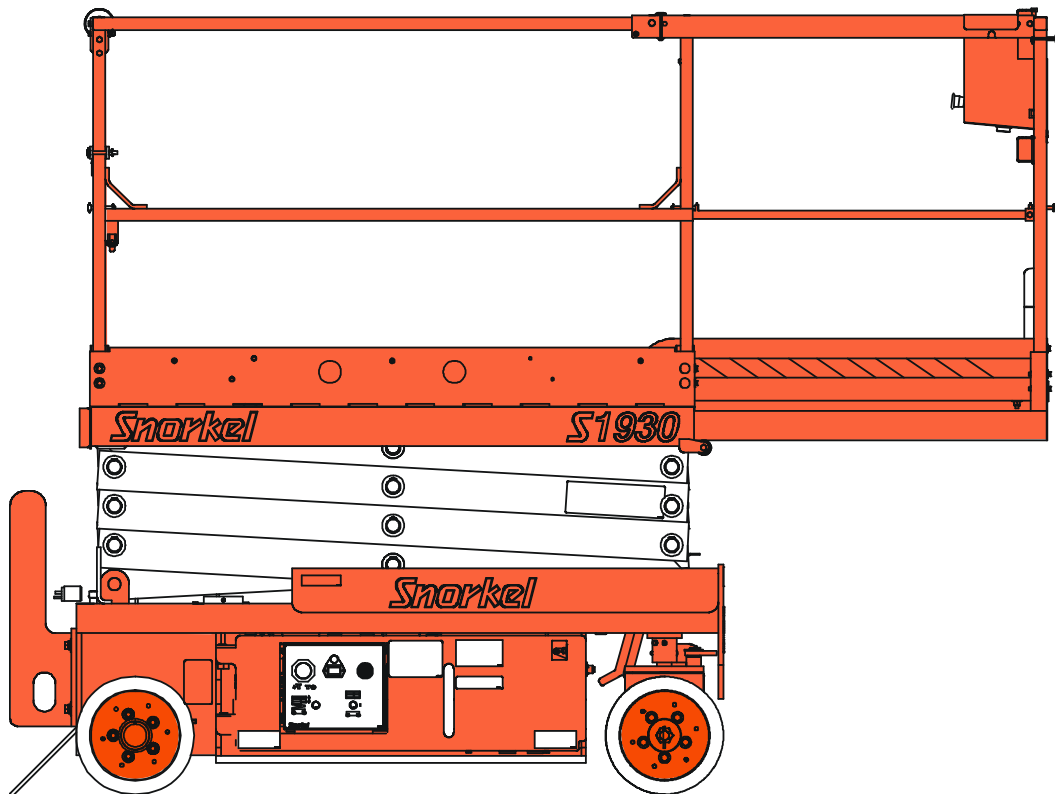


# ***Operator's Manual***



# S1930

Part Number 0361518EE  
July, 2005

CE

***Snorkel***  
INTERNATIONAL

# DANGER

**The aerial platform is not electrically insulated. Death or serious injury will 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.

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# Chapter 1 – Introduction

## Aerial Platform Features

The aerial platform is a self-propelled scissors lift that has been designed to raise personnel, their tools, and material to the workstation. The aerial platform has been designed for use on hard surface floors such as concrete. 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
- 0.9 meter (three foot) platform extension
- Swing-down platform rails
- Scissor arm safety support prop
- Lowering alarm
- Lowering interrupt
- Overload protection
- Removable upper controls
- Horn
- Forklift loadable from three sides
- Rear forklift pockets
- Gravity entry gate
- Keyed control selector switch
- Five year limited warranty

The aerial platform has been manufactured to conform to European Directive 98/37/EC and European Standard EN280.

## Options

The following options may be provided on the machine.

- Flashing light
- Battery condition indicator

## 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, warning, and caution instructions. Follow these instructions to reduce the likelihood of personal injury and property damage. The terms danger, warning, and caution indicate varying degrees of personal injury or property damage that can result if the instruction is not followed.

### **Danger**

**Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be used in the most extreme situations.**

### **Warning**

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

### **Caution**

**Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.**

#### *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.

### **Warning**

**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.

### **Owner and User Responsibilities**

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

### **Additional Information**

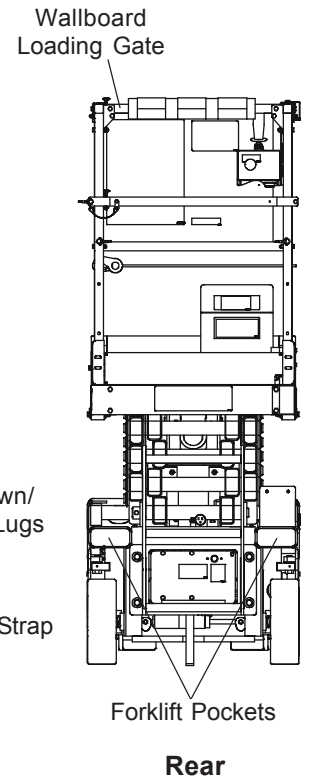
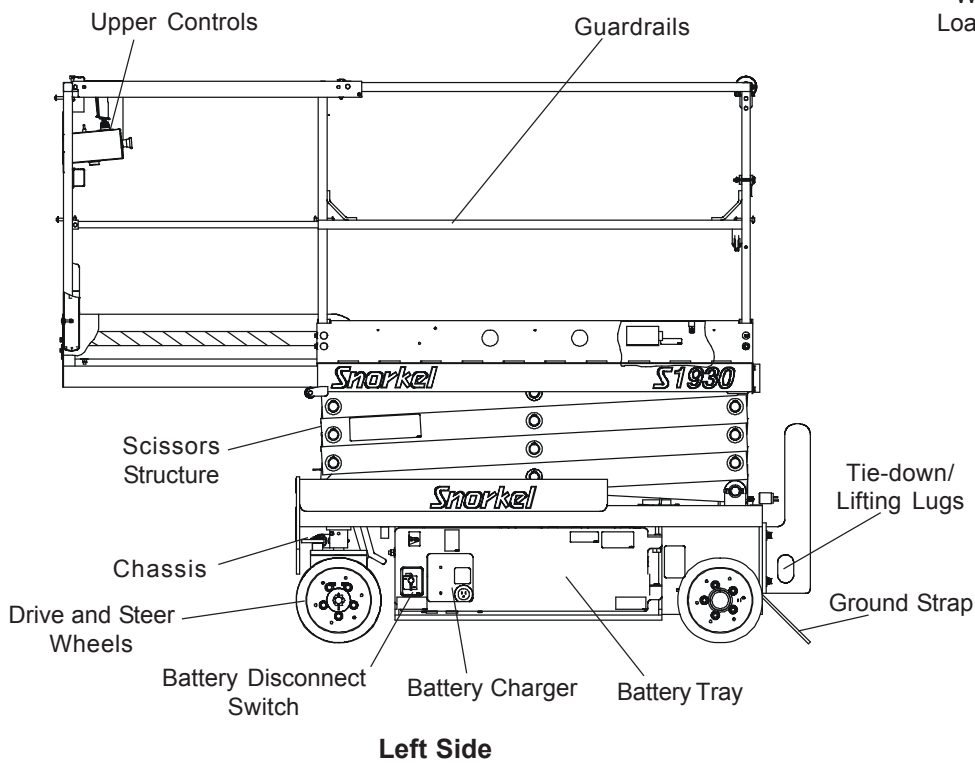
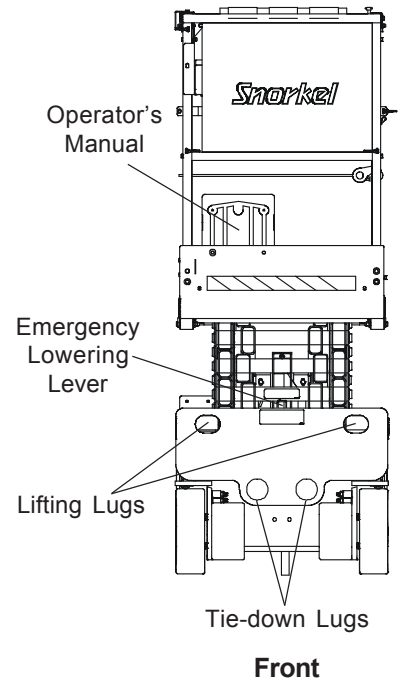
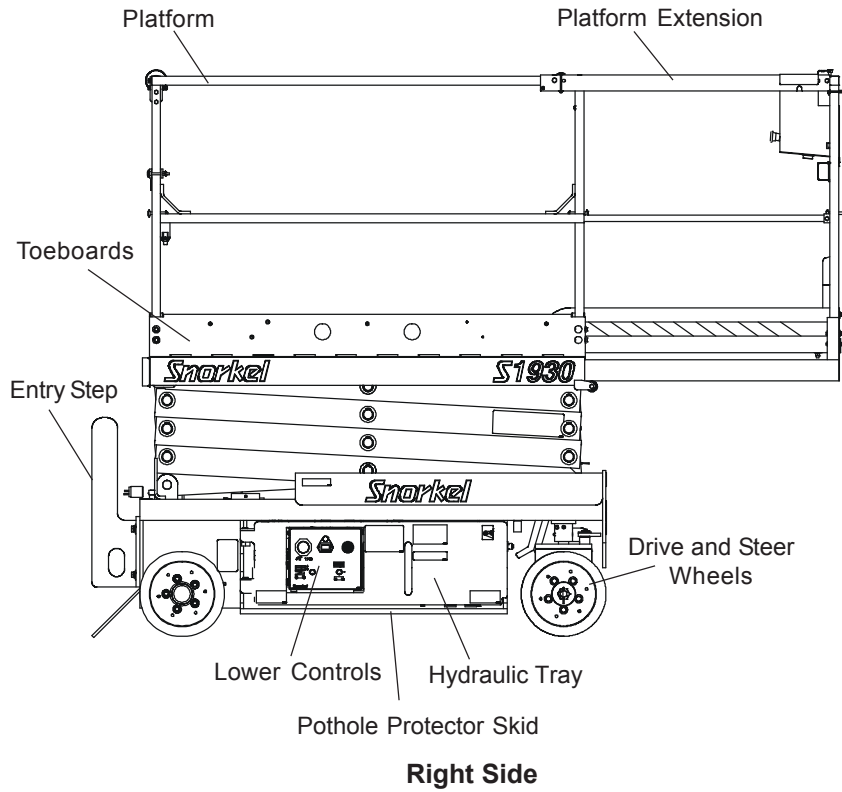
For additional information contact your local dealer or Snorkel at:

Snorkel International  
P.O. Box 1160  
St. Joseph, MO 64502-1160 USA  
785-989-3000

<http://www.snorkelusa.com>

# Chapter 2 – Specifications

## Component Identification



## General Specifications S1930

### Aerial Platform

Working height	7.6 m (25')
Maximum platform height	5.8 m (19')
Turning radius	
Inside	12.7 cm (5")
Outside	1.64 m (64.5")
Wheelbase	1.37 m (4' 6")
Ground clearance	
Pothole protector raised	6.3 cm (2.5")
Pothole protector lowered	1.9 cm (0.75")
Maximum wheel load	642 kg (1,416 lbs)
Maximum ground pressure	12.3 kg/cm <sup>2</sup> (175 psi)
Weight, GVW	
Approximate	1,379 kg (3,040 lbs)
Stowed width	76.2 cm (30")
Stowed length	1.9 m (6' 2")
With step removed	1.7 m (5' 6")
Stowed height	2.0 m (6' 7")
Rails up	216.5 cm (85.25")
Rails down	163.8 cm (64.5")

### Platform

Dimensions	
Main	74 cm x 156 cm (29" x 61.5")
Extension	61 cm x 91.4 cm (24" x 36")
Total length with extension	247.5 cm (97.5")
Guardrail height	
Rails up	111.8 cm (44")
Rails down	62.2 cm (24.5")
Toeboard height	15.2 cm (6")

