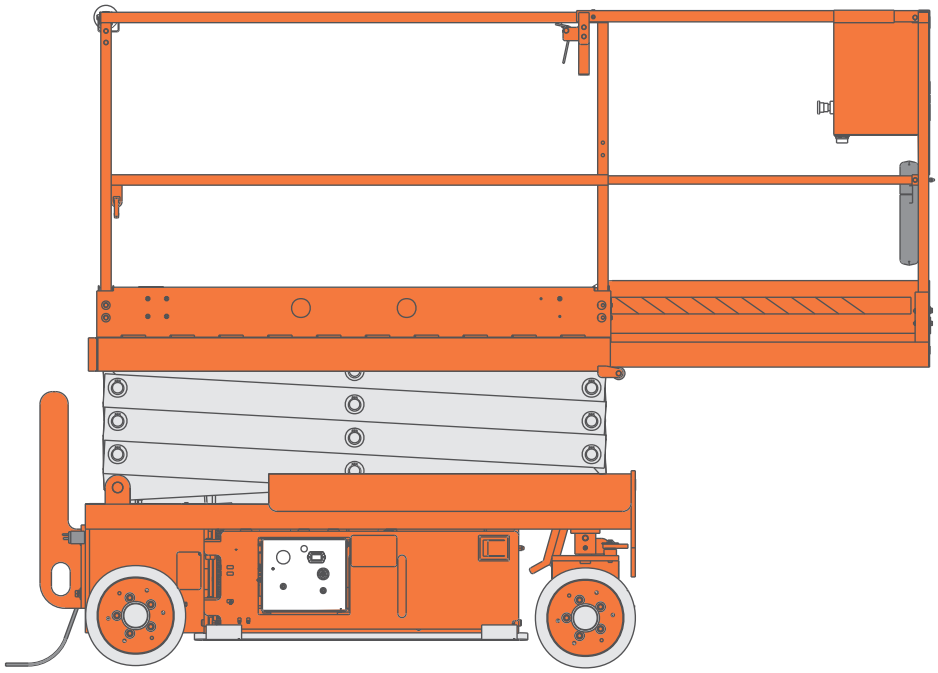
Operator's Manual



S1930

Snorkel

P/N 0361266
March, 2001

DANGER

The aerial platform is not electrically insulated. Death or serious injury can result from contact with, or inadequate clearance from, an energized conductor.

Do not go closer than the minimum safe approach distance as defined by the Minimum Safe Approach Distance section in Chapter 3–Safety.

Regard all conductors as energized.

Allow for electrical wire sag and aerial platform sway.

If the platform, scissors structure, or any part of the aerial platform contacts a high-voltage electrical conductor, the entire machine can become electrically charged.

If that happens, remain on the machine and do not contact any other structure or object. This includes the ground, adjacent buildings, poles, and any other objects that are not part of the aerial platform.

Such contact could make your body a conductor to the other object, creating an electrical shock hazard resulting in death or serious injury.

If an aerial platform is in contact with an energized conductor the platform operator must warn ground personnel in the vicinity to stay away. Their bodies can conduct electricity creating an electrical shock hazard resulting in death or serious injury.

Do not approach or leave the aerial platform until the electricity has been turned off.

Do not attempt to operate the lower controls when the platform, scissors structure, or any part of the aerial platform is in contact with a high-voltage electrical conductor or if there is an immediate danger of such contact.

Personnel on or near an aerial platform must be continuously aware of electrical hazards, recognizing that death or serious injury can result from contact with an energized conductor.

CALIFORNIA

Proposition 65 Warning

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

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Chapter 1. Introduction

Aerial Platform Features

The aerial platform is a self-propelled scissors lift that has been designed for indoor use only, to raise personnel, their tools, and material to the workstation. The platform is raised and lowered with a hydraulic cylinder. A hydraulic motor on each of the front drive wheels provides power to move the aerial platform.

The standard machine includes the following features.

- Proportional drive and lift up control
- Driveable at full height
- Drive motion alarm
- Non-marking tires
- Automatic pothole protection system
- Level sensor with drive/lift interlock
- Hour meter
- Manual lowering valve
- Lockable battery disconnect switch
- Tie-down lugs
- Lifting lugs
- Heavy duty battery charger with ammeter
- Swing-out hydraulic and electrical component trays
- Non-slip metal platform floor
- Three foot platform extension
- 125 volt AC electrical outlet with GFCI
- Scissor arm safety support prop
- Lowering alarm
- Removable upper controls
- Forklift loadable from three sides
- Rear forklift pockets
- Chain entry gate
- Five year warranty

The aerial platform has been manufactured to conform to all applicable requirements of the following organizations.

- Occupational Safety and Health Administration (OSHA)
- American National Standards Institute (ANSI)
- Canadian Standards Association (CSA)
- European Standard prEN 280

Options

The following options may be provided on the machine.

- Horn
- Flashing light
- Swinging platform gate
- Battery condition indicator
- EE rating (consult factory)

Operator's Manual

This manual provides information for safe and proper operation of the aerial platform. Read and understand the information in this Operator's Manual before operating the aerial platform on the job.

Additional copies of this manual may be ordered from Snorkel. Supply the model and manual part number from the front cover to assure that the correct manual will be supplied.

All information in this manual is based on the latest product information at the time of publication. Snorkel reserves the right to make product changes at any time without obligation.

Safety Alerts

A safety alert symbol is used throughout this manual to indicate danger and caution instructions. Follow these instructions to reduce the likelihood of personal injury and property damage. The terms danger and caution indicate varying degrees of personal injury or property damage that can result if the instruction is not followed.

⚠DANGER

Indicates a situation which if not avoided can result in death or serious injury.

⚠CAUTION

Indicates a situation which if not avoided can result in minor injury or property damage.

Notes

Notes are used to provide special information or helpful hints to assist in aerial platform operation, but do not indicate a hazardous situation.

Operation

The aerial platform has built-in safety features and has been factory tested for compliance with Snorkel specifications and industry standards. However, any personnel lifting aerial platform can be potentially dangerous in the hands of untrained or careless operators.

⚠DANGER

The potential for an accident increases when the aerial platform is operated by personnel who are not trained and authorized. Death or serious injury can result from such accidents. Read and understand the information in this manual and on the placards and decals on the machine before operating the aerial platform on the job.

Training is essential and must be performed by a qualified person. Become proficient in knowledge and actual operation before using the aerial platform on the job. You must be trained and authorized to perform any functions of the aerial platform. Operation of the aerial platform must be within the scope of the machine specifications.

The operator bears ultimate responsibility for following all manufacturer's instructions and warnings, regulations and safety rules of their employer and/or any state or federal law.

Maintenance

Every person who maintains, inspects, tests, or repairs the aerial platform must be qualified to do so. Following the daily prestart inspection in this Operator's Manual will help keep the aerial platform in optimum working condition. Other maintenance functions must be performed by maintenance personnel who are qualified to work on the aerial platform.

Do not modify this aerial platform without prior written consent of the Snorkel Engineering Department. Modification may void the warranty, adversely affect stability, or affect the operational characteristics of the aerial platform.

Manual of Responsibilities

All owners and users of the aerial platform must read, understand, and comply with all applicable regulations. Ultimate compliance to OSHA regulations is the responsibility of the user and their employer.

ANSI publications clearly identify the responsibilities of all personnel who may be involved with the aerial platform. A reprint of the "Manual of Responsibilities for Dealers, Owners, Users, Operators, Lessors and Lessees of ANSI/SIA A92.6-1999 Self-Propelled Elevating Work Platforms" is available from Snorkel dealers or from the factory upon request.

Copies are also available from:

Scaffold Industry Association
20335 Ventura Blvd. Suite 310
Woodland Hills, CA 91364-2471 USA

Additional Information

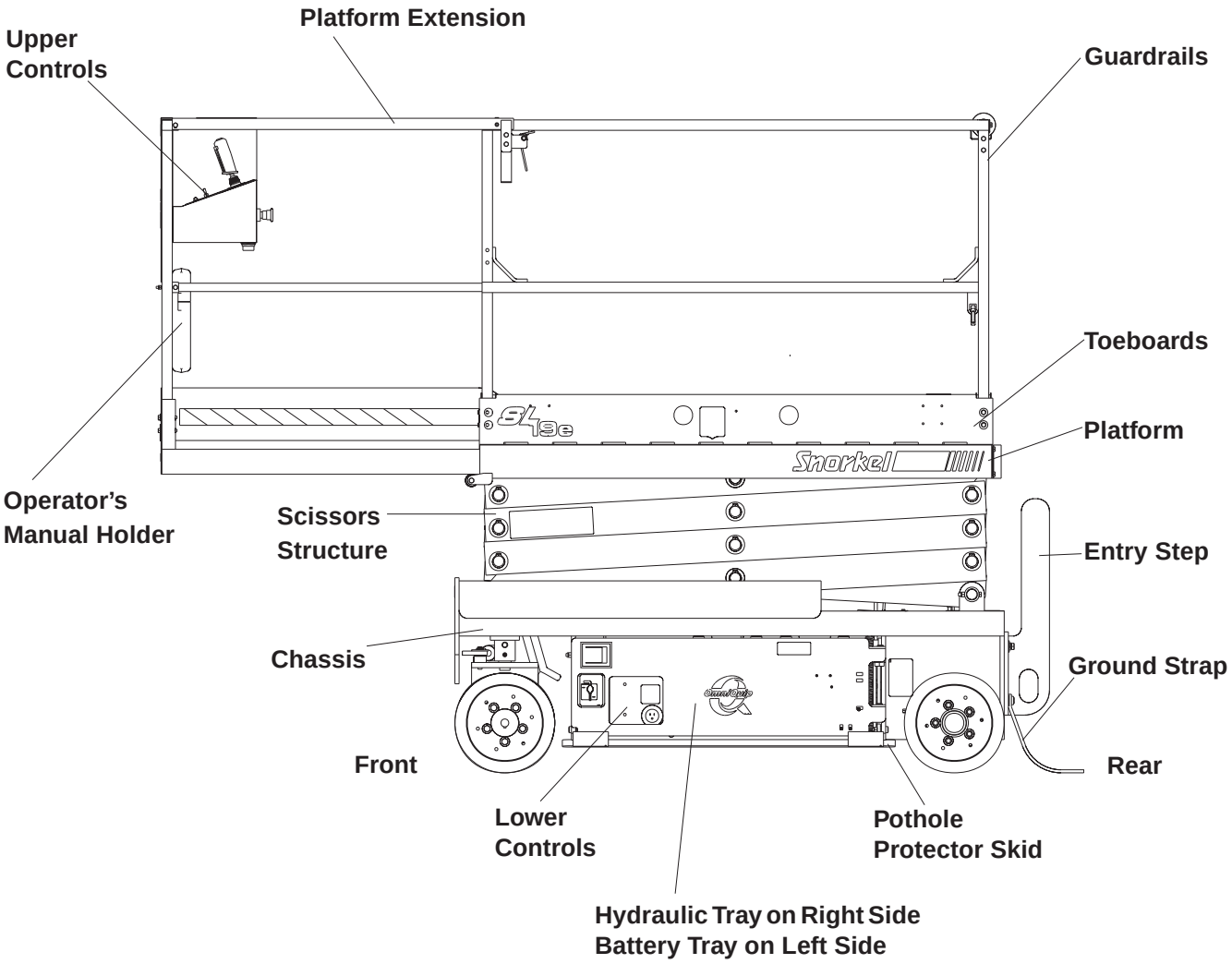
For additional information contact your local dealer or Snorkel at:

Snorkel International, Inc.
P.O. Box 1160
St. Joseph, MO 64502-1160 USA
816-364-0317

http://www.snorkelusa.com

Chapter 2. Specifications

Component Identification



General Specifications

Aerial Platform

Working height	25′ (7.6 m)
Maximum platform height	19′ (5.8 m)
Turning radius (Right turn)	
Inside	5.0″ (12.7 cm)
Outside	64.5″ (1.64 m)
Wheelbase	4′ 6″ (1.37 m)
Ground clearance	
Pothole protector raised	2.5″ (6.3 cm)
Pothole protector lowered	0.75″ (1.9 cm)
Maximum wheel load	1,416 lbs (642 kg)
Maximum floor pressure	175 psi (12.3 kg/cm²)
Weight, GVW	
Approximate	3,040 lbs (1,379 kg)
Stowed width	30″ (76.2 cm)
Stowed length	6′ 2″ (1.9 m)
With step removed	5′ 6″ (1.7 m)
Stowed height	6′ 7″ (2.0 m)

Platform

Dimensions	
Main	29″ x 61.5″ (74 cm x 156 cm)
Extension	24″ x 36″ (61.0 cm x 91.4 cm)
Guardrail height	
Main	39″ (1.0 m)
Extension	39″ (1.0 m)
Toeboard height	6″ (15.2 cm)
Rated work load	
Total	500 lb (227 kg)
Extension	250 lb (113 kg)
Maximum number of occupants	2 people
AC outlet	120 V, 17.4 amp

Function Speed

Platform raise	12 to 20 seconds
Platform lower	20 to 26 seconds
Drive	
Platform raised less than 7′ (2.1 m)	0 to 2 mph (0.6 to 3.2 km/h)
Platform raised more than 7′ (2.1 m)	0 to 0.4 mph (0 to 0.6 km/h)

Drive System

Standard	2-wheel drive
Gradeability	20%

Drive/Lift Level Sensor Interlock

Side to side	2°
Front to rear	4°

Tires

Solid rubber	4″ x 12″ (10.2 cm x 30.5 cm)

Electrical System

Voltage	24 V DC negative chassis ground
Source	4-6 V 220 amp hour batteries
Fluid recommended	distilled water

Hydraulic System

Maximum pressure	2,800 psi (19,305 kPa)
Reservoir capacity	3 US gal (11.4 l)
System capacity	3.5 US gal (13.2 l)
Maximum operating temperature	160°F (71°C)
Hydraulic fluid recommended	
Above 10°F (-13°C)	Mobil DTE-13M (ISO VG32)
Below 10°F (-13°C)	Mobil DTE-11M (ISO VG15)

Ambient Air Temperature Operating Range

Fahrenheit	0°F to 110°F
Celsius	-18°C to 43°C

Chapter 3. Safety

Knowledge of the information in this manual, and proper training, provide a basis for safely operating the aerial platform. Know the location of all controls and how they operate to act quickly and responsibly in an emergency.

Safety devices reduce the likelihood of an accident. Never disable, modify, or ignore any safety device. Safety alerts in this manual indicate situations where accidents may occur.

If any malfunction, hazard or potentially unsafe condition relating to capacity, intended use, or safe operation is suspected, stop aerial platform operation and seek assistance.

The operator bears ultimate responsibility for following all manufacturer's instructions and warnings, regulations and safety rules of their employer and/or any state or federal law.

Electrocution Hazards

The aerial platform is made of metal components and is not insulated. Regard all conductors as energized. Do not operate outside during a thunderstorm.

Minimum Safe Approach Distance

Minimum safe approach distances to energized power lines and their associated parts must be observed while operating the aerial platform.

⚠DANGER

The aerial platform is not electrically insulated. Death or serious injury can result from contact with, or inadequate clearance from, an energized conductor. Do not go closer than the minimum safe approach distance as defined by ANSI.

ANSI publications define minimum distances that must be observed when working near bus bars and energized power lines. Table 1 and Figure 3 are reprinted courtesy of Scaffold Industry Association, ANSI/SIA A92.6, page 36.

