

X40RT

Operator Manual

UpRight
POWERED ACCESS

Please Note:

The UpRight X40 is sold in some regions as the Snorkel SR4084.

Therefore any reference to the Snokel SR4084 also applies to the UpRight X40.

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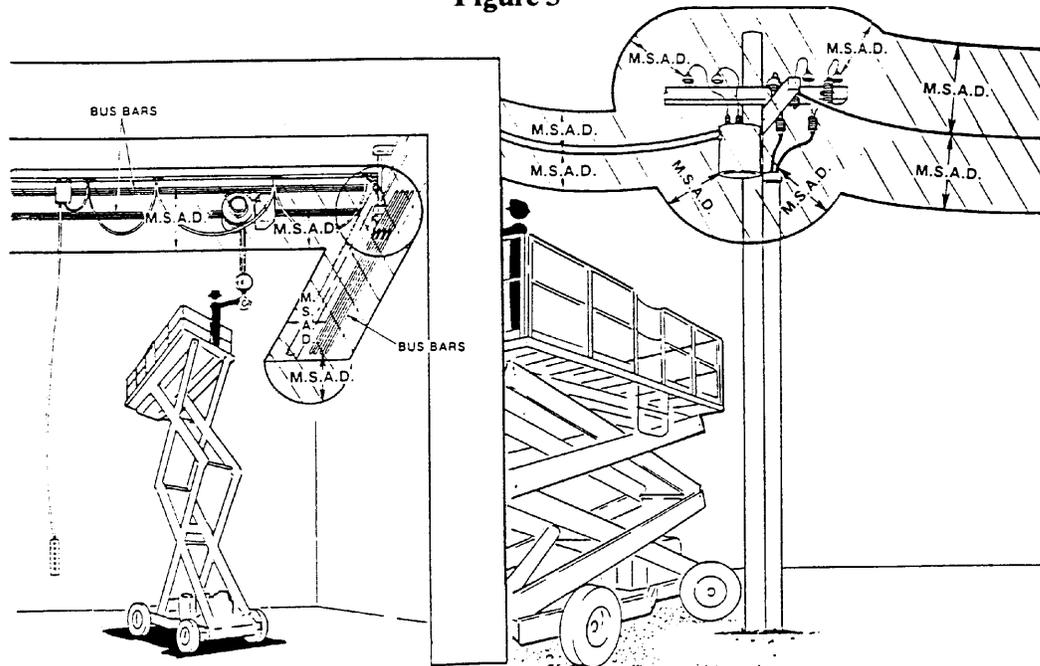
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! DANGER

ELECTRICAL HAZARD

An SR is an all-metal, NON-INSULATED, aerial work-platform. Do not operate it near ELECTRICAL conductors. Regard all conductors as being energized. Use the table and illustration below to determine safe clearance from electrical conductors. Table 1 and Figure 3 are reprinted courtesy of Scaffold Industry Association, ANSI/SIA A92.6, page 26.

Figure 3



M.S.A.D. = MINIMUM SAFE APPROACH DISTANCE (SEE TABLE BELOW)



DENOTES PROHIBITED ZONE

- DANGER:**
- DO NOT ALLOW MACHINE, PERSONNEL OR CONDUCTIVE MATERIALS INSIDE PROHIBITED ZONE.
 - MAINTAIN M.S.A.D. FROM ALL ENERGIZED LINES AND PARTS AS WELL AS THOSE SHOWN.
 - ASSUME ALL ELECTRICAL PARTS AND WIRES ARE ENERGIZED UNLESS KNOWN OTHERWISE.

- CAUTION:**
- DIAGRAMS SHOWN ARE ONLY FOR PURPOSES OF ILLUSTRATING M.S.A.D. WORK POSITIONS, NOT ALL WORK POSITIONS.

Table 1
MINIMUM SAFE APPROACH DISTANCE (M.S.A.D.)
to energized (exposed or insulated) power lines and parts.

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	4.50
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

DANGER

ELECTRICAL HAZARD

SR ELEVATING WORK PLATFORMS ARE NOT ELECTRICALLY INSULATED.

If the platform, scissors arm assembly, or any other conductive part of an SR contacts a high-voltage electrical conductor, the result can be **SERIOUS INJURY** or **DEATH** for persons on or near the machine.

GO NO CLOSER THAN THE MINIMUM SAFE APPROACH DISTANCES ON THE OPPOSITE PAGE.

Be sure to allow for sag and sway in the wires and the work platform.

If an SR comes in contact with a live electrical conductor, the entire machine can be charged. If that happens, you should remain on the machine and not contact any other structure or object within reach. That includes the ground, adjacent buildings, poles, and any object not a part of the SR. Such contact could make your body a conductor to the other object creating an electrical shock hazard resulting in **SERIOUS INJURY** or **DEATH**. Do not attempt to enter or leave the SR until you are sure the electricity has been turned off.

If an SR is in contact with a live conductor, the platform operator **MUST** warn others on the ground in the vicinity of the SR to **STAY AWAY** from the machine, since their bodies can also form a path for electricity to ground thus creating an electrical shock hazard with possible **ELECTROCUTION** and **DEATH**.

Do not attempt to operate SR ground controls when the platform, scissors arm assembly, or any other conducting part of the SR is in contact with electrical wires or if there is an immediate danger of such contact.

Regard all conductors as energized.

Personnel working on or near an SR must be continuously aware of electrical hazards, recognizing that **SERIOUS INJURY** or **DEATH** can result if contact with an electrical wire does occur.

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The most important chapter in this manual is “1. SAFETY.” Take time, now, to study it closely. The information in that chapter might save your life or prevent serious injury.

■ SIGNS

The following two conventions are used throughout this manual.

1. This sign



means: **Attention! Become alert! Your safety is involved.**

2. This sign



means one of two things: (1) an action, about to be performed, is potentially hazardous and might result in minor personal injury if not done correctly, or (2) an action, about to be performed, can harm the SR if not done correctly.

■ QUALIFIED OPERATORS

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

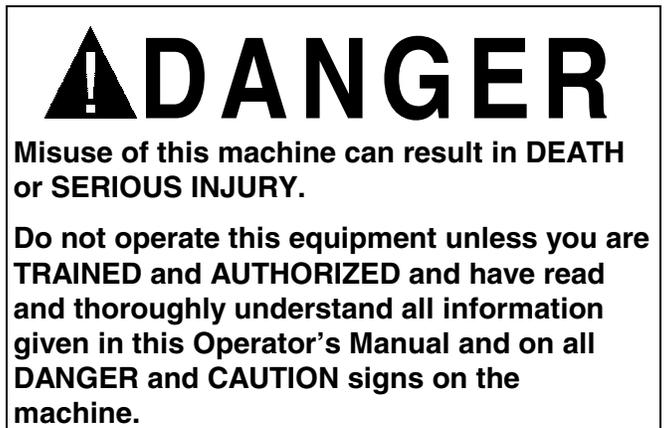
Training is essential and must be performed by a QUALIFIED person. Become proficient in knowledge and actual operation before using the SR on the job. You must be trained and authorized to perform any functions of the SR. Operation of the SR must be within the scope of the machine specifications.

Before operating an SR you must read and understand the operating instructions in this manual as well as the decals, warnings, and instructions on the machine itself.

Before operating an SR you must be AUTHORIZED by the person in charge to do so.

The following rules will help ensure the safety of personnel and help prevent needless downtime because of damaged equipment.

1. Only TRAINED and AUTHORIZED operators shall be permitted to operate the equipment.
2. All manufacturer’s operating instructions and safety rules and all employers’ safety rules and all OSHA and other government safety rules must be strictly adhered to.
3. Repairs and adjustments shall be made only by QUALIFIED TRAINED maintenance personnel.
4. No modification shall be made to the equipment without prior written consent of the Snorkel Engineering Department.
5. You must make a prestart inspection of the SR at the beginning of each shift. A malfunctioning machine must not be used.
6. You must make an inspection of the work place to locate possible hazards before operating an SR.



■ MAINTENANCE

Every person who maintains, inspects, tests, or repairs these machines, and every person supervising any of these functions, must be properly trained.

This Operator’s Manual provides a daily inspection procedure that will help you keep your SR in good operating condition. Do not perform other maintenance unless you are a TRAINED mechanic, QUALIFIED to work on SR’s. Call QUALIFIED maintenance personnel if you find problems or malfunctions.

INTRODUCTION

Information contained in this manual concerns only current SR models, and the right is reserved to make changes at any time without obligation.

■ RESPONSIBILITIES OF PARTIES

It is imperative that all owners and users of an SR read, understand, and conform to all applicable regulations. Ultimate compliance to OSHA regulations is the responsibility of the employer using the equipment.

ANSI Standard A92.6 identifies requirements of all parties who might be involved with Self-Propelled Elevating Work Platforms.

A reprint of the “Manual of Responsibilities for Dealers, Owners, Users, Operators, Lessors and Lessees of ANSI/SIA A92.6-1999 Self-Propelled Elevating Work Platforms” is available from Snorkel dealers or from the factory upon request.

Copies are also available from:

Scaffold Industry Association, Inc.
P. O. Box 20574
Phoenix, AZ 85036-0574 USA

■ ADDITIONAL INFORMATION

For additional information, contact your local dealer or write:

Snorkel International, Inc.
P.O. Box 1160
St. Joseph, MO 64502-1160 USA
1-800-255-0317

<http://www.snorkelusa.com>

■ SAFE OPERATION

The following safety information is vitally important for safe operation of an SR. Failure to follow these instructions can result in personal injury or DEATH.

□ Pre-start Inspection

Prior to each shift, the SR shall be given a visual inspection and function test. (See the “DAILY INSPECTION & MAINTENANCE” chapter in this manual for a list of items to inspect and test.)

Do not operate an SR unless you are trained and authorized, understand the operating characteristics of the SR, and have inspected and tested all functions to be sure they are in proper working order. (See the “DAILY INSPECTION & MAINTENANCE” chapter.)

□ Work Place Inspection and Practices

Do not use an SR as a ground for welding. Ground to the work piece.

Before an SR is used, and during use, check the area in which it is to be used for possible hazards such as, but not limited to:

- drop-offs or holes,
- side slopes,
- bumps and floor obstructions,
- debris,
- overhead obstructions and electrical conductors,
- hazardous locations,
- inadequate surface and support to withstand all load forces imposed by the aerial platform in all operating configurations,
- wind and weather conditions,
- presence of unauthorized persons,
- other possible unsafe conditions.

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.

A recommended safety practice is to have ground personnel, who are trained in the operation of SR emergency controls, working in the immediate vicinity of an elevated SR. In the event of an emergency, they can assist the platform operator.

When moving the platform, check the clearance around the SR to avoid contact with structures or other hazards. Always look in the direction of motion.

Keep ground personnel from under the platform when the platform is raised.

Secure all accessories, containers, tools, and other materials in the platform to prevent them from accidentally falling or being kicked off the platform.

Do not engage in any form of “horseplay” or “stunt driving” while operating an SR.

Do not permit riders on the machine anywhere other than on the platform.

Remove all loose objects stored in or on the machine, particularly in the platform. Remove all objects which do not belong in or on the machine.

When other moving equipment is in the area, take special precautions to comply with local regulations regarding warnings.

Never steady the platform by positioning it against another platform.

Do not operate an SR that is not functioning properly, or has been damaged, until the machine has been repaired by a qualified maintenance person.

Do not operate an SR that does not have all its decals and placards attached and legible.

Drive the machine with care and at speeds compatible with conditions. Use extra caution when driving over rough ground, on slopes, and when turning.

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

Watch for bystanders and never allow anyone to be under, or to reach through, the machine and its equipment while operating.

1. SAFETY

❑ **Electrocution**

SR's are all-metal, NON-INSULATED, aerial work-platforms. Do not operate an SR near ELECTRICAL conductors. Regard all conductors as being energized.

Do not operate outside during a thunderstorm.

❑ **Tipover & Falling Hazards**

On scissor lifts, like the SR, personal fall protection is not required by ANSI, Federal OSHA, nor Snorkel. However, fall restraint might be required by work regulations. If so, the user is responsible for fitness and method of use.

The guardrail system is your fall protection. Make sure the guardrail system is properly installed and that all gates and fasteners are in place.

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:

- Where possible, place the work platform next to a roof or walking structure to do the transfer.
- Transfer your anchorage from one structure to another before you step across.
- Remember that you might be transferring to a structure where *personal fall arrest* is required.
- Use the platform entrance, do not climb over the guard rails.

Maintain a firm footing on the platform floor. Climbing on the guardrails is prohibited.

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

Do not operate an SR from a position on trucks, trailers, railway cars, floating vessels, scaffolds, or similar equipment unless the application is approved in writing by Snorkel.

If the platform or elevating assembly becomes caught, snagged, or otherwise prevented from normal motion by an adjacent structure, or other obstacles, such that control reversal does not free the platform, remove all personnel from the

platform before attempts are made to free the platform using ground controls.

Do not exceed the platform capacity nor the platform-extension capacity shown on the capacity placards located at the entrance to the platform and on the toeboard of the platform extension.

Do not raise the platform if the SR is on soft ground. Raise the platform only on a firm surface capable of withstanding all load forces imposed by the aerial platform in all operating conditions.

Do not allow wires, cables, hoses, rope, or other materials to trail down from the platform or be entangled in the platform.

If you have to level an SR, that does not have outriggers, be sure the shoring you use is strong enough to support the weight of the SR and that the SR wheels are chocked so that the SR cannot be driven.

Do not jerk the controls. Move the controls slowly and deliberately to avoid jerky and erratic operation. Always stop the controls in the neutral, off, position before going in the opposite direction.

Do not use the platform for any purpose other than to position personnel, their tools and materials.

Do not use an SR as a crane, hoist, or jack.

Do not operate an SR in winds, or wind gusts, of 28 mph (12.5 m/s) or more.

Do not add anything to an SR that will increase the wind loading (billboards, banners, flags, etc.).

❑ **Crushing**

Always look in the direction of travel. Avoid overhead obstructions.

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

■ GENERAL SAFETY PRECAUTIONS

□ Personnel Precautions

If you encounter any suspected malfunction of the aerial platform, or any hazard or potentially unsafe condition relating to capacity, intended use, or safe operation, cease operation and seek assistance from management.

□ Operator General Precautions

Make sure that all protective guards, cowlings, and doors are in place and secure.

□ Mounting & Dismounting Precautions

Use three points of support when getting on or off the platform. Keep the platform clean.

Do not jump off the machine.

Do not dismount while the machine is in motion.

□ Starting and Stopping Precautions

Do not start until all personnel are clearly away from the machine.

Before leaving the operator's station, place the machine in the stowed position.

Remove the starter key from the **KEY** switch and set the **BATTERY** switch to OFF when leaving the machine parked or unattended.

□ Operating Precautions

Do not modify an SR in any way.

Do not override any of the safety features of an SR.

Do not exceed the side-pull forces listed on the capacity placards located at the entrance to the platform and on the toeboard of the platform extension.

Limit travel speeds according to conditions. Take into account: grade, surface, congestion, visibility, side slope, location of personnel, and other hazards.

□ Operator Maintenance Precautions

Do not use your hand to search for hydraulic oil leaks. High pressure hydraulic oil can easily cut and penetrate your skin — a very serious injury that requires immediate attention by a medical specialist trained in that type of injury. Use a piece of cardboard or wood to search for hydraulic oil leaks.

Do not attempt repairs unless you are trained. Refer to manuals and experienced repair personnel for help.

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

Use extreme caution when removing radiator caps. Park the machine and let it cool down before opening a pressurized compartment.

□ Fuel Handling Precautions

Do not smoke or permit open flames while fueling or near fueling operations.

Maintain control of the fuel filler nozzle when filling the tank.

Do not fill the fuel tank to capacity. Allow room for expansion.

Clean up spilled fuel immediately.

Tighten the fuel tank cap securely. If the fuel cap is lost, replace it with an approved cap from Snorkel. Use of a non-approved cap without proper venting may result in pressurization of the tank.

Never use fuel for cleaning purposes.

For diesel engines, use the correct fuel grade for the operating season.

■ SAFETY DECALS & PLACARDS

There are several safety decals and placards on an SR. Their locations and descriptions are shown in this section. Take time to study them.

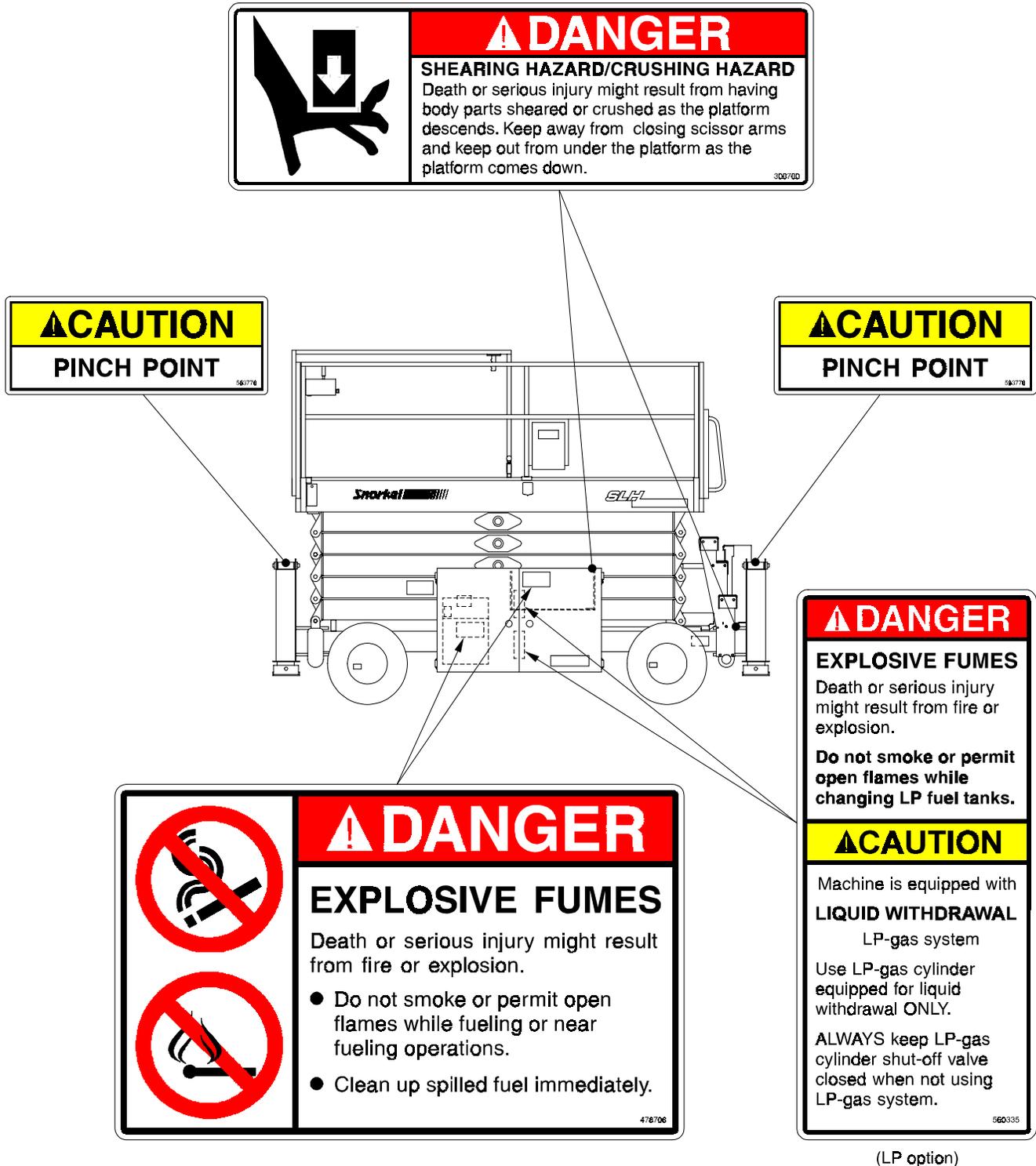
Be sure that all the safety decals and placards on the SR are legible. Clean or replace them if you cannot read the words or see the pictures. Clean with soap & water and a soft cloth. Do not use solvents.

You must replace a decal or placard if it is damaged, missing, or cannot be read. If it is on a part that is replaced, make sure a new decal or placard is installed on the replaced part. See your Snorkel dealer for new decals and placards.

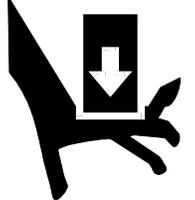
Refer to the **PLACARDS AND DECALS INSPECTION CHART** and **DRAWING** in the "DAILY INSPECTION AND MAINTENANCE" chapter for part numbers, location, and required quantities of all placards and decals.

Refer to the **PLACARDS AND DECALS INSPECTION CHART** and **DRAWING** in the “**DAILY INSPECTION AND MAINTENANCE**” chapter for part numbers, locations, and required quantities of all placards and decals.

LEFT-HAND SIDE OF SLH



RIGHT-HAND SIDE OF SLH



⚠ DANGER
SHEARING HAZARD/CRUSHING HAZARD
 Death or serious injury might result from having body parts sheared or crushed as the platform descends. Keep away from closing scissor arms and keep out from under the platform as the platform comes down.

302700

⚠ CAUTION
PINCH POINT

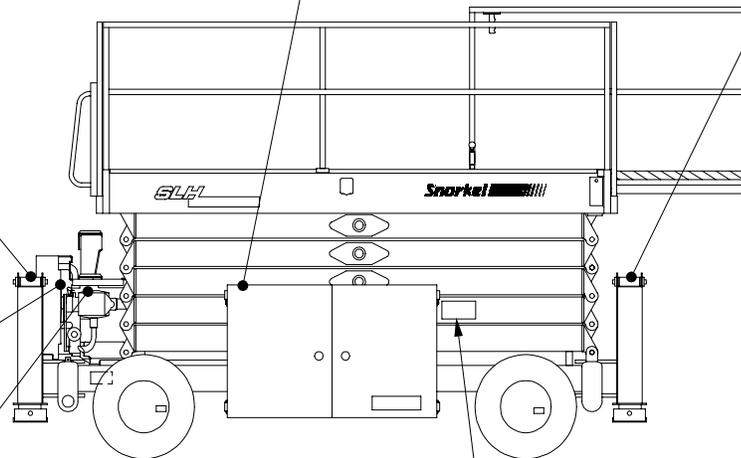
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⚠ CAUTION
PINCH POINT

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⚠ DANGER
ROTATING ENGINE PARTS
KEEP CLEAR
 SERIOUS INJURY CAN RESULT

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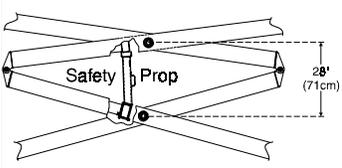
⚠ CAUTION



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⚠ DANGER

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 in scissors is approximately 28 inches (71cm).
3. Swing safety prop up from retaining bracket.
4. Remove hands and arms from scissors area.
5. Lower platform until scissors are supported by safety prop.

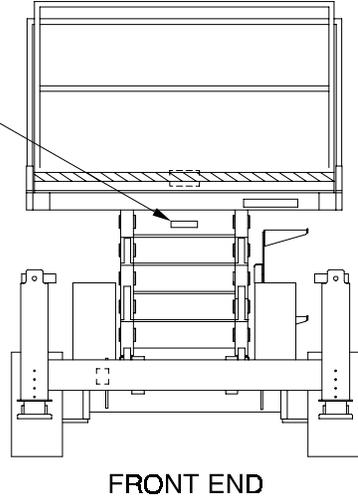
TO STORE SAFETY PROP

1. Raise platform until the open height in scissors area is approximately 28 inches (71cm).
2. Swing safety prop down onto retaining bracket.
3. Lower platform.

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▲ DANGER
SHEARING HAZARD/CRUSHING HAZARD
 Death or serious injury might result from having body parts sheared or crushed as the platform descends. Keep away from closing scissor arms and keep out from under the platform as the platform comes down.