### Rated work load

Total	227 kg (500 lb)
Extension	113.3 kg (250 lb)
Maximum number of occupants	1 outdoors 2 indoors

### Function Speed

Platform raise	12 to 20 seconds
Platform lower	20 to 26 seconds
High Drive	
Platform lower than 1.8 m (6 feet)	0 to 3.2 km/h (0 to 2 mph)
Low Drive	
Platform higher than 1.8 m (6 feet)	0 to 0.6 km/h (0 to 0.4 mph)

### Drive System

Standard	Two-wheel drive
Gradeability	20%
Maximum drive height	19' (5.8 m)

### Drive/Lift Level Sensor Interlock

Side-to-side	2 degrees
Front-to-rear	4 degrees

### Tires

Nonmarking solid rubber 30.5 cm x 10.2 cm (12" x 4")

### Electrical System

Voltage	24 V DC negative chassis ground
Source	Four - 6 V 220 amp hour batteries
Fluid recommended	distilled water
Charger	40 amp

### Hydraulic System

Maximum pressure	20,684 kPa (3,000 psi)
Reservoir capacity	11.35 l (3 US gal)
System capacity	13.2 l (3.5 US gal)
Maximum operating temperature	71°C (160°F)
Hydraulic fluid recommended	
Above 10°F (-13°C)	ISO VG32 (Mobil DTE-13M)
Below 10°F (-13°C)	ISO VG15 (Mobil DTE-11M)

### Ambient Air Temperature Operating Range

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

### Maximum Wind Speed

Gust or steady	12.5 m/s (28 mph)
----------------	-------------------

### Vibration

less than 2.5 m/sec<sup>2</sup>

### Sound Threshold

below 70 dB(A)



## 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.

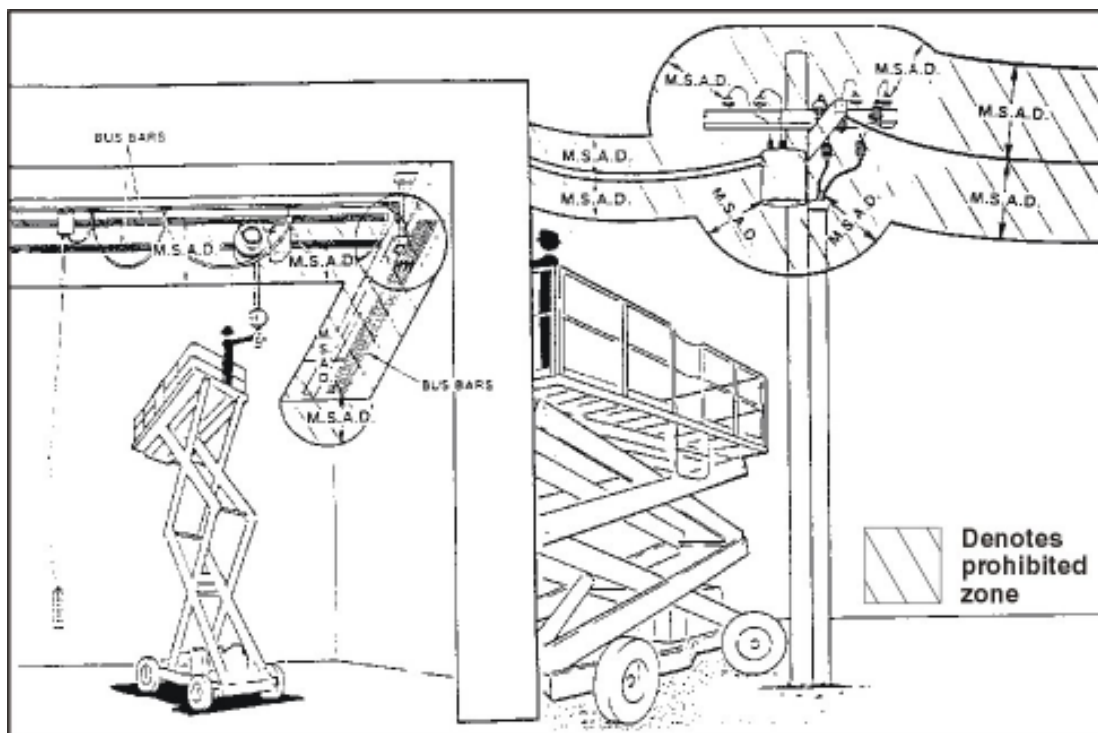
#### **⚠ Danger**

**The aerial platform is not electrically insulated. Death or serious injury will 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 or national safety regulations.**

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/SIAA92.6.

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 the platform, or to reach through the scissor arms while operating the aerial platform.

### **Danger**

**Pinch points may exist between moving components. Death or serious injury will 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 horse-play 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 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 will 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 raise the platform in winds above 12.5 m/s (28 mph).**

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

Do not raise the platform in winds above 12.5 m/s (28 mph). 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.

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 or through the guardrails.

## 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.

### Warning

**Batteries give off hydrogen and oxygen that can combine explosively. Death or serious injury could 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 will 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 work 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.

### **Warning**

**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.

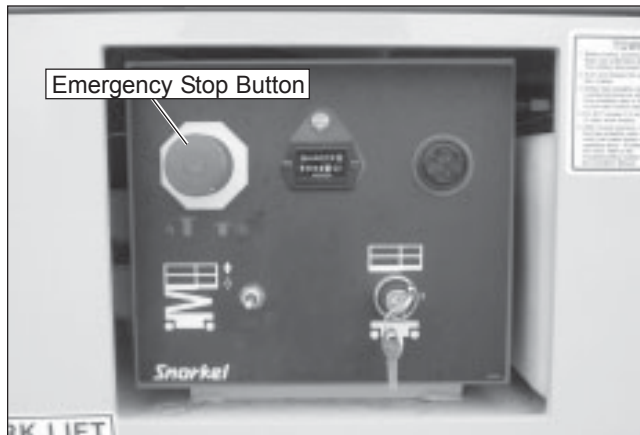


Figure 4.1 – Lower Controls

#### 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.

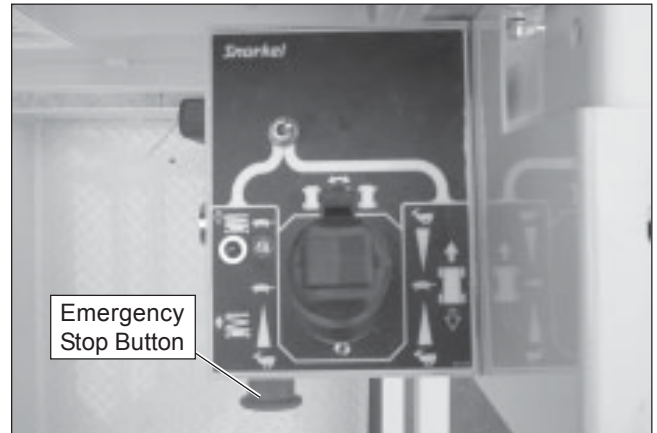


Figure 4.2 – Upper Controls

### 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 61 cm (24"). Ground clearance is reduced from 6.3 cm (2 1/2") to 1.9 cm (3/4") when the skids lock into position (refer to Figure 4.3).

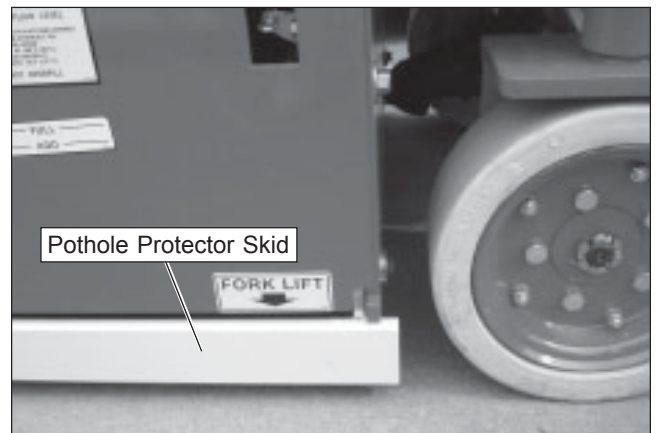


Figure 4.3 – Pothole Protector Skids

### **Danger**

**The aerial platform can tip over if it becomes unstable. Death or serious injury will result from a tip-over accident. Do not drive or position the aerial platform for elevated use within 1.2 m (4') 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 1.8 m (6').

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 1.8 m (6').

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 will 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.

### Lowering Interrupt

When the platform is lowered to about 1.5 m (5') lowering stops. The platform will not lower for five seconds regardless of the control position to allow personnel to clear the area of the scissors before the platform completely lowers.

Center the control in neutral to reset the lowering function, then continue to lower the platform.

### 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).

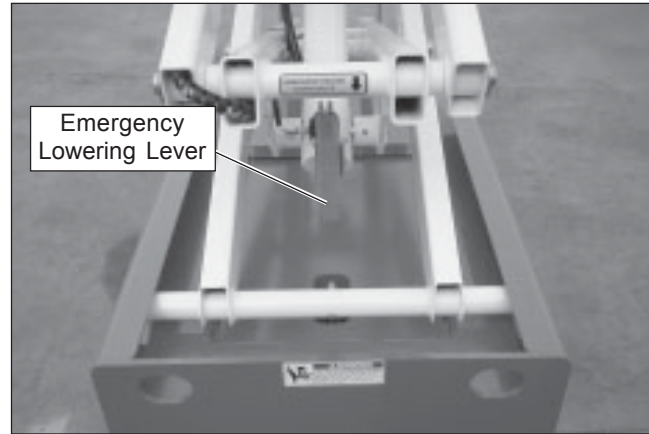


Figure 4.4 – Emergency Lowering Lever

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.

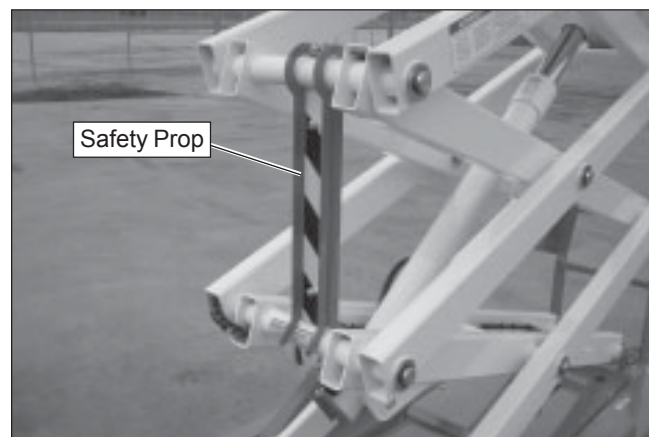


Figure 4.5 – Safety Prop

## Guardrails

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

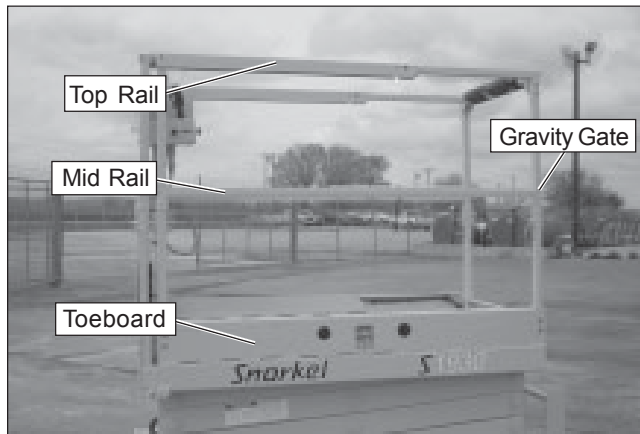


Figure 4.6 – Platform

A gravity gate allows for access to the platform. The gate closes automatically after entering or exiting the platform. The gate is part of the guardrail system and must be fully lowered after entering the platform.

## Horn

The 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.

