGER PERMANENTLY CLOSED	None	2_2	DriveState = PREVENTED LiftUpState = PREVENTED LiftDownState = PREVENTED	• Trigger Switch in the Platform Control Box was closed at power-up. Release switch or repair the switch / wiring to clear the difficulty.
231	FUNCTION PROBLEM – LIFT PERMANENTLY SELECTED	None	2_3	In GroundMode then • LiftUpState = PREVENTED • LiftDownState = PREVENTED	• Lift Switch (Up or Down) in the Ground Control Box was closed during power-up. Release or repair the switch to clear the message.
232	GROUND LIFT UP/DOWN ACTIVE TOGETHER	None	2_3	In GroundMode • then LiftUpState = PREVENTED • LiftDownState = PREVENTED	• In GroundMode, the control system has detected the Lift Up and Down are active simultaneously. Check the Lift Switch and associated wiring in the Ground Control Box.
242	AMBIENT TEMPERATURE SENSOR – OUT OF RANGE HIGH	PF: Continuous	2_4	• Drive and Lift Restrictions	• The temperature as communicated by the temperature/tilt sensor is greater than 185° F (85° C).
253	DRIVE PREVENTED – CHARGER CONNECTED	None	2_5	• DriveState = PREVENTED	• Driving is not possible since the vehicle is charging.
254	DRIVE & LIFT UP PREVENTED – CHARGER CONNECTED	None	2_5	• DriveState = PREVENTED • LiftUpState = PREVENTED	• Driving and Lifting are not possible since the vehicle is charging and it is configured to prevent all motion.

DTC	Help Message	Alarm	Flash Code	Action	Trigger
255	PLATFORM OVERLOADED	PF: 5000ms ON/ 2000ms OFF GND: 5000msON/2000ms OFF	2_5	• DriveState = PREVENTED if {TRANSPORT STATE = FALSE} • DriveState = CREEP if {MACHINE SETUP —> MARKET = JAPAN} AND {TRANSPORT STATE = TRUE} • LiftUpState = PREVENTED if {(PlatformMode = TRUE) OR (GroundMode = TRUE AND MACHINE SETUP —> LOAD = CUT-OUT ALL)} • LiftDownState = PREVENTED if {(PlatformMode = TRUE) OR (GroundMode = TRUE AND MACHINE SETUP —> LOAD = CUT-OUT ALL)} AND {(MACHINE SETUP —> MARKET = GB) OR (MACHINE SETUP —> MARKET = KOREA)}	• Triggers when OverloadState = TRUE • Clears when OverloadState = FALSE • While the Load Sensing System is enabled, the Platform Load measured by the Load Sensing System is excessive. Lift Up is Prevented, as well as drive above transport height. For the GB and KOREA markets, lift down is also prevented above a certain height. For the Japanese Market, Drive is limited to CREEP speeds in transport. • Refer to LSS functionality for Lift and Drive restrictions. • This fault shall be suppressed if technician navigates to the CALIBRATIONS menu of the ANALYZER.
256	DRIVE PREVENTED – POT-HOLE NOT ENGAGED	PF: 500ms On/500ms Off GND: 500ms On/ 500ms Off	2_5	• DriveState = PREVENTED	• While elevated, driving is not possible since the control system detected that the pot-hole protection mechanism failed to deploy. Clear the obstacle blocking the pot-hole protection mechanism, repair the mechanical problem, re-adjust the pot-hole limit switches, or repair the wiring to correct the problem. • Alternately, there may be difficulty with the Elevation Angle Sensor that causes the Control System to improperly believe the platform is elevated.

DTC	Help Message	Alarm	Flash Code	Action	Trigger
2568	TEMPERATURE CUTOUT ACTIVE - AMBIENT TEMPERATURE TOO LOW	If Transport Mode= TRUE PF: Continuous If Transport Mode= FALSE PF: OFF	2_5	• Drive and Lift Restrictions	• The temperature as communicated by the temperature sensor located on the temperature/tilt sensor is less than or equal to {PERSONALITIES->TEMP CUTOUT->CUTOUT SET} • (See Low Temperature Cutout Functionality) • This DTC shall not be displayed in GroundMode, and no restrictions shall be implemented.
421	POWER MODULE TOO HOT - PLEASE WAIT	None	4_2	• DriveState = PREVENTED • LiftUpState = PREVENTED	• Heatsink temperature above 203°F (95° C). • **Possible Cause:** • Controller is operating in an extreme environment. • Excessive load on vehicle. • Improper mounting of controller
4235	POWER MODULE TOO HOT - REDUCED OPERATION	None	4_2	• DriveState =CREEP • LiftUpState = CREEP	• Heatsink temperature exceeded 185° F (85° C). • **Effect:** Reduced drive and brake torque. • **Possible Cause:** • Controller is performance-limited at this temperature. • Controller is operating in an extreme environment. • Excessive load on vehicle • Improper mounting of controller.

