



An Oshkosh Corporation Company

Operation and Safety Manual

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

Model X540AJ/X18JP

X600AJ/X20JP

X600AJ - S/N C170003921 to present

ANSI



31223076

March 26, 2025 - Rev C



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.

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 POTENTIALITY HAZARDOUS SITUATION. IF NOT AVOIDED, COULD RESULT IN SERIOUS INJURY OR DEATH. THIS DECAL WILL HAVE AN ORANGE BACKGROUND.

CAUTION

INDICATES A POTENTIALITY 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 Your Local JLG Office
(See addresses on inside of manual cover)

In USA:

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

Outside USA:

Phone: 240-420-2661

E-mail: ProductSafety@JLG.com

REVISION LOG

Original Issue	A - January 8, 2024
Revision	B - January 27, 2025
Revision	C - March 26, 2025

FOREWORD	1-A	2.2 PREPARATION, INSPECTION, AND MAINTENANCE	2-2
SAFETY ALERT SYMBOLS AND SAFETY SIGNAL WORDS	1-B	Machine Familiarization	2-2
REVISION LOG	1-D	Pre-Start Inspection	2-4
SECTION - 1 - SAFETY PRECAUTIONS		Walk-Around Inspection	2-6
1.1 GENERAL	1-1	General	2-6
1.2 PRE-OPERATION	1-1	Function Check	2-8
Operator Training and Knowledge	1-1	SECTION - 3 - MACHINE CONTROLS, INDICATORS AND OPERATION	
Workplace Inspection	1-2	3.1 GROUND CONTROL STATION	3-3
Machine Inspection	1-3	Ground Control Station - Emergency Boom/Platform Functions	3-4
1.3 OPERATION	1-3	Ground Control Station - Emergency Chassis/Drive Functions	3-7
General	1-3	3.2 PLATFORM/REMOTE CONTROL STATION	3-9
Trip and Fall Hazards	1-4	Platform/Remote Control Station Functions	3-10
Electrocution Hazards	1-5	Remote Control Platform Position Connection	3-13
Tipping Hazards	1-6	Remote Control Ground Position Connection	3-14
Crushing and Collision Hazards	1-9	Remote Control LCD Display	3-15
1.4 TOWING, LIFTING, AND HAULING	1-9	3.3 WIRELESS CONTROLLER (RADIO CONTROL)	3-21
1.5 MAINTENANCE	1-10	Wireless Controller (If Equipped)	3-22
Maintenance Hazards	1-10	SECTION - 4 - MACHINE OPERATION	
Battery Hazards	1-11	4.1 DESCRIPTION	4-1
Long-Term Storage	1-12	4.2 BOOM OPERATING CHARACTERISTICS AND LIMITATIONS	4-1
SECTION - 2 - PREPARATION AND INSPECTION		Capacities	4-1
2.1 PERSONNEL TRAINING	2-1	Stability	4-1
Operator Training	2-1		
Training Supervision	2-1		
Operator Responsibility	2-1		

TABLE OF CONTENTS

4.3	ENGINE OPERATION	4-2
	Starting Procedure - Combustion Engine Machine 4-2	
	Shutdown Procedure - Combustion Engine Machine 4-3	
	Starting Procedure - Lithium Machine (Electric) . . 4-3	
	Shutdown Procedure - Lithium Machine (Electric) 4-4	
	Starting Procedure - Bi-Energy Machine (Combustion Engine Option) 4-4	
	Shutdown Procedure - Bi-Energy Machine (Combustion Engine Option) 4-5	
	Starting Procedure - Bi-Energy Machine (Electric Motor/Lithium-Ion Option) 4-5	
	Shutdown Procedure - Bi-Energy Machine (Electric Motor/Lithium-Ion Option) 4-6	
4.4	BASE AND BOOM/JIB ALIGNMENT	4-7
4.5	TRACKS - DRIVING, STEERING AND TRACK WIDTH ADJUST 4-8	
	Track Width Adjust	4-8
	Traveling (Drive and Steer)	4-8
	Traveling (Grades and Side Slopes)	4-8
	Jib Position for Traveling	4-11
4.6	OUTRIGGER OPERATION.	4-12
	Setting Outriggers From the Platform/Remote Console 4-13	
	Retracting The Outriggers (Reference Figure 4-5. for item numbers) 4-15	
4.7	BOOM/PLATFORM OPERATION.	4-15
	Overload Alarm	4-16

	Raise And Lower The Boom	4-16
	Telescope The Main Boom	4-16
	Platform Rotation	4-16
	Raise And Lower The Jib	4-17
	Swinging The Boom.	4-17
	(Item 21, Figure 4-2.)	4-17
	SkyGuard Operation	4-19
	Manual Descent (Emergency Lowering)	4-20
4.8	PLATFORM REMOVAL/INSTALLATION	4-20
4.9	BATTERY CHARGING.	4-20
	Charging the Battery Pack	4-21
	Charge Curve	4-23
	Cold Weather Charging	4-23
	Cooling Fans	4-23
4.10	SHUT DOWN AND PARK	4-24
4.11	LIFTING AND TIE DOWN	4-25
	Lifting - Outrigger Lifting Rings	4-25
	Lifting - Fork Lift Pockets	4-27
	Loading and Unloading the Machine on Transport Vehicles Using Ramps 4-27	
	Tie Down.	4-28
4.12	MACHINE DECALS	4-31

SECTION - 5 - EMERGENCY PROCEDURE

5.1	GENERAL	5-1
5.2	INCIDENT NOTIFICATION	5-1
5.3	EMERGENCY OPERATION	5-2
	Power Main Cut-Off Switch Location	5-2

Operator Unable to Control Machine	5-2	Interval - Clean or replace every 500 hours . . .	6-14
Platform or Boom Caught Overhead	5-3	Interval - Clean every 100 hours	6-14
5.4 MANUAL DESCENT WITH POWER	5-3	Hydraulic Oil Tank and Filter Cartridge	6-15
For Lithium or Combustion Engine Option Machines	5-3	Rubber Track Maintenance/Replacement	6-16
For Bi-Energy Option Machines	5-5	Wear Pad Inspection	6-19
5.5 MANUAL DESCENT USING HAND PUMP	5-8	Turntable Attach Bolts	6-19
Platform Retrieval Sequence	5-8	Battery Maintenance and Charging - Gas/AC-Electric	6-19
5.6 BYPASS SWITCH - SAFETY DEVICES	5-9	6.4 ELECTRIC MOTOR MAINTENANCE	6-20
5.7 EMERGENCY DESCENT IF OUTRIGGER LOSES		Electric Motor	6-20
GROUND CONTACT5-11		6.5 PLATFORM/REMOTE CONTROL SERVICE MENU .	6-21
5.8 EMERGENCY REALIGNMENT PROCEDURES . .	5-12	Service Button	6-21
SECTION - 6 - GENERAL SPECIFICATIONS AND OPERA-		Menu Input	6-22
TOR MAINTENANCE		Errors Menu	6-34
6.1 INTRODUCTION	6-1	Working Hours Menu	6-34
6.2 OPERATING SPECIFICATIONS	6-2	Set-up Menu	6-34
Dimensional Data	6-2	Joystick Menu	6-34
Chassis	6-2	6.6 LITHIUM-ION MACHINE ONLY - ADDITIONAL MAIN-	
Chassis Data (Continued)	6-3	TAINANCE INFORMATION6-35	
Capacities	6-3	Cleaning the Machine	6-35
Combustion Engine Data	6-3	Lithium-Ion Machine Fault Codes	6-36
Lithium-Ion Specifications	6-4	BMS Fault Codes - (Battery Management System)6-	39
Machine Major Component Weights	6-4	Battery Charger Fault Codes	6-40
6.3 SERVICE/MAINTENANCE	6-5	6.7 LITHIUM-ION BATTERY PACK - HANDLING IN DAN-	
Cleaning the Machine	6-5	GEROUS CONDITIONS6-42	
Lubrication	6-7	Procedure For Handling Hot Cells	6-43
Hydraulic Oil Specifications	6-8	Procedure For Handling Vented Cells	6-43

TABLE OF CONTENTS

	Procedure For Exploded Cells	6-45
	Lithium Battery Fire	6-47
6.8	SUPPLEMENTAL INFORMATION ONLY APPLICABLE TO CE MACHINES (EN280-1:2022)	6-49
	EC Declaration of Conformity	6-51
6.9	SUPPLEMENTAL INFORMATION ONLY APPLICABLE TO CE MACHINES (EN280:2013+A1:2015)	6-52
	EC Declaration of Conformity	6-53

SECTION - 7 - INSPECTION AND REPAIR LOG

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 and 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").

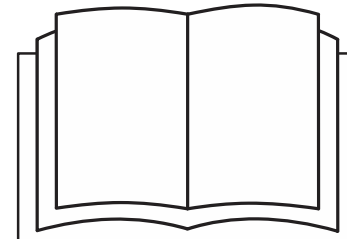
⚠ WARNING

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

Operator Training and Knowledge

- The Operation and Safety Manual must be read and understood in its entirety before operating the machine. For clarification, questions, or additional information regarding any portions of this manual, contact JLG Industries, Inc.



SECTION 1 - SAFETY PRECAUTIONS

- Only personnel who have received proper training regarding the inspection, application and operation of MEWPs (including recognition 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.
- 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 outrigger load indicated on the outrigger load decals located on the machine.
- 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.

Workplace Inspection

- Precautions to avoid all hazards in the work area must be taken by the user before and during operation of the machine.

Machine Inspection

- Do not operate this machine until the inspections and functional checks as specified in Section 2 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 and 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

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.

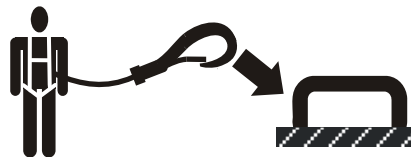
SECTION 1 - SAFETY PRECAUTIONS

- 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.
- When driving, always position boom over rear axle in line with the direction of travel. Remember, if boom is over the front axle, steer and drive functions will be reversed.
- 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.

Trip and Fall Hazards

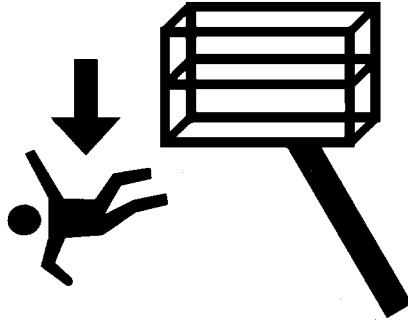
- Prior to operation, ensure all gates are closed and fastened in their proper position.
- During operation, occupants in the platform must wear a full body harness with a lanyard attached to an authorized lanyard anchorage point. Attach only one (1) lanyard per lanyard anchorage point.



NOTE: *For machines covered under CE/UKCA certifications, the utilization of fall protection systems is limited to fall restraint devices.*

- 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 platform 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

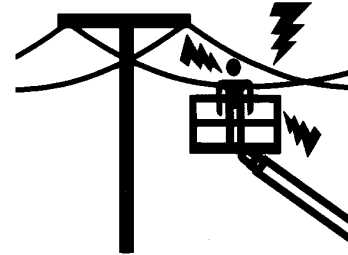
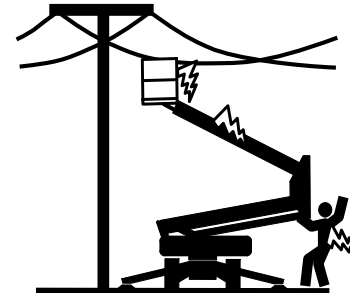
ladders, boxes, steps, planks, or similar items on unit to provide additional reach for any purpose.



- Keep oil, mud, and slippery substances cleaned from footwear and the platform floor.

Electrocution Hazards

- This machine is not insulated and does not provide protection from contact or proximity to electrical current.



- Maintain distance from electrical lines, apparatus, or any energized (exposed or insulated) parts according to the Minimum Approach Distance (MAD) as shown in Table 1-1.

SECTION 1 - SAFETY PRECAUTIONS

- Allow for machine movement and electrical line swaying.

Table 1-1. Minimum Approach Distances (M.A.D.)

Voltage Range (Phase to Phase)	MINIMUM APPROACH DISTANCE in Feet (Meters)
0 to 50 KV	10 (3)
Over 50KV to 200 KV	15 (5)
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: <i>This requirement shall apply except where employer, local or governmental regulations are more stringent.</i>	

- Maintain a clearance of at least 10 ft. (3m) 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 minimum approach distance 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 minimum approach distance shall be reduced to a distance within the designed working dimensions of the insulating barrier. This determination shall be made by a qualified person in accordance with the employer, local, or governmental requirements for work practices near energized equipment.

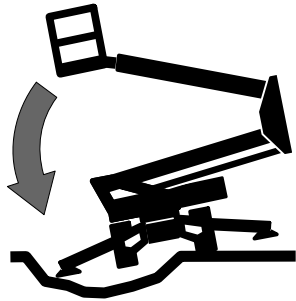


DO NOT MANEUVER MACHINE OR PERSONNEL INSIDE PROHIBITED ZONE (MAD). ASSUME ALL ELECTRICAL PARTS AND WIRING ARE ENERGIZED UNLESS KNOWN OTHERWISE.

Tipping Hazards

- Ensure that the ground conditions are adequate to support the maximum outrigger load indicated on the outrigger load decals located on the machine. Do not travel on unsupported surfaces.

- The user must be familiar with the operating surface before driving. Do not exceed the allowable sideslope and grade while driving.



- Do not elevate platform 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.
- Before driving on floors, bridges, trucks, and other surfaces, check allowable capacity of the surfaces.
- Do not elevate the platform unless the machine is on a firm operating surface and outriggers are properly set.
- Never exceed the maximum work load as specified on the platform. Keep all loads within the confines of the platform, unless authorized by JLG.
- Keep the chassis and outriggers of the machine a minimum of 2 ft. (0.6m) 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 boom.
- 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.
- Do not operate the machine when wind conditions exceed 28 mph (12.5 m/s). Refer to Table 1-2, Beaufort Scale (For Reference Only). 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 into 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.

SECTION 1 - SAFETY PRECAUTIONS

- Do not increase the platform size with unauthorized modifications or attachments.
- If boom assembly or platform is in a position that one or more outriggers are off the ground, all persons must be removed before attempting to stabilize the machine. Use cranes, forklift trucks, or other appropriate equipment to stabilize machine.

 WARNING

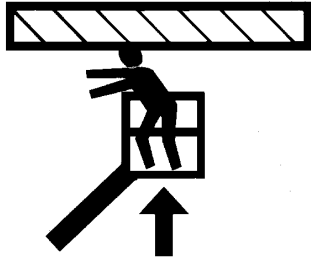
DO NOT OPERATE THE MACHINE WHEN WIND CONDITIONS EXCEED SPECIFICATIONS SHOWN IN SECTION 6, OR AS SHOWN ON THE CAPACITY PLACARD ON THE PLATFORM BILLBOARD.

Table 1-2. 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.

Crushing and Collision Hazards

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



- During operation, keep all body parts inside platform railing.
- Use the boom functions, not the drive function, to position the platform close to obstacles.
- Always post a lookout when driving in areas where vision is obstructed.
- Keep non-operating personnel at least 6 ft. (1.8m) away from machine during all driving and swing 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, switch to low 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.
- 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.

1.4 TOWING, LIFTING, AND HAULING

- Never allow personnel in platform while towing, lifting, or hauling.
- Ensure boom is in the stowed position and the turntable locked prior to towing, lifting or hauling. The platform must be completely empty of tools.

SECTION 1 - SAFETY PRECAUTIONS

- When lifting machine, lift only at designated areas of the machine. Lift the unit with equipment of adequate capacity.
- Refer to the Machine 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.

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, replace-

ment 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.
- Do not use machine as a ground for welding.
- When performing welding or metal cutting operations, precautions must be taken to protect the chassis from direct exposure to weld and metal cutting spatter.
- Do not refuel the machine with the engine running.
- 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 and 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.

Battery Hazards

- 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.

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. 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.

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 MEWPs 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.

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.

Operator Responsibility

The operator must be instructed that he/she has 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.

2.2 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. Frequency of inspections and maintenance must be increased as necessary when machine is used in a harsh or hostile environment, if machine is used with increased frequency, or if machine is used in a severe manner.

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 users 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.

NOTICE

JLG INDUSTRIES, INC. RECOGNIZES A FACTORY TRAINED SERVICE TECHNICIAN AS A PERSON WHO HAS SUCCESSFULLY COMPLETED THE JLG SERVICE TRAINING SCHOOL FOR THE SPECIFIC JLG PRODUCT.

Table 2-1. Inspection and Maintenance Table

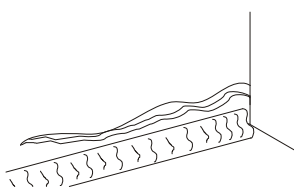
Type	Frequency	Primary Responsibility	Service Qualification	Reference
Pre-Start Inspection	Before using each day; or whenever there's an Operator change.	User or Operator	User or Operator	Operation and Safety Manual
Pre-Delivery Inspection (See Note)	Before each sale, lease, or rental delivery.	Owner, Dealer, or User	Qualified JLG Mechanic	Service and Maintenance Manual and applicable JLG inspection form
Frequent Inspection	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 and Maintenance Manual and applicable JLG inspection form
Annual Machine Inspection	Annually, no later than 13 months from the date of prior inspection.	Owner, Dealer, or User	Factory Trained Service Technician (Recommended)	Service and Maintenance Manual and applicable JLG inspection form
Preventive Maintenance	At intervals as specified in the Service and Maintenance Manual.	Owner, Dealer, or User	Qualified JLG Mechanic	Service and Maintenance Manual
<p>NOTE: Inspection forms are available from JLG. Refer to Section 6 - Operators Maintenance when performing inspections.</p> <p>NOTE: JLG Industries, Inc. recognizes a factory trained service technician as a person who has successfully completed the JLG service training school for the specific JLG product.</p>				

SECTION 2 - PREPARATION AND INSPECTION

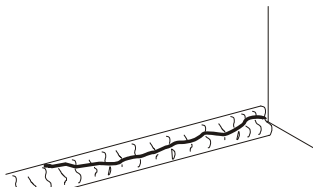
Pre-Start Inspection

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.



Parent Metal Crack



Weld Crack

3. **Decals and Placards** – Check all for cleanliness and legibility. Make sure none of the decals and

placards are missing. Make sure all illegible decals and placards are cleaned or replaced.

4. **Operation and Safety Manuals** – Make sure a copy of the Operation and 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** – Refer to Figure 2-1.
6. **Battery** – Charge as required.
7. **Fuel (Combustion Engine Powered Machines)** – Add the proper fuel as necessary.
8. **Engine Oil Supply (Combustion Engine Powered Machines)** - Ensure the engine oil level is at the Full mark on the dipstick and the filler cap is secure.
9. **Hydraulic Oil** – Check the hydraulic oil level. Ensure hydraulic oil is added as required.
10. **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 Section 4 for more specific operating instructions.
11. **Platform Gate** – Keep gate and surrounding area clean and unobstructed. Verify 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.

12. Lanyard Attach Points – During operation, occupants in the platform must wear a full body harness with a lanyard attached to an authorized lanyard anchorage point. Attach only one (1) lanyard per lanyard anchorage point.

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.

SECTION 2 - PREPARATION AND INSPECTION

Walk-Around Inspection

General

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

WARNING

TO AVOID POSSIBLE INJURY, BE SURE MACHINE POWER IS OFF. DO NOT OPERATE MACHINE UNTIL ALL MALFUNCTIONS HAVE BEEN CORRECTED.

WARNING

DO NOT OVERLOOK VISUAL INSPECTION OF CHASSIS UNDERSIDE. CHECKING THIS AREA MAY RESULT IN DISCOVERY OF CONDITIONS WHICH COULD CAUSE EXTENSIVE MACHINE DAMAGE.

INSPECTION NOTE: *On all components, make sure there are no loose or missing parts, that they are securely fastened, and no visible damage, leaks or excessive wear exists in addition to any other criteria mentioned.*

1. **Platform Assembly, Footswitch, Ladders and Gates** - Footswitch in good working order, not modified, disabled or blocked. Manuals in storage container, access bar slides up and down properly, platform properly installed and with both caps screwed on. See Inspection Note.
2. **Control Stations** - Switches and buttons return to neutral when activated and released, decals/placards secure and legible, control markings legible.
3. **Outriggers** - Pads pivot freely. See Inspection Note.
4. **Lithium Ion Battery Pack & Electrical Components** - Free of debris. See Inspection Note.
5. **Hydraulic Tank** - Hydraulic oil level correct. See Inspection Note.
6. **Drive Tracks** - Properly Adjusted. See Inspection Note.
7. **Combustion Engine & Main Hydraulic Pump** - Free of debris and See Inspection Note.
8. **Hydraulic Valve, Hand Pump Assemblies & Low Voltage Battery** - See Inspection Note.
9. **Swing Drive, Turntable & Turntable Bearing** - Check for proper lubrication. See Inspection Note.
10. **Boom Sections** - See Inspection Note.
11. **Machine Bubble Level** - See Inspection Note.
12. **Platform Rotator** - See Inspection Note.

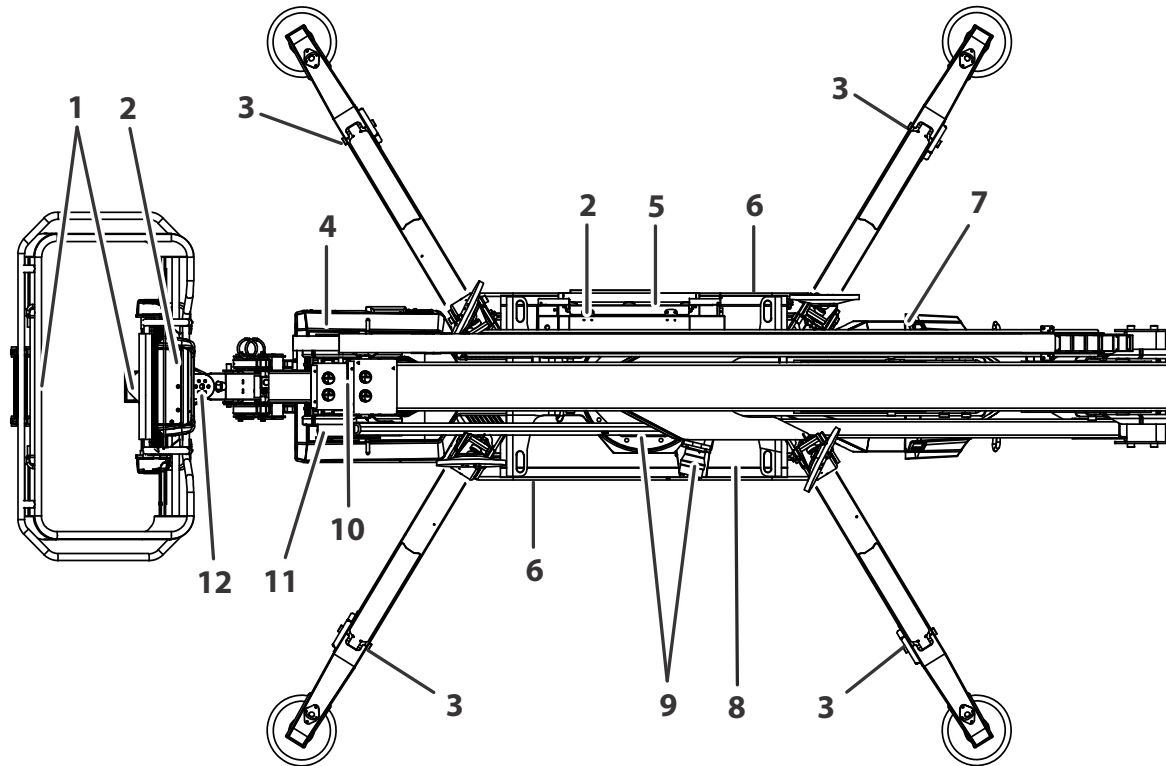


Figure 2-1. Walk-Around Inspection

Function Check



ENSURE NO FUNCTIONS (EXCEPT TRACK FUNCTIONS) OPERATE WHEN OUT-RIGGERS ARE NOT PROPERLY SET.

After properly setting the outriggers, perform the function check as follows:

1. From the ground control console with no load in the platform:
 - a. Check all guards protecting function control switches and controllers are in place.
 - b. Ensure all machine functions are disabled when Emergency Stop Button is pushed in.
 - c. Ensure all boom functions stop when function switch is released.
 - d. Operate all functions and ensure proper operation.
 - e. Ensure main lift down and jib lift down work properly when using the emergency lowering controls.
2. From the platform control console:
 - a. Ensure that the control console is firmly secured in the proper location.
 - b. Check that all guards protecting the function control switches and controllers are in place;
 - c. Ensure all boom functions stop when the foot switch is released.
 - d. Ensure that all machine functions are disabled when the Emergency Stop Button is pushed in.
 - e. Operate all functions and ensure proper operation.
 - f. Ensure main lift down and jib lift down work properly when using the emergency lowering controls.
3. SkyGuard™ Function Test
 - a. To test the SkyGuard feature - set up the machine and operate the telescope-out function from the platform controls.
 - b. Activate the SkyGuard sensor during telescope-out. The telescope-out function will stop and the telescope-in function will operate for a short duration. Also, the ground alarm will sound until the SkyGuard sensor is reconnected or footswitch is released.
 - c. Release the controls and reconnect the SkyGuard sensor. Recycle the e-stop and footswitch to ensure normal operation.
 - d. If SkyGuard sensor remains activated after function reversal or cutout, press and hold the SkyGuard Override Switch (button number 8)

to allow normal use of machine functions until the SkyGuard sensor can be reconnected.



