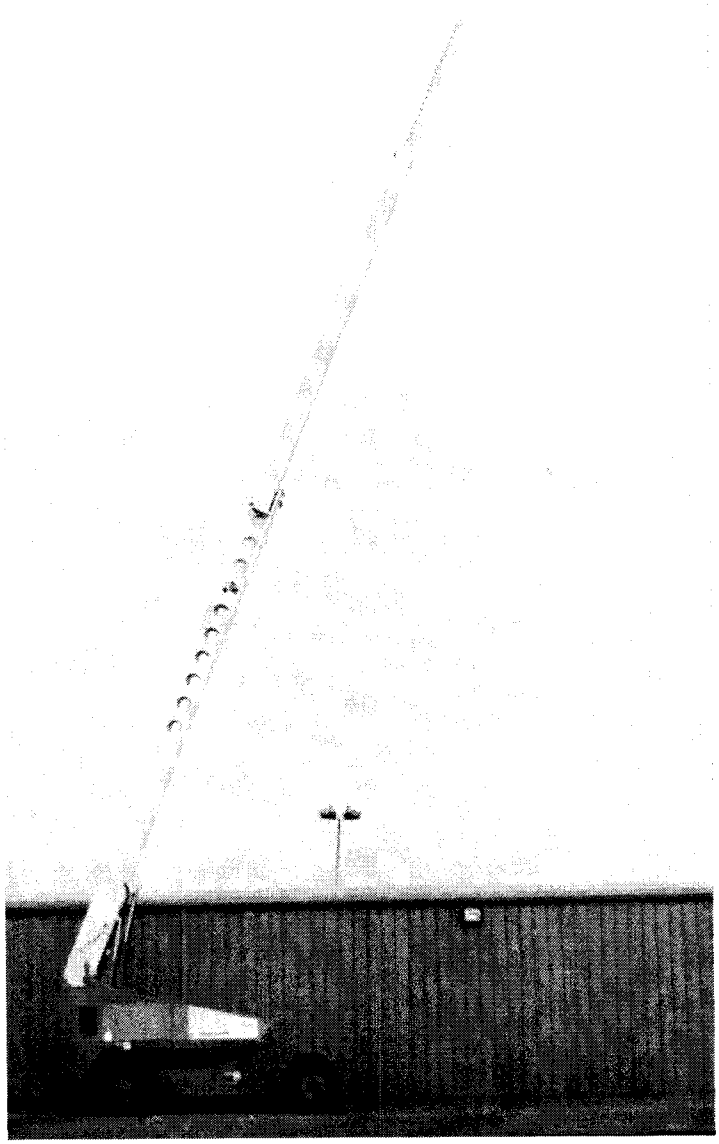
Snorkel

Operator's Manual

PRO100



P/N 0191402
January, 2001

OmniQuip TEXTRON Snorkel INTERNATIONAL

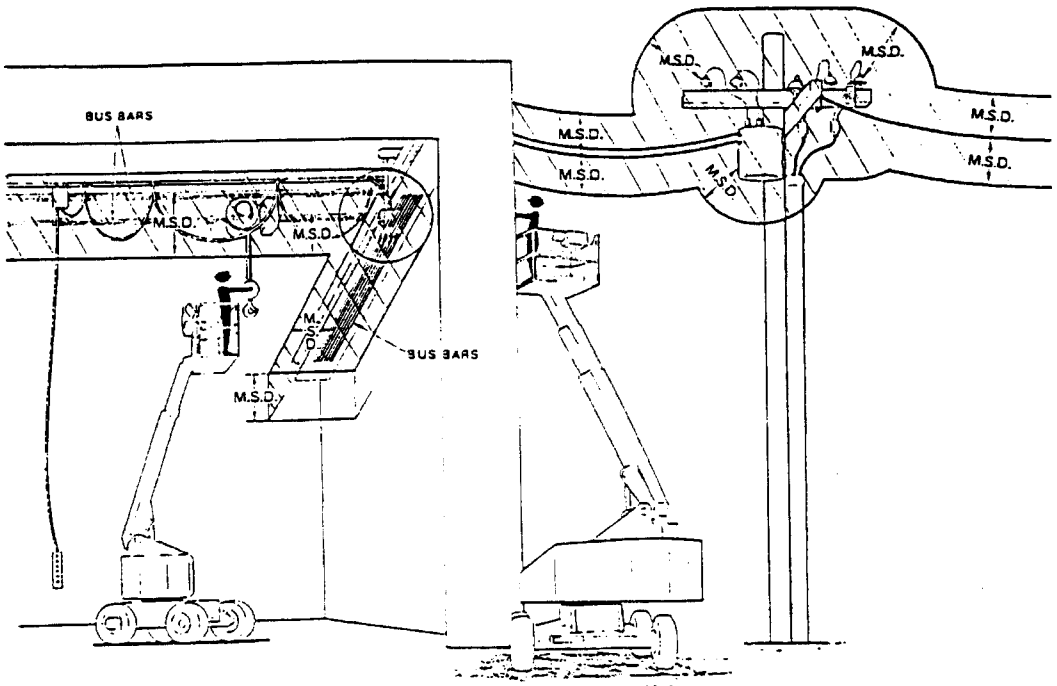
⚠DANGER

ELECTRICAL HAZARD

The PRO 100 is an all metal boom, NOT ELECTRICALLY INSULATED, aerial work platform. Do not operate it near ELECTRICAL conductors. Regard all conductors as being energized. Use the table and figure below to determine safe clearance from electrical conductors. Table 1 and Figure 3 are reprinted courtesy of Scaffold Industry Association, ANSI/SIA A92.5, page 23.

Table 1 - Minimum safe approach distance (M.S.A.D.)
to energized (exposed or insulated) power lines

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



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.

Figure 3 - Minimum Safe Approach Distance (M.S.A.D.)

⚠DANGER

ELECTRICAL HAZARD

THE PRO 100 AERIAL WORK PLATFORM IS NOT ELECTRICALLY INSULATED.

If the platform, booms, or any other conductive part of a PRO 100 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 a PRO 100 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 PRO 100. 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 PRO 100 until you are sure the electricity has been turned off.

If a PRO 100 is in contact with a live conductor, the platform operator **MUST** warn others on the ground in the vicinity of the PRO 100 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 the PRO 100 ground controls when the platform, booms, or any other conducting part of a PRO 100 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 a PRO 100 must be continuously aware of electrical hazards, recognizing that **SERIOUS INJURY** or **DEATH** can result if contact with an electrical wire does occur.

TABLE OF CONTENTS

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

⚠DANGER

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

2. This sign

⚠CAUTION

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 damage the PRO 100 if not done correctly.

■ QUALIFIED OPERATORS

The PRO 100 aerial platform has built-in safety features and has 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 PRO 100 on the job. You must be trained and authorized to perform any functions of the PRO 100. Operation of the PRO 100 must be within the scope of the machine specifications.

Before operating the PRO 100 you must read and understand the operating instructions in this manual as well as the decals, warnings, and instructions on the machine itself.

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 pre-start inspection of the PRO 100 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 the PRO 100.

⚠DANGER

Misuse of this machine can result in DEATH or SERIOUS INJURY.

Do not operate this equipment unless you are TRAINED and AUTHORIZED and have read and thoroughly understand all information given in this Operator's Manual and on all DANGER and CAUTION signs on the machine.

■ 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 PRO 100 in good operating condition. Do not perform other maintenance unless you are a TRAINED mechanic, QUALIFIED to work on the PRO 100. Call QUALIFIED maintenance

personnel if you find problems or malfunctions. Information contained in this manual concerns only current PRO 100s, 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 the PRO 100 read, understand, and conform to all applicable regulations. Ultimate compliance to OSHA regulations is the responsibility of the employer using the equipment.

ANSI Standard A92.5 identifies requirements of all parties who might be involved with Boom-Supported Elevating Work Platforms.

A reprint of the "Manual of Responsibilities for Dealers, Owners, Users, Operators, Lessors and Lessees of ANSI/SIA A92.5-1992 Boom-Supported Elevating Work Platforms" is available from Snorkel dealers or from the factory upon request.

Copies are also available from:

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

■ ADDITIONAL INFORMATION

For additional information, contact your local dealer, or write:

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

http://www.snorkelusa.com

■ SAFE OPERATION

The following safety information is vitally important for safe operation of the PRO 100. Failure to follow these instructions can result in personal injury or DEATH.

❑ Pre-start Inspection

Prior to each shift, the PRO 100 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 the PRO 100 unless you are trained and authorized, understand the operation characteristics of the PRO 100, 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 the PRO 100 as a ground for welding. Ground to the work piece.

Before the PRO 100 is used, and during use, check the area in which the PRO 100 is to be used for possible hazards such as, but not limited to:

1. drop-offs or holes
2. bumps and floor obstructions
3. debris
4. overhead obstructions and high voltage conductors
5. hazardous locations
6. inadequate surface and support to withstand all load forces imposed by the aerial platform in all operating configurations
7. wind and weather conditions
8. presence of unauthorized persons
9. 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 personnel that are trained in the operation of the emergency controls, working in the immediate area of the PRO 100 to assist the platform operator in the event of an emergency.

When moving the platform, check the clearance around the PRO 100 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 the PRO 100.

Do not permit riders on the machine anyplace 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 a PRO 100 that is not functioning properly, or has been damaged, until the machine has been repaired by a qualified maintenance person.

Do not operate a PRO 100 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.

❑ Electrocution

The PRO 100 is an all-metal boom, NON-INSULATED, aerial work-platform. Do not operate it near ELECTRICAL conductors. Regard all conductors as being energized.

Do not operate outside during a thunderstorm.

❑ Tipover & Falling Hazards

Do not operate a PRO 100 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.

Under normal working conditions it is best not to transfer from the platform to another structure or vice versa, unless that is the safest way to do the job. Each situation must be judged separately taking the work environment into account. The following guidelines apply:

- Where possible, place the work platform over 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 rails.

All platform occupants MUST wear a fall restraint device connected to a lanyard anchor point.

Do not exceed the unrestricted platform capacity shown on the platform.

Do not raise the boom if the PRO 100 is on soft ground. Operate the boom only on a firm surface capable of withstanding all load forces imposed by the aerial platform in all operating conditions.

Do not carry loads from any point outside of the platform.

Care shall be taken to prevent rope, electric cords, and hoses, etc., from becoming entangled in the aerial platform.

Raise the platform only when the PRO 100 is on level ground.

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

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

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 boom for any purpose other than to position personnel, their tools, and materials.

Do not use the PRO 100 as a crane, hoist, or jack.

Do not operate the PRO 100 in winds, or wind gusts, of 28 mph (45 km/hr) or more.

Do not add anything to the PRO 100 that will increase the wind loading (billboards, banners, flags, etc).

❑ Crushing

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

Never cover the floor grating or otherwise obstruct your view below.

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.

Be sure the guardrail system, including the gate, is in place and secure.

❑ Mounting & Dismounting Precautions

Use three points of support when getting on or off the platform (two hands and one foot or a similar set of points). 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.

When leaving the machine parked or unattended, remove the starter key from the **MASTER KEY SWITCH**, set the **BATTERY** switch to OFF, then lock the **BATTERY** switch.

❑ Operating Precautions

Do not modify the PRO 100 in any way.

When parts or components are replaced, they shall be identical or equivalent to original Snorkel parts or components.

Do not override any of the safety features of the PRO 100.

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.

Never remove the fuel cap or refuel a gasoline engine while the engine is running or hot. Never allow fuel to spill on hot machine components.

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 the PRO 100. 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 PRO 100 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 PLACARDS AND DECALS INSPECTION CHARTs and DRAWINGs in the "DAILY INSPECTION AND MAINTENANCE" chapter for part numbers, location, and required quantities of all placards and decals.

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⚠DANGER

Unit will become unstable if boom lowers without retracting which presents a hazard to the operator. DISCONTINUE THESE PROCEDURES (RELEASE SWITCHES OR CLOSE MANUAL BLEED-DOWN VALVE) IMMEDIATELY IF THE BOOM LOWERS WITHOUT RETRACTING!

ELECTRIC EMERGENCY BLEED-DOWN PROCEDURE

Use only when boom cannot be lowered with normal or emergency power systems and ***EMS*** error reset procedure has failed.

1. Make sure area under boom is clear.
2. Rotate turntable to align with chassis, if possible.
3. Turn OFF **MASTER** switch located on ground-control box.
4. Pull out **EMERGENCY STOP** button located on ground-control box.
5. Lift up and hold the two emergency bleed down toggle switches, one located on each side of this box.

MANUAL EMERGENCY BLEED-DOWN PROCEDURE

Use only after electric emergency bleed-down procedure has been tried.

Do not access manual bleed-down valve from above turntable. Lowering boom could crush operator. Make sure manual bleed-down valve is closed after bleed down is completed.

1. Make sure area under boom is clear.
2. Rotate turntable to align with chassis, if possible.
3. Turn OFF **BATTERY** disconnect switch above this box.
4. Open manual bleed-down valve located on lift cylinder, accessing it from under the turntable.

0190905

(LPG option only)

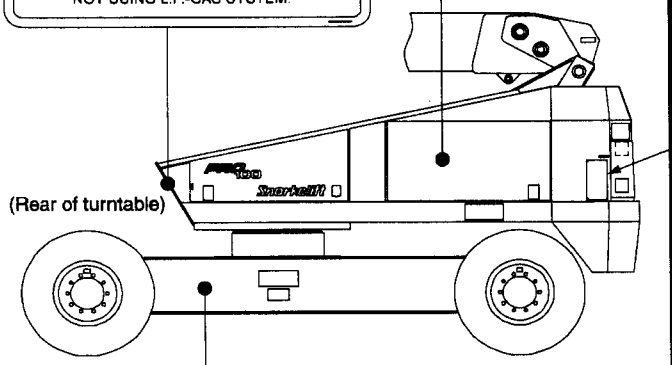
⚠CAUTION

THIS MACHINE IS EQUIPPED WITH

LIQUID WITHDRAWAL

L.P. GAS SYSTEM

- LIQUID OR VAPOR WITHDRAWAL L.P.-GAS CYLINDER MAY BE USED.
- ALWAYS KEEP L.P.-GAS CYLINDER SHUT-OFF VALVE CLOSED WHEN NOT USING L.P.-GAS SYSTEM.



(Rear of turntable)

⚠DANGER

A "RUNAWAY" SNORKELIFT CAN CAUSE DEATH OR SERIOUS INJURY. CHECK WITH TOW VEHICLE MANUFACTURER OR MANUFACTURER'S LITERATURE TO SEE THAT TOW VEHICLE CAN SAFELY TOW AND STOP TOTAL WEIGHT OF SNORKELIFT ON THE STEEPEST GRADE YOU WILL ENCOUNTER. REMEMBER, SNORKELIFT DOES NOT HAVE BRAKES WHEN IT IS TOWED.

BE CERTAIN TOW VEHICLE BRAKES ARE SET AND TOW BAR IS CONNECTED TO BOTH TOW VEHICLE AND SNORKELIFT BEFORE YOU TURN SNORKELIFT DISCONNECT-PLATES OVER.

AT THE END OF THE TOW, BEFORE YOU DISCONNECT THE SNORKELIFT FROM THE TOWING VEHICLE, TURN THE DISCONNECT-PLATES BACK OVER SO THE NIPPLES ARE OUT. THAT WILL PREVENT THE MACHINE FROM ROLLING WHEN YOU DISCONNECT IT FROM THE TOW VEHICLE.

DO NOT EXCEED 10 MPH (16 KM/HR) WHEN TOWING. AVOID SHARP TURNS.

(Tow option only) - far side

OPERATING INSTRUCTIONS

- Check engine oil level and hydraulic oil level daily.
- Check tire condition daily.
- Inspect unit including operation prior to each days use.
- Start and warm engine from ground control station - set SELECTOR SWITCH to GROUND.
- Extend and lock rear axle prior to extending or raising boom (see procedure below).
- Set SELECTOR SWITCH to PLATFORM and set BOOMS/AXLES SWITCH to BOOM for operation from platform control station.
- See Operator's Manual for complete operation and function procedures.
- Observe all safety regulations and cautions.

⚠DANGER

- Do not operate this unit unless you are a qualified operator and have read and thoroughly understand all information given in the Operator's Manual and on DANGER and CAUTION placards on this unit.
- Do not operate this unit in close proximity to power lines or electrical installations. UNIT IS NOT ELECTRICALLY INSULATED.
- Do not exceed the UNRESTRICTED PLATFORM CAPACITY shown on the decal on the front of the platform.
- Do not operate this unit on soft or unstable ground.
- Operate this unit only on firm level surfaces.
- Do not raise or extend main boom unless axle is extended and locked.
- Do not operate boom functions unless axle interlock system is functioning properly (see Operator's Manual).
- Do not use unit if not functioning properly or damaged in any way.
- Do not use boom as means of lifting or moving unit.
- Do not run engine while adding fuel or oil.
- Do not modify unit. Unauthorized equipment modification will void all warranties.

TO EXTEND (RETRACT) AXLE.

1. Position unit on firm level surface.
2. Completely lower and retract the main boom.
3. Set SELECTOR SWITCH to GROUND, set BOOMS/AXLE SWITCH to AXLES.
4. Use the jack control lever to RAISE the rear of the unit.

⚠DANGER

- Do not extend axle unless area adjacent to wheels is clear of all personnel and equipment.
- Do not get under unit when supported by jack.
- Do not use boom or drive functions while unit is supported by jack.
- Do not operate unit unless rear axle pin-lock is in place.

5. Remove axle pin-lock.
6. Fully EXTEND (RETRACT) axle.
7. Reinstall axle pin-lock and snapper pin.
8. Lower unit to ground and fully retract jack.
9. Return BOOMS/AXLES SWITCH to BOOMS.

EXTEND RAISE

AXLES

RETRACT LOWER

⚠DANGER

CRUSHING HAZARD. Be certain area under jack shoe plate is unobstructed and can support rear axle weight. 0110708

Snorkel ST JOSEPH, MISSOURI U.S.A.

MODEL NUMBER		SERIAL NUMBER	
MONTH / YEAR OF MANUFACTURE		SLOPE SENSOR ALARM SETTING	deg
MAXIMUM MACHINE WEIGHT	lbs kg	MAXIMUM WHEEL LOAD	lbs kg
ENGINE POWERED MODELS	hp kW	BATTERY POWERED MODELS ONLY — DRIVE MOTORS	V
		BATTERIES	V Ah
MAXIMUM ALLOWABLE MANUAL FORCE (SIDE PULL)	lbs N	MAXIMUM ALLOWABLE WIND SPEED	mi/h m/s
PLATFORM SIZE	in cm	MAXIMUM PLATFORM REACH	ft m
MAXIMUM PLATFORM HEIGHT	ft m	MAXIMUM DRIVE HEIGHT	ft m

⚠CAUTION

Do not remove any weight from this unit. Any weight added must be distributed equally on each axle. Proper stability and axle weights of this unit are based on the platform size shown above.

Axle weights with unit in the stowed - travel position.

STEER AXLE	lbs	kg
DRIVE AXLE	lbs	kg

00/0901

⚠DANGER

YOU MUST NOT OPERATE THIS DEVICE UNLESS:

1. YOU HAVE BEEN TRAINED IN THE SAFE OPERATION OF THIS DEVICE AND
2. YOU KNOW AND FOLLOW THE SAFETY AND OPERATING RECOMMENDATIONS CONTAINED IN THE MANUFACTURER'S MANUALS, YOUR EMPLOYER'S WORK RULES, AND APPLICABLE GOVERNMENTAL REGULATIONS.

AN UNTRAINED OPERATOR SUBJECTS HIMSELF AND OTHERS TO DEATH OR SERIOUS INJURY.

0323697

⚠DANGER

ELECTROCUTION HAZARD

THIS MACHINE IS NOT ELECTRICALLY INSULATED.

- Death or serious injury can result from contact or inadequate clearance to electrical power lines and apparatus.
- Maintain 10 feet minimum clearance from electrical power lines and apparatus.
- Allow for sway, rock, and sag.