## Tilt Alarm

An alarm will sound if the aerial platform chassis is out of level more than two degrees side-to-side or four degrees front-to-rear when the platform is raised.

### Danger

**The aerial platform can tip over if it becomes unstable. Death or serious injury will 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.

## Overload Protection

When the load in the platform is near or at rated capacity, an alarm will sound and the red light on the upper controls (refer to Figure 4.7) will flash.

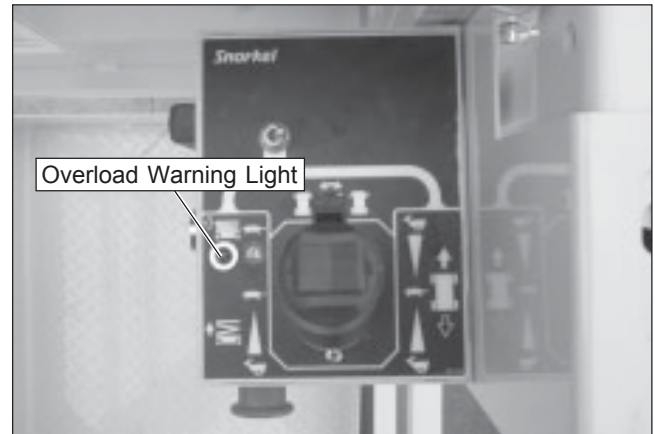


Figure 4.7 – Upper Controls

The alarm and light warn the operator that the platform is close to becoming overloaded. All functions remain fully operational.

### Danger

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

If the platform is fully lowered and is overloaded, when it is elevated just past 1.8 m (6'), a control module will stop the lift and drive functions and the alarm will sound and the warning light will flash. The platform can still be lowered to remove the excess load.

If the platform is elevated just past 1.8 m (6') and material is added to the platform overloading it, a control module will stop the lift, drive and lower functions and the alarm will sound and the warning light will flash. In this case, remove the load in excess of rated capacity and cycle the emergency stop button at the upper controls to return to normal operation.

## Flashing Light

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

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





## Chapter 5 – Gauges and Displays

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.

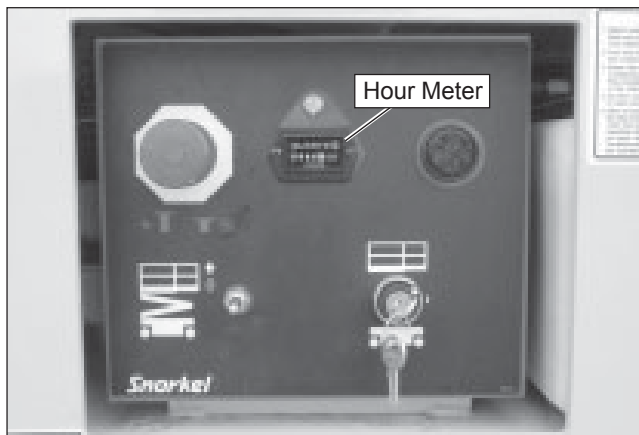


Figure 5.1 – Lower Controls

### 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.

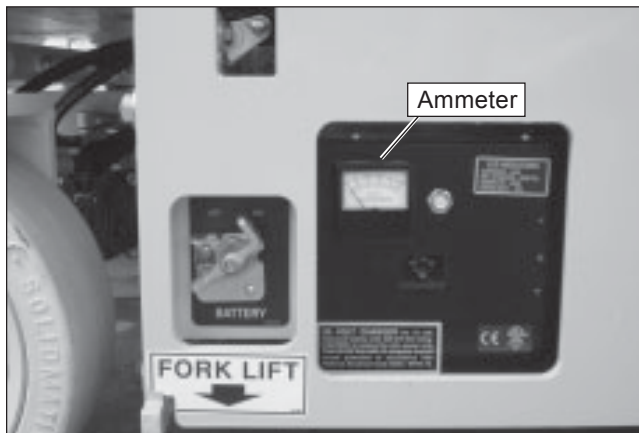


Figure 5.2 – Battery Charger

### 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.

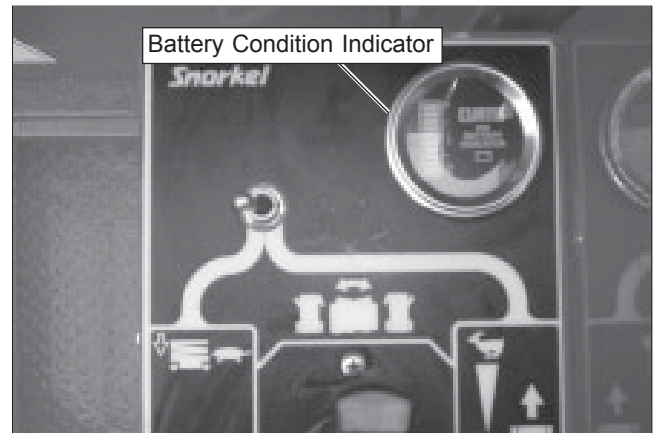


Figure 5.3 – Upper Controls



## 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.

### **⚠ Warning**

**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.

### **⚠ Warning**

**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 1 1/2 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.

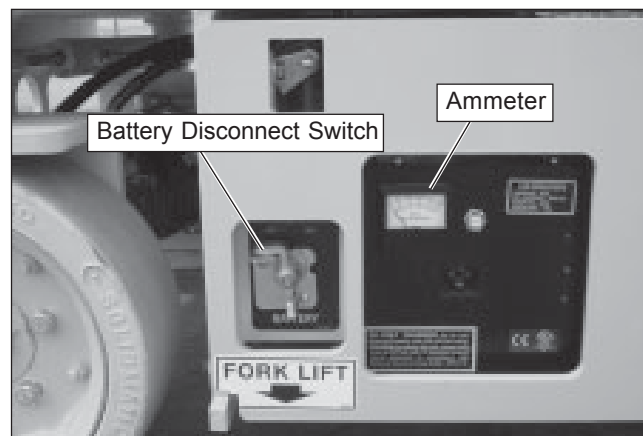


Figure 6.1 – Battery Tray

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 AC outlet using a 3 conductor, 14 gauge or larger extension cord. The extension cord must be as short as possible and in good electrical condition. Make sure the AC voltage selector switch on the charger is set to the same voltage as the outlet voltage. 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 40 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 35 to 40 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

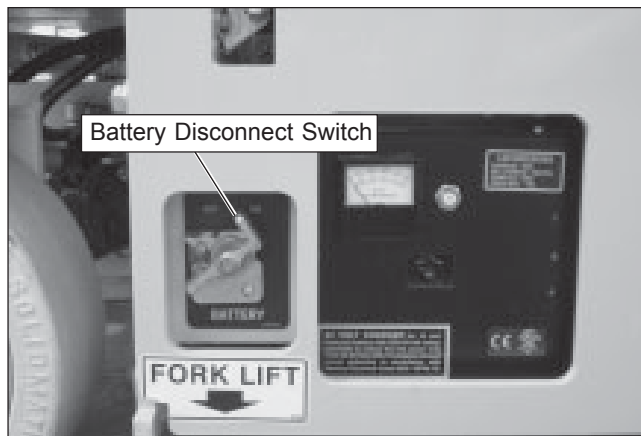
### **⚠ Danger**

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 while operating the aerial platform.

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**

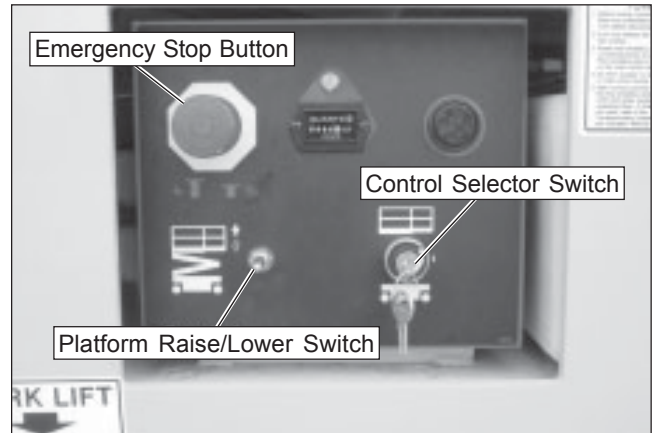
**Only authorized personnel should operate the aerial platform. Unqualified personnel may cause injury to coworkers or property damage. Lock the battery disconnect switch in the off position before leaving the aerial platform unattended.**

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 right 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**

Insert the key into the control selector switch. Turn the switch to the lower controls 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.

Turn the switch to the upper controls position to operate the aerial platform functions from the upper controls.

In the center position, aerial platform functions will not operate from the lower or 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.

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

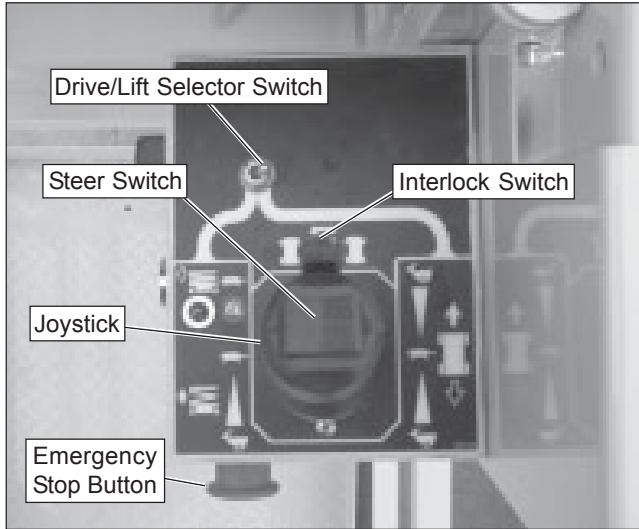


Figure 7.3 – Upper Controls

### 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 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.

### **Warning**

**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 in 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.

### **Warning**

**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.**

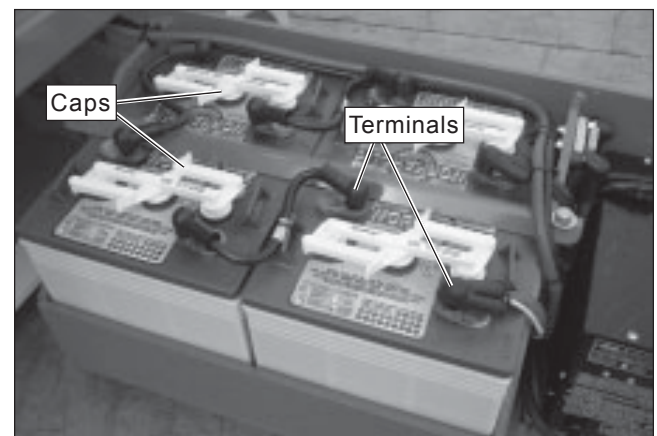
### **Caution**

**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 0.6 cm (1/4") 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 40 amps.
4. Unplug the charger.

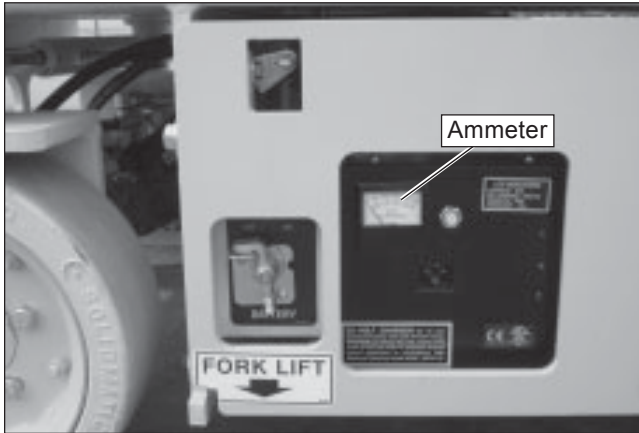


Figure 8.3 – Battery Charger

### 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.

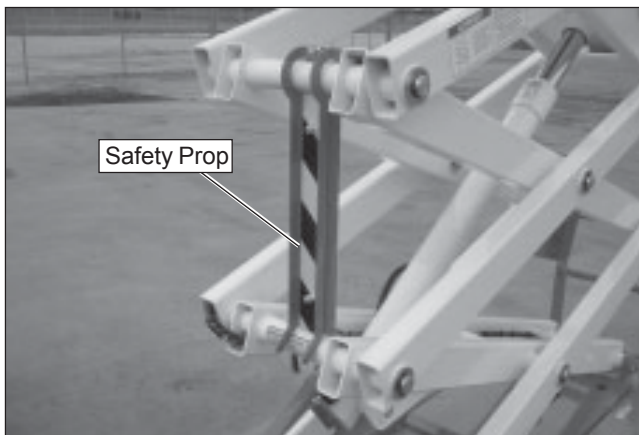


Figure 8.4 – Safety Prop

Swing the safety prop downward from the storage position to the support position. Inspect the safety prop for damage and deformation.