1. SkyGuard™ SkyLine

2. SkyGuard™ Override Switch
(button number 8)

Figure 2-2. SkyGuard™ Sensor and Override Switch Location

SECTION 2 - PREPARATION AND INSPECTION

SECTION 3. MACHINE CONTROLS, INDICATORS AND OPERATION

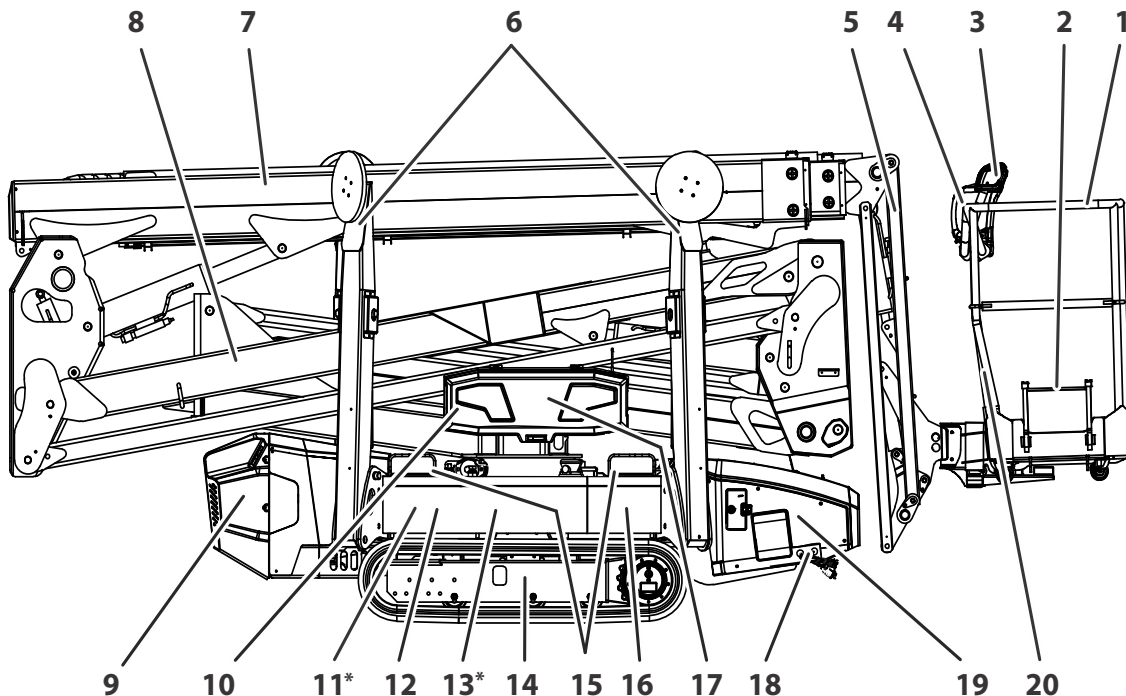


Figure 3-1. Basic Machine Component Locations

SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

Basic Machine Component Locations

- | | |
|---|--|
| 1. Platform | 11. 12V Battery (<i>*Opposite Side</i>) |
| 2. Platform Fold-Down Entry Ladder | 12. Hydraulic Oil Tank |
| 3. SkyGuard™ Sensor | 13. Ground Control - Outtrigger/Tracks (<i>*Opposite Side</i>) |
| 4. Platform/Remote Control Station | 14. Extendable Track Undercarriage |
| 5. Jib | 15. Forklift Pockets |
| 6. Outriggers (Stabilizers) | 16. Fuel Tank |
| 7. Main Boom | 17. Ground Control - Boom/Platform |
| 8. Tower Boom Assembly | 18. Battery Charging and Platform Power Cords |
| 9. Diesel Engine (Combustion/Bi-Energy Options) | 19. Lithium Battery (Lithium/Bi-Energy Options) |
| 10. Ground Emergency Stop | 20. Manuals Compartment |

SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

3.1 GROUND CONTROL STATION

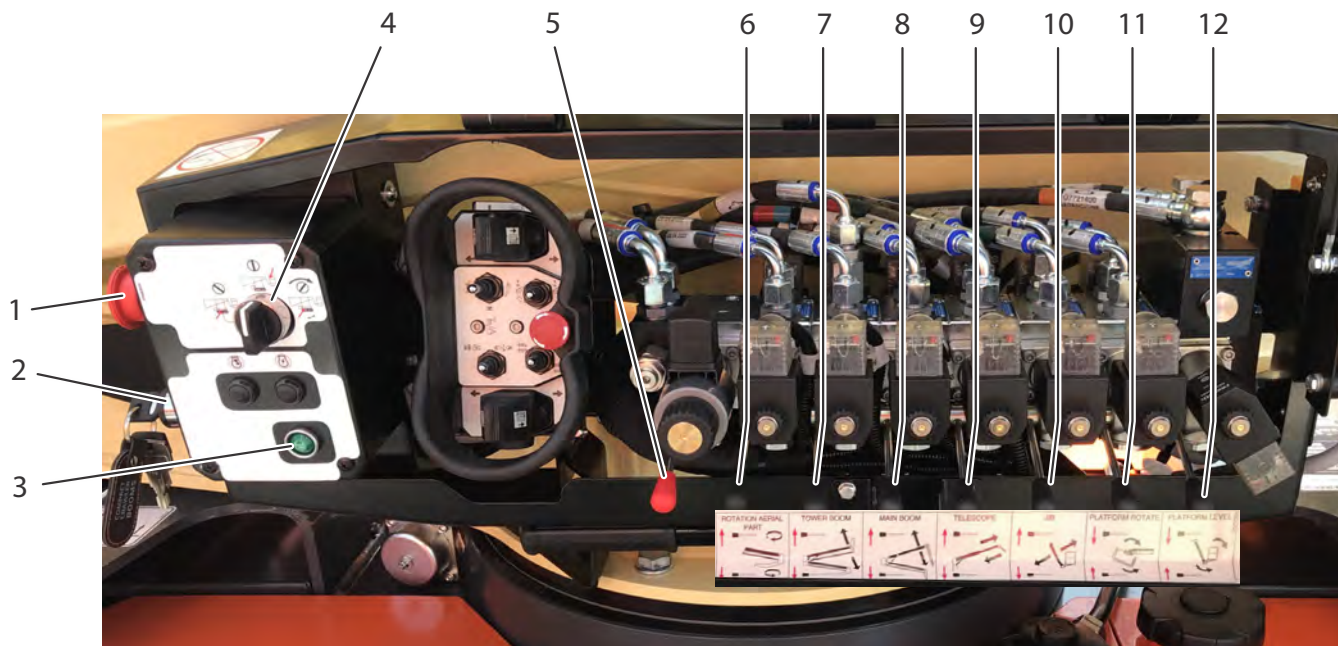


Figure 3-2. Ground Control Station - Emergency Boom/Platform Functions

SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

Ground Control Station - Emergency Boom/Platform Functions

See Figure 3-2.

WARNING

TO AVOID SERIOUS INJURY, DO NOT OPERATE MACHINE IF ANY CONTROL LEVERS OR SWITCHES CONTROLLING PLATFORM MOVEMENT DO NOT RETURN TO THE OFF POSITION WHEN RELEASED.

NOTICE

FOR PROLONGED SHUTDOWN OR WHILE PERFORMING MAINTENANCE/ REPAIRS, TURN OFF THE BATTERY DISCONNECT SWITCH.

1. Power/Emergency Stop Switch (E-Stop)

A two-position red switch supplies power to PLATFORM/GROUND/REMOTE SELECT switch when twisted clockwise to be in the out (on) position. When pushed in (off), power is shut off to the PLATFORM and GROUND controls.

2. Main Power Key Switch

This switch must be turned to the ON (I) position before power is supplied to the Power/Emergency

Stop switch. When machine is not in use, the key can be removed in the OFF (O) position.

3. Function Enable Light

Illuminates when outriggers are properly set and boom functions are allowed. Not illuminated indicates outriggers are not properly set and boom functions are not allowed.

4. Platform/Ground/Remote Select Switch

This three position selector switch provides power to the platform when in the center (neutral) position.

With the key switch turned clockwise and held, only the ground controls are operational. With the key switch turned counter-clockwise, the ground control electrical connector is enabled and the platform (remote) control station can be operated from the ground position.

5. Function Enable Lever

This lever must be engaged and held to operate platform, jib and boom functions from ground control.

NOTE: *FUNCTION ENABLE LEVER: Do not operate the boom controls unless the green light (item 3) is illuminated to indicate if operation is possible (machine stabilized) from these controls.*

SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

- 6. Swing Control**
Provides swing to the left or right of the boom assembly.
- 7. Tower Boom Lift Control**
Provides raising and lowering of the tower boom.
- 8. Main Boom Lift Control**
Provides raising and lowering of the main boom.
- 9. Main Boom Telescope Control**
Provides extension and retraction of the main boom.
- 10. Jib Lift**
Provides raising and lowering of the jib.
- 11. Platform Rotate Control**
Provides rotating the platform to the right or left.
- 12. Platform Level Control**
Provides for positioning the platform up and down to adjust the level of the platform.

WARNING

ONLY USE THE PLATFORM LEVELING OVERRIDE FUNCTION FOR SLIGHT LEVELING OF THE PLATFORM. INCORRECT USE COULD CAUSE THE LOAD/OCCUPANT TO SHIFT OR FALL. FAILURE TO DO SO COULD RESULT IN DEATH OR SERIOUS INJURY.

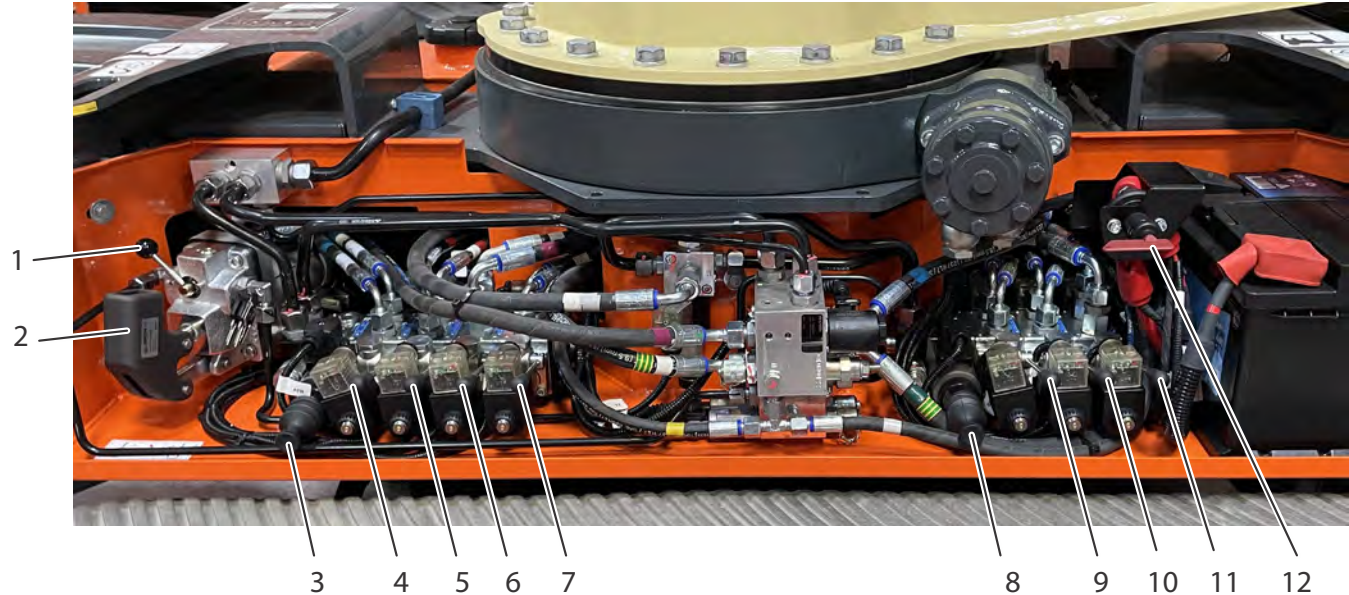


Figure 3-3. Ground Control Station - Emergency Chassis/Drive Functions

SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

Ground Control Station - Emergency Chassis/Drive Functions

See Figure 3-3.

WARNING

TO AVOID SERIOUS INJURY, DO NOT OPERATE MACHINE IF ANY CONTROL LEVERS OR SWITCHES CONTROLLING PLATFORM MOVEMENT DO NOT RETURN TO THE OFF POSITION WHEN RELEASED.

1. Hydraulic Components Select Lever (Diverter)
Two-position lever selects the hydraulic machine components the hand pump affects.
2. Hand Pump
Pressurizes the hydraulic system by hand for emergency movements if the main hydraulic system is inoperable.

NOTE: *A hand pump handle is stored under the Ground Control Station for Boom/Platform Functions.*

3. Function Enable Button
This button must be engaged and held to operate chassis hydraulic functions 4 through 7.

4. Left Rear Outrigger
Raises and lowers the left rear outrigger.
5. Left Front Outrigger
Raises and lowers the left front outrigger.
6. Left Track Drive Control
Moves left track forward (lever up) and backward (lever down).
7. Track Width Adjustment
Expands (lever up) or narrows (lever down) track width.
8. Function Enable Button
This button must be engaged and held to operate chassis hydraulic functions 9 through 11.
9. Right Rear Outrigger
Raises and lowers the right rear outrigger.
10. Right Front Outrigger
Raises and lowers the right front outrigger.
11. Right Track Drive Control
Moves right track forward (lever up) and backward (lever down).
12. Battery Disconnect Switch
Shuts off 12V battery power to the machine.

SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

CAUTION

BEFORE DISCONNECTING THE BATTERY POWER, MAKE SURE THAT THE MAIN POWER KEY SWITCH IS OFF AND THAT THE REMOTE CONTROL AND THE ELECTRONIC CARD ARE COMPLETELY OFF.

NOTICE

FOR PROLONGED SHUTDOWN OR WHILE PERFORMING MAINTENANCE/ REPAIRS, TURN OFF THE BATTERY DISCONNECT SWITCH.

3.2 PLATFORM/REMOTE CONTROL STATION

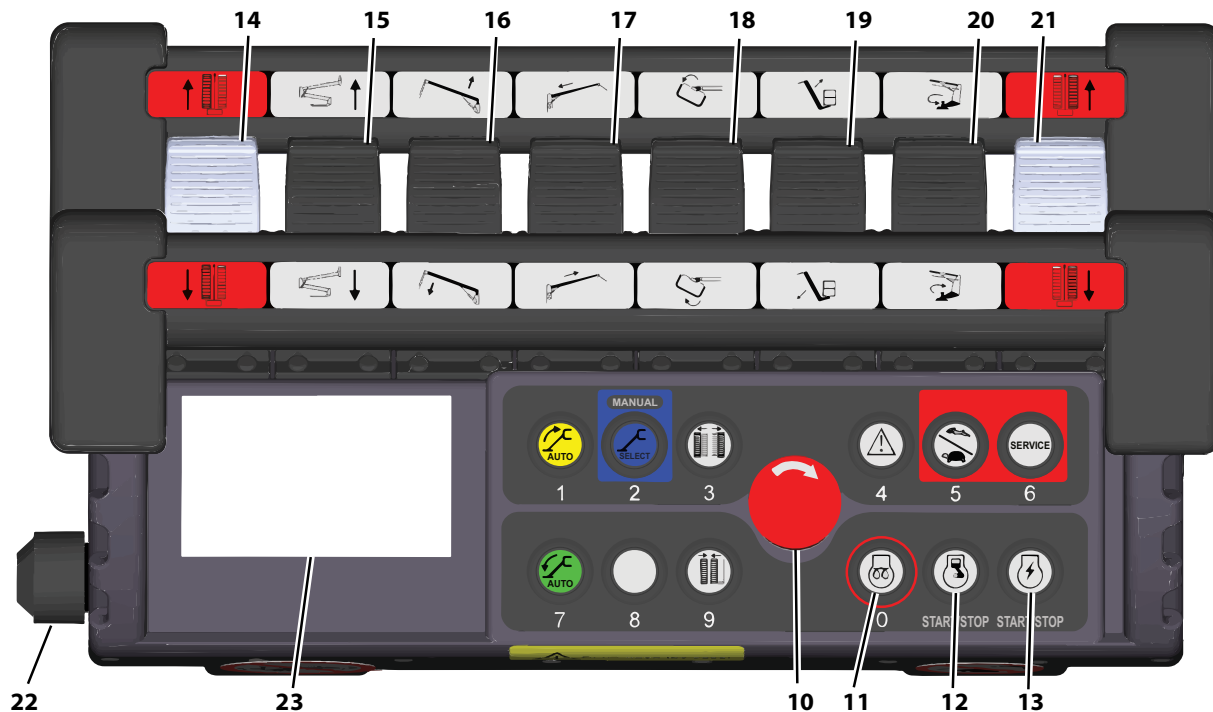


Figure 3-4. Platform/Remote Control Station

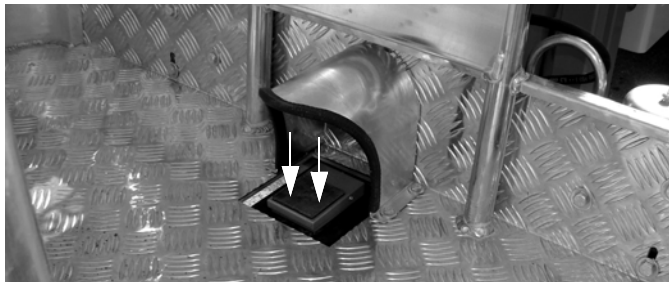
SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

Platform/Remote Control Station Functions

See Figure 3-4. Platform/Remote Control Station

Platform Foot Switch (see photo below)

To operate any function, the footswitch must be depressed and a function selected within seven seconds. If a function is not selected within seven seconds, or if a seven second lapse between ending one function and beginning the next function, the footswitch must be released and depressed again to enable the controls.



NOTICE

THE PLATFORM/REMOTE CONTROL IS MACHINE-MATCHED AT THE FACTORY. IT IS NOT RECOMMENDED TO REPLACE THE MACHINE UNIT WITH THOSE FROM OTHER MACHINES. ATTEMPTING TO REPLACE THE UNIT MAY CAUSE ABNORMAL FUNCTIONING AND MAY VOID WARRANTY.

NOTE: *Buttons 1, 2, 3, 4, 5, 6, 7, 8, 9, serve a double function - they can be used to operate a machine function (icon on button) or used as numerical keys (per number below the button) when the SERVICE button 6 (item 6) sub-menu is activated on the LCD display.*

1. Outrigger - Automatic Retract
This control allows the operator to control the retraction of all 4 outriggers at one time.
2. Outrigger - Manual
This control allows the operator to control the extension or retraction of one outrigger at a time.
3. Track Width Adjust
This control allows the operator to widen the track.
4. Emergency Lowering
This button allows the operator to lower the boom if engine power is not working.

NOTE: *Buttons 5 and 6 when pressed simultaneously also activate the horn.*

5. Speed Selector/Horn
This button allows the operator to select the desired engine speed for operation.
6. Service Menu/Horn
This button allows the operator to access the Service Menu.

SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

7. Outrigger - Automatic Set And Level

This control allows the operator to control the extension of all 4 outriggers at one time.

8. Selector Button

Used for selecting an item when the Service Menu button is pressed (*item 6*). This button is also used as the SkyGuard™ Override switch. When the SkyGuard™ system is engaged, press this button to override and disengage SkyGuard™.

9. Track Width Adjust

This control allows the operator to narrow the track.

10. Power/Emergency Stop (E-stop)

A two-position red switch supplies power to Platform Controls when turned counterclockwise (on). When pushed in (off), power is shut off to the platform and ground controls.

11. Glow Plug (*Diesel Engine Only*)

This button allows the operator to pre-heat the diesel engine in cold climates.

NOTE: On BiEnergy machines, buttons **12** and **13** are also used to switch between machine power sources.

12. Diesel Engine Start/Stop

Starts or stops the diesel engine.

Press once to select engine power. Press again to start engine. In colder ambient temperatures, press and hold to pre-heat the diesel engine glow plugs. (Engine starts in about 10-12 seconds).

Holding this button in with the engine running will shut off the engine.

13. Lithium Electric Power On/Off

Powers on or off the lithium electric system.

NOTE: *Controllers: (14 through 21) The speed of component movement is proportional to the controller distance from the center-neutral position.*

ERROR



Movement of a controller without first pressing the platform footswitch is indicated by the depress footswitch error icon on the platform/remote LCD display.

SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

14. Left Side Track Drive And Steer

This control when moved forward or rearward simultaneously with the right side track control (21), allows the operator to move the machine in a straight forward or reverse direction. If each control is moved individually, different amounts or in opposite directions steering the machine occurs.

15. Tower Boom Lift

This control allows the operator to raise and lower the tower boom.

16. Main Boom Lift

This control allows the operator to raise and lower the main boom.

17. Main Boom Telescope

This control allows the operator to extend and retract the main boom.

18. Platform Rotate

This control allows the operator to rotate the platform to the right or left.

19. Jib Lift

Control raises and lowers the jib.

20. Swing

This control allows the operator to swing the boom assembly to the right or left.

21. Right Side Track Drive And Steer

This control when moved forward or rearward simultaneously with the left side track control (14), allows the operator to move the machine in a straight forward or reverse direction or, if each control is moved individually or in opposite directions, to steer the machine.

22. Platform Level Switch

The control allows the operator to adjust the level of the platform up or down.



23. Display

Display shows status of machine and operating information. Wait until a display screen appears before starting operation.

SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

Remote Control Platform Position Connection

The platform/remote control is connected to the machine at the platform using a flexible cable.

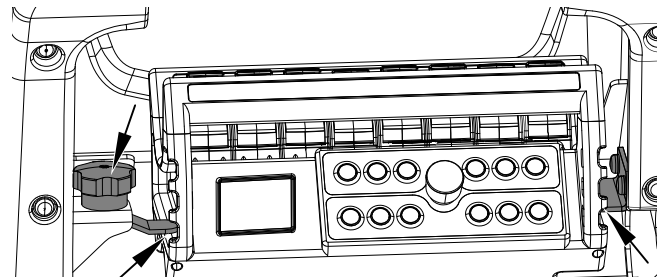
NOTE: Before removing or connecting the flex cable, the machine must be turned OFF and machine must be off.

Installing the Platform/Remote Control Station At The Platform

1. Connect the flexible control cable at the platform to the Platform/Remote Control Station box connector on the right side of the control box.



2. In the platform, slide the remote control station assembly into the storage box and place the rib on the right side of the control station assembly under the metal tab attached to the storage box assembly.



3. Lower remote control station assembly into the storage box, ensure the attached flexible cable slides into the slot also on the right side of the box.
4. On the left side of the control station secure the box by turning the handle on the locking tab clockwise locking the rib of the control station under the rotating metal tab of the handle assembly.
5. To remove the control station assembly, reverse the four steps above.

NOTE: The Platform/Remote control box may also be used to operate tracks, outriggers, and track widening by removing it from the platform storage box and plugging in at the ground control position. If outriggers are down, boom function (except jib) can be operated. The platform must be removed for jib operation.

SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

Remote Control Ground Position Connection

NOTICE

Using the platform/remote control station from this control position is for function check and maintenance only.

CAUTION

DO NOT OPERATE MACHINE USING THE PLATFORM/REMOTE CONTROL STATION FROM THIS POSITION IF ANYONE IS IN THE PLATFORM.

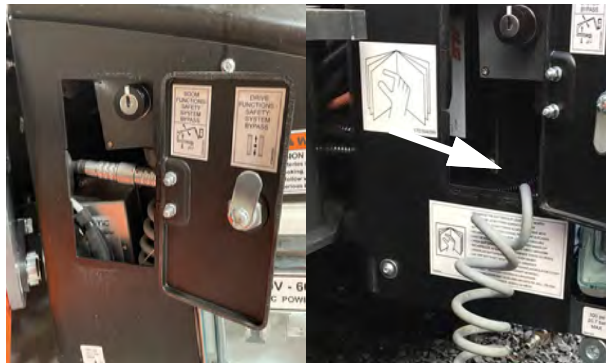
WARNING

WHEN OPERATING THE MACHINE FROM THE GROUND POSITION KEEP AT A DISTANCE OF AT LEAST 6 FT (1.8 M) FROM THE TRACKS.

Ground control position for the platform/remote control is possible by connecting the platform/remote control station to the ground/remote control cable located in the electrical component compartment. (See photo)

NOTE: Before removing or connecting the platform/remote control station, depress the emergency stop buttons and the machine must be off.

Open the electrical components cabinet door on the left side of the machine, (see image below) and disconnect the plug/cap from the end of the ground/remote cable. Connect the ground/remote control cable to the platform/remote control station cable connector.



To enable this position it is necessary to have the selector switch at the ground controls (Item 4 - Figure 3-2.) turned counterclockwise. This selector switch also overrides the footswitch in the platform.

WARNING

TO AVOID SERIOUS INJURY, DO NOT OPERATE MACHINE IF ANY CONTROL LEVERS OR CONTROL SWITCHES CONTROLLING PLATFORM MOVEMENT DO NOT RETURN TO THE OFF OR NEUTRAL POSITION WHEN RELEASED.

NOTE: Before removing or connecting the platform/remote control station, press the emergency stop buttons. Make sure machine is off. Before connecting the special adapter plug ensure there is no moisture in the electrical connectors at any time.

SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

Re-connect the platform/remote control station at the platform.

Remote Control LCD Display

At machine start-up and during machine operation the main LCD display screen (item 14 - Figure 3-4.) is activated. There are eight (8) display positions which indicate machine status during various stages of operation.

1	3	5	7
2	4	6	8

Position 1

1	3	5	7
2	4	6	8

Can indicate any of the following situations:

- Reduced operating area if all outriggers are not fully deployed.
- Rotation failure.
- Incorrect movements.



Position 2

1	3	5	7
2	4	6	8

Currently not used.

Position 3

1	3	5	7
2	4	6	8

Displays if selected engine (gas/diesel or electric) is on or off. The X on the icon indicates the engine is off.



SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

Position 4 Displays selected engine speed.

1	3	5	7
2	4	6	8



Position 5

1	3	5	7
2	4	6	8

- Indicates outriggers are properly set and boom functions allowed. No display indicates outriggers are not properly set and boom functions are not allowed.
- Displays overload icon when load sensor exceeds allowed work load.



Position 6

1	3	5	7
2	4	6	8

Indicates boom, jib, turntable, and base are aligned. Drive, steer, track width adjustment and outrigger functions are operational if this symbol below is present. No symbol indicates these functions are not operational. Drive and steer are operational if all 4 outriggers are not contacting the ground.

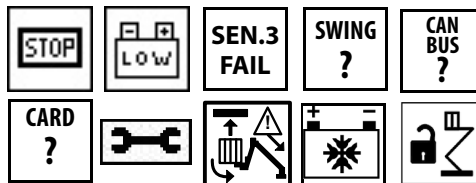


Position 7

1	3	5	7
2	4	6	8

Can indicate any of the following situations:

- An emergency stop is pushed in (off).
- A low battery. Batteries need charging by running the gas/diesel engine or connecting to a power source.
- Main boom sensor is faulty. Boom functions are cut out.
- Swing sensor is faulty.
- CANBUS communication is faulty.
- Electronic fault.
- Lithium ION - Signals an error in the BMS - Battery Management System
- SkyGuard System enabled.
- Battery cold/heater activated system is enabled.
- Safety by-pass activated



or:

- 50 Hr. - 1st Service Interval - See Section 6 - Table 6-10 and Table 6-11, Component Maintenance Intervals.



SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

Position 8

1	3	5	7
2	4	6	8

- Indicates emergency lowering has been selected.
- Lithium ION - Battery Charge Status and Battery Charger Plugged In.



SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

Table 3-1. LCD Display Icon Descriptions



Slow speed



Normal speed



Fast speed



Stop switch
pressed



Glow Plug
Preheat



Combustion
Engine ON



Electric Motor
ON



Electric Motor
Stop



Machine
Stabilized



Open
Outriggers



Lower
Outriggers



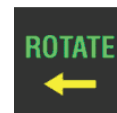
Raise
Outriggers



Press pedal



Rotate turret
Rightward



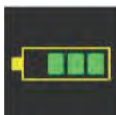
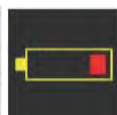
Rotate turret
Leftward



Select Outrigger
Direction



Battery
fully charged



Battery Charge Levels



Battery fully
discharged



Recharge
Battery



Battery
Charging



Cold weather
function active



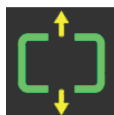
Battery low
voltage level



Turtle speed
due to low
battery charge



Automatic
movement
engaged



Aerial part
closed and
aligned



Only main movement
available during
translation



Emergency Descent:
Use Diesel Engine
(Bi-Energy Model)



Emergency Descent:
Use Electric Motor
(Bi-Energy Model)



SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

Table 3-1. LCD Display Icon Descriptions (Continued)



Remove weight or remote control from platform



Place remote in platform to move the outriggers



Safety state - Press and release RC Stop



Emergency descent engaged



Recommended movement during emergency descent



Safety bypass to activate ground part



Safety bypass to activate aerial part



Skyguard is activated



Close telescope on main boom



Close Jib - Jib position restricts stabilization



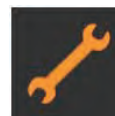
Max tilt angle reached during manual stabilization



Push button 8 to enable the required movement



Max tilt angle reached - Push button 8 to enable required movement



Error - refer to remote control error menu



Periodic maintenance reminder



Wrong model selected, aerial part not fed - Board out of order - Short on 5v line



Engine Oil Pressure



Engine Temperature



External Temperature Alarm



Platform weight not detected



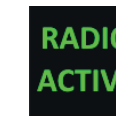
Platform overloaded



Radio Control OFF



Radio Control ON



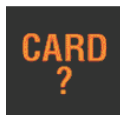
Radio Control ACTIVE

SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

Table 3-1. LCD Display Icon Descriptions (Continued)



Software Update



Board or software incorrectly installed



Sensor with double safety lines not congruent



Electric motor 380V not running



Aerial part in forbidden area - ropes or cylinder sensor error



Tilt sensor calibration required



Load cell sensor calibration required



Coil or sensor issue. Refer to relevant menu on remote control



Cycle ignition switch



Position control (remote or dashboard) not activated



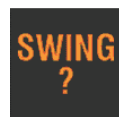
Cylinder sensor signal is missing



Can Bus Error - Check «Can Time Out» Menu



Turret rotation sensor calibration required



Turret rotation sensor alarm



Extension ropes alarm (check relevant input)

3.3 WIRELESS CONTROLLER (RADIO CONTROL)



Figure 3-5. Wireless Controller (Radio Control)

SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

Wireless Controller (If Equipped)

See Figure 3-4. Wireless Controller (Radio Control)

Wireless Controller Functions

The wireless controller operates drive, outrigger positioning, track widening and horn functions.