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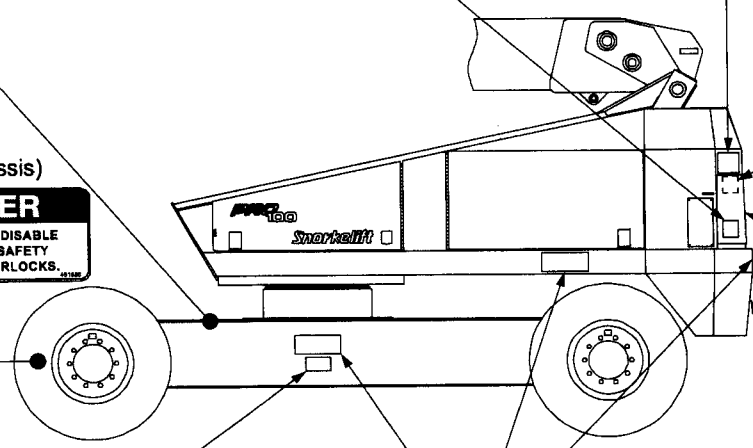
(rear of chassis)

⚠DANGER

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



⚠DANGER

ROTATING ENGINE PARTS

KEEP CLEAR

SERIOUS INJURY CAN RESULT

0181410

(Tow option only)

⚠DANGER

MACHINE TIPOVER HAZARD

DEATH or serious injury can result if machine tips over.

This machine is equipped with foam filled or solid tires, wheel weight is critical for stability.

To prevent machine tip over, replace tires with factory approved foam filled or solid tires ONLY.

DO NOT attempt to inflate foam filled or solid tires.

⚠DANGER

ELECTROCUTION HAZARD

KEEP CLEAR

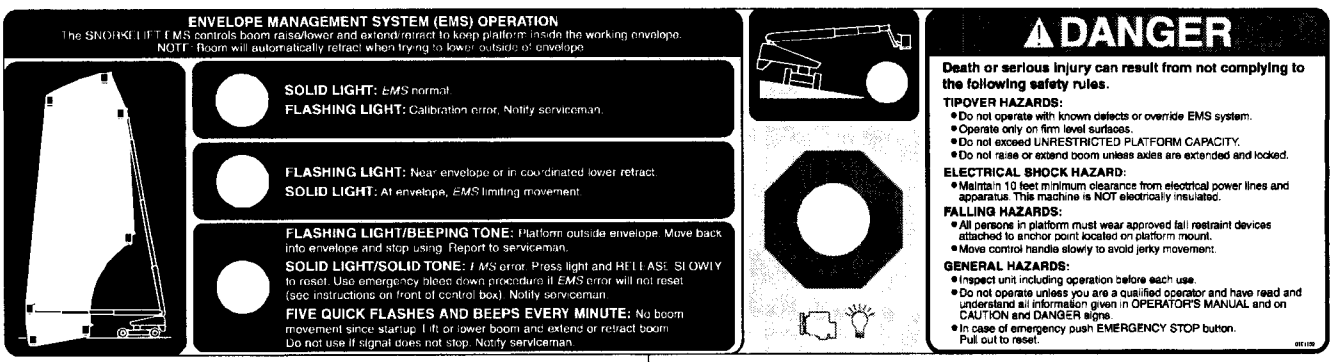
Death or serious injury can result from touching this machine if this machine is in contact with electrical power lines or apparatus.

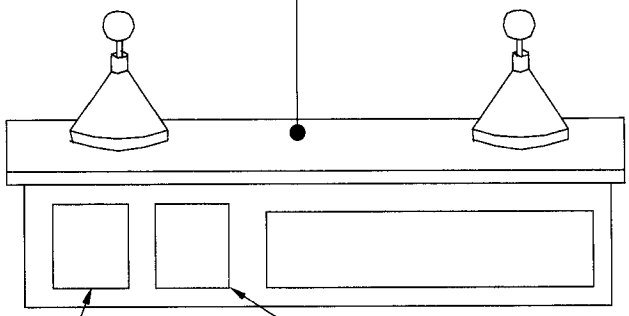
⚠DANGER

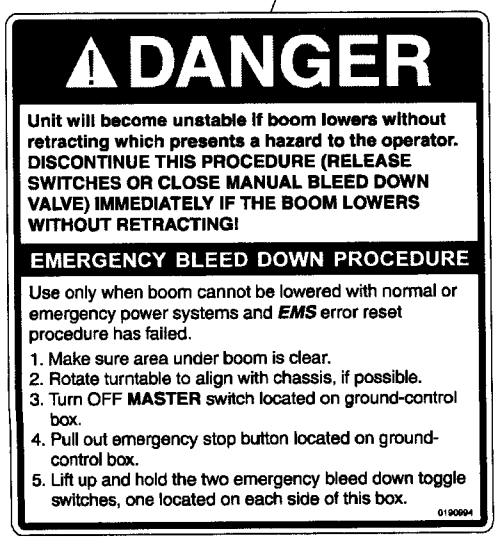
CRUSHING HAZARD

DEATH OR SERIOUS INJURY CAN RESULT FROM BEING CRUSHED BETWEEN COUNTERWEIGHT AND TOW VEHICLE.

DO NOT ATTEMPT TO ATTACH TOW BAR TO TOW VEHICLE UNLESS SNORKELIFT COUNTERWEIGHT IS TO SIDE OF CHASSIS.


ENVELOPE MANAGEMENT SYSTEM (EMS) OPERATION
The SNORKEL LIFT EMS controls boom raise/lower and extend/retract to keep platform inside the working envelope.
NOTE: Boom will automatically retract when trying to lower outside of envelope.
SOLID LIGHT: EMS normal.
FLASHING LIGHT: Calibration error. Notify serviceman.
FLASHING LIGHT: Near envelope or in coordinated lower retract.
SOLID LIGHT: At envelope, EMS limiting movement.
FLASHING LIGHT/BEEPING TONE: Platform outside envelope. Move back into envelope and stop using. Report to serviceman.
SOLID LIGHT/SOLID TONE: EMS error. Press light and RELEASE SLOWLY to reset. Use emergency bleed down procedure if EMS error will not reset (see instructions on front of control box). Notify serviceman.
FIVE QUICK FLASHES AND BEEPS EVERY MINUTE: No boom movement since startup. Lift or lower boom and extend or retract boom. Do not use if signal does not stop. Notify serviceman.
DANGER
Death or serious injury can result from not complying to the following safety rules.
TIPOVER HAZARDS:
• Do not operate with known defects or override EMS system.
• Operate only on firm level surfaces.
• Do not exceed UNRESTRICTED PLATFORM CAPACITY.
• Do not raise or extend boom unless axles are extended and locked.
ELECTRICAL SHOCK HAZARD:
• Maintain 10 feet minimum clearance from electrical power lines and apparatus. This machine is NOT electrically insulated.
FALLING HAZARDS:
• All persons in platform must wear approved fall restraint devices attached to anchor point located on platform mount.
• Move control handle slowly to avoid jerky movement.
GENERAL HAZARDS:
• Inspect unit including operation before each use.
• Do not operate unless you are a qualified operator and have read and understand all information given in OPERATOR'S MANUAL and on CAUTION and DANGER signs.
• In case of emergency push EMERGENCY STOP button. Pull out to reset.




DANGER
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Use only when boom cannot be lowered with normal or emergency power systems and EMS error reset procedure has failed.
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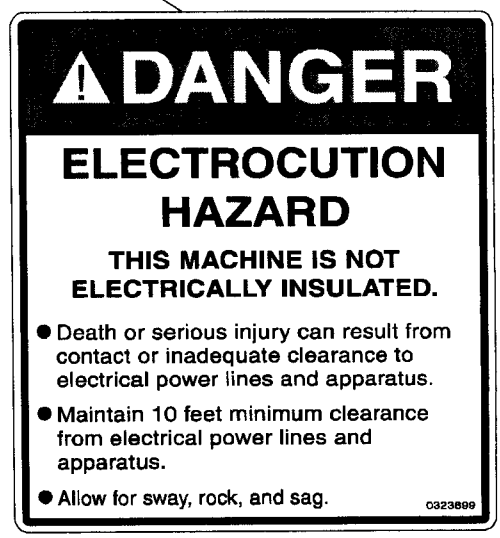
5. Lift up and hold the two emergency bleed down toggle switches, one located on each side of this box.
0190994


DANGER
ELECTROCUTION HAZARD
THIS MACHINE IS NOT ELECTRICALLY INSULATED.
• Death or serious injury can result from contact or inadequate clearance to electrical power lines and apparatus.
• Maintain 10 feet minimum clearance from electrical power lines and apparatus.
• Allow for sway, rock, and sag.
0323899

⚠ DANGER

PINCH POINT

Death or serious injury could occur if persons or objects become pinched between platform and mounting frame while platform is sliding.

To prevent pinching:

- Do not operate slide controls from platform.
- Remove all persons and equipment from platform.
- Keep hands and arms away from platform and frame.
- Position latch hooks, hoses, wires, bolts, etc. away from sliding mechanism.

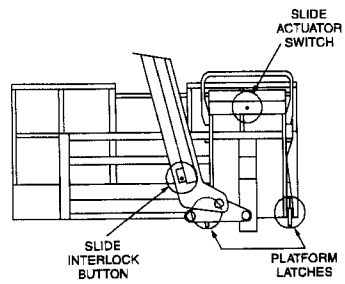
⚠ DANGER

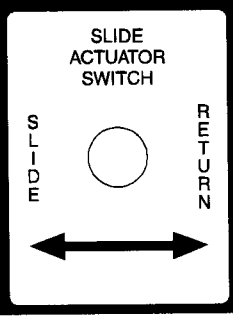
FALLING HAZARD

Death or serious injury could result if platform latches are loose or unfastened, causing the platform to be unstable, or slide from side to side.

To prevent a fall:

- Operate boom with platform in centered position only.
- Fasten platform latches before entering platform and operating machine.
- Adjust latches if not secure.
- Unfasten latches only to slide platform.





INSTRUCTIONS

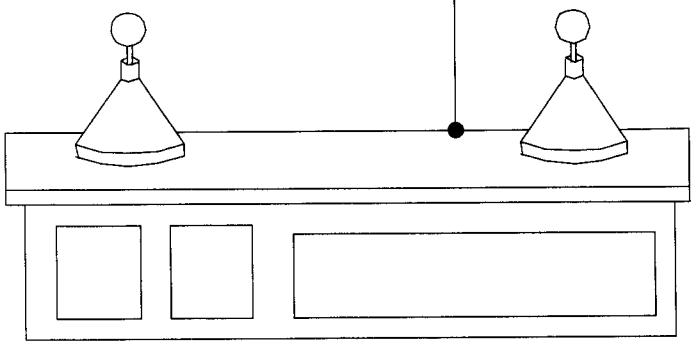
Platform slide is for truck transport only. It is not for use during boom operation.

To stow/unstow platform.

1. Unfasten latches before sliding platform.
2. Move Master Power and Emergency Stop switches to the "ON" position.
3. Move hands, arms, latch hooks, foot switch wire, etc. away from slide mechansim.
4. Push and hold slide interlock button.
5. Push and hold slide actuaror switch in direction of movement.
6. Fasten latches before operating boom.

0191251

(On front of box)



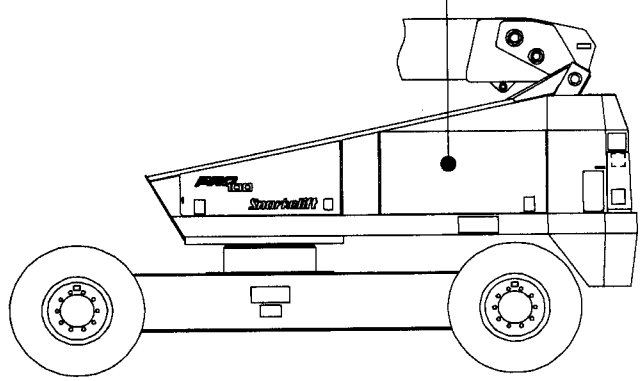
(Back view of platform-control box)

⚠ DANGER

Death or serious injury will result from tip over if Envelope Management System (EMS) is tampered with or improperly maintained.

1. Only trained qualified service personnel should work on EMS.
2. The EMS must be re-calibrated by trained qualified service personnel when any of the EMS components are replaced or adjusted. These components include joysticks, boom angle sensors, boom length sensors and MotionPac Electronic Control Units.
3. MotionPac Electronic Control Units must only be replaced with same model units. The model number of Snorkelift listed on the Electronic Control Unit name plates must match the model number of this Snorkelift unit.
4. Turn battery disconnect switch off and disconnect the EMS harnesses from the MotionPac Electronic Control Units before welding anyplace on this unit.

0191491



(Tow Option Only)

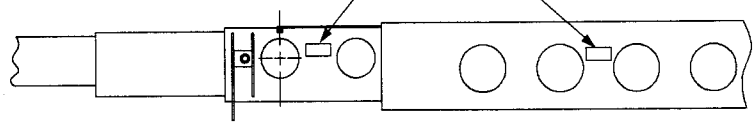
⚠DANGER

DO NOT RIDE IN PLATFORM WHILE UNIT IS BEING TOWED.

0082154

⚠DANGER

DO NOT REACH THROUGH HOLES.



⚠DANGER

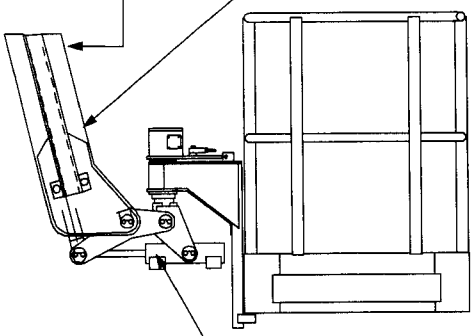
ELECTROCUTION HAZARD

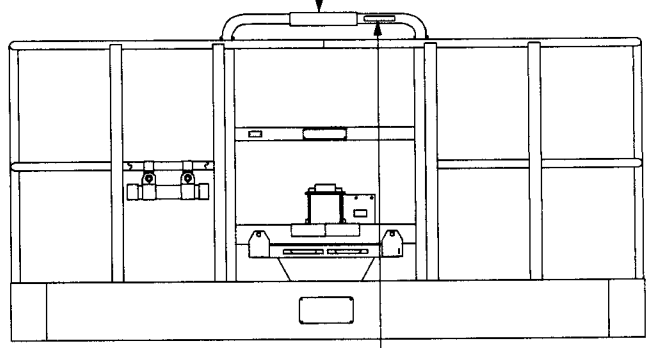
THIS MACHINE IS NOT ELECTRICALLY INSULATED.

- Death or serious injury can result from contact or inadequate clearance to electrical power lines and apparatus.
- Maintain 10 feet minimum clearance from electrical power lines and apparatus.
- Allow for sway, rock, and sag.

0323699

⚠DANGER **ELECTROCUTION HAZARD**
This machine is not electrically insulated.





⚠DANGER

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

Use only:

APPROVED Snorkel PARTS

0074311

(On all hydraulic cylinders)

⚠CAUTION

DO NOT USE BOOM TO LIFT OR PUSH MACHINE

0073666

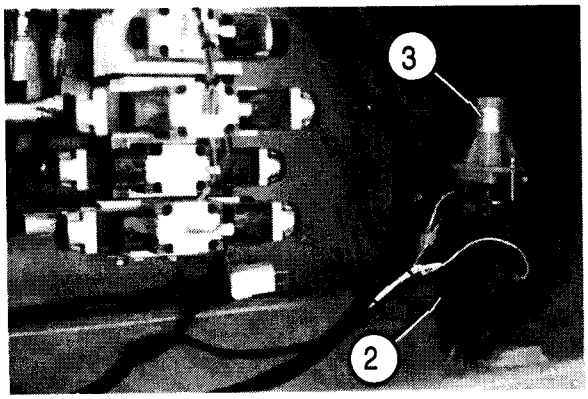
For emergency-operation controls and procedures see the "EMERGENCY OPERATION" chapter in this manual.

The devices listed in this chapter are safety devices. They are on a PRO 100 to increase safety in the work place for both the operator and other people near a PRO 100. 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 PRO 100 from service immediately until a qualified service technician can make repairs.

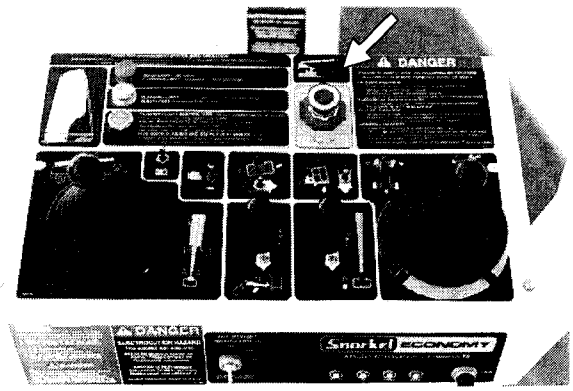
■ TILT-ALARM HORN, SIREN, & LIGHT

There is one tilt-alarm siren, one tilt-alarm horn, and one tilt-alarm warning light on a PRO 100.

The siren (1) is located under the platform-control box.



The horn (2) is located in the turntable under the tilt alarm sensor (3).



The warning light is on the platform-control box.

The siren will emit a two-toned sound (high-low-high-low...) if the PRO 100 is tilted more than 3.5° (7 inch rise in 10 foot run / 18 cm rise in 3 m run) and the booms are above horizontal or extended more than 7 feet (2 m). The warning light will come on and the horn will emit a continuous sound at the same time the siren sounds.

NOTE: The platform siren will not sound if the PRO 100 is bring controlled from the ground-control box.

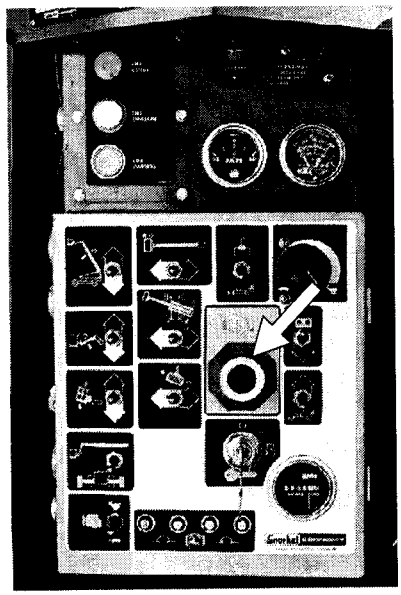
After the siren and/or horn begins to sound, if the tilt continues to increase, the PRO 100 can tip over. When you are in control of a PRO 100 and you hear either of these two warning sounds, or see the warning light come on, you should immediately:

1. Stop using the **DRIVE/STEER** controller stick on the platform-control box.

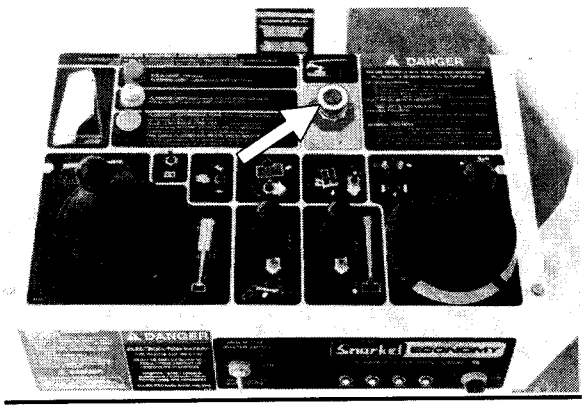
2. Completely retract and completely lower the booms.

3. Use the platform-control box **DRIVE/STEER** controller to move the PRO 100 to a level surface or more firm ground before extending or raising the booms again.

■ EMERGENCY STOP SWITCHES



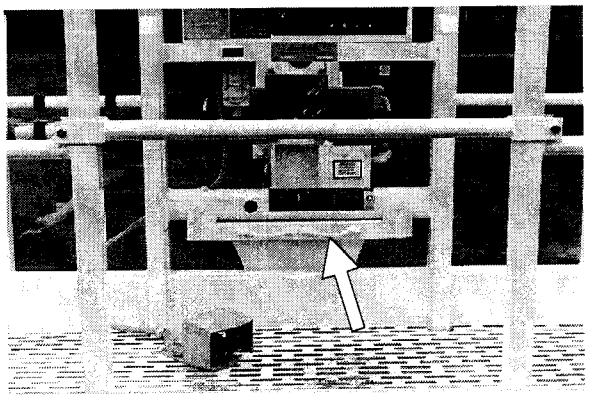
At the ground-control box: Press the red **EMERGENCY STOP** button in, at any time, under any conditions, and the entire machine stops, the engine turns off, and nothing moves. This switch must be pulled up (out) for anything on the PRO 100 to work.