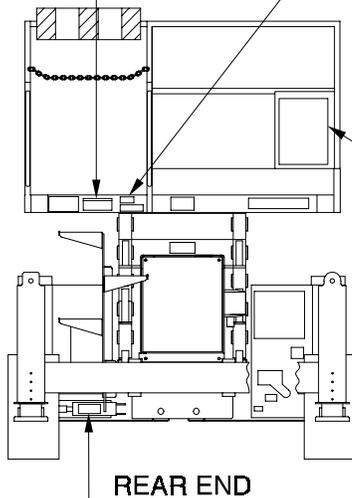
▲ DANGER

- THIS UNIT IS EQUIPPED WITH FOAM FILLED TIRES, WHEEL WEIGHT IS CRITICAL FOR UNIT STABILITY.
- REPLACE WITH FACTORY APPROVED FOAM FILLED TIRES ONLY.
- DO NOT ATTEMPT TO INFLATE.

(Option used on machines that have Big Paw pneumatic tires ONLY.)

▲ DANGER
TIPOVER HAZARD
 This machine is equipped with pneumatic tires. Death or serious injury might result if this machine tips over because of a flat tire or tire blowout. Visually check tire condition and tire inflation several times during each work shift.

▲ DANGER
 DO NOT ALTER OR DISABLE LIMIT SWITCHES, SAFETY SWITCHES, OR INTERLOCKS.



▲ CAUTION

THIS CYLINDER IS SPRING LOADED. INCORRECT ASSEMBLY OR DISASSEMBLY COULD CAUSE PHYSICAL INJURY. BEFORE REMOVING SNAP RING, RETRACT CYLINDER ROD .25 INCH. REMOVE SNAP RING AND SLOWLY EXTEND CYLINDER ROD UNTIL SPRING PRESSURE IS RELEASED. ASSEMBLE IN REVERSE ORDER.

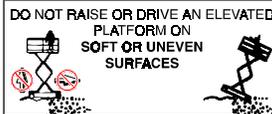
(each brake cylinder)

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

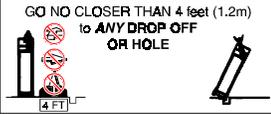
DO NOT RAISE OR DRIVE AN ELEVATED PLATFORM ON A SLOPE



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 A PLATFORM WHEN IT IS WINDY OR GUSTY



OTHER ACTIONS CAN ALSO CAUSE THIS MACHINE TO TIP OVER

- DO NOT override safety devices.
- DO NOT overload the machine.
- DO NOT stand or sit on guardrails.
- DO NOT attach ropes or chains to guardrails.
- DO NOT carry loads outside the railing or use as a crane.

- DO NOT ride platform while machine is on a truck, fork lift or other device.
- DO NOT use ladder, scaffold, or other means to increase size or platform height.
- DO NOT use with improperly inflated or damaged tires or wheels.

TWO-TONE ALARM MEANS TIPOVER DANGER! LOWER PLATFORM IMMEDIATELY

1. 
2. 
3. 

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

ELECTRICAL SHOCK CAN KILL YOU

This machine is not electrically insulated. Keep a safe distance from power lines and electrical equipment. Do not touch any electrical source.

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.

▲ DANGER

- 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 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 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 replace components critical to machine stability, such as batteries and wheel equipment, with lighter weight or non-factory approved substitutes.

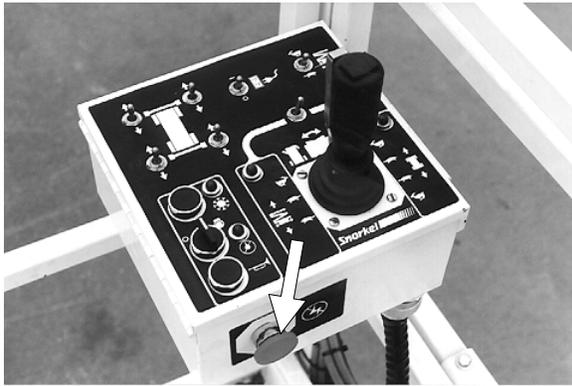
NOTE: STUDY THE OPERATOR'S MANUAL BEFORE OPERATING THIS MACHINE.

(both sides of plate)

2. SAFETY DEVICES

The devices listed in this chapter are safety devices. They are on an SR to increase safety in the work place for both the operator and other people near the machine. Do not by-pass, disable, modify, or ignore any of these devices. Check them carefully at the start of each work shift to see that they are in working order (see “DAILY INSPECTION & MAINTENANCE” chapter). If any is found to be defective, remove the SR from service immediately until a qualified service technician can make repairs.

■ EMERGENCY STOP SWITCHES

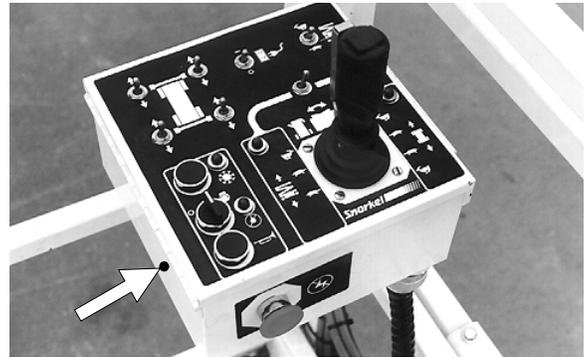


At the platform-control box: Press the large red **EMERGENCY STOP** button in and the entire machine stops, the engine turns off, and nothing moves. This switch must be out (on) to control the SR from the platform (turn the switch clockwise and it will pop out).



At the base-control panel: Press the red **EMERGENCY STOP** switch cover down, at any time, under any conditions, and the entire machine stops, the engine turns off, and nothing moves. The **EMERGENCY STOP** switch must be up for anything on the SR to work.

■ ALARMS



There are two alarms on an SR. One is located in the platform-control box,



the other is located in the base-control box. The alarms are connected in parallel, they both emit the same pattern of sound at the same time. The different alarm sound patterns are shown in the table immediately below and discussed below the table.

Engine shut-off (temp, oil, alt)	off	
DRIVE (forward) & platform lowering	off	
DRIVE (reverse)	off	
Level sensor	off	

The high-temperature, low oil-pressure, and alternator not-charging alarms are each a continuous tone. The **DRIVE** (forward) and the platform-lowering alarms beep at one beep per second. **DRIVE** (reverse) beeps at two beeps per second. The level sensor alarm is a high-low warbling sound.

2. SAFETY DEVICES

❑ Level Sensor

The level sensor alarm warns the SR operator that the SR is not level. If the tilt continues to increase, the SR will eventually tip over. When you hear this alarm, immediately lower the platform completely down. When the platform is completely down, determine and correct the cause of the tilt before raising the platform again.

NOTE: While the alarm is sounding it is not possible to drive the SR nor raise the platform.

❑ Lowering

The lowering alarm warns people near an SR that the platform is coming down and the scissor arm assembly is closing.

❑ High Temperature

The high-temperature alarm warns you that the engine is overheating. When the alarm sounds you should immediately lower the platform completely down then turn the engine off until the condition that caused the overheating has been corrected. (See “AUTOMATIC SHUT-OFFS & CIRCUIT BREAKERS” chapter for more information.)

❑ Low Oil Pressure

The low pressure alarm warns you that the engine oil pressure is near the lower limit for safe operation of the engine. When the alarm sounds you should immediately lower the platform completely down then turn the engine off until the condition that caused the low oil pressure has been corrected. (See “AUTOMATIC SHUT-OFFS & CIRCUIT BREAKERS” chapter for more information.)

❑ DRIVE (reverse)

The **DRIVE** (reverse) alarm alerts people that the SR is traveling backward along the ground. This alarm beeps twice as fast as the **DRIVE** (forward) alarm.

❑ DRIVE (forward)

The **DRIVE** (forward) alarm alerts people that the SR is traveling forward along the ground. This alarm beeps half as fast as the **DRIVE** (reverse) alarm.

■ GUARDRAILS



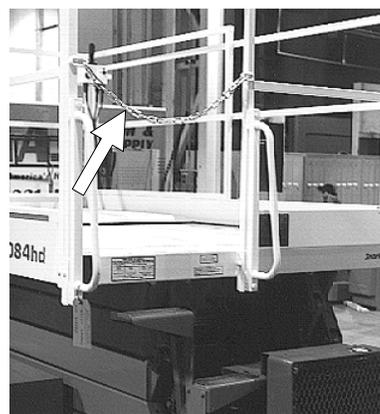
The guardrails help protect you from falling off the platform. Be sure the guardrails are properly installed and that the safety chain (or gate) and fasteners are in place.

■ SAFETY PROP



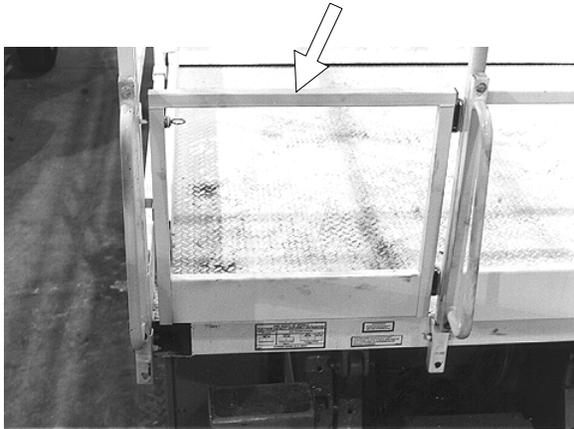
Always raise the safety prop then lower the scissor-arm assembly onto the safety prop before reaching into the scissor-arm assembly for any reason.

■ SAFETY CHAIN



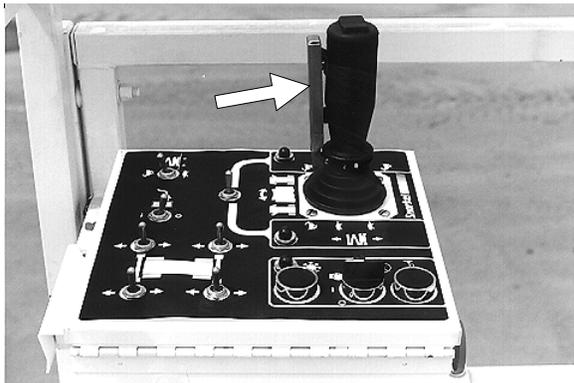
The safety chain should be closed at all times except when someone is entering or leaving the platform.

■ **SWINGING GATE** (option)



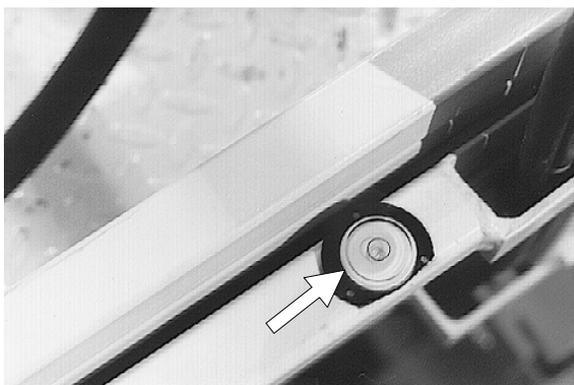
The swinging gate should be closed at all times except when someone is entering or leaving the platform.

■ **SAFETY CONTROL**



The safety control must be squeezed and held to activate the joystick. The safety control prevents the joystick from moving the platform if something accidentally pushes the joystick. Do not disable the safety control in any way.

■ **BUBBLE LEVEL** (outrigger machines only)



See the "GAUGES" chapter for a discussion of the bubble level.

■ **OPERATOR HORN** (option)



The operator horn is used primarily to get the attention of people on the ground when you are working aloft. For the horn to work the following switches, on the base-control panel, must be set as indicated:

- MAIN POWER**ON
- EMERGENCY STOP**on (up)
- SELECTOR**.....PLATFORM

■ **OUTRIGGERS** (option)



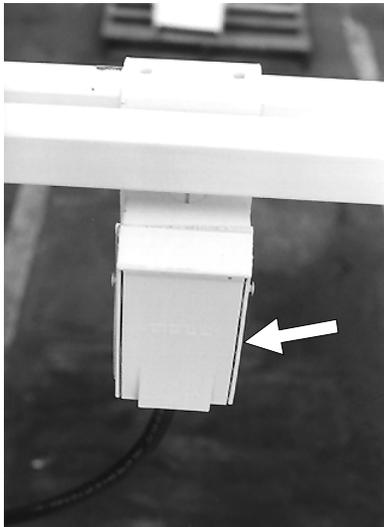
The outrigger controls are on the upper left side of the platform-control box.

The outriggers are used to level the SR (for complete outrigger operating procedures see the "OPERATION" chapter).

NOTE: The SR must be on a firm surface capable of withstanding all load forces imposed by the aerial platform in all operation conditions before the outriggers are used.

2. SAFETY DEVICES

■ GFCI AC OUTLET (option)



The GFCI (ground fault circuit interrupt) is located under the platform-control box. To use the outlet set the **AC OUTLET SWITCH** to on (-).

NOTE: If the SR does not have the ac generator option, connect a source of power to the GFCI plug at the base-control panel.

The GFCI will protect against short circuits to ground. When there is a short to ground the GFCI will shut off power to the outlet.

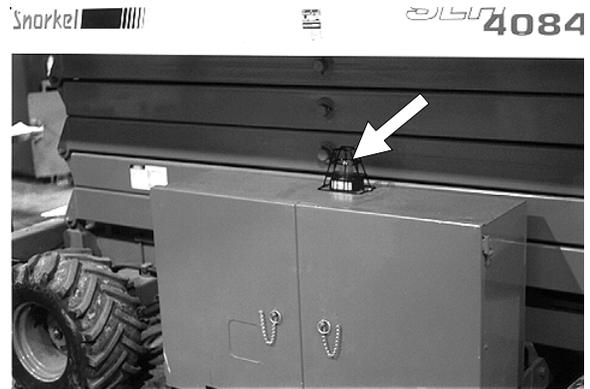
To reset the outlet:

Unplug the equipment being used.

Press the **RESET** button on the GFCI outlet.

This should restore power to the outlet. If it does not, set the **AC OUTLET SWITCH** to off (O) and refer the problem to a trained service technician.

■ FLASHING LIGHT (option)



The flashing light alerts people that the SR is present and that the SR is moving. The light flashes at about one flash per second any time the SR engine is running. There is no ON/OFF switch for the flashing light, it cannot be turned off while the SR is running.

■ LANYARD ANCHOR POINTS (option)

There are four anchors on the floor of the platform, one at the front of the roll-out deck, one at the back of the platform, and one on each side of the platform.

NOTE: These anchors are not for lifting or tying down the machine.

You should attach your fall protection to the anchors if work rules require it.

3. SPECIFICATIONS

Snorkelift SR series machines are scissor-supported elevating work-platforms built to conform to the following standards:

OSHA Paragraph 1910.67 Title 29, C.F.R. Vehicle-Mounted Elevating and Rotating Work Platforms - Labor.

OSHA Paragraph 1926.556 Title 29, C.F.R., Aerial Lifts - Construction. ANSI Standard A92.6, Self-Propelled Elevating Work Platforms.

CSA Standard CAN 3-B354.3-M82, Self Propelled Elevating Work Platforms for use as "Off Slab" Units.

■ GENERAL SPECIFICATIONS FOR STANDARD MACHINES

SR:	SR2584	SR3284	SR4084
Weight	6280 lbs. (2855 kg)	7650 lbs. (3477 kg)	8720 lbs. (3964 kg)
Max. single wheel load	3332 lbs. 1511 kg	3560 lbs. 1615 kg	3788 lbs. 1718 kg
Ground pressure (max)	34 psi 2.4 kg/cm ²	39 psi 2.7 kg/cm ²	45 psi 3.2 kg/cm ²
Width	84 in. (213 cm)	84 in. (213 cm)	84 in. (213 cm)
Length	137 in. (348 cm)	137 in. (348 cm)	149 in. (378 cm)
Height: working	31 ft. (9.4 m)	38 ft. (11.6 m)	46 ft. (14 m)
raised	25 ft. (7.6 m)	32 ft. (9.8 m)	40 ft. (12.2 m)
lowered	47 in. (119 cm)	53.5 in. (136 cm)	60 in. (152 cm)
Platform: driveable ht.	FULL	FULL	32 ft. (9.8 m)
size* in. (cm)	72x120 (183x305)	72x120 (183x305)	72x120 (183x305)
capacity	1750 lbs. 795 kg)	1250 lbs. (568 kg)	750 lbs. (341 kg)
Drive wheels	4	4	4
Rear axle	Driven Articulated	Driven Articulated	Driven Articulated
Tires in. (cm)	26x12 66x30.5	26x12 66x30.5	26x12 66x30.5
Speed: Max. drive	2.2 mph (1 km/h)	2.2 mph (1 km/h)	2.2 mph (1 km/h)
Max. raise	22 sec	30 sec	45 sec
Lower	25 sec	40 sec	40 sec
Gradeability	32%	32%	30%

* Four foot (1.8 m) platform-extension retracted.

3. SPECIFICATIONS

■ ENGINE DATA

ENGINE MAKE	KUBOTA		
MODEL	WG750-G	D905-B	V800-B
FUEL	gasoline	LPG	diesel no. 2-D
FUEL GRADE	unleaded 85 octane (motor method) Do not use gasoline blended with methyl alcohol.	HD5 Gas Processors Association Standard 2140 Category: special duty propane	ASTM no. 2-D ASTM D975 cetane no. > 44 (For operating temp. below 32°F (0°C) use "winterized" no. 2-D.)
COOLANT	50% water + 50% ethylene glycol		
OPERATING TEMPERATURE	180°F - 205°F (82°C - 96°C)		
OIL CAPACITY	3.5 qt USA (3.25 liters)	5.2 qt USA (5.1 liters)	4.2 qt USA (4.0 liters)
OIL GRADE	API: SF, SF/CD		API:CC/CD/CE
OIL WEIGHT	see chart below		
RUNNING TIME (one tank of fuel)	A full tank of gasoline, or diesel, will last an entire eight hour shift, under normal working conditions. It normally takes two tanks of LPG per eight hour shift.		

■ ENGINE OIL CHARTS

WG750-G

Ambient temperature	Engine oil weight
above 77°F (25°C)	SAE30 or 10W30
32°F to 77°F (0°C) to (25°C)	SAE20 or 10W30
0°F to 32°F (-17°C) to (0°C)	SAE10W or 10W30

D905-B and V800-B

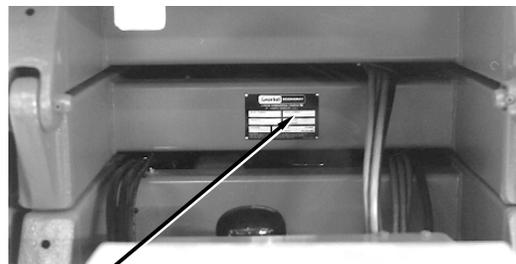
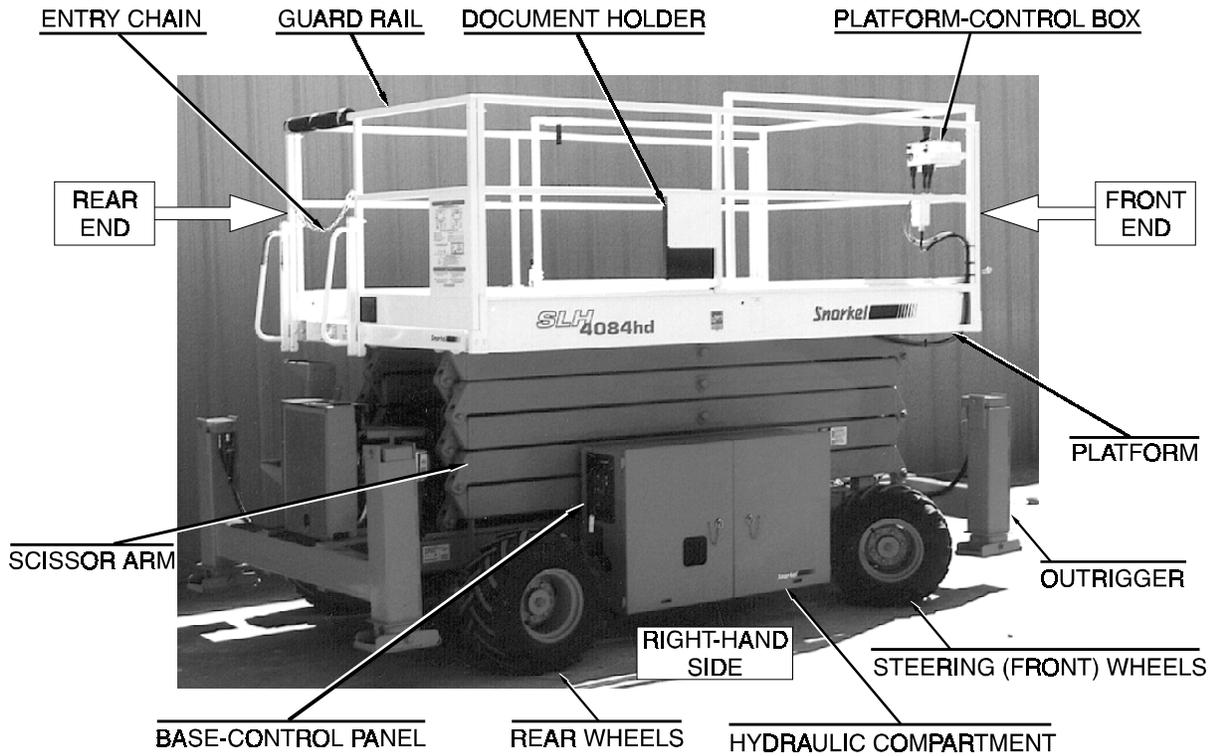
Ambient temperature	Engine oil weight
above 77°F (25°C)	SAE30 or 10W30 10W40
32°F to 77°F (0°C) to (25°C)	SAE20 or 10W30 10W40
below 32°F (0°C)	SAE10W or 10W30 10W40

■ HYDRAULIC FLUID RECOMMENDED

Above 10°F (13°C) use Mobil DTE-13M (ISO VG32)

Below 10°F (13°C) use Mobil DTE-11 (ISO VG15)

■ NOMENCLATURE & SERIAL-NUMBERS



SERIAL NUMBER
(behind motor, on scissor brace at rear of machine)



SERIAL NUMBER
(stamped on frame)



EXTENDIBLE
PLATFORM

SERIAL NUMBER
(stamped on frame)

FUEL COMPARTMENT

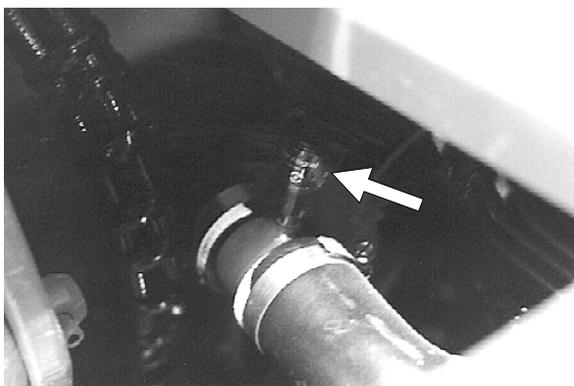
LEFT-HAND
SIDE

■ WATER



The **WATER** gauge is located on the base-control panel. It shows the temperature of the water-antifreeze mixture in the engine block. The typical operating-temperature range for Kubota engines is 180°F to 205°F (82°C to 96°C), both diesel and gasoline. (See the “AUTOMATIC SHUT-OFFS & CIRCUIT BREAKERS “ chapter for more information.)

■ AIR FILTER



The air filter gauge is located between the air filter and the intake manifold. The gauge measures the vacuum (air pressure) between the intake manifold and the air filter. As the filter clogs, the vacuum increases (pressure drops). As the vacuum increases, a red indicator raises toward the clear area of the gauge. When you can see the indicator in the clear area of the gauge, it's time to change the air filter.

The indicator stays at its highest setting, it does not go to the bottom of the gauge when the engine is turned off or the filter changed. After the filter is changed, press the small reset button to reset the indicator to the bottom of the gauge.