Voltage range (phase to phase)	Minimum safe approach distance	
	(Feet)	(Meters)
0 to 300V	Avoid contact	
Over 300V to 50kV	10	3.05
Over 50kV to 200kV	15	4.60
Over 200kV to 350kV	20	6.10
Over 350kV to 500kV	25	7.62
Over 500kV to 750kV	35	10.67
Over 750kV to 1000kV	45	13.72

Table 1—Minimum Safe Approach Distance

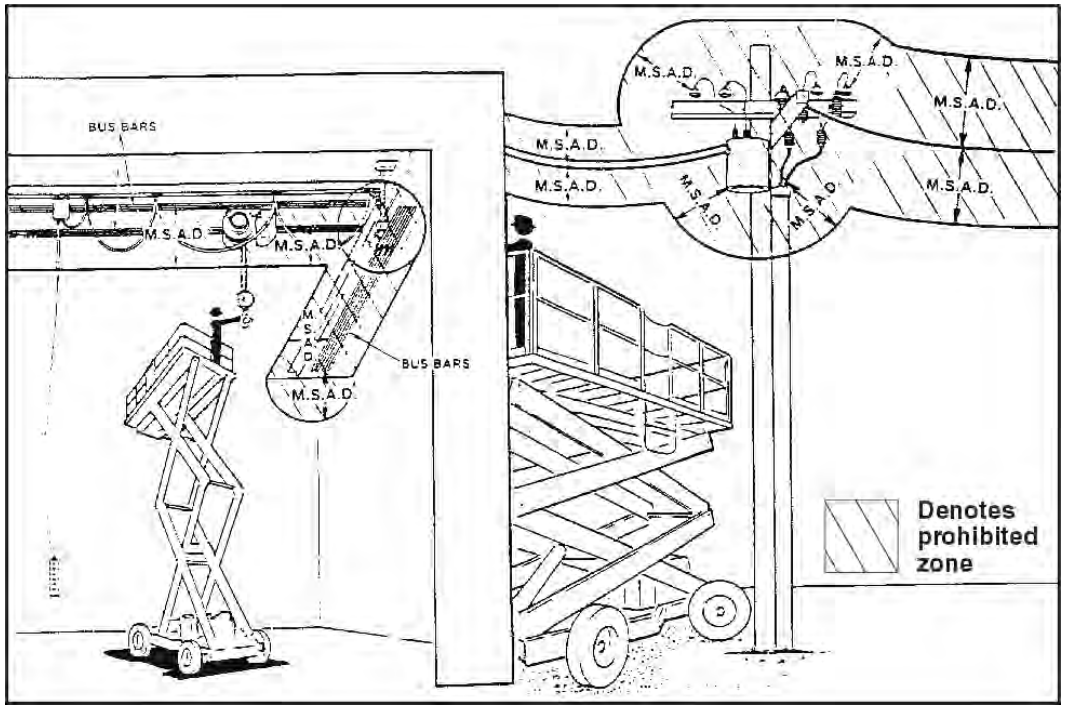


Figure 3—Minimum Safe Approach Distance

Prestart Inspection

Perform a prestart inspection before each shift as described in Chapter 8. Do not use the aerial platform on the job unless you are trained and authorized to do so.

Work Place Inspection and Practices

Do not use the aerial platform as a ground connection when welding. The welding ground clamp must be attached to the same structure that is being welded. Electrical current flow can be very intense, causing serious internal damage to some components.

Inspect the area before and during aerial platform use. The following are some potential hazards that may be in the work place.

- Debris
- Slopes
- Drop-offs or holes
- Bumps and floor obstructions
- Overhead obstructions
- Unauthorized persons
- High voltage conductors
- Wind and weather conditions
- Inadequate surface and support to withstand load forces applied by the aerial platform in all operating configurations

Before using the aerial platform in any hazardous (classified) location, make certain it is approved and of the type required by ANSI/NFPA 505 for use in that particular location.

Know and understand the job site traffic-flow patterns and obey the flagmen, road signs, and signals.

While operating the aerial platform, a good safety practice is to have qualified personnel in the immediate work area to:

- Help in case of an emergency
- Operate emergency controls as required
- Watch for loss of control by platform operator
- Warn the operator of any obstructions or hazards that may not be obvious to them
- Watch for soft terrain, sloping surfaces, drop-offs, etc. where stability could be jeopardized
- Watch for bystanders and never allow anyone to be under, or to reach through the scissors structure while operating the aerial platform

⚠DANGER

Pinch points may exist between moving components. Death or serious injury can result from becoming trapped between components, buildings, structures, or other obstacles. Make sure there is sufficient clearance around the machine before moving the chassis or platform. Allow sufficient room and time to stop movement to avoid contact with structures or other hazards.

Always look in the direction of movement. Drive with care and at speeds compatible with the work place conditions. Use caution when driving over rough ground, on slopes, and when turning. Do not engage in any form of horseplay or permit riders any place other than in the platform.

Secure all accessories, containers, tools, and other materials in the platform to prevent them from accidentally falling or being kicked off the platform. Remove all objects that do not belong in or on the aerial platform.

Never steady the platform by positioning it against another platform. Do not use boards, or other temporary means to support or level the aerial platform.

Do not operate the aerial platform if it is damaged or not functioning properly. Qualified maintenance personnel must correct the problem before putting the aerial platform back into service.

Operation

Use three points of support when entering or exiting the platform. For example, use two hands and one foot when climbing into the platform.

Make sure the area below the platform is free of personnel before lowering.

Keep both feet positioned firmly on the platform floor. Operate the controls slowly and deliberately to avoid jerky and erratic operation. Always stop the controls in neutral before going in the opposite direction.

Do not dismount while the aerial platform is in motion or jump off the platform.

Properly stow the aerial platform and secure it against unauthorized operation at the end of each work day, before transporting, or if it is left unattended.

Tip-Over and Falling Hazards

Operate the aerial platform only on a firm, flat, level surface capable of withstanding all load forces imposed by the aerial platform in all operating conditions. Refer to the General Specifications chart for the maximum wheel load, maximum floor pressure, and drive/lift level sensor interlock information. Raise the platform only when the aerial platform is on level ground.

⚠DANGER

The aerial platform can tip over if it becomes unstable. Death or serious injury can result from a tip-over accident. Do not drive or position the aerial platform for elevated use near any drop-off, hole, slope, soft or uneven ground, or other tip-over hazard.

Do not operate the aerial platform within 4 (1.2 m) of any drop-off or hole.

It is best not to transfer from the platform to another structure or from the structure to the platform, unless that is the safest way to do the job. Judge each situation separately taking the work environment into account. If it is necessary to transfer from the platform to another structure the following guidelines apply:

1. If you are using a fall restraint, transfer your anchorage from one structure to the other before stepping across.
2. Remember that you might be transferring to a structure where *personal fall arrest* is required.
3. Use the platform entrance, do not climb over the guardrails.

Do not raise the platform outdoors or in the wind. Do not add anything to the aerial platform that will increase the wind loading such as billboards, banners, flags, etc.

Never operate the aerial platform without all parts of the guardrail system in place and the safety chain or gate closed. Make sure that all protective guards, cowlings, and doors are securely fastened.

Do not exceed the platform capacity as indicated on the platform rating placard on the platform. Do not carry loads that extend beyond the platform guardrails without prior written consent from Snorkel.

Do not operate the aerial platform from trucks, trailers, railway cars, floating vessels, scaffolds, or similar equipment unless the application is approved in writing by Snorkel.

Do not use the aerial platform as a crane, hoist, jack, or for any purpose other than to position personnel, tools, and materials.

Do not climb on the guardrails or use ladders, planks, or other devices to extend or increase the work position from the platform.

Take care to prevent rope, electrical cords, and hoses, etc., from becoming caught in or on the aerial platform. If the platform or scissors structure becomes caught on an adjacent structure or other obstacle and is prevented from normal motion, reverse the control to free the platform. If control reversal does not free the platform, evacuate the platform before attempting to free it.

Electrical System

Charge the batteries in a well-ventilated area free of flame, sparks, or other hazards that might cause fire or explosion.

Do not operate any of the aerial platform functions while the battery charger is plugged in.

⚠DANGER

Batteries give off hydrogen and oxygen that can combine explosively. Death or serious injury can result from a chemical explosion. Do not smoke or permit open flames or sparks when checking the batteries.

Battery acid can damage the skin and eyes. Serious infection or reaction can result if medical treatment is not given immediately. Wear face and eye protection when working near the batteries.

Batteries contain sulfuric acid that can damage your eyes or skin on contact. Wear a face shield, rubber gloves, and protective clothing when working around batteries. If acid contacts your eyes, flush immediately with clear water and get medical attention. If acid contacts your skin, wash off immediately with clear water.

Hydraulic System

The hydraulic system contains hoses with hydraulic fluid under pressure.

⚠DANGER

Hydraulic fluid escaping under pressure can have enough force to inject fluid into the flesh. Serious infection or reaction can result if medical treatment is not given immediately. In case of injury by escaping hydraulic fluid, seek medical attention at once.

Do not place your hand or any part of your body in front of escaping hydraulic fluid. Use a piece of cardboard or wood to search for hydraulic leaks.

Placards and Decals

The aerial platform is equipped with placards and decals that provide instruction for operation and accident prevention. Do not operate the aerial platform if any placards or decals are missing or not legible.

Chapter 4. Safety Devices

This aerial platform is manufactured with safety devices, placards, and decals to reduce the likelihood of an accident. For the safety of all personnel, do not disable, modify, or ignore any safety device. Safety devices are included in the daily prestart inspection.

⚠DANGER

The potential for an accident increases when safety devices do not function properly. Death or serious injury can result from such accidents. Do not alter, disable, or override any safety device.

If any safety devices are defective, remove the aerial platform from service until qualified maintenance personnel can make repairs.

Emergency Stop Controls

There is an emergency stop control at the lower and upper controls.

At the lower controls, the emergency stop is a two-position push button (refer to Figure 4.1).

Push the emergency stop button in to disconnect power to all control circuits. Pull the button out to restore power.

Figure 4.1—Lower Controls

Note
The lower controls override the upper controls. If the upper control emergency stop button is engaged, the lower controls can still be used to operate the aerial platform.

At the upper controls, the emergency stop is a two-position push button (refer to Figure 4.2).

Push the emergency stop button in to disconnect power to the upper control circuits. Pull the button out to restore power.

Figure 4.2—Upper Controls

Drive Motion Alarm

When the joystick is moved out of neutral to drive the aerial platform, the alarm emits a loud beeping sound to warn personnel in the work area to stand clear.

Pothole Protector Skids

The pothole protector skids automatically lower when the platform is elevated approximately 24″ (61 cm). Ground clearance is reduced from $2^{1}/_{2}$″ (6.3 cm) to $^{3}/_{4}$″ (1.9 cm) when the skids lock into position (refer to Figure 4.3).

Figure 4.3—Pothole Protector Skids

⚠DANGER

The aerial platform can tip over if it becomes unstable. Death or serious injury can result from a tip-over accident. Do not drive or position the aerial platform for elevated use within four feet of any drop-off, hole, or other tip-over hazard.

This protection system limits the tilt angle if a wheel is driven into a drop-off or hole. This greatly reduces the likelihood of the aerial platform tipping over.

The pothole protection system is for added protection and does not justify operating near drop-offs or holes.

Drive/Lift Pothole Protector Interlock

The aerial platform drive and lift functions are interlocked through a limit switch that senses whether or not the pothole protection linkage is locked into position. The drive/lift pothole interlock operates when the platform is elevated approximately 7′ (2.1 m).

If an obstruction under the skids, or some other impairment prevents the skids from locking into position, the drive and lift functions will not operate and an alarm will sound.

Lower the platform and remove the obstruction when the drive/lift pothole protector interlock alarm sounds.

Drive/Lift Level Sensor Interlock

The aerial platform drive and lift functions are interlocked through a level sensor system. The drive/lift level sensor interlock operates when the platform is elevated approximately 7′ (2.1 m).

If the chassis is tilted more than 2 degrees side-to-side or more than 4 degrees front-to-rear, the drive and lift functions will not operate and an alarm will sound.

Lower the platform and drive to a level surface when the drive/lift level sensor alarm sounds.

The drive/lift level sensor system is for added protection and does not justify operating on anything other than firm, flat, level surfaces.

Lowering Alarm

When the joystick is moved out of neutral to lower the platform, the alarm emits a loud beeping sound to warn personnel in the work area to stand clear.

⚠DANGER

Pinch points exist on the scissors structure. Death or serious injury can result if the scissors structure lowers onto personnel within the scissors arms or under the raised platform. Stand clear while raising and lowering the platform.

Be careful when lowering the platform. Keep hands and fingers away from the scissors structures components.

Emergency Lowering Lever

The emergency lowering lever may be used to lower the platform if there is a malfunction in the hydraulic or electrical system. The lever is mounted at the front of the aerial platform (refer to Figure 4.4).

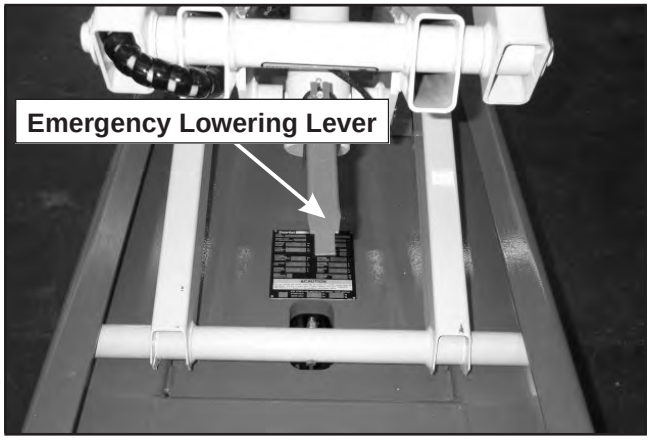


Figure 4.4—Emergency Lowering Lever

The emergency lowering lever may be used to lower the scissors arms onto the safety prop before inspecting the machine.

Safety Prop

The safety prop (refer to Figure 4.5) is used to support the scissors structure when access to the scissors arm components or the chassis is required. Always use the safety prop when the platform is raised during inspection and maintenance.

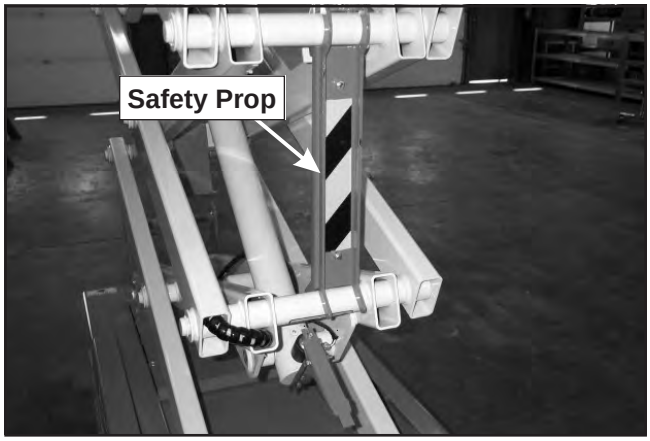


Figure 4.5—Safety Prop

Guardrails

The guardrail system includes a top rail, mid rail, and toeboards around the sides of the platform (refer to Figure 4.6).

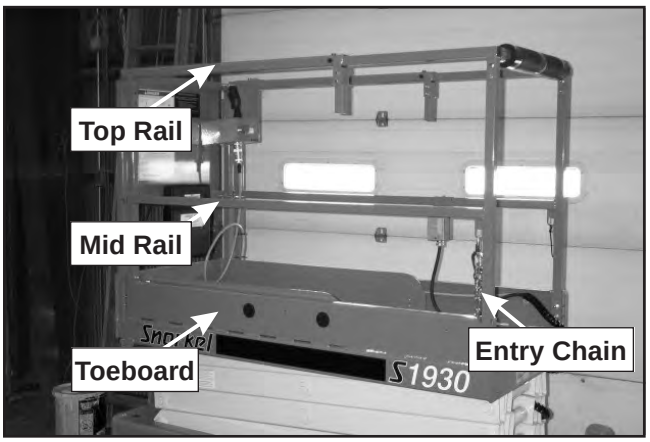


Figure 4.6—Guardrails

A safety chain or an optional swinging gate allows for access to the platform. The gates close automatically after entering or exiting the platform. The chain or gate is part of the guardrail system and must be securely fastened after entering the platform.

Ground Fault Circuit Interrupter

The electrical power outlet (refer to Figure 4.7), at the platform contains a ground fault circuit interrupter (GFCI) to help prevent accidental conductor grounding.

Figure 4.7—Electrical Power Outlet

Tilt Alarm

An alarm will sound if the aerial platform chassis is out of level more than 1½ degrees when the platform is raised.