At the platform-control box: Press the large red **EMERGENCY STOP** button down and the entire machine stops, the engine turns off, and nothing moves. This switch must be pulled to its up (out) position to control the PRO 100 from the platform.

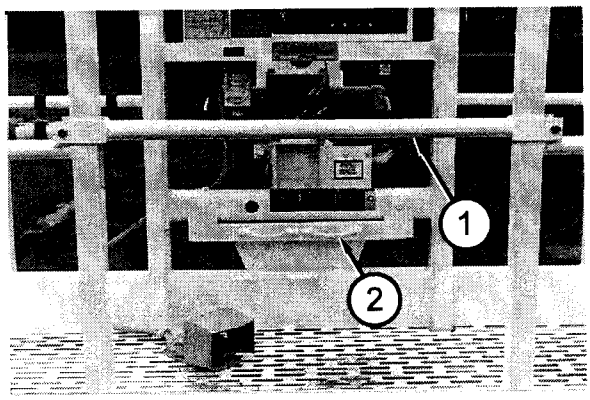
NOTE: The ground-control box is designed to override the platform-control box. If the platform-control box **EMERGENCY STOP** button is down (off) the ground-control box can still be used to start and operate the PRO 100.

■ LANYARD ANCHOR POINTS



All personnel on the platform shall attach their fall restraint lanyards to one of the lanyard anchor points.

■ GRAVITY GATE

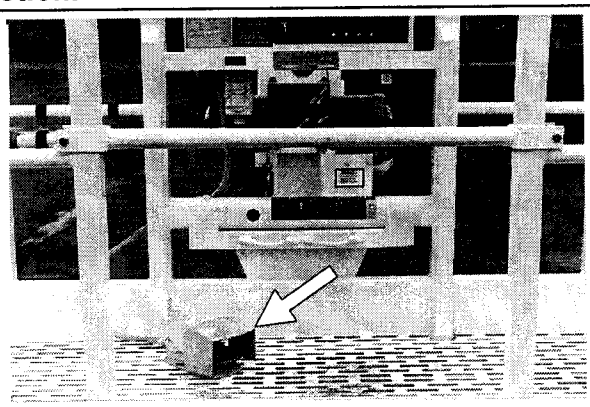


The gravity gate (1) is the place in the platform guardrail system where you should enter and leave the platform. Raise the gate and step under it onto the platform. Once you have entered the platform and attached your fall restraint lanyard to the anchorage point (2), check to see that the gravity gate (1) has fallen back into place.

■ FOOT SWITCH

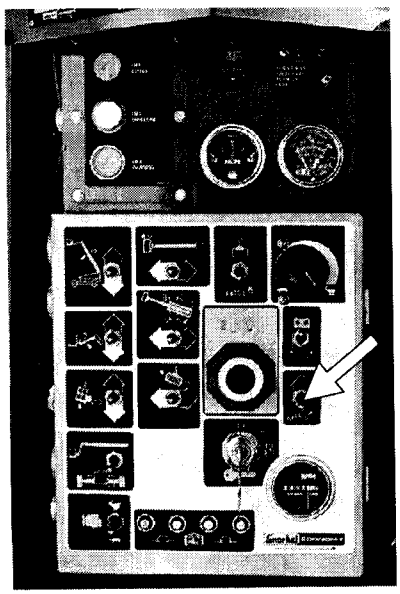
⚠DANGER

Serious injury can result from sudden stops. To avoid sudden stops, do not remove your foot from the foot switch while the TB 37 is in motion.



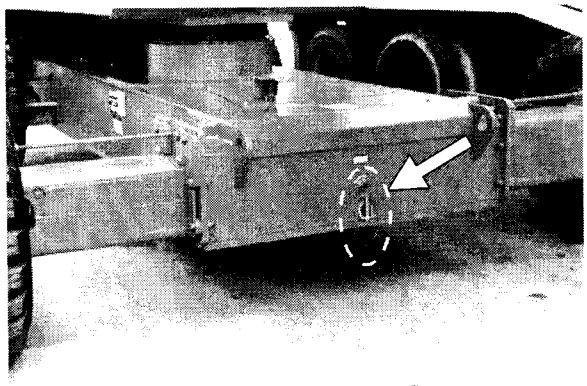
The foot switch prevents the platform from moving if something accidentally pushes one of the platform controls on the platform-control box. (It is a second action that must be performed, at the same time as another, to make the platform move.)

■ GROUND OPERATION SWITCH



The **GROUND OPERATION** switch prevents the platform from moving if something accidentally pushes one of the platform-moving switches at the ground-control box. (It is a second action that must be performed, at the same time as another, to make the platform move.)

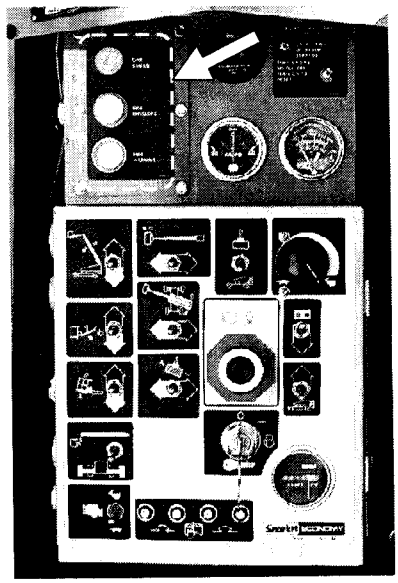
■ EXTENDIBLE AXLE INTERLOCKS



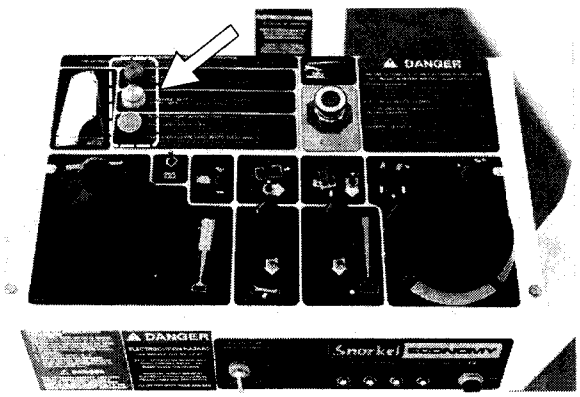
The left and right rear axles of a PRO 100 must be extended and locked for safe-working machine stability. The booms cannot be raised or extended unless the axles are completely extended and locked into place. Instructions for extending and locking the axles are given in the "OPERATION" chapter.

■ EMS LIGHTS & AUDIO ALARMS

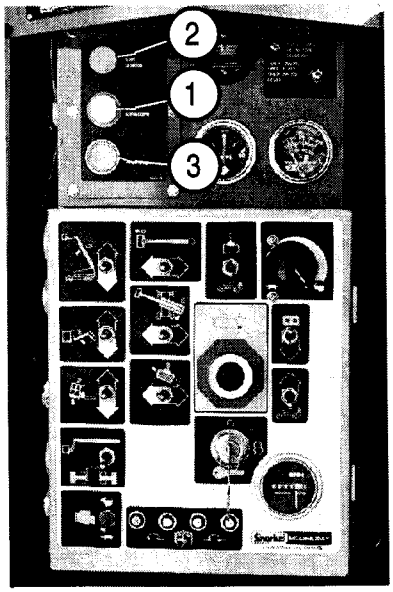
There are six envelope management system (EMS) lights on a PRO 100.



Three are on the instrument panel.



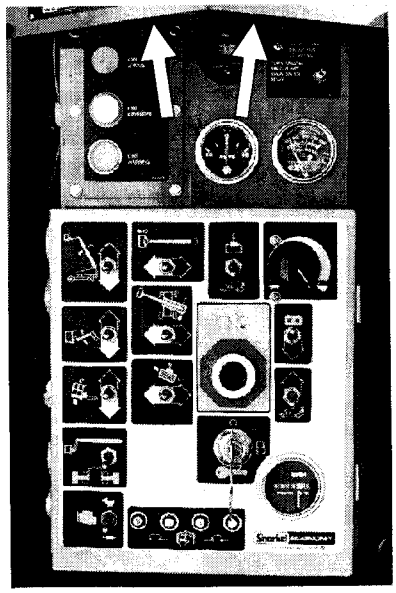
A second identical set of three is on the platform-control box.



The **EMS ENVELOPE** lights (1) give the operator information about where the platform is located relative to the platform's safe working envelope. (See the "SPECIFICATIONS" chapter for the PRO 100 safe working envelope.) The **EMS STATUS** (2) and **EMS WARNING** lights (3) tell the operator whether or not the envelope management system is operating correctly.

NOTE: EMS lights on the platform-control box have the same names as those on the instrument panel even though they are not labeled on the platform-control box.

In addition to EMS lights there are EMS audio alarms.



Two are above the instrument panel.

Two are on the bottom of the platform-control box. The audio alarms emit various sounds to alert the operator to unsafe conditions. The audio alarms and EMS lights work together to give valuable safety information. The table below summarizes that information.

NOTE: When a PRO 100 engine first starts, the EMS self-test will briefly sound all EMS audio alarms and briefly turn all six EMS lights on to check that they work. After the brief EMS self-test, conditions in the table below prevail.

EMS TABLE

LIGHT	CONDITION	AUDIO ALARM
GREEN EMS STATUS	**ON**: Machine is ready for normal operation.	None.
	FLASHING: Calibration error. Notify qualified service technician. **DO NOT USE MACHINE**.	None.
WHITE EMS ENVELOPE	**OFF**: Platform is well inside the safe working envelope.	None.
	FLASHING: Platform is less than 3 feet (1 m) inside the safe working envelope.	None.
	ON: Platform is at the limits of the safe working envelope.	None.
RED EMS WARNING	**ON**: EMS error detected. Press the red **EMS WARNING** light in and release it. If the red **EMS WARNING** light stays on, use the emergency lowering procedures system described in the "EMERGENCY OPERATION" chapter to retrieve the platform.	Continuous tone.
	FLASHING: Platform is outside the limits of the safe working envelope. Move the boom into the safe working envelope.	4 beeps - pause - 4 beeps pause - 4 beeps - etc.

■ OPERATOR HORN

The operator **HORN** button is on the right side of the platform-control box. It is used primarily to get the attention of people on the ground when you are working aloft.

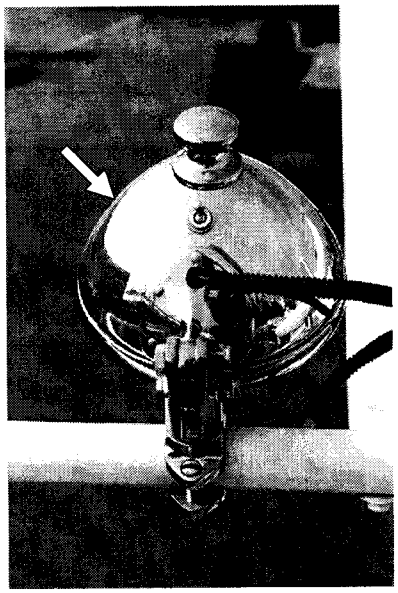
The horn itself is located below the tilt alarm sensor, it is the same horn used to sound the tilt alarm. For the horn to work the **BATTERY** switch must be ON and the following switches, on the ground-control box, must be set as indicated:

SELECTOR SWITCH.....PLATFORM
EMERGENCY STOP.....pulled up
MASTER KEY SWITCH.....ON

■ MOTION ALARM (option)

The motion alarm emits a loud beeping sound at ground level anytime the **DRIVE/STEER** controller is in FORWARD or REVERSE. This alarm alerts people on the ground that the PRO 100 is traveling along the ground.

■ PLATFORM WORK LIGHTS (option)



The platform work lights are located on top the platform guard rail. Use the lights to improve visibility when you are working aloft in dimly lit areas. Do not use the platform work lights to drive on public thoroughfares.

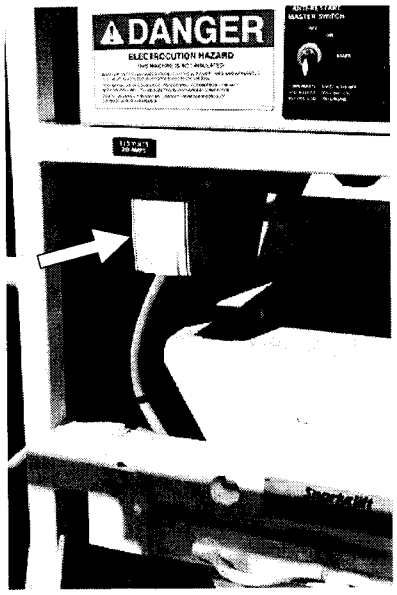
For more information about platform work lights see the "OPTIONS" chapter.

■ DRIVING LIGHTS (option)

Two 30 watt headlights are located on top of the front cowling, two 25 watt blinking taillights are on the sides of the rear cowlings. Driving lights help improve your visibility and help others see you when you are driving on dimly lit construction sites. Driving lights are not for driving on public thoroughfares.

For more information about driving lights see the "OPTIONS" chapter.

■ GFCI OUTLET

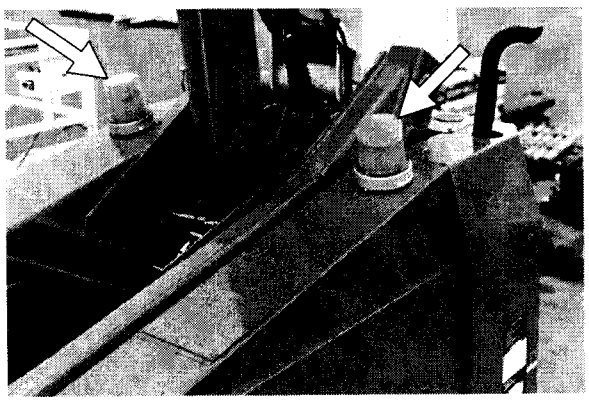


The GFCI (ground fault circuit interrupt) is the electrical outlet located under the platform-control box. The GFCI protects against short circuits to ground. When there is a short to ground the GFCI shuts off power at the electrical outlet.

■ GUARDRAILS

The guardrails help protect you from falling off the platform. Be sure the guardrails are properly installed and that the gate is in place.

■ FLASHING LIGHTS (option)



The flashing lights alert people that the PRO 100 is present. The lights flash at about one flash per second any time the engine is running. There is no ON/OFF switch for the flashing lights.

The Snorkelift PRO 100 is a boom-supported elevating work-platform 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 A92.5-1992 Boom-Supported Elevating Work Platforms.

■ GENERAL SPECIFICATIONS

Working height (nominal).....106 ft - 0 in (32.3 m)
Platform height (maximum)..100 ft - 0 in (30.5 m)
Platform reach (maximum).....66 ft - 0 in (20.1 m)
Length
(booms down and retracted)...44 ft - 6 in (13.6 m)
Width:
axles retracted .....8 ft - 6 in (2.6 m)
axles extended.....12 ft - 10 in (3.9 m)
Height (booms down) .....10 ft - 4 in (3.1 m)
Wheelbase.....12 ft - 0 in (3.7 m)
Ground clearance .....17 in (0.3 m)
Weight (approximate)..... 33,000 lbs (15,000 kg)
Max. single wheel load..... 16,750 lbs (7,598 kg)
Ground pressure (max.) .....74 psi (511 kPa)
Travel speeds (max.):
booms down and retracted
high speed, low torque .....3.0 mph (4.8 km/hr)
high torque, low speed ...0.75 mph (1.2 km/hr)
booms up and/or extended
to mid elevation .....0.75 mph (1.2 km/hr)
above mid elevation.....creep
Gradeability.....25%
Turning radius:
outside.....30 ft - 0 in (9.1 m)
inside, axles retracted.....18 ft - 8 in (5.7 m)
inside, axles extended .....16 ft - 6 in (5.0 m)

Tires (foam filled)..15 x 22.5 in (38 X 57 cm), 18 ply
Electrical system...12 V dc (neg. chassis ground)
Environmental operating ranges:
ambient air temperature .....0°F to +110°F
(-18°C to +43°C)
wind speed
(maximum gust or steady) ....28 mph (45 km/hr)
Fuel tank capacity:
std. gasoline/diesel..... 40 gal USA (151 liters)
optional LPG..... 43.5 lbs USA (20 kg)
Hydraulic oil:
tank capacity ..... 60 gal USA (227 liters)
maximum temperature (at tank)... 200°F (93°C)
system capacity..... 90 gal USA (341 liters)
maximum pressure..... 2,800 psi (19,320 kPa)
Hydraulic oil recommended:
above 10°F (-13°C) Mobil DTE 13M (ISO VG32)
below 10°F (-13°C) Mobil DTE 11M (ISO VG15)

Boom elevation .....+74°/-1° to horizontal
Boom movement times (complete range of movement):
Jib Boom
UP.....40 - 45 seconds
DOWN .....40 - 45 seconds
Turntable Swing
360° CW or CCW,
boom retracted.....110 - 120 seconds
boom extended .....320 - 330 seconds
Platform Rotation
180° CW or CCW,.....16 - 20 seconds
Main Boom Elevation
UP (boom retracted).....80 - 120 seconds
UP (boom extended) .....120 -180 seconds
DOWN (boom retracted) .....80 - 120 seconds
DOWN (boom extended).....120 -180 seconds
Boom Extension
OUT .....90 - 120 seconds
IN .....90 - 120 seconds

■ PLATFORM SPECIFICATIONS

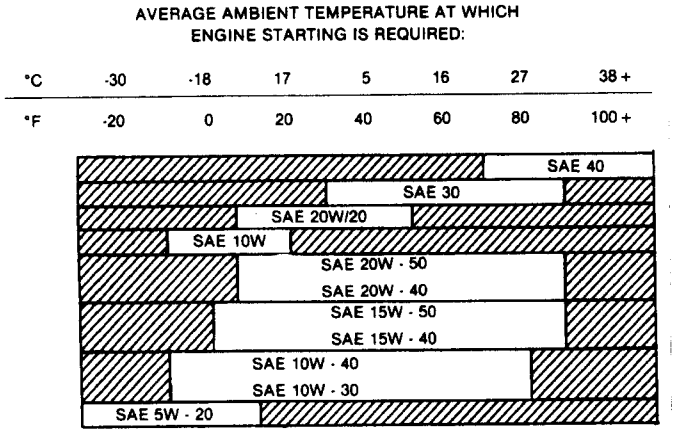
PLATFORM	SIZE inches (cm)	Unrestricted rated work load (total weight of personnel, tools, and materials that the platform is designed to carry above its floor -- same as UNRESTRICTED PLATFORM CAPACITY)
standard aluminum	30 x 92 (76 x 234)	Rated work load: 600 lbs (272 kg). Rated number of occupants: 3.
optional aluminum	30 x 60 (76 x 152)	Rated work load: 650 lbs (293 kg). Rated number of occupants: 3.
optional self-stowing aluminum	30 x 92 (76 x 234)	Rated work load: 500 lbs (227 kg). Rated number of occupants: 2.
optional steel	30 x 60 (76 x 152)	Rated work load: 600 lbs (272 kg). Rated number of occupants: 3.
optional steel	30 x 92 (76 x 234)	Rated work load: 500 lbs (227 kg). Rated number of occupants: 2.