■ AMPS



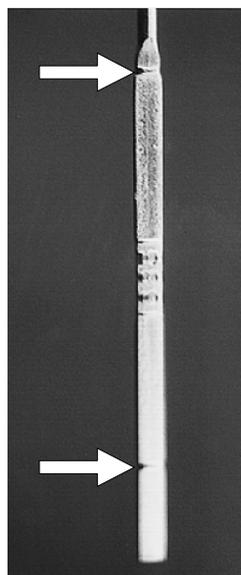
The **AMPS** gauge shows the electric current from the alternator to the battery. When the engine is running, the needle in the **AMPS** gauge should not be to the left of “0.” Under normal operating conditions, after the engine has been running for a few minutes, the **AMPS** gauge should read “0.”

■ ENGINE OIL

GASOLINE

DIESEL

Engine oil level is measured with a dipstick. Oil capacities given in the “SPECIFICATIONS”



chapter are approximate. True values will vary from machine to machine due to slight variations or modifications during production. The oil dipstick is the only way to accurately gauge if the engine oil level is correct. Engine oil level should

4. GAUGES

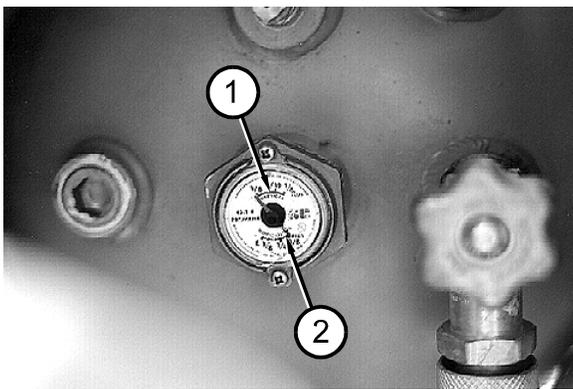
always be between the lines on the dipstick — never above the top line or below the bottom line.

■ HOURS



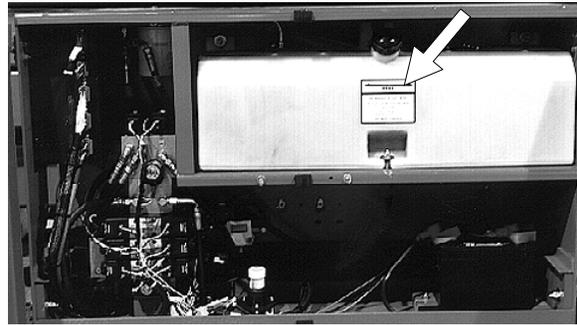
The **HOURS** gauge is basically an electric clock. It accumulates time only when the engine is running. The **HOURS** gauge cannot be reset. An SR-qualified service technician uses it to tell when it is time for the periodic maintenance listed in the Maintenance Manual.

■ FUEL LEVEL (option)



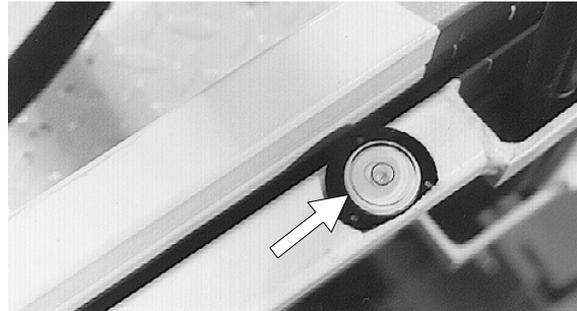
LPG tanks have two fuel gauges (1) (2) on top. One measures correctly when the tank is standing on end (**VERTICAL**) the other measures correctly when the tank is laying down (**HORIZONTAL**). Both read in fractions-of-a-full-tank. SR tanks are mounted horizontally. Therefore, you should read the **HORIZONTAL** scale (2).

■ HYDRAULIC OIL LEVEL



The hydraulic-oil level gauge is on the side of the hydraulic oil tank. It shows the actual level of oil inside the tank. Read it only when the platform is completely down. Otherwise, the lift cylinders become large reservoirs for hydraulic oil and the oil level in the tank will be low. The oil level should be within ± 0.25 inches (± 6.4 mm) of the line.

■ BUBBLE LEVEL (outrigger machines only)



A bubble level is located on the platform side rail, below the platform-control box. Watch the bubble level while you set the outriggers. Lower the outriggers, one at a time, just enough to center the bubble in the circle on top of the gauge. When the bubble is centered the platform is level and can safely be raised.

■ COOLANT



The engine coolant reservoir is on the front of the step weldment. When the engine is at operating temperature the coolant should be at the **HOT** line. When the engine is cold there should be about one inch (2.54 cm) of coolant in the bottom of the reservoir.

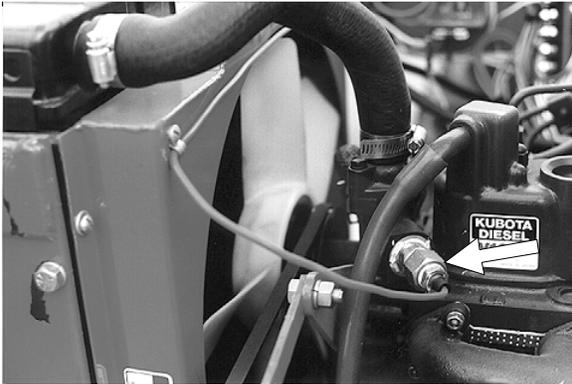
5. AUTOMATIC SHUT-OFFS & CIRCUIT BREAKERS

■ AUTOMATIC SHUT-OFFS

□ Level Sensor

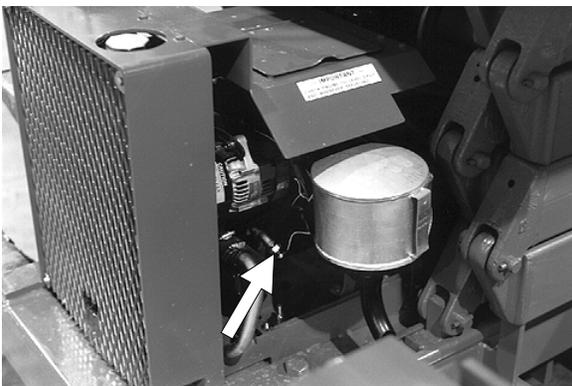
When the level sensor alarm sounds, automatic interlocks make it impossible to drive the SR or raise the platform. For more complete information see the “Level Sensor” subsection of the “SAFETY DEVICES “ chapter.

□ Engine Temperature



There is a temperature sensor in the engine. It measures the temperature of the antifreeze-water mixture as the mixture leaves the top of the radiator and enters the top of the engine. If the temperature reaches 210°F (99°C) an alarm sounds. If the temperature continues to rise, the engine shuts off when the temperature reaches 230°F (110°C). The engine will not restart until the temperature drops below 210°F (99°C).

□ Engine Oil Pressure



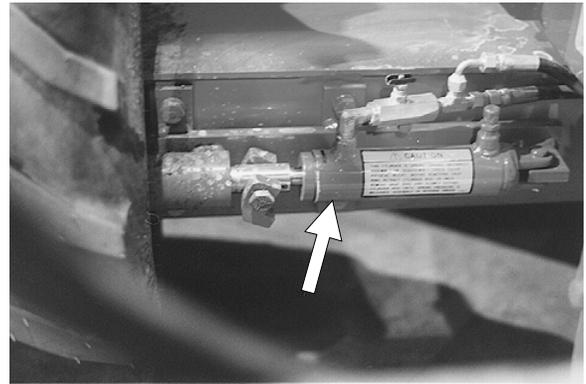
There is an oil pressure sensor in the engine. It measures the engine oil pressure at the oil filter. If the pressure falls below a safe operating value

the engine shuts off. The engine will restart with low pressure but it will only run a few seconds before it automatically shuts off again.

□ Platform Height vs. Drive Speed

When the platform is over seven feet (2.1 m) above the ground the drive speed is limited to the slowest speed and the lift speed is also limited to the slowest speed.

□ Parking Brakes



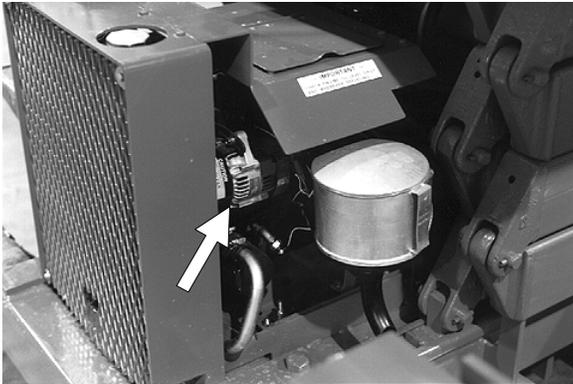
When the **JOYSTICK CONTROLLER** is in the neutral position the SR parking brakes are automatically set. The brakes automatically release when you move the **JOYSTICK CONTROLLER** to drive.

□ Dynamic Brakes

When you drive an SR down a slope, if the SR begins to coast (outrun the drive motors) the hydraulic system “senses” the coasting condition. The hydraulic drive motors then become hydraulic brakes and the SR is slowed. This action prevents SRs from speeding down grades.

5. AUTOMATIC SHUT-OFFS

❑ Alternator Not Charging



When the fan belt breaks, or the alternator output falls below a safe level for other reasons, the engine automatically shuts off and an alarm sounds. As long as the SR battery is charged you can lower the platform, in the usual way, from the platform-control box or the base-control panel without the engine running.

❑ Outriggers (option)

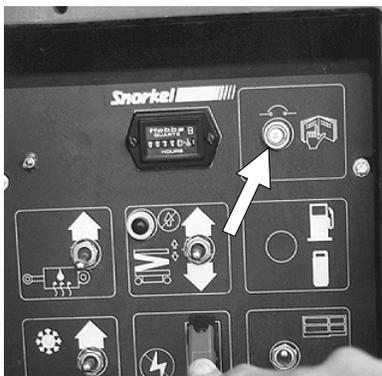
The SR cannot be driven unless the outriggers are completely up. If you have just raised the outriggers but the SR will not drive, double check to be sure all four outriggers are completely up.

❑ Hydraulic Generator (option)

The SR cannot be driven nor can the platform be raised while the 120 V ac, hydraulically powered, generator is running (the **GENERATOR/MACHINE** switch is set to **GENERATOR**).

■ CIRCUIT BREAKERS

❑ Main Breaker



There is only one circuit breaker, on a standard SR, that is accessible to the operator. Its purpose is to protect the electrical circuits from electrical overloads. When the circuit breaker trips (pops out) push it back in then attempt to use the SR. If the circuit breaker trips a second time, take the SR out of service and refer the

problem to a qualified trained service technician for repair.

❑ Hydraulic Generator Circuit Breaker (option)

SRs that have hydraulically powered ac generators have a circuit breaker at the generator to protect the generator from overloads. If the breaker trips (pops out) do the following:

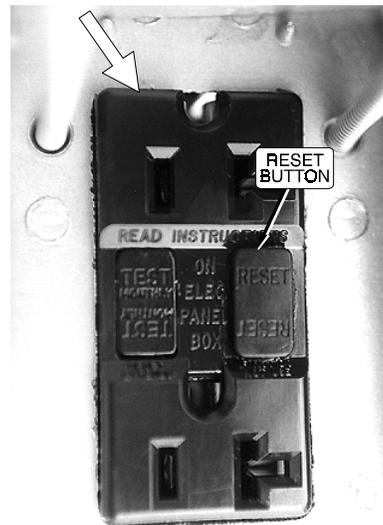
Turn the **MACHINE/GENERATOR** switch to **MACHINE**.

Disconnect whatever is plugged into the ac outlet on the platform.

After the breaker has had time to cool off, push it back in then attempt to reuse the generator in the normal way.

If the breaker trips a second time, refer the problem to a qualified trained service technician.

❑ GFCI Outlet (option)



The GFCI (ground fault circuit interrupt) will protect against short circuits to ground. When there is a short to ground the GFCI will shut off power to the outlet.

To reset the outlet:

Unplug the equipment being used.

Press the **RESET** button on the GFCI outlet.

This should restore power to the outlet. If it does not, set the **AC OUTLET SWITCH** to off (O) and refer the problem to a trained service technician.

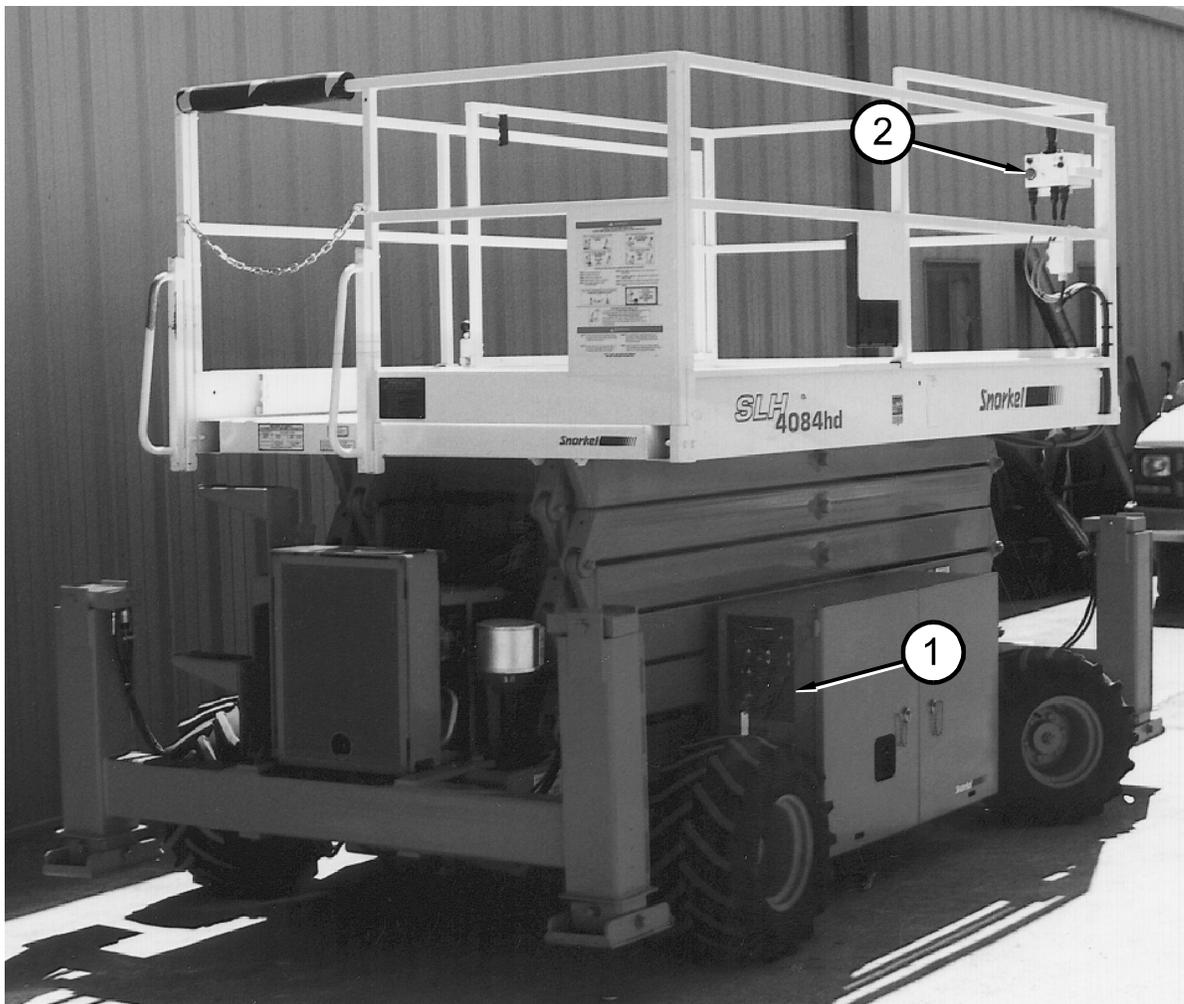
NOTE: The GFCI does not protect against electrical overloads.

This chapter explains what each control does. This chapter does not explain how to use the controls to produce useful work, refer to the “OPERATION” chapter for that, after you have read this chapter.

For optional-equipment controls, see the “OPTIONS” chapter. The only optional-equipment controls discussed in this chapter are the controls for: diesel engines, dual-fuel engines, LP-only engines, and outriggers.

See the “EMERGENCY OPERATION” chapter for the location of the emergency bleed down control and for correct emergency bleed down procedures.

The main operating functions of an SR can be controlled from the base-control panel (1) or the platform-control box (2).



■ HYDRAULIC COMPARTMENT

BATTERY: The BATTERY switch must be ON for the engine to start. When the BATTERY switch is OFF the positive side of the SR battery is disconnected from the electrical system. Lock this switch OFF when the SR is left unattended.



■ BASE-CONTROL PANEL

Controls for operating an SR from the ground are located on the right side of the machine on the rear of the hydraulic compartment.

NOTE: The number of each control below corresponds to the control's call-out on the next page.

1. **EMERGENCY STOP:** Press the red switch-cover down, at any time, under any conditions, and the entire machine stops — the engine turns off and nothing moves. This switch must be up for anything on the machine to work.

2. **KEY SWITCH:** This switch works like an automobile ignition switch. Hold the key at the start symbol (extreme clockwise position) until the engine starts then release it to the on position (bar symbol).

Turn the key to off (O) if the platform is to stay in one position for a long time. That will turn the engine off and save fuel.

3. **CHOKE INDICATOR LIGHT** (gasoline engines only): This light will be lit while you choke the engine (see **CHOKE** below).

3. **GLOW-PLUG INDICATOR LIGHT** (diesel engines only): This light will be on while the glow plugs are on. Wait, about 10 seconds for the light to go out before you try to start a diesel.

4. **CHOKE** (gasoline engines only): Hold the choke switch up anytime you start a gasoline engine that is at ambient air temperature (a "cold" engine).

4. **GLOW PLUG** (diesel engines only): This is a momentary contact switch. Press it up then release it just before you start a diesel engine that is at ambient air temperature (a "cold" engine). This action automatically causes glow plugs to come on for 10 seconds to warm the inside top of each cylinder, thus aiding combustion.

5. **HYDRAULIC OIL WARM-UP:** When the ambient air temperature is below 50°F (10°C) and SR movement is sluggish because of cold hydraulic oil, turn the warm-up switch on (up) for 5 to 10 minutes or until the hydraulic oil tank is warm to the touch then turn the switch off (down).

For the warm-up system to work, the engine must be running.

While the warm-up system is on, do not attempt to move the SR in any way.

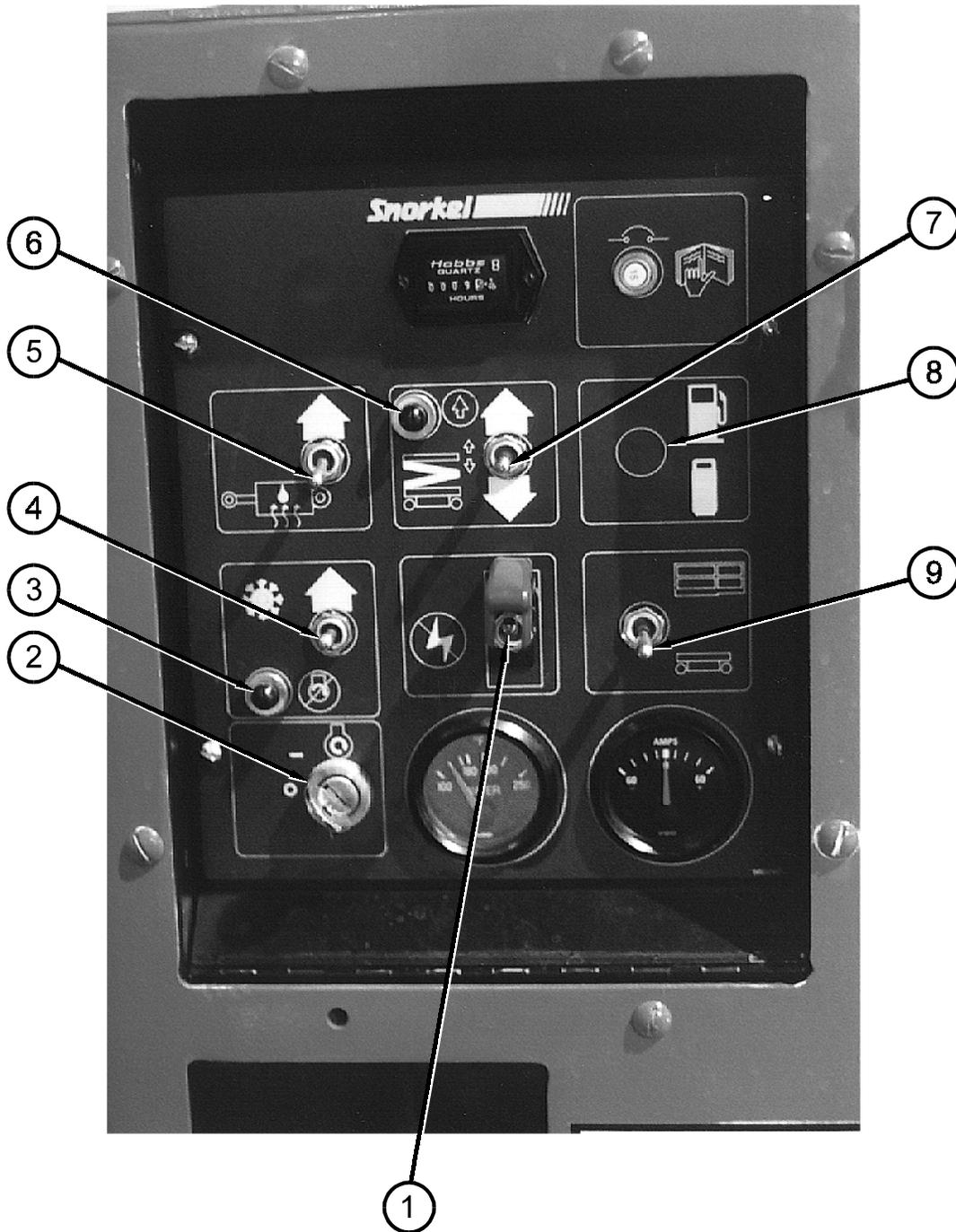
6. **LIFT INDICATOR LIGHT:** The platform can be raised only when this light is lit. When this light is not lit the platform will not rise because: the platform is not level, the outriggers are not properly set, or the articulating axles are not all set.

7. **PLATFORM LIFT/LOWER:** Holding this switch up causes the platform to rise. Pushing this switch down causes the platform to lower.

8. **FUEL** (option): Before starting a dual-fuel engine set the FUEL switch to gasoline (up) or LP gas (down) depending on which you want to use. If you select LP gas, be sure to open the valve on top the LP gas tank.

9. **BASE/PLATFORM SELECTOR:** Must be down for the base-control panel to work. Must be up for the platform-control box to work.

BASE-CONTROL PANEL



■ PLATFORM-CONTROL BOX

Controls for operating an SR from the platform are located on the platform-control box.

NOTE: The number of each control below corresponds to the control's call-out on the next page.

1. **EMERGENCY STOP:** Press the red button in at any time, under any conditions, and the entire machine stops — the engine turns off and nothing moves. This switch must be out (on) to start and run the SR from the platform-control box, turn the switch clockwise and it will pop out (on). Press the switch in (off) if the platform is to stay in one position for a long time. That will turn the engine off and save fuel.

NOTE: The EMERGENCY STOP switch on the base-control panel overrides the one on the platform-control box. If the one on the base-control panel is off the SR will not start or run, it does not make any difference whether the one on the platform-control box is on or off.

2. **START:** Press and hold the switch in to start the engine. As soon as the engine starts, release the switch.

3. **CHOKE** (gasoline engines only): Press and hold the switch in anytime you start a gasoline engine that is at ambient air temperature (a "cold" engine).

3. **GLOW PLUG** (diesel engines only): This is a momentary contact switch. Press it up then release it just before you start a diesel engine that is at ambient air temperature (a "cold" engine). This action automatically causes glow plugs to come on for 10 seconds to warm the inside top of each cylinder, thus aiding combustion.