WARNING

WHEN OPERATING THE MACHINE FROM THE GROUND KEEP A DISTANCE OF AT LEAST 3 FT. (1M) FROM THE TRACKS.

WARNING

TO AVOID SERIOUS INJURY, DO NOT OPERATE MACHINE IF ANY CONTROL LEVERS OR TOGGLE SWITCHES DO NOT RETURN TO THE OFF POSITION WHEN RELEASED.

NOTICE

PRIOR TO OPERATION, ENSURE THERE ARE NO OTHER WIRELESS DEVICES NEAR THE MACHINE THAT COULD CREATE INTERFERENCE TO OR FROM THE WIRELESS CONTROLLER.

NOTICE

THE WIRELESS CONTROLLER IS MACHINE-MATCHED AT THE FACTORY. IT IS NOT RECOMMENDED TO REPLACE THE MACHINE UNIT WITH THOSE FROM OTHER MACHINES. ATTEMPTING TO REPLACE THE UNIT MAY CAUSE ABNORMAL FUNCTIONING AND MAY VOID WARRANTY.

1. Pairing Port

This port is used during the process of pairing the wireless controller to the machine. See Service Manual for pairing procedure.

2. Horn

This button sounds an audible alert (horn).

3. Activation and Secondary Control Button

This button activates the wireless controller. Once activated, the machine is connected and ready to receive commands from the controller.

This button also performs secondary functions when used in conjunction with other switches or controls. (Ex. Jib opening/closing)

4. Left Track Movement

This joystick moves the left track forwards and backwards.

5. Speed Selector

This button allows the operator to select the desired engine speed for operation.

Slow (Turtle) - Idling. Operation at lowest possible speed.

SECTION 3 - MACHINE CONTROLS, INDICATORS AND OPERATION

Normal (N) - Maximum engine speed but functional motors in minimum displacement mode. Movements will be at a medium speed.

Fast (Rabbit) - Maximum engine speed with functional motors in variable displacement mode. Movements will be at the maximum speed.

6. Outrigger - Automatic Set and Level
This control extends or retracts the outriggers and self-levels the machine.

NOTE: *Button 6 will also move the jib when pressing and holding button 3 simultaneously.*

7. Wireless Controller Status Indicator
This LED indicator will illuminate green or red based on wireless controller and machine status.

Green Light (Steady On) - Wireless controller connected and movements are enabled.

Green Light (Flashing - Three Times) - Self-stabilization completed successfully.

Red Light (Steady On) - Wireless controller connected and movements disabled.

Red Light (Flashing) - Wireless controller connected and requested movement or function is restricted.

8. Emergency Stop Switch

A two-position red switch supplies power to the wireless controller when turned counterclockwise (on). When pushed in (off), power is shut off to the platform and ground controls.

9. Wireless Controller Low Battery Indicator

This LED indicator will illuminate when the battery level of the wireless controller is low.

10. Track Width Adjust

This control allows the operator to widen or narrow the tracks.

11. Combustion Engine/Lithium Electric Selector

This switch selects machine operation from engine or electric power.

NOTE: *Button 11 will also pre-heat the glow plug when pressing and holding button 3 simultaneously.*

12. Right Track Movement

This joystick moves the left track forwards and backwards.

13. Power Switch

This turns on the wireless controller power.

SECTION 4. MACHINE OPERATION

4.1 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. The operator can control drive, steer, boom/platform functions and outriggers. The machine has a Ground Control Station which will override the Platform Control Station. Ground Controls operate boom and platform functions. Except for performing inspections and the function check, the ground controls are to be used in an emergency to lower the platform to the ground should the operator in the platform be unable to do so.

This machine is equipped with an ALL MOTION alarm warning system to alert other personnel in the work area of any machine movement during operation. The motion alarm system is activated during machine function movement such as track, boom, or outrigger operation.

4.2 BOOM OPERATING CHARACTERISTICS AND LIMITATIONS

Capacities

The boom can be raised from the transport position with or without any load in platform, if:

- Machine is positioned on a firm surface and outriggers set properly with the outrigger pads on horizontal surfaces.
- Load is within manufacturer's rated capacity.
- All machine systems are functioning properly.

Stability

In addition to the conditions listed above under Capacities, machine stability also depends on the following:

- A work surface capable of supporting the machine and a slope within machine leveling specifications.
- Platform is only operated within its work area specification for rated load and boom reach. (*See Figure 4-3.*)

SECTION 4 - MACHINE OPERATION

4.3 ENGINE OPERATION

Three engine/motor options are available on the X540AJ/X600AJ machines. The combustion engine option provides power through a diesel motor, and a lithium option provides power to an electric motor through a lithium-ion battery or directly via an AC power cord connection. The Bi-Energy option has both a diesel engine and an electric motor (lithium-ion connection) for power.

Starting Procedure - Combustion Engine Machine

The battery disconnect switch must be ON (*see Section 4.10 on page 4-24*). The emergency stop switch at the ground control station and platform control box must be ON (*turned clockwise*) to start the engine.

1. With power on, set the platform/ground control select switch to the platform control box (counter-clockwise) position.
2. Press and hold the diesel engine START/STOP button on the platform control box until engine starts.

NOTE: *Holding the diesel engine START/STOP button in will allow the glow plugs to come to an appropriate temperature for starting. When they are at temperature, the engine will start.*

NOTE: *If engine fails to start promptly, do not crank for an extended time. Should engine fail to start again, allow starter to cool off for 2-3 minutes. If engine fails after several attempts, refer to manufacturers engine maintenance manual.*

NOTE: *Allow engine to warm-up for a few minutes at low speed before applying any load.*

NOTE: *At low temperatures start the motor and let it run for a few minutes, so that the hydraulic oil circulates and reaches at least 50°F (10°C) before operating the platform.*

Shutdown Procedure - Combustion Engine Machine

1. Remove all load and allow engine to operate at low speed for 3-5 minutes; this allows further reduction of internal engine temperature.
2. Turn off the diesel engine by using the gas/diesel engine button (*item 12, Figure 4-6.*) on the platform/remote control box.
3. The shutdown procedure takes about 1 minute, wait for complete shut-off (display off).
4. Push in EMERGENCY STOP switches at the platform and ground, to the off position.
5. Turn engine key and main power key to off.

Starting Procedure - Lithium Machine (Electric)

⚠ CAUTION

ENSURE THE ELECTRICAL CIRCUIT BEING USED IS THE SAME VOLTAGE AND FREQUENCY INDICATED ON THE ELECTRIC MOTOR PLATE. USE AN AC EXTENSION CORD WITH SUFFICIENT AMPERAGE CAPACITY TO PROPERLY POWER THE MACHINE.



1. Before connecting the machine to the electrical circuit, ensure the key switch is in the OFF position.
2. Power the machine using a heavy duty AC (alternating current) power cord with sufficient amperage capacity, through the connector (1) positioned near the electric motor.
3. Turn on the circuit breaker switch (2) positioned behind the clear plastic cover near the electric motor (— symbol is ON, O symbol is OFF).
4. Power on the electric motor using the electrical motor START/STOP button on the platform control box and operate machine.

SECTION 4 - MACHINE OPERATION

Shutdown Procedure - Lithium Machine (Electric)

1. When finished operating with the electric motor, turn off breaker switch (2), and unhook the electric AC cord from connector (1).

Starting Procedure - Bi-Energy Machine (Combustion Engine Option)

Bi-Energy machines start from lithium-ion power by default. The first operation of the joystick will display the lithium-ion power icons on the controller.

To start the machine using the combustion engine, the battery disconnect switch must be ON (see Section 4.10 on page 4-24). The emergency stop switch at the ground control station and platform control box must be ON (turned clockwise) to start the engine.



1. With power on, set the platform/ground control select switch to the platform control box (counter-clockwise) position, then press and hold the diesel engine START/STOP button (1) on the platform control box.

NOTE: In colder ambient temperatures, pressing and holding the diesel engine START/STOP button will pre-heat the glow plugs.

2. Release the diesel engine START/STOP button (1).
3. Press the diesel engine START/STOP button (1) again to start the engine.

NOTE: If engine fails to start promptly, do not crank for an extended time. Should engine fail to start again, allow starter to cool off for 2-3 minutes. If engine fails after

several attempts, refer to manufacturers engine maintenance manual.

NOTE: *Allow engine to warm-up for a few minutes at low speed before applying any load.*

NOTE: *At low temperatures start the motor and let it run for a few minutes, so that the hydraulic oil circulates and reaches at least 50°F (10°C) before operating the platform.*

Shutdown Procedure - Bi-Energy Machine (Combustion Engine Option)

1. Remove all load and allow engine to operate at low speed for 3-5 minutes; this allows further reduction of internal engine temperature.
2. Turn off the diesel engine by pressing the diesel engine START/STOP button on the platform control box.
3. Wait for the display to turn off (complete shut-off).
4. Push in EMERGENCY STOP switches at the platform and ground, to the off position.
5. Turn engine key and main power key to off.

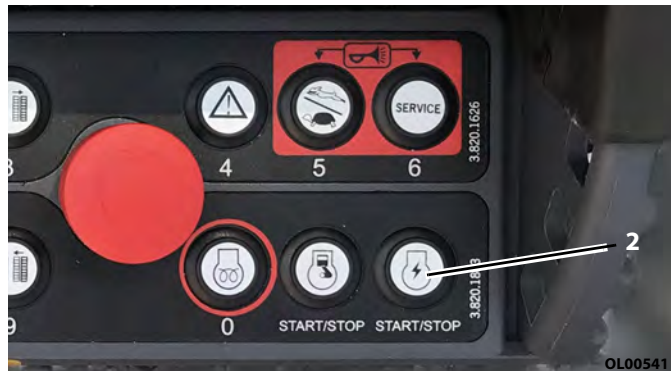
Starting Procedure - Bi-Energy Machine (Electric Motor/Lithium-Ion Option)

1. Turn on the circuit breaker switch (**1**) positioned behind the clear plastic cover on the lithium-ion battery (— symbol is ON, O symbol is OFF).



2. With power on, set the platform/ground control select switch to the platform control box (counter-clockwise) position, then press the electric power (Lithium Ion) START/STOP button (**2**) on the platform control box.

SECTION 4 - MACHINE OPERATION



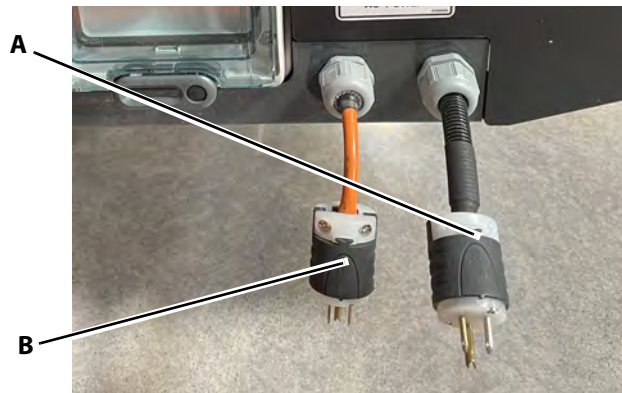
3. The Electric Motor and Lithium-Ion Battery Status icons will be visible on the LCD display.

Shutdown Procedure - Bi-Energy Machine (Electric Motor/Lithium-Ion Option)

1. Press the electric power (Lithium-Ion) START/STOP button (2) on the platform control box.
2. When the shutdown procedure is complete the LCD display will shut off.
3. Push EMERGENCY STOP switches at the platform and ground in, to the off position.
4. Turn engine key and main power key to off.

NOTE: On Bi-Energy machines the AC electric charging feature charges the Lithium-Ion battery while the machine is in operation. The machine will not operate directly from the AC connection.

NOTE: When viewing two receptacle cords on the lithium battery pack, one charges the lithium-ion battery (A) and the other (B) provides AC current to the platform to power accessories.

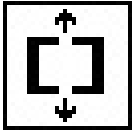


A. Lithium-Ion Battery Charging

B. 110V AC or 230V AC current to platform

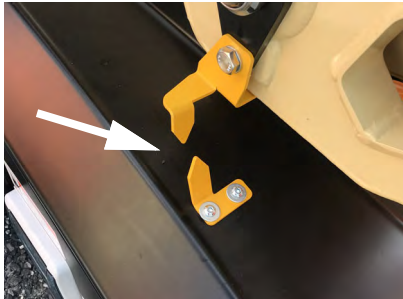
4.4 BASE AND BOOM/JIB ALIGNMENT

The machine has two reflectors/photocells that check if the boom assembly is completely lowered and retracted, the jib is lowered, and the turntable is aligned with the base. (see photos)



When these conditions are met this symbol will display in position (6) on the Platform/ Remote Control LCD display.

UNLESS THESE CONDITIONS ARE MET, DRIVE, STEER, TRACK WIDTH ADJUSTMENT, AND OUTRIGGER MOVEMENT IS PREVENTED.



Base/Boom Alignment - Visual Indicator



Boom/Jib and Base Alignment - Reflectors/Photocells

4.5 TRACKS - DRIVING, STEERING AND TRACK WIDTH ADJUST

⚠ WARNING

KEEP EVERYONE A DISTANCE OF AT LEAST 3 FT. (1M) FROM THE MACHINE WHEN OPERATING THE TRACKS.

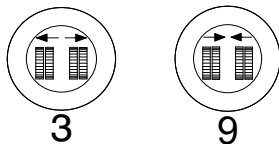
NOTE: *The base and boom/jib must be aligned and retracted before this function will operate, see Section 4.4, BASE AND BOOM/JIB ALIGNMENT.*

Track Width Adjust

NOTICE

DO NOT WIDEN OR NARROW THE TRACKS WIDTH WHEN PARKED WITH THE TRACKS ON THE GROUND. THE MACHINE MUST BE TRAVELLING OR RAISED ON ITS OUTRIGGERS WHEN OPERATING THIS FUNCTION.

Press and hold button 3 for widening or button 9 for narrowing the track.



Traveling (Drive and Steer)

⚠ WARNING

USE EXTREME CAUTION WHEN APPROACHING A CREST OF ANY TERRAIN OBSTACLE. CHECK FOR CURBS, LARGE STONES, OR OTHER TERRAIN OBSTACLES INCLUDING OVERHEAD OBSTACLES AS THE MACHINE WILL MAKE UNCONTROLLED PIVOTING MOTIONS WHEN THE CENTER OF GRAVITY (CENTER OF TRACK FRAME) SHIFTS OVER AN EDGE. SLOW DOWN TO MINIMIZE ACCELERATION DURING PIVOTING MOVEMENT.

USE EXTREME CAUTION WHEN DRIVING IN REVERSE.

- To drive straight forward or reverse, move the controllers for both tracks at the same time, direction and position.
- Always fully widen the track prior to driving, if possible, for easier steering and increased stability.
- Always travel in the slow speed setting unless the travel path is firm, level and uniform.

Traveling (Grades and Side Slopes)

⚠ WARNING

DO NOT DRIVE MACHINE ON GRADES EXCEEDING 16 DEGREES (28.7%).

USE RAMPS WHEN TRAVELLING ON STEPS OR OTHER SURFACES THAT ARE NOT SMOOTH OR HAVE GOOD TRACTION.

WHEN DRIVING ON SIDE-SLOPES, EXTEND THE LOW SIDE OUTRIGGERS

UNTIL THEY ARE CLOSE TO THE GROUND TO HELP PREVENT A TIP-OVER IF A CHANGE IN SURFACE OCCURS. (SEE FIGURE 4-1.) DRIVE ON SIDE-SLOPES WITH THE BOOM STOWED. DO NOT DRIVE ON SIDESLOPES WHICH EXCEED 10 DEGREES.

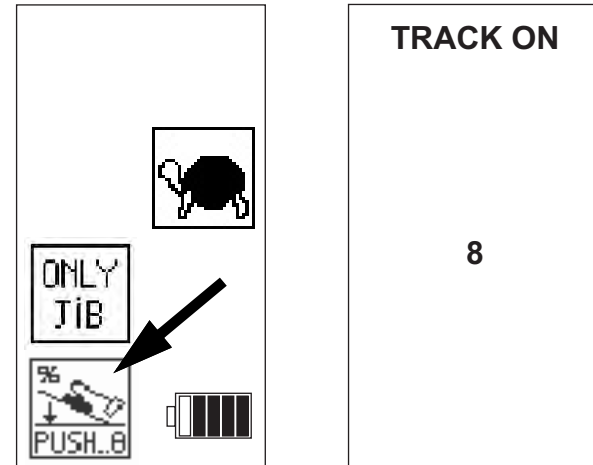
CUT-OUT CONDITION	EMPTY BASKET	BASKET WITH MORE THAN 40 Kg
Longitudinal Limit	16° (jib closed); 13° (jib open)	13°
Tracks Extended Side Limit	15°	15°
Tracks Retracted Side Limit	10°	10°

The machine is equipped with automatic tilt sensing during driving, the possible driving speeds are adjusted according to the weight in platform, undercarriage retracted or extended, position of JIB and inclination of the ground.

In case of approach to dangerous inclinations for machine's stability, both lateral and longitudinal, an alarm is activated and afterwards further movement is prohibited. The only allowed operation to exit this condition is activate the movement override, pressing button 8 on platform/remote control, (displays **TRACK ON** allowing 8 seconds of drive time with each press of the override button) and reposition the machine to a safer condition, reducing the inclination. It is absolutely forbidden to increase the inclination of the

machine as it could cause machine tipping with consequent danger for operator or people nearby the machine.

It is the operator's responsibility to run the machine safely, checking the ground conditions, evaluating the obstacles and dangers in the working area, and following the rules of this manual and indications on decals and display of the machine.



LCD - Showing Maximum Incline Exceeded - While Driving

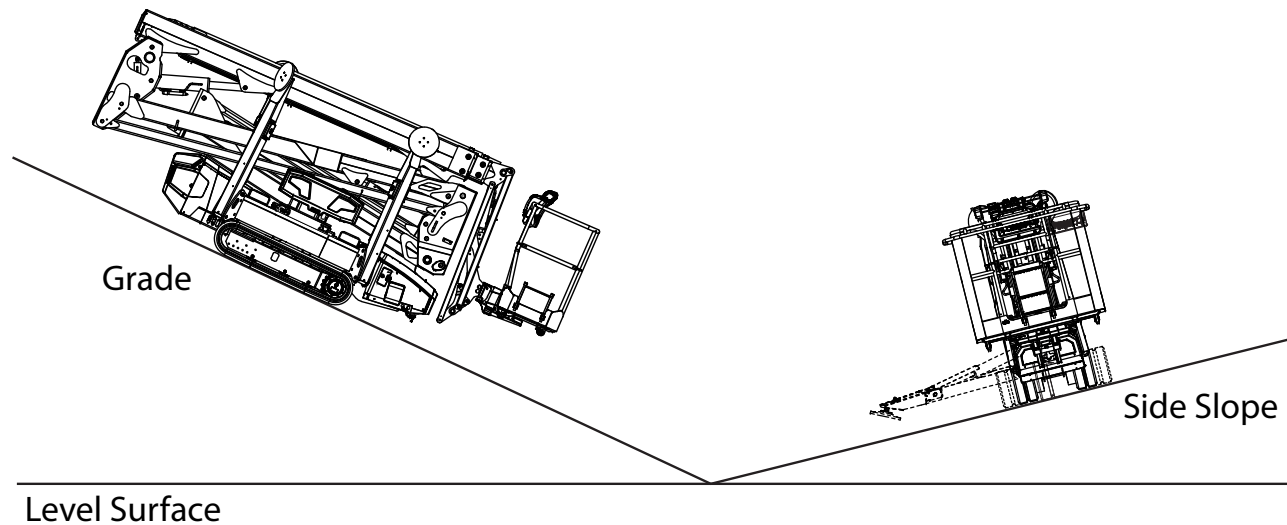


Figure 4-1. Grade and Side Slope Definition

Jib Position for Traveling

It is necessary to raise the jib arm when driving up or down slopes that exceed 10° and but less than the max. 16° to prevent the jib from contacting the ground.

NOTICE

ONLY PERFORM THIS OPERATION WHEN IT IS NECESSARY. IN ALL OTHER SITUATIONS, DRIVE WITH THE BOOM AND JIB FULLY LOWERED AND ALIGNED.



The permission to use the JIB is indicated by the icon in position 5 on the remote control display panel.

Before lifting the jib arm in the traversing phase, the following conditions must be verified:

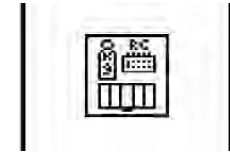
- All outriggers must be lifted from the ground
- There must be no operator in the basket
- The platform/remote control box must be removed from the platform and used from the ground.

NOTE: The aerial part safety device by-pass key must not have been activated after the machine has been closed and aligned.

If any of these conditions have not been met, the use of the jib is not possible and one of the following error displays appears.



OL00160



After these conditions have been met, make sure that there are no obstacles in the Jib working area and operate as follows:

- Activate the joystick for moving the jib arm. If a different joystick is activated an error message will appear on the display.
- After the slope has been passed, for which the jib had to be raised, fully lower the jib and continue traveling.
- With the jib raised, ALWAYS travel at minimum speed and keep the jib as near as possible to the ground.

4.6 OUTRIGGER OPERATION

 WARNING

BE CERTAIN THAT THE OUTRIGGER PADS ARE SET ON A FIRM AND HORIZONTAL SURFACE. DO NOT SET THE OUTRIGGER PADS ON INCLINED, VERTICAL, OR SLIPPERY SURFACES.

NOTICE

THE OUTRIGGERS WILL NOT OPERATE UNLESS THE BOOM AND JIB ARE COMPLETELY LOWERED, RETRACTED AND ALIGNED WITH THE BASE.

NOTE: *The base and boom/jib must be aligned and stowed before this function will operate, see Section 4.4, BASE AND BOOM/JIB ALIGNMENT.*

If one of the outriggers does not come into contact with the ground while being set, the engine will turn off or, the self-leveling attempt will stop. This situation may be due to the slope on which the outriggers are being set up on exceeds the allowed slope for proper set up at the end of the stabilization phase. If the machine is to be lifted even further from the ground after the outriggers are properly set, push and hold the outrigger automatic set and level button.

ERROR



ST1	OK
ST2	OK
ST3	OK
ST4	OK
INCL	OK
LOAD	OK
BASKET	OK
PEDAL	OK
AUTOST	NO

If the functions are selected when one of the above listed conditions is missing, an error message will appear on the platform/remote control display indicating which of the conditions are OK and which are not. If the condition is that an outrigger is not set properly, the message will also indicate which outrigger is not set properly.

ST1: if OK outrigger 1 is set properly.

ST2: if OK outrigger 2 is set properly.

ST3: if OK outrigger 3 is set properly.

ST4: if OK outrigger 4 is set properly.

INCL: if OK the machine is set up on an accepted slope.

LOAD: if OK the load in the platform is acceptable.

PLATFORM: if OK the platform/remote control box is in the proper location in the platform.

PEDAL: If OK the footswitch is correctly depressed.

AUTOST: when using the auto stabilizer set button 7, if OK, stabilizers are set properly.

If NO, button 7 was released before tilt sensor detected machine was level and stabilizers were not set properly.

Setting Outriggers From the Platform/Remote Console

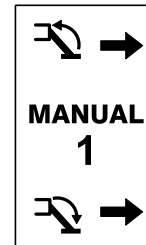
(Reference Figure 4-5. for item numbers)



7



2



Either - Press and hold the outrigger auto-set and level button 7 (item 7) until OK appears on the platform LCD display.

or

Operate each outrigger separately by pressing button 2 (item 2) to select which outrigger to control (each outrigger is numbered 1 thru 4, see decal, each press of button 2 displays the outrigger selected on the LCD display). Press button 1 (item 1) to retract or button 7 (item 7) to set that outrigger. The OK will appear on the display when the outriggers are set properly and the unit is level.

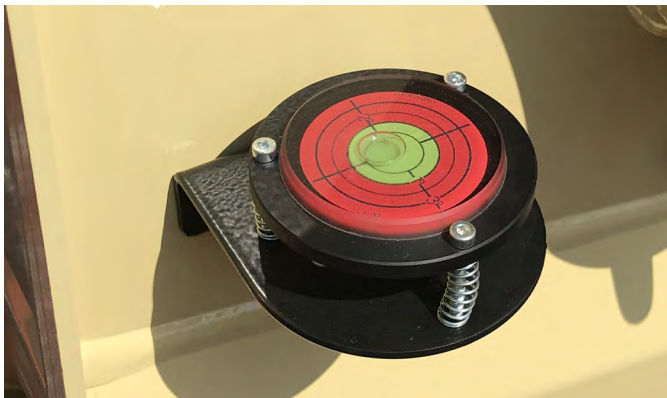
Note: To cycle back to outrigger auto-set mode, press button 2 (item 2) until the LCD display shows the normal operating icons.

⚠ WARNING

CHECK THE BUBBLE LEVEL TO CONFIRM UNIT IS LEVEL (BUBBLE IS COMPLETELY IN THE 1° GREEN (CENTER) AREA) AND THAT THE TRACKS ARE OFF

SECTION 4 - MACHINE OPERATION

THE GROUND BEFORE OPERATING THE BOOM FUNCTIONS. IF THE BUBBLE IN THE LEVEL IS NOT IN THE GREEN AREA, AFTER USING THE AUTO-LEVEL FUNCTION, SHUT DOWN THE MACHINE AND HAVE THE MACHINE REPAIRED BY A QUALIFIED SERVICE TECHNICIAN.



Each outrigger has a yellow light installed. All lights will be on steady if the outriggers are positioned to the full operation area. No lights will be on if the outriggers are not set properly.

NOTICE

IF ONE OF THE ORANGE LIGHTS LOCATED ON EACH OUTRIGGER SHOULD REMAIN ON WHEN THAT OUTRIGGER IS LIFTED FROM THE GROUND, STOP THE MACHINE IMMEDIATELY AND CALL A QUALIFIED JLG SERVICE TECHNICIAN AS THIS INDICATES A PROBLEM WITH THE CORRESPONDING OUTRIGGER MICRO SWITCH.

⚠ WARNING

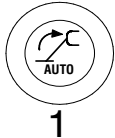
IF THE SLOPE EXCEEDS 12°, THE MACHINE IS NOT CAPABLE OF PROPERLY SETTING THE OUTRIGGERS AND LEVELING ITSELF. OPERATION OF THE BOOM AND PLATFORM FUNCTIONS WILL NOT BE ALLOWED IN THIS CONDITION. THE MACHINE IS CONSIDERED STABILIZED WHEN LEVELED TO LESS THAN 1° AND THE TRACKS ARE LIFTED AT LEAST 2 IN. (5 CM) FROM THE GROUND.

STABILIZING THE MACHINE WITH AN INCLINATION DEGREE HIGHER THAN THE ONE ALLOWED COULD CAUSE INSTABILITY OF THE MACHINE

If the platform ladder is higher than 16 in. (40 cm) off the ground when the ladder is lowered, when setting the machine on outriggers from the ground position, lower the outriggers until the ladder is less than 16 in. (40 cm) off the ground. Then enter the platform to properly set the machine up on outriggers.

Retracting The Outriggers

(Reference Figure 4-5. for item numbers)



1

Either - Press and hold button no. 1 (*item 1*) of the remote control.

The 4 outriggers will all retract at the same time and lower the machine.

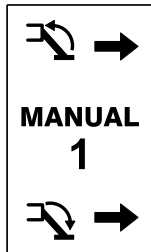
or



2

Operate each outrigger separately by pressing button 2 (*item 2*) to select which outrigger to control (*each outrigger is numbered 1 thru 4, see decal at each outrigger, each press of button 2 displays the outrigger selected on the LCD display*). Press button 1 (*item 1*) to retract or button 7 (*item 7*) to set that outrigger.