⚠DANGER

The aerial platform can tip over if it becomes unstable. Death or serious injury can result from a tip-over accident. Do not drive or position the aerial platform for elevated use near any drop-off, hole, slope, soft or uneven ground, or other tip-over hazard.

Completely lower the platform and then drive to a level surface when the tilt alarm sounds.

The tilt alarm is for added protection and does not justify operating on anything other than firm, flat, level surfaces.

Horn

The optional horn may be used to warn personnel on the ground. The horn is operational when the machine is set up for operation from the upper controls.

Flashing Light

An optional red or amber flashing light may be located at the rear of the aerial platform (refer to Figure 4.9). The flashing light warns personnel that the aerial platform is in the area.

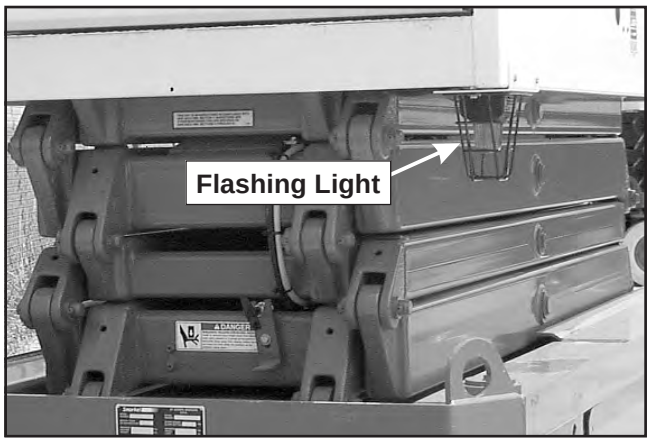


Figure 4.9—Flashing Light

The light flashes at about one flash per second when the machine is set up for operation from the upper controls.

Chapter 5. Gauges

The aerial platform is equipped with several gauges to monitor the condition of the machine before and during operation.

Hour Meter

The hour meter is located on the lower control panel (refer to Figure 5.1). It measures the accumulated aerial platform operating time.

Figure 5.1—Lower Controls

Ammeter

The ammeter is located on the battery charger (refer to Figure 5.2). When the batteries are charging, the ammeter displays the level of current flow from the charger to the batteries.

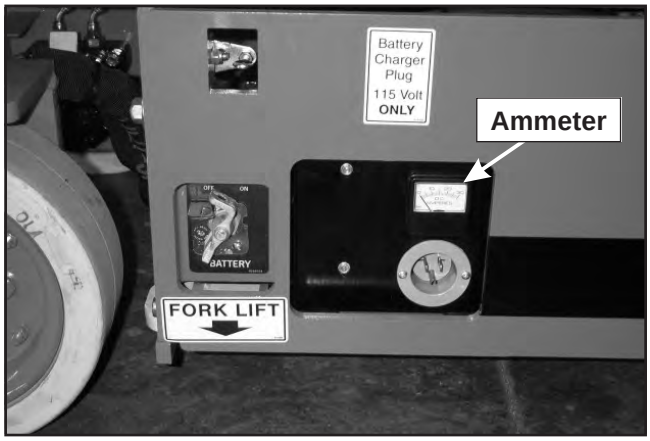


Figure 5.2—Battery Charger

Battery Condition Indicator

The optional battery condition indicator (refer to Figure 5.3) is located on the upper control panel. It displays the level of available battery power to operate the aerial platform. The number one on the scale indicates full power and zero indicates no power.

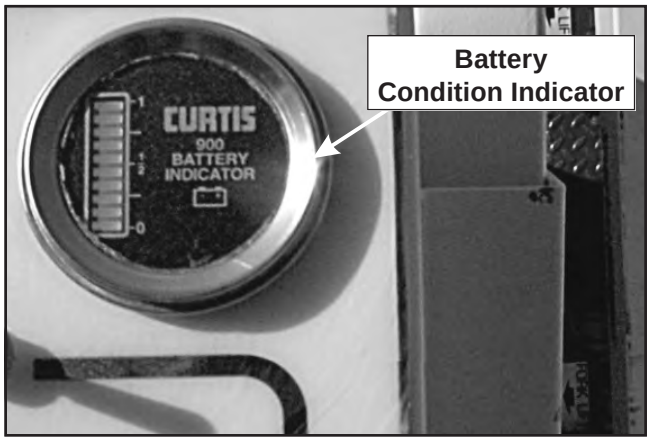


Figure 5.3—Battery Condition Indicator

Chapter 6. Batteries

The battery tray contains 4, 220 amp hour, 6 volt batteries. These batteries supply 24 volt DC electrical power to operate the aerial platform drive and platform control systems. Proper machine operation depends on well maintained and charged batteries.

General Maintenance

Always keep the batteries clean, free of dirt and corrosion. A film on top of the battery can accelerate discharge.

Cold reduces battery capacity and retards charging. Heat increases water usage and can result in overcharging. Very high temperatures can cause thermal run away which may lead to an explosion or fire. Consult a battery charger specialist if extreme temperature use is unavoidable.

⚠DANGER

Battery acid can damage the skin and eyes. Serious infection or reaction can result if medical treatment is not given immediately. Wear face and eye protection when working near the batteries.

Use distilled water to refill the batteries. Avoid water containing metallic solids such as iron.

Charging

Fully recharge the batteries, immediately after use. One charging cycle per day is preferred. Fully charged batteries perform best. The deeper the discharge, the fewer number of cycles a battery will deliver. Deep discharges deteriorate the battery quicker than light shallow cycles.

An overly discharged battery may need to be cycled a few times before it can fully recover. If a battery begins to heat before becoming fully charged, it may be necessary to recharge and discharge the battery a few times.

The aerial platform is equipped with an automatic battery charger that will completely recharge the batteries and turn off after the charge cycle is completed.

⚠DANGER

Batteries give off hydrogen and oxygen that can combine explosively. Death or serious injury can result from a chemical explosion. Charge the batteries only in a well ventilated area away from sparks or flame.

⚠CAUTION

The batteries can be overcharged and/or damaged if the charger fails to shut off automatically. Do not leave the battery charger on for more than two days.

It may take from 1½ to 16 hours to recharge the batteries depending on the amount of discharge. If the charging cycle exceeds 16 hours without the batteries being fully recharged, shut off the charger and have the batteries checked.

Use the following procedure to charge the batteries.

1. Turn the battery disconnect switch off (refer to Figure 6.1). The switch is next to the latch on the battery tray.

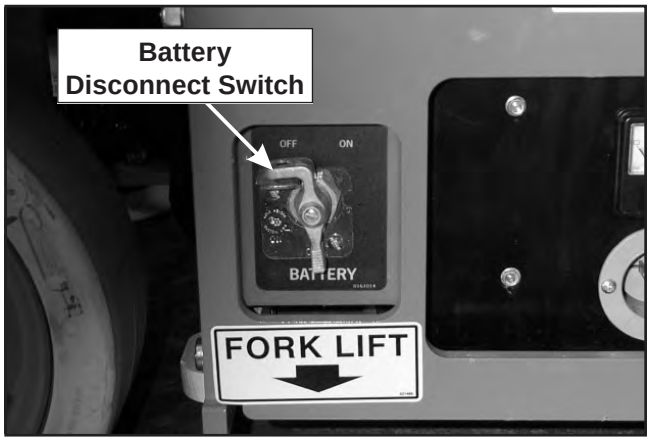


Figure 6.1—Battery Tray

2. Check the battery water level. Add water to individual cells only if the plates are exposed. Replace the battery caps.
3. Plug the charger into a properly grounded outlet (115 volt AC, 60 Hz) using a 3 conductor, 14 gauge or larger extension cord. The extension cord must be as short as possible and in good electrical condition. The charger will turn on three to five seconds after a complete electrical connection is made. The ammeter (refer to Figure 6.1) will indicate near 20 amps initially then taper off to 5 to 10 amps as the batteries charge.

Note
If the batteries are fully charged when the charger is plugged in, the ammeter will initially read 15 to 20 amps then quickly read zero.

4. Leave the charger plugged in until it shuts itself off.
5. Unplug the extension cord after the battery charger turns itself off. Allow the batteries to cool off after charging.
6. Check the battery water level. Add water to individual cells only if the plates are exposed. Replace the battery caps.

Chapter 7. Controls

Controls to position the platform are located on the lower control panel on the chassis and on the upper control panel in the platform. Drive controls are located on the upper control panel only.

Battery Disconnect Switch

The battery disconnect is located next to the latch on the battery tray (refer to Figure 7.1).

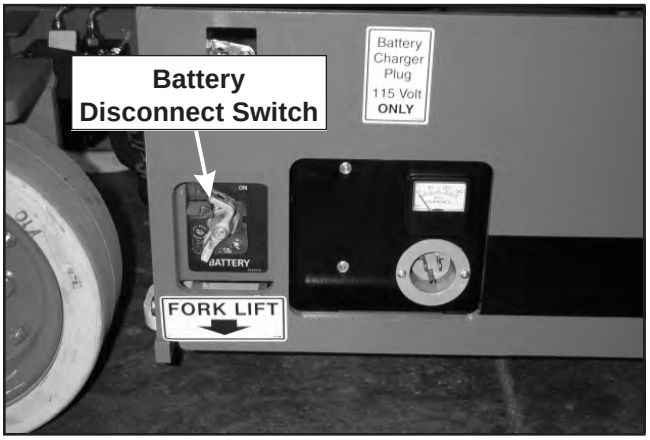


Figure 7.1—Battery Disconnect Switch

The battery disconnect switch removes electrical power from all electrically controlled functions when in the off position. Place the switch in the on position to operate any electrically controlled function.

⚠CAUTION

Only authorized personnel should operate the aerial platform. Unqualified personnel may cause injury to coworkers or property damage. Lock the battery disconnect switch in the off position before leaving the aerial platform unattended.

Lock the battery disconnect switch in the off position to prevent unauthorized use of the aerial platform.

Lower Controls

The lower controls (refer to Figure 7.2) are located on the left side of the chassis. Only platform functions can be operated from the lower controls. The following controls are located on the lower control panel.

- Emergency stop button
- Control selector switch
- Platform raise/lower switch

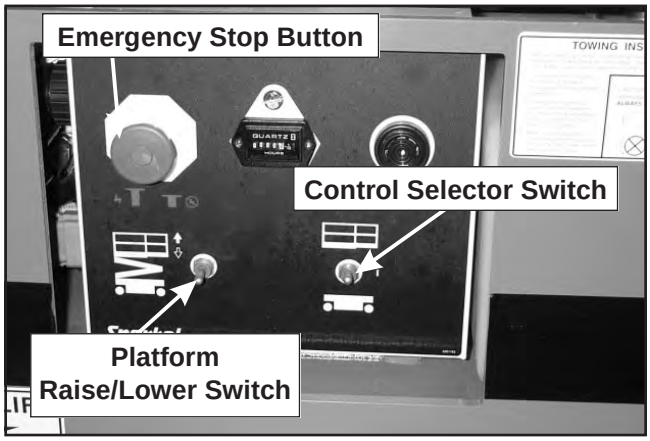


Figure 7.2—Lower Controls

Emergency Stop Button

The emergency stop is a two-position push button. Push the button in to disconnect power to all control circuits. Pull the button out to restore power.

Control Selector Switch

Place the control selector switch in the down position to operate aerial platform functions from the lower controls. The upper controls will not operate while the control selector is in the lower position.

Place the selector switch in the up position to operate the aerial platform functions from the upper controls.

Platform Raise/Lower Switch

Pull up on the platform switch toward the white arrow to raise the platform. Release the switch when the desired height is reached.

Push down on the switch toward the black arrow to lower the platform. The lowering alarm will sound as the platform lowers.

Circuit Breaker Reset Buttons

The lower control panel electrical system has a circuit breaker in its power line. The circuit breakers protect the electrical wiring and components from electrical overload in case of a short circuit or other fault.

⚠CAUTION

A tripped circuit breaker indicates a malfunction in the electrical system. Component damage can result if the cause of the malfunction is not corrected. Do not operate the aerial platform if the circuit breaker trips repeatedly.

Push the button to reset the circuit breaker.

Upper Controls

The upper controls (refer to Figure 7.3) are located on the control box at the platform. The following controls are located at the upper control station.

- Emergency stop button
- Drive/lift selector switch
- Joystick to control platform lift, drive and steer

The optional horn button and battery condition indicator gauge may also be located at the upper control station.

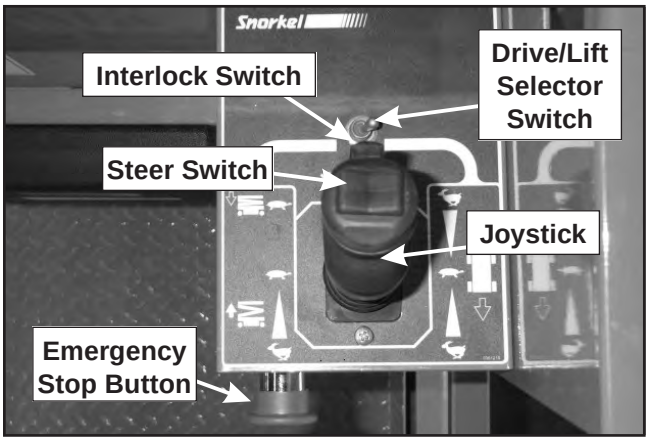


Figure 7.3—Upper Controls

Emergency Stop Button

The emergency stop is a two-position red push button on the front of the upper control box. Push the button in to disconnect power to all control circuits at the upper controls. Pull the button out to restore power.

Note
The lower controls override the upper controls. If the upper control emergency stop is engaged the lower controls can still be used to operate the aerial platform.

Push the button in when the upper controls are not in use to help protect against unintentional platform operation.

Drive/Lift Selector Switch

Place the drive/lift selector switch in the drive position to drive the aerial platform using the joystick. The platform will not raise or lower while driving.

Place the drive/lift selector switch in the lift position to raise and lower the platform using the joystick.

Joystick

Use the joystick (refer to Figure 7.3) to operate the following functions.

- Aerial platform steering
- Aerial platform drive and speed
- Platform raise/lower and speed

Movement of the joystick in a given direction produces a corresponding movement of the aerial platform. The steering and drive functions may be operated separately or simultaneously.

Interlock

The joystick has an interlock switch in the handle. Engage the interlock by grasping the joystick and pulling the switch toward the handle. Engage the interlock to activate the steering, drive, or lift functions.

Steer Switch

The steer switch is a momentary contact, rocker switch on top of the joystick. This switch controls the two front wheels to steer the aerial platform.

To steer to the right, engage the interlock on the joystick and hold down the right side of the steer switch. To steer to the left, engage the interlock on the joystick and hold down the left side of the steer switch.

Note
The steering wheels are not self-centering. Set the steering wheels straight ahead after completing a turn.

Horn Button

The optional horn button is on the left side of the upper control box. Press the button to sound the horn.

Battery Condition Indicator

The optional battery condition indicator gauge is on the top of the upper control box. It indicates the level of available battery power to operate the aerial platform.

Chapter 8. Prestart Inspection

Potential service and safety problems may be detected by inspecting the aerial platform. This chapter includes information on properly inspecting the aerial platform and includes a prestart inspection check list at the end of the chapter to ensure that no areas are overlooked.

⚠DANGER

The potential for an accident increases when operating an aerial platform that is damaged or malfunctioning. Death or serious injury can result from such accidents. Do not operate the aerial platform if it is damaged or malfunctioning.

Perform a prestart inspection at the beginning of each shift, before using the aerial platform on the job. The inspection site must have a smooth and level surface.

Operator's Manual

The manual holder is located at the inside the platform (refer to Figure 8.1) at the front of the machine. Make certain it is securely fastened in place.