4. **CHOKE INDICATOR LIGHT** (gasoline engines only): This light will be lit while you choke the engine.

4. **GLOW PLUG INDICATOR LIGHT** (diesel engines only): This light will be on while the glow plugs are on. Wait for the light to go out before you try to start a diesel.

5. **SAFETY CONTROL** The SAFETY CONTROL must be squeezed against the JOYSTICK CONTROLLER to activate the JOYSTICK

CONTROLLER. If the SAFETY CONTROL is not squeezed the JOYSTICK CONTROLLER is inoperative.

6. **JOYSTICK CONTROLLER:** If the LIFT/DRIVE SELECTOR is set to the left (lift function), pushing the JOYSTICK CONTROLLER forward causes the platform to rise, pulling the JOYSTICK CONTROLLER backward causes the platform to lower. If the LIFT/DRIVE SELECTOR is set to the right (drive function), pushing the JOYSTICK CONTROLLER forward causes the SR to move forward, pulling the JOYSTICK CONTROLLER backward causes the SR to move backward. The further you push or pull the controller the faster the motion (except lowering—it occurs at one speed only).

NOTE: Squeeze the SAFETY CONTROL anytime you use the JOYSTICK CONTROLLER.

7. **STEERING:** The rocker switch on top of the JOYSTICK CONTROLLER turns the front wheels left or right depending upon which side of the switch you press.

NOTE: The wheels do not return to straight ahead, after a turn, the way automobile wheels do. You must use the STEERING switch to straighten the wheels after a turn.

8. **LIFT/DRIVE SELECTOR:** When this switch is set to the left the JOYSTICK CONTROLLER becomes a lift/lower controller to raise or lower the platform. When this switch is set to the right the JOYSTICK CONTROLLER becomes a drive controller to drive the SR forward or backward. The SR will not drive and lift at the same time.

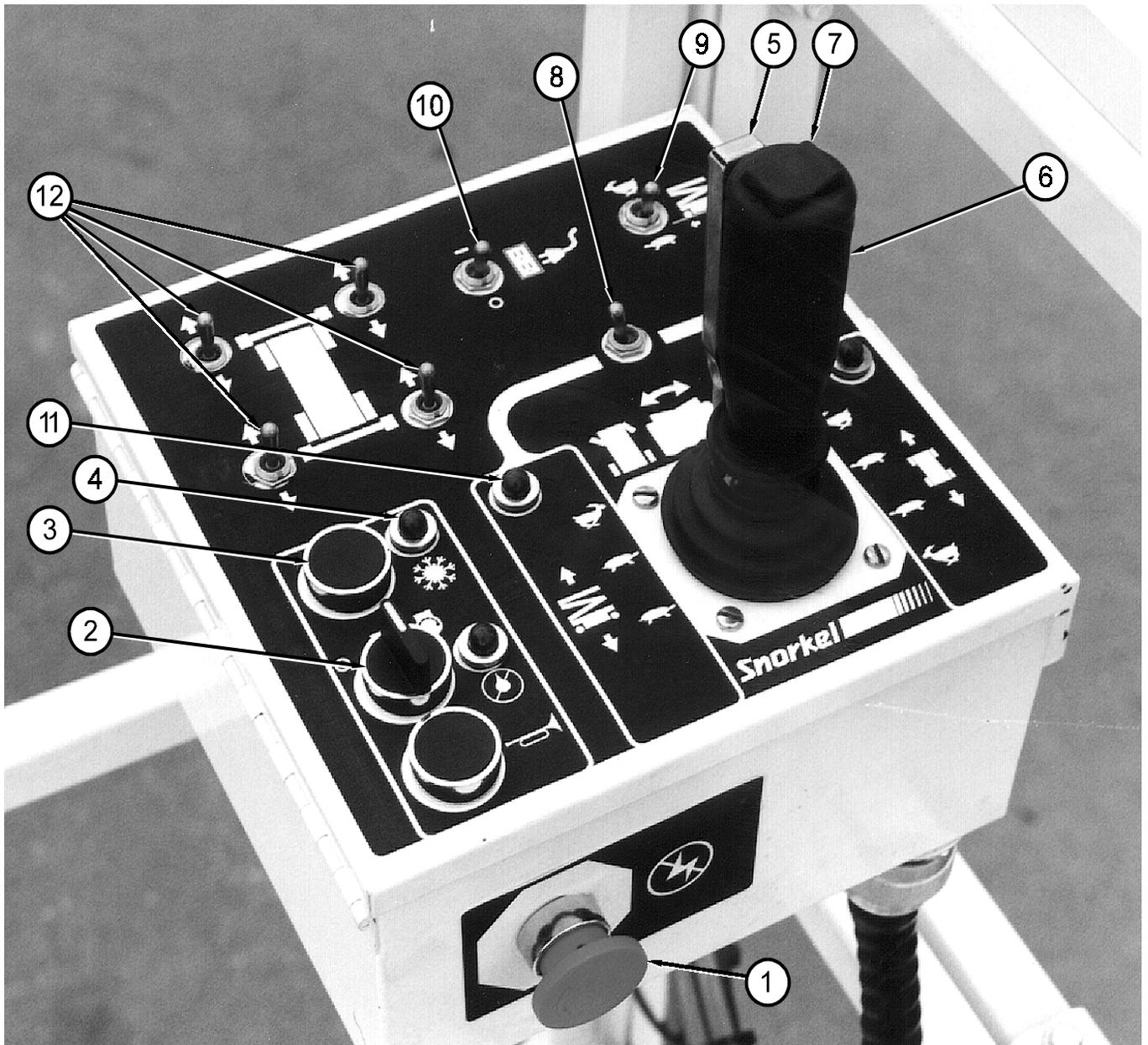
9. **SPEED:** Set the switch to turtle (slow) when you are working in close quarters or if you are new to the machine. Setting the switch to rabbit (fast) doubles the top speed of the SR.

10. **AC OUTLET SWITCH** (option): This is an on/off switch for the 120 V ac hydraulically powered generator. When the switch is on, the outlet box at the platform is energized.

11. **LIFT INDICATOR LIGHT:** The platform can be raised only when this light is lit. When this light is not lit the platform will not rise because: the platform is not level, the outriggers are not properly set, or the articulating axles are not all set.

12. **OUTRIGGERS:** Each switch corresponds to one of the outriggers. Pull a switch backward to lower an outrigger, push it forward to raise the outrigger.

PLATFORM-CONTROL BOX



This chapter explains how to start and run an SR that has either a gasoline or diesel engine. Starting a gasoline engine that is set up to burn LP-only or dual-fuel is also discussed in this chapter.

To use this chapter, first decide whether you will be starting and operating the SR from the base-control panel or the platform-control box. Go to the section entitled “OPERATING FROM THE BASE-CONTROL BOX” if you intend to start and run the SR from the base-control panel. Go to “OPERATING FROM THE PLATFORM-CONTROL BOX” if you intend to start and run the SR from the platform.

After you have made the “base-control / platform-control” decision you need to know whether the SR has a gasoline or diesel engine. If it has a “gasoline” engine you further need to know whether it is set up to burn LP-only, or dual-fuel (LP or gasoline). If it is set up to burn dual-fuel you have to decide whether to burn gasoline or LP. The simplest way to tell what kind of engine set up you have is to look in the fuel compartment on the left side of the SR -- open both fuel compartment doors.

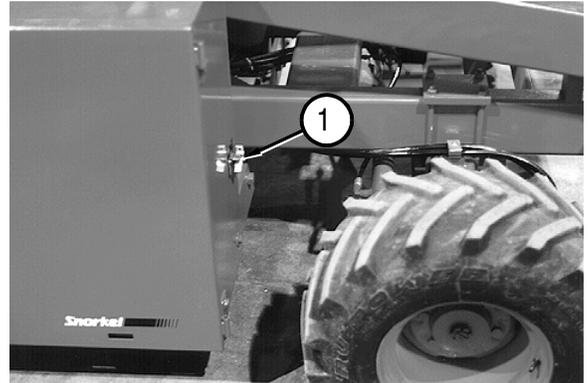
1. If the only fuel source you see there is a tank labeled GASOLINE FUEL, the SR has a gasoline engine set up to burn gasoline.
2. If the only fuel source you see is a tank labeled DIESEL FUEL, the SR has a diesel engine.
3. If the only fuel source you see is one or more LP tanks, the SR has a special gasoline engine set up to burn LP-only.
4. If you see a GASOLINE FUEL tank and one or more LP tanks, the SR has a special gasoline engine set up to burn either gasoline or LP.

Once you have determined the type of engine installed and the type of fuel you will burn you should go to the corresponding subsection that explains how to start that type engine. Read the “TABLE OF CONTENTS” at the front of this manual to see how the different sections and subsections of this chapter are arranged.

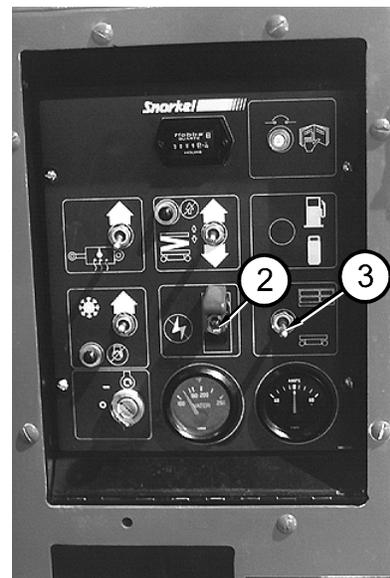
■ OPERATING FROM THE BASE-CONTROL PANEL

□ Starting a Gasoline, LP-only, or Dual-fuel Engine

To start a gasoline, LP-only, or dual-fuel (LP & gasoline) engine from the base-control panel do the following:

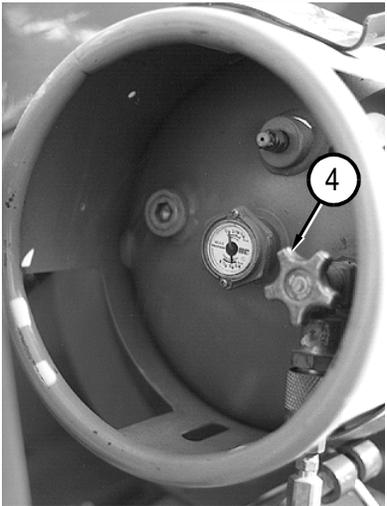


1. Set the **BATTERY** switch (1) to ON.

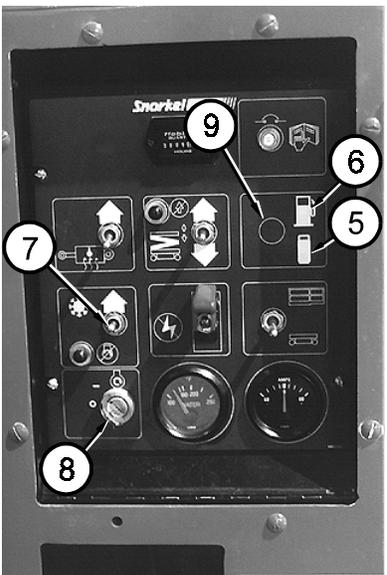


2. Set the **EMERGENCY STOP** switch (2) to on (up).
3. Set the **BASE/PLATFORM SELECTOR** switch (3) to base (down).

7. OPERATION



4. For LP operation: Completely open the valve (4) on top of the LP tank (unscrew counterclockwise until it stops).



5. For a dual-fuel engine: Set the **FUEL** switch (9) to LP fuel (5) or gasoline fuel (6), depending on which you want to use.

6. If the engine is cold, press and hold the **CHOKE** switch (7) during the next step.

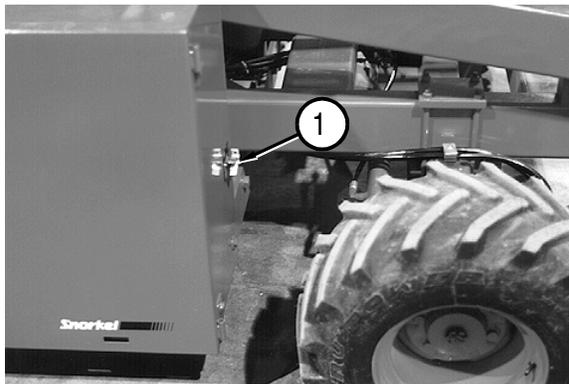
7. Turn the key (8) to start and hold it there until the engine starts or for 20 seconds, whichever comes first. When the engine starts, release both the key (8) and the **CHOKE** switch (7).

CAUTION

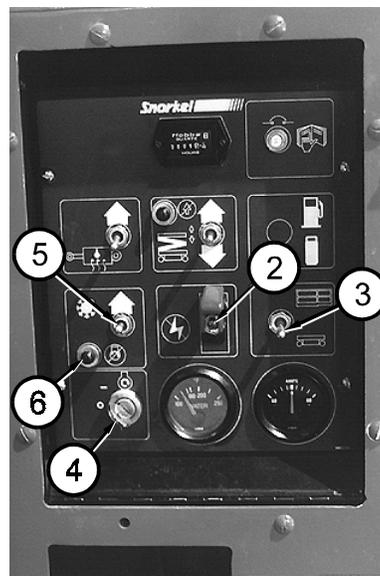
If the engine does not start in 20 seconds, turn the key (8) to off and release the **CHOKE** switch (7) then wait 60 seconds before trying to start the engine again.

□ Starting a Diesel Engine

To start a diesel engine from the base-control panel do the following:



1. Set the **BATTERY** switch (1) to ON.



2. Set the **EMERGENCY STOP** switch (2) to on (up).

3. Set the **BASE/PLATFORM SELECTOR** switch (3) to base.

4. Turn the key (4) to on -- do not turn the key (4) to start.

5. If the engine is at ambient temperature, momentarily press the **GLOW-PLUG** switch (5). This action will automatically turn the glow-plugs, in the engine, on for 10 seconds. A light (6) will automatically come on to indicate that the glow-plugs are on.

CAUTION

If the engine does not start in 20 seconds, turn the key (4) to off then wait 60 seconds before trying to start the engine again with the **GLOW-PLUG** switch (5) and key (6).

6. When the light (6) goes out, turn the key (4) to start and hold it there until the engine starts or for 20 seconds, whichever comes first. When the engine starts, release the key (4).

❑ Raising the Platform

The platform, on models with outriggers, cannot be raised above 32 feet (9.8 m) if the outriggers are not set. (See "SETTING THE OUTRIGGERS" below in this chapter.

To raise the platform from the base-control panel, do the following:

1. The engine must be running. If not, start it from the base-control panel as described above.



2. To raise the platform, press and hold the **PLATFORM LIFT/LOWER** switch (1) up.

NOTE: If the indicator light (2) is not lit, the platform will not rise because: the chassis is not level, the outriggers (if present) are not properly set, or the articulating axles are not locked. Correct the problem then continue.

3. To lower the platform, press and hold the **PLATFORM LIFT/LOWER** switch (3) down.

❑ Warming the Hydraulic Oil

When SR movement is sluggish due to low ambient temperature -- below about 50°F (10°C) -- do the following:



1. Start the motor from the base-control panel.

2. Set the **HYDRAULIC OIL WARM-UP** switch (1) to on (up).

3. Leave the **HYDRAULIC OIL WARM-UP** switch (1) on for 5 to 10 minutes, or until the hydraulic oil tank feels warm to the touch, then turn the switch off (down) and use the SR in the normal way.

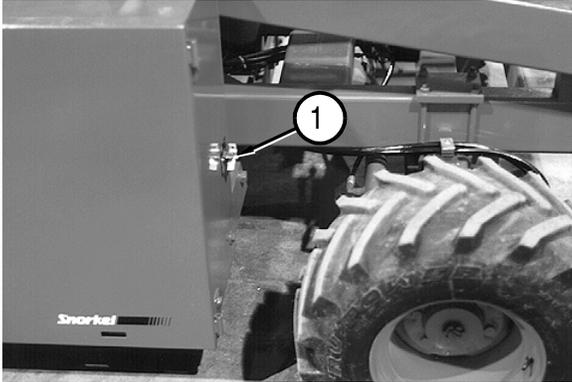
NOTE: The SR should respond more quickly than when it was cold.

7. OPERATION

■ OPERATING FROM THE PLATFORM-CONTROL BOX

□ Starting a Gasoline, LP-only, or Dual-fuel Engine

To start a gasoline, LP-only, or dual-fuel (LP & gasoline) engine from the platform-control box do the following:

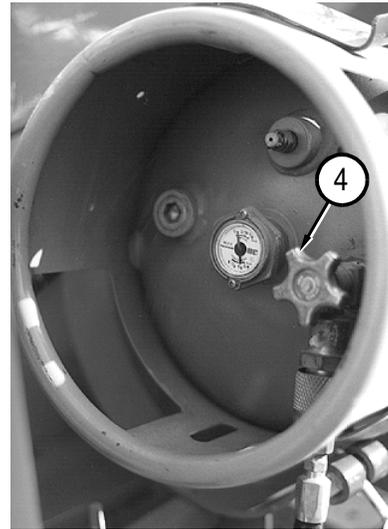


1. Set the **BATTERY** switch (1) to ON.

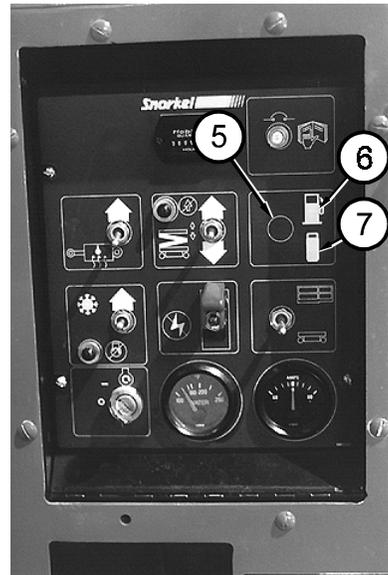


2. Set the **EMERGENCY STOP** switch (2) to on (up).

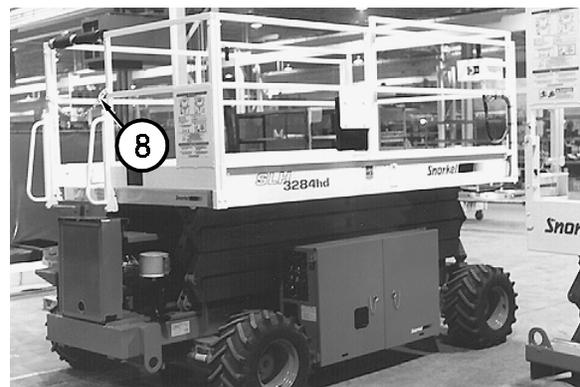
3. Set the **BASE/PLATFORM SELECTOR** switch (3) to platform (up).



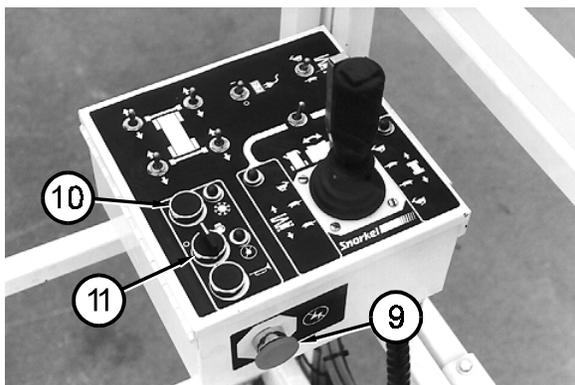
4. For LP operation: Completely open the valve (4) on top of the LP tank (unscrew counterclockwise until it stops).



5. For a dual-fuel engine: Set the **FUEL** switch (5) to gasoline (6) or LP gas (7), depending on which you want to use.



6. Enter the platform and latch the safety chain (8) closed.



7. Turn the **EMERGENCY STOP** switch (9) clockwise and it will pop out (on).

8. If the engine is cold, press and hold the **CHOKE** switch (10) during the next step.

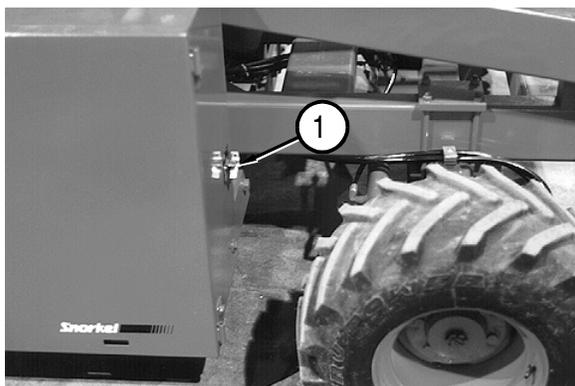
9. Turn and hold the **START** switch (11) clockwise (to the start position) until the engine starts or for 20 seconds, whichever comes first. When the engine starts, release both the **START** switch (11) and the **CHOKE** switch (10).

CAUTION

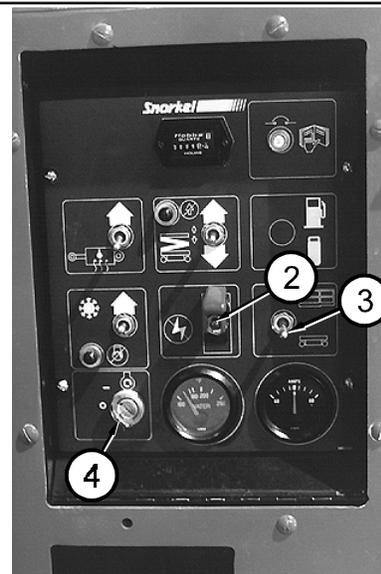
If the engine does not start in 20 seconds, release the **START** switch (11) and release the **CHOKE** switch (10) then wait 60 seconds before trying to start the engine again.

❑ Starting a Diesel Engine

To start a diesel engine from the platform-control box do the following:



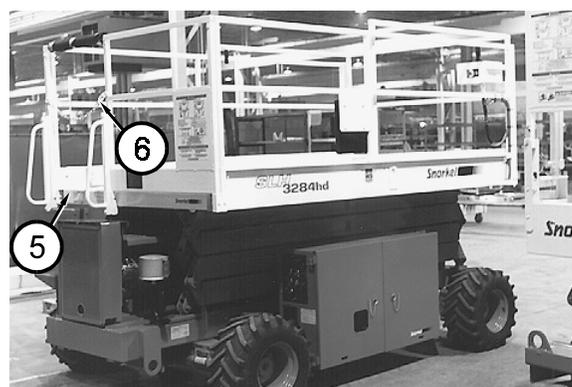
1. Set the **BATTERY** switch (1) to ON.



2. Set the **EMERGENCY STOP** switch (2) to on (up).

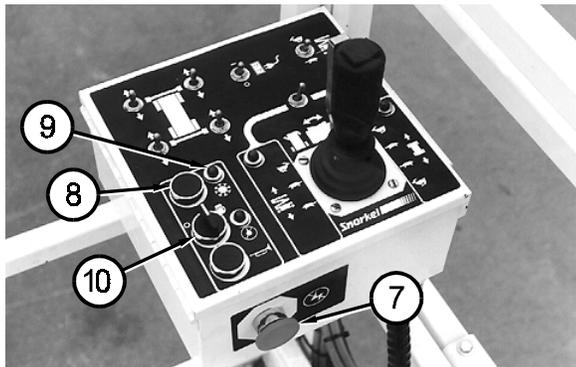
3. Set the **BASE/PLATFORM SELECTOR** switch (3) to platform (up).

4. Turn the key (4) to on -- do not turn the key (4) to start.



5. Enter the platform (5) and latch the safety chain (6) closed.

7. OPERATION



6. Turn the **EMERGENCY STOP** switch (7) clockwise and it will pop out (on).

7. If the engine is at ambient temperature, momentarily press the **GLOW-PLUG** switch (8). This action will automatically turn the glow-plugs, in the engine, on for 10 seconds. A light (9) will automatically come on to indicate that the glow-plugs are on.