■ ENGINE DATA

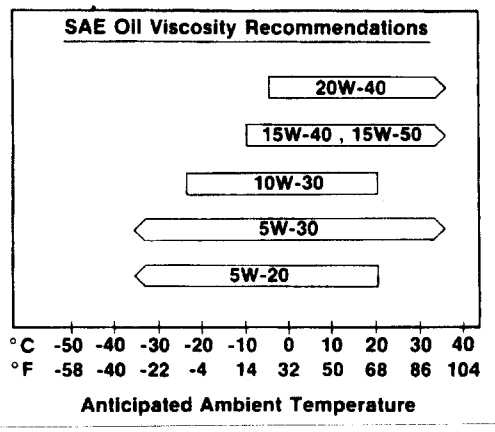
ENGINE MAKE	CONTINENTAL	CONTINENTAL	CUMMINS
MODEL	TM27		4B3.9
FUEL	gasoline	LPG	diesel
FUEL GRADE	unleaded 85 octane (motor method)	HD5 Gas Processors Association Standard 2140. Category: special duty propane.	ASTM No. 2 D Cetane # > 40 (For operating temp. below 32°F / 0°C use "winterized" No. 2 D.)
CYLINDERS	4		
COOLANT	50% water + 50% ethylene glycol		
POWER	71.5 hp @ 3000 rpm (53.3 kW)	64.4 hp @ 3000 rpm (48.0 kW)	76 hp @ 2500 rpm (56.7 kW)
OPERATING TEMPERATURE	180°F - 202°F (81°C - 94°C)		141°F - 211°F (60°C - 100°C)
OIL SUMP CAPACITY	6 qt USA (5.7 liters)		10 qt USA (9.5 liters)
OIL FILTER CAPACITY	1 qt USA (0.95 liters)		
OIL GRADE	API: SE, SF, SE/CD, SF/CD		API: CE/SF, CD/SF
OIL WEIGHT	see chart below		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

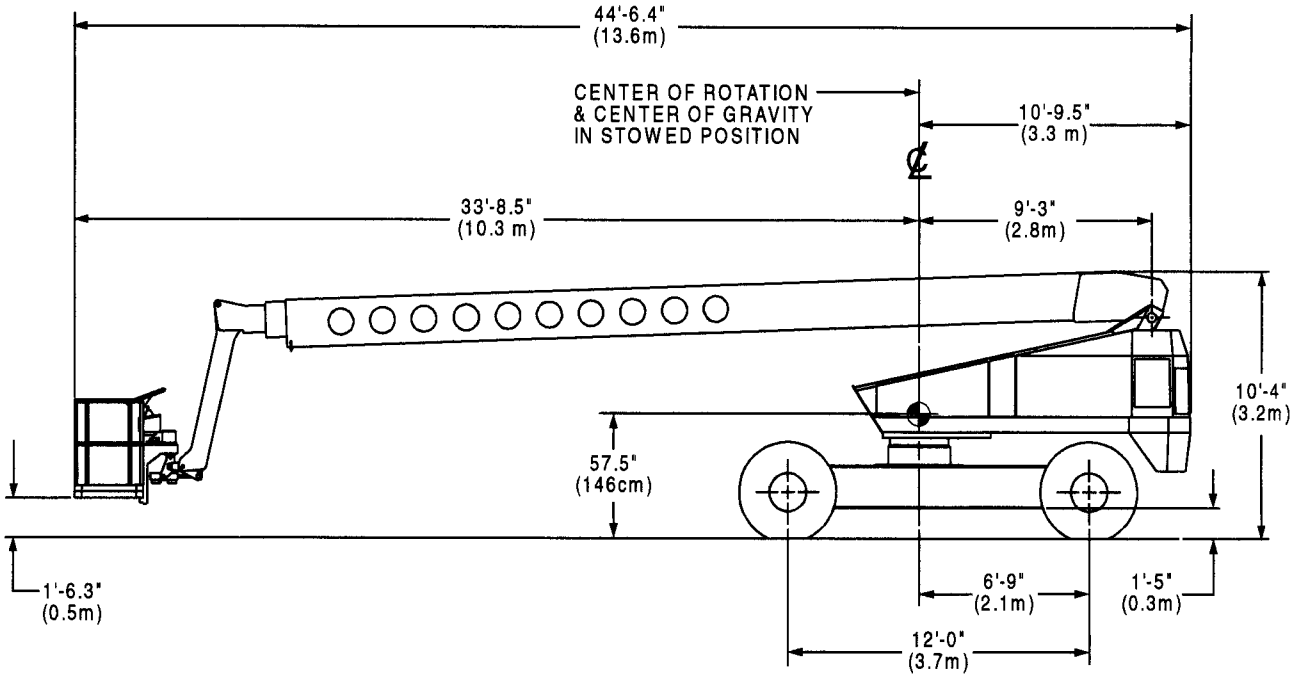
CONTINENTAL ENGINE

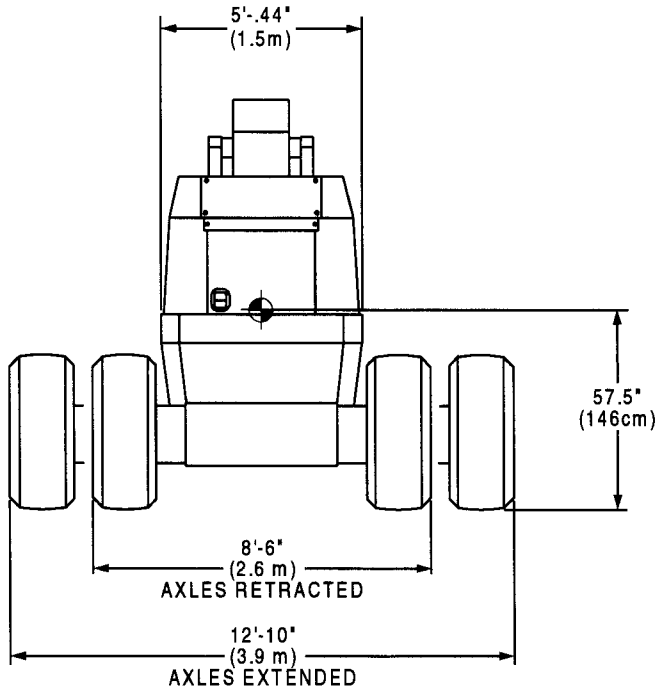


CUMMINS ENGINE

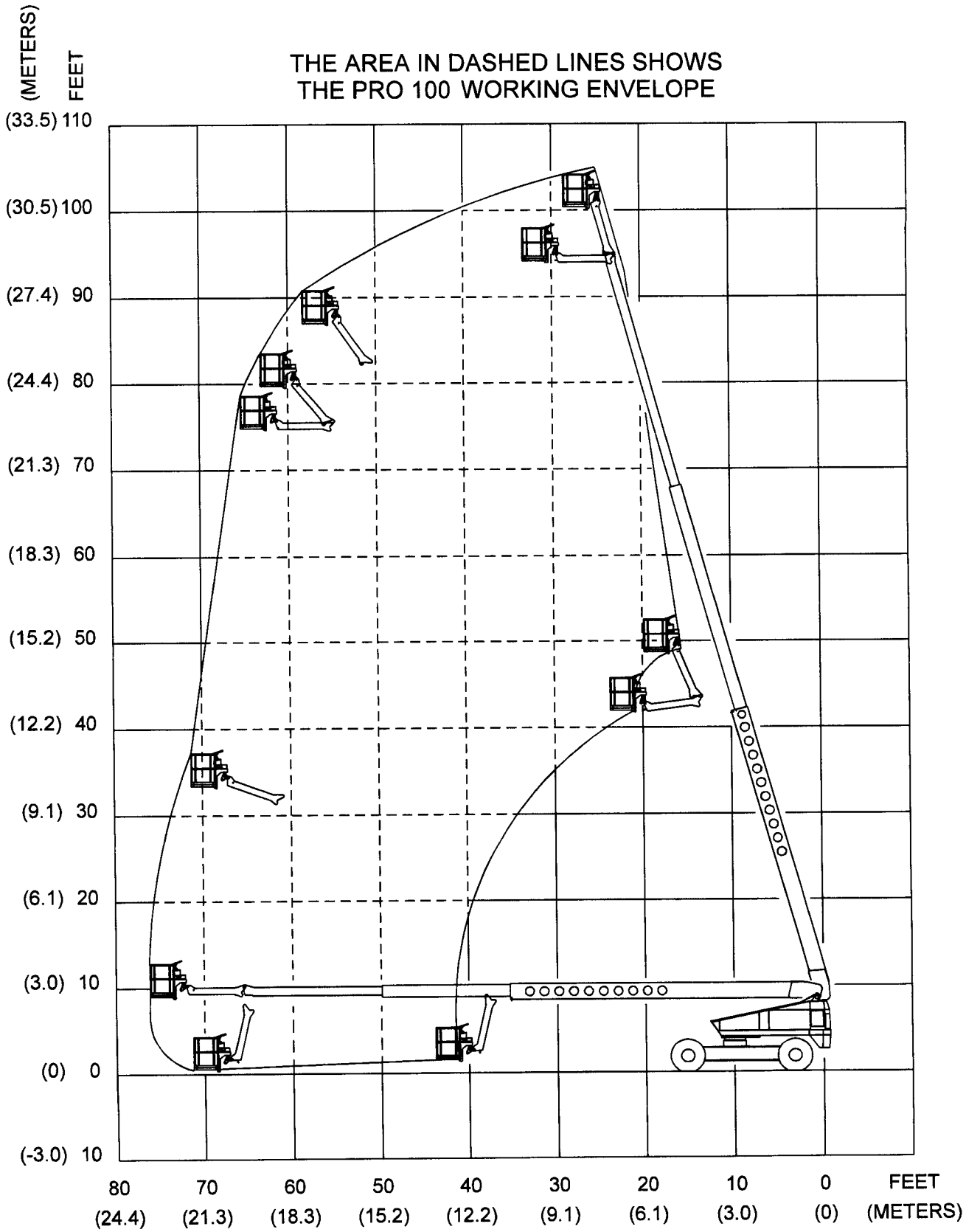


■ OVERALL DIMENSIONS



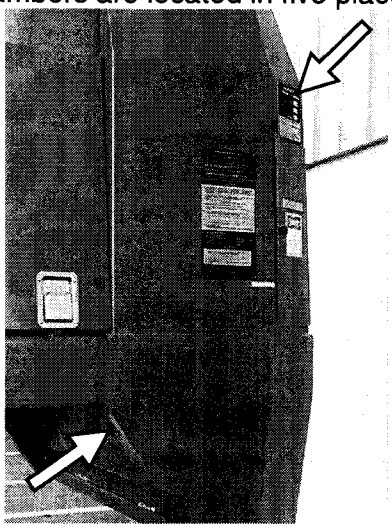


■ WORKING ENVELOPE

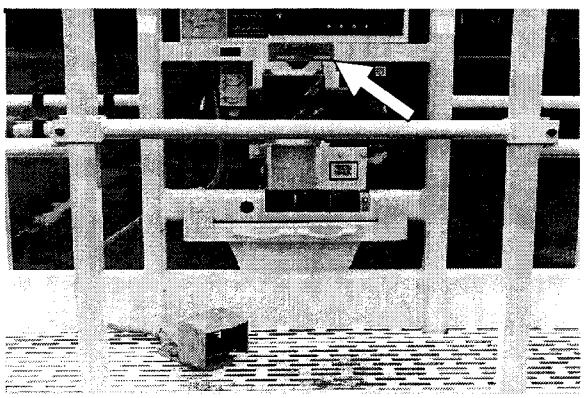


■ SERIAL-NUMBER LOCATIONS

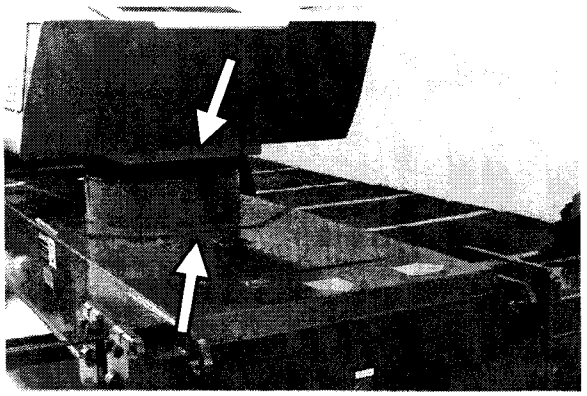
Serial Numbers are located in five places.



1. Above the ground-control box on a placard. (The last four digits are month and year shipped.)
2. On the back-right of the counterweight.



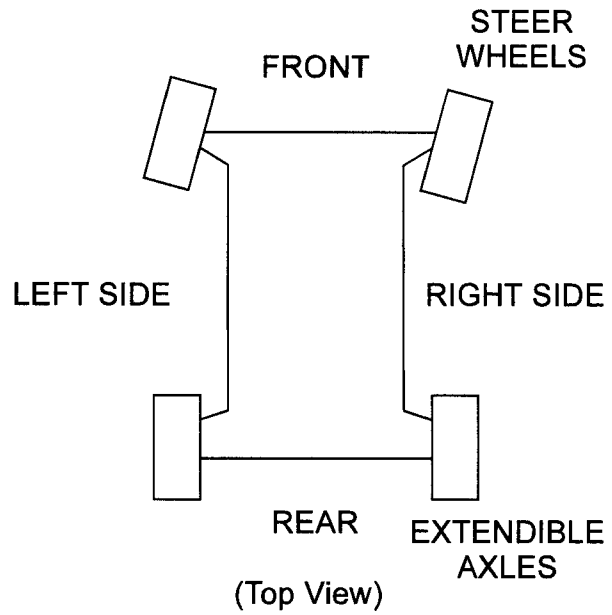
3. On a placard below the platform-control box. (Last four digits are mo. and yr. shipped.)



4. Below the drain hole in the turntable.

5. At the weld behind the rotation bearing turret.

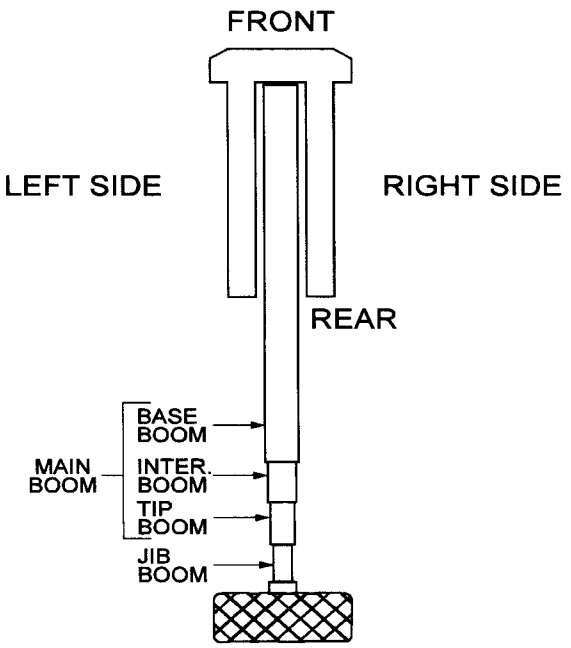
■ CHASSIS NOMENCLATURE



(Top View)

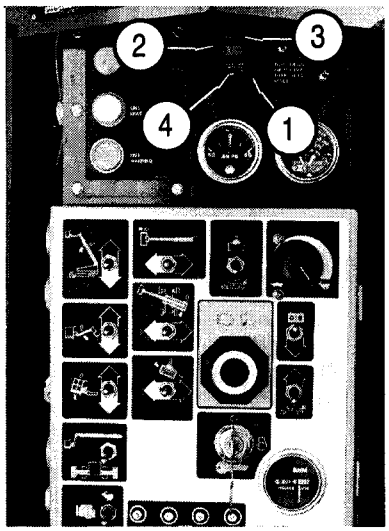
■ TURNTABLE & BOOM NOMENCLATURE

NOTE: If the turntable is rotated 180° its FRONT is above the REAR of the chassis.



(Top View)

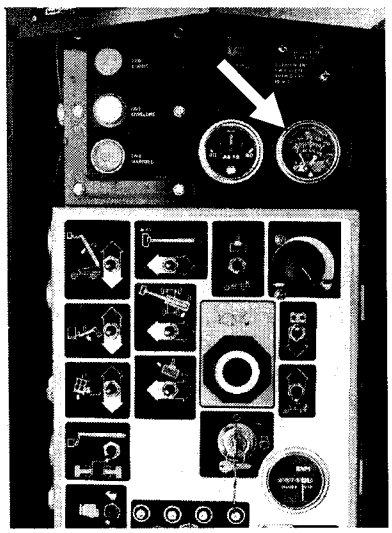
■ FILTER MINDER



The air filter gauge (1) **(FILTER MINDER)** is located just above the ground-control box. 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, the yellow indicator (2) raises toward the red area (3) of the sight glass. When the yellow indicator reaches the red, it's time to change the air filter.

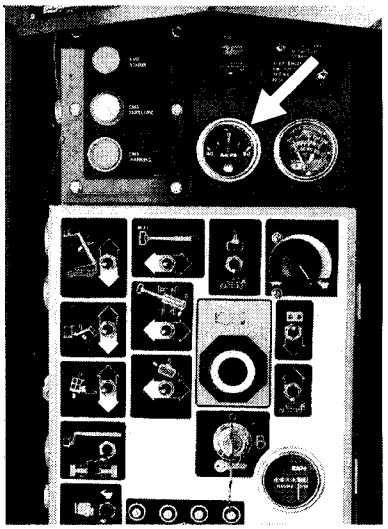
The indicator (2) stays at its highest setting, it does not go to the bottom of the sight glass when the engine is turned off. After the filter is changed, press the small **RESET** button (4) to reset the indicator disk to the bottom of the sight glass.

■ TEMPERATURE



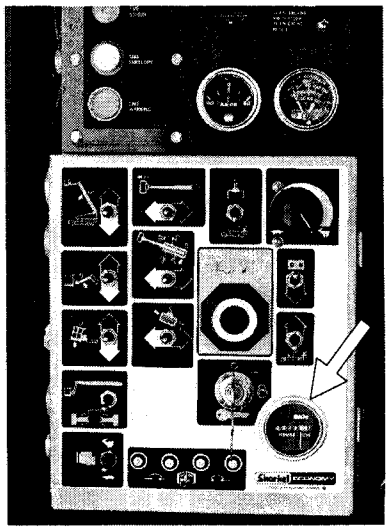
The **TEMPERATURE** gauge is located just above the ground-control box. It shows the temperature of the water-antifreeze mixture in the engine block. The typical operating-temperature range for a Continental engine is 180°F to 202°F (81°C to 94°C); for a Cummins engine, 141°F to 211°F (60°C - 100°C).

■ AMPS



The **AMPS** gauge shows the electric current from the alternator to the batteries. 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, this gauge should read "0."

■ HOURS



The **HOURS** gauge is basically an electric clock. It accumulates time when:

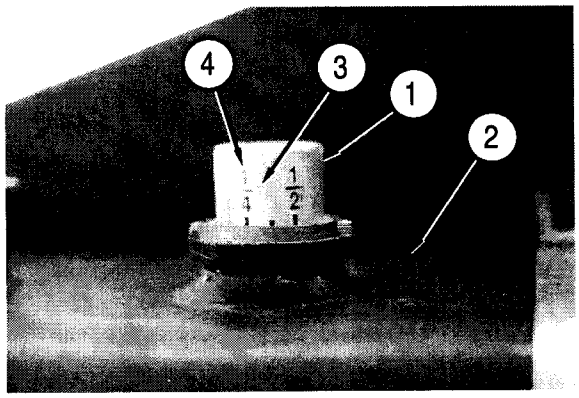
BATTERY ..... ON
SELECTOR SWITCH..... GROUND
MASTER KEY SWITCH... ON.

The **HOURS** gauge also accumulates time when:

BATTERY ..... ON
SELECTOR SWITCH ..... PLATFORM
ANTI-RESTART
MASTER SWITCH ..... ON.

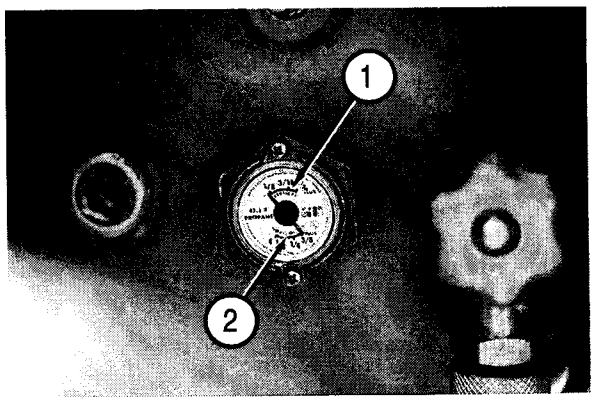
The **HOURS** gauge cannot be reset. Use it to tell when it is time to perform the periodic maintenance listed in the Maintenance Manual.