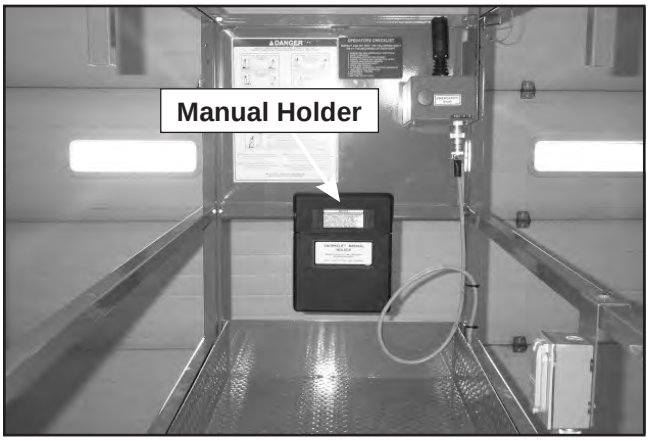


Figure 8.1—Operator's Manual Holder

Check to see that the proper Operator's Manual is in the holder. The manual should be complete with all pages intact and in readable condition.

Electrical System

Electrical power is supplied from 4, 220 amp hour, 6 volt batteries. These batteries supply 24 volt DC electrical power to operate the aerial platform drive and control system.

⚠DANGER

Batteries give off hydrogen and oxygen that can combine explosively. Death or serious injury can result from a chemical explosion. Do not smoke or permit open flames or sparks when checking the batteries.

⚠CAUTION

Even with low voltage electrical systems, severe arcing can occur. Electrical shock or component damage can result from contact with energized conductors. Use caution when working with any electrical device.

The batteries are in the swing-out tray on the left side of the aerial platform.

Battery Fluid Level

Remove the caps from each battery (refer to Figure 8.2). Visually check the battery fluid level. If the level is not within $^{1}/_{4}$″ (0.6 cm) of the bottom of the filler neck inside each hole, add distilled water.

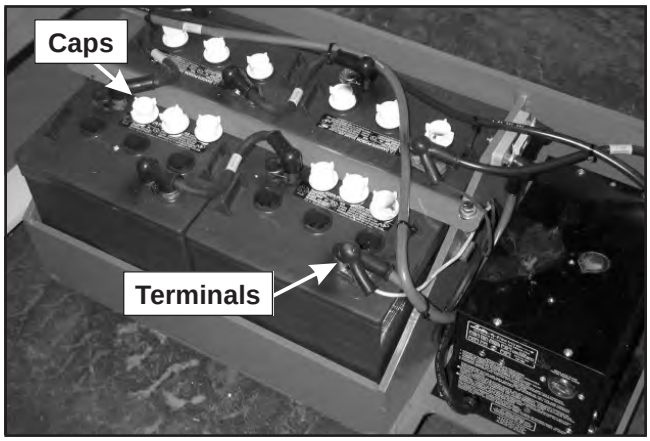


Figure 8.2—Batteries

Replace the caps on the batteries. The caps must be in place and tight during machine operation and battery charging.

Battery Terminals

Check the top of the batteries, the terminals, and cable ends (refer to Figure 8.2). They should be clean and free of corrosion and dirt. Clean the top of the batteries if necessary. Clean the terminals and cable ends with a wire brush or terminal cleaning tool. All cable ends must be securely fastened to the terminals.

Battery Charger

Inspect the battery charger (refer to Figure 8.3) to ensure that it is operating properly.

1. Turn the battery disconnect switch off.
2. Plug the charger into a source of power.

3. Observe the reading on the ammeter. The reading should be 20 amps.

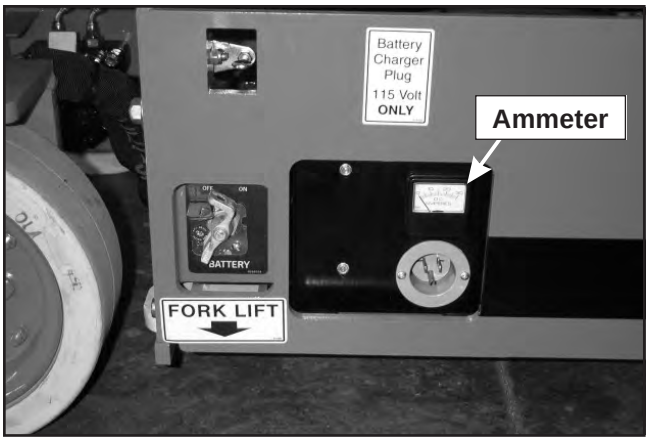


Figure 8.3—Battery Charger

4. Unplug the charger.

Safety Prop

Using the lower controls, raise the platform until the open height between the arm pins is wide enough to position the safety prop. Refer to Figure 8.4.

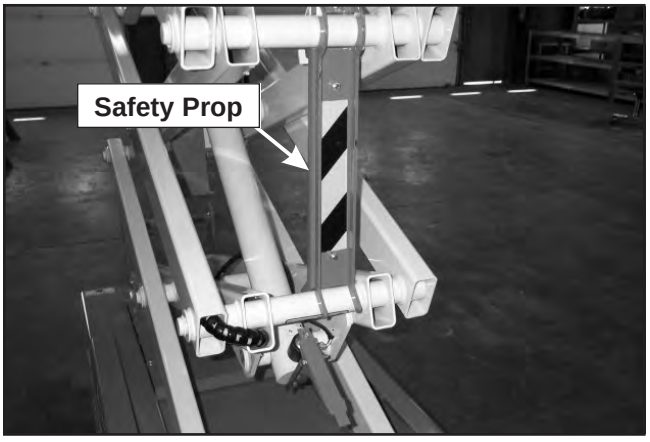


Figure 8.4—Safety Prop

Swing the safety prop downward from the storage position to the support position. Inspect the safety prop for damage and deformation. Check for cracks in the welds that hold the handle and the support channel onto the tube.

Always use the safety prop when the platform is raised during inspection and maintenance.

⚠DANGER

Pinch points exist on the scissors structure. Death or serious injury can result if the scissors structure drops onto personnel working within the scissors arms or under the raised platform. Properly position the safety prop before reaching through the scissors structure.

When inspecting or servicing the aerial platform with the platform raised, use the following procedure to properly position the safety prop.

1. Remove all tools and material from the platform.
2. Using the lower controls, raise the platform until the open height between the arm pins is wide enough to position the safety prop. Refer to Figure 8.4.
3. Swing the safety prop downward from the storage position to the support position.
4. Remove hands and arms from the scissors structure area.
5. Lower the platform until the scissors are supported by the safety prop.

Use the following procedure to stow the safety prop.

1. Using the lower controls, raise the platform until the open height between the arm pins is wide enough to position the safety prop.
2. Swing the safety prop up to the stowed position.

Cables and Wiring Harness

Inspect all cables and wiring for wear and/or physical damage such as loose connections, broken wires, and frayed insulation. Check the wiring in areas where a change in routing direction may cause them to become pinched (refer to Figure 8.5). Make sure the cables and wires are properly routed to avoid sharp edges, pinching, and scuffing.

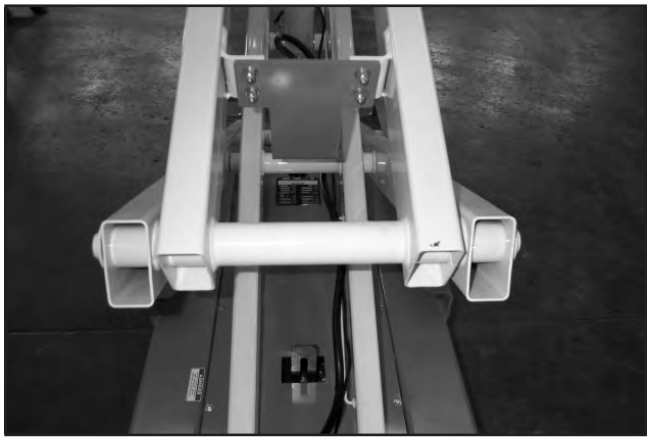


Figure 8.5—Cables and Wiring Harness

Hydraulic System

Hydraulic power is supplied from a single stage hydraulic pump with a 4.25 horsepower DC electrical motor.

⚠DANGER

Hydraulic fluid escaping under pressure can have enough force to inject fluid into the flesh. Serious infection or reaction can result if medical treatment is not given immediately. In case of injury by escaping hydraulic fluid, seek medical attention at once.

The hydraulic reservoir, pump, filter, and control valve are located in the hydraulic tray on the right side of the chassis.

Fluid Level

Check the hydraulic fluid level with the aerial platform on a level surface and the platform raised about two feet. The fluid must be visible in the plastic tube (refer to Figure 8.6).

Figure 8.6—Fluid Level Indicator

⚠CAUTION

Not all hydraulic fluid is suitable to use in the hydraulic system. Some have poor lubricating characteristics and can increase component wear. Only use hydraulic fluid as recommended.

If necessary, remove the filler cap and add fluid of the proper type. Refer to Chapter 2—Specifications for the proper type and grade of hydraulic fluid to use. The need to regularly add fluid indicates a leak that should be corrected.

Hoses, Tubes, and Fittings

Inspect all hydraulic hoses, tubes, and fittings for wear, leakage, or damage (refer to Figure 8.7). Make sure the hoses are properly routed to avoid sharp edges, kinking, and scuffing. Inspect the tubes for dents or other damage that may restrict fluid flow. Make sure all hoses and tubes are held firmly in their support brackets.

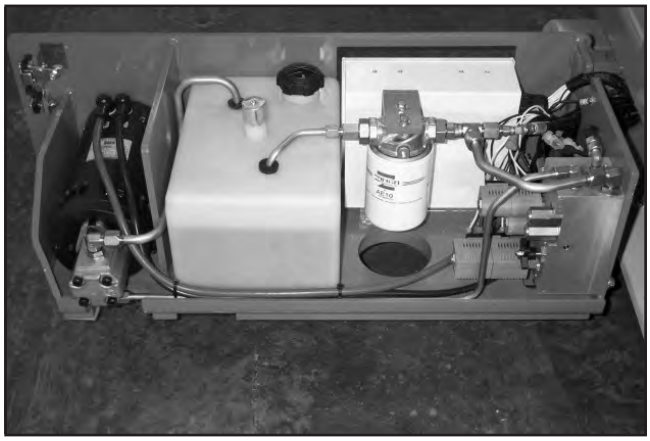


Figure 8.7—Hose, Tubes, and Fittings

Hydraulic fluid leaks are easily visible on the ground. Check under the chassis for fluid that has leaked.

Free-Wheeling Valve

Swing out the hydraulic tray. The free-wheeling valve is located on the hydraulic manifold (refer to Figure 8.8). Check the free-wheeling valve to make sure it is fully closed (clockwise).

Figure 8.8—Free-Wheeling Valve

Tires and Wheels

Visually inspect the tires (refer to Figure 8.9). They should be smooth without any cuts, gouges, or missing rubber that might affect aerial platform stability.

Figure 8.9—Tires and Wheels

Check the wheel lug nuts to see that none are missing, damaged, or loose.

Parking Brakes

Inspect the brake release cams for rust, dirt, and proper orientation. When the brakes are engaged the release cam should swing freely when pushed with a finger and be oriented as shown in Figure 8.10.

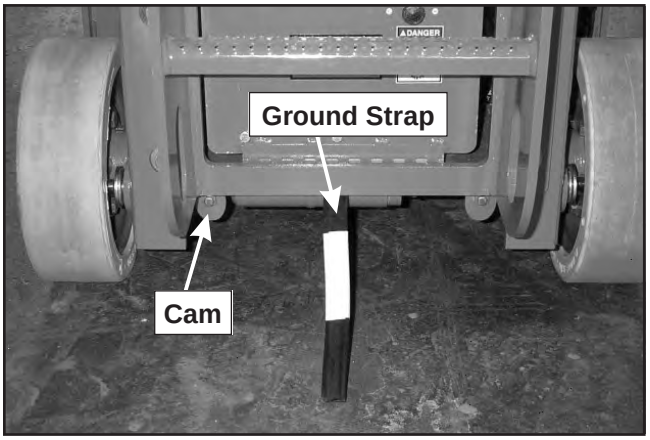


Figure 8.10—Brake Release Cam

Ground Strap

Make certain the ground strap (refer to Figure 8.10) is securely fastened to the chassis. It should be long enough to contact the ground surface to eliminate static electricity from the machine.

Lower Control Station

With no personnel in the platform, test the operation of each control from the lower control station (refer to Figure 8.11).

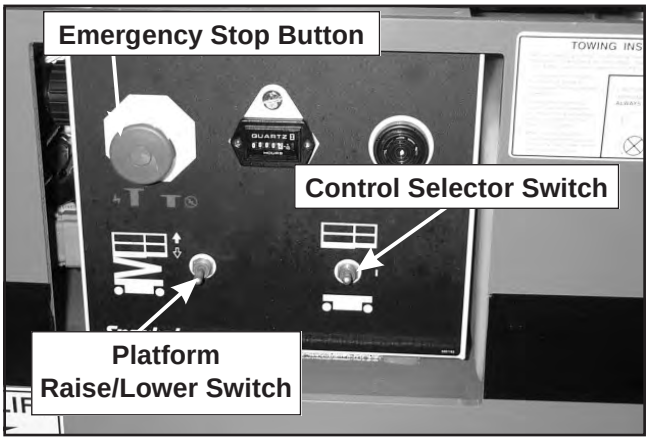


Figure 8.11—Lower Controls

Operating Controls

Use the following procedure to operate the machine from the lower controls.

1. Turn the battery disconnect switch on.
2. At the lower controls, lift the emergency stop safety guard up, and push the toggle switch up to the on position.
3. Insert the key into the master switch and turn the switch to start until the engine starts, then release it.
4. Let the engine warm to operating temperature.
5. Hold the ground controls switch in the on position.

⚠DANGER

Pinch points may exist between moving components. Death or serious injury can result from becoming trapped between components, buildings, structures, or other obstacles. Make sure all personnel stand clear of the aerial platform while performing the prestart inspection.

Test the operation of each function in both directions.

Test the operation of the platform raise/lower switch in both directions.

Place the battery disconnect switch in the off position. The platform should not raise or lower with the disconnect in this position.

Emergency Stop

Push the emergency stop button in to turn off the electrical power. The lower control functions should not operate with the emergency stop in this position.

Lowering Alarm

Raise the platform and then lower it to ensure that the alarm sounds to warn personnel in the area that the platform is lowering.

Pothole Protector Interlock

Perform this test using the lower controls.

1. Stow the aerial platform on a smooth, flat, level concrete slab.
2. Remove all persons and materials from the platform.
3. With the trays closed, check the ground clearance under the pothole protector skids (refer to Figure 8.12). Clearance should be at least 2 3/4″ (7 cm) on both sides of the aerial platform.

Figure 8.12—Pothole Protector Skid

4. Raise the platform while watching movement of the skids. The skids should lower to less than 3/4″ (2 cm) ground clearance when the platform is raised approximately 24″ (61 cm).
5. Fully lower the platform while watching movement of the skids. The skids should raise to their original position when the platform is lowered to approximately 24″ (61 cm).
6. Place a 1 1/2″ (3.8 cm) thick board, such as a 2 x 4, under the skid on the left side (refer to Figure 8.13).

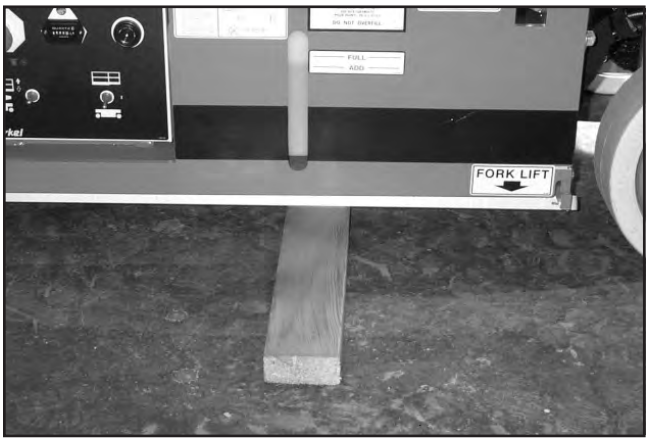


Figure 8.13—Pothole Protector Interlock Test

7. The board will prevent the skid from lowering fully. Raise the platform while watching the skid. When the skid contacts the board, the platform should stop raising and an alarm should sound at less than seven feet platform floor height. The alarm should then sound when the platform lift switch is activated. The platform should not raise any farther.
8. Lower the platform. Place the board under the skid on the right side.
9. Raise the platform while watching the skid. When the skid contacts the board, the platform should stop raising and an alarm should sound at less than seven feet platform floor height. The alarm should then sound when the platform raise switch is activated. The platform should not raise any farther.