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 will 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 move 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.

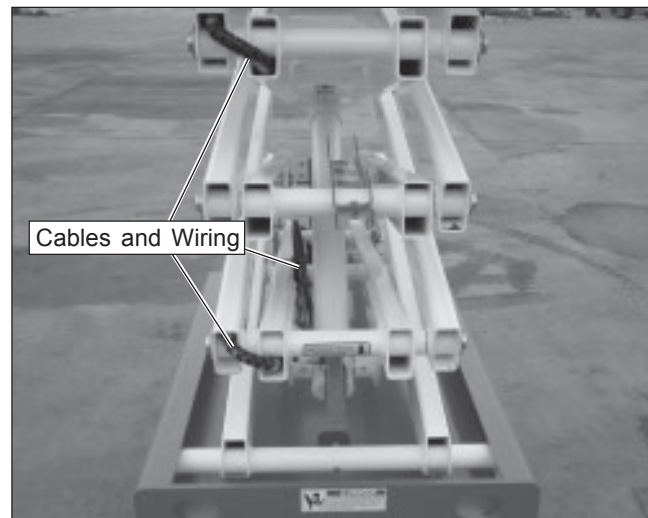


Figure 8.5 – Cables and Wiring Harness

### 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 will 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 stowed. The fluid level must be between the add and full marks (refer to Figure 8.6).

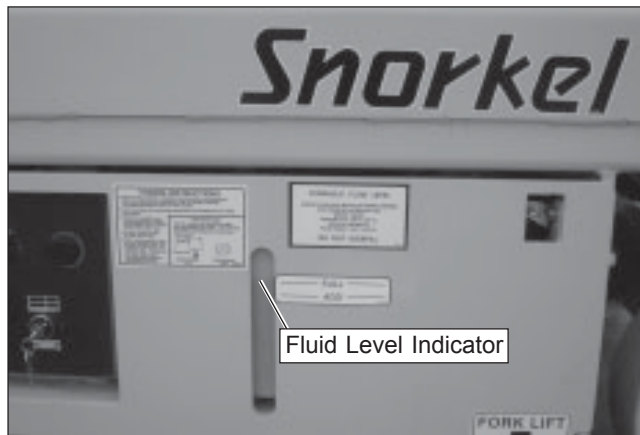


Figure 8.6 – Hydraulic Tray

### ⚠ 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.

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

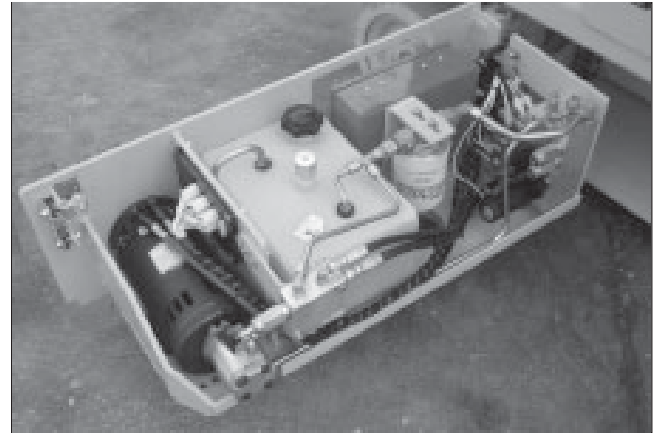


Figure 8.7 – Hoses, Tubes, and Fittings

### Free-Wheeling Valve

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

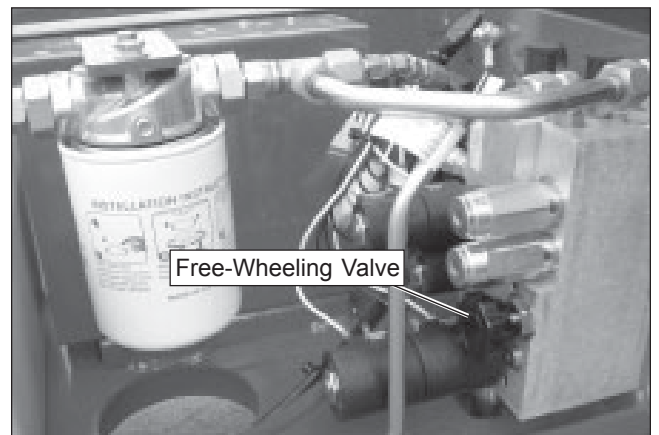


Figure 8.8 – Free-Wheeling Valve

### 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.

### 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.



Figure 8.10 – Rear of Chassis

### 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).

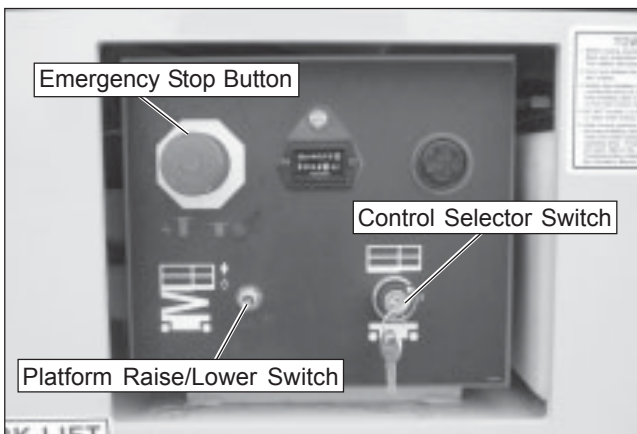


Figure 8.11 – Lower Controls

### 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, pull the emergency stop switch outward to the on position.
3. Insert the key into the control selector switch and turn the switch to the lower controls position.

### **⚠ Danger**

**Pinch points may exist between moving components. Death or serious injury will 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 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 and Interrupt

Raise the platform approximately 3 m (10'). Lower the platform and make sure the alarm sounds. The platform should stop lowering when it reaches about 1.5 m (5'). Release the raise/lower toggle switch to reset the lowering function. Wait for 5 seconds and then push the joystick forward to continue 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 about 7 cm (2 <sup>3</sup>/<sub>4</sub>" ) on both sides of the aerial platform.

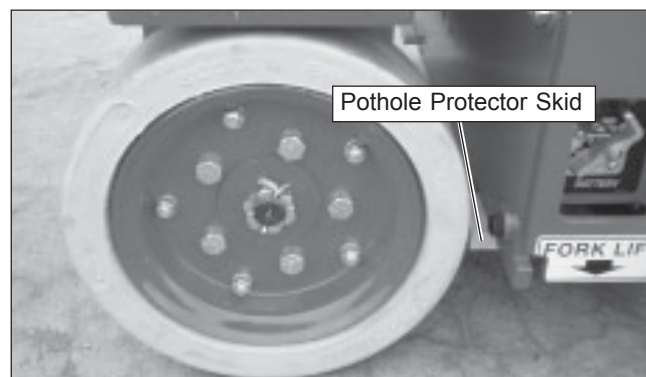
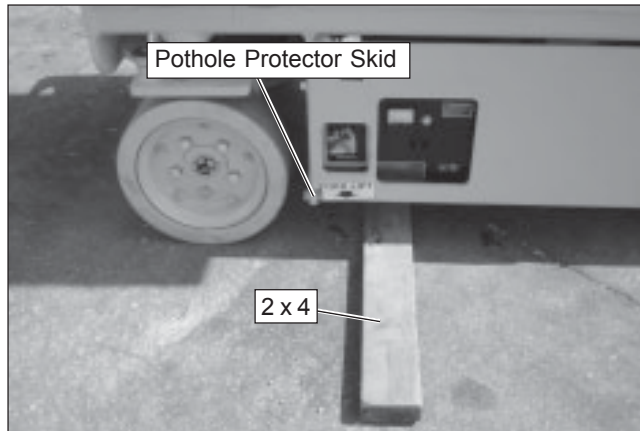


Figure 8.12 – Pothole Protector Skid

4. Raise the platform while watching movement of the skids. The skids should lower to approximately 2 cm ( <sup>3</sup>/<sub>4</sub>" ) ground clearance when the platform is raised approximately 61 cm (24").

- Fully lower the platform while watching movement of the skids. The skids should raise to their stowed position, with about 7 cm (2 3/4") ground clearance when the platform is fully lowered.
- Place a 3.8 cm (1 1/2") 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 Skid**

- The board will prevent the skid from lowering fully. Raise the platform. When the skid contacts the board, the platform should stop raising and an alarm should sound at approximately 2 m (7') platform floor height. The alarm should then sound when the platform lift switch is activated and the platform should not raise.
- Lower the platform. Place the board under the skid on the right side.
- Raise the platform. When the skid contacts the board, the platform should stop raising and an alarm should sound at approximately 2 m (7') platform floor height. The alarm should then sound when the platform lift switch is activated and the platform should not raise.

### **⚠ Warning**

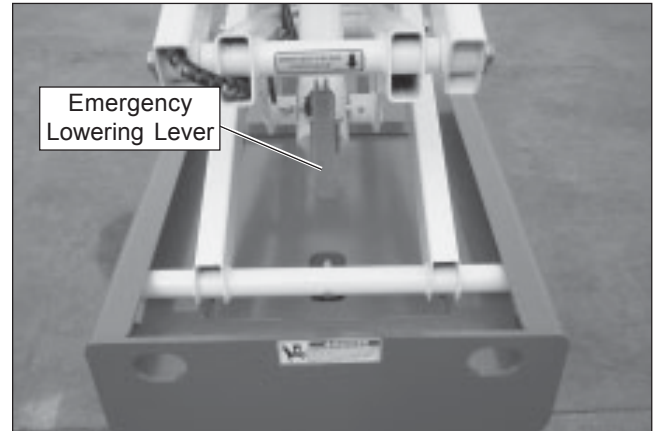
**The potential for an accident increases when safety devices do not function properly. Death or serious injury can result from such accidents. Do not alter, disable, or override any safety device.**

- If the platform raise function is not disabled, or the alarm does not sound remove the aerial platform 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 8.14) at the front of the aerial platform.

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.



**Figure 8.14 – Front of Chassis**

### **Structures**

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

### **Weldments**

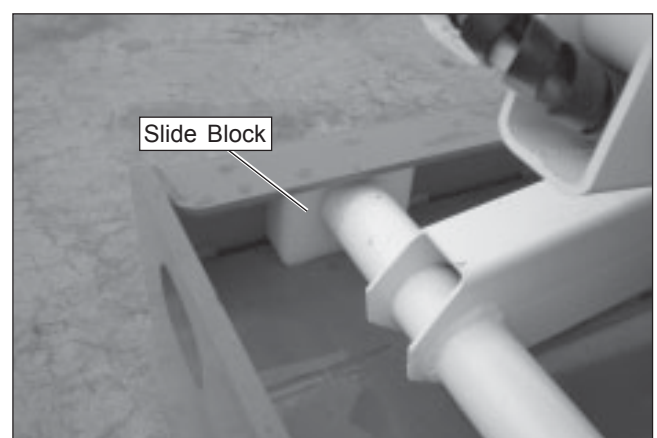
Visually inspect all weldments for abnormal wear, abrasion, or deformation that could cause interference between moving parts.