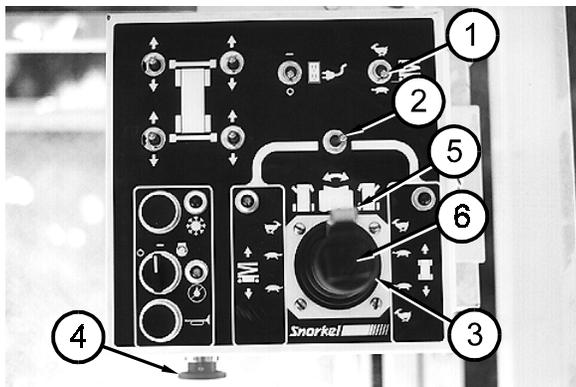
8. When the light (9) goes out, press and hold the **START** switch (10) until the engine starts or for 20 seconds, whichever comes first. When the engine starts, release the **START** switch (10).

CAUTION

If the engine does not start in 20 seconds, release the **START** switch (10) then wait 60 seconds before trying to start the engine again with the **GLOW-PLUG** (8) and **START** switches (10).

□ Driving

1. The engine should be running. If not, start it from the platform-control box as described above.



2. Set the **SPEED** switch (1) to turtle (slow) if you are going to be driving close to other objects or need to move the SR very slowly for other reasons.

NOTE: Setting the **SPEED** to rabbit doubles the travel speed. (See the “SPECIFICATIONS” chapter for speeds of different models.)

3. Set the **LIFT/DRIVE SELECTOR** switch (2) to drive (right).

CAUTION

The SR is about to move. If you have to make an emergency stop, release the **JOYSTICK CONTROLLER** (3) and sharply strike the **EMERGENCY STOP** switch (4) straight in.

To make a normal stop, slowly move the **JOYSTICK CONTROLLER** (3) to its “centered” neutral position then release it.

4. Squeeze and hold the **SAFETY CONTROL** (5) against the **JOYSTICK CONTROLLER** (3).

5. Push the **JOYSTICK CONTROLLER** (3) slowly forward or pull it slowly backward, depending on which way you want to go. The further you move the joystick the faster the SR moves.

6. To make a right or left turn, press and hold the **STEERING** rocker-switch (6) on top of the **JOYSTICK CONTROLLER** (3).

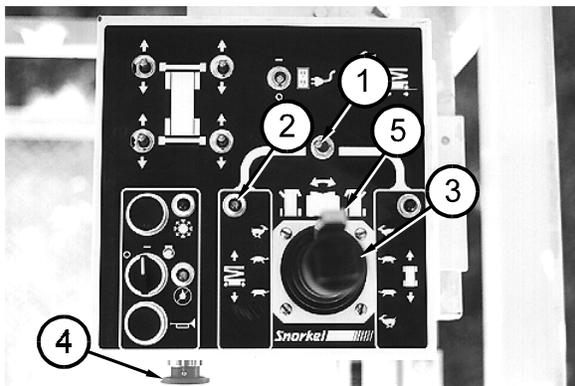
NOTE: When you release the **STEERING** rocker-switch (6) the steering wheels remain pointed in the direction you left them. They do not return to “straight ahead” the way automobile wheels do. You will have to press the opposite side of the **STEERING** rocker-switch (6) to return to straight line travel. In tight spots you should stop the SR, turn the wheels the direction you want to go, then, after you have “aimed” the steering wheels, squeeze the **SAFETY CONTROL** (5) and move the **JOYSTICK CONTROLLER** (3) slowly forward or backward.

❑ Raising the Platform

The platform, *on models with outriggers*, cannot be raised above 32 feet (9.8 m) if the outriggers are not set. (See “SETTING THE OUTRIGGERS” below in this chapter.

To raise the platform from the platform-control box do the following:

1. The engine must be running. If not, start it from the platform-control box as described above.



2. Set the **LIFT/DRIVE SELECTOR** (1) to lift (left).

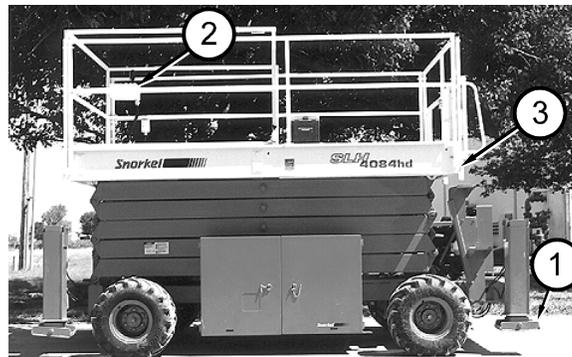
NOTE: If the **LIFT INDICATOR LIGHT** (2) is not lit, the platform will not go up because: the chassis is not level, the outriggers (if present) are not properly set, or the articulating axles (if present) are not locked. Correct the problem then continue.

NOTE: The platform is about to move. If you have to make an emergency stop, release the **JOYSTICK CONTROLLER** (3) and sharply strike the **EMERGENCY STOP** switch (4) straight in.

To make a normal stop, slowly move the **JOYSTICK CONTROLLER** (3) to its “centered” neutral position then release it.

3. Squeeze and hold the **SAFETY CONTROL** (5) against the **JOYSTICK CONTROLLER** (3).
4. Push the **JOYSTICK CONTROLLER** (3) forward to raise the platform, or backward to lower it. The further you push the **JOYSTICK CONTROLLER** (3) forward, the faster the platform rises. There is only one down speed.

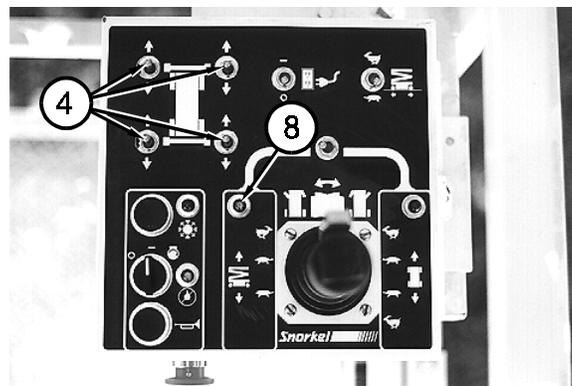
■ SETTING THE OUTRIGGERS



1. Check to see that the ground under the four outrigger pads (1 typ.) is firm, stable, and unobstructed.
2. Completely lower the platform (3).

NOTE: If the platform (3) is above 8 feet (2.4 m) the outriggers cannot be set or adjusted. This safety feature prevents the SR from being tipped over by the outriggers if the **OUTRIGGER** switches are accidentally pushed while the platform is raised.

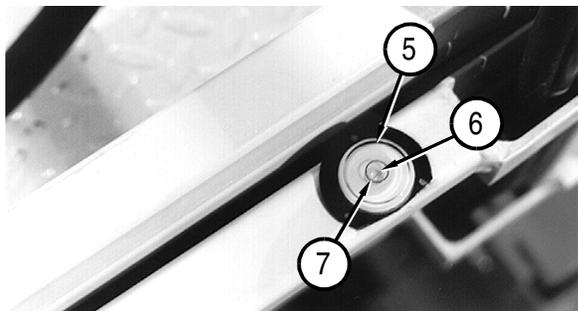
3. The engine must be running and the SR set for platform-control box (2) operation.



4. Pull and hold the **OUTRIGGER** switches (4) backward, one at a time, until all four outrigger pads (1) contact the ground.

! DANGER

Death or serious injury can result if an SR tips over. Do not use the outriggers to gain extra working height, they are not designed for that purpose. At least one of the outriggers should raise the SR less than six inches (15 cm) above the ground -- use the other three outriggers to level the SR as necessary.



5. Visually check the bubble level (5) to determine which outriggers must be further extended to level the platform (3).

NOTE: When the bubble (6) in the bubble level is in the center of the ring (7), the platform is level.

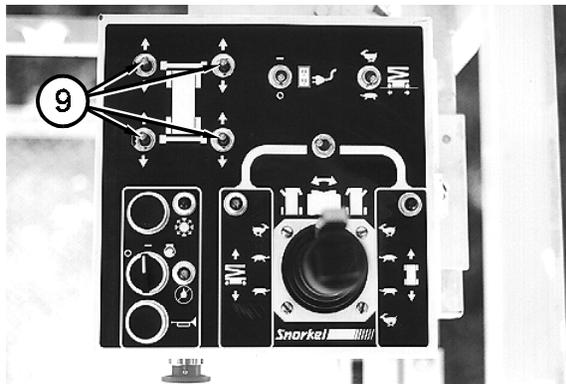
! DANGER

If the platform is up and the ground compresses unevenly under different outrigger pads the SR might fall over causing serious injury or death. Check the bubble level (5) frequently during operation. If any movement of the bubble (6) occurs, completely lower the platform immediately and readjust the outriggers to recenter the bubble (6) in the ring (7).

6. Lower the appropriate outriggers just enough to center the bubble (5). When the **LIFT INDICATOR LIGHT** (8) comes on, the platform can be safely raised.

To raise the outriggers:

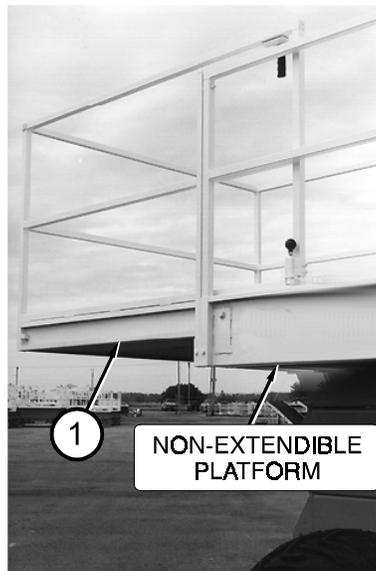
1. Completely lower the platform.



2. Push and hold the **OUTRIGGER** switches (9) forward until all the outriggers are completely up.

NOTE: The DRIVE function will not work unless the outriggers are completely up.

■ EXTENDING THE TWO-POSITION PLATFORM

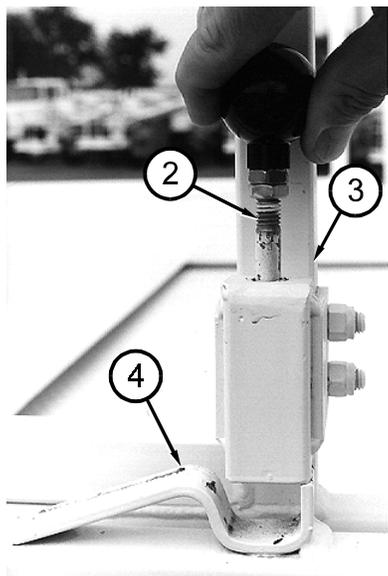


The two-position extendable platform (1) can be securely locked into two different positions. To move it from one position to the other do the following:

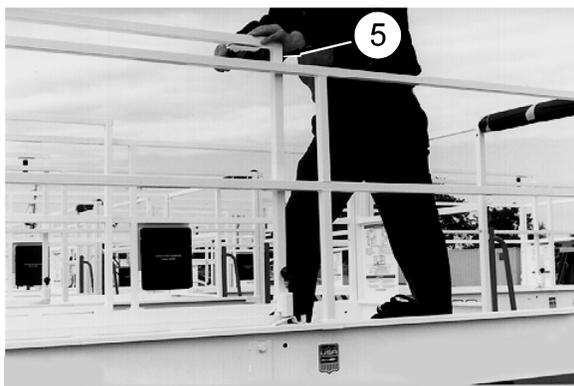
1. Stand on the non-extendable part of the platform and face the front of the machine.

! DANGER

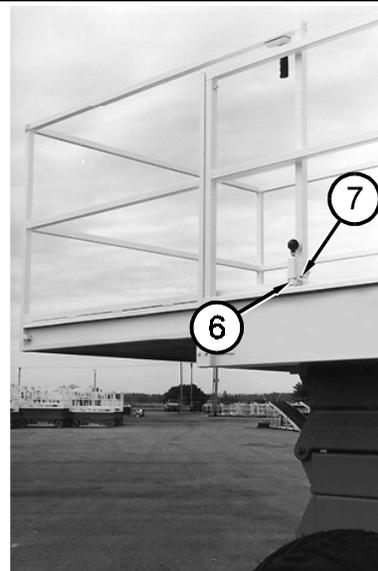
The distribution of the **RATED WORK LOAD** changes when the extendible platform is extended. Read the decal on the toe board at the front of the platform or at the entrance to the platform for safe weight distribution.



2. Pull up and hold the lock pin (2) while you push or pull the rails (3) just far enough to get the lock pin (2) past the lock ramp (4).



3. Push or pull the rails (5) vigorously until the extendible platform moves to the second position.



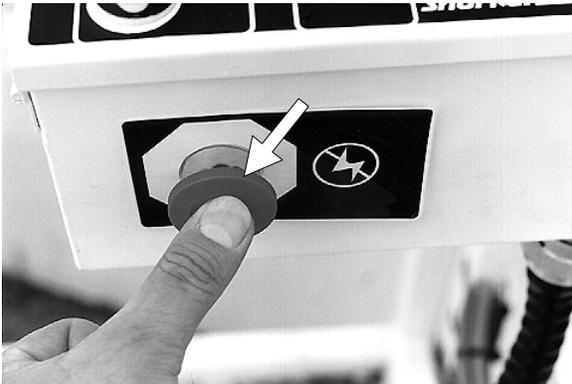
4. The lock pin (6) should lock into the second lock ramp (7).

8. EMERGENCY OPERATION

There are three forms of emergency operation for the SR: emergency stop, emergency bleed-down, and pushing. Each is covered as a separate section below.

■ EMERGENCY STOP

There are two **EMERGENCY STOP** switches on an SR.



One is located on the platform-control box.



One is located on the base-control panel.

Push either **EMERGENCY STOP** switch, at any time, and the entire machine stops, the engine turns off, and nothing moves.

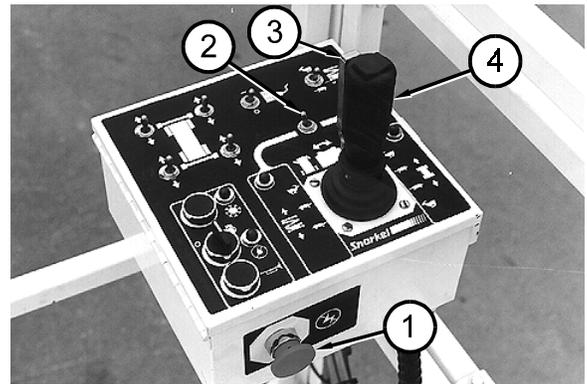
Functionally, the **EMERGENCY STOP** switches do the same thing as turning the **MAIN POWER** switch to off. The **EMERGENCY STOP** switches are designed to be easier to find and faster to use than key switches.

To reset the **EMERGENCY STOP** switch at the platform-control box, turn it clockwise and it will

pop out (on). To reset the **EMERGENCY STOP** switch at the base-control panel, raise the red switch-cover and push the switch up. The SR engine can then be restarted in the normal way.

■ EMERGENCY BLEED-DOWN

The SR platform can be lowered from the platform-control box anytime there is electricity to the platform-control box -- the SR engine does **not** have to be running. If you are working from the platform and the engine dies and cannot be restarted, do the following:



1. Check to be sure the **EMERGENCY STOP** switch (1) is pulled out (on).

2. Set the **SELECTOR** switch (2) to the platform function (left).

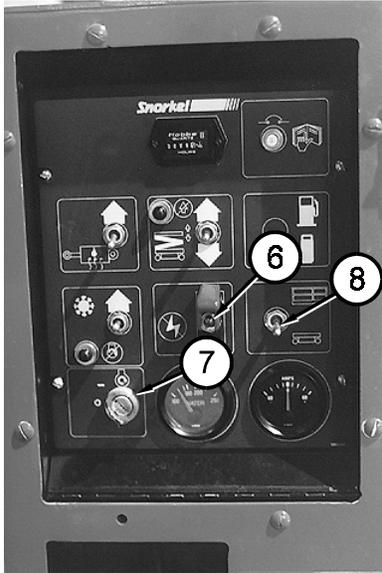
3. Squeeze the **SAFETY CONTROL** (3) and pull the **JOYSTICK CONTROLLER** (4) back. The platform should lower. If it does not lower, call for help from someone on the ground.

The person on the ground should do the following:



1. Check to be sure the **BATTERY** switch (5) is ON.

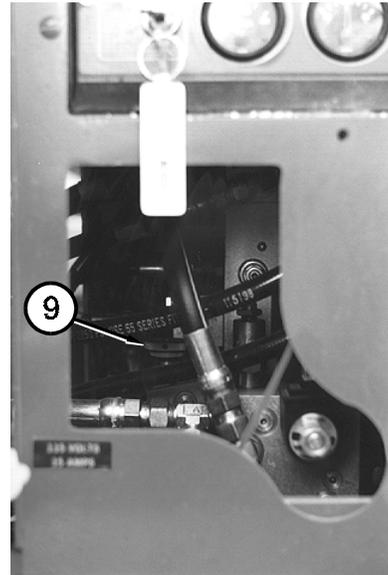
8. EMERGENCY OPERATION



2. Check to be sure the **EMERGENCY STOP** switch (6) is on (up).
3. Check to be sure the **MAIN POWER** switch (7) is on.
4. Check to be sure the **SELECTOR** switch (8) is set to platform (up).
5. If the **BATTERY** (5), **EMERGENCY STOP** (6), **MAIN POWER** (7), and **SELECTOR** switch (8) are all set correctly, and the engine will not start from the platform-control box, set the **SELECTOR** switch (8) to base (down) and try to lower the platform from the base-control panel.

! DANGER

PINCHING AND CRUSHING HAZARD. At the next step the platform will come down and the scissor arms will close. Keep all body parts out of the scissor arms and out from under the platform.



6. If the platform will not lower, the person on the ground should reach through the opening immediately below the base-control panel and screw open the emergency bleed-down valve (9) until the platform begins to slowly descend.

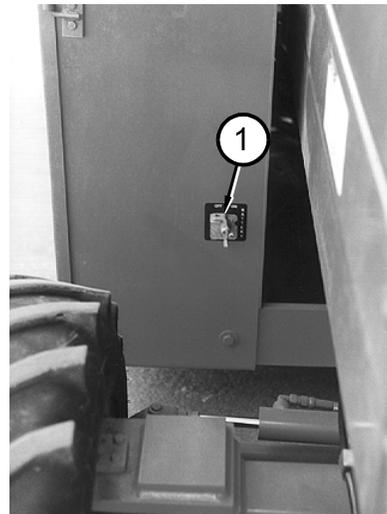
NOTE: If you need to stop decent, screw the emergency bleed-down valve (9) back in.

NOTE: As soon as the platform is completely down, close the emergency bleed-down valve (9).

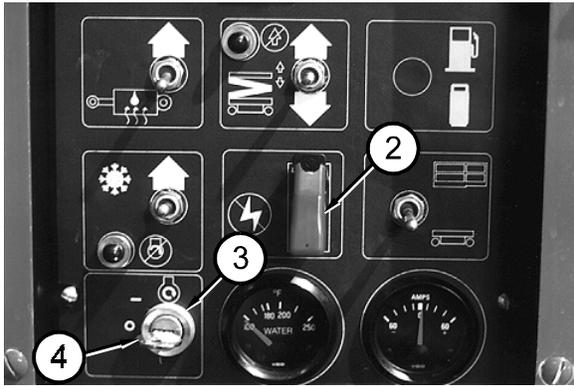
NOTE: If the platform does not come down, refer the problem to a qualified trained service technician.

■ PUSHING

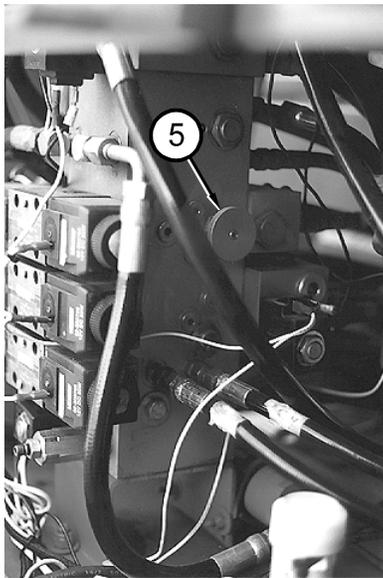
An SR can be safely pushed by hand on level firm surfaces. To do so:



1. Turn the **BATTERY** switch (1) to OFF.



2. At the base-control panel set the **EMERGENCY STOP** switch (2) to off, turn the **MAIN POWER** switch (3) off and remove the key (4).



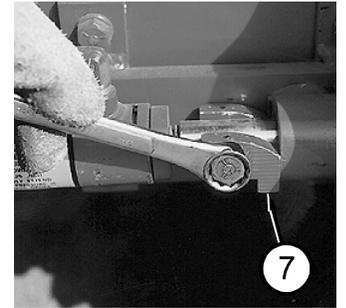
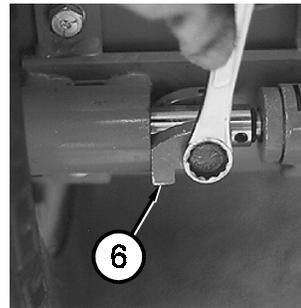
3. Inside the hydraulic compartment, completely open the free-wheeling valve (5) (turn counterclockwise until knob stops).

⚠ DANGER

A runaway SR can cause death or serious injury. At the next step the SR brakes will be released. Do not proceed to the next step unless the SR is on a level surface or the SR is securely attached to another vehicle that has the capacity to safely control the SR on a grade.

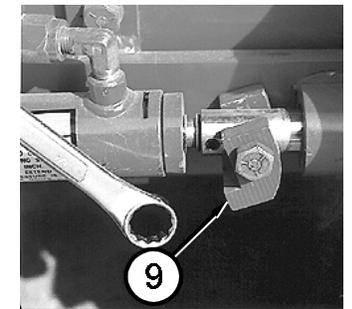
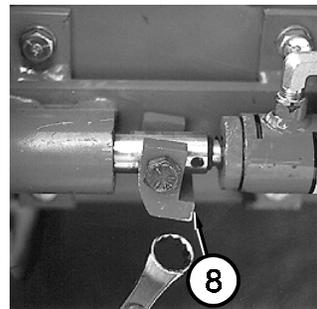
⚠ CAUTION

The **SR** drive motors will be ruined if the **SR** is pushed (or pulled) faster than 2 mph (3.2 km/hr). Unless personnel safety considerations dictate otherwise, do not push (or pull) faster than 2 mph (3.2 km/hr).

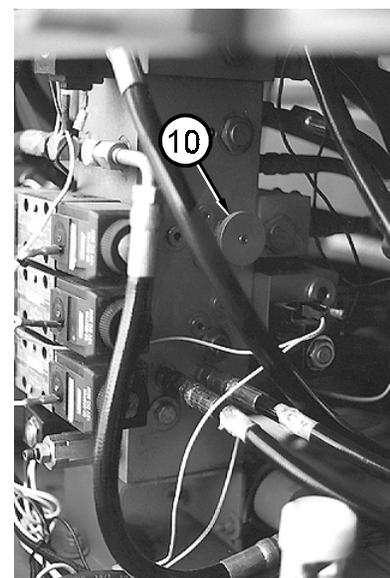


4. At the rear wheels, use a 3/4" box-end wrench to release both of the brakes by turning the cams (6)(7) as shown. Manually push the **SR** to safety.

5. As soon as the **SR** is in a safe place, reset the



brakes by turning the cams (8)(9) as shown.



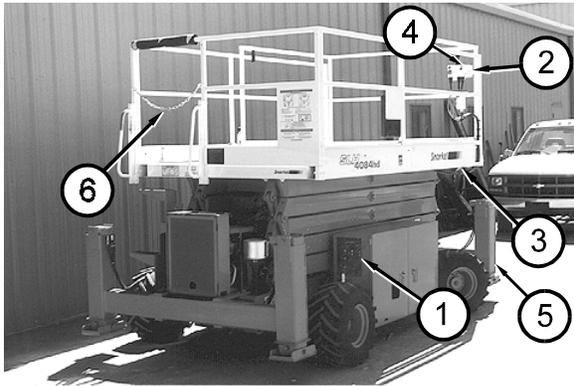
6. Close the free-wheeling valve (10).