■ FUEL



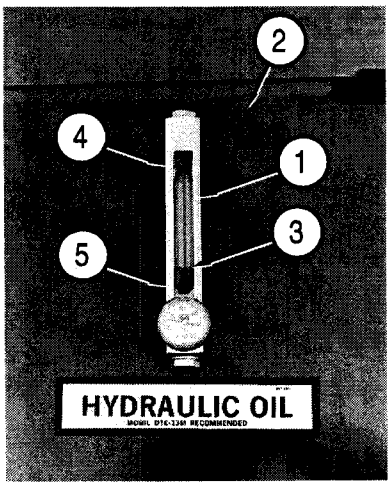
The fuel gauge (1) is located on top of the gasoline or diesel fuel tank (2). Read it at the line (3) in the clear plastic window (4). It reads in fractions-of-a-full-tank. The tank shown is a little more than 1/4 full.

NOTE: Do not run a diesel fuel tank dry. Air in the fuel line makes a diesel engine hard to start.



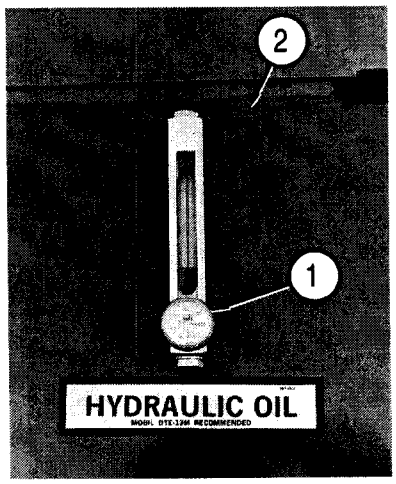
(OPTION - LPG) LPG tanks have two fuel gauges (1) (2) on top. One measures correctly when the tank is standing on end (**VERTICAL**) the other measures correctly when the tank is laying down (**HORIZONTAL**). Both read in fractions-of- a-full-tank. PRO 100 tanks are mounted horizontally. Therefore, you should read the **HORIZONTAL** scale (2).

■ HYDRAULIC OIL LEVEL



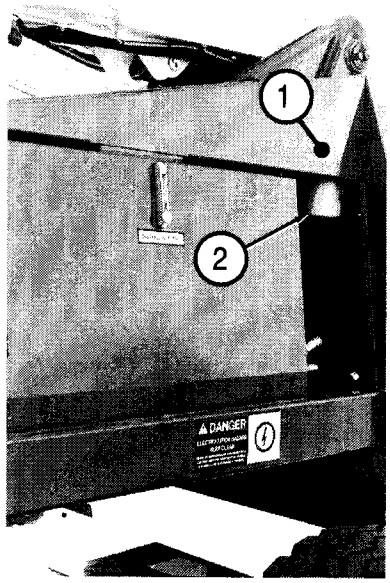
The hydraulic-oil level gauge (1) is on the side of the hydraulic oil tank (2). It shows the actual level of oil inside the tank. Read it only when the booms are completely down and completely retracted. Otherwise, the lift and/or extend cylinders become large reservoirs for hydraulic oil and the oil level in the tank will be low. The oil level (3) should be between the **HIGH** mark (4) and **LOW** mark (5).

■ HYDRAULIC OIL TEMPERATURE



The hydraulic-oil temperature gauge (1) is located at the bottom of the hydraulic-oil level gauge. It measures the temperature of the oil in the tank (2). The temperature should not exceed 200°F (93°C). If it does, reduce your driving speed or stop the PRO 100 to let the hydraulic oil cool.

■ HYDRAULIC OIL FILTER



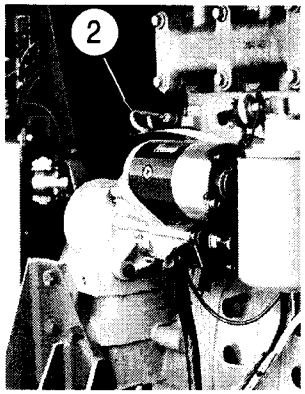
The hydraulic-oil filter gauge (1) is located above the hydraulic-oil filter (2). The gauge measures pressure into the filter. As the filter clogs, the pressure goes up.

The hydraulic-oil filter gauge should only be read by qualified trained maintenance personnel. An accurate reading requires very special conditions and should not be attempted by operators.

■ ENGINE OIL

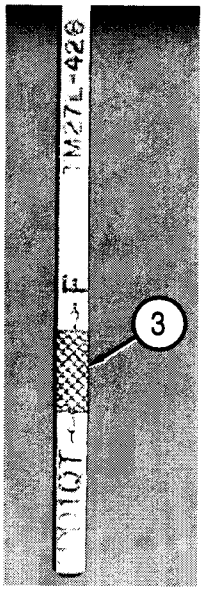
CONTINENTAL

CUMMINS

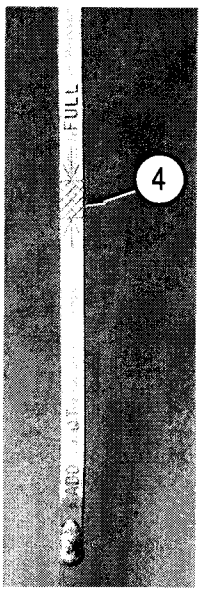


Engine oil level is measured with a dipstick (1) (2). Oil sump and oil filter capacities given in the "SPECIFICATIONS" chapter are approximate. True values may vary from machine to machine due to slight variations or modifications during production. The oil dipstick is the only way to accurately gauge if the engine oil level is correct.

CONTINENTAL



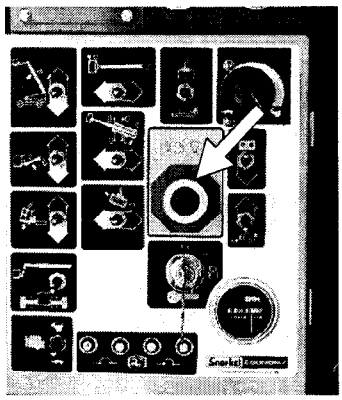
CUMMINS

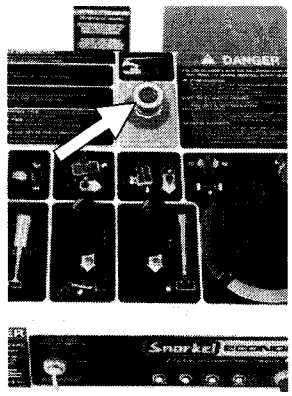


Engine oil level should always be in the cross-hatched area (3) (4) of the dipstick — never above or below it. Check the oil level after the engine has been turned off a few minutes so that oil can run down out of the engine into the sump.

■ AUTOMATIC SHUT-OFFS

There is a light inside the **EMERGENCY STOP** switch at both the ground-control box and the platform-control box.





The lights come on if the engine temperature, engine oil pressure, or alternator current gets outside preset values. When the **EMERGENCY STOP** light comes on, immediately lower the platform and correct the problem. Use **EMERGENCY POWER OPERATION** to lower the platform to the ground if the engine has automatically shut off. Use **EMERGENCY BLEED DOWN** only if **EMERGENCY POWER OPERATION** does not work (see "EMERGENCY OPERATION" chapter for instructions).

❑ Engine Temperature

If the engine temperature (check the **TEMPERATURE** gauge) of either a Continental or Cummins engine reaches 210°F (99°C) the lights in the **EMERGENCY STOP** switches will come on. If the engine temperature continues to climb to 230°F (110°C) the engines will automatically shut off and cannot be restarted until they cool. Check engine coolant level (see "DAILY INSPECTION & MAINTENANCE" chapter) before you try to restart the engine. If the coolant is low, replenish it then check for leaks. If the engine will not restart, or if it automatically shuts off a second time, refer the problem to a qualified service technician.

❑ Engine Oil Pressure

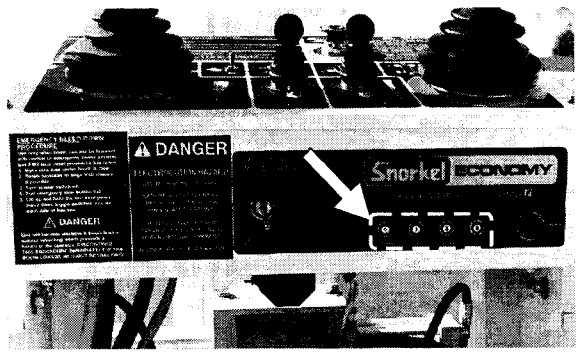
If the engine oil pressure in either a Continental or Cummins engine drops to an unsafe level, the lights in the **EMERGENCY STOP** switches come on and the engine automatically shuts off. Check engine oil level (see "DAILY INSPECTION & MAINTENANCE" chapter) before you try to restart the engine. If the engine oil is low, replenish it then check for leaks. Check the engine oil filter to be sure it is in place and tight. If the engine will not restart, or if it automatically shuts off a second time, refer the problem to a qualified service technician.

❑ Alternator Not Charging

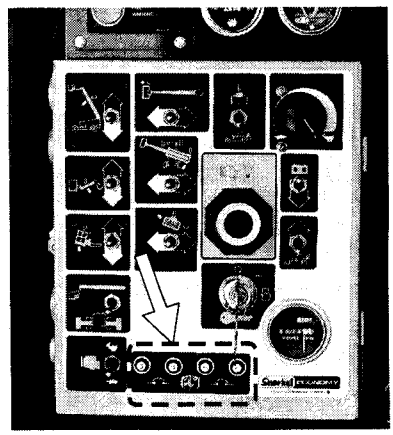
If the alternator on either a Continental or Cummins engine fails, the lights in the **EMERGENCY STOP** switches come on. The PRO 100 will continue to run until the batteries get too weak to work and the engine automatically shuts off. Check the alternator drive belt to see if it is broken or loose (see "DAILY INSPECTION & MAINTENANCE" chapter) before you try to restart the engine. If the engine will not restart, or if it starts but the **EMERGENCY STOP** light is still on, refer the problem to a qualified service technician.

■ CIRCUIT BREAKERS

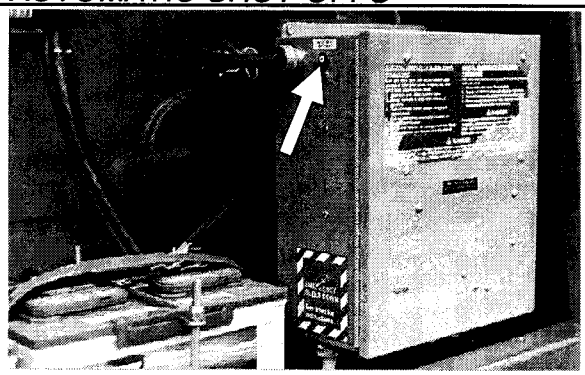
There are twelve circuit breakers on a PRO 100. Their purpose is to protect electrical circuits from electrical overloads.



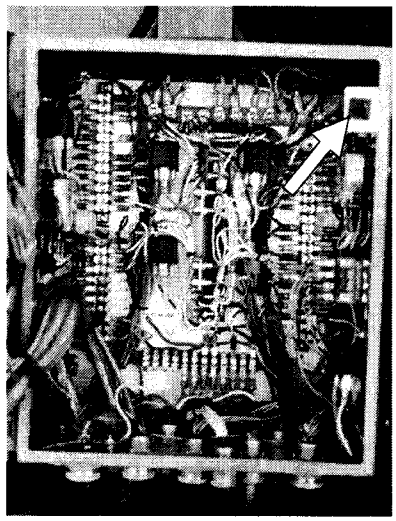
Four are in the rear of the platform-control box.



Four are on the ground-control box.



One is on the junction wiring box assembly.



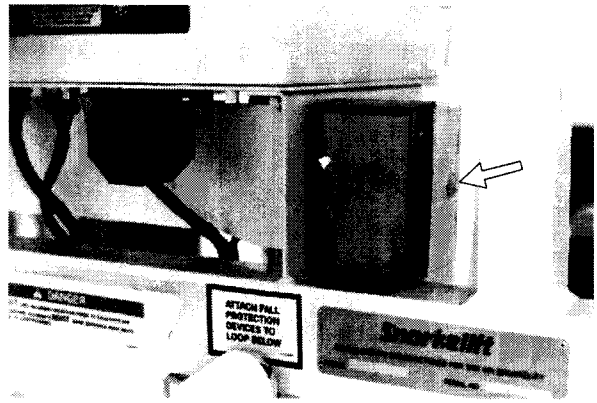
One is inside the junction-wiring box assembly.

If any of these circuit breakers pops out, as shown here,

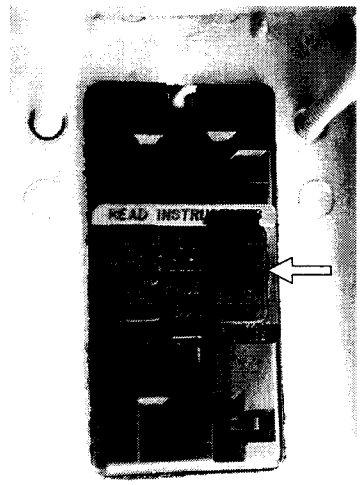
wait a minute or two for the breaker to cool, then push it back in. If it pops out again, there is a problem in its electrical circuit and the PRO 100 should be removed from service immediately and remain out of service until it is repaired by a qualified service technician.

NOTE: Do not open the junction-wiring box assembly to check the one breaker inside unless the following occurs: the **EMERGENCY STOP** switch on the ground-control box is pulled out (on), but when you turn the **MASTER KEY SWITCH** to on, neither the EMS lights nor the EMS alarm comes on for their self test. If neither the lights nor audible alarm comes on, open the box and check the breaker. If it has popped out, press it in then try to start the engine.

The other two circuit breakers are part of the ground fault circuit interrupt (GFCI).



If the 20 A circuit breaker on the GFCI outlet trips, disconnect whatever you plugged into the outlet, wait one minute, then press the circuit breaker button back in. If the circuit breaker trips a second time, refer the problem to a qualified service technician.

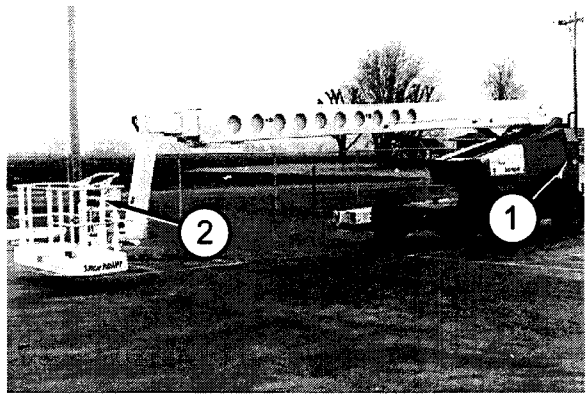


If the ground-fault circuit breaker on the GFCI outlet trips, disconnect whatever you plugged into the outlet, wait one minute, then press the RESET button back in. If the circuit breaker trips a second time, refer the problem to a qualified service technician.

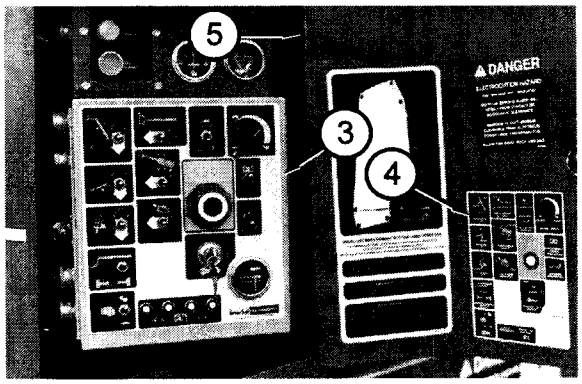
When a circuit breaker trips that will not reset, immediately attempt to lower the platform to the ground by using normal operating procedures. If normal procedures do not work, use **EMERGENCY POWER OPERATION**. If that does not work, use **EMERGENCY BLEED DOWN**. (See "EMERGENCY OPERATION" chapter for instructions.)

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.

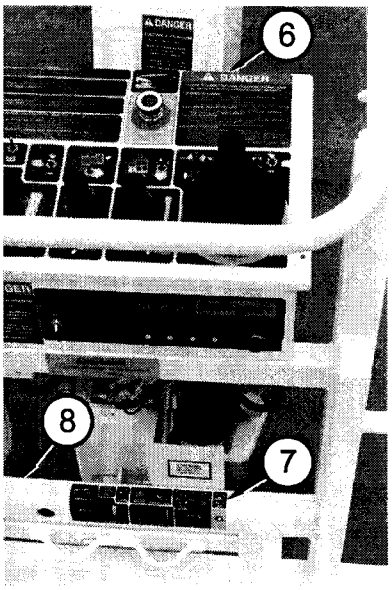
The only optional equipment discussed in this chapter is the control for dual-fuel. For other optional equipment controls, see the "OPTIONS" chapter.



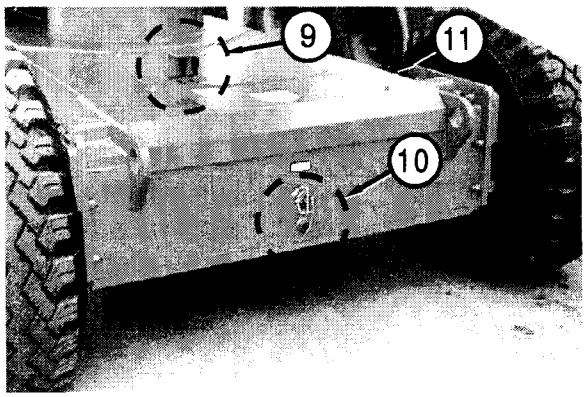
The main operating functions of a PRO 100 can be controlled from the ground-control box (1) or the platform-control box (2).



The names of the different controls on the ground-control box (3) are shown on a decal (4) on the inside of the door (5). The decal also shows the names of the different settings to which each control can be set.



The names of the controls on the platform-control box (6) are shown on a decal (7) on the guardrail (8) below the platform-control box.



Controls (9) for operating the jack and extendible axles are on the rear of the chassis (11) along with the axle interlock (10).

See the "EMERGENCY OPERATION" chapter for the locations of emergency bleed down controls and for correct emergency bleed down procedures.

■ GROUND-CONTROL BOX

Controls for operating the PRO 100 from the ground are located on the right side of the machine behind the small door.

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 up for anything on the machine to work.

2. **EMERGENCY POWER OPERATION**: If the engine stops and cannot be restarted, continuously holding this switch down activates a small, battery-powered hydraulic-pump that supplies emergency hydraulic power for the machine. Boom movements will be slow and have long lag times under EMERGENCY POWER OPERATION.

3. **SELECTOR SWITCH**: Must be in the GROUND position for the ground-control box to work. Must be in the PLATFORM position for the platform controls to work.

4. **BOOM SPEED**: This control determines how fast the main boom moves in, out, up, or down. Set it to SLOW until you are very familiar with the way the machine works or if the platform is working in dangerous or cramped surroundings.

5. **GROUND OPERATION**: You must manually hold this switch up any time you use one of the six platform-moving switches (see box at right) to move the platform. Holding the switch up increases the engine speed and activates the platform-moving switches in preparation to do work.

6. **MASTER KEY SWITCH**: This switch works like an automobile ignition switch. Hold it at START until the engine starts then release it to ON. If the engine dies in ON, the key must be turned to OFF before it will go back to START.

NOTE: On some machines you might have to pause about three seconds in the ON position before going to START so the starter can engage.

Turn the MASTER KEY SWITCH to OFF if the platform is to stay in a particular position for a long time. That will turn the engine off and save fuel.

7. **ENGINE THROTTLE**: Leave the switch set on LO unless you need to warm the engine and hydraulic oil up fast. Return to LO after warm-up.

8. **BOOMS/AXLES SWITCH**: This switch must be up (BOOMS) for the booms to move. It must be down (AXLES) anytime you use the AXLES controls, on the top-rear of the chassis, to move the jack or the rear axles.

9 through 14 are the platform-moving switches. Each is a three position, momentary contact, normally-off switch.

9. **PLATFORM LEVEL**: UP rotates the platform up relative to the end of the jib-boom. DN (down) rotates the platform down.

10. **PLATFORM ROTATION**: CW rotates the platform clockwise (as seen from above) relative to the end of the jib-boom. CCW rotates the platform counterclockwise.