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.

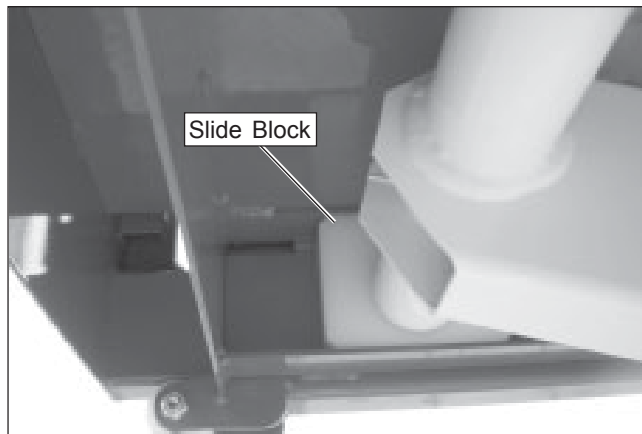
### **Slide Blocks**

Visually inspect the scissors arm slide blocks (refer to Figure 8.15). The slide blocks must be free to move without obstruction. There is one slide block on each side of the chassis.



**Figure 8.15 – 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 8.16).



**Figure 8.16 – Platform Slide Blocks**

There is one slide 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.

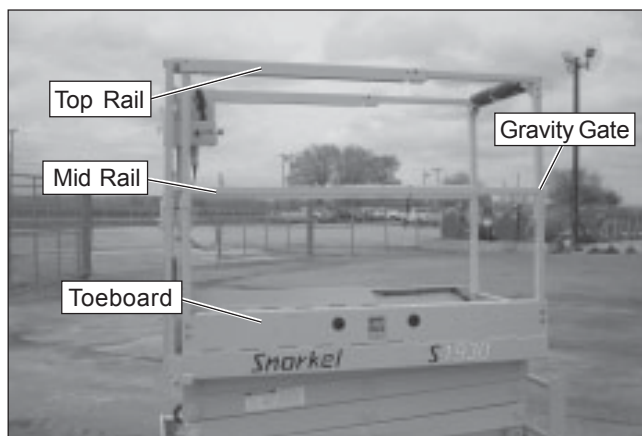
Pay particular attention to all of the bolts, nuts, roll pins, collars, and snap rings that connect the scissors arms. They should all be present, tight, and not damaged in any way.

### 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 8.17) includes the top rail, mid rail, toeboards and an gravity gate.



**Figure 8.17 – Guardrail System**

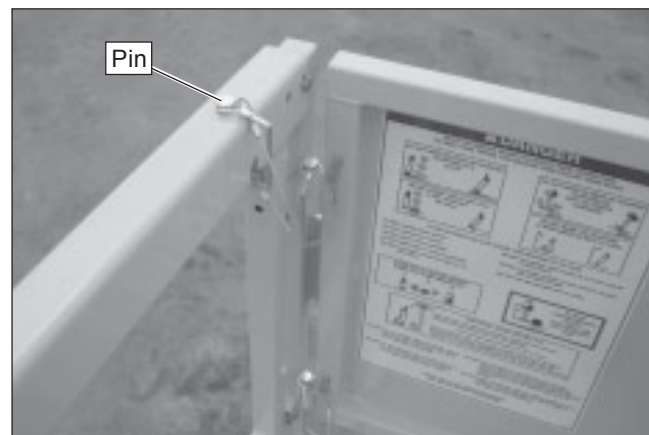
Inspect all components of the guardrail system. The rails and toeboards must all be in place and free of any damage or deformation. Visually check the rail and toeboard welds for cracks. All bolts and nuts fastening the guardrails in place must be present and not show any signs of looseness.

Inspect the gravity gate to be sure it is present and securely fastened to the rail. The chain must be free of damage and deformation that may prevent it from functioning properly. Inspect the pin that secures the gate.

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

### Platform Extension

A pin at the left front of the platform secures the extension deck and the upper controls to the main platform deck. Inspect the pin (refer to Figure 8.18) to ensure that it properly secures the extension deck. Release the pin to extend the platform. Extend the platform while checking for proper operation.

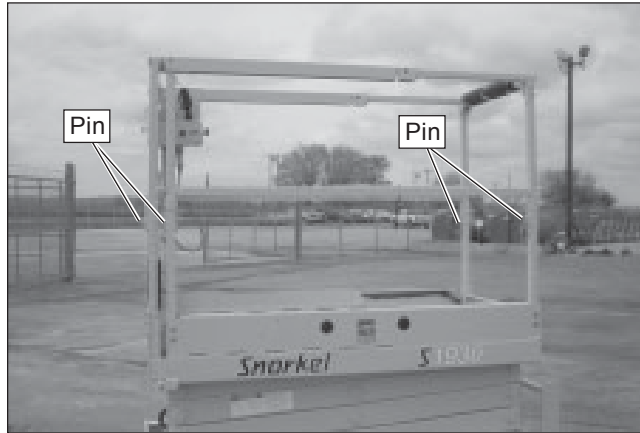


**Figure 8.18 – Platform Extension Pin**

Extend the platform and inspect the weldments for deformation and damage. Visually check the platform welds for cracks. Retract the deck and install the pin to secure it to the platform.

### Swing-Down Rails

Inspect the pins that hold the rails in position (refer to Figure 8.19) to make sure they are all in place and are not deformed. There is one pin on the top rail, one on the gravity gate and one on each of the vertical platform tubes. There are also two pins on the front panel and two that fasten the upper controls to the platform rails. One of the pins that holds the upper controls in place is the platform extension pin.

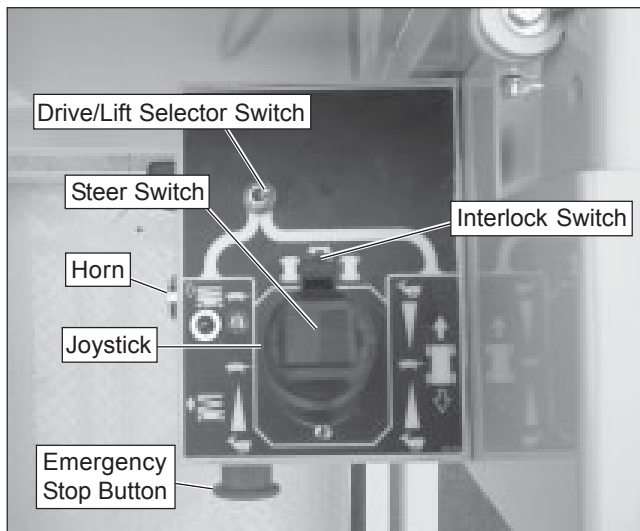


**Figure 8.19 – Swing-Down Rails Pin Location**

The pins must securely fasten the swing-down rails in the upright position.

### Operating Controls

With the aerial platform stowed, test the operation of each control from the upper control station (refer to Figure 8.20).



**Figure 8.20 – Upper Controls**

Place the battery disconnect switch in the on position and from the lower controls, place the control selector in the upper controls position. Pull the emergency stop button outward 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.

### Horn

Press the horn button to ensure that it operates properly.

### Lowering Alarm and Interrupt

Raise the platform approximately 3 m (10'). Push the joystick forward to lower the platform. The platform should stop lowering when it reaches about 1.5 m (5'). Center the joystick in neutral to reset the lowering function. Wait for 5 seconds and then push the joystick forward to continue lowering.

### Drive Motion Alarm

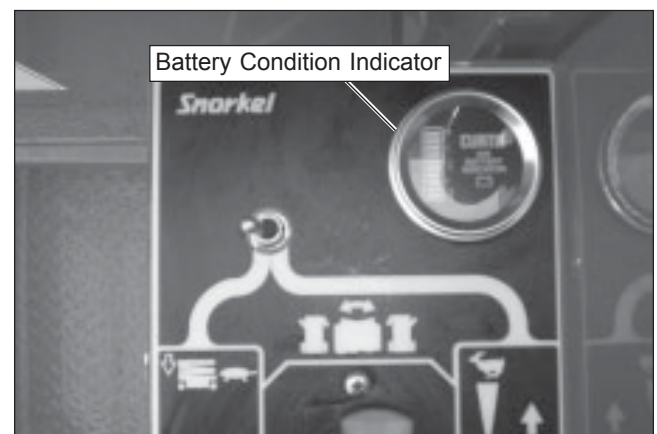
Drive in both the forward and reverse directions to ensure that the alarm sounds to warn personnel in the area that the aerial platform is in motion.

### Flashing Light

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

### Battery Condition Indicator

The optional battery condition indicator (refer to Figure 8.21) is located on the upper control panel. With the machine set up for upper control operation, check to see that the gauge displays a power reading.



**Figure 8.21 – Upper Controls**

### Placards and Decals

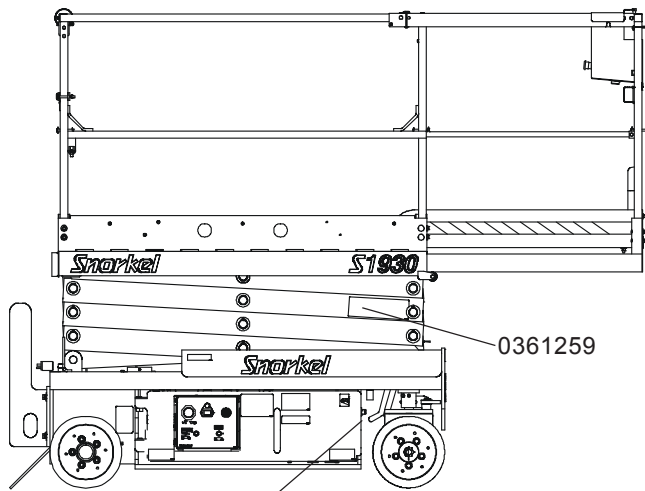
Inspect all safety and operational placards and decals. Make certain they are in place, in good condition, and are legible. The placards and decals may be cleaned with soap and water, and a soft cloth if the words or pictures cannot be seen.

#### **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.**

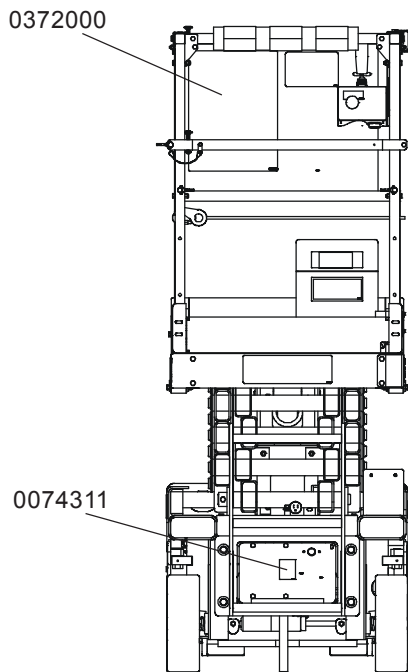
Wet paint overspray may be removed using a natural biodegradable solvent and a soft cloth. Replace any missing or illegible placards or decals before operating the aerial platform. Placard and decal kits are available from Snorkel.

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



0070901  
(Inside hydraulic tray)

Right Side



Rear

**⚠ DANGER**

Proper position for safety prop use:

Death or serious injury might result if safety prop is not used and/or properly positioned. Use safety prop at all times when servicing machine with platform raised.

**PROPER USE OF SAFETY PROP**

1. Remove all material from platform.
2. Raise platform until the open height is wide enough to position the safety prop.
3. Place safety prop in the proper position.
4. Remove hands and arms from scissors area.
5. Lower platform until scissors are supported by safety prop.

**TO STORE SAFETY PROP**

1. Raise platform until the open height is wide enough to position the safety prop.
2. Place the safety prop in the storage position.