⚠DANGER

The potential for an accident increases when safety devices do not function properly. Death or serious injury can result from such accidents. Do not alter, disable, or override any safety device.

10. If the platform raise function is not disabled, or the alarm does not sound remove the aerial platform from service until the problem is corrected.

Level Sensor Interlock

Perform this test after verifying proper operation of the pothole protector interlock.

1. Position the aerial platform on a smooth, flat, level surface.
2. Remove all persons and materials from the platform.
3. From the lower controls, raise the platform to access the level sensor at the rear of the chassis (refer to Figure 8.14).

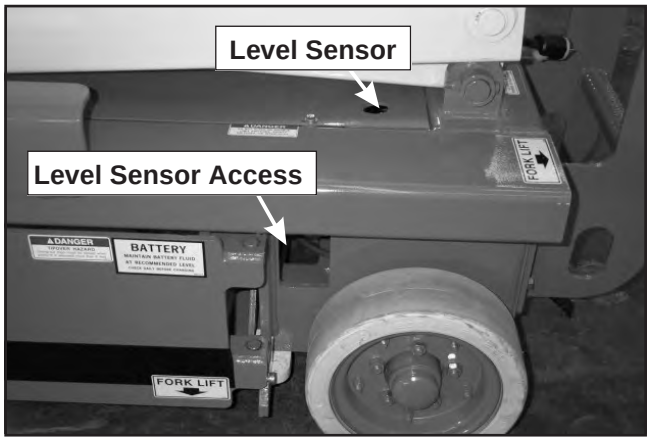


Figure 8.14—Left Rear of Chassis

4. Pull the level sensor to the side as far as possible while raising the platform. The platform should stop raising and the alarm should sound at less than 7′ (2 m) of platform elevation.

⚠DANGER

The potential for an accident increases when safety devices do not function properly. Death or serious injury can result from such accidents. Do not alter, disable, or override any safety device.

5. If the platform does not stop raising or the alarm does not sound, remove the machine from service until the problem is corrected.

Emergency Lowering

Using the lower controls, fully raise the platform. Locate the emergency lowering lever (refer to Figure 8.15) at the rear of the aerial platform.

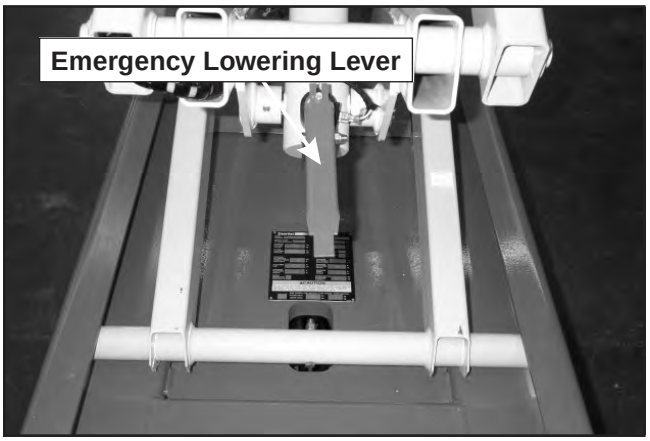


Figure 8.15—Emergency Lowering Level

While standing clear of the scissors structure, push the lever down. The platform will begin to lower as the lever is pushed down. Release the lever to stop.

Flashing Light

If the machine is equipped with the optional flashing light (refer to Figure 8.16), visually check to see that it flashes. The light should flash when power is turned on to operate the machine.

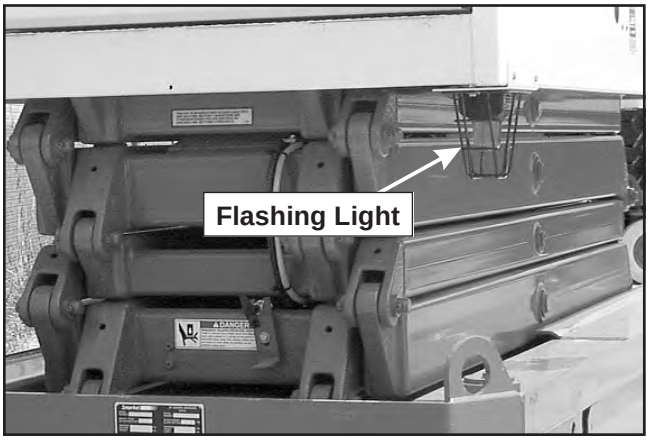


Figure 8.16—Flashing Light

Structures

Visually inspect all mechanical structures including the weldments and related components. It is important to inspect the fasteners that connect the components.

Weldments

Visually inspect all weldments for abnormal wear, abrasion, or deformation that could cause interference between moving parts.

Inspect the welds on the structural components. The area to be inspected should be clean and free of dirt and grease. Look for visible cracks in the weld and at the weld to parent material joint. A bright light may be used to provide adequate visibility of the inspection area.

Pay close attention to welds in areas where changes in cross section take place and near the attachment points of highly loaded components.

Slide Blocks

Visually inspect the scissors arm slide blocks (refer to Figure 8.17). The slide blocks must be free to move without obstruction.

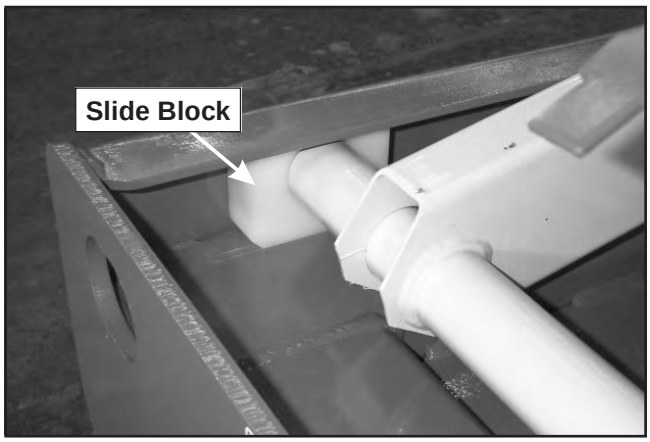


Figure 8.17—Scissors Arm Slide Blocks

Raise the platform from the lower controls to visually inspect the slide blocks underneath the front of the platform (refer to Figure 8.18).

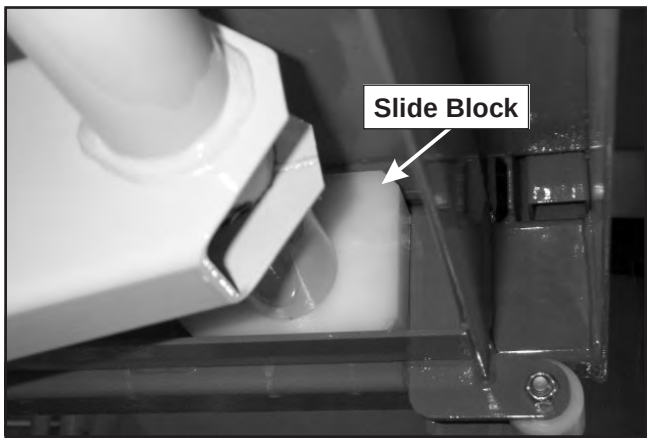


Figure 8.18—Platform Slide Blocks

There is one side block on each side of the platform. The slide blocks must be in good condition and free to move without obstruction.

Fasteners

Visually inspect all fasteners to see that none are missing or loose.

Pay particular attention to all of the bolts, nuts, roll pins, collars, and snap rings that connect the scissors arms. They should all be present, tight, and not damaged in any way.

Upper Control Station

Inspect the platform and upper controls only if all functions operated properly from the lower controls.

Guardrail System

The guardrail system (refer to Figure 8.19) includes the top rail, mid rail, toeboards and an entry chain or optional swinging gate.

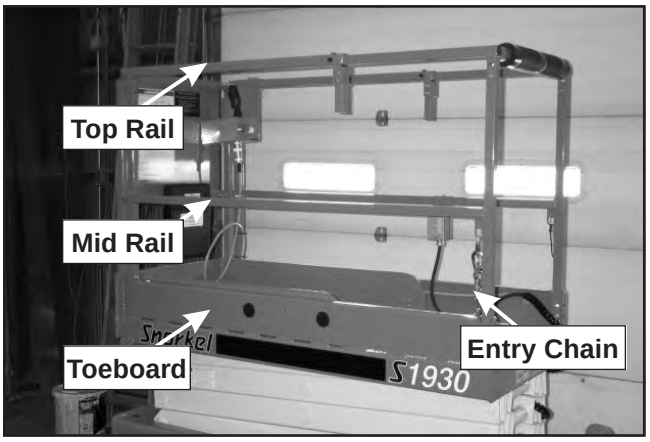


Figure 8.19—Guardrail System

Inspect all components of the guardrail system. The rails and toeboards must all be in place and free of any damage or deformation. Visually check the rail and toeboard welds for cracks. All bolts and nuts fastening the guardrails in place must be present and not show any signs of looseness.

Inspect the entry chain to be sure it is present and securely fastened to the rail. The chain must be free of damage and deformation that may prevent if from functioning properly. Inspect the hook and eye that secures the chain to the rail.

Inspect the optional swinging gate to see that it swings freely, closes firmly, and is not deformed in any way. Make sure the gate is secure when it's closed.

Platform Extension

A snapper pin at the right front of the platform secures the extension deck to the main platform deck. Inspect the pin (refer to Figure 8.20) to ensure that it properly secures the extension deck. Release the pin to extend the platform. Extend the platform while checking for proper operation.

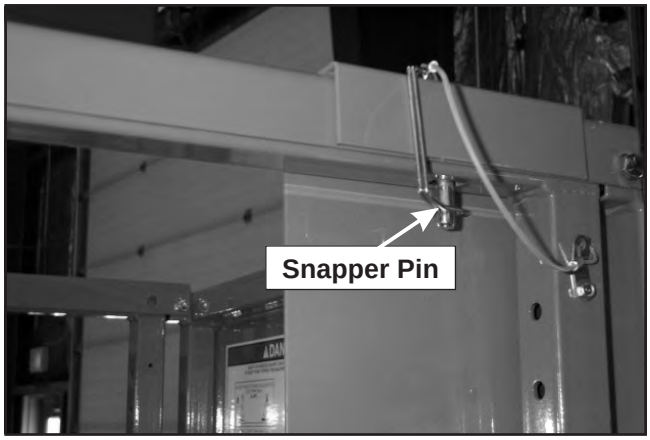


Figure 8.20—Platform Extension Snapper Pin

Extend the platform and inspect the weldments for deformation and damage. Visually check the platform welds for cracks.

Operating Controls

With the aerial platform stowed, test the operation of each control from the upper control station (refer to Figure 8.21).

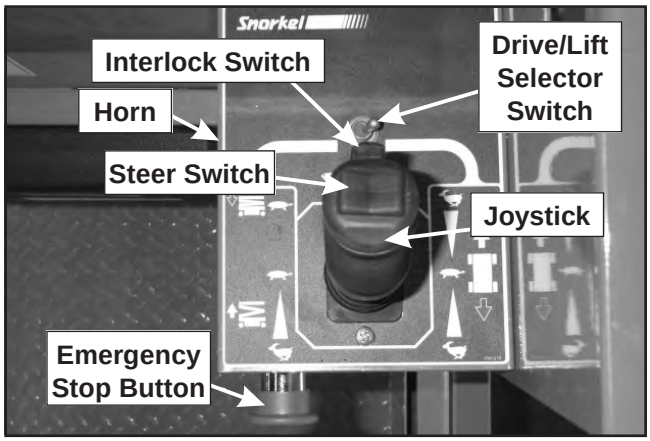


Figure 8.21—Upper Controls

Place the battery disconnect switch in the on position and from the lower controls, place the control selector in the up position and turn the key switch on if the machine is equipped with that option. Pull the emergency stop button out to turn on the electrical power to the upper controls.

From the upper controls, test the interlock by moving the joystick without engaging the interlock switch. If movement occurs the interlock is not functioning properly. Do not operate the machine until the problem is corrected.

Place the drive/lift selector switch in the drive position and test the operation of the joystick in both directions. The lift functions should not operate with the selector in the drive position.

Place the drive/lift selector switch in the lift position and test the operation of the joystick in both directions. The drive functions should not operate with the selector in the lift position.

Emergency Stop

Push the emergency stop button in to turn off the electrical power. The upper control functions should not operate with the emergency stop in this position.

Lowering Alarm

Raise the platform and then lower it to ensure that the alarm sounds to warn personnel in the area that the platform is lowering.

Drive Motion Alarm

Drive in both the forward and reverse directions to ensure that the alarm sounds to warn personnel in the area that the aerial platform is in motion.

Electrical Power Outlet

Connect a source of 125 volt AC power to the power-input connector at the front of the chassis. Plug an electrical tool into the receptacle and try to operate the tool to verify proper operation of the outlet.

Use the following procedure to test the ground fault circuit interrupter GFCI.

1. Push the black test button (refer to Figure 8.22).

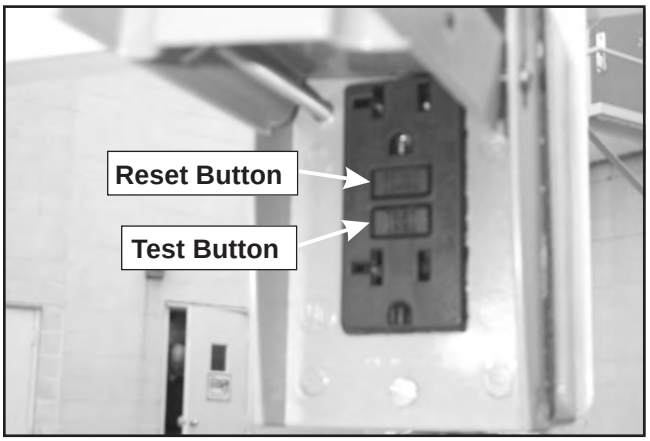


Figure 8.22—Electrical Power Outlet

2. Plug an electrical tool into the outlet and verify the power is off.
   - If the power was off, push the reset button to restore power.
   - If the power was on, repair or replace the receptacle.

Battery Condition Indicator

The optional battery condition indicator (refer to Figure 8.23) is located on the upper control panel.

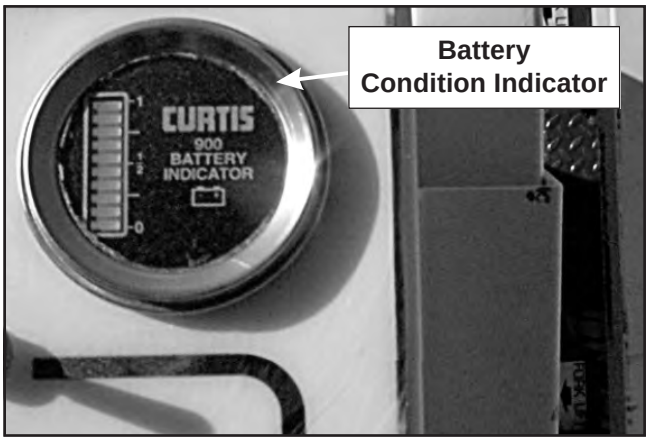


Figure 8.23—Battery Condition Indicator

With the machine set up to operate from the upper controls, check to see that the battery condition indicator gauge displays a power reading.

Horn

If the machine is equipped with the optional horn, press the horn button (refer to Figure 8.21) to ensure that it sounds to warn personnel in the area.

Placards and Decals

Inspect all safety and operational placards and decals. Make certain they are in place, in good condition, and are legible.

The placards and decals may be cleaned with soap and water, and a soft cloth if the words or pictures cannot be seen.