DTC	Help Message	Alarm	Flash Code	Action	Trigger
4236	POWER MODULE TOO COLD - MODULE SHUT- DOWN	None	4_2	• DriveState = PREVENTED • LiftUpState = PREVENTED	• Heatsink temperature below -40° F(-40°C). • **Possible Cause:** • Controller is operating in an extreme environment.
426	MASTER MODULE TEMPERATURE – OUT OF RANGE	None	4_2	• Normal operation	• The Ground Module's internal temperature sensor is out of range. (<104° F (40° C) or > 302° F (150° C)
441	BATTERY VOLTAGE TOO LOW – SYSTEM SHUTDOWN	None	4_4	• SafeMode • LiftDownState = PREVENTED	• Battery Voltage (VBAT) momentarily dropped below 14.5V when using flooded lead-acid batteries, or 16.0V when using AGM batteries. With a low battery charge, this can occur during heavy current demand due to Drive, Steer, or Lift Up. Recharge batteries or check for damaged batteries, sulfated batteries, or poor power connections.
44156	POWER MODULE LOGIC VOLTAGE - INCORRECT AT POWER ON	None	4_4	• DriveState = PREVENTED • LiftUpState = PREVENTED	Power Module Voltage at the logic Ignition pin is incorrect/ out of range for proper operation (Less than 14V or greater than 32V)
44161	POWER MODULE VOLTAGE – OUT OF RANGE	None	4_4	• DriveState = PREVENTED • LiftUpState = PREVENTED	Power Module Voltage at the power Module Contactor output/high current B+ on the power module is incorrect/out of range for proper operation (Less than 14V or greater than 32V)

DTC	Help Message	Alarm	Flash Code	Action	Trigger
44188	BATTERY DISCHARGE CURRENT LIMITED - REDUCED SPEEDS	None	4_4	• DriveState = Creep • DriveState = Prevented if AdjustedYTiltValue < -3.0deg for 0.5s AND Joystick Command indciates Drive Up the Hill OR AdjustedYTiltValue > +3.0deg for 0.5s AND Joystick Command Indicates Drive Up the Hill • LiftUpState = PREVENTED	• Trigger Condition: When MACHINE SETUP ==> BATTERY = {LITHIUM or LITHIUM +} AND the GM determines the VB_Discharge_Current_Limit signal communicated by the BMS is < 135 (Must be adjustable in Constant Data) and >= 90A for 1.0s • Reset Condition: VB_Discharge_Current_Limit >= 135A for 3.0s • Possible Fix: - Allow the battery to warm up - Charge the battery
44189	BATTERY DISCHARGE CURRENT TOO LOW - FUNCTIONS PREVENTED	None	4_4	• LiftUpState = PREVENTED • DriveState = PREVENTED	• Trigger Condition: When MACHINE SETUP ==> BATTERY = {LITHIUM or LITHIUM +} AND the GM determines the VB_Discharge_Current_Limit signal communicated by the BMS is < 90A for 1.0s • Reset Condition: VB_Discharge_Current_Limit >= 90A for 3.0s • Possible Fix: - Allow the battery to warm up - Charge the battery
442	BATTERY VOLTAGE TOO HIGH – SYSTEM SHUTDOWN	None	4_4	• Enter SafeMode • LiftDownState = MAX	• The Ground Module measured excessively high battery voltage (VBAT) (>32.0V) and de-energized the Main Line Contactor and Battery Relay to protect system devices and was unable to bring voltage down to normal operating range. This may be due to improper battery charging or incorrect voltage batteries being used.

DTC	Help Message	Alarm	Flash Code	Action	Trigger
4421	LOGIC SUPPLY VOLTAGE OUT OF RANGE HIGH	None	4_4	• Enter SafeMode • LiftDownState = MAX	• The Ground Module's VSW voltage was measured to be more than 32V. This may be caused by loose battery terminal, severely discharged batteries, a damaged battery, or an improper wire harness connection.
4476	BATTERY VOLTAGE TOO HIGH – UNPLUG CHARGER	None	4_4	• Enter SafeMode • LiftDownState = MAX	• The Ground Module momentarily measured excessively high battery voltage (VBAT) (>32.0V) and entered SafeMode to protect system devices. This may be due to improper battery charging or incorrect voltage batteries being used.
4477	BATTERY VOLTAGE TOO HIGH – FORCING DISCHARGE	None	4_4	Lift Down = PREVENTED Lift Up = PREVENTED Drive = PREVENTED	• The Ground Module momentarily measured excessively high battery voltage (VBAT) (>32.0V) and entered SafeMode. This may be due to improper battery charging or incorrect voltage batteries being used.

Serial Number _____

Any additional required certificates can be attached to the rear cover of this manual or stored in the manual box.

Date	Comments



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