0361259

<b>Snorkel</b>		SERIAL NUMBER	
MODEL NUMBER	DATE OF MANUFACTURE	SLOPE SENSOR ALARM SETTING	RS
MAXIMUM MACHINE WEIGHT	lbs	MAXIMUM WIRE LOAD	lbs
MAXIMUM POWERED MODELS	hp	BATTERY POWERED MODELS ONLY	Y
MAXIMUM ALLOWABLE MANUAL FORCE (SEE FIELD)	lbs	MAXIMUM ALLOWABLE WIND SPEED	mph
PLATFORM SIZE	in	MAXIMUM PLATFORM REACH	ft
MAXIMUM PLATFORM HEIGHT	ft	MAXIMUM WHEEL	in
WALD NUMBER OF OCCUPANTS	sw	MAXIMUM DRIVE MOTOR	hp
<b>CAUTION</b>			
Do not remove any weight from this machine. Any weight added must be distributed equally on each axle. Proper stability and safe weights of this machine are based on the platform size shown above.			
Add weights with machine in the stored + travel position.			
STEER AXLE	lbs	kg	
DRIVE AXLE	lbs	kg	

0070901

**⚠ DANGER**

DEATH OR SERIOUS INJURY CAN RESULT FROM TIPPING OVER. TO KEEP FROM TIPPING THIS MACHINE OVER FOLLOW THESE RULES.

**DO NOT RAISE OR DRIVE AN ELEVATED PLATFORM ON A SLOPE**

**DO NOT RAISE OR DRIVE AN ELEVATED PLATFORM ON SOFT OR UNEVEN SURFACES**

**GO NO CLOSER THAN 4 feet (1.2m) TO ANY DROP OFF OR HOLE**

**DO NOT RAISE THE PLATFORM IN WIND ABOVE 28 MPH (22.5 M/S)**

**OTHER ACTIONS CAN ALSO CAUSE THIS MACHINE TO TIP OVER**

**DO NOT** override safety devices.

**DO NOT** ride platform while machine is on a truck, fork lift or other device.

**DO NOT** overload the machine.

**DO NOT** stand or sit on guardrails.

**DO NOT** use ladder, scaffold, or other means to increase size or platform height.

**DO NOT** attach ropes or chains to guardrails.

**DO NOT** use with damaged tires or wheels.

**DO NOT** carry loads outside the railing or use as a crane.

**ALARM MEANS TIPOVER DANGER! LOWER PLATFORM IMMEDIATELY**

1. [Diagram]
2. [Diagram]
3. [Diagram]

**TO AVOID TIPOVER HAZARDS USE ON FLAT, LEVEL, AND SOLID SURFACES ONLY**

**ELECTRICAL SHOCK CAN KILL YOU**

This machine is not electrically insulated. Maintain 10 feet minimum clearance from electrical power lines and apparatus.

**This machine will not protect you from shock.**

Allow for platform sway, rock, or sag. If voltage is 300 V to 50 kV stay at least 10 feet (3.1m) away. If voltage is more than 50 kV talk with your supervisor or read the Operator's Manual on this machine for safe distances.

**DO NOT** use this machine without the railings and the entry gate, chain or bar in place. You could fall out and hurt or kill yourself.

**DO NOT** let an untrained or unauthorized person use this machine. When you leave the machine unattended, remove the key, or turn off the battery switch on the base of the machine and lock the battery switch in the off position.

**DO NOT** use this machine if it is not working right, or if any part of it is damaged, worn, or missing. An accident could cause injury or death.

**DO NOT** replace components critical to machine stability, such as batteries and wheel equipment, with lighter weight or non-factory approved substitutes.

**NOTE: STUDY THE OPERATOR'S MANUAL BEFORE OPERATING THIS MACHINE.**

0372000

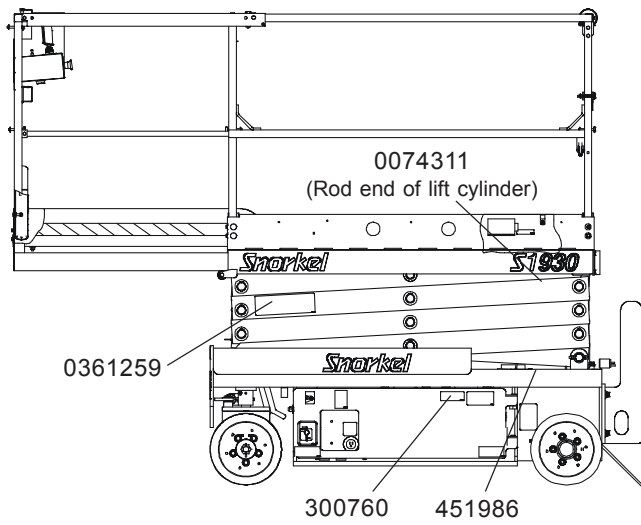
**⚠ DANGER**

Using incorrect parts can cause cylinder failure. Death or serious injury can result.

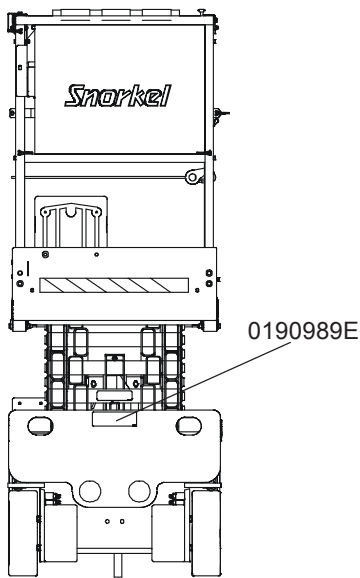
Use only:

0074311

0074311



Left Side



Front

<b>⚠ DANGER</b>	
<p>Proper position for safety prop use</p>	<p>Death or serious injury might result if safety prop is not used and/or properly positioned. Use safety prop at all times when servicing machine with platform raised.</p>
<p><b>PROPER USE OF SAFETY PROP</b></p> <ol style="list-style-type: none"> <li>1. Remove all material from platform.</li> <li>2. Raise platform until the open height is wide enough to position the safety prop.</li> <li>3. Place safety prop in the proper position.</li> <li>4. Remove hands and arms from scissors area.</li> <li>5. Lower platform until scissors are supported by safety prop.</li> </ol> <p><b>TO STORE SAFETY PROP</b></p> <ol style="list-style-type: none"> <li>1. Raise platform until the open height is wide enough to position the safety prop.</li> <li>2. Place the safety prop in the storage position.</li> </ol>	

0361259

<b>⚠ DANGER</b>	
<p><b>DO NOT ALTER OR DISABLE LIMIT SWITCHES, SAFETY SWITCHES, OR INTERLOCKS.</b></p>	

451986

<b>⚠ DANGER</b>	
<p>Using incorrect parts can cause cylinder failure. Death or serious injury can result.</p>	
<p>Use only:</p>	

0074311

<b>⚠ DANGER</b>	
<p><b>TIPOVER HAZARD</b> DEATH OR SERIOUS INJURY MAY RESULT IF MACHINE TIPS OVER</p> <p>Trays must be closed when platform is elevated.</p>	

300760



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## Prestart Inspection Checklist

Item	Inspect For	Ok
<b>Operator's Manual</b>	In manual holder	
<b>Electrical System</b>		
Battery fluid level	Proper level	
Battery terminals	Clean, connectors tight	
Battery charger	Proper operation	
Cables and wiring harness	No wear or physical damage	
<b>Hydraulic System</b>		
Fluid level	Between full and add marks	
Hoses, tubes, and fittings	No leaks	
Free-wheeling valve	Fully closed	
<b>Tires and Wheels</b>	Good condition	
<b>Ground Strap</b>	In place and securely fastened	
<b>Lower Control Station</b>		
Operating controls	Proper operation	
Emergency stop	Shuts off lower controls	
Lowering alarm and interrupt	Sounds when platform lowers	
<b>Pothole Protection Interlock</b>	Proper operation	
<b>Emergency Lowering</b>	Proper operation	
<b>Safety Prop</b>	No damage or deformation	
<b>Flashing Light</b>	Proper operation	
<b>Structures</b>		
Weldments	Welds intact, no damage or deformation	
Slide pads	In place, no damage or deformation	
Fasteners	In place and tight	
<b>Upper Control Station</b>		
Guardrail system	Welds intact, no damage or deformation	
Platform extension	Proper operation	
Operating controls	Proper operation	
Emergency stop	Shuts off upper controls	
Hom	Sounds when activated	
Lowering alarm and interrupt	Sounds when platform lowers, proper operation	
Drive motion alarm	Sounds when aerial platform moves	
Battery condition indicator	Proper operation	
<b>Placards and Decals</b>	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 will 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 or national safety regulations.**

**Pinch points may exist between moving components. Death or serious injury will 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 will 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. 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 raise the platform in wind speeds above 12.5 m/s (28 mph).**

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 at the rear of the platform.

### **⚠ Danger**

**The aerial platform can tip over if it becomes unstable. Death or serious injury will 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 (refer to Chapter 8).
2. Close and latch the battery and hydraulic trays.

3. Place the battery disconnect switch in the on position.

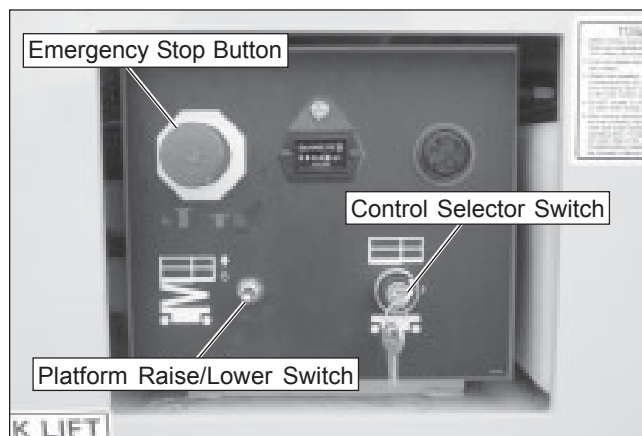
### **Lower Controls**

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 during 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.

### **Lowering Interrupt**

When the platform is lowered to about 1.5 m (5') lowering stops. The platform will not lower for five seconds regardless of the platform raise/lower switch position.

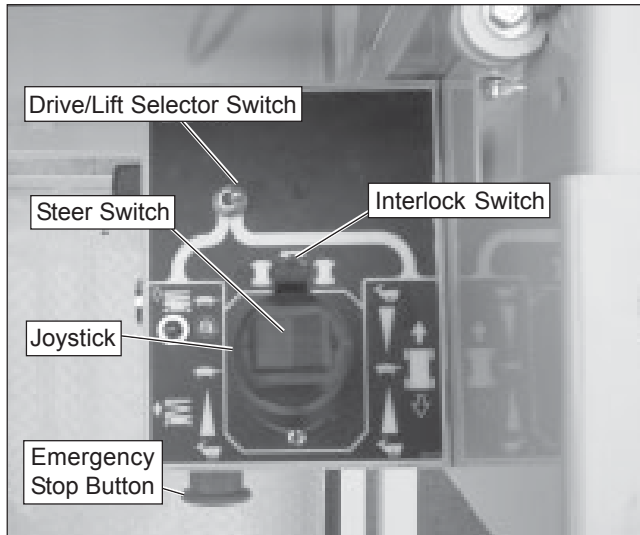
Center the switch in neutral to reset the lowering function, then continue to lower the platform.

### **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.

Before operating from the upper controls, properly set up the aerial platform as described under Preparing for Op-

eration. Use the following procedure to operate the aerial platform from the upper controls.



**Figure 9.2 – 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 lower the gravity 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 will 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 61 cm (24") vertical rise in 3.05 m (10') horizontal length.

### **⚠ Warning**

**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 1.8 m (6'), the aerial platform may be driven within the full range of drive speeds. Above 1.8 m (6') 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 0.6 km/h (0.4 mph), which is 5.3 m (17' 7") in 30 seconds, when elevated above 1.8 m (6') even if the joystick is in the mid or high speed position.