9. STOWING & TRANSPORTING

■ STOWING

At the end of each work day (or in preparation for transporting, pushing, lifting, or storage) a qualified operator should put the SR into its **STOWED POSITION** then lock it.

The correct **STOWED POSITION** is shown here.



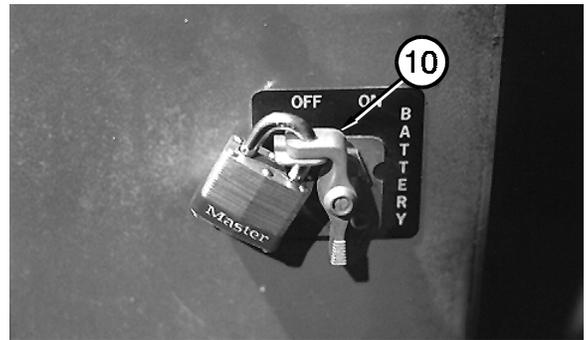
To bring the SR into the **STOWED POSITION** use the controls on either the base-control panel (1) or the platform-control box (2) to:

1. Fully lower the platform (3).
2. For models with outriggers: Use the outrigger controls (4) to completely raise all four of the outriggers (5).
3. Close the platform entry chain (6) and close all the doors on the machine.

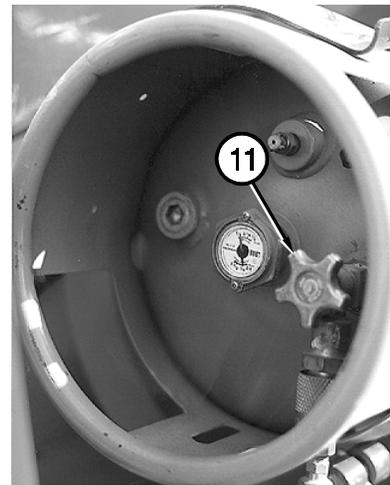
To lock an SR:



1. Push the **EMERGENCY STOP** switch (7) down (OFF) and set the **MAIN POWER** switch (8) to OFF then remove the key (9).



2. Turn the **BATTERY** switch (10) OFF and padlock it.



3. (OPTION - LPG) For machines equipped with LPG: close the valve (11) on the LPG-tank (completely screwed in).

■ TRANSPORTING

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.

☐ Trailering

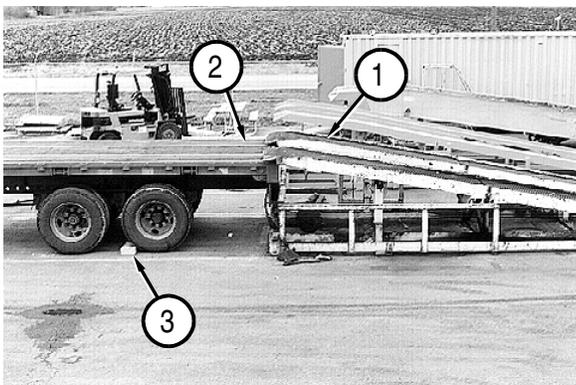
⚠ DANGER

Loading ramps must be able to support that weight. Transport trailers must be able to safely transport that weight.

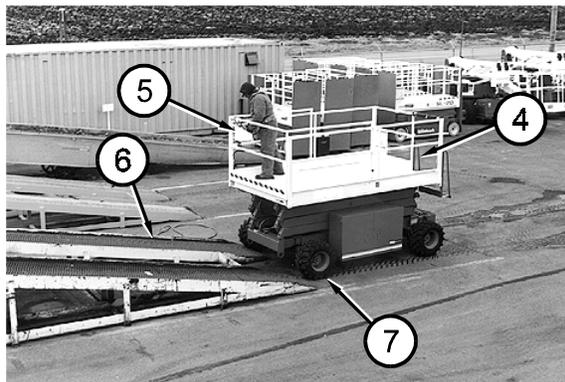
SR brake and drive systems are not designed for grades over 20% to 32%, depending on the model. Drive slowly and carefully on all slopes and loading ramps.

9. STOWING & TRANSPORTING

To safely drive an SR onto a transport trailer:



1. Visually inspect the alignment of the loading ramp (1) and the truck or trailer (2). They should both be on the same straight line.
2. Chock (3) the wheels of the truck or trailer so it cannot roll away from the loading ramp (1) while the SR is being loaded.
3. Set the SR base-control panel for platform operation.



4. Enter the platform and close the safety chain(4).
5. Use the platform controls (5) to bring the SR into the STOWED POSITION at the foot of the loading ramp (6) with the steering wheels (7) nearest the ramp.
6. Visually check (from the platform) to be sure the SR is aligned with the ramp and the ramp is still aligned with the truck or trailer. All should be in a straight line.

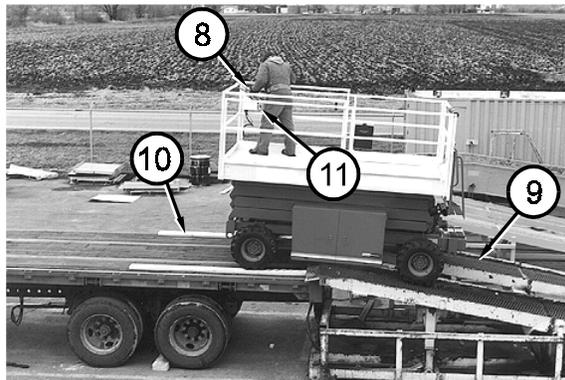
! CAUTION

An SR has low ground clearance. Look to see that the transition from the loading ramp to the trailer is not so sharp that the bottom of the SR drags. The photo immediately below shows what to look for.



! DANGER

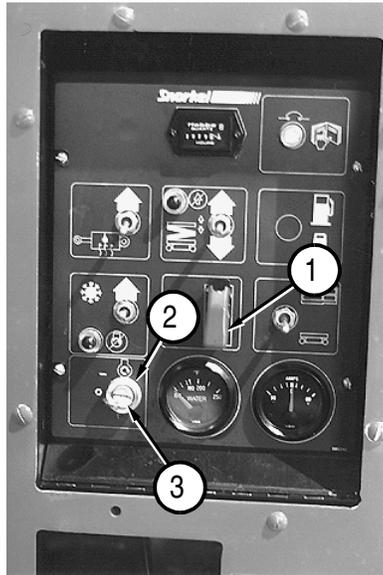
Death or serious injury can result from losing control of an SR during loading or unloading. Always drive up or down a grade with the SPEED switch set to turtle (slow).



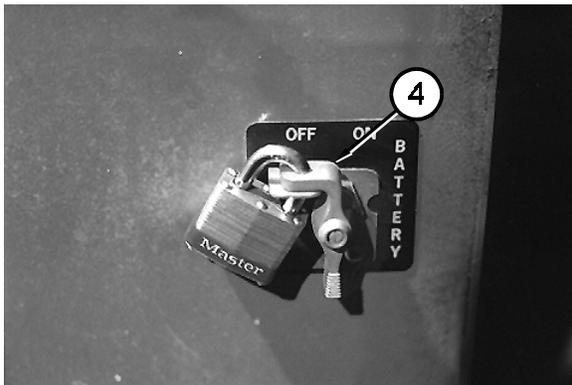
7. Use the joystick controller (8) to slowly drive the SR straight onto the ramp (9) and trailer (10).
8. When the SR is in place on the trailer, push the **EMERGENCY STOP** switch (11) in (OFF) at the platform-control box.
9. Chock the SR wheels.

❑ **Securing to a Transport Vehicle**

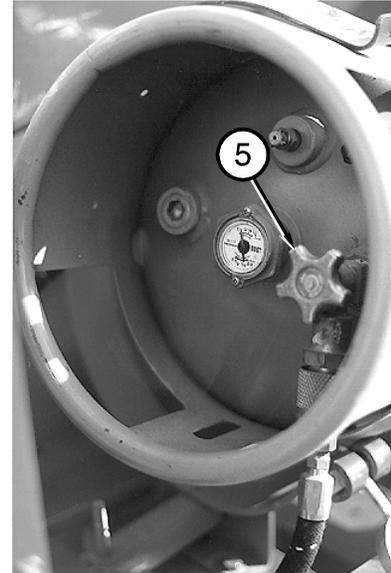
This procedure assumes that you have just finished the previous section and that the wheels are chocked.



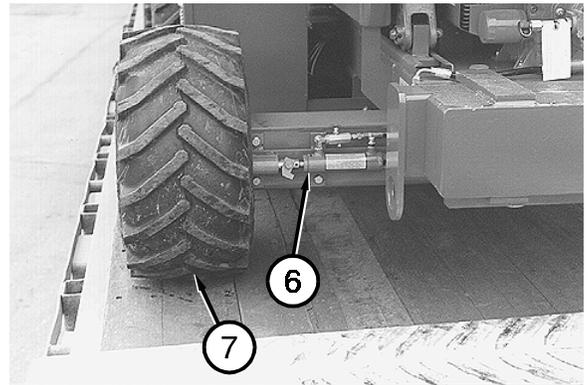
1. Push the **EMERGENCY STOP** switch (1) down (OFF) and set the **MAIN POWER** switch (2) to OFF then remove the key (3).



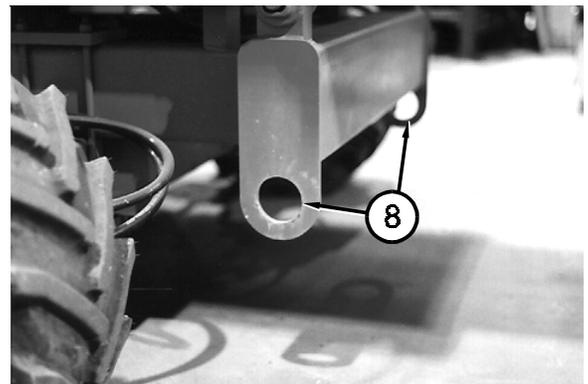
2. Set the **BATTERY** switch (4) to OFF and padlock it.



3. (OPTION - LPG) *For machines equipped with LPG:* Close the valve (5) on the LPG tank (completely screwed in).



3. Brakes (6) automatically lock the wheels (7) when the SR motor is off. However, it is not safe to transport an SR that is not tied down.



Always attach chains to the front and back tie-down lugs (8). Chocks may be removed at this time, though it is a good idea to leave them in place.

Reverse the above procedure after transporting.

9. STOWING & TRANSPORTING

Towing

Do not tow an SR. The SR hydraulic-drive motors will be permanently damaged, and rendered useless, by towing speeds.

Lifting

An SR can be safely lifted. However, only a trained qualified service technician should perform lifting.

Pushing

An SR can be safely pushed by hand on level, firm surfaces. The procedure for pushing is located in the "EMERGENCY OPERATION" chapter.

10. DAILY INSPECTION & MAINTENANCE

At the start of each work day (or 8 hour shift) an SR qualified operator must perform the DAILY INSPECTION AND MAINTENANCE listed in the table below.

The purpose of the daily inspection and maintenance is to keep the SR in proper working condition and to detect signs of malfunction at the earliest possible time.

DANGER

Do not operate an SR that is known to be damaged or malfunctioning. Defective parts or equipment malfunctions jeopardize the safety of the operator and other personnel, and can cause damage to the machine.

DAILY INSPECTION AND MAINTENANCE TABLE

(Set the **KEY SWITCH** to off before starting this inspection.)

ITEM	SERVICE REQUIRED
1. Fuel level	Visually inspect
2. Fuel filter (diesel engines only)	Visually inspect (condition)
3. Fuel leaks	Visually inspect (hoses, connections, etc.)
4. Engine oil	Check oil level (between dipstick lines)
5. Engine coolant	Check fluid level and radiator hoses
6. Radiator cap	Visually inspect (installation)
7. Platform safety chain	Visually inspect (operation)
8. Swinging gate (option)	Visually inspect (installation, operation)
9. Wiring harnesses and connectors	Visually inspect (installation, condition)
10. Battery terminals	Visually inspect (no corrosion)
11. Hydraulic tank cap	Visually inspect (installation)
12. Hydraulic oil level	Check fluid level (at line on side of tank)
13. Hydraulic oil leaks	Visually inspect (hoses, tubes)
14. Tires and wheels	Visually inspect (condition)
15. Bolts and fasteners	Visually inspect (looseness)
16. Structural damage & welds	Visually inspect (weld cracks, dents)
17. Guardrails	Visually inspect (condition)
18. Lanyard anchorages (option)	Visually inspect (condition)
19. Bubble level on platform (outrigger machines)	Visually inspect (condition)
20. Guides, rollers, and slides	Visually inspect (condition)
START THE ENGINE FROM THE BASE-CONTROL PANEL	
21. Charging system	Check condition (gauge)
22. Level sensor	Check operation
23. Ground controls	Actuate and visually inspect for operation
24. Emergency lowering	Check operation (causes correct motion)
25. Platform controls	Actuate and visually inspect for operation
26. Flashing light (option)	Visually check (operation)
27. GFCI (option)	Check operation
28. Air filter	Check condition (gauge)
29. Safety prop	Check operation
30. Parking brakes	Check operation
31. Placards, decals, and Operator's Manual	Visually inspect (installation and condition)

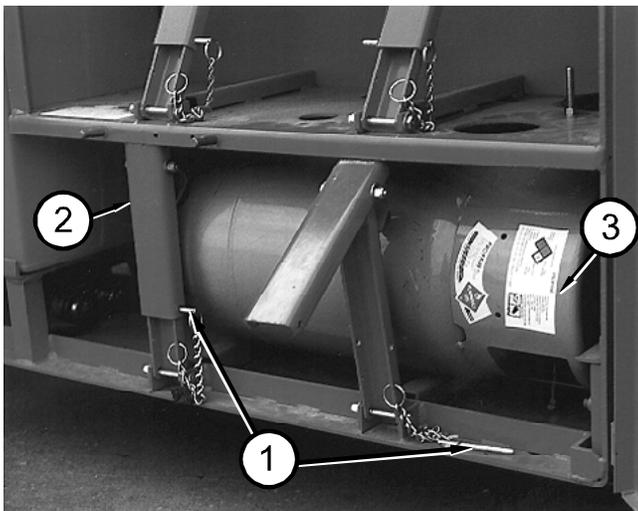
10. DAILY INSPECTION & MAINTENANCE

The rest of this chapter shows how to perform the SERVICE REQUIRED for each ITEM in the DAILY INSPECTION AND MAINTENANCE TABLE.

1. Fuel level

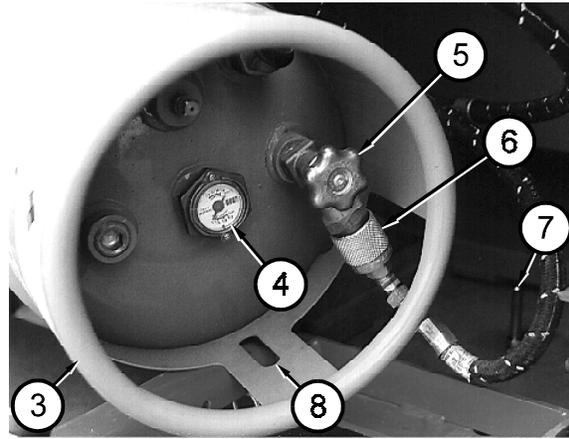


Remove the fuel tank cap. Visually check to see that the gasoline or diesel tank is full. Replace the tank cap and tighten.



(OPTION - LPG) To check the fuel gauge on the LPG tank, remove pins (1) and lower straps (2).

Pull tank (3) partially out and visually check gauge (4) to see that the LPG tank is full.



To replace an LPG tank:

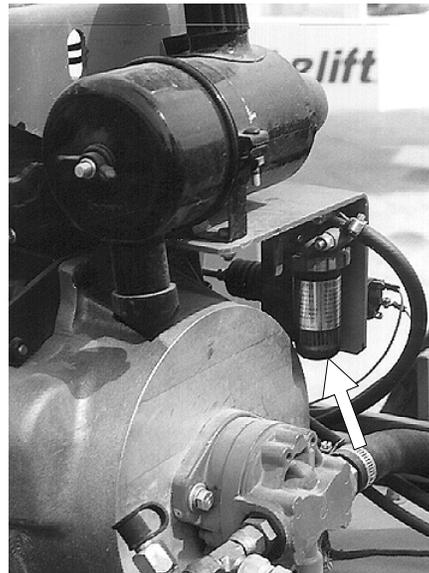
Close the valve (5).

Manually disconnect the fuel hose at the knurled ring (6).

Manually lift the tank (3) out.

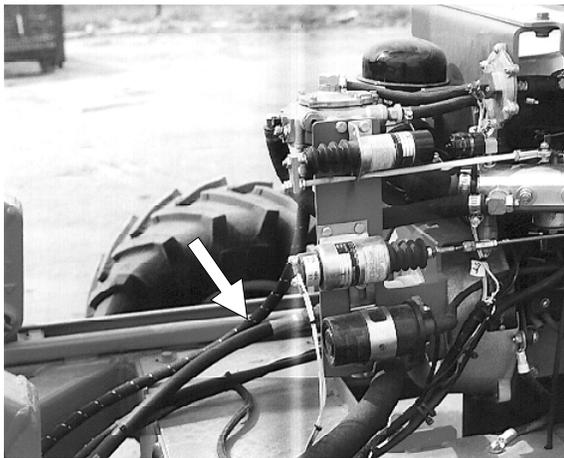
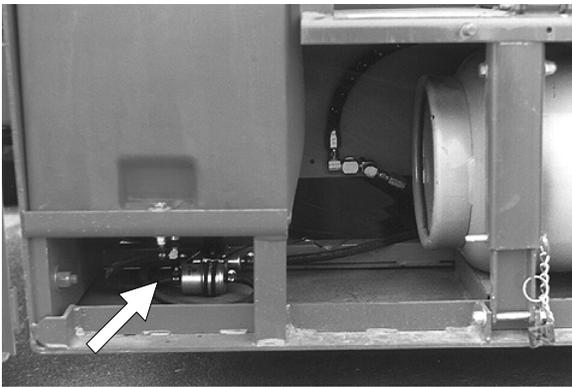
NOTE: Notice the positioning pin (7). At re-installation be sure the slot (8) in the top of the LPG tank (3) aligns with the pin (7).

2. Fuel Filter (diesel engines only)



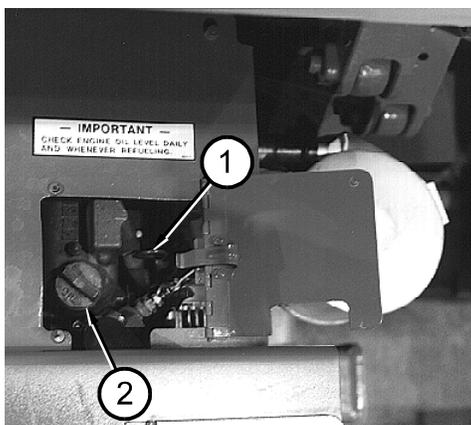
Visually check to see that there is no water in the bottom of the filter.

3. Fuel leaks



Visually inspect the entire length of the fuel line, from the engine to the fuel tank, for leaks.

4. Engine oil

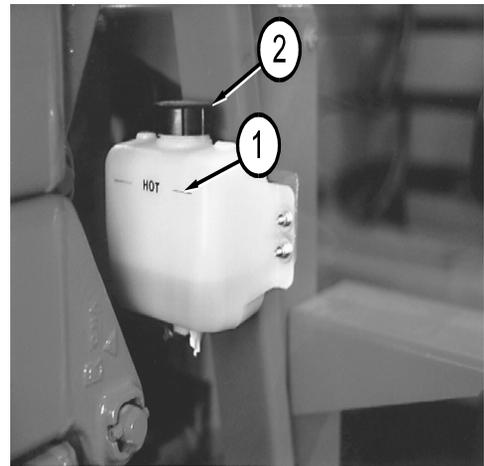


Keep the oil level between the marks on the dipstick (1).

The distance between the top and bottom dipstick marks corresponds to about 1 qt. (one liter). Add oil, if needed at the cap (2) on top of the engine.

NOTE: See the “SPECIFICATIONS” chapter for the correct engine oil grade and weight.

5. Engine coolant



The Kubota engine is liquid cooled. At operating temperatures the coolant should be at the HOT level (1). When cold there should be approximately 1 inch (2.5 cm) of coolant in the bottom of the reservoir.

The coolant is half water and half ethylene glycol.

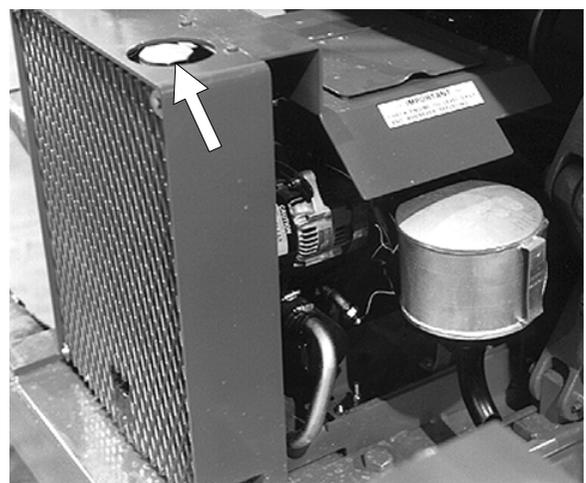
To add coolant:

Turn the engine OFF at the base-control box panel **KEY SWITCH**.

Remove the cap (2) from the coolant reservoir.

Add coolant and replace cap.

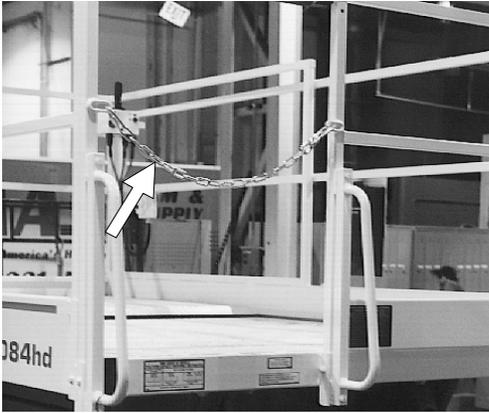
6. Radiator cap



Visually check to see that the cap is in place and tight.

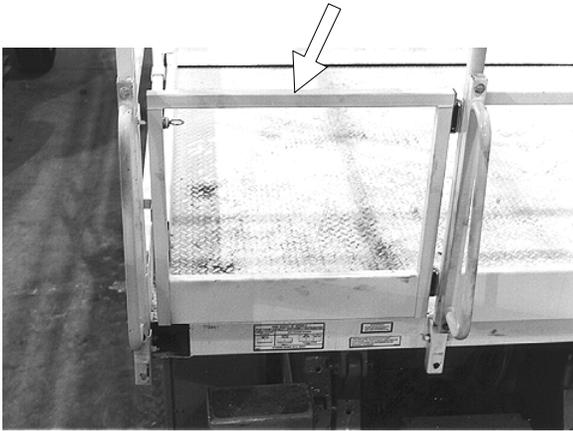
10. DAILY INSPECTION & MAINTENANCE

7. Platform safety chain



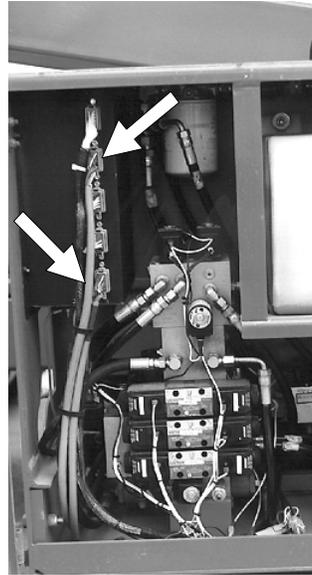
Inspect the safety chain to be sure it is present and latches into place properly.