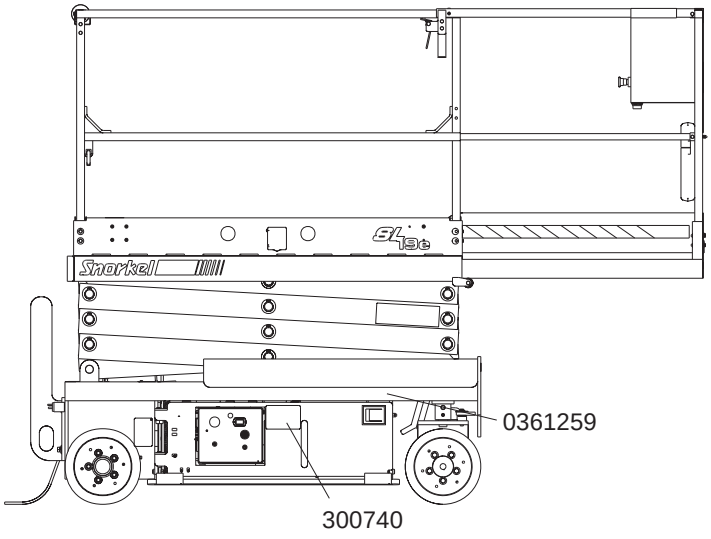
⚠CAUTION

Solvents may contain hazardous ingredients. Follow the manufacturer's label for proper use and disposal. Wear protective gloves and splash-proof safety glasses when using solvents.

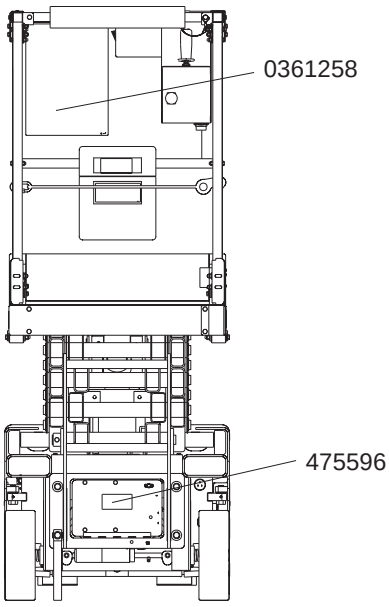
Wet paint overspray may be removed using a natural biodegradable solvent and a soft cloth.

Replace any missing or illegible placards or decals before operating the aerial platform. Placard and decal kits are available from Snorkel dealers.

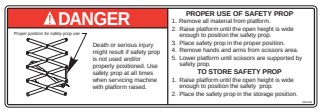
The safety related placards and decals are illustrated on the following pages.



Right Side



Rear



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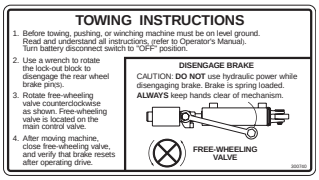

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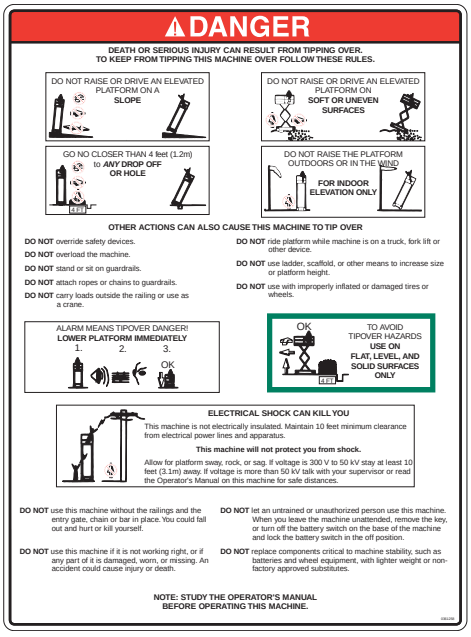

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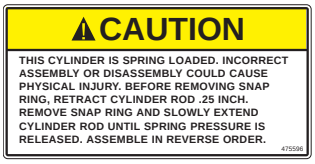

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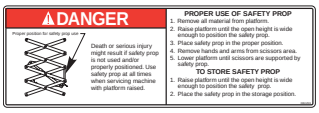

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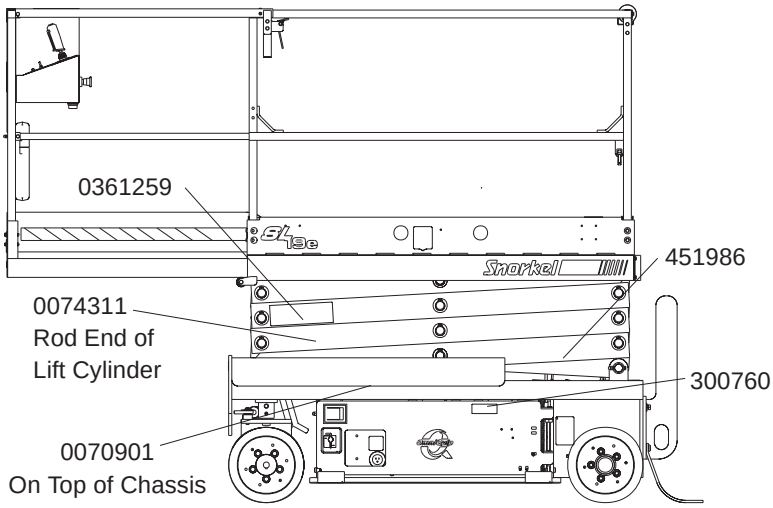

Left Side

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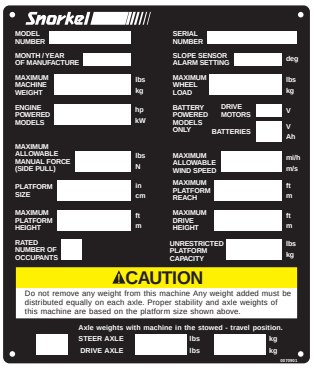

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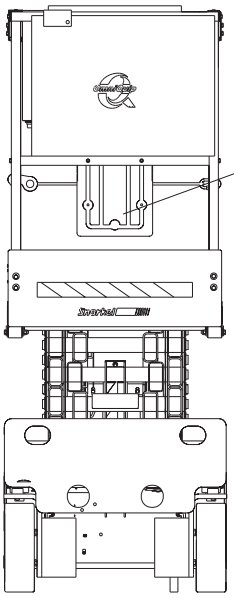

Front

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300700

Prestart Inspection Check List

Item	Inspect for	Ok
Operator's manual	In manual holder	
Electrical system		
Battery fluid level	Proper level	
Battery terminals	Clean, connectors tight	
Battery charger	Proper operation	
Cables and wiring harness	No wear or physical damage	
Hydraulic system		
Fluid level	Between Full and Add marks	
Hoses, tubes, and fittings	No leaks	
Free-wheeling valve	Full closed	
Tires and wheels	Good condition	
Parking brakes	Proper cam operation	
Ground strap	In place and securely fastened	
Lower control station		
Operating controls	Proper operation	
Emergency stop	Shuts off lower controls	
Lowering alarm	Sounds when platform lowers	
Pothole protection interlock	Proper operation	
Level sensor interlock	Proper operation	
Emergency lowering	Proper operation	
Safety prop	No damage or deformation	
Flashing light	Proper operation	
Structures		
Weldments	Welds intact, no damage or deformation	
Slide blocks	Proper operation, no damage	
Fasteners	In place and tight	
Upper control station		
Guardrail system	Welds intact, no damage or deformation	
Platform extension	Proper operation	
Operating controls	Proper operation	
Emergency stop	Shuts off upper controls	
Lowering alarm	Sounds when platform lowers	
Drive motion alarm	Sounds when aerial platform moves	
Electrical power outlet	Proper operation	
Battery condition indicator	Proper operation	
Horn	Sounds when activated	
Placards and decals	In place and readable	

Chapter 9. Operation

The aerial platform may be operated from either the lower or upper controls.

⚠DANGER

The aerial platform is not electrically insulated. Death or serious injury can result from contact with, or inadequate clearance from, an energized conductor. Do not go closer than the minimum safe approach distance as defined by ANSI.

Pinch points may exist between moving components. Death or serious injury can result from becoming trapped between components, buildings, structures, or other obstacles. Make sure there is sufficient clearance around the machine before moving the chassis or platform. Allow sufficient room and time to stop movement to avoid contact with structures or other hazards.

The aerial platform can tip over if it becomes unstable. Death or serious injury can result from a tip-over accident. Operate the aerial platform on a firm, flat, level surface. Avoid travel speeds and/or rough terrain that could cause sudden changes in platform position.

The platform rated work load is the total weight of the personnel and equipment that may be lifted in the platform. The work loads are stated on the platform rating placard mounted on the toeboard at the front of the platform.

⚠DANGER

The aerial platform can tip over if it becomes unstable. Death or serious injury can result from a tip-over accident. Do not exceed the capacity values indicated on the platform rating placard.

Capacity values indicate the rated lifting capacity and do not indicate aerial platform stability.

The operator bears ultimate responsibility for ensuring that the aerial platform is properly set up for the particular conditions encountered.

Preparing for Operation

Make certain the batteries are charged and the charger is unplugged before operating the aerial platform. Use the following procedure to prepare the aerial platform for operation.

1. Perform a prestart inspection as described in Chapter 8.
2. Close and latch the battery and hydraulic component trays.
3. Place the battery disconnect switch in the on position.

Lower Controls

The lower controls override the upper controls. This means that the lower controls may be used to operate the platform regardless of the position of the upper controls emergency stop button.

Only the platform raise and lower functions may be operated from the lower controls. The lower controls may be used for initial set up of the aerial platform and for positioning the platform while testing or inspection.

Use the following procedure to raise or lower the platform using the lower controls.

1. Pull the emergency stop button outward (refer to Figure 9.1).

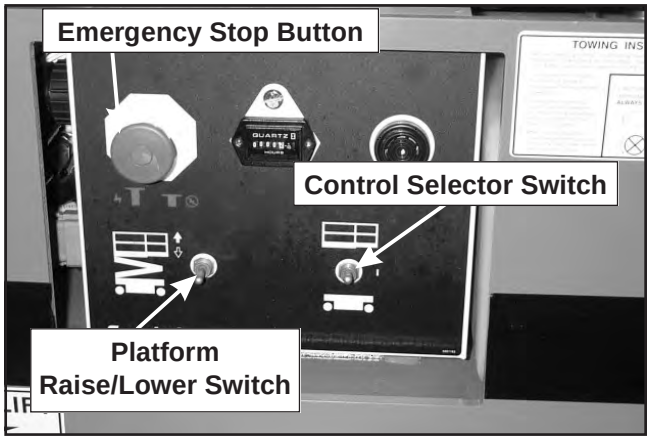

Figure 9.1—Lower Controls

2. Place the control selector switch in the lower position.
3. Hold the platform raise/lower toggle switch up to raise the platform and down to lower it.
4. Release the toggle switch to stop movement.

Upper Controls

The upper controls (refer to Figure 9.2) may be used for driving the aerial platform and positioning the platform while on the job.

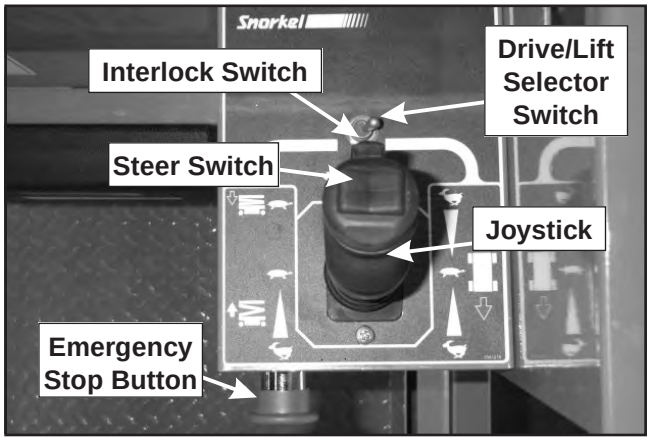

Figure 9.2—Upper Controls

Before operating from the upper controls, properly set up the aerial platform as described under Preparing for Operation. Use the following procedure to operate the aerial platform from the upper controls.

1. From the lower controls, place the control selector switch in the upper position.

Note
The upper controls will not operate while the control selector is in the lower position.

2. Enter the platform and secure the chain, or optional swinging gate.
3. Pull the emergency stop button out.
4. The aerial platform may be driven and the platform may be raised and lowered from the upper controls.

Driving

⚠DANGER

The aerial platform can tip over if it becomes unstable. Death or serious injury can result from a tip-over accident. Do not drive an elevated aerial platform on soft, uneven, or sloping surfaces. Do not drive a fully stowed machine on grades that exceed 20 percent.

A fully stowed machine may be operated on grades up to 20 percent. A grade of 20 percent is a 24″ (61 cm) vertical rise in 10′ (3.05 m) horizontal length.

⚠DANGER

Death or serious injury can result from improperly driving or steering the aerial platform. Read and understand the information in this manual and on the placards and decals on the machine before operating the aerial platform on the job.

Use the following procedure to operate the drive functions.

1. Place the drive/lift selector switch (refer to Figure 9.2) in the drive position.
2. Squeeze and hold the interlock switch against the joystick.
   - To move forward, slowly push the joystick forward.
   - To move backward, slowly pull the joystick backward.

Drive Speeds

The drive speed is proportional to the joystick position. The farther the joystick is moved, the faster the travel speed.

Drive speed ranges are interlocked through a limit switch that senses scissors arm position. When the platform is elevated below approximately seven feet, the aerial platform may be driven within the full range of drive speeds. Above 7′ (2.1 m) of elevation, only the slowest drive speed will work.

⚠DANGER

The potential for an accident increases when safety devices do not function properly. Death or serious injury can result from such accidents. Do not alter, disable, or override any safety device.

Do not use the aerial platform if it drives faster than 0.4 mph (0.6 km/h) which is 20′ (6 m) in 30 seconds when elevated above 7′ (2.1 m) even if the joystick is in the mid or high speed position.

Drive/Lift Level Sensor Interlock

When the platform is elevated above 7′ (2.1 m), lift and drive functions are interlocked through a level sensor system. If the chassis is tilted more than 2 degrees side-to-side or more than 4 degrees front-to-rear, platform raise and drive functions are disabled and an alarm sounds when those controls are activated.

If the drive/lift level sensor interlock shuts off the platform raise and drive functions, lower the platform and drive to a level surface.

Platform raise and drive functions may also be disabled by the pothole protection interlock.

Steering

The steer control switch is located on the joystick (refer to Figure 9.2). Use the following procedure to steer the aerial platform using the upper controls.

1. Squeeze and hold the interlock switch against the joystick.
   - To turn to the left, tap lightly on the left side of the steer switch.
   - To turn to the right, tap lightly on the right side of the steer switch.

Note
Holding the steer switch down too long may result in a sharp turn. This is especially true when driving and steering at the same time. It may be easier to turn the wheels in small increments using a series of quick taps on the steer switch.

2. Set the steer wheels straight ahead after completing a turn. The steering wheels are not self-centering.

Platform

Use care when entering and exiting the platform to avoid slipping and/or falling. Securely close the safety chain or optional swinging gate when the platform is occupied.

Raising and Lowering

The raise speed is proportional to the joystick position. The farther the joystick is moved, the faster the platform raises. There is only one lowering speed.

1. Place the drive/lift selector switch (refer to Figure 9.2) in the lift position.
2. Squeeze and hold the interlock switch against the joystick.
   - To raise the platform, slowly pull the joystick back until the desired speed is reached.
   - To lower the platform, slowly push the joystick forward.

Extending

The platform can be extended and securely locked into seven different positions. Use the following procedure to extend or retract the platform.

1. Stand on the non-extendible part of the platform floor, facing the front of the platform.
2. Remove the snapper pin and push on the handles (refer to Figure 9.3) to extend the deck.