### **Drive/Lift Level Sensor Interlock**

When the platform is elevated above 1.8 m (6'), 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. Fully lower the gravity gate when the platform is occupied.

**⚠ Danger**

**The potential for an accident increases when the swing-down rails are lowered. Death or serious injury can result from such accidents. Do not elevate the platform with the swing-down rails lowered.**

Be sure the swing-down rails are up and the pins are all installed, anytime the machine is not being transported.

**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.

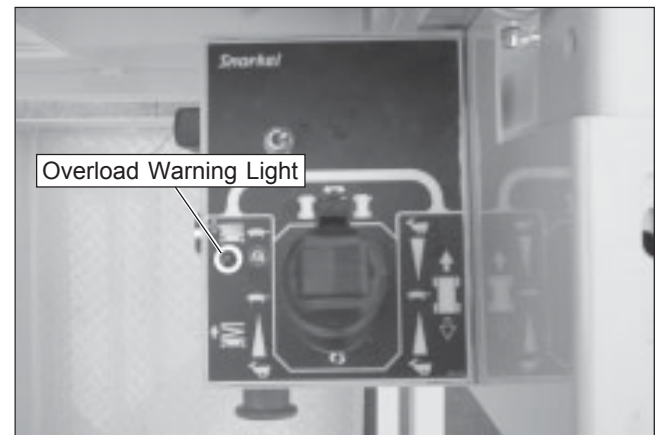
**Lowering Interrupt**

When the platform is lowered to about 1.5 m (5') lowering stops. The platform will not lower for five seconds regardless of the joystick position.

Center the joystick in neutral to reset the lowering function, then continue to lower the platform.

**Overload Protection**

When the load in the platform is near or at rated capacity, an alarm will sound and the red light on the upper controls (refer to Figure 9.3) will flash.



**Figure 9.3 – Upper Controls**

The alarm and light warn the operator that the platform is close to becoming overloaded. All functions remain fully operational.

**⚠ Danger**

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

If the platform is fully lowered and is overloaded, when it is elevated just past 1.8 m (6'), a control module will stop the lift and drive functions and the alarm will sound and the warning light will flash. The platform can still be lowered to remove the excess load.

If the platform is elevated just past 1.8 m (6') and material is added to the platform overloading it, a control module will stop the lift, drive and lower functions and the alarm will sound and the warning light will flash. In this case, remove the load in excess of rated capacity and cycle the emergency stop button at the upper controls to return to normal operation.

**Extending**

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

**⚠ Caution**

**The extension deck is free to move when the pin is removed. Personal injury may result from extending the platform deck while the aerial platform is on a slope. Do not attempt to extend or retract the platform unless the aerial platform is on a level surface.**

1. Remove the pin from the top rail on the left side of the platform (refer to Figure 9.4).

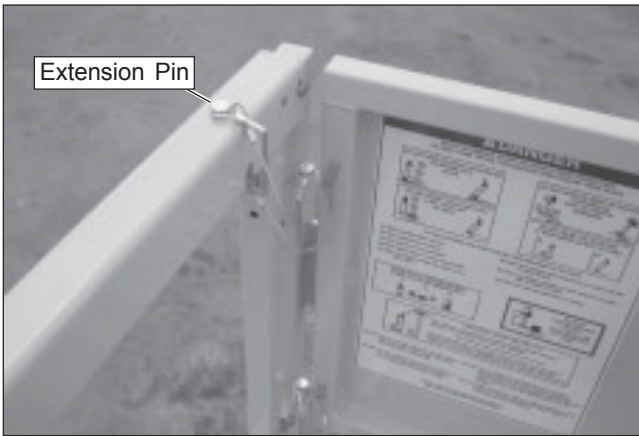


Figure 9.4 – Front of Platform

2. Stand on the main deck of the platform, facing the front of the platform. Grasping the top rail of the extension deck, push forward to extend the deck.

### ⚠ Caution

The extension deck is free to move when the pin is removed. Make certain the pin is in place when the deck is extended in the working position and when it is stowed.

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

### Wallboard Loading Gate

The wallboard gate (refer to Figure 9.5) is hinged on the right side of the platform and is pinned on the left.



Figure 9.5 – Rear of Platform

For easy loading of work materials in the platform, remove the pin and swing the gate upward and out of the way. Lower and pin the gate after loading the platform.

### Swing-Down Rails

The platform rails may be lowered approximately 52 cm (20.75") to fit the machine under low height obstructions.

### ⚠ Warning

The potential for an accident increases when the swing-down rails are lowered. Death or serious injury can result from such accidents. Do not elevate the platform with the swing-down rails lowered. Use extreme care when moving the aerial platform while the swing-down rails are lowered.

Use the following procedure to lower the platform guardrails.

1. Remove the pin from the gravity gate. Fasten the gravity gate to the mid rail on the right side of the platform (refer to Figure 9.6).

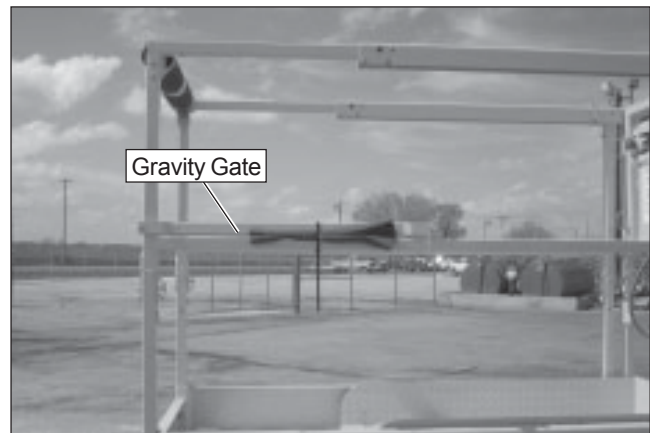


Figure 9.6 – Gravity Gate

2. Remove the wallboard loading gate pin and lower the gate.
3. Extend the platform approximately 15 cm (6").
4. Remove the pins that connect the upper controls to the guardrails (refer to Figure 9.7). Lay the upper controls on the floor of the platform.

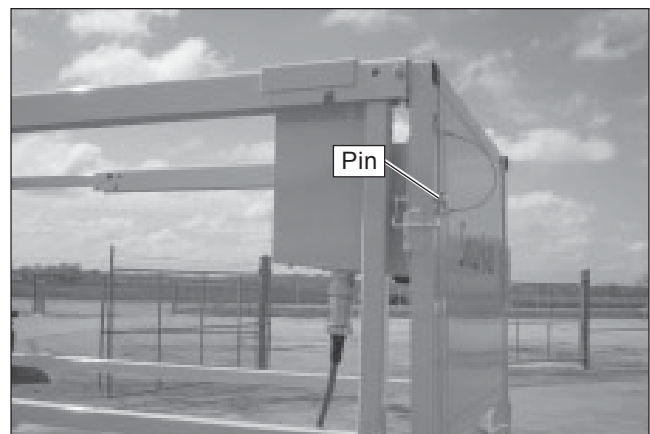
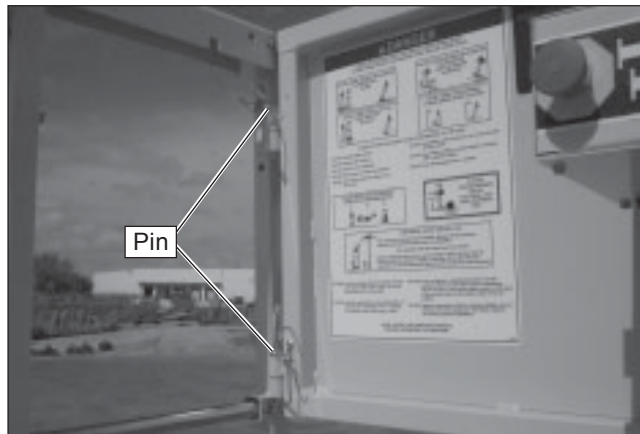


Figure 9.7 – Upper Controls

- Remove the two pins that connect the front panel to the guardrails (refer to Figure 9.8).



**Figure 9.8 – Front Panel**

- Fasten the front panel to the mid rail on the right side of the platform (refer to Figure 9.9) using the bottom pin.



**Figure 9.9 – Front Panel Fastened to Mid Rail**

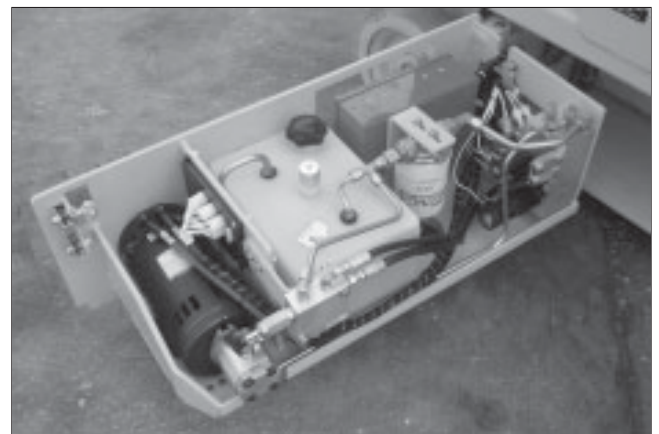
- Remove the three pins on the right side of the platform. Fold the guardrails down to rest on the stop on the left front vertical rail.
- Remove the three pins on the left side of the platform. Fold the guardrails down to rest on the right side guardrails.
- Reverse this procedure to reposition the rails. Install the two pins at both sides of the front of the platform, with the pin heads to the inside of the rails (refer to Figure 9.10). The extension deck will not fully retract unless the pins are installed properly.



**Figure 9.10 – Front Rail Pins**

### Swing-Out Trays

Batteries and hydraulic components are enclosed in swing-out trays (refer to Figure 9.11) on each side of the chassis.



**Figure 9.11 – 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, brake release hand pump, 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, push down on the latch and swing the tray open.





## 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 deck and ensure the pin is in place.

### **⚠ Caution**

**The extension deck is free to move when the pin is removed. Make certain the pin is in place when the deck is extended in the working position and when it is stowed.**

2. Fully lower the platform.
3. Push the emergency stop button in on the lower control panel.
4. Remove the key from the control selector switch.
5. Turn the battery disconnect switch off and lock it.
6. 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. If lifting from the rear of the machine, insert the forklift forks into the pockets (refer to Figure 10.1).

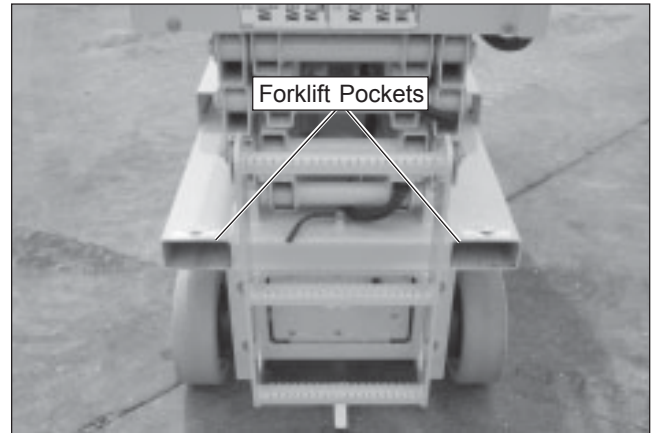


Figure 10.1 – Rear of Chassis

### **⚠ Caution**

**Lifting the aerial platform with the forklift forks positioned improperly can produce enough force to damage machine components. When lifting the machine from the side, place the forklift forks directly under the designated lift points.**

4. If lifting from either side of the machine, place the forklift forks directly under the designated points under the pothole protector skid (refer to Figure 10.2).