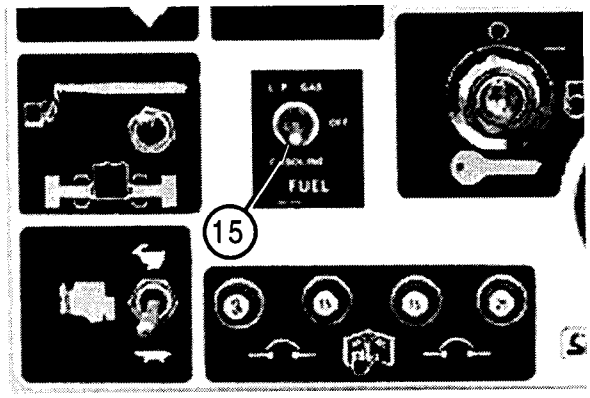
11. **JIB BOOM LIFT**: UP raises the jib-boom relative to end of the tip-boom. DN (down) lowers the jib-boom.

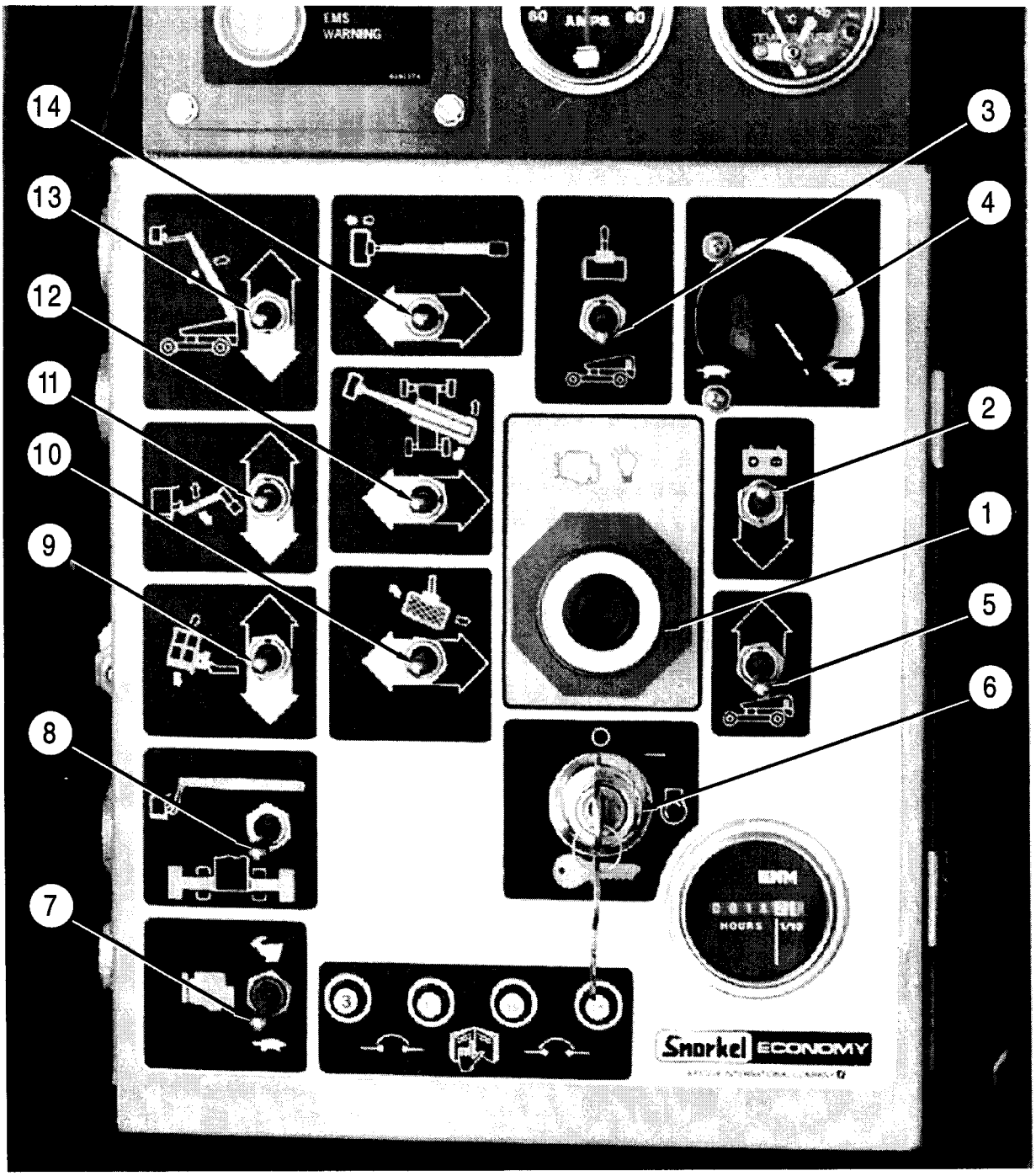
12. **TURNTABLE SWING**: CW rotates the entire turntable clockwise (as seen from above). CCW rotates the turntable counterclockwise.

13. **MAIN BOOM LIFT**: UP raises the base-boom. DN (down) lowers the base-boom.

14. **MAIN BOOM EXT./RET.**: EXTEND extends the booms. RETRACT retracts the booms.

15. (OPTION - **FUEL**): Before starting the engine set the FUEL switch to GASOLINE or L.P.-GAS depending on which you want to use. If you select L.P.-GAS be sure to open the valve on top the LP gas tank. To switch fuels with the engine running, see the DUAL FUEL SYSTEM decal on the inside of the ground-control box door.





GROUND-CONTROL BOX

■ PLATFORM-CONTROL BOX

Controls for operating the PRO 100 from the platform are located on the platform-control box, with the exception of the yellow foot switch which is on the platform floor.

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

1. **EMERGENCY STOP**: Press the large red button down at any time, under any conditions, and the entire machine stops — the engine turns off and nothing moves. This switch must be pulled to its up (or out) position if the PRO 100 is to be controlled from the platform.

2. **EMERGENCY POWER OPERATION**: If the engine stops and cannot be restarted, hold the switch toward you and a small, battery-powered hydraulic-pump comes on to supply power for the machine. Boom movements will be slow and have long lag times under EMERGENCY POWER.

3. **ENGINE THROTTLE**: Leave this switch set on LO unless you want to *drive* at maximum speed (see DRIVE RANGE below).

4. **PLATFORM ROTATION**: CW rotates the platform clockwise (as seen from above) relative to the end of the jib-boom. CCW rotates the platform counterclockwise.

5. **PLATFORM LEVEL**: UP rotates the platform up relative to the end of the jib-boom. DN (down) rotates the platform down.

6. **DRIVE RANGE**: This switch, together with the position of the booms, determines how fast the PRO 100 can travel along the ground. See the DRIVE RANGE Table below for settings and maximum speeds.

Switching from LO to HI changes the driving conditions from low speed and high torque to the wheels to high speed and low torque to the wheels.

⚠CAUTION

Prolonged driving in HI (3 mph, 4.8 km/hr) heats the hydraulic oil. Periodically check the thermometer at the hydraulic-oil tank sight-glass. Do not let the oil exceed 200°F (93°C). Stop the engine and let the oil cool if necessary.

DRIVE RANGE Table

MAX. SPEED	**DRIVE RANGE**	boom position
3.0 mph (4.8 km/hr)	HI	stowed
0.75 mph (1.2 km/hr)	LO	stowed
0.75 mph (1.2 km/hr)	--	extended but below mid-elevation
creep	--	above mid-elevation

NOTE: ENGINE THROTTLE, at the platform-control box, must be set to HI for MAX. SPEED.

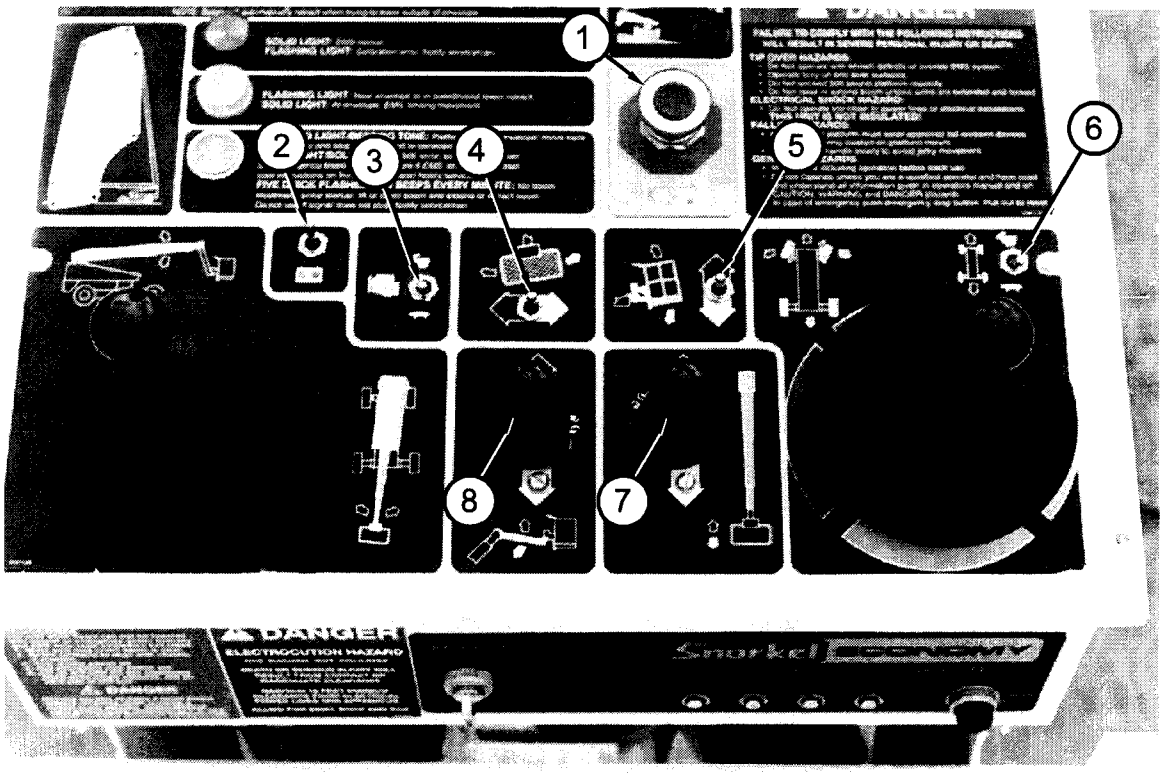
7. **MAIN BOOM EXTEND/RETRACT**: EXTEND extends the booms. RETRACT retracts the booms. Speed of movement is proportional to how far you push the controller.

8. **JIB BOOM LIFT**: UP raises the jib-boom relative to end of the tip-boom. DN (down) lowers the jib-boom. Speed of movement is proportional to how far you push the controller.

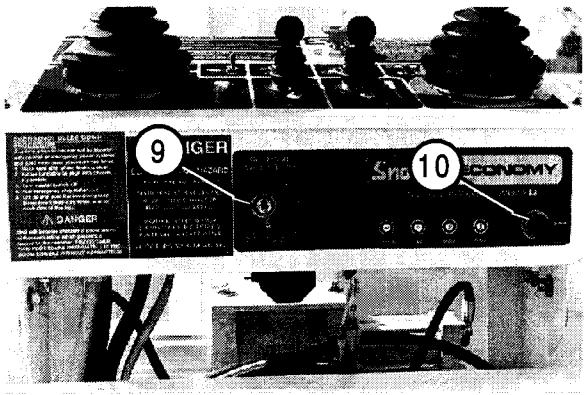
9. **ANTI-RESTART MASTER SWITCH**: This switch works like an automobile ignition switch. Hold it at START until the engine starts then release it to ON. If the engine dies in ON, the key must be turned to OFF before it will go back to START. Turn the switch to OFF if the platform is to stay in a particular position for a long time. This will turn the engine off and save fuel.

10. **HORN**: See "SAFETY DEVICES" chapter.

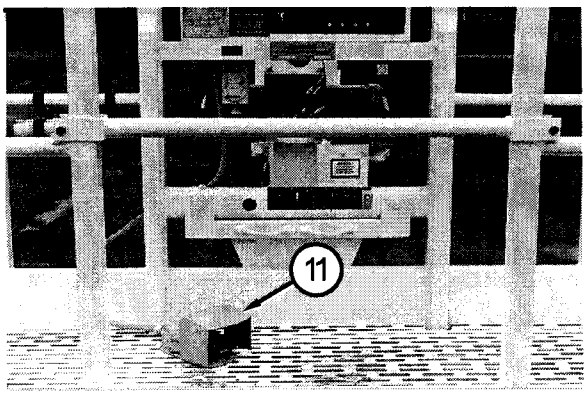
11. Foot Switch: You must step down on the foot switch, and hold it down, any time you use any platform control that causes the platform to move. Stepping on the foot switch increases the engine speed and activates other switches/controls in preparation to do work. (The foot switch is to the platform what the GROUND OPERATION switch is to the ground-control box.)



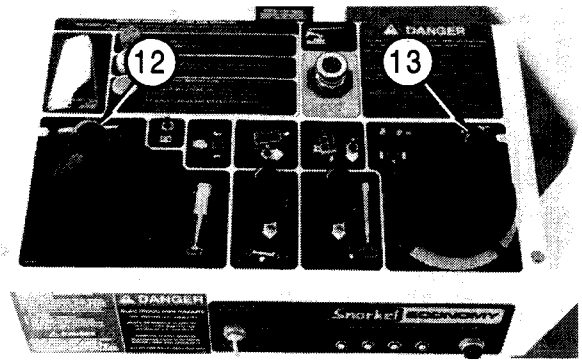
PLATFORM-CONTROL BOX



NOTE: On some machines you might have to pause about three seconds in the ON position before going to START so the starter can engage.



NOTE: Do not step on the foot switch while you are trying to start the engine.



12. **LIFT/SWING CONTROLLER**:

UP: Slowly push the LIFT/SWING controller forward and the main-boom raises. The further forward you push the controller the faster the main-boom raises.

DN: Same as UP only the main-boom goes down.

CW: Slowly push the LIFT/SWING controller to the left and the turntable swings clockwise (from above). The further left you push the controller the faster the turntable swings.

CCW: Same as CW only the turntable swings counterclockwise.

13. **DRIVE/STEER CONTROLLER**:

DRIVE FORWARD: Slowly push the DRIVE/STEER controller forward and the PRO 100 moves forward. The further forward you push the controller the faster the PRO 100 goes (max. 3 mph, 4.8 km/hr).

DRIVE REVERSE: Same as DRIVE FORWARD except the PRO 100 moves backward.

STEER RIGHT: Push the DRIVE/STEER controller to the right and the front wheels move in the direction for a right hand turn. The longer you hold the controller to the right the further the wheels turn.

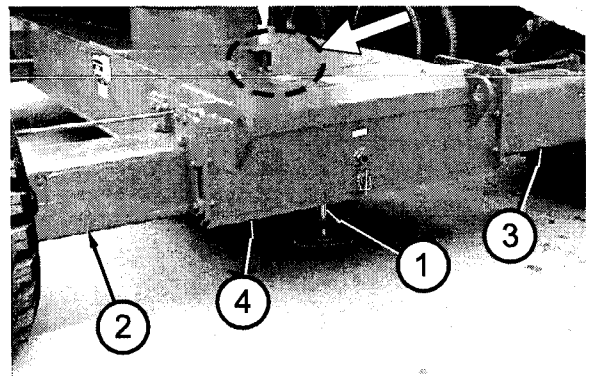
STEER LEFT: Works the same as STEER RIGHT only for a left hand turn.

NOTE: The wheels stay the direction you turn them, they do not automatically return to center the way automobile wheels do.

NOTE: There are blue and yellow arrows on top of the chassis. The blue arrows point to the FORWARD end of the chassis and to the LEFT side of the PRO 100. The yellow arrows point to the REVERSE end of the chassis and to the RIGHT side of the PRO 100. The **DRIVE/STEER** controller is color coded to match the arrows. The color coding is designed to keep you from becoming disoriented when you are aloft and the platform is rotated with respect to the chassis.

■ CHASSIS

AXLES:



RAISE: Lowers the jack (1) and raises the chassis (4).
LOWER: Raises the jack and lowers the chassis.
EXTEND: Extends both rear axles (2) (3).
RETRACT: Retracts both rear axles.

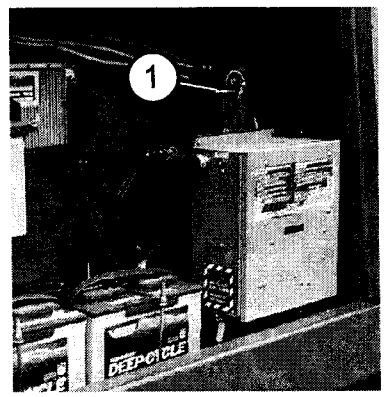
NOTE: The axles extend or retract one at a time, not simultaneously.

For the AXLES controls to work BOOMS/AXLES SWITCH must be set to AXLES and the SELECTOR SWITCH set to GROUND. Also, the main boom must be down and retracted.

■ TURNTABLE

BATTERY:

When the **BATTERY** switch (1) is set to OFF, all of the batteries are disconnected from the electrical system.



Read and understand all the previous chapters in this manual before you begin to operate a PRO 100.

Dual-fuel is the only optional equipment discussed in this chapter. For operation of other optional equipment, see the "OPTIONS" chapter.

■ CONTROL STATIONS

A PRO 100 can be operated from the ground-control box or from the platform-control box. There are basically two differences between ground-control and platform-control operations, both are safety related:

1. The ground-control box can override the platform-control box at any time. If a person operating the machine from the platform becomes incapacitated, a person on the ground can always take over machine control.

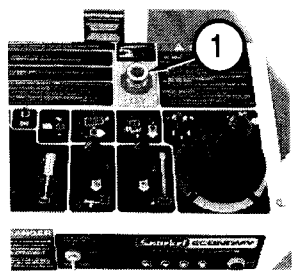
⚠DANGER

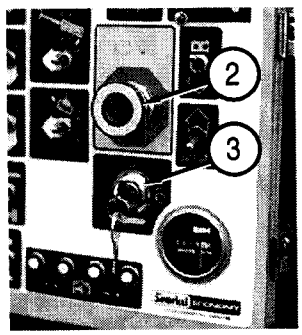
Do not attempt to operate the PRO 100 ground controls when the platform, booms, or any other conducting part of the PRO 100 is in contact with energized electrical wires or if there is an immediate danger of such contact.

2. The PRO 100 can only be driven from the platform-control box. The wheels cannot be made to move from the ground-control box. This prevents ground-control operators from running over themselves.

■ EMERGENCY STOPPING

Anytime you want to stop a PRO 100, push either of the two **EMERGENCY STOP** buttons (1) (2) in. (For a complete discussion of the **EMERGENCY STOP** switches, see the "CONTROLS" chapter.)





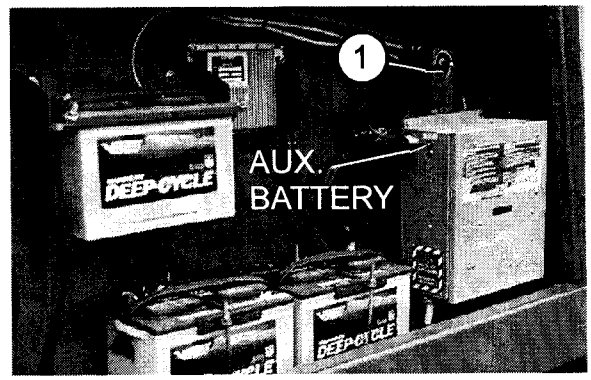
■ STARTING FROM THE GROUND-CONTROL BOX

Before you begin to operate the PRO 100 a qualified operator must perform the "DAILY INSPECTION & MAINTENANCE" described in the chapter by that name in this manual.

❑ Pre-start Conditions

After the DAILY INSPECTION & MAINTENANCE has been performed, put the PRO 100 into its pre-start conditions. Pre-start conditions for starting from the ground-control box are:

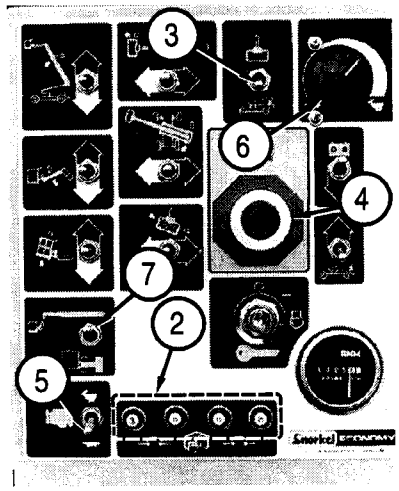
1. Set the **BATTERY** switch (1) to ON and look to see that the **AUX. BATTERY** circuit breaker has not popped out (close the battery-compartment door).