*Note: To cycle back to outrigger auto-retract mode, press button 2 (*item 2*) until the LCD display shows the normal operating icons.*



4.7 BOOM/PLATFORM OPERATION

NOTICE

THE BOOM WILL NOT OPERATE UNTIL THE OUTRIGGERS ARE PROPERLY SET AND MACHINE IS LEVELED.

NOTICE

AT PLATFORM/REMOTE CONTROL STATION, TWIST THE EMERGENCY STOP BUTTON CLOCKWISE TO BE IN THE OUT POSITION, START ENGINE AND ACTIVATE FOOTSWITCH FOR ALL PLATFORM/ REMOTE CONTROL FUNCTIONS..

NOTICE

ALWAYS STOW (RAISE) THE LADDER AFTER ENTERING OR EXITING THE PLATFORM TO PREVENT IT BEING DAMAGED WHEN OPERATING THE MACHINE.

If the operator attempts to raise the jib with more than the allowed capacity in the platform a maximum weight reminder icon appears in the middle of the platform/remote LCD display and the function stops.

NOTE: *At low temperatures start the motor and let it run for a few minutes, so that the hydraulic oil circulates and reaches at least 50°F (10°C) before operating the platform.*

SECTION 4 - MACHINE OPERATION

Overload Alarm

If the platform is overloaded all the boom functions are stopped, the overload icon appears on the platform/remote LCD display and the alarm sounds. To restore the boom functions it is necessary to remove the extra load.

WARNING

TO AVOID SERIOUS INJURY, DO NOT OPERATE MACHINE IF ANY CONTROL LEVER OR SWITCH CONTROLLING PLATFORM MOVEMENT DOES NOT RETURN TO THE 'OFF' OR NEUTRAL POSITION WHEN RELEASED.

WARNING

IF THE PLATFORM DOES NOT STOP WHEN A CONTROL SWITCH OR LEVER IS RELEASED, REMOVE YOUR FOOT FROM THE FOOT SWITCH AND/OR USE EMERGENCY STOP SWITCH TO STOP THE MACHINE.

If platform is lifted from the proper mounting position during the use of the machine, an alarm will sound and all the movements of the machine will stop. An error message will appear on the LCD display of the platform/remote control.

Platform Level Adjustment (Item 15, Figure 4-2.)

NOTE: *During normal operation of the machine, the platform will automatically maintain its position.*

- To manually Level Up, turn select switch clockwise and hold until desired position is reached.

- To manually Level Down, turn the select switch counter clockwise and hold until desired position is reached.

WARNING

ONLY USE THE PLATFORM LEVELING OVERRIDE FUNCTION FOR SLIGHT LEVELING OF THE PLATFORM. INCORRECT USE COULD CAUSE THE LOAD/OCCUPANT TO SHIFT OR FALL. FAILURE TO DO SO COULD RESULT IN DEATH OR SERIOUS INJURY.

Raise And Lower The Boom (Item 17, Figure 4-2.)

The machine will operate in Flush-To-Wall Ascent Mode by default. See Figure 4-5.

- To raise the main boom, depress the foot switch and move the controller forward.
- To lower the main boom, depress the foot switch and move the controller backwards.

Telescope The Main Boom (Item 18, Figure 4-2.)

- To extend the main boom, depress foot switch and move controller backward.
- To retract the main boom, depress foot switch and move controller forward.

Platform Rotation (Item 19, Figure 4-2.)

- To rotate the platform to the right, depress the footswitch and move the controller forward.

- To rotate the platform to the left, depress the footswitch and move the controller backwards.

Raise And Lower The Jib (Item 20, Figure 4-2.)

- To raise the jib, depress the foot switch and move the controller forward.
- To lower the jib, depress the foot switch and move the controller backwards.

Swinging The Boom (Item 21, Figure 4-2.)

⚠ WARNING

WHEN SWINGING THE BOOM MAKE SURE THERE IS AMPLE ROOM FOR THE BOOM AND UPRIGHT TO CLEAR SURROUNDING WALLS, PARTITIONS AND EQUIPMENT.

⚠ WARNING

IF THE TURNTABLE IS ROTATED WITH THE BOOM TOO LOW OR THE BOOM IS LOWERED NEAR AN OUTRIGGER, THE BOOM MAY CONTACT THE OUTRIGGERS CAUSING MACHINE DAMAGE.

- To swing the boom to the right, depress the foot switch and move the controller forward.
- To swing boom to the left, depress foot switch and move controller backwards.

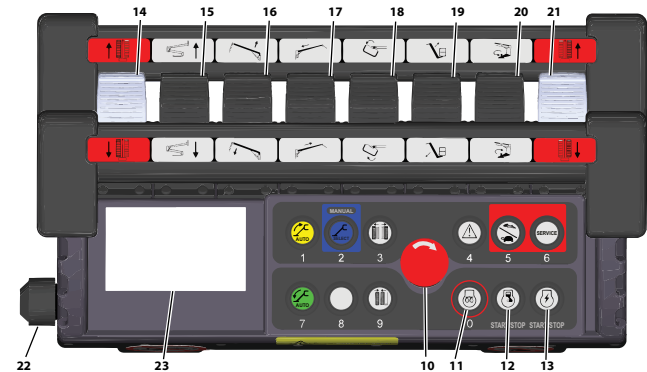


Figure 4-2. Platform/Remote Control Station

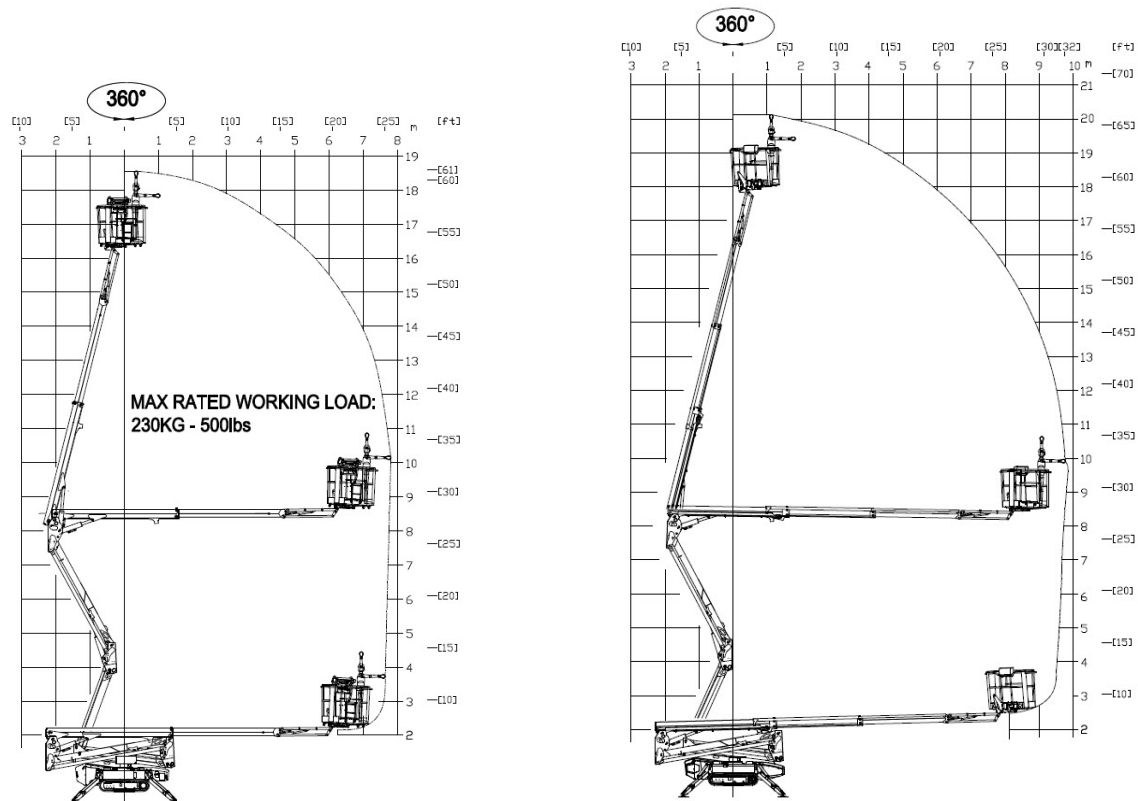


Figure 4-3. Platform - Load/Reach Chart - X540AJ and X600AJ

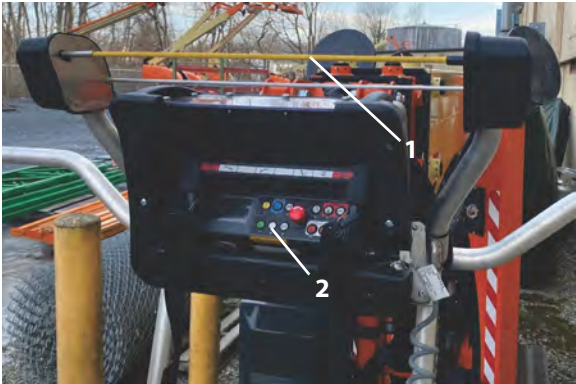
SkyGuard Operation

The SkyGuard™ feature is used to provide enhanced control panel protection. When the SkyGuard™ sensor is activated, functions that were in use at the time of actuation will reverse or cutout and the ground alarm will beep. The table below outlines these functions.



NOTE: Reverse motion can be stopped by the operator by releasing the footswitch, depressing the emergency stop button, or by releasing pressure on the SkyGuard™ sensor.

If SkyGuard sensor remains activated after function reversal or cutout, press and hold the SkyGuard Override Switch (button number 8) to allow normal use of machine functions until the SkyGuard sensor is reconnected.



1. SkyGuard™ Sensor 2. SkyGuard™ Override Switch
(button number 8)

Figure 4-4. SkyGuard™ Sensor and Override Switch Location

Table 4-1. SkyGuard™ Function Table

Main Lift Up	Main Lift Dn	Main Tele In	Main Tele Out	Swing	Drive Forward	Drive Reverse	Tower Lift Up	Tower Lift Down	Platform Level	Platform Rotate	Jib Lift
R	C	C	R	R	C	C	R	C	C	C	C
R = Indicates Reversal is Activated											
C = Indicates Cutout is Activated											
N/A Indicates the function does not exist for this model											

SECTION 4 - MACHINE OPERATION

Manual Descent (Emergency Lowering)

Please refer to Section 5, EMERGENCY PROCEDURES for boom/platform manual descent options and operation instructions.

4.8 PLATFORM REMOVAL/INSTALLATION

The platform may only be removed to allow passage through areas measuring a minimum of 39 in. (99cm).

NOTE: If the platform is removed only track movement is allowed.

Platform Removal

1. Remove the platform/remote control box from the mounting support.
2. Loosen and remove the aluminum caps that secure the platform to the jib platform mounting posts.



3. Lift the platform off the mounting posts in an upward direction. Place platform aside for later installation.

Platform Installation

1. Lift the platform and align the platform mounts with the jib mounting posts and lower until seated.
2. Secure the platform to the jib mounting posts with the aluminum threaded caps. Do not overtighten.
3. Re-install the platform/remote control box into the mounting support on the platform.

4.9 BATTERY CHARGING

To check the battery condition, power up the machine and use the special indicator shown at position 8 on the platform control station LCD display.



or;

Check charge indicator **While charging**, this indicator shows the current charge state of the lithium-ion battery pack as follows;

RED LED: shows that the battery is charging.

GREEN LED: blinking light shows that the battery is balancing. Steady light shows battery has reached 100% charge.



If machine is powered on while charging, the LCD display on the platform control station also shows the machine charge indicator.



Charging the Battery Pack

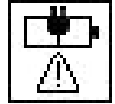
NOTICE

DO NOT LEAVE THE MACHINE IN CONTINUOUS CHARGING FOR TIME PERIODS EXCEEDING 24 HOURS. REMEMBER, THE CHARGE WORKS EVEN IF THE ELECTRONIC BOARD OF THE MACHINE IS TURNED OFF. SO THE BATTERIES CAN BE CHARGING EVEN IF THE REMOTE CONTROL IS OFF. CHARGE THE MACHINE USING ONLY THE BATTERY CHARGER INSTALLED ON IT. THE USE OF A CHARGER OTHER THAN THAT PROVIDED VOIDS ANY KIND OF WARRANTY ON BATTERIES.

Approximate time required to fully recharge the battery pack:

- Full Recharge -8 hrs. - 120V AC or 4 hrs. - 220V AC
- 80% Recharge -4 hrs. - 120V AC or 2 hrs. - 220V AC
- The batteries can be charged during machine operation, (*obviously the charging times in this case will be longer*).
- The batteries can be charged when they are not fully depleted.

- If the charge is less than 20% an audible warning signal and an icon will be activated whenever the electric motor is started, to alert the user to charge the machine.
- If the charge is less than 10%, in addition to the audible warning signal, reduced speed is activated and an icon comes on in position 4 on the platform station LCD display.



To start charging the battery connect the main AC power supply to the **AC socket (item A - photo next page)** located near the electric motor.

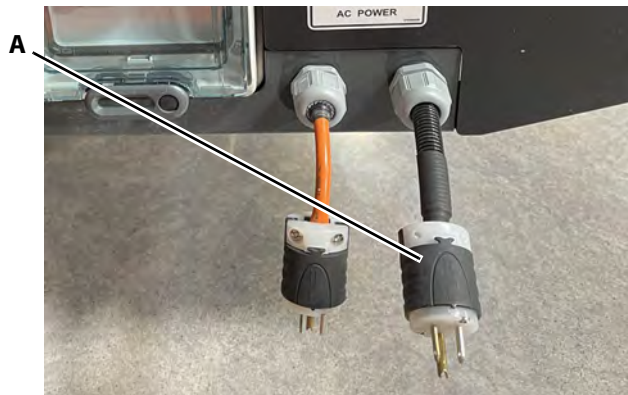
After a few seconds the charge indicator located on the right hand side of the machine on top of the lithium-ion battery pack turns red, meaning the battery has started charging.

⚠ WARNING

THE BATTERY CHARGER SUPPLIED WITH THE LIFT WAS DESIGNED TO ENSURE SAFE AND RELIABLE PERFORMANCE. IT IS ALREADY FITTED ON THE MACHINE AND DOES NOT NEED ANY ADJUSTMENT OR CONFIGURATION BY THE USER; NONETHELESS, TO AVOID INJURY AND DAMAGE TO THE BATTERY CHARGER, THE FOLLOWING ESSENTIAL PRECAUTIONS MUST BE OBSERVED:

- Carefully read installation instructions contained in this manual. For future reference, keep manual in a safe place.

SECTION 4 - MACHINE OPERATION



A. Lithium-Ion Battery Charging

- Do not place battery pack near heat sources.
- As battery charger is sealed without forced ventilation, its performance depends on ambient temperature and type of installation.
- Be certain type of power supply available corresponds to voltage specified and indicated on the battery charger rating plate or in this Operation/Maintenance Manual. If any questions, contact your local JLG Service Center or the local electrical company.
- An AC class circuit breaker can be used as a protection device for the battery charger power supply, however it

is recommended to use a class A or even better class B device.

- In regard to safety and electromagnetic compatibility, the battery charger features a three pin plug with ground, which can only be plugged into an grounded socket. If the plug does not go into the socket, most probably the socket is old and not grounded. In this case, contact an electrician to have the socket replaced. Do not use adapters to resolve ungrounded circuit plug problems.
- Ensure power cable is undamaged. If cable is worn or damaged, have it replaced immediately.
- If extensions or multiple sockets are used, make sure these support total rated current.
- Disconnect power supply before connecting or disconnecting battery.
- Do not use the battery charger to charge the batteries of other vehicles; the battery charger installed was specially designed to charge the type of lithium batteries used on this machine. Do not attempt to charge any other type of batteries.
- Do not attempt to repair the battery charger. Opening the cover may expose the user to the risk of electric shock.
- Do not open battery charger, opening it may affect the index of protection (IP) even after it has been closed again.

- If battery charger is not working correctly or is damaged, disconnect it immediately from power outlet and the battery socket and contact your local JLG Service Center.

Charge Curve

The battery charger features just one charge curve (IU1a) plus balancing and maintenance, designed specifically for charging the lithium-ion battery pack on this machine.

Cold Weather Charging

Lithium battery pack discharge and/or recharge with positive lithium battery level (SOC>0) is possible over 14°F (-10°C).

In cold environmental temperature (not lower than -4°F (-20°C), the on-board electric heaters automatically warm up the cells. The heaters are activated by the BMS when the minimum cell temperature is 30.2°F (-1°C). The heaters are automatically switched off when the minimum cell temperature raises over 35.6°F (2°C).

In cases where the battery charger is connected, when the minimum cell temperature is 32°F (0°C), the charger only supplies 3A to supply power to the heaters until a positive minimum cell temperature is reached.

From -4°F (-20°C) to 35.6°F (2°C) with null lithium battery level (SOC=0) the heaters will only work while the battery charger is connected to the machine.

The battery cold/heater activated icon will be shown on the display when the heaters are enabled. The machine can only be moved in the lower speed while the heater system is active.



Cooling Fans

In hot environmental temperatures, the cooling fans system becomes active to cool down the battery cells. This system is automatically activated by the BMS when cell temperature raises over 98.6°F (37°C). The cooling fans system will automatically shut off when cell temperature cools down to 95°F (35°C).

4.10 SHUT DOWN AND PARK

CAUTION

WHEN PARKING THE MACHINE ON A SLOPE OR UNEVEN GROUND WITH THE OUTRIGGERS RETRACTED, PARK WITH THE TRACKS IN THE FULLY WIDENED POSITION AND BLOCK THE TRACKS USING WEDGES TO PREVENT MACHINE MOVEMENTS.

1. Drive machine to a reasonably well protected area.
2. Ensure boom and jib are in the stowed (aligned) position.
3. Shut down electric engine with the same button on the platform/remote control station used to start it. Complete machine shut down takes approximately 1 minute, LCD display OFF.
4. At ground and platform controls, push-in emergency stop buttons and remove key at the ground controls. Turn off and remove the key.
5. Close platform control console lid if necessary to protect instruction placards, warning decals and operating controls from hostile environment, place a cover over this area.
6. If machine is to be shut down for long periods of time, turn battery disconnect switch, RED handle located on the front of the hydraulic tank/battery tray housing, to the POWER OFF position.

POWER ON

Clockwise
(As Shown)

POWER OFF

Counter-
Clockwise



BATTERY DISCONNECT SWITCH

4.11 LIFTING AND TIE DOWN

Lifting - Outrigger Lifting Rings

1. Determine gross weight of machine, refer to the serial number tag, or weigh the individual unit to find out the gross vehicle weight.
2. Configure the machine in the transport position;
 - a. place the booms in the stowed position and properly aligned
 - b. all outriggers are fully retracted
 - c. tracks are fully widened
 - d. Remove all loose items from the machine
3. Lift machine using only the lifting lugs on the fork lift pockets, on both sides of the machine. (See Figure 4-5.)
4. Use a lifting bar capable of supporting the full weight of the machine, with a distance between the attach points a minimum of 21.65 in. (550mm) to maximum of 28.75 in. (730mm)
5. Properly adjust the lifting bar and rigging to prevent damage to the machine and so the machine remains level and balanced.

⚠ DANGER

TO LIFT THE MACHINE A SEPARATE WIRE ROPE/CHAIN/SLING MUST BE ATTACHED TO EACH OF THE (4) LIFTING LUGS USING THE APPROPRIATE

LIFTING POINTS AS INDICATED IN FIGURE 4-5. OTHERWISE THE MACHINE MAY NOT BALANCE PROPERLY AND MOVE UNEXPECTEDLY.

NOTICE

THE USE OF ROPES, CHAINS OR SLINGS WITH LENGTH LESS THAN 10 ft. (3m) COULD CAUSE PERMANENT DAMAGE TO THE MACHINE OUTRIGGERS.

As the weight of the machine is not spread equally over the four lifting lugs, the minimum required capacity of the four ropes, chains or slings used must be: no less than 4,409 lb. (2000 kg) and their length no less than 10 ft. (3m) and all identical.



Figure 4-5. Lifting Machine - Lifting Lugs Location

1. Lifting Lugs (4 - 1 Each Corner)

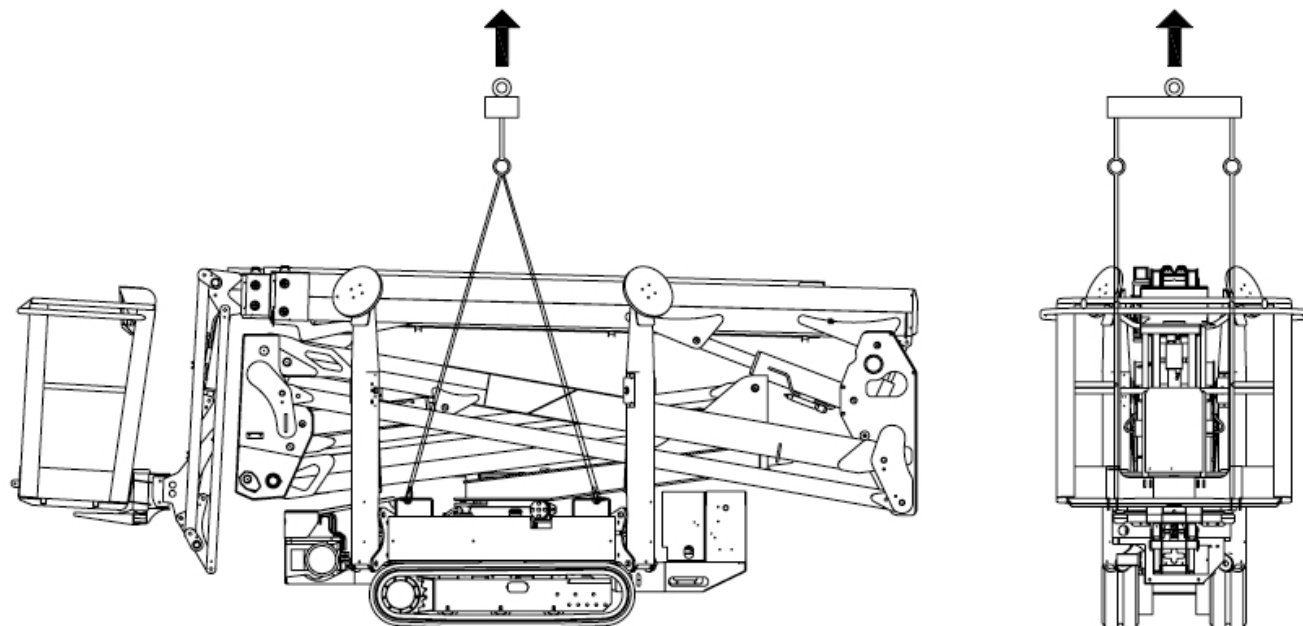


Figure 4-6. Lifting Machine - Lifting Bar Rigging

Lifting - Fork Lift Pockets

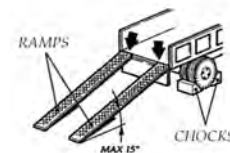
The machine is equipped with two tubular fork lift pockets designed to lift the machine using a forklift of suitable capacity.

1. Determine gross weight of machine, refer to the serial number tag, or weigh the individual unit to find out the gross vehicle weight.
2. Configure the machine in the transport position;
 - a. place the booms in the stowed position and properly aligned
 - b. all outriggers are fully retracted
 - c. tracks are fully widened
 - d. Remove all loose items from the machine
3. Adjust forks of fork lift to the proper width for the lifting pockets on machine.
4. Carefully approach the machine with fork lift truck being careful not to damage any machine components. Insert the forks into the lifting pockets on the machine and carefully lift machine.
5. Move machine to new location.



Figure 4-7. Lifting Machine - Fork Lift Pockets Location

Loading and Unloading the Machine on Transport Vehicles Using Ramps



SECTION 4 - MACHINE OPERATION

The JLG platform offers high maneuverability and stability even in traveling (stowed) configuration.

Despite this, the user must work with care even when carrying out the simplest operations.

DANGER

ALWAYS LOAD/UNLOAD THE MACHINE WITH UNDERCARRIAGE (TRACKS) EXTENDED TO WIDEST WIDTH.

Loading

For example, follow the procedure below to load the machine onto a truck/trailer:

- It is recommended to load/unload the machine using the remote control while at the side of the machine, keeping a MINIMUM distance of 3 feet (1m).
- Park the truck/trailer on a flat surface;
- Make sure that the ramps do not exceed the maximum inclination of 15°;
- Make sure that the ramps and the trailer have the capacity to support the machine and are free from debris or slippery material;
- Position the ramps parallel to each other at a distance equal to the space between the drive tracks;
- Climb the ramps, proceeding with the basket facing backwards;

- When approaching the loading surface, before the change in inclination, ALWAYS check that the JIB arm is COMPLETELY RETRACTED. Then proceed with great care in order to prevent sudden jolts when passing from the sloping ramps to the truck/trailer flatbed;
- Position the machine so that none of its parts protrude from the transport vehicle.

Unloading

Unload the machine following the same instructions given above.

- During travel and when changing slope, make sure not to damage the safety devices positioned under the basket.
- If the change in inclination is excessive, adjust the angle of the ramps or, if this is not possible, use longer ramps. It is also possible to use the jib arm as described earlier.

Tie Down

(See Figure 4-8.)

NOTICE

WHEN TRANSPORTING THE MACHINE, THE BOOM MUST BE FULLY LOWERED INTO THE BOOM REST.

- Travel up ramps with the platform behind the machine.
- Do not contact the ground with the jib or bottom of platform when loading/unloading. Operate the

machine from the ground remote position and raise the jib to prevent contact with the ground. See "" on page 4-10.

- ALWAYS load/unload the machine with the track fully widened.

1. Configure the machine to the transport position;
 - a. place the booms in the stowed position and properly aligned
 - b. all outriggers are fully retracted
 - c. tracks are fully widened
 - d. remove all loose items from the machine
2. Secure the chassis using straps or chains of adequate strength.

CAUTION

DO NOT MAKE CONNECTIONS AT POINTS DIFFERENT THAN THOSE IDENTIFIED BY THE TIE DOWN LOCATION DECAL SHOWN - SEE FIGURE 4-8. THIS COULD CAUSE PERMANENT DAMAGE RESULTING IN THE COLLAPSE OF THE PRODUCT.