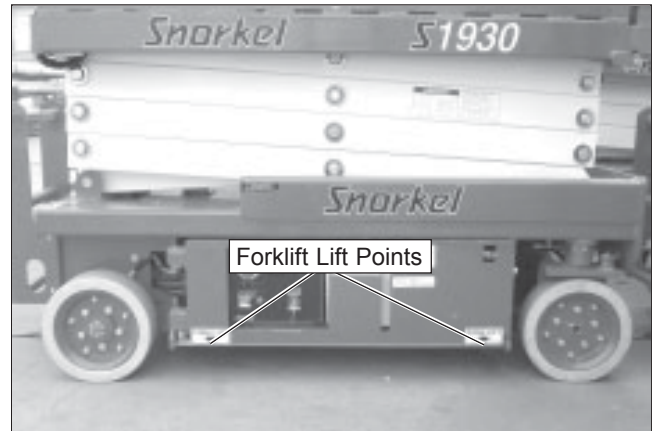


Figure 10.2 – Side of Chassis

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

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.

### **⚠ Warning**

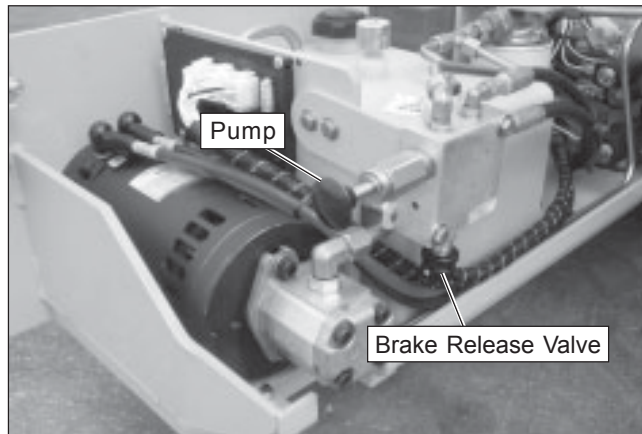
The aerial platform is free to move when the brakes are released. Death or serious injury can result. Re-enable the brakes before operating the aerial platform.

5. Chock the wheels to prevent uncontrolled motion of the aerial platform.
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 the fully open position.



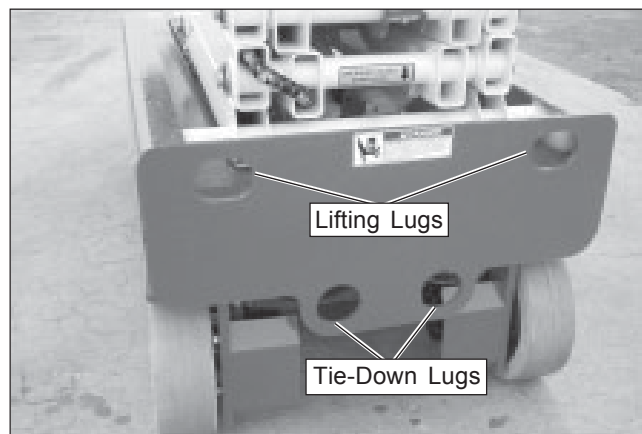
**Figure 10.3 – Hydraulic Tray**

7. The brake release pump is located on the brake release valve (refer to Figure 10.4). Push and release the knob several times to release the brakes.



**Figure 10.4 – Hydraulic Tray**

8. Attach the winch line to the tie-down lugs (refer to Figure 10.5) on the front of the chassis.



**Figure 10.5 – Front of Chassis**

9. Remove the wheel chocks and use the winch to position the aerial platform on the transport vehicle.
10. Close the free-wheeling valve.
11. Drive the aerial platform forward or reverse and then stop to reset the parking brakes.
12. Verify that the drive system and brakes operate properly before operating the aerial platform.

### **Driving**

### **⚠ Danger**

The aerial platform can tip over if it becomes unstable. Death or serious injury will 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 a 20 percent grade. A grade of 20 percent is a 61 cm (24") vertical rise in 3.05 m (10') hori-

zontal 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.

### **⚠ Caution**

**The extension deck is free to move when the pin is removed. Make certain the pin is in place when the deck is extended in the working position and when it is stowed.**

4. Retract the platform extension deck and ensure the pin is in place. 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.

### **⚠ Warning**

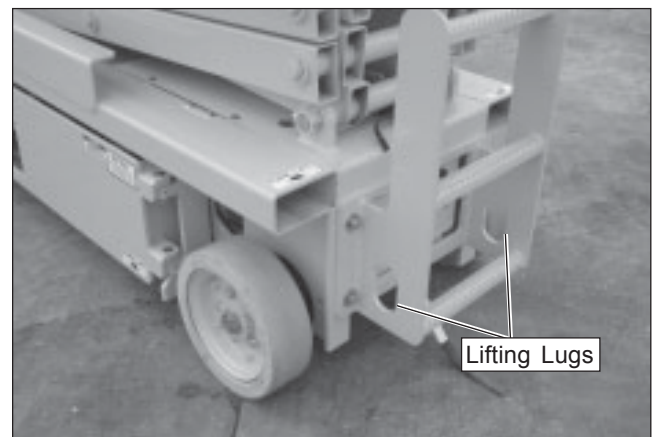
**The potential for an accident increases when the aerial platform is lifted using improper equipment and/or lifting techniques. Death or serious injury can result from such accidents. Use proper equipment and lifting techniques when lifting the aerial platform.**

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 front lifting lugs (refer to Figure 10.5) and the rear lifting lugs (refer to Figure 10.6) to make sure they are free of cracks 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.



**Figure 10.6 – Rear of Chassis**

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 pot-hole 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 front of the aerial platform (refer to Figure 11.1).

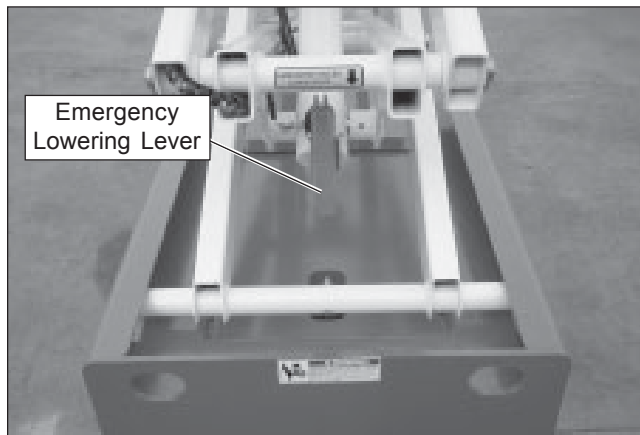


Figure 11.1 – Front of Chassis

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 will 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.

### **⚠ Warning**

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

1. Chock the wheels to prevent uncontrolled motion of the aerial platform.
2. Turn the battery disconnect switch off.

3. Unlatch and swing out the hydraulic tray. The free-wheeling valve is located on the hydraulic manifold (refer to Figure 11.2). Turn the free-wheeling valve counterclockwise to the fully open position.

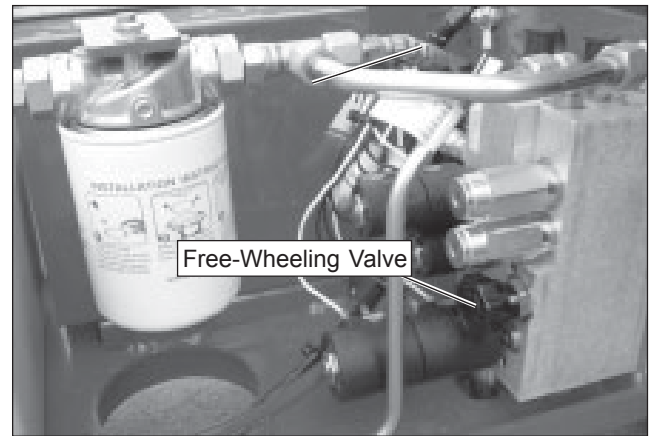


Figure 11.2 – Hydraulic Tray

4. The brake release pump is located on brake release valve (refer to Figure 11.3) in the hydraulic tray. Push and release the knob several times to release the brakes.

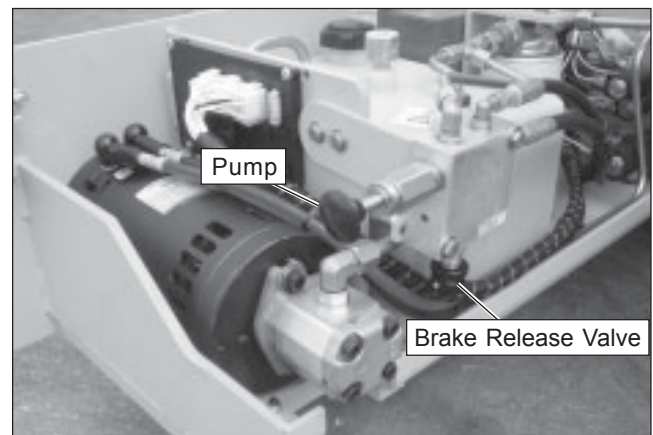


Figure 11.3 – Hydraulic Tray

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

### **⚠ Warning**

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

6. Close the free-wheeling valve after towing.
7. Drive the aerial platform forward or reverse and then stop to reset the parking brakes.
8. Verify that the drive system and brakes operate properly before operating the aerial platform.



## 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 is turned off.	Place switch in the on position.
	Emergency stop button is pushed inward to the off position.	Pull the emergency stop button outward to the on position.
	Emergency lowering lever is not properly disengaged.	Ensure lever returns to normal operating position.
Upper controls will not work.	Control selector switch is in the lower control position.	Place switch in the upper control position.
	Battery disconnect switch is turned off.	Place switch in the on position.
	Emergency stop button is 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 1.8 m (6').	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.
Wheels won't turn when winching or pushing.	Brakes are engaged.	Manually release the brakes using the hand pump.
	Free-wheeling valve closed.	Fully open free-wheeling valve.
Brakes don't hold or won't reset after towing.	Brakes not fully engaged due to excessive hydraulic pressure in the brake release valve.	Use the knob on the bottom of the brake release valve to relieve the pressure using the following procedure: <ol style="list-style-type: none"> <li>1. Release the lock and turn the release wheel fully in (CW).</li> <li>2. Turn the release fully out (CCW) and then lock the release wheel in position with the lock.</li> </ol>
Tilt alarm does not work.	Platform is not raised more than 1.8 m (6').	Normal operation. The tilt alarm is not active until the platform is raised more than 1.8 m (6').
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 71°C (160°F) 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.

**ambient temperature** – the air temperature of the immediate environment.

**ammeter** – an instrument for measuring the strength of an electric current in amperes.

**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 additional fall protection beyond the platform guardrails on scissor 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.

**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 hold the electrical panel for the lower controls, the hydraulic directional control valve, the free-wheeling valve, the pump, and the hydraulic fluid filter.

**level sensor** – a device that detects a preset degree of variation from perfect level. The level sensor is used to prohibit certain aerial platform functions if operating on a slope greater than the preset value.

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

**manufacturer** – a person or entity who makes, builds, or produces an 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 (M.S.A.D)** – 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.

**operator** – a qualified person who controls the movement of an aerial platform.

**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.

**pothole protection interlock** – a safety feature that sounds and alarm and automatically stops the platform raise function if the pothole protection skids are prevented from lowering properly.

**pothole protection system** – a mechanical tip-over prevention system consisting of skids along the bottom of both sides of the chassis which lower as the platform is raised.

**prestart inspection** – a required safety inspection routine that is performed daily before operating the aerial platform.

**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.

**safety prop** – a bar that when properly positioned mechanically prevents the platform from lowering.

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

**turning radius** – the radius of the circle created by the wheel during a 360° turn with the steering wheels turned to maximum. Inside turning radius is the wheel closest to the center and outside turning radius is the wheel farthest from the center.

**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.

**wheelbase** – the distance from the center of the rear wheel to the center of the front wheel.

## Appendix A – Glossary

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**working envelope** – the area defined by the horizontal and vertical limits of boom travel that the platform may be positioned in.

**working height** – platform height plus six feet.

# 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.

Effective July 1995