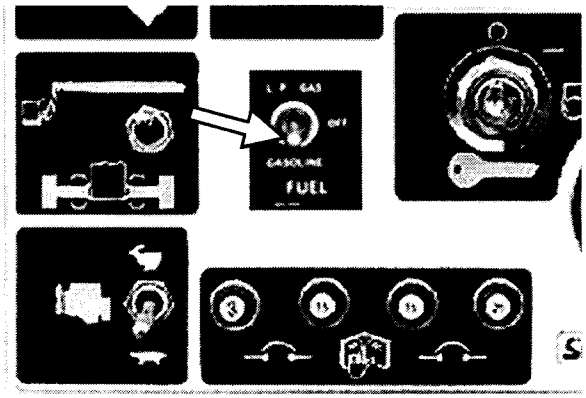
2. Check the circuit breakers (2) to see that none has popped out.

   NOTE: You do not need to check the circuit breakers on the platform-control box.

3. Set **SELECTOR SWITCH** (3) to GROUND.
4. Pull **EMERGENCY STOP** (4) out.
5. Set **ENGINE THROTTLE** (5) to LO.
6. Set **BOOM SPEED** (6) as shown.
7. Set **BOOMS/AXLES SWITCH** (7) to BOOMS.



8. (OPTION - DUAL FUEL) For machines set up to run both gasoline and LP gas: Set the **FUEL** switch to GASOLINE or L.P.-GAS depending on which you want to use. If you select L.P.-GAS, open the valve on top the LP gas tank.



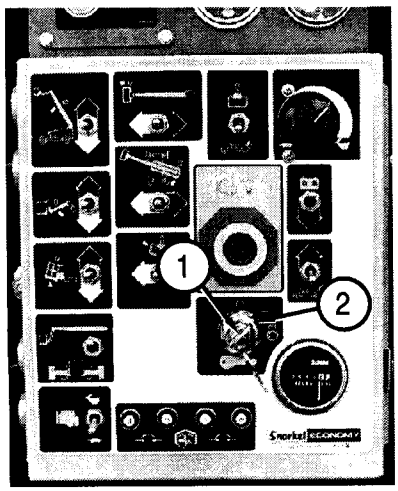
❑ Starting (from the ground)

Do not attempt to start a PRO 100 until the actions in the previous part of this section ("STARTING FROM THE GROUND-CONTROL BOX") have been completed.

NOTE: You cannot raise or extend the main boom unless the rear axles are extended and locked. If you want to move the platform, from the ground-control station, go to the "EXTEND & LOCK REAR AXLES" section of this chapter.

1. Insert the key (1) into the **MASTER KEY SWITCH** (2).

2. Turn the key (1) to ON and pause there a few seconds while an alarm sounds to alert others that the PRO 100 is about to start.

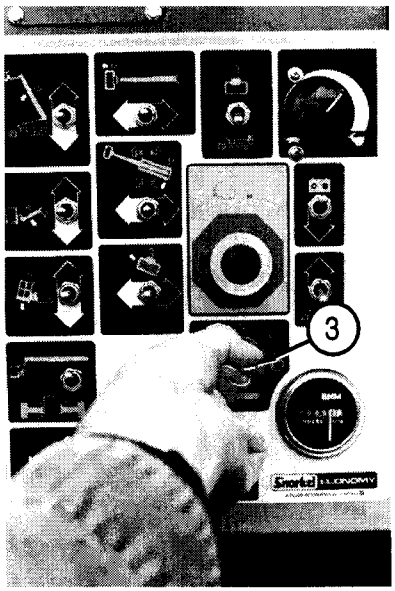


NOTE: If you pause 30 seconds or more an automatic protection feature will prevent the PRO 100 from starting. If that happens, turn the key to OFF and try again.

⚠CAUTION

If the engine fails to start (at the next step) in 20 seconds, turn the key to OFF and wait 60 seconds before turning the key to START again.

3. Turn the key (3) to START and hold it there until the engine starts (or for a maximum of 20 seconds) then release the key to ON.



The engine should now be running.

■ STARTING FROM THE PLATFORM-CONTROL BOX

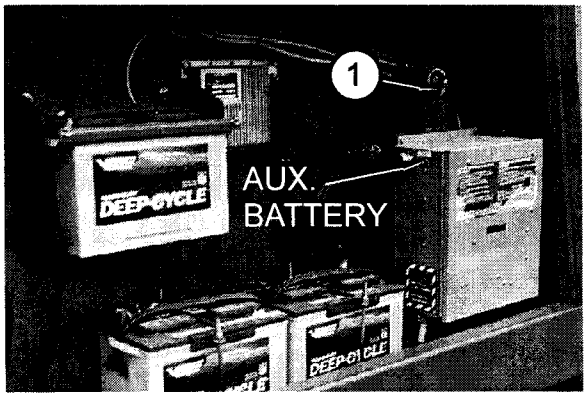
Before you begin to operate the PRO 100, a qualified operator must perform the "DAILY INSPECTION & MAINTENANCE" described in the chapter by that name in this manual.

If you want to drive the PRO 100 with the main boom down and retracted, you do not need to extend the rear axles. Therefore, you should go on to "Pre-Start Conditions" immediately below. If you want to start the PRO 100 from the platform-control box then extend or raise the main boom, you first need to extend and lock the rear axles for stability. Therefore, you should go to the "EXTEND & LOCK REAR AXLES" section in this chapter.

❑ Pre-start Conditions

After the DAILY INSPECTION & MAINTENANCE has been performed, put the PRO 100 into its pre-start conditions. Pre-start conditions for starting from the platform-control box are:

1. Set the **BATTERY** switch (1) to ON and look to see that the **AUX. BATTERY** circuit breaker has not popped out (close the battery-compartment door).



2. Check the circuit breakers (2) to see that none has popped out.

3. At the ground-control box, set the **SELECTOR SWITCH** (3) to PLATFORM.

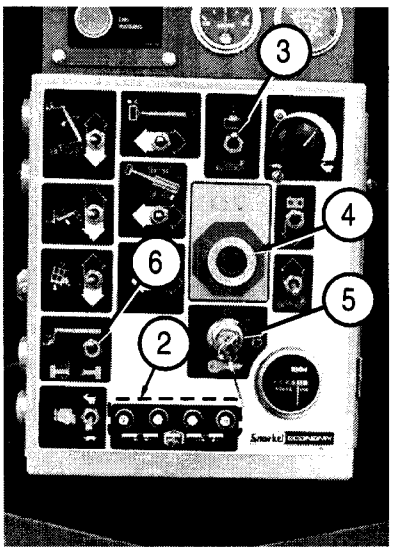
NOTE: This last step is often overlooked. Set the **SELECTOR SWITCH** to PLATFORM.

4. At the ground-control box, pull the **EMERGENCY STOP** switch (4) out.

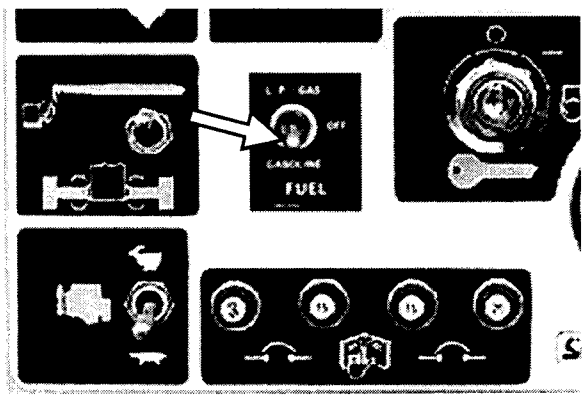
5. At the ground-control box, insert the key into the **MASTER KEY SWITCH** (5) and turn it to ON.

NOTE: Because you set the **SELECTOR SWITCH** to PLATFORM, no alarm will sound when you set the **MASTER KEY SWITCH** to ON (unless the platform **EMERGENCY STOP** switch and **ANTI-RESTART MASTER SWITCH** are both ON).

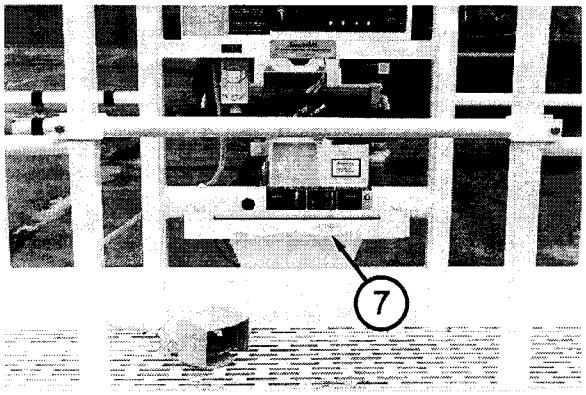
6. Set the **BOOMS/AXLES SWITCH** (6) to BOOMS then close the ground-control door.



7. (OPTION - DUAL FUEL) For machines set up to run both gasoline and LP gas: Set the **FUEL** switch to GASOLINE or L.P.-GAS depending on which you want to use. If you select L.P.-GAS, open the valve on top the LP gas tank.



8. Put on your fall restraint, enter the platform, close the gravity gate, and attach the lanyard of your fall restraint to the anchorage point (7).

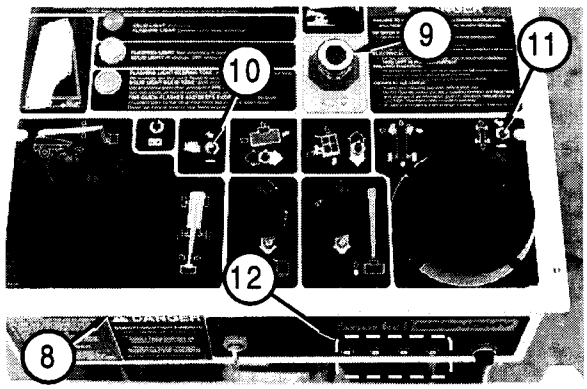


9. At the platform-control box (8) set the following:

EMERGENCY STOP (9).....pulled out
ENGINE THROTTLE (10).....LO
DRIVE RANGE (11).....LO

NOTE: With these settings the maximum ground speed is 0.75 mph (1.2 km/hr). If you want to go faster, see the "PLATFORM-CONTROL BOX" section in the "CONTROLS" chapter. Pay particular attention to the DRIVE RANGE Table in that section.

10. Check the platform-control box circuit breakers (12) to see that none has popped out.



❑ Starting (from the platform)

Do not attempt to start a PRO 100 until the actions in the previous part of this section (STARTING FROM THE PLATFORM CONTROL BOX) have been completed.

1. Turn the **ANTI-RESTART MASTER SWITCH** (1) to ON and pause there a few seconds while an alarm sounds to alert others that the PRO 100 is about to start.

NOTE: If you pause 30 seconds or more an automatic protection feature will prevent the PRO 100 from starting. If that happens, turn the **ANTI-RESTART MASTER SWITCH** to OFF and try again.

⚠CAUTION

If the engine fails to start (at the next step) in 20 seconds, turn the **ANTI-RESTART MASTER SWITCH** to OFF and wait 60 seconds before turning the switch to START again.

2. Turn the **ANTI-RESTART MASTER SWITCH** (2) to START and hold it there until the engine starts (or for a maximum of 20 seconds) then release the switch to ON.

NOTE: Do not step on the foot switch while you are trying to start the engine.

The engine should now be running.

■ MOVING THE PLATFORM

The engine should already be running (as described earlier in this chapter) before you start this section.

Before you can raise or extend the main boom the rear axles must be extended (see "EXTEND & LOCK REAR AXLES" in this chapter).

⚠DANGER

Be certain that the space into which you are about to move the platform, boom, turntable, and chassis is free of obstructions. Always look in the direction of movement.

Do not operate near energized electrical conductors. See the inside-front cover of this manual for the minimum safe approach distance to energized power lines.

⚠DANGER

If you operate from the platform-control box, be sure that the lanyard of your fall restraint is attached to the anchorage point on the platform mount. Also, be sure the gravity gate is closed behind you.

Each of the ways the platform can move is shown in the following two-page spread. The photos show the switches to push to move the platform. The switch call-out numbers (on the left-hand page) correspond to the illustration numbers on the right-hand page.

NOTE: At the end of each work day the PRO 100 should be returned to the STOWED POSITION as described under STOWING in the "STOWING & TRANSPORTING" chapter.

⚠DANGER

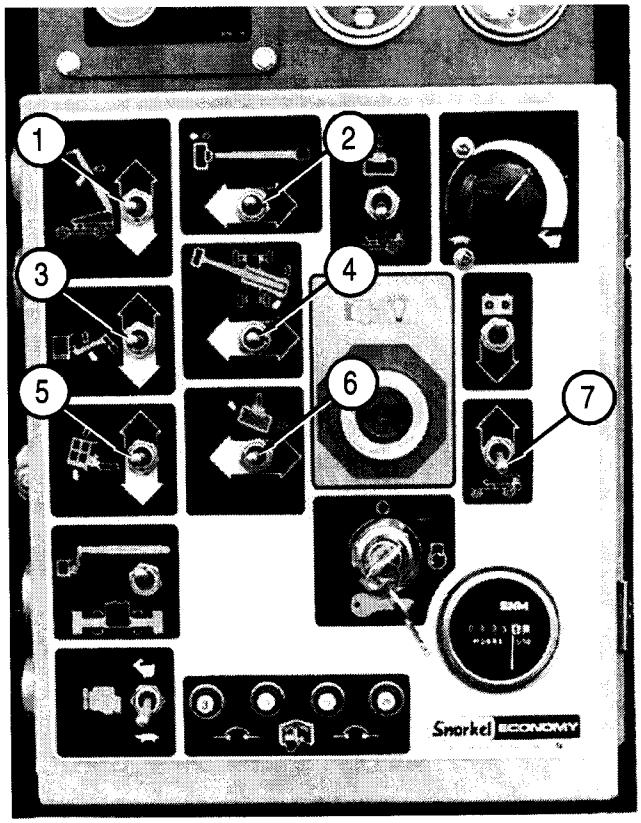
Death or serious injury can result if a PRO 100 tips over. A PRO- 100 might tip over if the rear axles are retracted while the booms are up or extended. The PRO 100 should have its booms completely retracted and completely down before retracting the rear axles.

NOTE: The correct procedure for retracting the rear axles is shown at the end of this chapter under "RETRACT & LOCK REAR AXLES."

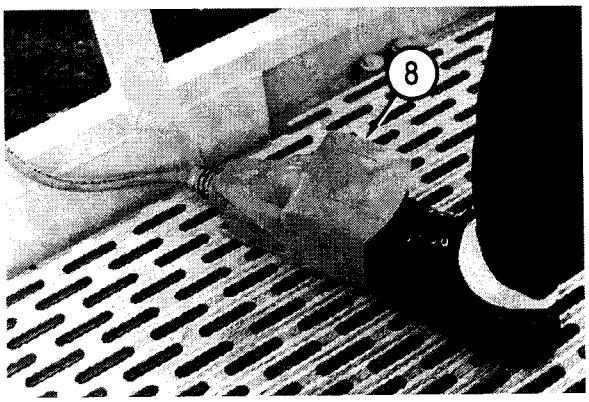
***IMPORTANT* (ground-control box operation):** You must hold the **GROUND OPERATION** switch (7) up when you use any of the platform-moving switches (1 through 6) to move the platform. This is a safety feature to prevent the platform from moving if a single platform-moving switch is accidentally pushed.

***IMPORTANT* (platform-control box operation):** You must be stepping on the foot switch (8) when you use any of the platform-moving switches (1 through 6) to move the platform. Also, you must be stepping on the foot switch to use either the **LIFT/SWING** controller or the **DRIVE/STEER** controller. The foot switch is a safety feature to prevent the platform from moving if a single platform-moving switch or controller is accidentally pushed.

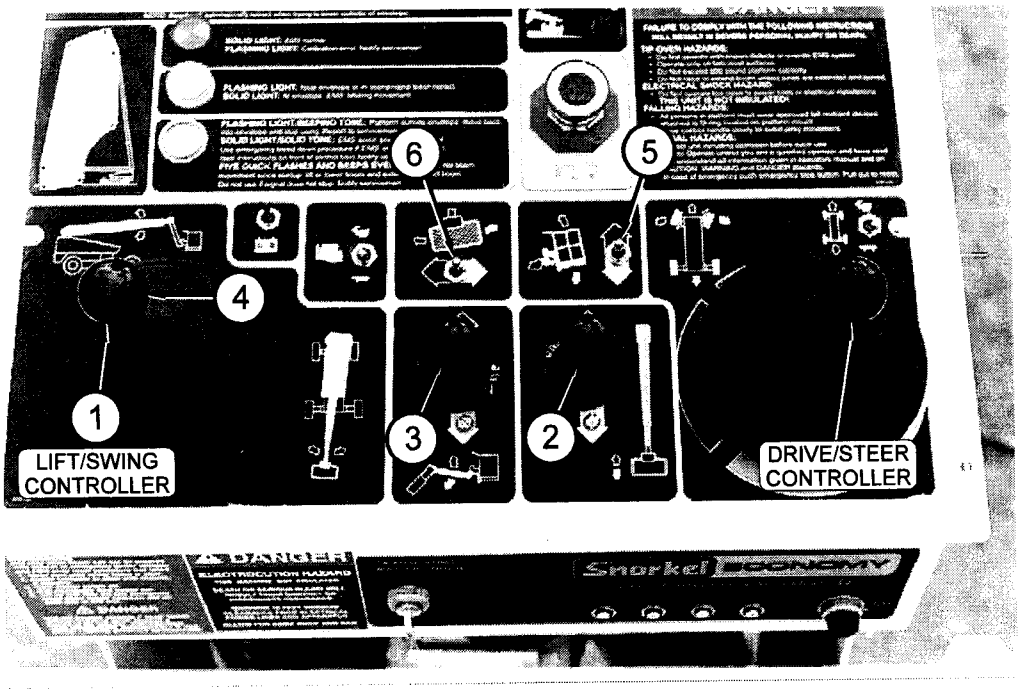
GROUND-CONTROL BOX



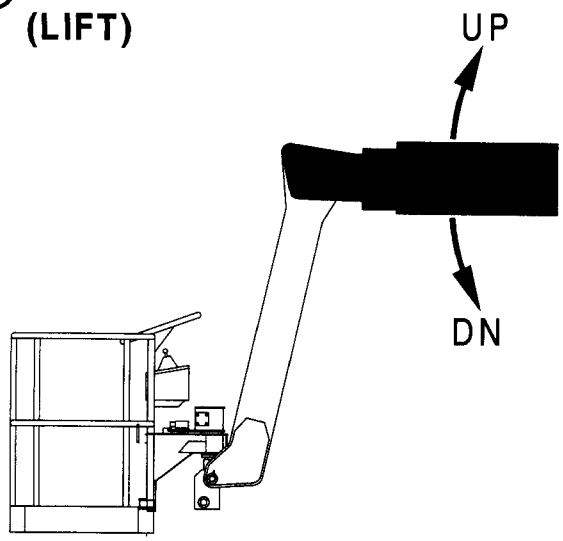
FOOT SWITCH



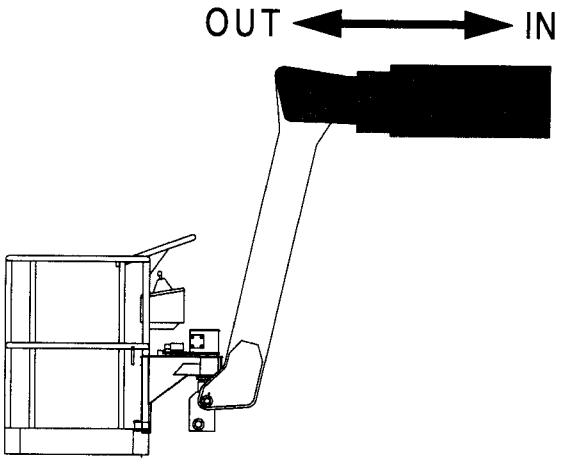
PLATFORM-CONTROL BOX



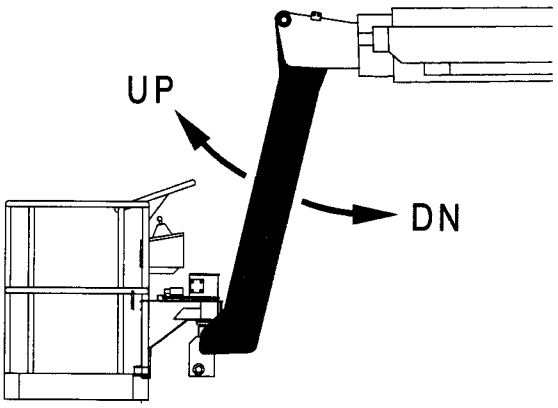
1 MAIN BOOM LIFT (LIFT)