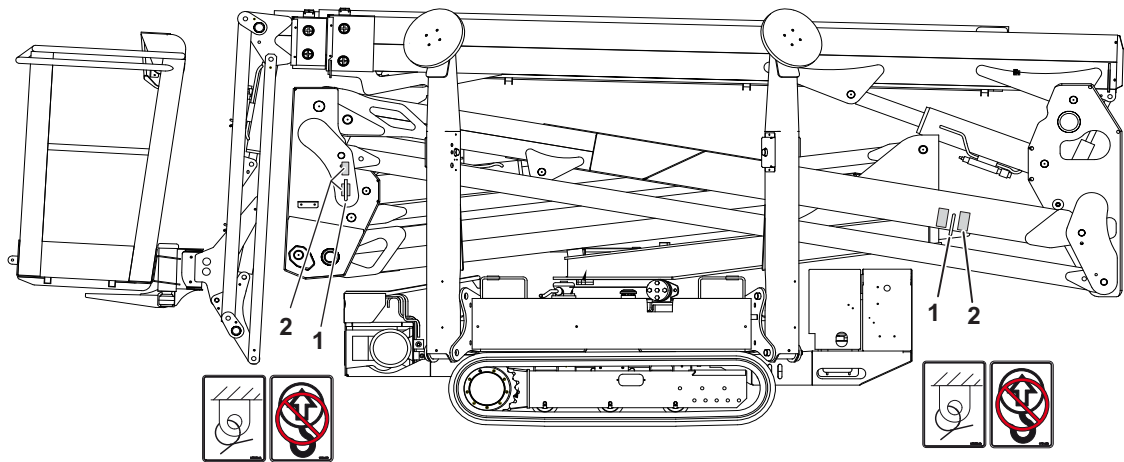


Figure 4-8. Machine Tie-Down Points (both sides of machine)

- 1. Tie-Down Loop
- 2. Tie-Down Decal

4.12 MACHINE DECALS

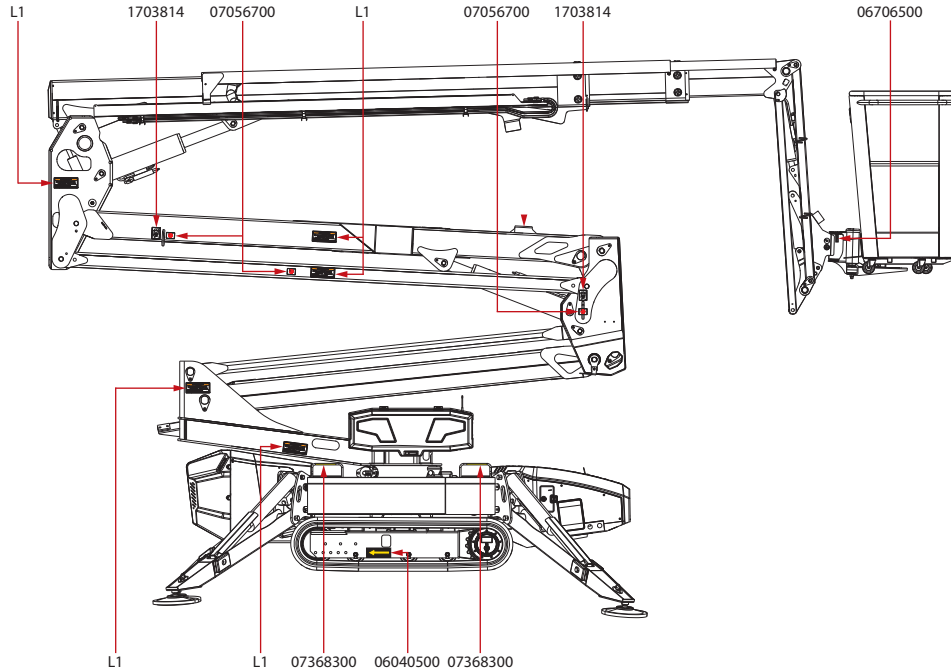


Figure 4-9. Decal Installation

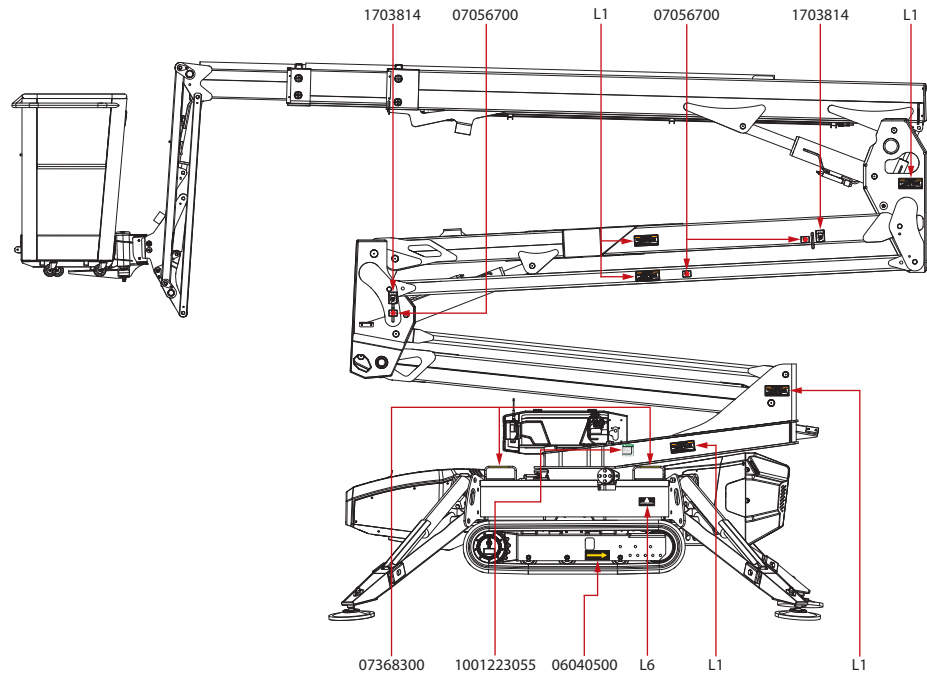


Figure 4-10. Decal Installation

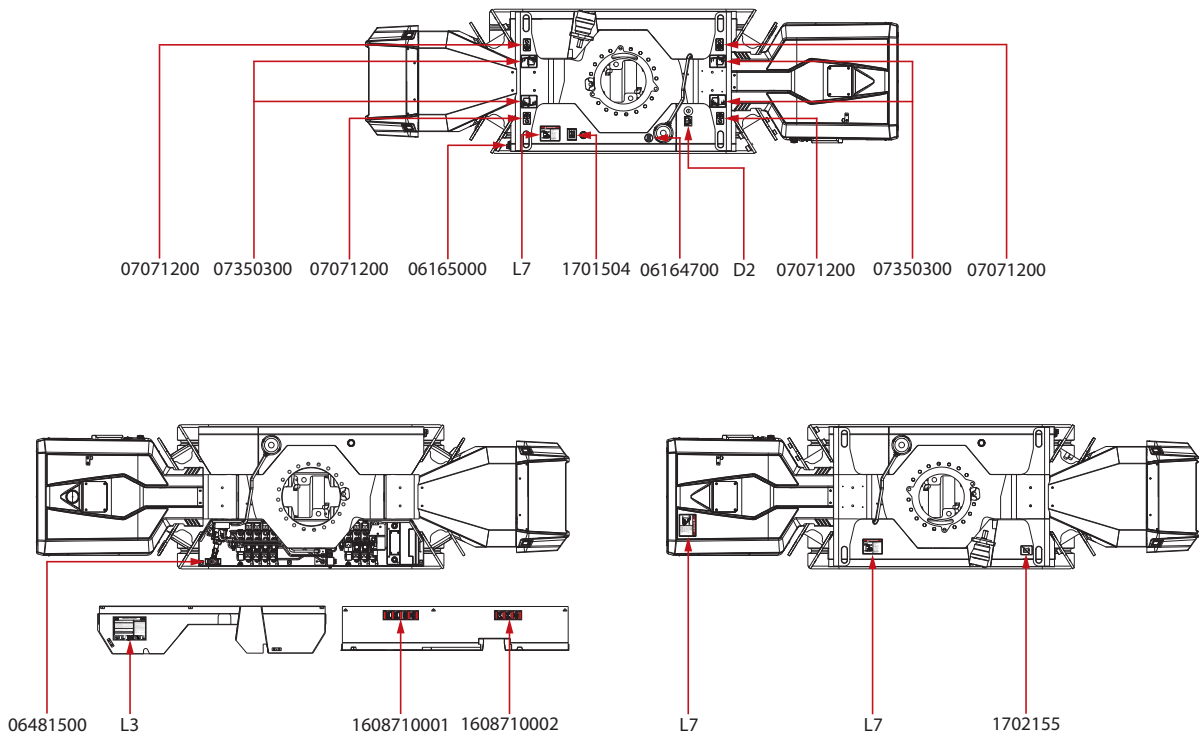


Figure 4-11. Decal Installation

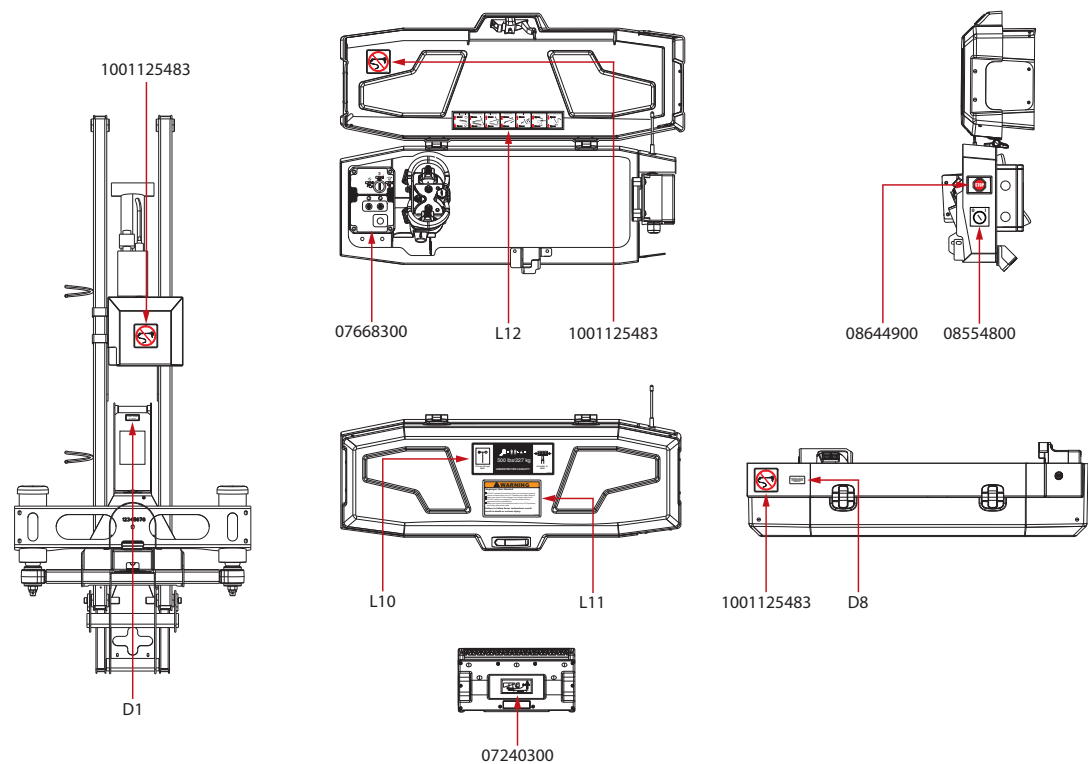


Figure 4-12. Decal Installation

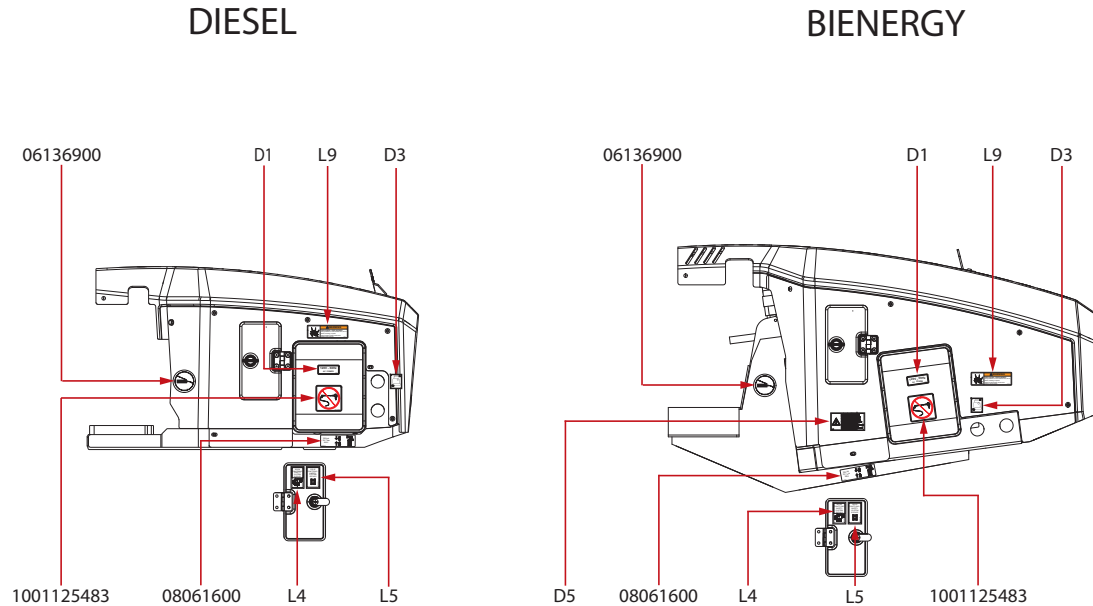


Figure 4-13. Decal Installation

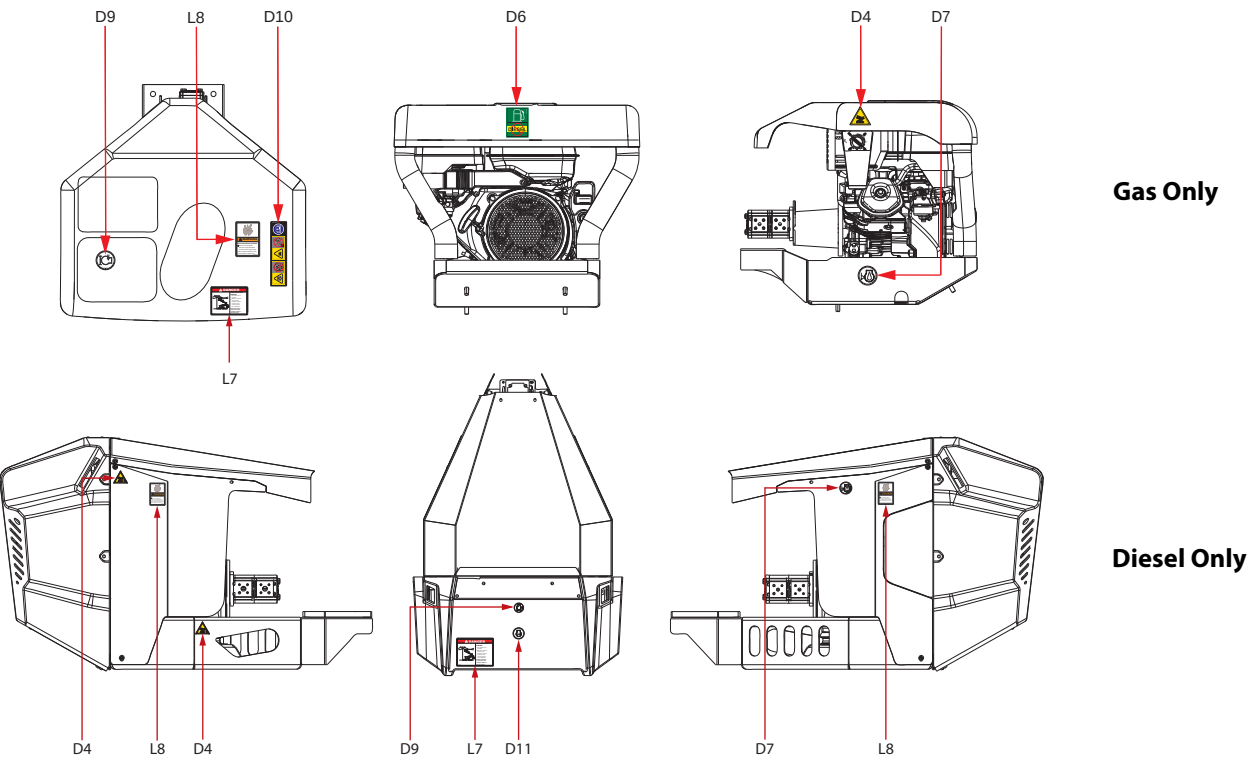


Figure 4-14. Decal Installation

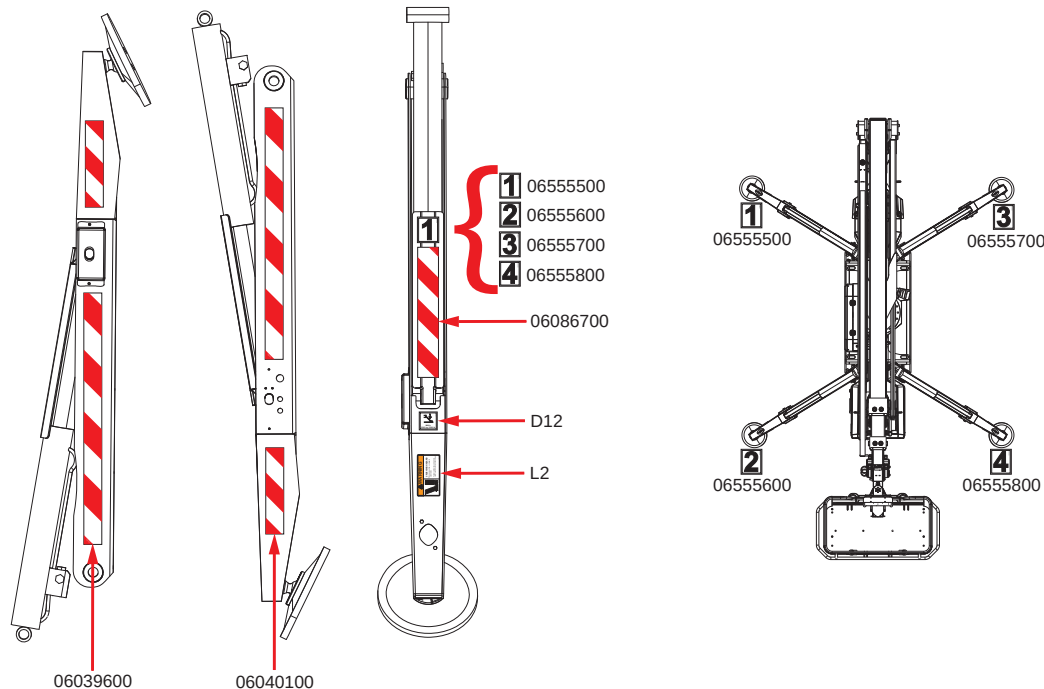


Figure 4-15. Decal Installation - Additional Diesel, Lithium and Bi-Energy

SECTION 4 - MACHINE OPERATION

Table 4-2. Main Decal Set

Part Number	Description
01701504	Hydraulic Oil Decal
01702155	Battery Disconnect
01703814	Tie-Down Point
06039600	White/Red Safety Stripe
06040100	White/Red Safety Stripe
06040500	Direction Arrow
06086700	White/Red Safety Stripe
06136900	Greasing Point
06164700	Hydraulic Oil Filter
06165000	Hydraulic Oil Level Decal
06481500	Hand Pump Diverter
06555500	Outrigger 1
06555600	Outrigger 2
06555700	Outrigger 3
06555800	Outrigger 4
06706500	Platform Alignment (2 Pc)
07056700	No Lifting
07071200	Lifting Point
07240300	Remote/Radio Controls - Maintain One Meter Distance

Table 4-2. Main Decal Set

Part Number	Description
07268300	Yellow Forklift Caution
07350300	Forklift Fork Pocket Lift Point
07668300	Ground/Platform/Emergency Selector Box Decal
08061600	Air/Water Line Connection
08554800	Ignition
08644900	Ground Emergency Stop
1001125483	Do Not Wash (Also 100112548399)
1001223055	Annual Inspection Decal
1608710001	Outrigger/Track Controls, Left Side
1608710002	Outrigger/Track Controls, Right Side

Table 4-3. Multi-Language Decal Set

Item Number	Part Number				Description
	English	French	Portuguese	Spanish	
L1	07056100	07116800	07121400	07112200	Boom Movement Crushing Hazard Warning
L2	07056200	07116900	07121500	07112300	Outrigger Crushing Hazard Warning
L3	086445GB	086445FR	086445PT	086445ES	Emergency Descent Under Cover
L4	07042100	07115200	07119800	07110600	Boom Functions Safety System Bypass
L5	07042200	07115300	07119900	07110700	Drive Functions Safety System Bypass
L6	1702901	07117900	07122500	07113300	Manual/Emergency Descent Instructions Inside
L7	1706128	07118600	07123200	07114000	Electrocution Hazard Danger
L8	1704972	07118300	07122900	07113700	Explosion/Fire Hazard Warning
L9	1703813	07118200	07122800	07113600	Explosion/Fire Hazard Ventilation Warning
L10	081081GB	081081FR	081081PT	081081ES	Boom Functions Safety System Bypass
L11	1706135	07118800	07123400	07114200	Improper Use Hazard Warning
L12	076787GB	076787FR	076787PT	076787ES	Boom/Platform Control Functions

SECTION 4 - MACHINE OPERATION

Table 4-4. Multi-Option Decal Set

Item Number	Part Number	Description
D1	07056400	120V - 60HZ AC Power
	07056300	220V - 50/60HZ AC Power
D2	1701505	Diesel Fuel
D3	01701644	Battery Charger Cord
D4	06056300	Burn Hazard
D5	08550500	Monthly Battery Charge (Multi-Language)
D6	06041600	Gas Only (No Diesel Fuel)
D7	06060000	Engine Oil Level
D8	1001228370	ICES-001 Canadian Regulations
	1001223453	ICES-002 Canadian Regulations
D9	06164600	Air Filter
D10	06232100	Flammable Gas / Gas Fumes Warning
D11	06214200	Coolant (Refrigerant Liquid)
D12	08644600	Outriggers - Ground Reaction (X540AJ)
	08644700	Outriggers - Ground Reaction (X600AJ)

SECTION 5. EMERGENCY PROCEDURE

5.1 GENERAL

This section explains the steps to be taken in case of an emergency situation while operating.

5.2 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, the factory should 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 ACCIDENT, THOROUGHLY INSPECT MACHINE AND TEST ALL FUNCTIONS FIRST FROM GROUND CONTROLS, THEN FROM PLATFORM CONTROLS. DO NOT LIFT ABOVE 10 FT (3 M) UNTIL YOU ARE SURE ALL DAMAGE HAS BEEN REPAIRED, IF REQUIRED, AND ALL CONTROLS ARE OPERATING CORRECTLY.

SECTION 5 - EMERGENCY PROCEDURE

5.3 EMERGENCY OPERATION

Power Main Cut-Off Switch Location

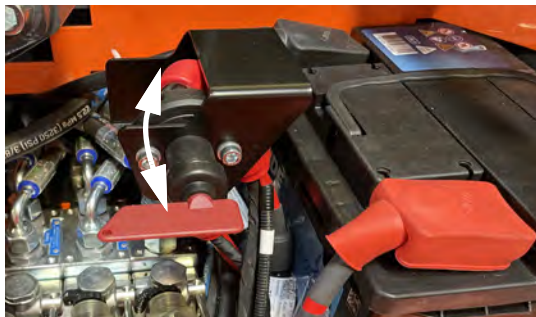
A battery cut-off switch - RED handle (*photo shows power ON*) is located on the inside of the Chassis/Drive Ground Control Station next to the 12V battery. When switched off - handle turn all the way counter-clockwise - all electrical power to the machine is shut down.

POWER ON

Clockwise
(As Shown)

POWER OFF

Counter-
Clockwise



BATTERY DISCONNECT SWITCH

Operator Unable to Control Machine

IF THE PLATFORM OPERATOR IS PINNED, TRAPPED OR UNABLE TO OPERATE OR CONTROL MACHINE:

1. Other personnel should operate the machine from ground controls only as required.
2. Other qualified personnel on the platform may use the platform controls. DO NOT CONTINUE OPERATION IF CONTROLS DO NOT FUNCTION PROPERLY.
3. Cranes, forklift trucks or other equipment can be used to remove platform occupants and stabilize machine motion.

SECTION 5 - EMERGENCY PROCEDURE

Platform or Boom Caught Overhead

If the platform or boom becomes jammed or snagged in over-head 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, use the Auxiliary Power System (if equipped) to carefully free the platform or boom from the object.
5. Once clear, restart the machine and return the platform to a safe position.

NOTE: 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.

5.4 MANUAL DESCENT WITH POWER

The manual descent (emergency lowering) system provides an emergency means to lower personnel in the platform.

Some functions will not operate since this is a gravity lowering system and a symbol will appear on the display if one of those functions is selected.

Manual descent can be activated from the platform control station or ground control station.



ENSURE BOOM IS NOT POSITIONED OVER THE OUTRIGGERS OR OVERHEAD OF PERSONNEL BEFORE LOWERING.

For Lithium or Combustion Engine Option Machines

Using Platform/Remote Control Station from Platform

(See Figure - Platform/Remote Control Station)

1. Check emergency stop button (*item 10*) is in the ON position by turning it clockwise.
2. Press platform foot switch on platform floor.
3. Press and hold down button 4 (*item 4*) with hazard symbol on platform/remote control box. The LCD display (*item 23*) will indicate the triangle/hazard symbol seen on the button in LCD position 8.



SECTION 5 - EMERGENCY PROCEDURE

4. Select a boom function to operate by moving the paddle controller in the direction for lowering. (*items 15-20*).
5. When finished, release the emergency lowering switch, controller and foot switch.
6. Position (*press*) the emergency stop switch to the OFF position.

Determine the reason for the primary power failure and have the problem corrected by a qualified JLG service technician.



Platform/Remote Control Station

NOTE: For a larger platform/remote control station image, see Section 3, Figure 3-4.

Using Emergency/Ground Control Station from Ground

(See Figure 5-1. Ground Control Station)

CAUTION

ENSURE BOOM IS NOT POSITIONED OVER THE OUTRIGGERS OR OVERHEAD OF PERSONNEL BEFORE LOWERING.

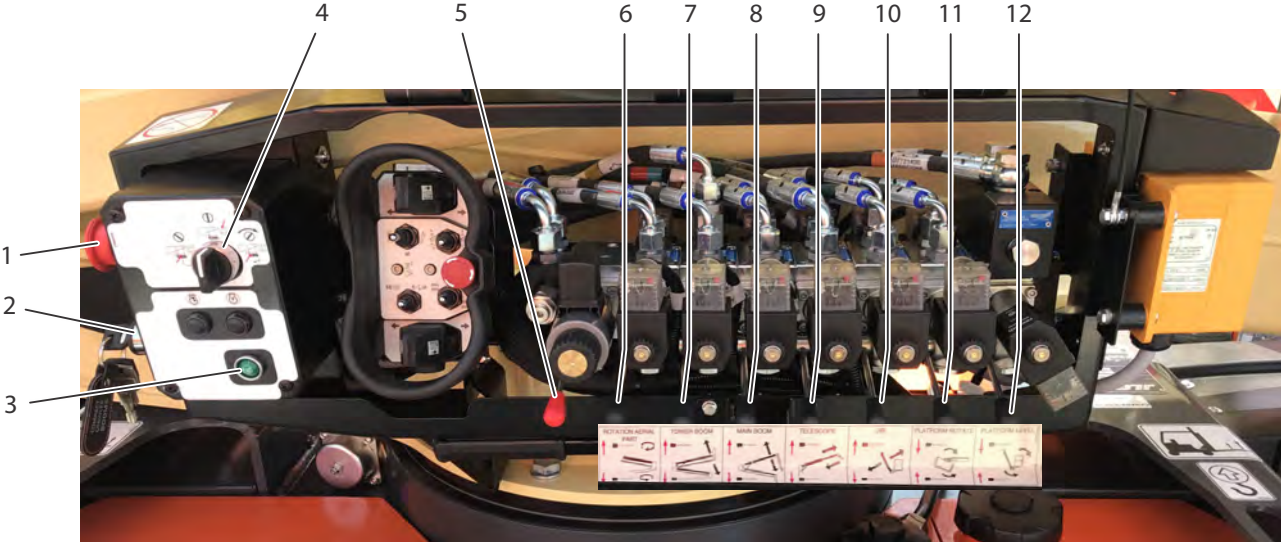
1. Check that the main power key switch (*item 2*) is set to the ON (I) position.
2. Be certain emergency stop button (*item 1*) is in the ON position by turning it clockwise.
3. Start engine, if not already running.
4. At Emergency/Ground Control station, turn mode selector switch (*item 4*) all the way clockwise and hold.
5. Check that the green (*machine stabilized*) indicator light (*item 3*) is on at the ground Emergency Stop/key switch panel.
6. Select a boom function to operate by moving it's controller in the direction for lowering. (*item 5 thru 10*) See decals on cover for boom component functions and directional movement.
7. When finished, release mode selector switch (*item 4*) back to the neutral position.
8. When finished, position (*press*) emergency stop switch (*item 1*) to the OFF position.