8. Swinging gate (option)

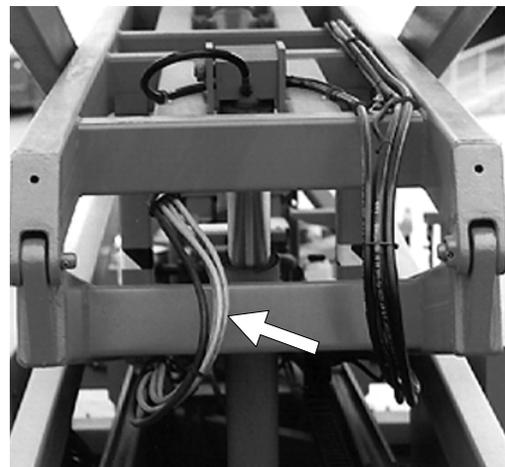
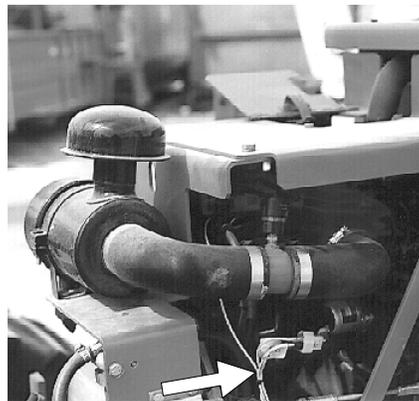


Inspect the gate to see that it swings freely, latches securely, and is not deformed in any way.

9. Wiring harnesses and connectors

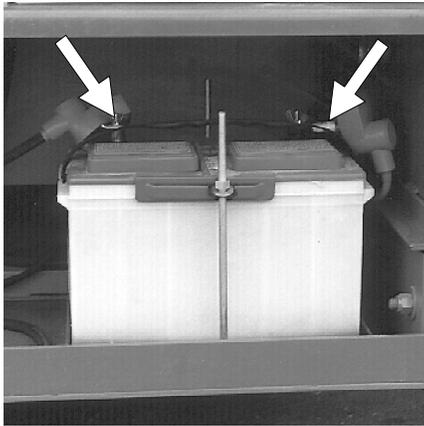


Inspect all the wiring harnesses, on the machine, for loose connections, broken wires, and frayed insulation.



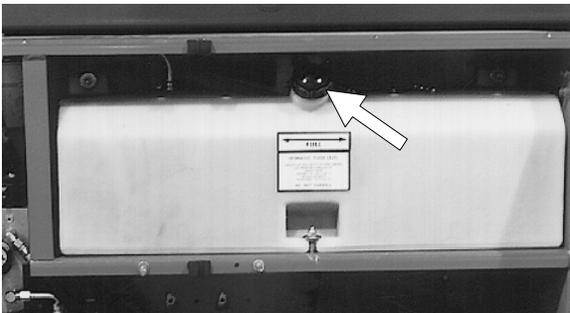
Pay particular attention to the wiring harnesses that are attached to the scissor stack.

10. Battery terminals



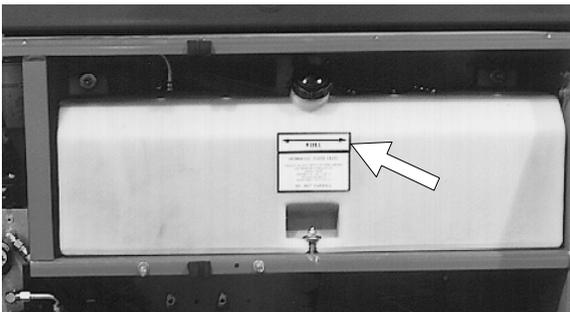
Battery terminals should be clean and free of corrosion.

11. Hydraulic tank cap



Check to see that the cap is in place and is tight.

12. Hydraulic oil level



To check the hydraulic oil level:

Completely lower the platform.

The hydraulic oil level should be at the full level.

If necessary, add hydraulic oil at the Hydraulic oil tank cap. See the "SPECIFICATIONS" chapter for type and grade of hydraulic oil.

13. Hydraulic oil leaks

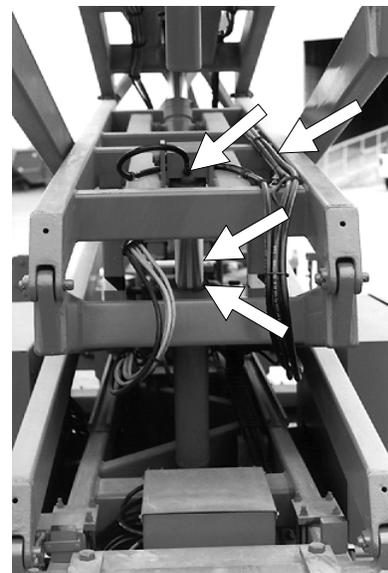
! DANGER

Leaking hydraulic oil can cause burns, fires, falls (slipping), cuts, and puncture wounds (if under high pressure). Do not tolerate hydraulic oil leaks. They are dangerous.

Hydraulic oil leaks are easily visible and can show up anyplace. Visually inspect the entire machine for hydraulic oil. Check the ground under the machine for leaked oil.

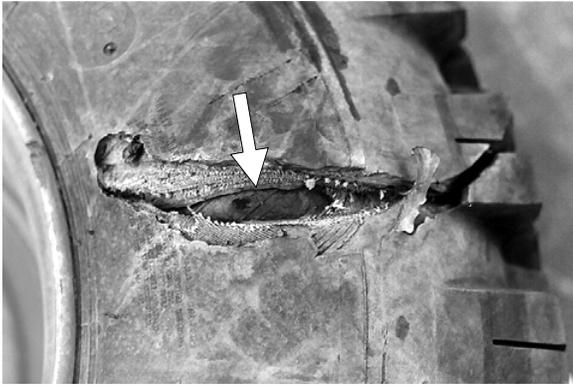


Check for loose fittings at the valve.



Pay particular attention to the cylinders, check to see that there is no oil leaking from the seal, also check all hoses that run to the cylinders.

14. Tires and wheels



SR tires are foam filled. Punctures of the type caused by bolts, screws, or nails are not a problem. Look for large holes or long cuts completely through the tire body: holes or cuts where foam is being forced or eroded out of the tire. Also look for large imbedded objects, such as angle iron, that can rip a tire body open under some conditions.

(OPTION-BIG PAW Tires)

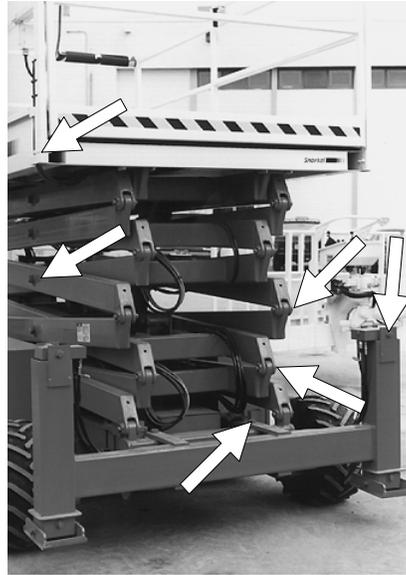
! DANGER

Death or serious injury can result if an SR tips over. An air-filled tire that has an air leak or blow-out is a tip over hazard. Do not raise the SR platform if any tire has an air leak or is in such condition that a blow-out could occur.

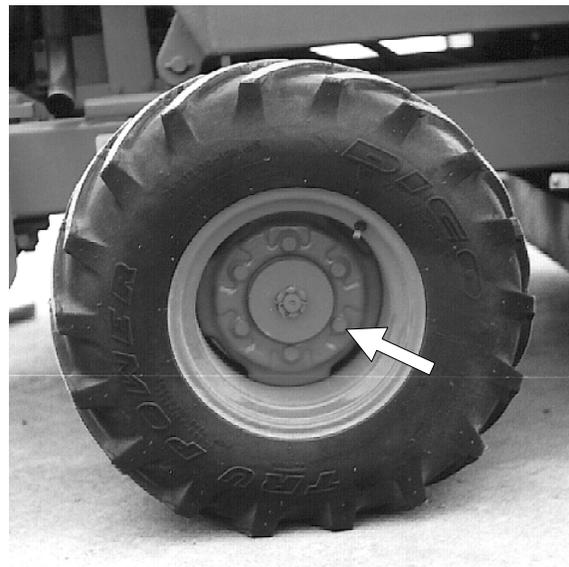


Some Big Paw tires are air-filled. Air-filled tires should be visually checked several times a day to see that they are properly inflated. Air-filled tires should be checked very carefully for imbedded material, cuts, punctures, or abraded areas. Do not tolerate a suspect tire, it can be fatal.

15. Bolts and fasteners

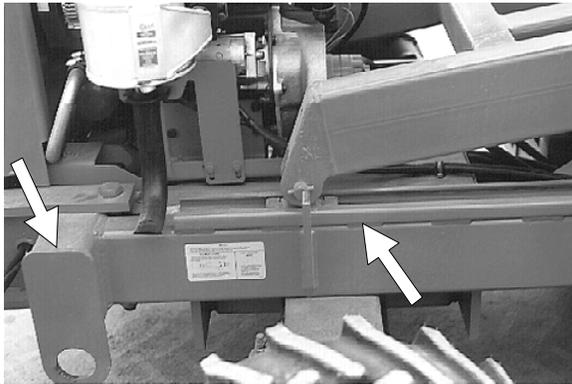


Visually inspect all fasteners to see that none are missing or obviously loose.



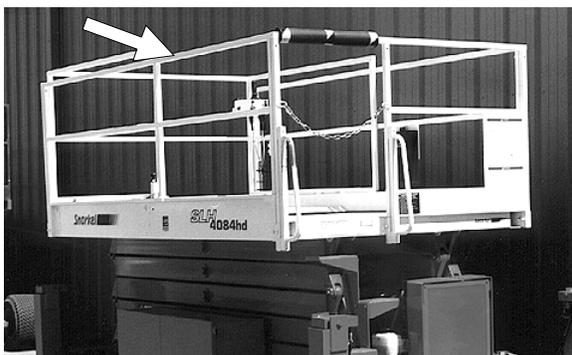
Pay particular attention to all of the wheel nuts. None should be visibly loose, missing, or deformed.

16. Structural damage & welds



Visibly inspect all welds for cracks, all structural members for deformity, and all sheet metal for dents that could interfere with machine operation.

17. Guardrails



Pay particular attention to the guardrails. Make sure the guardrails are properly installed, that all the fasteners are in place, and that the safety chain or swinging gate is in place and works properly.

18. Lanyard anchorages (option)

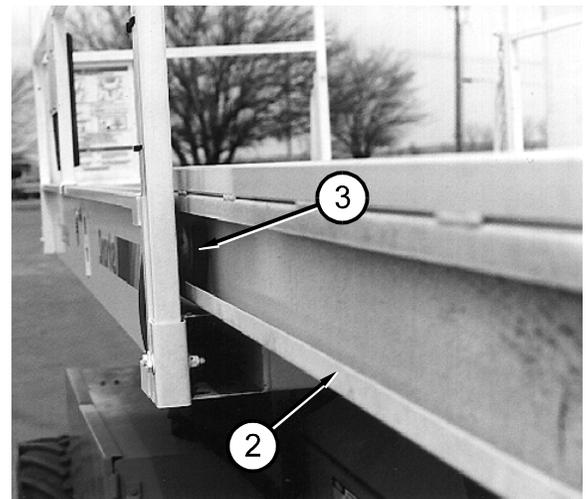
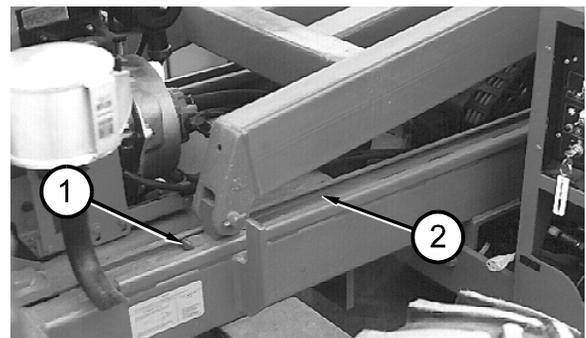
Check all four lanyard anchorages on the floor of the platform to see that they are present, not deformed, that they move freely, and that they are securely attached to the platform.

19. Bubble level (machines with outriggers)



Visually check to see that the bubble level is not damaged, that it is full of fluid, that the bubble does not exceed the diameter of the center black circle, and the surface on which the bubble level is mounted is not deformed or bent out of level.

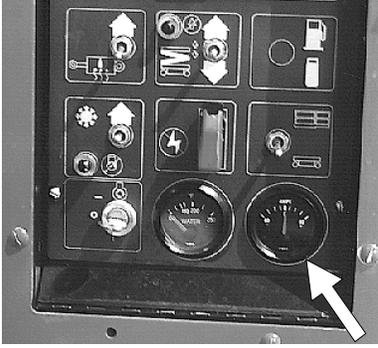
20. Guides, rollers, and slides



Visually check slides (1), and rollers (3) for wear or damage. Be sure that the guides (2) are free of debris and allow the slides and rollers to move smoothly.

10. DAILY INSPECTION & MAINTENANCE

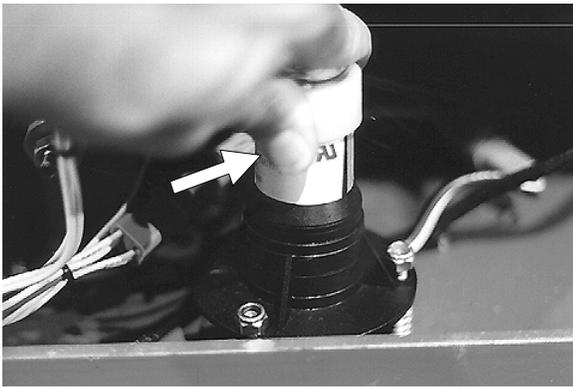
21. Charging system



With the engine idling, the needle in the **AMPS** gauge should not be to the left of "0" (left of "0" is discharging).

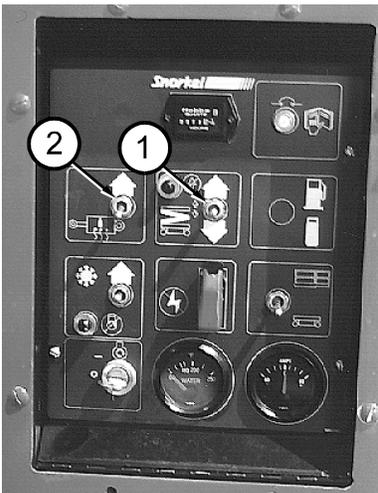
NOTE: Leave the engine running for the next step

22. Level sensor



With the SR engine running, push the level sensor to the side as far as possible. The level sensor alarm should sound.

23. Ground controls

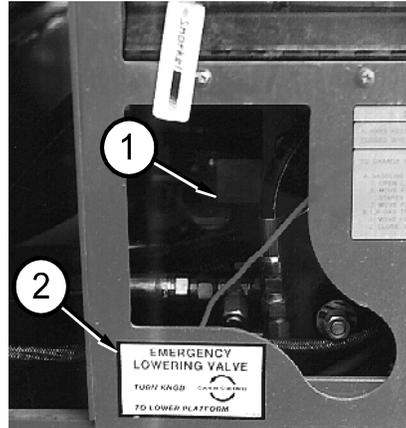


Check the **PLATFORM LIFT/LOWER** switch (1) to see that it is functioning properly by holding the switch up to rise platform and pushing the switch down to lower the platform.

In cold temperatures (below 50°F/10°C) check to see that the **HYDRAULIC OIL WARM-UP** switch (2) is functioning properly by turning the switch on (up) for 5 to 10 minutes or until the hydraulic oil tank is warm to the touch then turn the switch off (down).

Pay particular attention to the **EMERGENCY STOP** switch (3) to see that it turns the SR engine off when struck.

24. Emergency lowering



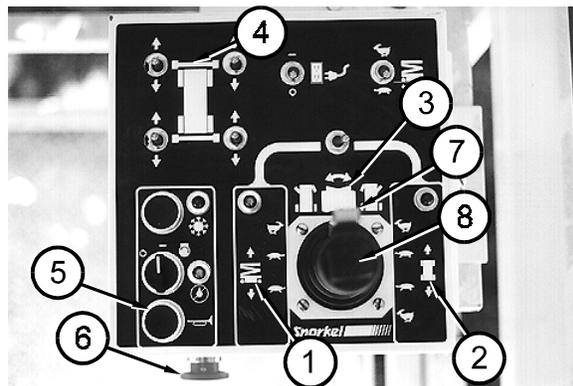
To check the emergency lowering:

Raise the platform and turn the engine OFF at the base-control panel **KEY SWITCH**.

Then open the emergency bleed-down valve (1) by following the instructions on the emergency lowering decal (2).

Screw the emergency bleed-down valve (1) completely in after the platform is down.

25. Platform controls



Check all of the lift (1), drive (2), steer (3), and outrigger (4, if present) functions from the platform-control box to see that they cause the SR to move the way it should. (for correct operating procedures see the "OPERATION" chapter).

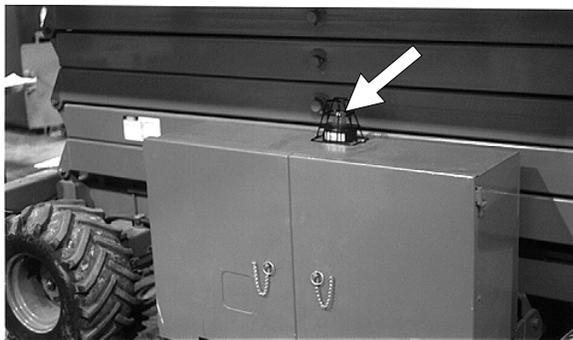
Listen for the lowering alarm while the platform is going down. Listen for the motion alarm while the SR is being driven forward. Listen for the back-up alarm while the SR is backing up.

Press the operator horn (5) to see that it works.

Pay particular attention to the **EMERGENCY STOP** switch (6) to see that it turns the engine off when struck.

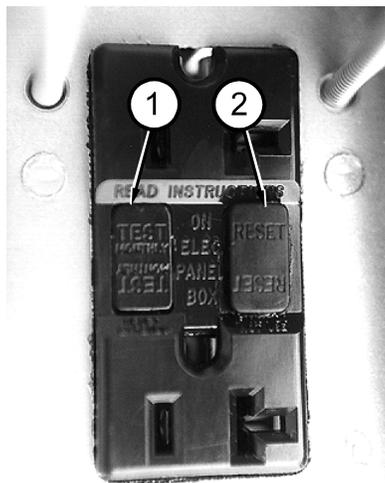
Pay particular attention to the **SAFETY CONTROL** (7) to see that it deactivates the **JOYSTICK CONTROLLER** (8) when the **SAFETY CONTROL** (7) is released.

26. Flashing light (option)



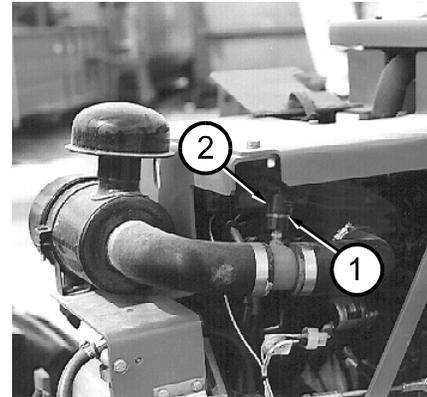
Check to see that the light flashes approximately once a second when the SR engine is running.

27. GFCI (option)



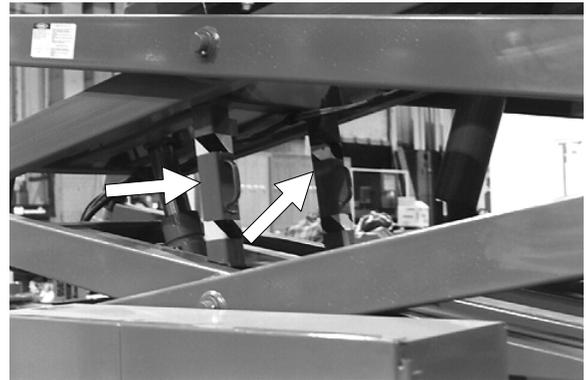
If the SR does not have the generator option, connect a source of power to the GFCI (ground fault circuit interrupt) plug at the base-control panel. Set the **AC OUTLET SWITCH** to on (-). Push the **TEST** button (1) in on the GFCI. The **RESET** button (2) should pop out. Press the **RESET** button (2) back in.

28. Air filter



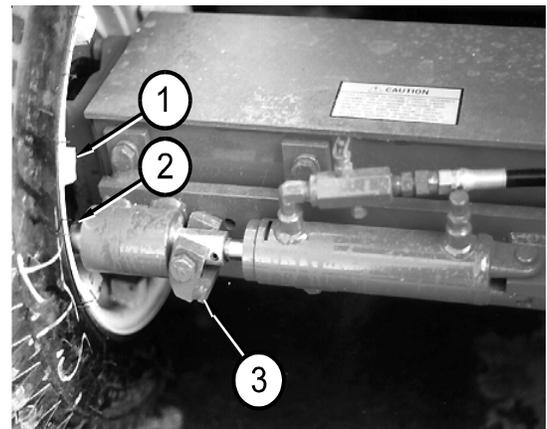
Visually check the viewing area (1) on the air cleaner service indicator (2) to see that it is clear. If it is red, change the air filter and push the reset button on top of the air cleaner service indicator.

29. Safety prop



Inspect the safety prop(s) to see that it is present and moves freely.

30. Parking brakes



Visually check to see that the pin (2) is engaging and that there is enough surface (1) to hold the pin when it engages. Also check the brake release cam (3) to see that it moves freely.

10. DAILY INSPECTION & MAINTENANCE

31. Placards, decals, and Operator's Manual

Look to see that all placards and decals are in place and legible. Replace any missing or illegible placards or decals before placing the SR into service for the daily work shift.