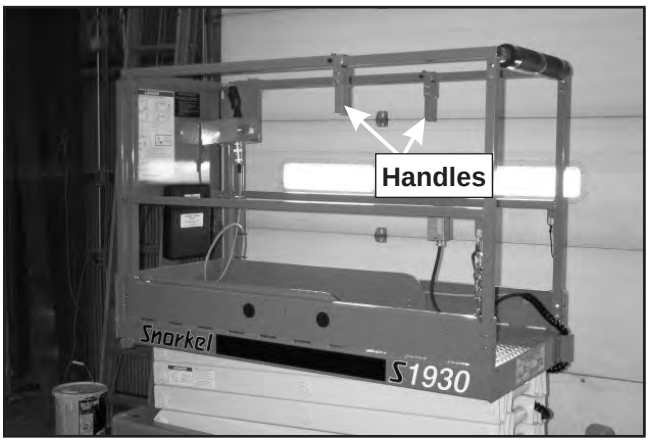

Figure 9.3—Platform Extend Handle

3. Replace the snapper pin when the platform is extended.
4. Try to move the rails back and forth to make sure the platform extension deck is locked in position.

Brakes

Each rear wheel is equipped with a mechanical spring-applied, hydraulically released parking brake. When the drive control is in neutral, a spring-activated pin (refer to Figure 9.4) protrudes through an opening in the brake disc to prevent movement. A flow control valve slows the pin movement to allow the aerial platform to stop before the parking brakes engage.

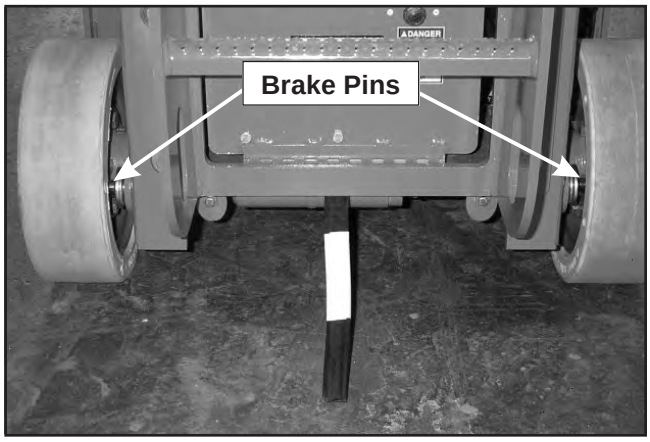

Figure 9.4—Mechanical Brake

This system operates automatically to stop and hold the aerial platform when the drive controls are released or power is interrupted. Manually disengage the brakes before towing or winching the aerial platform as described under Towing in Chapter 11—Emergency Operation.

Swing-Out Trays

Batteries and hydraulic components are enclosed in swing-out trays (refer to Figure 9.5) on each side of the chassis.

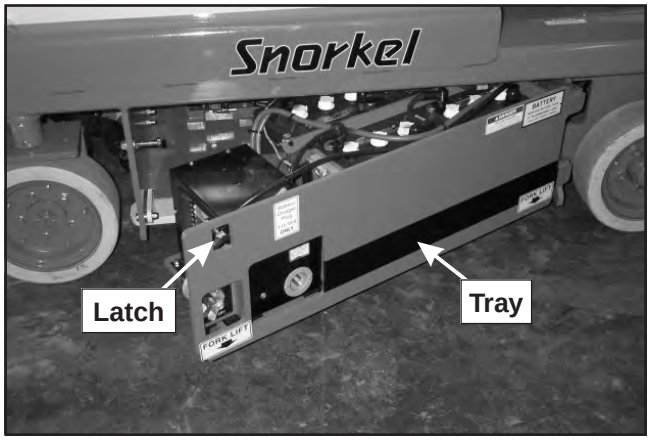

Figure 9.5—Swing-Out Tray

The tray on the right side of the chassis contains the lower controls, the hydraulic directional control valve, the pump, free-wheeling valve, and the hydraulic fluid filter. The tray on the left side contains the four batteries and the battery charger.

⚠DANGER

The aerial platform can tip over if it becomes unstable. Death or serious injury can result from a tip-over accident. Do not open the trays when the platform is raised more than eight feet.

To open a tray, pull outward on the latch and swing the tray open.

Electrical Power Outlet

The electrical power outlet has two, 3-prong, 125 volt AC electrical connectors (refer to Figure 9.6). Their combined output is limited by a 20 amp circuit breaker.

Figure 9.6—Electrical Power Outlet

Power is supplied to the outlet by connecting an external power source to the power-input connector at the rear of the chassis (refer to Figure 9.7).

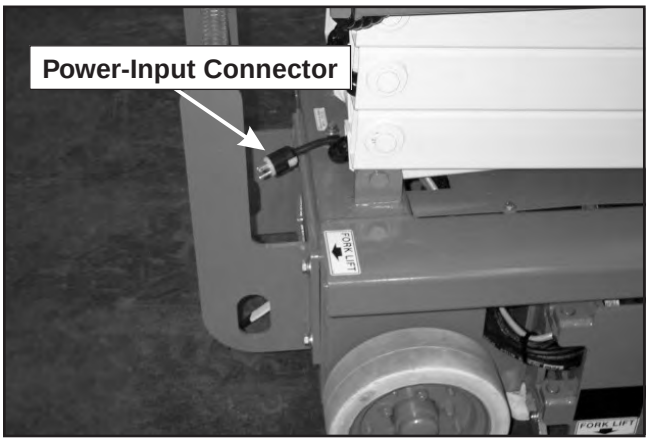

Figure 9.7—Power-Input Connector

To use the outlet, plug a source of power into the power-input connector. Unplug the source of power before moving the aerial platform.

Chapter 10. Stowing and Transporting

To prevent unauthorized use and damage, properly stow the aerial platform at the end of each work day. It must also be properly stowed while transporting.

Stowing

Use the following procedure to properly stow the aerial platform.

1. Retract the platform extension.
2. Fully lower the platform.
3. Push the emergency stop button in.
4. Turn the battery disconnect switch off and lock it.
5. Securely close the swing-out trays.

Transporting

The aerial platform may be moved on a transport vehicle. Depending on the particular situation, the aerial platform may be lifted with a forklift, winched, driven, or hoisted onto a vehicle such as a truck or trailer. Lifting with a forklift is the preferred method.

The equipment used to load, unload, and transport the aerial platform must have adequate capacity. The gross vehicle weight is listed in Chapter 2 and is stamped on the serial number placard.

The user assumes all responsibility for choosing the proper method of transportation, and the proper selection and use of transportation and tie-down devices, making sure the equipment used is capable of supporting the weight of the aerial platform and that all manufacturer's instructions and warnings, regulations and safety rules of their employer, the DOT and/or any other state or federal law are followed.

Lifting With a Forklift

Use the following procedure to lift the aerial platform with a forklift.

1. Properly stow the aerial platform.
2. Remove all personnel, tools, materials, or other loose objects from the platform.
3. Insert the forklift forks into the pockets (refer to Figure 10.1) or at the designated points under the pothole protector skids to lift the machine.

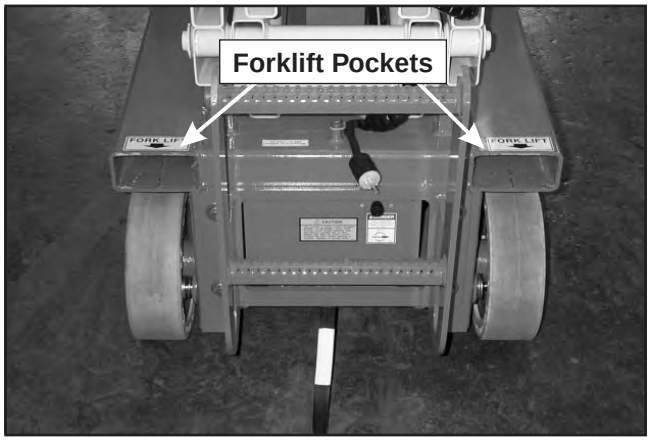

Figure 10.1—Forklift Pockets

4. Do not raise the aerial platform higher than necessary to transport it. Drive the forklift slowly and carefully when transporting the aerial platform.

Winching

Use the following procedure to winch the aerial platform onto the transport vehicle.

1. Position the transport vehicle so the aerial platform will not roll forward after it is loaded.
2. Remove any unnecessary tools, materials, or other loose objects from the platform.
3. Drive the machine to the foot of the loading ramp with the front wheels nearest the ramp. Make sure the machine is centered with the ramps and that the steering wheels are straight.
4. Properly stow the aerial platform.

⚠DANGER

The aerial platform is free to move when the brakes are released. Death or serious injury can result. Re-enable the brakes before operating the aerial platform.

5. Use a 7/8″ wrench to rotate each brake release cam 90° (refer to Figure 10.2). Rotate the cam on the right brake cylinder counterclockwise and the one on the left brake cylinder clockwise. This will retract the brake pins from the wheel lugs releasing the brakes. Remove the wrench.

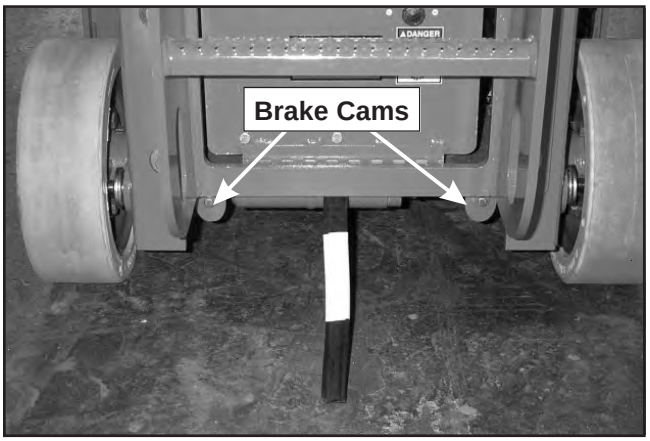

Figure 10.2—Brake Release Cams

6. Unlatch and swing out the hydraulic tray on the right side of the chassis. The free-wheeling valve is located on the hydraulic manifold (refer to Figure 10.3). Turn the free-wheeling valve counterclockwise to a fully opened position.

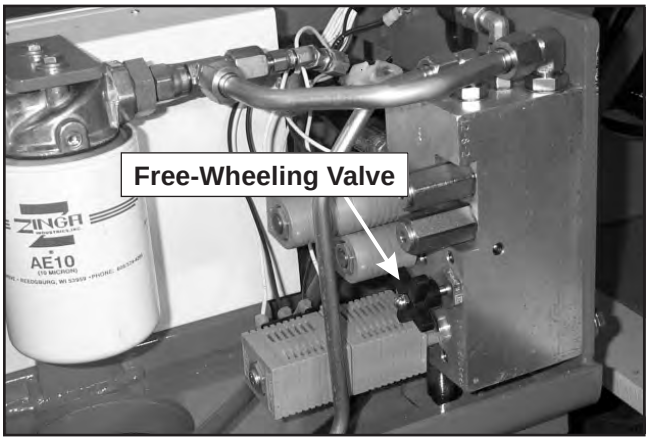

Figure 10.3—Free-Wheeling Valve

7. Attach the winch to the tie-down lugs (refer to Figure 10.4) on the front of the chassis.

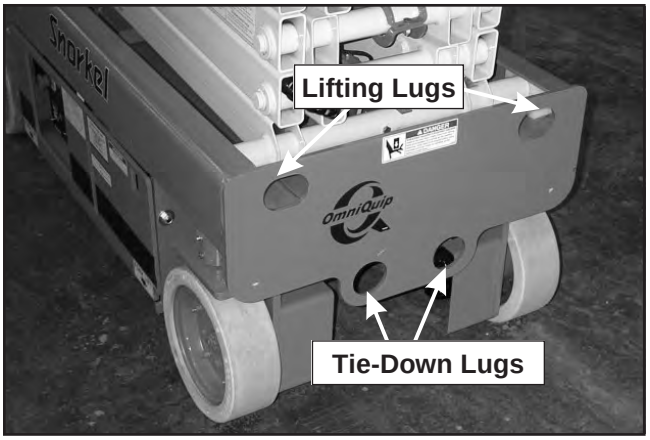

Figure 10.4—Tie-Down and Lifting Lugs

8. Use the winch to position the aerial platform on the transport vehicle.
9. Close the free-wheeling valve.
10. Use a wrench to manually reset the parking brakes.

Driving

⚠DANGER

The aerial platform can tip over if it becomes unstable. Death or serious injury can result from a tip-over accident. Do not drive on ramps that exceed 20 percent grade, or where conditions of the ramp could cause driving to be hazardous.

Use a winch to load and unload the aerial platform on ramps that exceed 20 percent grade. A 20 percent grade is a 24″ (61 cm) vertical rise in 10′ (3.05 cm) horizontal length. A winch may also be used when poor traction, uneven surfaces, or stepped ramp transitions make driving hazardous.

Drive the aerial platform onto the transport vehicle if a winch is not available and the ramp incline is within the 20 percent grade capability of the aerial platform

Use the following procedure to drive the aerial platform onto the transport vehicle.

1. Position the transport vehicle so the aerial platform will not roll forward after it is loaded.
2. Chock the vehicle wheels so it cannot roll away from the ramp while the aerial platform is loaded.
3. Remove any unnecessary tools, materials, or other loose objects from the platform.
4. Retract the platform extension and fully lower the platform.
5. Drive the aerial platform to the foot of the loading ramp with the front wheels nearest the ramp. Make sure the aerial platform is centered with the ramps and that the steering wheels are straight.
6. Place the joystick in high for climbing a ramp or low for descending a ramp.
7. Drive the aerial platform on or off the transport vehicle in a straight line through the grade transitions with minimal turning.

Hoisting

Use a four point sling arrangement attached to the lifting lugs when hoisting the aerial platform. Machine damage can occur if the sling is attached to the chassis, scissors structure, or platform.

⚠DANGER

The potential for an accident increases when the aerial platform is lifted using improper equipment and/or lifting techniques. Death or serious injury can result from such accidents. Use proper equipment and lifting techniques when lifting the aerial platform.

Know the weight of the aerial platform and the capacity of the lifting devices before hoisting. Lifting devices include the hoist or crane, chains, straps, cables, hooks, sheaves, shackles, slings, and other hardware used to support the machine. The gross vehicle weight is stamped on the serial number placard and is listed in Chapter 2.

The user assumes all responsibility for making sure the equipment used is capable of supporting the weight of the aerial platform and that all manufacturer's instructions and warnings, regulations and safety rules of their employer and/or any state or federal law are followed.

Use the following procedure to hoist the aerial platform onto the transport vehicle.

1. Properly stow the aerial platform.
2. Inspect the lifting lugs (refer to Figure 10.4) to make sure they are free of cracks, rust, and are in good condition. There are two lugs on the rear of the chassis and two on the front. Have any damage repaired by a qualified service technician before attempting to hoist the machine.
3. Remove all personnel, tools, materials, or other loose objects from the platform.
4. Connect the chains or straps to the lifting lugs using bolted shackles. Hooks that fit properly in the lugs and that have latching mechanisms to prevent them from falling out under a slack line condition may also be used.

   Do not run the sling cable through the lifting lugs. Cable damage and/or failure can result from the cable contacting the sharp corners of the lift lug. There is no effective way of putting a corner protector in the hole of the lug.
5. Use spreader bars of sufficient length to keep the chains, straps, or cables from contacting the scissors structure or platform. When using cables, use rigid corner protectors at any point where the cable contacts on sharp corners to prevent damaging the cable. Careful rigging of the spreaders is required to prevent machine damage.
6. Use the hoist or crane to carefully raise and position the aerial platform onto the transport vehicle.

Securing for Transport

Use the following procedure to secure the aerial platform on the transport vehicle.

1. Chock the wheels.
2. Remove all personnel, tools, materials, or other loose objects from the platform.
3. Properly stow the aerial platform.
4. Place wood blocks under the front ends of the pothole protection skids to limit excessive loading on the front drive wheel bearings.
5. Place the lower controls emergency stop switch in the off position.
6. Turn the battery disconnect switch off.

⚠CAUTION

Ratchets, winches, and come-alongs can produce enough force to damage machine components. Do not over tighten the straps or chains when securing the aerial platform to the transport vehicle.

7. Use chains or straps to securely fasten the aerial platform to the transport vehicle using the front and rear tie-down lugs as attachment points. Proper tie-down and hauling is the responsibility of the carrier.