SECTION 5 - EMERGENCY PROCEDURE

For Bi-Energy Option Machines

For manual descent (emergency lowering) on Bi-Energy machines where the current power source (diesel engine or electric motor) is not working, the alternative power source can be used to safely bring the operator down to an accessible zone.

NOTE: *Functions may operate normally when using the alternative power source. However, if one power source is not working properly, discontinue operation immediately so that it may be serviced and repaired before continuing operation.*



Note: For a full list of function titles and descriptions, see Section 3.

Figure 5-1. Ground Control Station - Emergency Boom/Platform Functions

SECTION 5 - EMERGENCY PROCEDURE

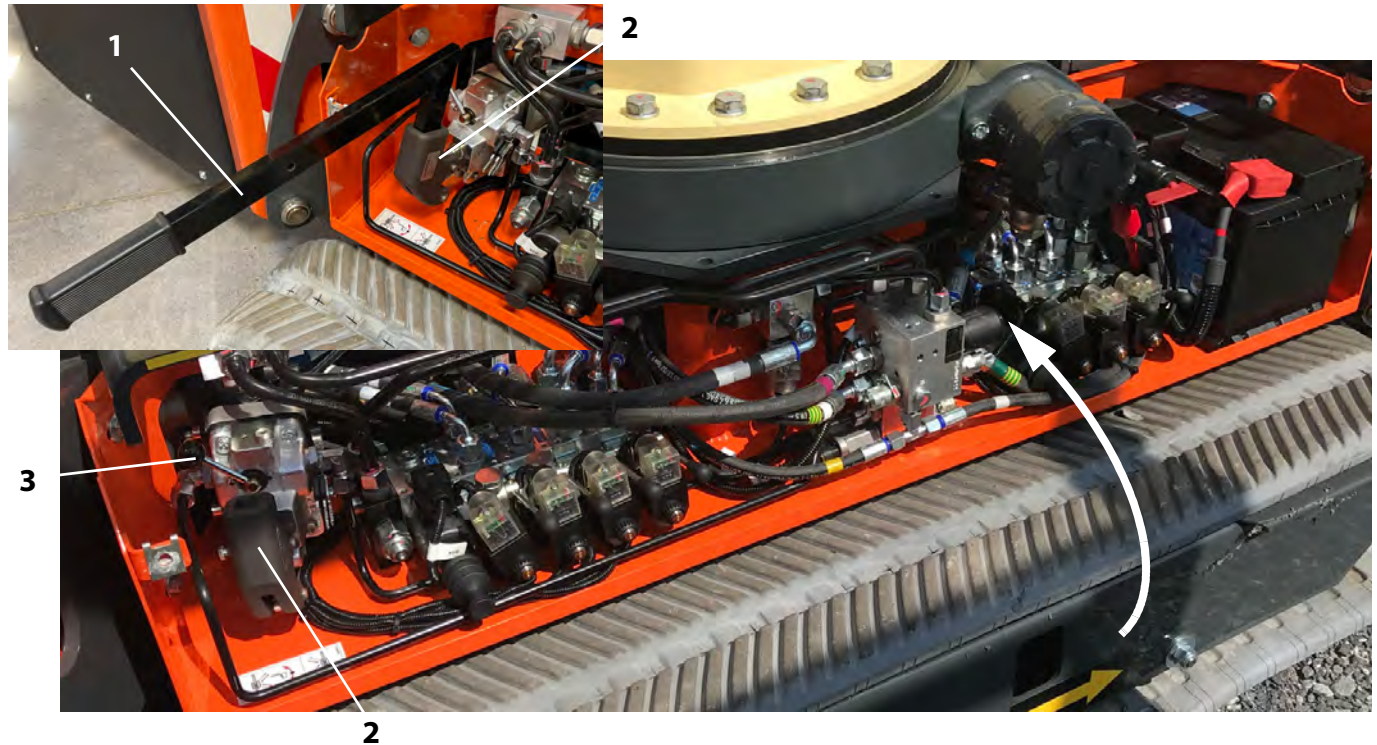


Figure 5-2. Ground Control Station - Emergency Chassis/Drive Functions and Hand Pump

SECTION 5 - EMERGENCY PROCEDURE

5.5 MANUAL DESCENT USING HAND PUMP

Manual descent (emergency lowering) using the hand pump provides an emergency means to lower personnel in the platform when the machine is without power.

Manual descent using the hydraulic hand pump can only be controlled using the ground control station.

NOTE: *Always swing turntable inline with the chassis first so that the turntable and base indicator arrows are aligned. This will eliminate possibility of an elevated or extended boom being positioned overhead of personnel at the pump and eliminate the risk of lowering the jib onto an outrigger.*

NOTE: *The distributor enable valve adjusts the speed of the boom movements (pressure flow) when using the boom control valves at the valve distributor. Without electrical power you must manually open this valve by pressing it in before operating the boom controls.*

The boom must be fully lowered and retracted and the jib fully lowered to begin moving the outriggers and allowing the machine to be configured for transport.

NOTICE

TO AVOID CONTACT BETWEEN JIB AND OUTRIGGERS. DO NOT ATTEMPT MANUAL SWING WITH BOOMS AND JIB FULLY LOWERED.

Platform Retrieval Sequence

See Figure 5-2.

Ensure the machine is level and all outriggers are properly deployed on a firm surface.

1. Remove the Ground Control Station - Emergency Chassis/Drive Function tray cover.
2. Locate the pump handle secured to machine. (The handle is located at the Emergency Boom/Platform Ground Control Station from the factory.)
3. Insert pump handle (*item 1 - Figure 5-2.*) into the pump handle base (*item 2 - Figure 5-2.*) The lever on the pump must be set to the left (*item 3 - Figure 5-2.*), check decal above pump.
4. Remove the diverter valve seal and unscrew the knob on the valve. (*See arrow.*)

⚠ WARNING

AFTER REMOVING VALVE SEALS, AN AUTHORIZED SERVICE CENTER MUST RESTORE THE SEAL AND VERIFY MACHINE OPERATION PRIOR TO RETURNING THE MACHINE TO SERVICE.

⚠ WARNING

NEVER REACH THROUGH, UNDER, OR OVER THE BOOM'S PATH OF TRAVEL TO THE GROUND CONTROL PANEL. IF NO ASSISTANT IS AVAILABLE, PROCEED WITH THE FOLLOWING STEPS.

SECTION 5 - EMERGENCY PROCEDURE

1. Lift the function enable lever UP and hold, While pumping the hand pump and activating the swing control lever in the desired direction of travel, until the turntable is aligned with the chassis.
2. Retract the main boom (*if necessary*).
Lift the function enable lever UP and hold. While pumping the hand pump, activate telescope function lever in the appropriate direction to retract the main boom.
3. Lower the Jib
Lift the function enable lever UP and hold while pumping the handpump, activate the jib lift function lever in the appropriate direction to lower the jib.
4. Lower the Main Boom
Lift the function enable lever UP and hold while pumping the handpump, activate the main boom lift function lever in the appropriate direction to lower the main boom.
5. Level the Platform (*if necessary*)
Lift the function enable lever UP and hold while pumping the handpump, activate the appropriate platform level function lever to level the platform.
6. Remove the manual pump handle from the pump and secure in its original position. Set the pump lever (*item 2*) back to the right (original position.)

5.6 BYPASS SWITCH - SAFETY DEVICES

WARNING

THIS FEATURE MUST ONLY BE USED AS DESCRIBED BELOW. THE MACHINE COULD TIP OVER IF THESE DIRECTIONS ARE NOT FOLLOWED.

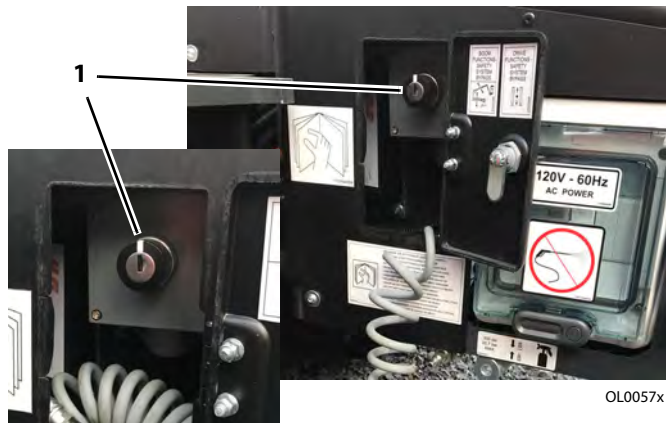
The safety bypass system enables bypassing platform safety devices in emergency situations. The safety device bypass switch is located inside the remote ground cable door. The key used to activate the safety bypass switch is fastened inside the ground control station compartment from the factory.

The safety bypass system is used to operate (and will only operate) a machine with a qualifying fault. The bypass icon is displayed and the alarm will sound. This system must only be used by qualified personnel.



Remove key from storage location. Insert key into safety bypass switch (*item 1*). Turn and hold counterclockwise to engage aerial bypass functions.

SECTION 5 - EMERGENCY PROCEDURE



WARNING

SAFETY DEVICE BYPASS ALLOWS OPERATION OF MACHINE WITH AN OVERLOAD IN THE PLATFORM. THE OVERLOAD ALARM WILL SOUND AND THE OVERLOAD ICON WILL BE ON THE PLATFORM/REMOTE CONTROL BOX DISPLAY. REMOVE OVERLOAD FROM THE PLATFORM BEFORE OPERATION.

After using the safety device bypass switch, a qualified JLG mechanic must be contacted to determine the reason for needing to use this feature. Return the key and secure it in its storage location.



The safety device circuit board records every time the safety device bypass key is activated along with the movements made during these operations.

NOTE: *In case of machine with restricted area of operation, the bypass of the safety devices does not allow the boom assembly to go out of the safe working area.*

5.7 EMERGENCY DESCENT IF OUTRIGGER LOSES GROUND CONTACT

One or more of the outriggers may lose contact with the ground which will result in the platform/remote control box functions being inoperable except for emergency lowering.

To restore platform/remote control box functions, lower and retract the boom and then reposition the machine and properly set the outriggers.

Use the emergency descent from the platform if possible by using the following sequence, fully retract main boom, fully lower jib, and lower main boom.

If this is not possible, have a properly trained person on the ground bypass the platform safety devices and allow the operator in the platform to lower and retract the booms or allow emergency manual operations to bring the platform back to the ground.

1. Locate and use safety device bypass key as stated above.
2. Activate safety device bypass by turning key in a counterclockwise direction and hold it in position (see decal).
3. The safety devices BYPASS icon will appear on the platform/remote control box display.



4. Operate the machine from the platform/remote control ONLY carrying out operations that allow the tower boom lowering, main boom retract and jib lowering. The main boom must be fully retracted prior to operating swing and main boom lowering functions.

WARNING

NEVER PERFORM OPERATIONS DIFFERENT TO THOSE LISTED OR THAT CAN IN SOME WAY REDUCE THE STABILITY OF THE MACHINE. THE ORDER OF THE BOOM MOVEMENTS MUST BE DONE IN A WAY TO PREVENT ANY OPERATION THAT REDUCES THE STABILITY OF THE MACHINE.

5. Once boom and jib are fully lowered and aligned, release the key and follow instructions above to secure the key.

If machine is set up in the reduced stabilization area, bypassing the safety devices does not allow the boom to go out of the working area related to that outrigger configuration.

5.8 EMERGENCY REALIGNMENT PROCEDURES

WARNING

THIS OPERATION MUST ONLY BE PERFORMED WITH THE BOOM AND JIB FULLY LOWERED AND RETRACTED.

During transport, the turntable may swing and become out of alignment with the base. If this occurs, one of the two EMERGENCY PROCEDURES given below can be used:

Machine Re-alignment:

1. Open the electric components compartment;
2. Locate and use the safety device bypass key as described above;
3. Activate the safety device bypass by turning the key in a counterclockwise direction and holding it in position (see sticker);
4. The safety devices BYPASS icon will appear on the platform/remote control box LCD display.
5. Realign the machine while operating the swing function from the platform/remote control box.
6. Once the machine is aligned, release the key and store it as stated above.



NOTE: *In case of machine with restricted work area, the bypass of the safety devices does not allow the boom*

assembly to go out of the working area related to that outrigger configuration.

Movement Of Tracks With Machine Not Aligned:

WARNING

OPERATION ONLY ALLOWED TO GO TO A CONDITION SUITABLE TO CARRY OUT THE PROCEDURE INDICATED IN "MACHINE RE-ALIGNMENT" ABOVE. ALL OTHER USE IS PROHIBITED.

1. Locate and use the safety device bypass key as described above;
2. Activate the safety device bypass key by turning it in a clockwise direction and holding it in position (see decal);
3. The safety devices BYPASS icon will appear on the platform/remote control box display.
4. Operate drive/steer controls with extreme caution.
5. Move machine to a proper location to perform "Machine Re-alignment" procedure to realign the machine.
6. At the end of the operation release the key and store it as is described above.



The control circuit board records every activation of the safety device bypass key.

SECTION 6. GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

6.1 INTRODUCTION

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 and Maintenance Manual.

NOTICE

IT IS GOOD PRACTICE TO AVOID PRESSURE-WASHING ELECTRICAL/ELECTRONIC COMPONENTS. IN THE EVENT PRESSURE-WASHING THE MACHINE IS NEEDED, ENSURE THE MACHINE IS SHUT DOWN BEFORE PRESSURE-WASHING. SHOULD PRESSURE WASHING BE UTILIZED TO WASH AREAS CONTAINING ELECTRICAL/ELECTRONIC COMPONENTS, JLG INDUSTRIES, INC. RECOMMENDS A MAXIMUM PRESSURE OF 750 PSI (52 BAR) AT A MINIMUM DISTANCE OF 12 INCHES (30.5 CM) AWAY FROM THESE COMPONENTS. IF ELECTRICAL/ELECTRONIC COMPONENTS ARE SPRAYED, SPRAYING MUST NOT BE DIRECT AND BE FOR BRIEF TIME PERIODS TO AVOID HEAVY SATURATION.

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

6.2 OPERATING SPECIFICATIONS

Table 6-1. Operating Specifications

	X540AJ	X600AJ
Maximum work load (capacity)	500 lb. (230 kg)	500 lb. (230 kg)
Max. Vertical Platform Height	54 ft. (16.45 m)	59.22 ft. (18.05 m)
Max. Horizontal Platform Reach	25.59 ft. (7.80m)	31.82 ft. (9.70m)
Ambient (Operating) Temperature	See Hydraulic Oil Figure - Operating Temperature Specifications	

Dimensional Data

Table 6-2. Dimensional Data

	X540AJ	X600AJ
Overall Width (<i>with platform removed-tracks retracted</i>)	31.3 in. (79.5cm)	31.3 in. (79.5cm)
Outriggers Deployed Width	9.58 ft. x 9.58 ft. (2.92 m x 2.92 m)	9.58 ft. x 9.58 ft. (2.92 m x 2.92 m)
Stowed Height	78.6 in. (1.996m)	78.6 in. (1.996m)
Stowed Length	16 ft. 5 in. (5.01m)	16 ft. 5 in. (5.01m)
Approach angle with Jib Lowered	20°	20°
Departure angle	20°	20°

Chassis

Table 6-3. Chassis Data

	X540AJ	X600AJ
Maximum Travel Grade w/ boom in stowed position (gradeability)	16° (28.7%)	16° (28.7%)
Maximum Travel Side Slope w/ boom in stowed position	12° (21%)	12° (21%)
Turning radius	0°	0°
Maximum ground pressure per track (psi)	9.2 psi (0.64 daN/cm ²)	9.2 psi (0.64 daN/cm ²)
Maximum ground pressure per outrigger	45 psi (3.04 daN/cm ²)	45 psi (3.04 daN/cm ²)
Maximum outrigger pad load (per pad)	4,833 ft.-lb. (2,150 daN)	4,833 ft.-lb. (2,150 daN)
Outrigger pad diameter	11.8 in (300 mm)	11.8 in (300 mm)
Max drive speed (Gas Engine) w/ 2nd Speed	0.31 mph (0.5 km/hr) 0.81 mph (1.3 km/hr) 1.55 mph (2.5 km/hr)	0.31 mph (0.5 km/hr) 0.81 mph (1.3 km/hr) 1.55 mph (2.5 km/hr)
Max hydraulic system pressure Track/Outrigger: Boom:	2,610 psi (180 bar) 3,045 psi (185 bar)	2,610 psi (180 bar) 3,045 psi (185 bar)
Maximum wind speed	28 mph (12.5m/s)	28 mph (12.5m/s)
Maximum manual force	90 lb. (400 N)	90 lb. (400 N)

Chassis Data (Continued)

Table 6-4. Chassis Data

	X540AJ	X600AJ
Electrical system voltage		
Charger/Platform Plug - AC:	120V	120V
Gas Engine/Start Battery/System - DC:	12V	12V
Lithium-Ion Battery/Electric Motor:	64V	64V
Gross machine weight (platform empty)		
Gas/Petrol Engine:	6,129 lb. (2780 kg)	6,393 lb. (2900 kg)
Diesel Engine:	6,239 lb. (2830 kg)	6,548 lb. (2970 kg)
Lithium Ion:	6,349 lb. (2880 kg)	6,614 lb. (3000 kg)
BiEnergy:	6,592 lb. (2990 kg)	6,834 lb. (3100 kg)

Capacities

Table 6-5. Capacities

Component	Capacity
Hydraulic Tank	10.56 gal. (40 L)
Fuel Tank	Gasoline: 1.55 gal. (5.9 L) Diesel: 7.4 gal. (24 L)
Engine Oil	Gasoline: 0.3 gal. (1.1 L) Diesel: 0.66 gal. (2.5 L)

Combustion Engine Data

Table 6-6. Engine Specifications

	Honda iGX440	Kubota Z602
Fuel/Type	Gasoline/Air cooled	Diesel
Number of cylinders	1	2
Displacement	27 cu. in. (440 cm ³)	36.5 cu. in. (599 cm ³)
Output	12.74 hp (9.5 kW)	14.5 hp (10.8 kW)
High engine speed	3600 RPM	3200 RPM
Torque (Max.)	22 ft. lb. / 29.8 Nm @ 2500 RPM	-

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

Lithium-Ion Specifications

Table 6-7. Lithium Ion Specifications

Component	X540AJ/X600AJ
Battery Pack	
No. of cells in the battery pack:	20 cells
Rated voltage of each cell:	3.2 volt
Max. cell voltage:	3.65 volt
Min. cell voltage:	2.5 volt
Features of complete pack:	64 volt @ 120 Amp/hr
*Charge cycles:	2000 cycles
Cathode:	Lithium Ion Phosphate (LiFePO ₄)
Anode:	Graphite
Memory effect:	NO
Battery Charger	
Type:	120V (+/- 10%) - 50/60 Hz
Necessary time to recharge:	8 hrs to Balance - 6 hrs. to 80% of recharge
Electric System	64 volt for the batteries - 12 volt for the machine
Electric Motor	72 volt - three phase - 3500 watt
* The charge cycles have to be considered based on the fact that there is not memory effect in the lithium batteries, i.e. 2000 charges at 100% or 4000 charges at 50%, etc..	

Machine Major Component Weights

Table 6-8. Major Component Weights

Component	X540AJ/X600AJ
Engine (tank full)	Gasoline: 86 lb. (39 kg)
Lithium Ion Battery Pack (64V)	227 lb. (103 kg)
Boom Sections Combined	3,104 lb. (1408 kg)
Lift Cylinders	Level Cylinder: 17.6 lb. (8 kg) Jib Cylinder: 26.4 lb. (12 kg) 3rd boom level cylinder: 117.5 lb. (53.3 kg) Lift cylinder: 15.4 lb. (7 kg) Upper lift cylinder: 117.5 lb. (53.3 kg) Swing Actuator: 37.4 lb. (17 kg) Telescope cylinder: 135.5 lb. (61.5 kg)
Platforms	2 - occupant: 79.3 lb. (36 kg)
Chassis	2,802 lb. (1271 kg)

6.3 SERVICE/MAINTENANCE

Cleaning the Machine

WARNING

WHEN WASHING THE MACHINE, THE MAIN POWER SWITCH MUST BE DISENGAGED, THE KEY REMOVED AND THE EMERGENCY STOP BUTTON PRESSED.

- Washing the outside of the machine;
Never use flammable liquids. Adopt the above safety measures to prevent sparks due to short-circuits.

If washing the track with a cleaning solution, carefully cover all the vital parts and above all the electrical components. Follow the instructions provided by the manufacturer of the cleaning solution.

Clean the machine using only water-soluble detergents.

The more often the machine is cleaned, the more it will need to be re-greased (*see lubrication chart*).

Do not wet the electric motors and the other electrical components directly.

Do not aim the spray directly onto decals and rating plates.

- Cleaning the electrical system;

WARNING

NEVER CLEAN THE INVERTERS OR THE ELECTRIC MOTOR WITH WATER, AS THIS MAY CAUSE DAMAGE TO THE ELECTRICAL SYSTEM.

NOTICE

ONLY USE DRY DETERGENTS, IN ACCORDANCE WITH THE MANUFACTURERS' INSTRUCTIONS. NEVER REMOVE COVERS, GUARDS AND THE LIKE.

Clean the electrical system using a dry, non-metallic brush and low pressure air.

- After cleaning
Dry the machine carefully before starting it again (for example using compressed air).

WARNING

IF, DESPITE ALL THE PRECAUTIONS, MOISTURE HAS PENETRATED INTO THE ELECTRIC MOTOR OR OTHER PARTS OF THE ELECTRIC SYSTEM, THESE MUST BE DRIED USING COMPRESSED AIR TO AVOID THE RISK OF SHORT CIRCUITS.

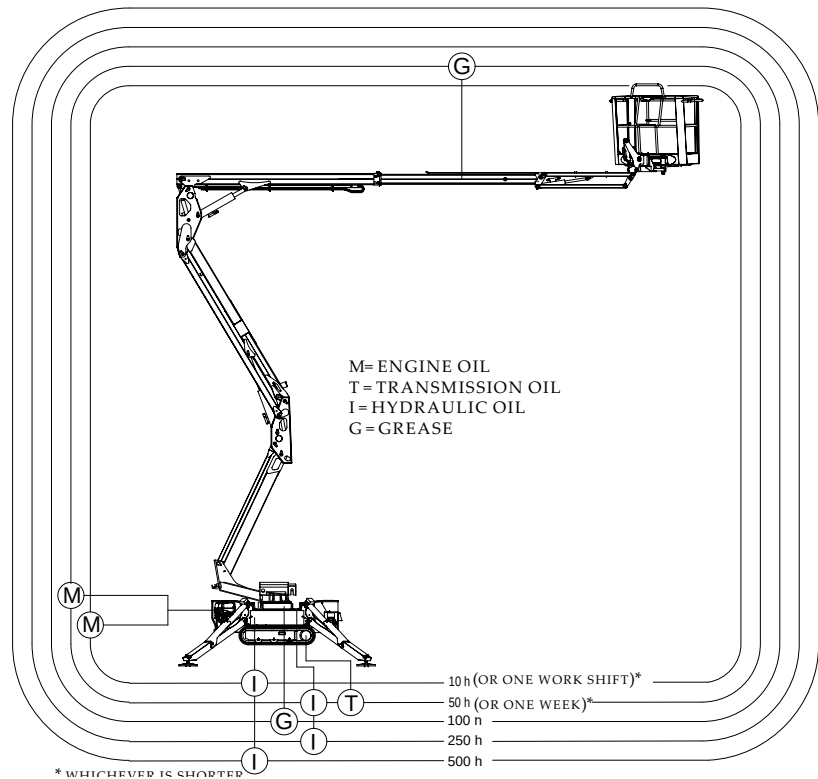


Figure 6-1. Lubrication and Maintenance Point Locations

WARNING

FOLLOW THE LUBRICATION INTERVALS INDICATED AND USE ONLY THE RECOMMENDED LUBRICANTS IN ORDER TO PROTECT PINS AND CONNECTIONS FROM WEAR.

Lubrication

(See Figure 6-1.)

Hydraulic Oil

Table 6-9. Hydraulic Oil Specifications

Hydraulic System Operating Temperature Range	Viscosity Grade
14deg F (-10 deg C) and 104deg F (+40deg C)	ISOVG46
14deg F (-10 deg C) or above 104deg F (+40deg C)	ISO 68

NOTE: When adding or replacing hydraulic oil only use JLG approved hydraulic oil. Do not mix oils unless directed by JLG.

Recommended Gearbox Oils

600 XP 150

EP 150

Blasia 150

Spartan EP150

Engine Oil

SAE 10W30

Greasing and Lubrication

Recommended lubricants

Contact Grease EP (blue in color) be used to grease the turntable and cylinder pins on the chassis

GR MU EP1 Grease be used to grease the expansion guide of the chassis, the track tension valve, and basket support pins

White EP NLGI 2 Grease be used on the boom extensions

Either MU EP1 or Esso Beacon EP2 be used to grease the coupler and belt tensioner

Greasing Locations (See Figure 6-1.)

NOTE: Use a brush to spread grease onto telescopic boom wear pad areas.

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

Hydraulic Oil Specifications

Fluid Description	Proprieties		Base				Classifications		
	Viscosity at 40°C (cst, Typical)	Viscosity Index	Mineral Oils	Vegetable Oils	Synthetic	Synthetic Polyol Esters	Readily Biodegradable*	Virtually Non-toxic**	Fire Resistant***
Pakelo Hydraulic EP Extra ISO 68	68	180	X						
Pakelo Hydraulic EP Extra ISO 46	46	160	X						
GeolubeECO Hydraulic ISO 46 (P/N 17527700)	47,3	144				X	X		
GeolubeECO Hydraulic ISO 32 (P/N 18487600)	32,1	198				X	X		
Pakelo Hydraulic EP Extra ISO 32	32	160	X						
Pakelo Hydraulic EP Extra ISO 22	22	180	X						
SHELL TELLUS S3V 68	68	180	X						
SHELL TELLUS S3V 46	46	160	X						
MobilEAL EnviroSynH46 (P/N2300029)						X	X		
SHELL TELLUS S3V 32	32	160	X						
SHELL TELLUS S3V 22	22	180	X						

Figure 6-2. Hydraulic Oil Specifications

* Readily biodegradable 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 an LC₅₀ > 5000 per OECD 203.