PLACARDS AND DECALS INSPECTION CHART

NO	PART #	DESCRIPTION	REQ
1	257806	Snorkel logo 10"(white/blk)	2
2	300698	Snorkel logo 10"(Orange/blk)	2
3	605726	Diesel fuel only (option)	1
4	451786	Lowering valve	1
5	451986	Danger - do not alter	1
6	302820	Caution no step	1
7	464416	Check engine oil	1
8	300694	ANSI standards	1
9	476706	Danger - explosive fumes	1
10	560262	Electrical schematic 12 volt	1
11	0151410	Danger - rotating engine parts	1
12	560241	Platform-control box	1
13	560272	Emergency stop	1
14	562426	Operating manual enclosed	1
15	562436	Operator's checklist	1
16	562446	Parking brake	3
17	562456	Danger - safety prop	1
18	560239	Snorkel logo 28" (orange/blk)	2
19	604896	Gasoline only	1
20	0070420	Emergency bleed down	1
21	300700	Danger - shear/crush hazard	4
22	0073585	Made in USA	2
23	480658	Danger - tipover/elect. hazard	2
24	969249	Warning stripe	213"
25	969676	Serial number	1
26	0090493	Dual fuel instructions (option)	1
27	560240	Base-control panel	1
28	475596	Caution - cylinder disassembly	2
29	0070921	115 volt 20 amp (option)	1
30	560335	Danger - explo fume/lq (option)	2
31	0102006	Battery disconnect switch	1
32	0073298	Danger - foam filled tires	1
33	451776	Hydraulic fluid level	1
34	467036	Full tank	1
35	560261	Hydraulic schematic	1
36	476706	Danger - explo fumes	1

Additional placards and decals found on **SR2584.**

NO	PART #	DESCRIPTION	REQ
37	560233	SLH 2584hd logo	2
38	560256	25' platform capacity	2
39	438296	Safety tread	3
40	560285	Tire pressure 44 PSI (option)	4
41	0151959	Danger - tipover hazard (option)	1
42	564806	Outrigger operating instr. (option)	1
43	583776	Danger - pinch point (option)	4

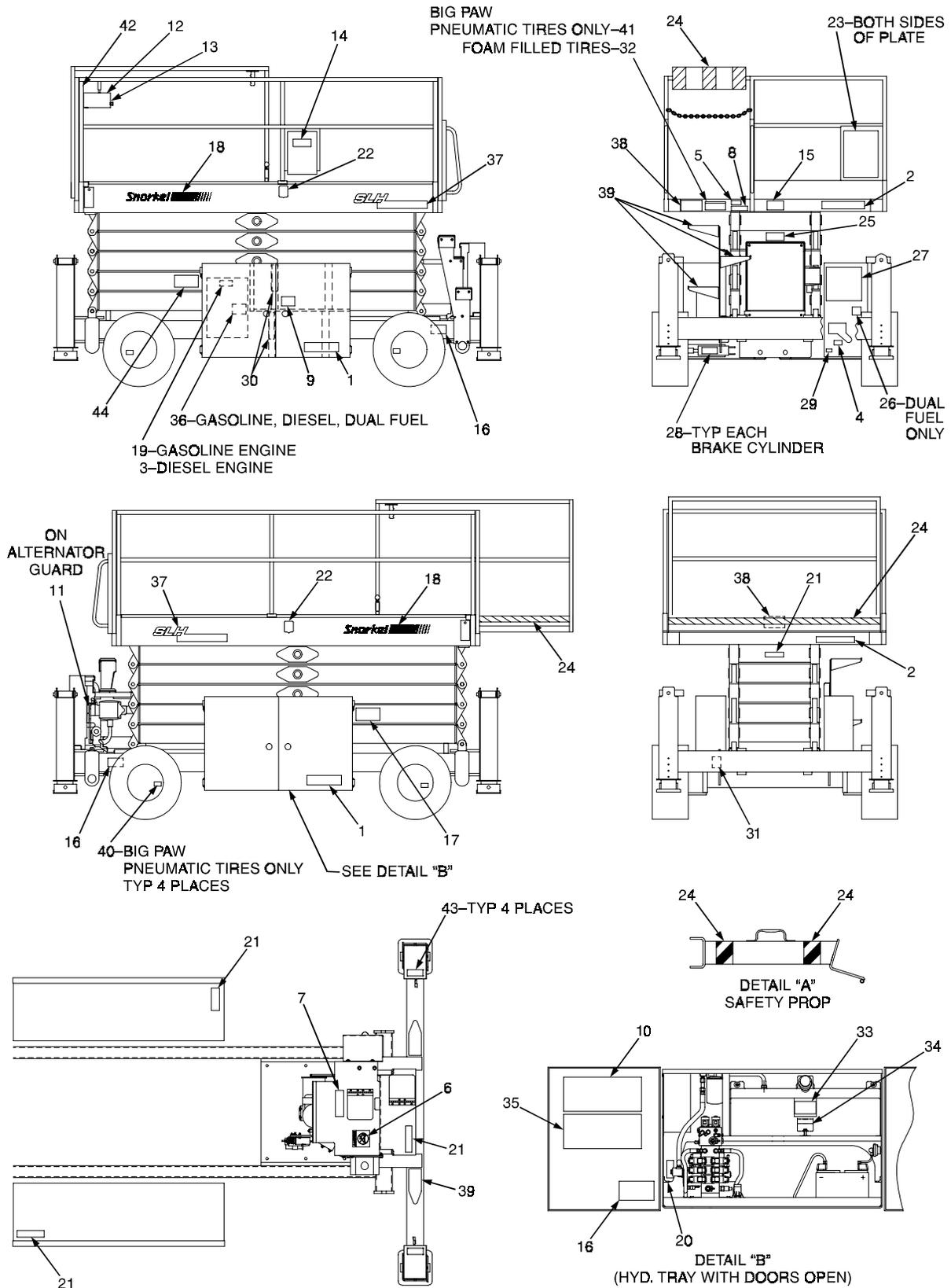
Additional placards and decals found on **SR3284.**

NO	PART #	DESCRIPTION	REQ
37	560236	SLH 3284hd logo	2
38	560257	32' platform capacity	2
39	438296	Safety tread	4
40	560285	Tire pressure 44 PSI (option)	4
41	0191959	Danger - tipover hazard (option)	1
42	564806	Outrigger oper. instr. (option)	1
43	583776	Danger - pinch point (option)	4

Additional placards and decals found on **SR4084.**

NO	PART #	DESCRIPTION	REQ
37	560237	SLH 4084hd logo	2
38	560258	40' platform capacity	2
39	438296	Safety tread	5
40	560285	Tire pressure 44 PSI (option)	4
41	0151959	Danger - tipover hazard (option)	1
42	564806	Outrigger operating instr.	1
43	583776	Danger - Pinch point	4
44	562456	Danger - safety prop	1

PLACARDS AND DECALS INSPECTION DRAWING



11. TROUBLESHOOTING

All of the actions described in this chapter may be performed by an SR *operator* -- a trained and qualified service technician is not required. Any problem that cannot be fixed by actions listed below should be referred to a trained and qualified SR *service technician*.

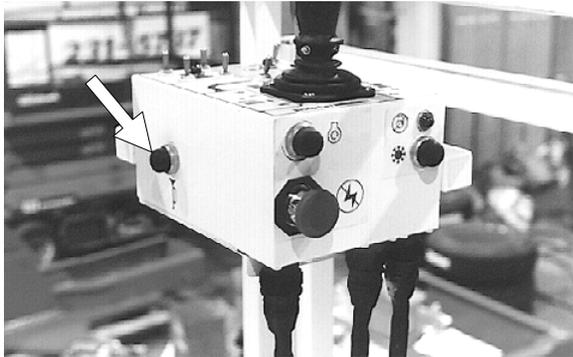
The first column, of the following chart, lists some common problems encountered by SR operators. The second column lists some of the causes for each problem. The third column lists remedies.

SR OPERATOR TROUBLESHOOTING CHART		
PROBLEM	CAUSE	REMEDY
Engine will not start.	BATTERY switch set to OFF.	Turn the BATTERY switch to ON.
	EMERGENCY STOP switch(es) not on.	Set the base-control EMERGENCY STOP switch to on (up). Also, if you are trying to start at the platform-control box you should turn the EMERGENCY STOP switch, at the platform-control box, clockwise until it pops out (on).
	KEY SWITCH set to off.	Set the KEY SWITCH to on (the bar symbol).
	BASE/PLATFORM SELECTOR switch set to wrong location.	If you are trying to start from the base-control panel, set the BASE/PLATFORM SELECTOR to base (down). If you are trying to start from the platform, set the selector to platform (up).
	Circuit breaker tripped.	Push the circuit breaker in.
	FUEL switch not set correctly.	If you are trying to start a dual-fuel engine be sure the FUEL switch is set to the correct fuel.
	Out of fuel.	DANGER: Keep flames and lit tobacco away from open fuel tanks. Remove the cap from the gasoline or diesel tank to see if there is fuel. Check the gauge(s) on top the LP tank(s). If you are using LP gas, be sure the valve on top the tank is open.
	Clogged air filter.	Visually check the air filter gauge.
Engine oil too thick for ambient temperature.	Check engine oil chart in "SPECIFICATIONS" chapter for correct oil weight.	
Outriggers inoperative.	Platform not completely down.	Completely lower the platform.
Platform drifts down.	The emergency bleed-down valve is open.	Close the emergency bleed-down valve.
All systems sluggish.	Hydraulic oil is too thick.	Turn the HYDRAULIC OIL WARM-UP switch on until the hydraulic oil tank is warm to the touch.
SR will not drive forward or reverse.	Free-wheeling valve is open.	Close the free-wheeling valve.

SR OPERATOR TROUBLESHOOTING CHART (CONTINUED)		
PROBLEM	CAUSE	REMEDY
Platform will not go up or down.	Engine is not running.	Start the engine from the control station where you will operate the SR.
	Switches set wrong. (LIFT INDICATOR LIGHT lit.)	<p>For base-control panel operation:</p> <ul style="list-style-type: none"> • BASE/PLATFORM SELECTOR = BASE. • MACHINE/GENERATOR (if equipped with ac generator) = MACHINE. <p>For platform-control box operation:</p> <ul style="list-style-type: none"> • BASE/PLATFORM SELECTOR = PLATFORM. • MACHINE/GENERATOR (if equipped with ac generator) = MACHINE. • LIFT/DRIVE SELECTOR = LIFT. <p>Squeeze and hold SAFETY CONTROL then push JOYSTICK CONTROLLER forward to go up or pull it backward to go down.</p>
	Emergency bleed-down valve open. (LIFT INDICATOR LIGHT lit.)	Close the emergency bleed-down valve.
	SR is not level. (LIFT INDICATOR LIGHT is not lit and level sensor alarm is sounding.)	If the SR has outriggers use them to level the SR. Otherwise, use adequate shoring to level the SR then chock the wheels to prevent the SR from being driven once the platform is raised.
	The outriggers (if present) are not properly set. (LIFT INDICATOR LIGHT is not lit.)	<p>If you are using the outriggers, one or more of them is not down quite far enough. Lower each outrigger a few inches more to be sure each is firmly in contact with the ground.</p> <p>If you are not using the outriggers, one or more of them is not fully up. Raise each outrigger completely up.</p>
	Articulating axles are not properly set: the tire on one of the articulating axles is not firmly against the ground. (Platform will lower but will not go up. LIFT INDICATOR LIGHT is not lit.	Lower the platform completely down then drive the SR to a new location where the LIFT INDICATOR LIGHT is lit.

This chapter lists and explains all the options available for an SR.

■ OPERATOR HORN



The operator **HORN** button is on the right side of the platform-control box. For the **HORN** to work the **BATTERY** switch must be ON and the following switches, on the ground control panel, must be set as indicated:

- SELECTOR SWITCH**.....platform
- EMERGENCY STOP**.....out for run
- KEY SWITCH**.....on

The operator **HORN** is used primarily to get the attention of people on the ground when you are working aloft.

■ OUTRIGGERS

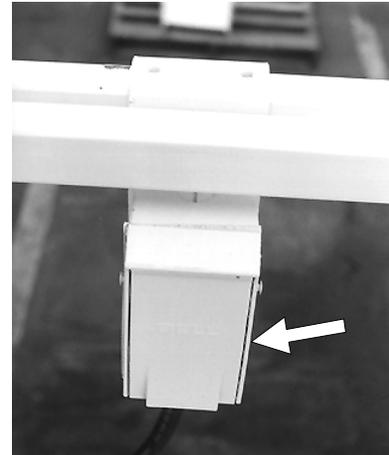


The outrigger controls are on the upper left side of the platform-control box.

The outriggers are used to level the SR (for complete outrigger operating procedures see the "OPERATION" chapter).

NOTE: The SR must be on a firm surface capable of withstanding all load forces imposed by the aerial platform in all operation conditions before the outriggers are used.

■ GFCI OUTLET



The GFCI (ground fault circuit interrupt) is located under the platform-control box. To use the outlet the SR must have the AC GENERATOR option or you must plug the power cord, at the base-control panel, into a source of power. Set the **AC OUTLET SWITCH** (on the platform-control box) to on (-).

The GFCI will protect against short circuits to ground. When there is a short to ground the GFCI will shut off power to the outlet.

To reset the outlet:

Unplug the equipment being used.

Press the reset button on the GFCI outlet.

This should restore power to the outlet. If it does not, set the **AC OUTLET SWITCH** to off (O) and refer the problem to a trained service technician.

■ BIG PAW TIRES



Because Big Paw tires are wider than standard tires, Big Paw tires decrease the pressure the SR exerts on the ground and give more traction than standard tires. Therefore, Big Paw

12. OPTIONS

tires are better suited for sandy soil than standard tires. Big Paws increase the overall width of the SR.

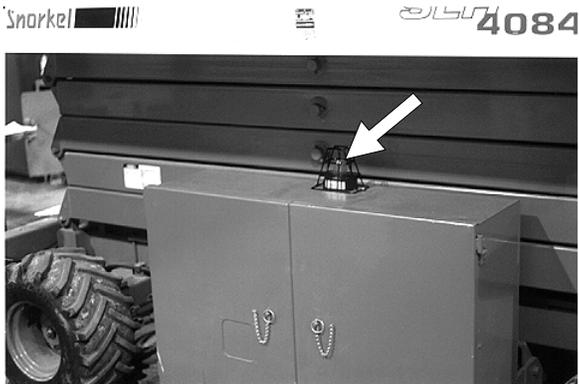
! DANGER

Death or serious injury can result if an SR tips over. An air-filled tire that has an air leak or blow-out is a tipover hazard. Do not raise the SR platform if any tire has an air leak or is in such condition that a blow-out could occur.

Some Big Paw tires are air-filled. Air-filled tires should be visually checked several times a day to see that they are properly inflated. Air-filled tires should be checked very carefully for imbedded material, cuts, punctures, or abraded areas. Do not tolerate a suspect tire, it can be fatal.

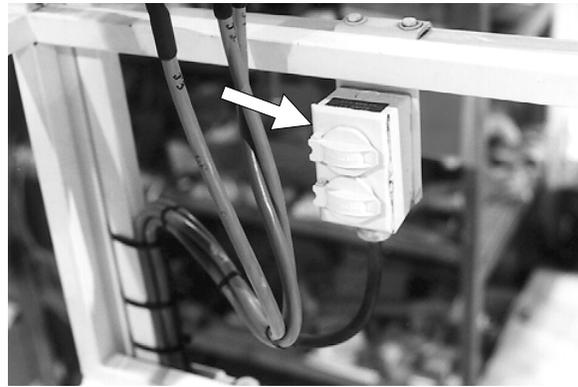
NOTE: "Big Paw" is a generic name, it is not molded into the tire sidewall.

■ FLASHING LIGHT



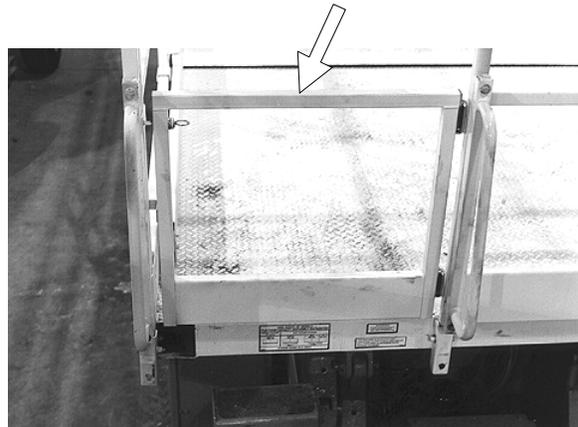
The flashing light alerts people that the SR is present and that the SR is moving. The light flashes at about one flash per second any time the SR is running. There is no ON/OFF switch for the flashing light, it cannot be turned off while the SR is running.

■ ELECTRICAL OUTLET



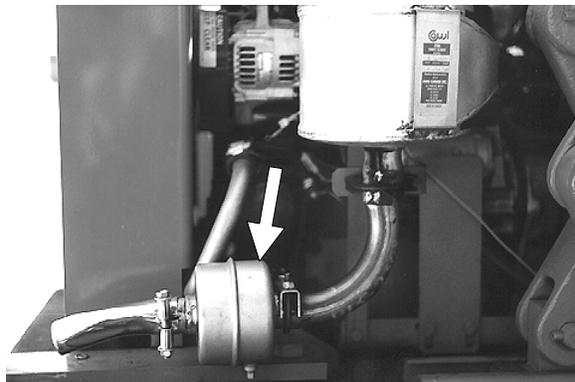
The electrical outlet on the platform, and its power cable, are designed to supply 2 kW of continuous duty power to run power tools of various sorts. The power can come from either the optional ac generator, discussed elsewhere in this chapter, or from an electrical source outside the SR. If you use an electrical source outside the SR be sure you disconnect it before you drive the SR away.

■ SWINGING GATE



The swinging gate is designed to automatically close after you enter or leave the platform. It helps prevent people from falling off the platform.

■ SPARK ARRESTOR



The spark arrestor prevents incandescent carbon particles from coming out the tail pipe. Baffles in the spark arrestor slow the flow of particles through the exhaust system. The additional time spent in the exhaust system lets the carbon completely burn before it comes out the tail pipe.

■ LANYARD ANCHOR POINTS

There are four anchors on the floor of the platform, one at the front of the roll-out deck, one at the back of the platform, and one on each side of the platform.

NOTE: These anchors are not for lifting or tying down the machine.

You should attach your fall protection to the anchors if work rules require it.

■ AC GENERATOR

⚠ CAUTION

Do not use the ac generator unless the hydraulic oil is over 70°F (21°C). The output voltage of the generator depends on the temperature of the hydraulic oil. Temperature below 70°F (21°C) will cause dangerously low output voltages that can burn out some kinds of electrical equipment.

The hydraulically powered, 115 V ac generator can be used anytime the SR engine is running and the SR is completely stationary. Turning the ac generator on stops all machine movement.

Set the **AC OUTLET SWITCH**, on the platform-control box, to on (--) and a total of 2 kW, continuous duty, 120 V ac power is available from the two electrical outlets under the platform-control box or the electrical outlet on the end of the generator housing.

NOTE: To energize the two platform electrical outlets, the power cord from the platform outlets must be plugged into the receptacle on the generator.

13. FIRE FIGHTING & HAZARDOUS CHEMICAL CONTAINMENT

An SR contains the following materials and objects that potentially could become significant fire or environmental hazards during the lifetime of an SR:

- Anti-freeze (ethylene glycol)
- Battery, lead/acid
- Diesel fuel
- Foam in tires
- Gasoline
- Hydraulic oil
- Liquefied petroleum gas
- Motor oil

The rest of this chapter lists information from manufactures' Material Safety Data Sheets. You will need the information if you ever have to control any of the above items during an upset or emergency.

■ ANTIFREEZE (UN 1993)

Fire extinguishing media: Dry Chemical, foam, or CO₂.

Special fire fighting procedures: Water spray may be ineffective on fire but can protect fire fighters and cool closed containers. Use fog nozzles if water is used. Do not enter confined fire-space without full bunker gear. (Helmet with face shield, bunker coats, gloves & rubber boots). Use a NIOSH approved positive pressure self-contained breathing apparatus. Keep container tightly closed. Isolate from oxidizers, heat & open flame.

Spill or leak: Small - mop up with absorbent material & transfer to hood.

Waste disposal method: Small - evaporate until all vapors are gone. Dispose of remainder by legally applicable methods.

■ BATTERY, LEAD/ACID (UN 2794)

Extinguishing media: Dry chemical, foam, or CO₂.

Special fire fighting procedures: Use positive pressure, self-contained breathing apparatus.

Unusual fire and explosion hazards: Hydrogen and oxygen gases are produced in the cells during normal battery operation

(hydrogen is flammable and oxygen supports combustion). These gases enter the air through the vent caps. To avoid the chance of a fire or explosion, keep sparks and other sources of ignition away from the battery.

Spill or leak: Remove combustible materials and all sources of ignition. Contain spill by diking with soda ash (sodium carbonate) or quicklime

(calcium oxide). Cover spill with either chemical. Mix well. Make certain mixture is neutral then collect residue and place in a drum or other suitable container. Dispose of as hazardous waste.

Wear acid resistant boots, face shield, chemical splash goggles, and acid resistant gloves. DO NOT RELEASE UNNEUTRALIZED ACID!

Waste disposal method - Sulfuric Acid:

Neutralize as above for a spill, collect residue, and place in a drum or suitable container. Dispose of as hazardous waste.

DO NOT FLUSH LEAD CONTAMINATED ACID TO SEWER.

Waste disposal method - Batteries: Send to lead smelter for reclamation following applicable federal, state, and local regulations.

■ DIESEL FUEL (NA 1993)

Extinguishing media: Use water spray, dry chemical, foam, or CO₂.

Special fire fighting procedures: Use water to keep fire-exposed containers cool. If leak or spill has not ignited, use water spray to disperse the vapors and to provide protection for personnel attempting to stop a leak. Water spray may be used to flush spills away from exposures.

Unusual fire and explosion hazards: Products of combustion may contain carbon monoxide, carbon dioxide, and other toxic materials. Do not enter enclosed or confined space without proper protective equipment including respiratory protection.

Spill or leak: Contain spill immediately in smallest area possible. Recover as much of the product itself as possible by such methods as vacuuming, followed by soaking up of residual fluids by use of absorbent materials. Remove contaminated items including contaminated soil and place in proper containers for disposal. Avoid washing, draining, or directing material to storm or sanitary sewers .

Waste disposal method: Recycle as much of the recoverable product as possible. Dispose of nonrecyclable material as a RCRA hazardous waste by such methods as incineration, complying with federal, state, and local regulations.

■ FOAM IN TIRES

Extinguishing media: Water, dry chemical, foam, or CO₂.

13. FIRE FIGHTING

Special fire fighting procedures: Evacuate non emergency personnel to a safe area.

Unusual fire and explosion hazards: Fire fighters should use self-contained breathing apparatus. Avoid breathing smoke, fumes, and decomposition products. Use water spray to drench smoldering elastomer. Product may melt, after ignition, to form flammable liquid. Burning produces intense heat, dense smoke, and toxic gases, such as carbon monoxide, oxides of nitrogen, and traces of hydrogen cyanide.

Spill or leak: Pick up and handle as any other inert solid material.

Waste disposal method: Not considered a hazardous material. Dispose of material according to any local, state, and federal regulations.

■ GASOLINE (UN 1203)

Extinguishing media: Dry chemical, foam, or CO₂.

Special fire fighting procedures: Water may be ineffective to extinguish, but water should be used to keep fire-exposed containers cool. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop a leak. Water spray may be used to flush spills away from areas of potential ignition.

Unusual fire and explosion hazards: Highly Flammable. Products of combustion may contain carbon monoxide, carbon dioxide and other toxic materials. Do not enter enclosed or confined space without proper protective equipment including respiratory protection.

Spill or leak: Review fire and explosion hazards before proceeding with clean up. Use appropriate personal protective equipment during clean up. Dike spill. Prevent liquid from entering sewers, waterways, or low areas. Soak up with sawdust, sand, oil dry or other absorbent material. Shovel or sweep up.

Remove source of heat, sparks, flame, impact, friction or electricity including internal combustion engines and power tools. If equipment is used for spill cleanup, it must be explosion proof and suitable for flammable liquid and vapor.

NOTE: Vapors released from the spill may create an explosive atmosphere.

Waste disposal method: Treatment, storage, transportation and disposal must be in accordance with applicable federal, state,

provincial, and local regulations. Do not flush to surface water or sanitary sewer system. By itself, the liquid is expected to be a RCRA ignitable hazardous waste.

■ HYDRAULIC OIL (UN 1270)

Extinguishing media: Use water spray, dry chemical, foam, or CO₂.

Special fire fighting procedures: Water or foam may cause frothing. Use water to keep fire-exposed containers cool. Water spray may be used to flush spills away from exposures.

Unusual fire and explosion hazards: Products of combustion may contain carbon monoxide, carbon dioxide, and other toxic materials. Do not enter enclosed or confined space without proper protective equipment including respiratory protection.

Spill or leak: Contain spill immediately in smallest area possible. Recover as much of the product itself as possible by such methods as vacuuming, followed by soaking up of residual fluids by use of absorbent materials. Remove contaminated items including contaminated soil and place in proper containers for disposal. Avoid washing, draining or directing material to storm or sanitary sewers .

Waste disposal method: Recycle as much of the recoverable product as possible. Dispose of nonrecyclable material as a RCRA hazardous waste by such methods as incineration, complying with federal, state, and local regulations.

■ LIQUEFIED PETROLEUM GAS (UN 1075)

Extinguishing media: Water spray. Class A-B-C or BC fire extinguishers.

Special fire fighting procedures: Stop flow of gas. Use water to keep fire-exposed containers cool. Use water spray to disperse unignited gas or vapor. If ignition has occurred and no water available, tank metal may weaken from overheating. Evacuate area. If gas has not ignited, LP-gas liquid or vapor may be dispersed by water spray or flooding.

Spill or leak: Keep public away. Shut off supply of gas. Eliminate sources of ignition. Ventilate the area. Disperse with water spray. Contact between skin and these gases in liquid form can cause freezing of tissue causing injury similar to thermal burn.

Waste disposal method: Controlled burning.

■ MOTOR OIL (UN 1270) See HYDRAULIC OIL (UN 1270) above.

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LIMITED WARRANTY

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

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

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

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

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

REPLACEMENT PARTS WARRANTY

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

THIS WARRANTY EXCLUDES AND SNORKEL DOES NOT WARRANT:

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

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

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

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

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