Chapter 11. Emergency Operation

If the aerial platform cannot be operated due to a loss of hydraulic power, such as motor or pump failure, the platform lift cylinder and drive wheels may be operated manually. Refer to the Emergency Lowering or Towing section for the appropriate procedure.

Emergency Lowering

Use the following procedure to lower the platform.

1. Retract the platform extension, if possible.
2. Locate the emergency lowering lever at the rear of the aerial platform (refer to Figure 11.1).

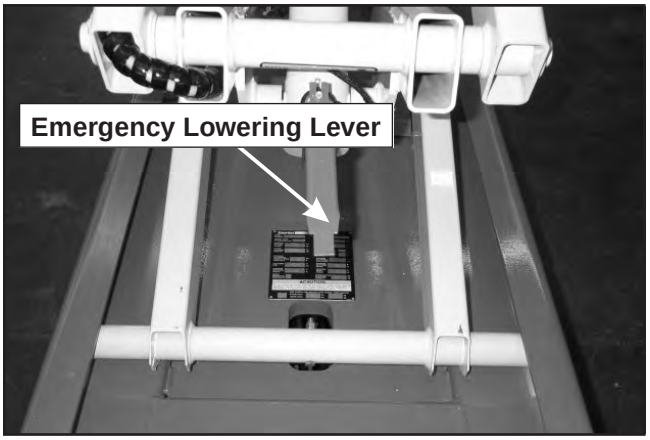

Figure 11.1—Emergency Lowering Lever

3. Make sure there is nothing in the way to obstruct the platform when it lowers.

⚠DANGER

Pinch points exist on the scissors structure. Death or serious injury can result from becoming trapped within the scissors structure. Make sure all personnel stand clear while lowering the platform with the emergency lowering lever.

4. Push the lever down to lower the platform. Release the lever to stop.

Towing

The aerial platform may be pushed or pulled after disengaging the brakes. Use the following procedure to manually disengage the brakes.

1. Restrain the aerial platform to prevent movement when the brakes are released.
2. Turn the battery disconnect switch off.

⚠DANGER

The aerial platform is free to move when the brakes and free-wheeling valve are disabled. Death or serious injury can result. Restrain the aerial platform before disengaging the brakes and opening the free-wheeling valve.

3. Use a 7/8″ wrench to rotate each brake release cam 90° (refer to Figure 11.2). Rotate the cam on the right brake cylinder counterclockwise and the one on the left brake cylinder clockwise. Remove the wrench.

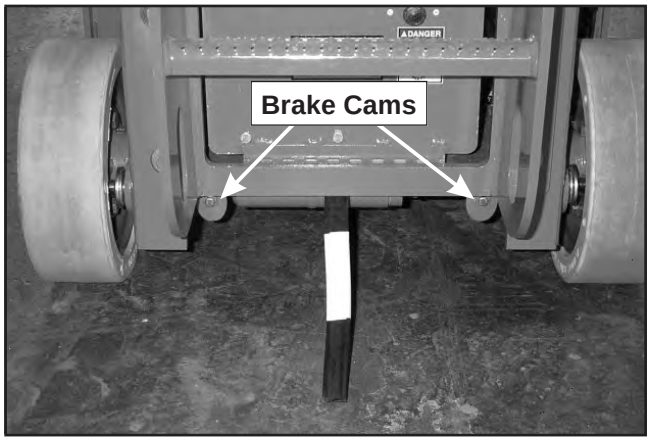

Figure 11.2—Brake Release Cam

4. Unlatch and swing out the hydraulic tray. The free-wheeling valve is located on the hydraulic manifold (refer to Figure 11.3). Turn the free-wheeling valve counterclockwise to a fully opened position. Close the tray.

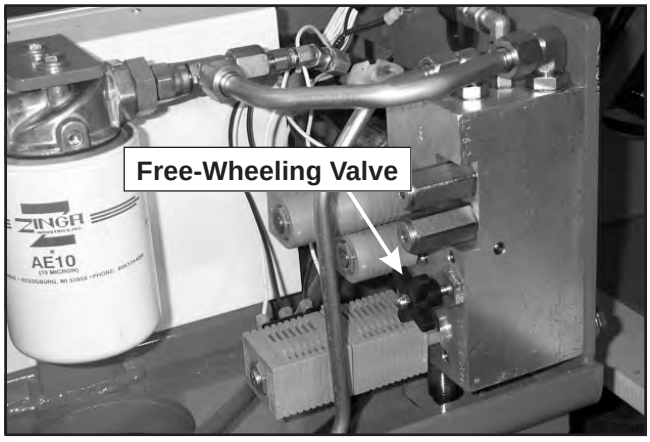

Figure 11.3—Free-Wheeling Valve

5. Do not exceed 2 mph (3.2 km/h) when towing.

⚠DANGER

The aerial platform is free to move when the brakes and free-wheeling valve are disabled. Death or serious injury can result. Close the free-wheeling valve and reset the brakes before operating the aerial platform.

6. Close the free-wheeling valve after moving the aerial platform.
7. Manually reset the parking brakes using a wrench or drive the aerial platform to reset them.
8. Verify that the drive system and brakes operate properly.

Chapter 12. Troubleshooting

The troubleshooting chart may be used to locate and eliminate situations where machine operation may be interrupted. If the problem cannot be corrected with the action listed, stow the machine and remove it from service. Repairs must be made by qualified maintenance personnel.

Troubleshooting Chart

Symptom	Possible Cause	Corrective Action
All functions stop working.	Motor or pump failure.	Manually stow the machine.
	Low fluid level in reservoir.	Check fluid level. Add correct type of fluid if necessary.
	Electrical system malfunction.	Stow the machine and do not operate until repairs are made.
Platform will not raise or lower from lower controls.	Control selector switch in the upper control position.	Place switch in the lower control position.
	Battery disconnect switch turned off.	Place switch in the on position.
	Emergency stop button pushed inward to the off position.	Pull the emergency stop button outward to the on position.
	Emergency lowering lever not properly disengaged.	Ensure lever returns to normal operating position.
Upper controls will not work.	Control selector switch in the lower control position.	Place switch in the upper control position.
	Battery disconnect switch turned off.	Place switch in the on position.
	Emergency stop button pushed inward to the off position.	Pull the emergency stop button outward to the on position.
Platform will not raise or lower from upper controls.	Drive/lift selector is in the drive position.	Place switch in the lift position.
	Emergency lowering lever not properly disengaged.	Ensure lever returns to normal operating position.
Platform will not raise and alarm is sounding.	Machine is not on a level surface.	Lower the platform and drive to a level surface.
Platform drifts down.	Emergency lowering lever not properly disengaged.	Ensure lever returns to normal operating position.
	Hydraulic system malfunction.	Stow the machine and do not operate until repairs are made.
Platform will not lower.	Safety prop in place.	Stow the safety prop.
Platform will not extend.	Latch pin still in place.	Remove latch pin before extending the platform.

Symptom	Possible Cause	Corrective Action
Drive functions don't work.	Drive/lift selector is in the lift position.	Place the switch in the drive position.
	Machine is not on a level surface or too steep a grade.	Lower the platform and drive to a level surface.
	Free-wheeling valve is open.	Fully close the free-wheeling valve.
	Load capacity exceeded.	Remove load from platform. Refer to platform capacity placard for maximum capacity.
	Low hydraulic system pressure.	Stow the machine and do not operate until repairs are made.
Only slow drive speed works.	Platform elevated above 6′ (1.8 m).	Lower platform to drive machine at faster speed.
Machine will not steer.	Joystick interlock switch not engaged.	Engage the interlock switch before operating the steer switch.
Electrical outlet does not work.	Power supply not plugged in.	Plug a source of power into the power-input connector at front of chassis.
	GFCI is tripped.	Push reset button on outlet.
Wheels won't turn when winching or pushing.	Brake pins engaged.	Rotate brake release cams to disengage brakes.
	Free-wheeling valve closed.	Fully open free-wheeling valve.
Brakes don't work.	Brake pins not engaged.	Manually release brake cams with a wrench or drive the machine to reset the brakes.
Tilt alarm does not work.	Platform is not raised more than 6′ (1.8 m).	Normal operation. The tilt alarm is not active until the platform is raised more than 6′ (1.8 m).
Ammeter does not indicate a reading when charging the batteries.	No source of power.	Make sure power source is plugged in and turned on.
	Charger power fuse is blown.	Stow the machine and do not operate until repairs are made.
Hydraulic fluid temperature of 160°F (71°C) or more.	Prolonged driving or platform operation.	Stop operation until fluid cools.
	High pressure fluid return to reservoir caused by kinked or twisted hose.	Remove the kink or twist from the hose. Let fluid cool before resuming operation.
	Hydraulic system component failure.	Stow the machine and do not operate until repairs are made.
Severe hydraulic leak.	Failure of hose, tube, fitting, seal, etc.	Stow the machine and do not operate until repairs are made.

Appendix A. Glossary

aerial platform—a mobile device that has an adjustable position platform, supported from ground level by a structure.

authorized personnel—personnel approved as assigned to perform specific duties at a specific location.

base—the relevant contact points of the aerial platform that form the stability support (e.g. wheels, casters, outriggers, stabilizers).

battery tray—a swing-out compartment that holds the batteries and the battery charger.

center of gravity—the point in the aerial platform around which its weight is evenly balanced.

chassis—the integral part of the aerial platform that provides mobility and support for the scissors structure.

fall restraint—a system that is used while working on a boom lift within the boundaries of platform guardrails to provide restraint from being projected upward from the platform. This system includes a harness or belt, lanyard, and a lanyard anchor. Although federal regulations, OSHA, ANSI, and Snorkel do not require the use of fall protection beyond the platform guardrails on scissors lift aerial platforms, local, state, or employer rules may require their use.

floor or ground pressure—the maximum pressure, expressed in pounds per square inch, a single wheel concentrates on the floor or ground.

free-wheeling valve—a needle valve that when adjusted open allows hydraulic fluid to flow through the wheel drive motors. This allows the aerial platform to be pushed or towed without damage to the drive motors.

gradeability—the maximum slope that the aerial platform is capable of travel.

ground fault circuit interrupter (GFCI)—a fast-acting circuit breaker that opens to stop electrical circuit flow if it senses a very small current leakage to ground. The GFCI is used to protect personnel against a potential shock hazard from defective electrical tools or wiring.

guardrail system—a vertical barrier around the platform to prevent personnel from falling.

hazardous location—any location that contains, or has the potential to contain, an explosive or flammable atmosphere as defined by ANSI/NFPA 505.

hydraulic tray—a swing-out compartment that holds the electrical panel for the lower controls, the hydraulic directional control valve, the free-wheeling valve, the pump, and the hydraulic fluid filter.

lower controls—the controls located at ground level for operating some or all of the functions of the aerial platform.

maximum travel height—the maximum platform height or the most adverse configuration(s) with respect to stability in which travel is permitted by the manufacturer.

maximum wheel load—the load or weight that can be transmitted through a single wheel to the floor or ground.

Minimum Safe Approach Distance—the minimum safe distance that electrical conductors may be approached when using the aerial platform. Also called M.S.A.D.

operation—the performance of any aerial platform functions within the scope of its specifications and in accordance with the manufacturer's instructions, the users work rules, and all applicable governmental regulations.

personal fall arrest system—a fall protection system that is used while working on an unprotected edge (such as a roof top with no guardrail). This system includes a harness, lanyard or other connecting device, a fall arrestor, an energy absorber or decelerator, an anchorage connector, and a secure anchorage such as a building beam, girders or columns. An aerial platform is not a fall arrest anchorage.

platform—the portion of an aerial platform intended to be occupied by personnel with their tools and materials.

platform height—the vertical distance measured from the floor of the platform to the surface upon which the chassis is being supported.

qualified person—a person, who by reason of knowledge, experience, or training is familiar with the operation to be performed and the hazards involved.

rated work load—the designed carrying capacity of the aerial platform as specified by the manufacturer.

stow—to place a component, such as the platform, in its rest position.

unrestricted rated work load—the maximum designed carrying capacity of the aerial platform allowed by the manufacturer in all operating configurations.

upper controls—the controls located on or beside the platform used for operating some or all of the functions of the aerial platform.

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LIMITED WARRANTY

Snorkel warrants each new machine manufactured and sold by it to be free from defects in material and workmanship for a period of one (1) year from date of delivery to a Customer or for one year after the machine has been placed in first service in a Dealer rental fleet, whichever comes first. Any part or parts which, upon examination by the Snorkel Service Department, are found to be defective, will be replaced or repaired, at the sole discretion of Snorkel, through its local Authorized Dealer at no charge.

Snorkel further warrants the structural components; specifically, the mainframe chassis, turntable, booms and scissor arms, of each new machine manufactured by it to be free from defects in material and workmanship for an additional period of four (4) years. Any such part or parts which, upon examination by the Snorkel Service Department, are found to be defective will be replaced or repaired by Snorkel through its local Authorized Dealer at no charge; however, any labor charges incurred as a result of such replacement or repair will be the responsibility of the Customer or Dealer.

The Snorkel Service Department must be notified within forty-eight (48) hours of any possible warranty situation during the applicable warranty period. Personnel performing warranty repair or replacement must obtain specific approval by Snorkel Service Department prior to performing any warranty repair or replacement.

Customer and Dealer shall not be entitled to the benefits of this warranty and Snorkel shall have no obligations hereunder unless the “Pre-Delivery and Inspection Report” has been properly completed and returned to the Snorkel Service Department within ten (10) days after delivery of the Snorkel product to Customer or Dealer’s rental fleet. Snorkel must be notified, in writing, within ten (10) days, of any machine sold to a Customer from a Dealer’s rental fleet during the warranty period.

At the direction of the Snorkel Service Department, any component part(s) of Snorkel products to be replaced or repaired under this warranty program must be returned freight prepaid to the Snorkel Service Department for inspection. All warranty replacement parts will be shipped freight prepaid (standard ground) from the Snorkel Service Department or from Snorkel’s Vendor to Dealer or Customer.

REPLACEMENT PARTS WARRANTY

Any replacement or service part made or sold by Snorkel is not subject to the preceding **Limited Warranty** beyond the normal warranty period of the machine upon which the part was installed.

THIS WARRANTY EXCLUDES AND SNORKEL DOES NOT WARRANT:

1. Engines, motors, tires and batteries which are manufactured by suppliers to Snorkel, who furnish their own warranty. Snorkel will, however, to the extent permitted, pass through any such warranty protection to the Customer or Dealer.
2. Any Snorkel product which has been modified or altered outside Snorkel’s factory without Snorkel’s written approval, if such modification or alteration, in the sole judgment of Snorkel’s Engineering and/or Service Departments, adversely affects the stability, reliability or service life of the Snorkel product or any component thereof.
3. Any Snorkel product which has been subject to misuse, improper maintenance or accident. “Misuse” includes but is not limited to operation beyond the factory-rated load capacity and speeds. “Improper maintenance” includes but is not limited to failure to follow the recommendations contained in the Snorkel Operation, Maintenance, Repair Parts Manuals. Snorkel is not responsible for normal maintenance, service adjustments and replacements, including but not limited to hydraulic fluid, filters and lubrication.
4. Normal wear of any Snorkel component part(s). Normal wear of component parts may vary with the type application or type of environment in which the machine may be used; such as, but not limited to sandblasting applications.
5. Any Snorkel product that has come in direct contact with any chemical or abrasive material.
6. Incidental or consequential expenses, losses, or damages related to any part or equipment failure, including but not limited to freight cost to transport the machine to a repair facility, downtime of the machine, lost time for workers, lost orders, lost rental revenue, lost profits or increased cost.

This warranty is expressly in lieu of all other warranties, representations or liabilities of Snorkel, either expressed or implied, unless otherwise amended in writing by Snorkel’s President, Vice President-Engineering, Vice President-Sales or Vice President-Marketing.

SNORKEL MAKES NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION OF THIS LIMITED WARRANTY. SNORKEL MAKES NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND DISCLAIMS ALL LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO INJURY TO PERSONS OR PROPERTY.

The Customer shall make all warranty claims through its local Authorized Dealer and should contact the Dealer from whom the Snorkel product was purchased for warranty service. Or, if unable to contact the Dealer, contact the Snorkel Service Department for further assistance.

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