*** Fire Resistant classification indicates Factory Mutual Research Corp. (FMRC) Approval.

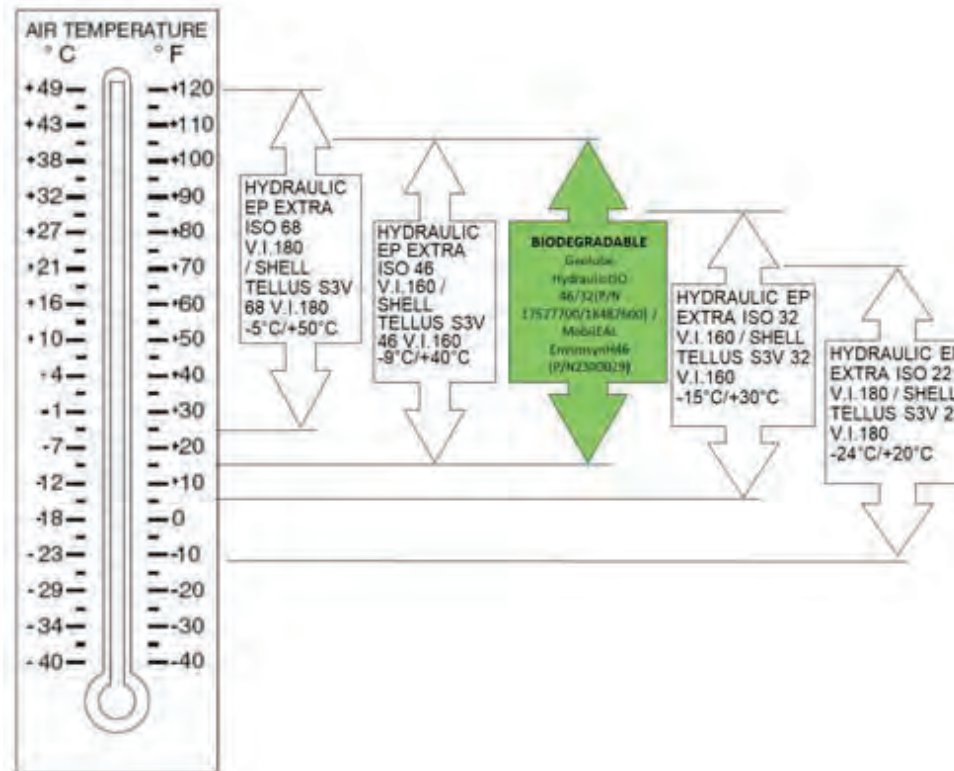


Figure 6-3. Hydraulic Oil Operating Temperatures

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

Table 6-10. Component Maintenance Intervals - X540AJ/X600AJ

Component	Operation	Pre-Start	As Needed	Hours						
				50	100	250	500	1000	2000	3000
Dry Air Filter (Gas/Diesel)	Check/Clean	•								
	Replace						•			
Engine Oil (Gas/Diesel)	Check Level	•								
	Replace (Diesel)			•*		•				
	Replace (Gas)				•					
Engine Oil Filter (Diesel)	Check/Clean			•						
	Replace					•				
Fuel Filter (Diesel)	Clean	•								
	Replace						•			
Cooling System (Diesel)	Check Level	•								
	Liquid Add and Replacement						•			
Water Separator (Diesel)	Clean and Drain Water	•		•*		•				
Hydraulic Oil	Check Level	•								
	Replace							•		
Hydraulic Oil Filter	Replace Cartridge			•*		•				
Articulated Joint Points	Grease			•*	•					
Battery	Check		•							
Reduction Gear Oil	Check Level				•					
	Replace			•*				•		

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

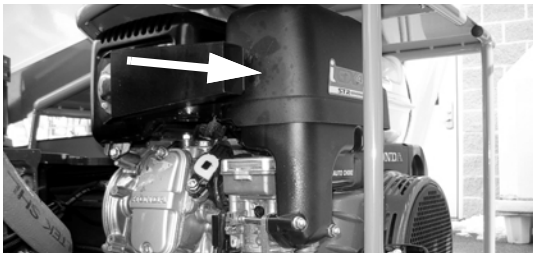
Table 6-10. Component Maintenance Intervals - X540AJ/X600AJ

Component	Operation	Pre-Start	As Needed	Hours						
				50	100	250	500	1000	2000	3000
Machine	General Periodic Check							•	•*	
Extension Arm Internal Sliding Ring (if equipped)	Check Wear					•				
	Replace							•		
Turntable Bolt Tightening	Check					•*	•			
Platform Mount Pin Nuts	Check torque 148 ft. lb. (200 Nm)							•****		
Extension Ropes and pulleys (if equipped)	Check Wear							•**		
	Replace									•***
<div style="display: flex; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px; text-align: center;">  SERV... </div> <div> <p>* 1st time interval then per chart thereafter</p> <p>** At least every 3 months or 1000 hrs. of operation</p> <p>*** At least every 7 years or 3000 hrs of operation. Check every year. If torque is not correct, replace the nuts with new nuts of same specification.</p> <p>**** At least once a year. Replace nuts if not properly torqued. Install dry without using grease or oil to specified torque.</p> </div> </div>										

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

Engine Air Filter

**Honda
Gas**

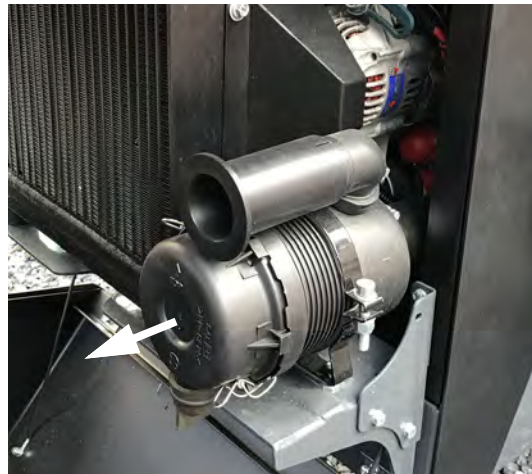


Lube Point(s) - Replaceable Paper Element, or Foam Filter Element

Interval - Check daily. Replace paper element after 500 hrs of operation, sooner if operating in a dusty environment.

The foam element can be washed out in warm soapy water, then rinse and let dry, Dip in clean engine oil and squeeze out the excess oil. If too much oil is left in the foam the engine will smoke when started.

**Kubota
Z602
Diesel**



Lube Point(s) - Replaceable Paper Element, or Foam Filter Element

Interval - Check daily. Replace paper element after 500 hrs of operation, sooner if operating in a dusty environment.

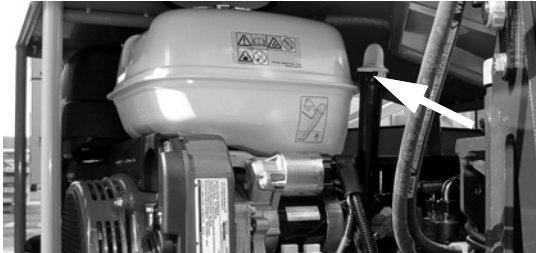
The foam element can be washed out in warm soapy water, then rinse and let dry, Dip in clean engine oil and squeeze out the excess oil. If too much oil is left in the foam the engine will smoke when started.

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

Engine Oil

**Honda
Gas**

DIPSTICK



Lube Point(s) - Fill Cap/Dip Stick Tube

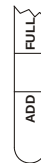
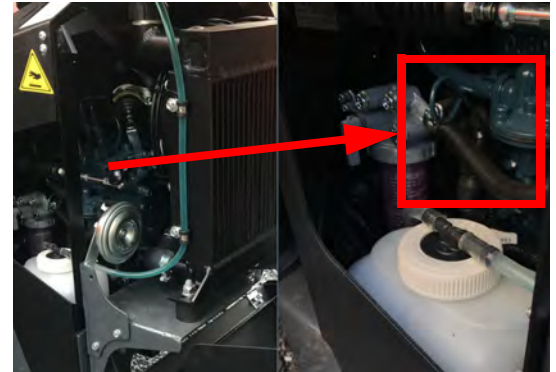
Capacity - Gasoline 0.3 gal (1.1L)

Diesel 0.39 gal (1.5 L)

Interval - Check fill level on dipstick daily. Do not overfill.
Change oil per maintenance interval chart -
(Figure 6-4.)

**Kubota
Z602
Diesel**

DIPSTICK



Lube Point(s) - Fill Cap on Valve Cover or Dip Stick Tube

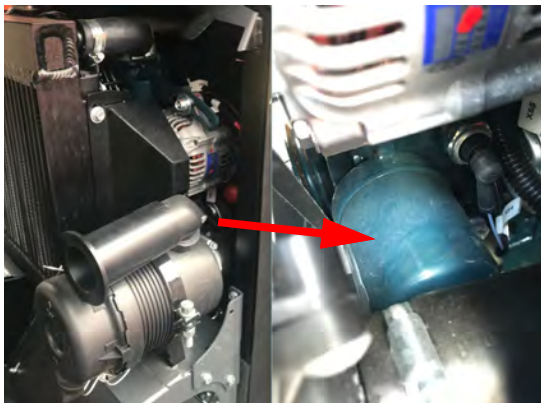
Oil Capacity - Diesel (Oil Pan) - 0.66 gal (2.5 L) - API - CH grade or better

Interval - Check fill level on dipstick daily.
Change oil/filter per maintenance interval chart -
(See Table 6-10)

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

Engine Oil Filter (if equipped)

**Kubota
Z602
Diesel**



Lube Point(s) - Filter Cartridge/replaceable

Interval - Clean every 100 hours. Replace 500 hours

Engine Fuel Filter/Sediment Bowl (if equipped)

**Honda
Gas**



Interval - Clean or replace every 500 hours

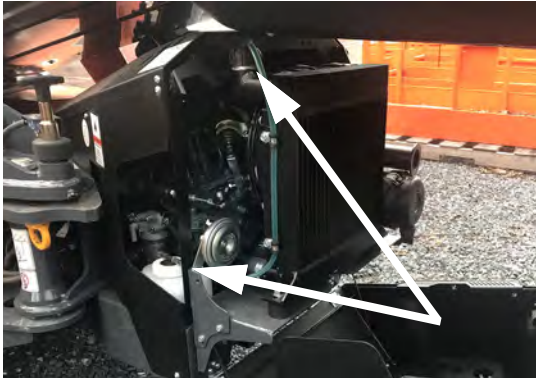
**Kubota
Z602
Diesel**



Interval - Clean every 100 hours

Engine Cooling System and Fluid (if equipped)

Kubota
Z602
Diesel



Interval - Check daily. Replace fluid every 500 hours

NOTE: Coolant utilized is to be compliant with SAE J 1034

Hydraulic Oil Tank and Filter Cartridge

NOTE: Check hydraulic oil levels with the machine in transport position while on a firm, level and uniform surface. Oil level must be halfway in the level indicator (Item A). To add hydraulic oil use fill cap (Item B).

NOTE: Remove Fill Cap (B) slowly, tank is pressurized at 2.1 PSI (.15 bar).



Lube Point(s) - Fill Cap (Item B)

Capacity - 10.56 gallons (40 liters)

Interval - Check level daily. Change every two years or 1200 hours of operation

Lube Point(s) - Filter Cap (Item C)

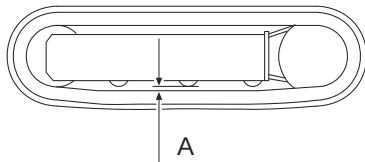
Interval - Replace after first 50 hours of use. Replace thereafter every 250 hours and every time the hydraulic oil is replaced.

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

Rubber Track Maintenance/Replacement

Check track tension

Stop the machine on a firm, level, and uniform surface. Raise the machine off the surface using the outriggers. Measure distance A from the bottom of the roller to the inside of the rubber belt. The rubber track tension is to be between 0.4inches (10mm) and 0.6 inches (15mm).

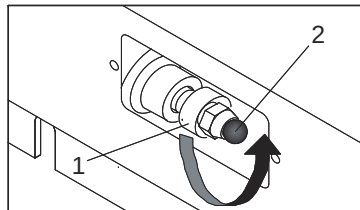


NOTE: If the track is out of tolerance immediately discontinue use of the machine.

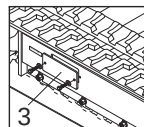
WARNING

THE GREASE CONTAINED WITHIN THE HYDRAULIC TRACK IS PRESSURIZED. NEVER LOOSEN GREASING VALVE 1 MORE THAN ONE (1) TURN. NEVER LOOSEN GREASE VALVE 2.

1. Ensure all debris has been removed between the wheel teeth and track links.
2. Remove the screws from the adjustment access lid 3.



 **DANGER**



3. Loosening of the track.
4. Slowly unscrew valve 1 in the counterclockwise direction. Do not exceed one (1) screw rotation.
5. If the grease does not begin to drain, slowly rotate the track.
6. Once correct track tension has been achieved, turn grease valve 1 clockwise to tighten valve.
7. Clean area of all trace grease.

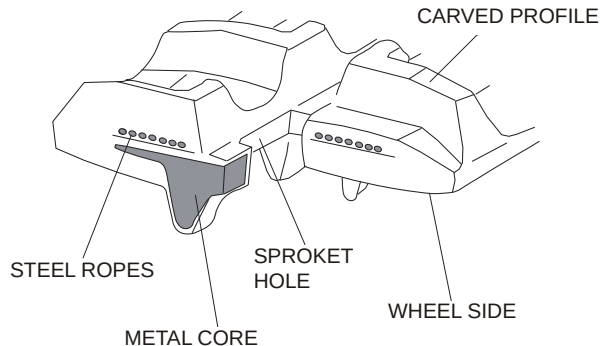
Tightening of the track

- Connect a grease gun to grease valve (2) and add grease until belt tension is within the specified values.

NOTE: *If the track does not return to the specified values by following the above procedure immediately discontinue use and contact service personnel.*

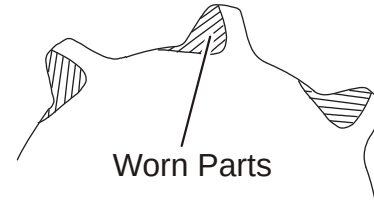
Checking the rubber tracks

- If broken steel ropes are noted discontinue use until damaged components are replaced



- If broken metal cores are noted discontinue use until damaged components are replaced

- If metal cores are separating discontinue use of the machine until the damaged components are replaced.



- If abrasive or fatigue cracks are noted it is recommended the machine be removed from service until the components are replaced.



Track Torque

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

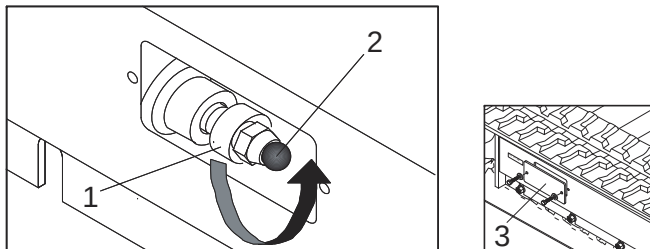
⚠ WARNING

TRACK NUTS MUST BE INSTALLED AND MAINTAINED AT THE PROPER TORQUE TO PREVENT LOOSENING OF THE TRACK, BROKEN STUDS, AND POSSIBLE DANGEROUS SEPARATION OF THE TRACK FROM THE TEETH.

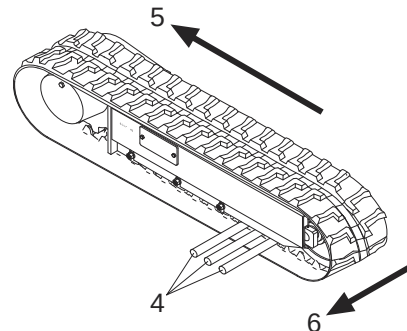
SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

Replacing Rubber Tracks

1. Elevate the machine on firm, level and uniform surface utilizing the outriggers.
2. Remove the screws and remove cover 3 as shown in figure.



3. To loosen the track, slowly unscrew valve 1 in a counter-clockwise direction. Do NOT exceed one (1) rotation.
4. Allow grease to drain. If grease does not drain, slowly rotate the track.
5. Insert three steel pipes 4 between the rollers of the track. Turn the driving wheel backwards 5 to engage the track tensioning wheel. Apply an outward force 6 to lift the track from the track tensioning wheel.



Installation of Rubber Track

1. Ensure all hydraulic cylinder grease have been removed
2. Align the track links with the wheel teeth. Position the other end of the track on the track tensioning wheel
3. Slowly rotate the drive wheel in reverse while, using one steel pipe, pushing the track plate inside the frame.
4. Verify the track links have engaged the wheel teeth in the track tensioning wheel
5. Adjust track tension (see Loosening/Tightening track section).

Wear Pad Inspection

Check for distance between wear pads and boom sections. Distance is to be no more than 1/32nd inch.

Turntable Attach Bolts

Ensure the bolts of the coupling elements (turntable) are torqued to 183 ft-lb. (248 Nm)

Battery Maintenance and Charging - Gas/AC-Electric

NOTE: *The battery is a maintenance free battery. Do NOT attempt to open a maintenance-free sealed battery.*

External Battery Charger Use

WARNING

WHEN AN EXTERNAL 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.

1. Open battery cover.
2. Disconnect the terminal clamps from the battery poles.
3. Connect the cables of the charger to the battery poles. and turn on the battery charger

NOTE: *Re-charge voltage should never exceed 14.7 volts and the load intensity shall be 0.2% of the value indicated below and on the lid of the battery.*

4. When charging is completed turn off the battery charger before disconnecting the cables from the battery poles
5. Return the terminal clamps to the battery poles and lubricate with the appropriate product
6. Close battery cover.

NOTICE

IT IS GOOD PRACTICE TO AVOID PRESSURE-WASHING ELECTRICAL/ELECTRONIC COMPONENTS. IN THE EVENT PRESSURE-WASHING THE MACHINE IS NEEDED, ENSURE THE MACHINE IS SHUT DOWN BEFORE PRESSURE-WASHING. SHOULD PRESSURE WASHING BE UTILIZED TO WASH AREAS CONTAINING ELECTRICAL/ELECTRONIC COMPONENTS, JLG INDUSTRIES, INC. RECOMMENDS A MAXIMUM PRESSURE OF 750 PSI (52 BAR) AT A MINIMUM DISTANCE OF 12 INCHES (30.5 CM) AWAY FROM THESE COMPONENTS. IF ELECTRICAL/ELECTRONIC COMPONENTS ARE SPRAYED, SPRAYING MUST NOT BE DIRECT AND BE FOR BRIEF TIME PERIODS TO AVOID HEAVY SATURATION.

6.4 ELECTRIC MOTOR MAINTENANCE

Periodically check the condition of the following electric motor components.

Electric Motor

The electric motor is located inside of the rear hydraulic valve distributor support cover.

- **POWER SUPPLY TERMINALS**

Check tightness of the nuts on the power supply terminals and make sure the insulation is intact.

- FAN

Keep air intakes clean and make sure the fan can rotate freely.

- BEARINGS

Check the condition of the bearings, in the event of noise contact JLG for replacement, the life of the bearings is reduced significantly in heavy duty operating conditions.

NOTE: *This motor is "brushless" therefore no brushes need to be checked or replaced.*

6.5 PLATFORM/REMOTE CONTROL SERVICE MENU

Service Button

A SERVICE button is present on the remote control which allows to view the status of the machine parameters and is an aid in the safety checks of the machine.

By pressing the SERVICE button a numerical menu is displayed on the LCD display, each of these menu items can be accessed by pressing the corresponding platform/remote control buttons (*numbered 1 thru 9*) below the buttons.

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

- 1 - INPUT
- 2 - LANGUAGE
- 3 - ERRORS
- 4 - RAMPS
- 5 - CURRENT
- 6 - W. HOURS
- 7 - SETUP
- 8 - JOYSTICK
- 9 - EXIT

MENUS 4; 5; CANNOT BE ACCESSED

Menu Input

The signals that arrive at the board from the various sensors mounted on the machine and from the platform/remote control commands are displayed. The status of the input and the following selection to scroll the menu appears for each screen:

- 1 - PREV - access the previous input
- 2 - NEXT - access the successive input
- 9 - ESC - escape from the INPUT menu

ST4 OPEN A	ON	Do not consider
	OFF	Do not consider

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

ST1 GND A	ON	Outrigger N° 1 on the ground – the switch is released and A line is closed
	OFF	Outrigger N° 1 lifted – the switch is pressed and A line is opened
ST1 GND B	ON	Outrigger N° 1 on the ground – the switch is released and B line is closed
	OFF	Outrigger N° 1 lifted – the switch is pressed and B line is opened
ST1 OPEN A	ON	Do not consider
	OFF	Do not consider
ST1 OPEN B	ON	Do not consider
	OFF	Do not consider
ST2 GND A	ON	Outrigger N° 2 on the ground – the switch is released and A line is closed
	OFF	Outrigger N° 2 lifted – the switch is pressed and A line is opened
ST2 GND B	ON	Outrigger N° 2 on the ground – the switch is released and B line is closed
	OFF	Outrigger N° 2 lifted – the switch is pressed and B line is opened

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

ST2 OPEN A	ON	Do not consider
	OFF	Do not consider
ST2 OPEN B	ON	Do not consider
	OFF	Do not consider
ST3 GND A	ON	Outrigger N° 3 on the ground – the switch is released and A line is closed
	OFF	Outrigger N° 3 lifted – the switch is pressed and A line is opened
ST3 GND B	ON	Outrigger N° 3 on the ground – the switch is released and B line is closed
	OFF	Outrigger N° 3 lifted – the switch is pressed and B line is opened
ST3 OPEN A	ON	Do not consider
	OFF	Do not consider
ST3 OPEN B	ON	Do not consider
	OFF	Do not consider
ST4 GND A	ON	Outrigger N° 4 on the ground – the switch is released and A line is closed
	OFF	Outrigger N° 4 lifted – the switch is pressed and A line is opened
ST4 GND B	ON	Outrigger N° 4 on the ground – the switch is released and B line is closed
	OFF	Outrigger N° 4 lifted – the switch is pressed and B line is opened

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

ST4 OPEN B	ON	Do not consider
	OFF	Do not consider
BYPASAE A	ON	The aerial part safeties are disconnected through the key button (emergency condition) – “A” line of the aerial part safeties by-pass button is closed.
	OFF	The aerial part safeties are connected (normal working condition) – “A” line of the aerial part safeties by-pass button is opened
BYPASAE B	ON	The aerial part safeties are disconnected through the key button (emergency condition) – “B” line of the aerial part safeties by-pass button is closed.
	OFF	The aerial part safeties are connected (normal working condition) – “B” line of the aerial part safeties by-pass button is opened
BYPASCB A	ON	The ground part safeties are disconnected through the key button (emergency condition)– “A” line of the ground part safeties by-pass button is closed.
	OFF	The ground part safeties are connected (normal working condition) – “A” line of the ground part safeties by-pass button is opened

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

BYPASCB B	ON	The ground part safeties are disconnected through the key button (emergency condition)– “B” line of the ground part safeties by-pass button is closed.
	OFF	The ground part safeties are connected (normal working condition) – “B” line of the ground part safeties by-pass button is opened
EM GRND A	ON	Emergency stop on the ground is released –“A” line of the emergency stop is closed
	OFF	Emergency stop on the ground is pressed – “A” line of the emergency stop is opened
EM GRND B	ON	Emergency stop on the ground is released –“B” line of the emergency stop is closed
	OFF	Emergency stop on the ground is pressed – “B” line of the emergency stop is opened
FOTO A	ON	Photocell A receives the signal from the reflector (Aerial part closed and aligned)
	OFF	Photocell A does not receive the signal from the reflector (Aerial part opened)
FOTO B	ON	Photocell B receives the signal from the reflector (Aerial part closed and aligned)
	OFF	Photocell B does not receive the signal from the reflector (Aerial part opened)
EM.R.C.GND	ON	The emergency stop on ground remote control is released.
	OFF	The emergency stop on ground remote control is pressed or the ground remote control is disconnected

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

PROXIMITY	ON	Turret is not almost completely rotated, contact is close, the 1 st -2 nd arm is not above the engine
	OFF	Turret is almost completely rotated, contact is open, the 1 st -2 nd arm is above the engine

EM.R.C.GND	ON	The stop button on ground remote control is released.
	OFF	The stop button on ground remote control is pressed or the ground remote control is disconnected
ST12 CLOSED	ON	The pressure switch of outriggers 1 and 2 closes the contact – the outriggers are at end run and the max pressure valve is opened
	OFF	The pressure switch contact of outriggers 1 and 2 is opened – the outriggers are open, partially open or already closed
ST34 CLOSED	ON	The pressure switch of outriggers 3 and 4 closes the contact – the outriggers are at end run and the max pressure valve is opened
	OFF	The pressure switch contact of outriggers 3 and 4 is opened – the outriggers are open, partially open or already closed
TEMP ALRM A <i>Option reserved for some markets</i>	ON	The temperature external probe reached the maximum value – “A” line of the temperature probe is closed
	OFF	The temperature external probe hasn't reached the maximum value – “A” line of the temperature probe is open

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

TEMP ALRM B <i>Option reserved for some markets</i>	ON	The temperature external probe reached the maximum value – “B” line of the temperature probe is closed
	OFF	The temperature external probe hasn't reached the maximum value – “B” line of the temperature probe is open
POS.1 ARM	ON	The switch of 1-2 arm position is released, contact is close, the 1 st -2 nd arm is open
	OFF	The switch of 1-2 arm position is pressed, contact is open, the 1 st -2 nd arm is closed
TRACK OPEN	ON	Tracks are in wide position. Widening cylinders switches are pressed, contact is closed
	OFF	Tracks are not in full wide position. Widening cylinders switches are released, contact is open
FREE		Do not consider this signal
EMRG. COMM	ON	The control position key selector for aerial part operation from the ground is activated (emergency condition)
	OFF	The control position key selector for aerial part operation is released (normal working condition)
MICROROPES <i>To consider only for LL20JP - X600AJ</i>	ON	The cables of the extension are OK. The control switch of the cables on extension is released and the line is closed (normal working condition)
	OFF	At list one cable on the extension is out of order. The control switch of the cables on extension is pressed and the line is open (emergency condition)

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

START M.TE	ON	The ground button for engine start is pressed
	OFF	The ground button for engine start is released
MOTOR TEMP <i>To consider only for X20JP - X600AJ</i>	ON	The engine reached the max functioning temperature (emergency condition – the engine remains at min)
	OFF	The engine maintains the correct functioning temperature (normal working condition)

MOTOR PRES <i>To consider only for X20JP - X600 AJ</i>	ON	The engine oil pressure is inadequate (emergency condition – engine turns off)
	OFF	The engine oil pressure is OK
START M.EL	ON	The ground button for electric motor start is pressed
	OFF	The ground button for electric motor start is released
GND/BASKET	ON	The control position key selector is positioned on “basket”
	OFF	The control position key selector is positioned on “ground”
MICROJIB A	ON	The JIB is closed – the control switch is released and “A” line is closed
	OFF	The JIB is open – the control switch is pressed and “A” line is open
MICROJIB B	ON	The JIB is closed – the control switch is released and “B” line is closed
	OFF	The JIB is open – the control switch is pressed and “B” line is open

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

PEDAL	ON	The pedal is pressed– the pedal electric line is closed
	OFF	The pedal is released – the pedal electric line is open
FREE B		Do not consider this signal
EM.BASK.A	ON	The stop button on remote control in basket is released – “A” line is closed
	OFF	The stop button on remote control in basket is pressed or the ground remote control is disconnected – “A” line is open
EM.BASK. B	ON	The stop button on remote control in basket is released – “B” line is closed
	OFF	The stop button on remote control in basket is pressed or the ground remote control is disconnected – “B” line is open
POSM1 A	ON	Do not consider
	OFF	Do not consider
POSM1 B	ON	Do not consider
	OFF	Do not consider
POSM2 A	ON	Do not consider
	OFF	Do not consider

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

POSM2 B	ON	Do not consider
	OFF	Do not consider
POSM3 A	ON	Do not consider
	OFF	Do not consider

POSM3 B	ON	Do not consider
	OFF	Do not consider
POSM4 A	ON	Do not consider
	OFF	Do not consider
POSM4 B	ON	Do not consider
	OFF	Do not consider
R.C. BASKET	ON	The remote control is in the support in basket
	OFF	The remote control is not in the support in basket

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

INCLIN. X	0	Indicates the inclination of the machine on the X axis in tenth of degrees (accelerometer A)
	0	Indicates the inclination of the machine on the X axis in tenth of degrees (accel B)
INCLIN. Y	0	Indicates the inclination of the machine on the Y axis in tenth of degrees (accelerometer A)
	0	Indicates the inclination of the machine on the Y axis in tenth of degrees (accel B)
LOAD	94	Indicates the weight in Kg in the basket
POS. 1E2	0	Do not consider
POS. 3	2398	Indicates the opening of the 3 arm cylinder in tenths of a millimetre
ROTATION A	180	Do not consider
MOTOR RPM Diesel Only	2200	Indicate the engine RPM

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

CURRENT A	2,5	Indicates (in tenth of mA) the current ECM1-2 is sending to the aerial part proportional valve or to the left-side undercarriage proportional valve (values less that 5 not relevant)
CURRENT B	45,3	Indicates (in tenth of mA) the current ECM1-2 is sending to the right-side undercarriage proportional valve (values less that 5 not relevant)
CURRENT C	0	Do not consider
TEMPERAT.	37,6	Indicates the temperature of the control module in C°
SUPPLY (V)	12,1	Indicates the batteries voltage, or the output voltage from the battery charger
BATTERY %	100	Only for Lithium version: indicates the % level of charge of the pack

Errors Menu

Indicates the agreement (OK) or not (FAULT) status of the sensors that have a double control.

The sensors are listed on different screens use:

- 1 - PREV - access the previous input
- 2 - NEXT - access the successive input
- 9 - ESC - escape from the INPUT menu

If the OK symbol appears at the side of the sensor it means that the two elements of the same sensor sent identical information.

If the FAULT symbol appears at the side of the sensor it means that the two elements of the same sensor sent inconsistent information.

The last page of the error menu describes the error code relating to the battery charger system, inverter or battery pack. (See "Lithium-Ion Machine Fault Codes" on page 6-36.)

Errors are indicated by the "spanner" icon in position 7 on the remote control display (See "" on page 3-16.).



If there are operating problems with the machine and the "spanner" icon is shown on the display, do not operate machine until repaired by a JLG factory trained technician.

Working Hours Menu

Indicates the number of machine working hours.

Set-up Menu

The items in this menu cannot normally be accessed.

Joystick Menu

Displays the signal that each individual Joystick sends to the main board.

6.6 LITHIUM-ION MACHINE ONLY - ADDITIONAL MAINTAINANCE INFORMATION

CAUTION

WHEN RECHARGING THE BATTERY PACK AND DURING ANY OTHER MAINTENANCE OPERATION ON THE BATTERY PACK, IT IS NECESSARY TO USE AT LEAST THE PERSONAL PROTECTIVE EQUIPMENT (PPE) LISTED BELOW.

- Eye protection devices
Protective glasses, for protection against sprays of hazardous materials.
- Hand protection devices
Hand protection gloves, for protection and insulation during work on live parts.
- Foot protection devices
Shoes with antistatic coating able to insulate the worker during work on the electrical parts of the system.

Cleaning the Machine

WARNING

WHEN WASHING THE MACHINE, THE MAIN POWER SWITCH MUST BE DISENGAGED, THE KEY REMOVED AND THE EMERGENCY STOP BUTTON PRESSED.

- Washing the outside of the machine;
Never use flammable liquids. Adopt the above safety measures to prevent sparks due to short-circuits.
If washing the track with a cleaning solution, carefully cover all the vital parts and above all the electrical components. Follow the instructions provided by the manufacturer of the cleaning solution.
Clean the machine using only water-soluble detergents.
The more often the machine is cleaned, the more it will need to be re-greased (*see lubrication chart*).
Do not wet the electric motors and the other electrical components directly.
Do not aim the spray directly onto decals and rating plates.

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

- Cleaning the electrical system;

WARNING

NEVER CLEAN THE INVERTER OR THE ELECTRIC MOTOR WITH WATER, AS THIS MAY CAUSE DAMAGE TO THE ELECTRICAL SYSTEM.

NOTICE

Only use dry detergents, in accordance with the manufacturers' instructions. Never remove covers, guards and the like.

Clean the electrical system using a dry, non-metallic brush and low pressure air.

- After cleaning

Dry the machine carefully before starting it again (for example using compressed air).

WARNING

IF, DESPITE ALL THE PRECAUTIONS, MOISTURE HAS PENETRATED INTO THE ELECTRIC MOTOR OR OTHER PARTS OF THE ELECTRIC SYSTEM, THESE MUST BE DRIED USING COMPRESSED AIR TO AVOID THE RISK OF SHORT CIRCUITS.

Lithium-Ion Machine Fault Codes

(See "Errors Menu" on page 6-34 info for display information)

Table 6-11. Inverter Fault Codes

CODE	DESCRIPTION
1	Wrong Config Cause - EEPROM memory not configured. Solution - Contact Hinowa after sales service.
8	Watch Dog Cause - Inverter cannot start or stop electric motor. Solution - Check connections and continuity of electric motor. If OK, replace inverter.
13	Eeprom KO Cause – EEPROM hardware or software problem. Solution – Replace inverter.
16	Aux output KO Cause – Problem with electromechanical brake. Solution – This is generally a temporary problem due to certain working conditions. If problem persists, replace inverter.
17	Logic failure #3 Cause – Activated in the event of high inverter current peaks. Solution – This is generally a temporary problem due to certain working conditions. If problem persists, replace inverter.
18	Logic Failure #2 Cause – Internal fault in the inverter. Solution – Replace inverter.

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

Table 6-11. Inverter Fault Codes

CODE	DESCRIPTION
19	Logic failure #1 Cause – Sudden voltage surge or voltage drop. Solution – This is a temporary problem due to certain working conditions. If problem persists, replace inverter.
30	VMN low Cause – Inverter power supply voltage is lower than battery voltage, or alternatively incorrect connection to positive battery pole. Solution – Check connection to positive battery pole. If problem persists, replace inverter.
31	VMN High Cause – One motor phase not connected correctly or faulty. Solution – Check motor phases. If problem persists, replace inverter.
37	Contact closed Cause – Relay remains closed when power to coil is disconnected. Solution – Check relay.
38	Contact Open Cause – Inverter supplies power to relay coil but contact doesn't close. Solution – Check relay and power supply to coil.
49	I=0 Error Cause – Feedback current from motor sensor not constantly at 0. Solution – Check connection to motor.

Table 6-11. Inverter Fault Codes

CODE	DESCRIPTION
53	STBY I high Cause – Internal fault detected in the inverter. Solution – This is generally a temporary problem due to certain working conditions. If problem persists, replace inverter.
60	Capacitor Charge Cause – Internal fault in the inverter. Solution – Check connections and motor phases.
61	High temperature Cause – High temperature inside the inverter. Solution – Improve cooling to inverter. If fault persists, contact JLG after-sales service.
65	Motor temperature Cause – High motor temperature. Solution – Temporarily stop machine to allow motor to cool down.
67	Can Bus KO Cause – Inverter doesn't receive any information from Can Bus line. Solution – Check connections using multifunction tester.
70	Encoder Error Cause – Problem detected with encoder (=motor speed sensor). Solution – Check speed sensor connection. Anomaly may also have been caused by fault with bearing.

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

Table 6-11. Inverter Fault Codes

CODE	DESCRIPTION
73	Thermis sensor KO Cause – Signal from temperature sensor greater than 4.95 Volts or less than 0.1 Volt. Solution – This is generally a temporary problem due to certain working conditions. If problem persists, replace inverter.
74	Driver shorted Cause – Relay power supply fault. Solution – Check relay power supply. This is generally a temporary problem due to certain working conditions. If problem persists, replace inverter.
75	Driver shorted Cause – Relay power supply fault. Solution – Check relay power supply. This is generally a temporary problem due to certain working conditions. If problem persists, replace inverter.
76	Coil shorted Cause – Problem detected with relay coil. Solution – Make sure relay coil is intact.
78	VACC not OK Cause – Solution – This is generally a temporary problem due to certain working conditions. If problem persists, replace inverter.

Table 6-11. Inverter Fault Codes

CODE	DESCRIPTION
79	Incorrect start Cause – Incorrect starting procedure. Solution – Check electrical connections. This is generally a temporary problem due to certain working conditions. If problem persists, replace inverter.
86	Pedal wire KO Cause – Solution – This is generally a temporary problem due to certain working conditions. If problem persists, replace inverter.
93	Wrong set batt Cause – With power connected, battery test detected incorrect batteries fitted. Solution – Replace batteries with the original ones supplied directly by JLG.
94	Current sensor KO Cause – Set up procedure for maximum current in progress. Solution – Contact JLG after-sales service.
99	Check up needed Cause – Solution – Contact Hinowa after.sales service.

BMS Fault Codes - (Battery Management System)

(See "Errors Menu" on page 6-34 info for display information)

NOTE: The CODE column indicates the CAN CODE in the message sent by the battery charger. The normal mains voltage tolerance is the rated value $\pm 15\%$.

CODE – TYPE OF ERROR

A99E01 – Configuration error

A99E02 – Incorrect voltage

A99E03 – Incorrect temperature

A99E04 – Excess discharge current

A99E05 – Excess charge current

A99E06 – Pre.charge error

A99E07 – No 12 V power supply

A99E08 – No 12 V power supply

A99E09 – High battery compartment temperature

A99E10 – High electronic board temperature

A99E11 – Incorrect self.protection device temperature

A99E12 – Fault on all temperature sensors

A99E13 – Temperature sensor fault

A99E14 – Earth connection fault

A99E01 – Incorrect system configuration

A99E02 – Incorrect voltage

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

- A99E03 – Incorrect temperature

A99E04 – Excess discharge current

A99E05 – Excess charge current

A99E06 – Pre.charge error

A99E07 – No 12 V power supply

A99E08 – No 12 V power supply

A99E09 – High battery compartment temperature

A99E15 – Bootloader error

A99E16 – Secondary protection

A99E17 – Control device error

A99E18 – Power board error
- A99E19 – I2C module not ready

A99E20 – I2C TX error

A99E21 – I2C RX error

A99E22 – I2C RX error 2

A99E23 – AD error

A99E99 – General error

Battery Charger Fault Codes

(See “Errors Menu” on page 6-34 info for display information)

Table 6-12. Battery Charger Fault Codes

CODE	DESCRIPTION	STATUS	ACTION
8	Internal logic fault.	Battery charger stops working.	Contact service dept. or change product.
13	Communication pro.blem with external memory.	Battery charger stops working.	Contact service dept. or change product.
18	Extended shutdown or power failure.	Battery charger stops supplying power. Operation resumes as soon as alarm conditions are no longer present or after restarting.	If problem is a power failure, check battery charger mains power supply.
19	Internal logic fault.	Battery charger stops working.	Contact service dept. or change product.

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

Table 6-12. Battery Charger Fault Codes

CODE	DESCRIPTION	STATUS	ACTION
240	Digital input is open and managed as hardware start-stop.	Battery charger stops charging until digital input closes.	Close digital input.
241	Problem in CANBUS communication with other systems in the network.	The way this is managed may change based on different firmware releases.	Check correct operation of CANBUS system.
242	Error when reading internal memory on microcontroller.	Battery charger stops working.	Contact service dept. or change product.
244	Mains voltage lower than maximum operating range tolerance.	Battery charger won't start charging until mains voltage returns within normal operating range.	Make sure mains voltage is within correct operating parameters.
245	Abnormal current draw in primary section.	Battery charger stops supplying power. Operation resumes as soon as alarm conditions are no longer present.	If problem persists, contact service dept. or change product.
246	Stage 1 ended by timeout without reaching control voltage.	Battery charger stops working.	Make sure battery capacity is compatible or check that battery is compliant with battery charger. If battery is correct and problem persists, contact service dept.
248	Temperature inside battery charger too high.	If internal temperature exceeds 80°C, battery charger reduces power to 80%, while it stops operating altogether if internal temperature exceeds 90°C. Battery charger starts at full power again when internal temperature falls below 70°C.	

Table 6-12. Battery Charger Fault Codes

CODE	DESCRIPTION	STATUS	ACTION
249	Battery temperature too high.	If temperature exceeds 55°C or is less than –20°C, battery charger stops working. When battery temperature falls below 45°C or exceeds –10°C battery charger resumes normal operation.	
251	Power failure detected.	Battery charger stops supplying power. Operation resumes as soon as alarm conditions are no longer present.	If problem persists, check battery charger mains power supply.
252	Short-circuit in battery charger output.	Battery charger stops working.	Turn off battery charger and resolve short.circuit at output. If problem persists, contact service dept. or change product.
253	Mains voltage higher than maximum operating range tolerance.	Battery charger won't start charging until mains voltage returns within normal operating range.	Make sure mains voltage is within correct operating parameters.

6.7 LITHIUM-ION BATTERY PACK - HANDLING IN DANGEROUS CONDITIONS

The battery cells must be handled correctly in order to ensure proper and safe use. However, if mistakes are made in handling the cells, causing explosion or venting, the user has to be equipped so as to be able to face this emergency. The aim of this section is to adequately train the user on safe handling of the cells that have been subjected to extreme conditions.

These Conditions Are As Follows:

1. Hot cells
2. Cells that have released substances or vented
3. Exploded cells
4. Fire enveloping the lithium batteries

Procedure For Handling Hot Cells

As soon as it has been established that the temperature of a cell has risen considerably, the first action is the evacuation of personnel from the affected area. The area has to be isolated and nobody can enter if not strictly necessary.

If possible, before leaving the area, the person who first identified the problem has to check if there is an external short-circuit and resolve it as soon as possible. After the short-circuit has been resolved, the cell will start to cool down. However, the area has to remain isolated until the cell reaches ambient temperature and is removed from the area. The temperature of the cell has to be checked periodically using a remote sensor such as an infrared sensor. If the cell remains hot the following actions must be assessed.

Minimum Equipment Required:

- Infrared temperature probe
- Safety glasses
- Hard hat with impact resistant face visor
- Non-conductive pliers
- Hand, arm and body protection

Procedure For Handling Vented Cells

Start Procedure;

1. Evacuate the area as soon as abnormal cell temperature has been established.
2. Periodically check the temperature of the cell using a remote sensor for the first two hours or until one of the following cases occur:
 - The cell starts to cool down
 - The cell vents
 - The cell explodes
3. If the cell starts cooling, check the temperature every hour until ambient temperature has been reached.
4. If a temperature sensor is not available, do not handle the cell for a minimum of 24 hours.
5. Remove the cell from the work area when ambient temperature has been reached and return to normal operations.
6. Dispose of the cell in accordance with existing legislation (in the country in question) on hazardous materials.

The procedures in cases of venting or explosion are examined in the following paragraphs.

In normal conditions a cell does not show leaks or venting, however a cell may vent or release substances if the critical

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

temperature is reached or if the protective glass/metal seal breaks due to severe mechanical conditions.

The severity of the leak consequent to venting ranges from slight leak around the seal to a violent leak of substances through the vent. In some cases, if the cell is not plugged, it may behave as a projectile.

The electrolyte inside the cell may cause very serious irritation to the respiratory tract, eyes and skin. In addition, venting may cause the emission of highly corrosive vapors in the work environment. In this case, all protective equipment suited to limit exposure to toxic fumes must be available.

Minimum Equipment Required;

- Class D fire extinguisher
- Eye protection or face shield
- Respirator with filter for hydrochloric acid and sulphur dioxide
- Neoprene gloves
- Acid-resistant lab coats
- Baking soda, calcium oxide or acid absorbent in kit form
- Vermiculite
- Plastic bags

Start Procedure;

In the event of electrolyte release from the cells, proceed as follows:

1. Evacuate the people exposed to fumes from the area.
2. Air the environment until the complete removal of the cell and until the characteristic pungent odour has disappeared.
3. If the cell is too hot, allow it to cool to ambient temperature before handling it (see "Procedure For Handling Hot Cells" on page 6-43).
4. Wear safety equipment: coat, gloves, mask and filters, and move the cell to a well-ventilated area.
5. Place every cell in a sealable plastic bag and remove the excess air, then seal the bag.
6. Place a cup of vermiculite in a second bag, place the first bag in the second and seal it.
7. Place everything in a third bag with some baking soda and seal the bag.
8. Absorb and collect the leaked electrolyte with absorbent material or baking soda.
9. Place the absorbent material in a bag and seal it.
10. Clean the area with plenty of water.
11. Dispose of the hazardous material in accordance with the local legislation in force.

First Aid In The Event Of Contact With The Electrolyte

EYES

Immediately wash the eyes in abundant running water for at least 15 minutes, keeping the eyelids open and flushing the eye and back of the eyelid. Immediately seek medical help.

SKIN

Wash in cold water under a shower, remove contaminated garments. Continue washing for at least 15 minutes. Seek medical help where necessary.

RESPIRATORY TRACT

Move the person(s) outdoors into the open air. If the person(s) has difficulty breathing, have oxygen administered by trained personnel. If breathing stops, apply mouth-to-mouth resuscitation and immediately seek emergency medical help.

Procedure For Exploded Cells

The explosion of lithium batteries is not likely, it is a rare event that only occurs when an abnormal condition causes the temperature to rise and reach a critical point. However, in the event of lithium battery explosion the environment will quickly be filled with dense white smoke which will cause serious irritation to the respiratory tract, eyes and skin. Precautions must be taken to limit exposure to these fumes.

Minimum Equipment Required;

- Class D fire extinguisher
- Class ABC extinguisher for any secondary fires
- Eye protection or face shield
- Respirator with filter for hydrochloric acid and sulphur dioxide
- Neoprene gloves
- Acid-resistant lab coats
- Baking soda, calcium oxide or acid absorbent in kit form
- Vermiculite
- Plastic bags

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

Start Procedure;

In the event of cell explosion, proceed as follows:

1. Evacuate personnel from the areas contaminated by smoke.
2. Ventilate the rooms until the cell has been removed from the area and until the characteristic pungent odor has disappeared.
3. Even if this is quite unlikely, there may be fires as a consequence of the explosion. The ways these emergencies are faced are described in the following paragraph.
4. The exploded cell may be hot. Allow it to cool down to ambient temperature before handling it (see Procedure for handling hot cells).
5. Wear safety equipment: coat, gloves, mask and filters.
6. In case of explosion the area around the cell will be covered by a black carbonaceous material which contains metallic parts of the cell. Cover the carbonaceous residues with a 50/50 mixture of baking soda and vermiculite or other absorbent material. Avoid contact between the metallic residues and charged cells, as this condition may cause a short.circuit.
7. Place the contaminated material in a sealable plastic bag and remove the excess air.
8. Seal the bag.
9. Place a cup of vermiculite in a second bag, place the first bag in the second and seal it.

10. Clean the area with plenty of water and keep cleaning with water and soap.

11. Dispose of the hazardous material in accordance with the local legislation in force.

First Aid In The Event Of Contact With The Electrolyte;

EYES

Immediately wash the eyes in abundant running water for at least 15 minutes, keeping the eyelids open and flushing the eye and back of the eyelid. Immediately seek medical help.

SKIN

Wash in cold water under a shower, remove contaminated garments. Continue washing for at least 15 minutes. Seek medical help where necessary.

RESPIRATORY TRACT

Move the casualty outdoors into the open air. If the person(s) has difficulty breathing, have oxygen administered by trained personnel. If breathing stops, apply mouth-to-mouth resuscitation and immediately seek emergency medical help.

Lithium Battery Fire

All metals may burn in certain conditions, which depend on certain factors such as: physical state, presence of oxidizing atmospheres and severity of the source of ignition. Alkali metals such as lithium may burn in normal atmospheres. In addition, lithium reacts explosively with water to form hydrogen and the presence of small quantities of water may set fire to the material and the hydrogen gas that is released. Once metal fires start they are very hard to extinguish with ordinary equipment. This is partly due to the strong heat produced by the burning metal, whose temperature may reach 1832° F (1000° C). In addition, lithium may react with certain materials commonly used in fire extinguishers, like water and CO₂. Special extinguishers are required, designed for controlling and extinguishing lithium fires.

In particular, graphite-based extinguishers (Lith-x) are used. Usually these extinguishers work by forming a crust or a layer of material on the surface of the burning metal. Lith-x, which is a common graphite-based agent, may be used with an extinguisher or spread over the fire. In the event of lithium fire, the room may fill with a dense white smoke, mostly formed by lithium oxide and other metal oxides. This condition may cause serious damage to the respiratory tract, skin and eyes. All precautions needed to limit exposure to these fumes must be adopted. It should be noted that this procedure is applicable only to fires on individual

cells. Larger fires have to be managed only by professionally trained personnel.

Finally, it should be noted that in the presence of combustible materials other than lithium it is advisable to use different types of extinguishers in conjunction to better ensure the extinguishing action of each on the appropriate material, however do not use water or CO₂ extinguishers directly on lithium fires.

Minimum Equipment Required;

- Class D fire extinguisher
- Class ABC extinguisher for any secondary fires
- Breathing apparatus
- Fireproof clothing
- Fireproof gloves
- Mask or protective glasses
- Non.conductive pliers
- Dustpan, mineral oil

Start Procedure;

1. In the event of fire on one cell, a team of experienced fire-fighting personnel has to be contacted. The personnel must be properly trained to fight lithium battery fires.
2. Evacuate personnel from all areas and sound the fire alarm.

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

3. The fire-fighting personnel go to the area where the fire is located and gather all the information regarding the situation and the person who gave the alarm.
4. Quarantine the area. Air the rooms until the burning material has been removed from the area and the characteristic pungent odor has disappeared.
5. Two members of the team enter the area with appropriate safety equipment.

NOTE: *Lithium melts at 356° F (180° C). It becomes highly reactive and when it catches fire it may eject molten lithium particles. For this reason the surrounding cells may overheat and cause a violent explosion. The fire-fighting personnel must pay attention to any dangerous materials located near the fire.*

6. Completely cover the fire with extinguishing material. Never leave the fire unattended as it may develop again.
7. If necessary, extinguish the secondary fires with suitable extinguishers.
8. After all the material has burned and cooled down, carefully mix the residual material to prevent resumption of the fire.
9. Put the material in a metal drum, cover the surface with plenty of extinguishing material.
10. The residual material may contain un-reacted lithium, therefore limit exposure to rain by covering, for example, with mineral oil.

11. Wear safety equipment: coat, gloves, mask and filters.
12. The area around the cell will be covered by a black carbonaceous deposit which contains metallic parts of the cell. Cover the carbonaceous residue with a 50/50 mixture of baking soda and vermiculite or other absorbent material. Avoid contact between the metallic residue and charged cells as this condition may cause a short.circuit.
13. Place the contaminated material in a sealable plastic bag and remove the excess air.
14. Seal the bag.
15. Place a cup of vermiculite in a second bag, place the first bag in the second and seal it.
16. Clean the area with plenty of water and keep cleaning with water and soap.
17. Dispose of hazardous material in accordance with the local legislation in force.

First Aid In The Event Of Contact With The Electrolyte;

EYES

Immediately wash the eyes in abundant running water for at least 15 minutes, keeping the eyelids open and flushing the eye and back of the eyelid. Immediately seek medical help.

SKIN

Wash in cold water under a shower, remove contaminated garments. Continue washing for at least 15 minutes. Seek medical help where necessary.

RESPIRATORY TRACT

Move person(s) outdoors into the open air. If person(s) has difficulty breathing, have oxygen administered by trained personnel. If breathing stops apply mouth-to-mouth resuscitation and immediately seek emergency medical help.

6.8 SUPPLEMENTAL INFORMATION ONLY **APPLICABLE TO CE MACHINES (EN280-1:2022)**

The following information is provided in accordance with the requirements of the European Machinery Directive 2006/42/EC or Supply of Machinery (Safety) Regulations 2008 No. 1597.

The A-Weighted emission sound pressure level at the specified workstation based on test methods per EN280-1:2022 Annex M.1 is 73 dB (A).

The guaranteed Sound Power Level (LWA) per European Directive 2000/14/EC (Noise Emission in the Environment by Equipment for Use Outdoors) based on test methods in accordance with Annex III, Part B, Method 1 and 0 of the directive, is 104 dB(A) for machines equipped with Stage IIIA and with Stage IIIB engines.

The vibration highest root mean square value of weighted acceleration to which the whole body is subjected during driving or lifting does not exceed 0.5 m/s².

JLG declares that machines included in this manual, before placing on the market, have been subjected to the required tests in accordance with EN280-1:2022, clause 5.3.

NOTE: *EC Declarations of Conformity may vary. Refer to the original serial number-specific declaration for your machine to determine which is applicable.*

SECTION 6 - GENERAL SPECIFICATIONS AND OPERATOR MAINTENANCE

EC Declaration of Conformity

Manufacturer:

JLG Industries, Inc.

Address:

1 JLG Drive
1McConnellsburg, PA 17233 USA

Technical File:

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

Contact / Position:

Senior Manager - Product Strategy EMEA

Date / Place:

Hoofddorp, Netherlands

Machine Type:	Mobile Elevating Work Platform
Model Type:	X18JP
EC-Number:	0714
Certificate Number:	714-M-0411
Notified Body:	ECO Certificazioni S.p.A
Address:	Via Mengolina, 33 - 48108 Faenza, Italy
Reference Standards:	<ul style="list-style-type: none">• EN 55011:2016+A11:2020• EN 61000-6-2:2005• EN 60204-1:2018• EN 280-1:2022• EN ISO 12100:2010

JLG Industries Inc. hereby declares that the above mentioned machine conforms with the requirements of:

- 2006/42/EC - Machinery Directive
- 2014/30/EU - EMC Directive
- 2014/53/EU - RED Directive (If fitted with optional equipment)
- 2000/14/EC - Outdoor Noise Directive

This declaration conforms with the requirements of annex II-A of the council directive 2006/42/EC. Any modification to the above described machine violates the validity of this declaration.

EC Declaration of Conformity

Manufacturer:

JLG Industries, Inc.

Address:

1 JLG Drive
1McConnellsburg, PA 17233 USA

Technical File:

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

Contact / Position:

Senior Manager - Product Strategy EMEA

Date / Place:

Hoofddorp, Netherlands

Machine Type:

Mobile Elevating Work Platform

Model Type:

X20JP

EC-Number:

0714

Certificate Number:

714-M-0422

Notified Body:

ECO Certificazioni S.p.A

Address:

Via Mengolina, 33 - 48108 Faenza, Italy

Reference Standards:

- EN 55011:2016+A11:2020
- EN 61000-6-2:2005
- EN 60204-1:2018
- EN 280-1:2022
- EN ISO 12100:2010

JLG Industries Inc. hereby declares that the above mentioned machine conforms with the requirements of:

- 2006/42/EC - Machinery Directive
- 2014/30/EU - EMC Directive
- 2014/53/EU - RED Directive (If fitted with optional equipment)
- 2000/14/EC - Outdoor Noise Directive

This declaration conforms with the requirements of annex II-A of the council directive 2006/42/EC. Any modification to the above described machine violates the validity of this declaration.

6.9 SUPPLEMENTAL INFORMATION ONLY APPLICABLE TO CE MACHINES (EN280:2013+A1:2015)

The following information is provided in accordance with the requirements of the European Machinery Directive 2006/42/EC.

The A-Weighted emission sound pressure level at the work platform is less than 70dB(A)

The guaranteed Sound Power Level (LWA) per European Directive 2000/14/EC (Noise Emission in the Environment by Equipment for Use Outdoors) based on test methods in accordance with Annex III, Part B, Method 1 and 0 of the directive, is 106 dB(A) for machines equipped with Stage IIIA engines and 112 dB(A) for machines equipped with Stage IIIB engines.

The vibration total value to which the hand-arm system is subjected does not exceed $2,5 \text{ m/s}^2$. The highest root mean square value of weighted acceleration to which the whole body is subjected does not exceed $0,5 \text{ m/s}^2$.

NOTE: *EC Declarations of Conformity may vary. Refer to the original serial number-specific declaration for your machine to determine which is applicable.*

EC Declaration of Conformity

Manufacturer:

JLG Industries, Inc.

Address:

1 JLG Drive
1McConnellsburg, PA 17233 USA

Technical File:

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

Contact / Position:

Senior Manager - Product Safety & Reliability

Date / Place:

Hoofddorp, Netherlands

Machine Type:

Mobile Elevating Work Platform

Model Type:

X540AJ, X18JP, X600AJ, X20JP

EC-Number:

0714

Certificate Number:

714-M-0410

Notified Body:

ECO Certificazioni S.p.A

Address:

Via Mengolina, 33 - 48108 Faenza, Italy

Reference Standards:

- EN 55011:2009/A1:2010
- EN 61000-6-2:2005
- EN 60204-1:2018
- EN 280:2013+ A1:2015
- EN ISO 12100:2010

JLG Industries Inc. hereby declares that the above mentioned machine conforms with the requirements of:

- 2006/42/EC - Machinery Directive
- 2014/30/EU - EMC Directive
- 2014/53/EU - RED Directive (If fitted with optional equipment)
- 2000/14/EC - Outdoor Noise Directive

This declaration conforms with the requirements of annex II-A of the council directive 2006/42/EC. Any modification to the above described machine violates the validity of this declaration.

SECTION 7. INSPECTION AND REPAIR LOG

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

Machine Serial Number _____

Date	Comments

SECTION 7 - INSPECTION AND REPAIR LOG

Date	Comments



An Oshkosh Corporation Company

Corporate Office
JLG Industries, Inc.
1 JLG Drive
McConnellsburg, PA 17233-9533 USA
☎ (717) 485-5161 (Corporate)
☎ (877) 554-5438 (Customer Support)
📠 (717) 485-6417

Visit our website for JLG Worldwide Locations.
www.jlg.com