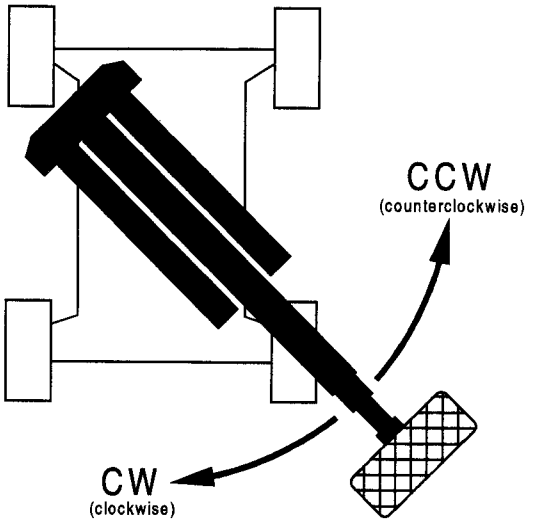
2 MAIN BOOM EXT./RET. (EXTEND)



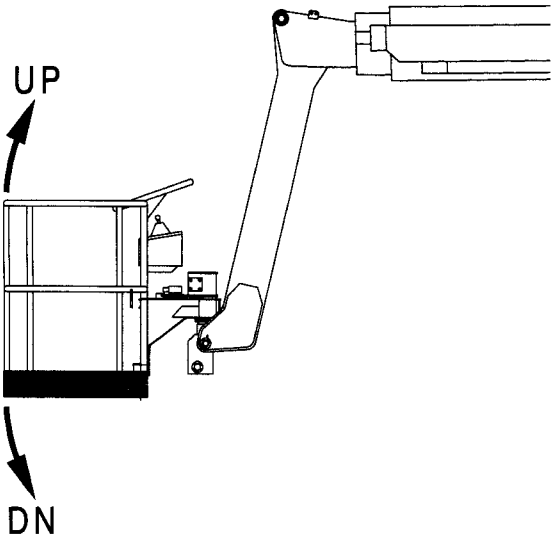
3 JIB BOOM LIFT



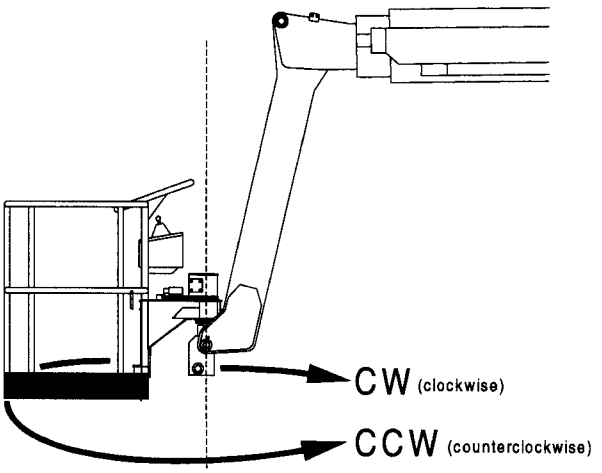
4 TURNTABLE SWING (SWING)



5 PLATFORM LEVEL



6 PLATFORM ROTATION

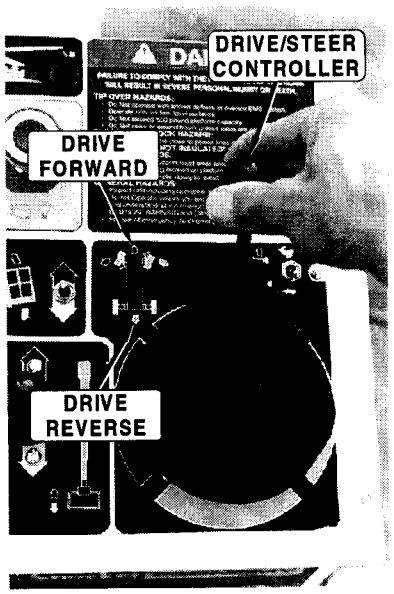


■ MOVING THE PRO 100

The PRO 100 chassis can only be moved form the platform-control box. You cannot move the chassis from the ground-control box.

There is a blue arrow on the DRIVE FORWARD end of the chassis and a yellow arrow on the DRIVE REVERSE end of the chassis. Pushing the **DRIVE/STEER** controller to DRIVE FORWARD causes the chassis to move in the direction of the blue arrow on the end of the chassis. Pushing the **DRIVE/STEER** controller to DRIVE REVERSE causes the chassis to move in the direction of the yellow arrow on the opposite end of the chassis.

NOTE: You must be stepping on the foot switch for the **DRIVE/STEER** controller to work.



■ STEERING

The PRO 100 can only be steered from the platform-control box. You cannot steer the PRO 100 from the ground-control box.

There are two blue arrows on the STEER LEFT side of the chassis and two yellow arrows on the STEER RIGHT side of the chassis. Pushing the **DRIVE/STEER** controller to STEER LEFT causes the front wheels to turn for a left turn. Pushing the **DRIVE/STEER** controller to STEER RIGHT causes the front wheels to turn for a right turn.

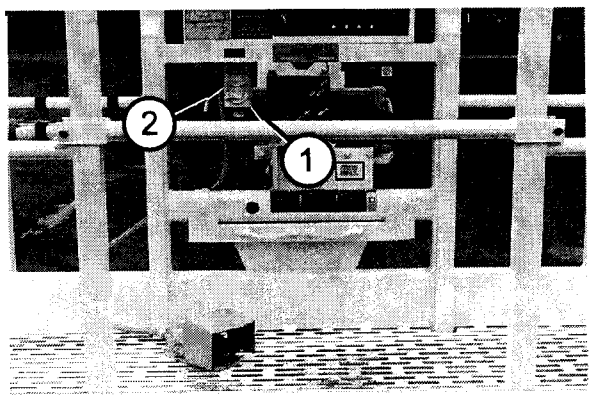
NOTE: You must be stepping on the foot switch.

NOTE: You cannot steer the wheels while the brakes are set. This prevents high stresses from building up in the tires and steering mechanism. To release the brakes the **DRIVE/STEER** controller must be in a "drive position" -- not in its center, off, position.

NOTE: When you release the **DRIVE/STEER** controller the wheels stay where you set them. The wheels do not return to the "straight ahead" position the way automobile wheels do.

■ 125 V AC OUTLET AT THE PLATFORM

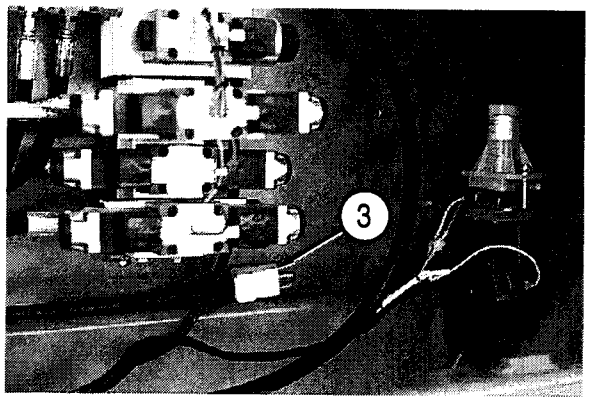
The electrical box (1) has two 3-prong, 125 V ac electrical connectors. Their combined output is limited by a 20 A, slow-blow circuit breaker (2).



The power-input connector (3) for the electrical box (1) is inside the left rear side of the turntable. Plug a source of power into the power-input connector (3) if you intend to use the electrical box (1) to power equipment.

⚠CAUTION

Unplug the source of power before you move the PRO 100.

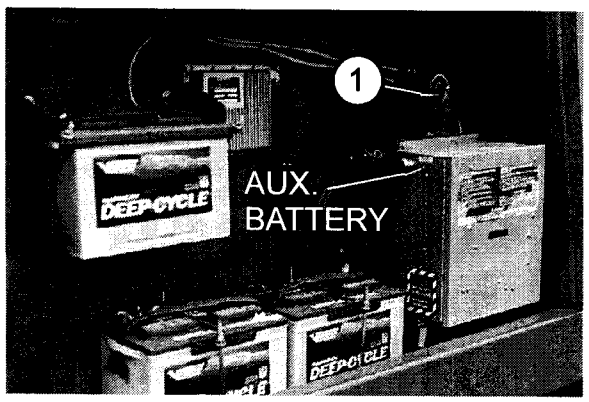


■ EXTEND & LOCK REAR AXLES

Before the main boom can be raised or extended the rear axles of the PRO 100 must be extended and locked. This section explains the procedure for extending and locking the rear axles.

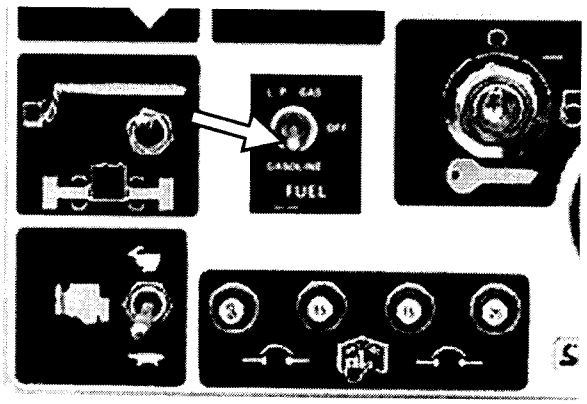
- **Inside the turntable:**

1. Set **BATTERY** (1) to ON and look to see that the **AUX. BATTERY** circuit breaker has not popped out (close the battery-compartment door).

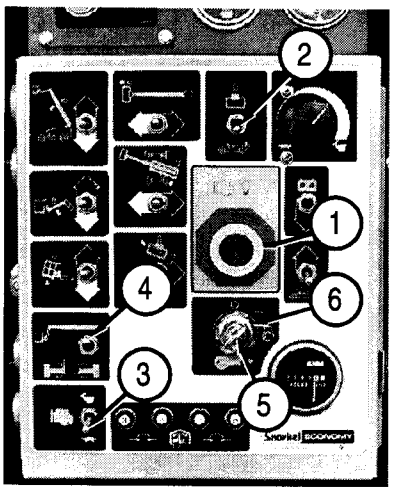


- **At the ground-control box:**

(OPTION - DUAL FUEL) For machines set up to run both gasoline and LP gas: Set the **FUEL** switch to GASOLINE or L.P.-GAS depending on which you want to use. If you select L.P.-GAS, open the valve on top the LP gas tank.



1. Pull **EMERGENCY STOP** (1) out.
2. Set **SELECTOR SWITCH** (2) to GROUND.
3. Set **ENGINE THROTTLE** (3) to LO.
4. Set **BOOMS/AXLES SWITCH** (4) to BOOMS.
5. Insert the key (5) into **the MASTER KEY SWITCH** (6).
6. Turn the key (5) to ON and pause there a few seconds while an alarm sounds to alert others that the PRO 100 is about to start.

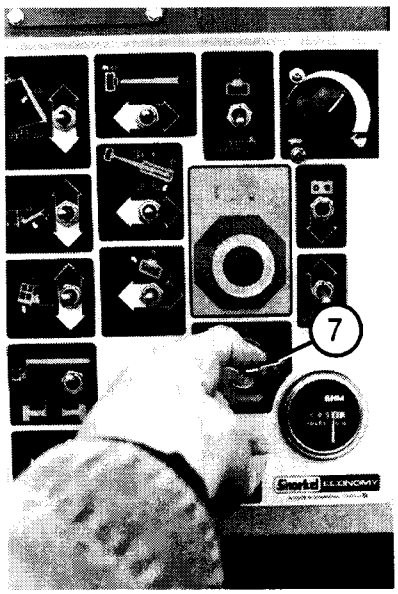


NOTE: If you pause 30 seconds or more an automatic protection feature will prevent the PRO 100 from starting. If that happens, turn the key to OFF and try again.

⚠CAUTION

If the engine fails to start (at the next step) in 20 seconds, turn the key to OFF and wait 60 seconds before turning the key to START again.

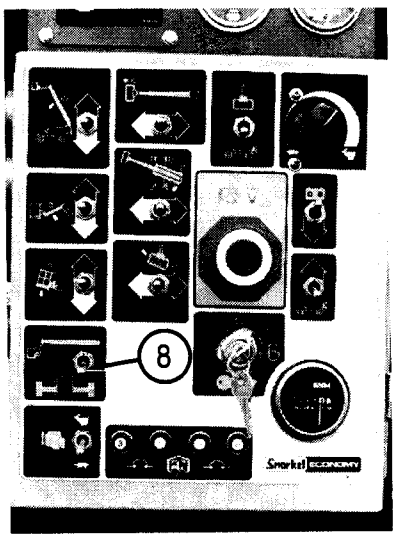
7. Turn the key (7) to START and hold it there until the engine starts (or for a maximum of 20 seconds) then release the key to ON.



The engine should now be running.

8. Set **BOOMS/AXLES SWITCH** (8) to AXLES.

NOTE: The engine rpm should automatically increase when you switch to AXLES.



- **At the AXLES controls:**

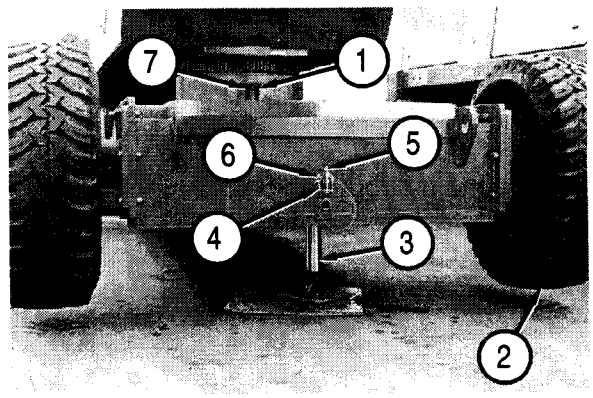
⚠CAUTION

Rear axle weight is about to be lifted by the jack. Check to be sure the area under the jack shoe plate will support that weight and that the area is clear of objects that might be crushed.

1. Push and hold the jack control lever (1) to RAISE until the rear wheels (2) are off the ground and the jack (3) has stopped lifting the chassis.

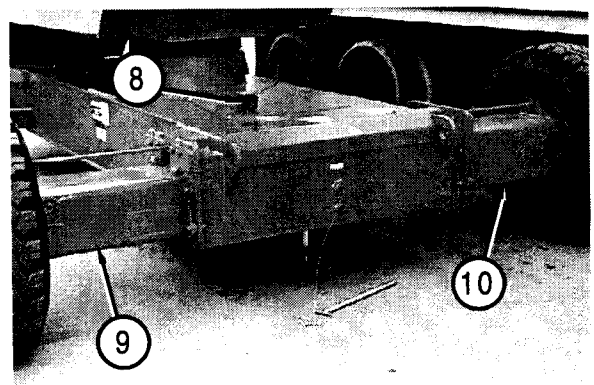
2. Remove the snapper pin (4) from the pin lock (5) then remove the pin lock (5) from the upper hole (6) in the chassis.

NOTE: You might have to cycle the axle control lever (7) back and forth, to relieve pressure on the pin lock (5), while you twist and pull the pin lock (5) out of the chassis.



3. Push and hold the axle control lever (8) to EXTEND until the axles (9) (10) stop extending.

NOTE: One axle might extend before the other, they do not necessarily extend together.

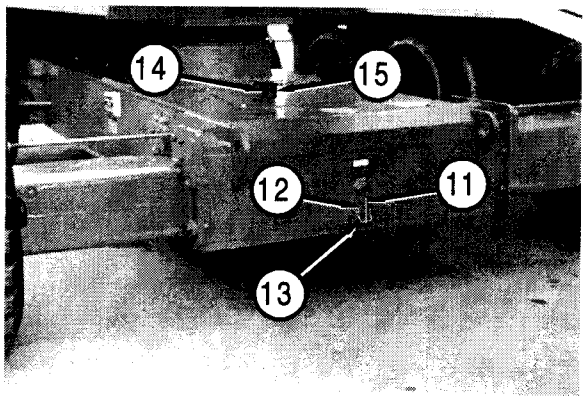


4. Completely insert the pin lock (11) into the lower hole (12) in the chassis and install the

snapper pin (13) through the pin lock (11) and the hole lip.

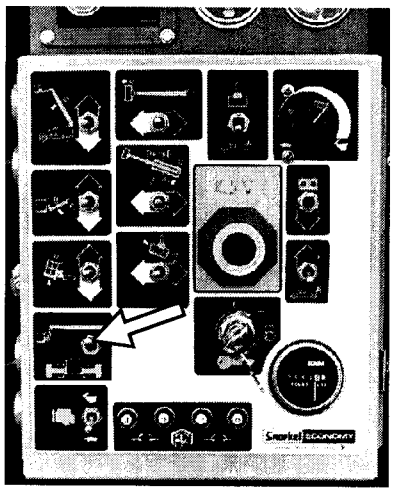
NOTE: You might have to cycle the axle control lever (14) back and forth, to align holes inside the chassis, while you push the pin lock (11) into the chassis.

5. Pull and hold the jack control lever (15) to LOWER until the wheels are on the ground and the jack stops retracting.



- **At the ground-control box:**

1. Set the **BOOMS/AXLES SWITCH** to BOOMS.



- **What next:**

1. If you want to control the platform from the ground-control box, go to the "MOVING THE PLATFORM" section of this chapter.

2. If you want to control the platform from the platform-control box, return to the "Pre-Start Conditions" in the "STARTING FROM THE PLATFORM CONTROL BOX" section of this chapter.

■ RETRACT & LOCK REAR AXLES

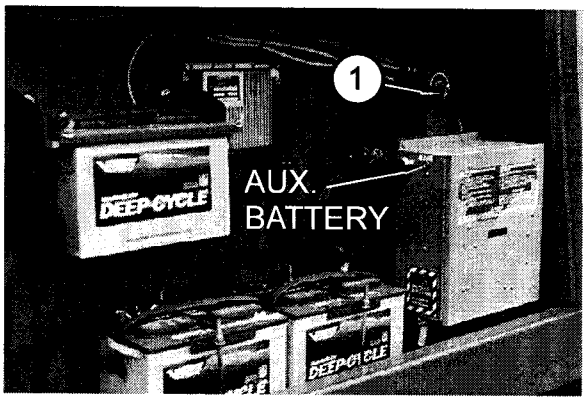
Retracting the rear axles is basically the reverse of extending them.

⚠DANGER

Death of serious injury can result if a PRO 100 tips over. A PRO 100 might tip over if the rear axles are retracted while the booms are up or extended. The PRO 100 should have its booms completely retracted and completely down before retracting the rear axles.

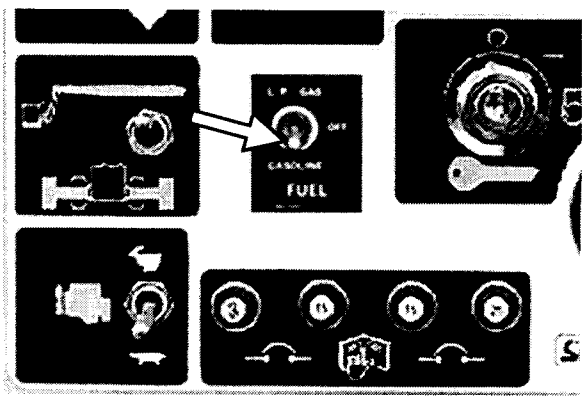
- **Inside the turntable:**

1. Set **BATTERY** (1) to ON and look to see that the **AUX. BATTERY** circuit breaker has not popped out (close the battery-compartment door).



- **At the ground-control box:**

(OPTION - DUAL FUEL) For machines set up to run both gasoline and LP gas: Set the **FUEL** switch to GASOLINE or L.P.-GAS depending on which you want to use. If you select L.P.-GAS, open the valve on top the LP gas tank.



1. Pull **EMERGENCY STOP** (1) out.

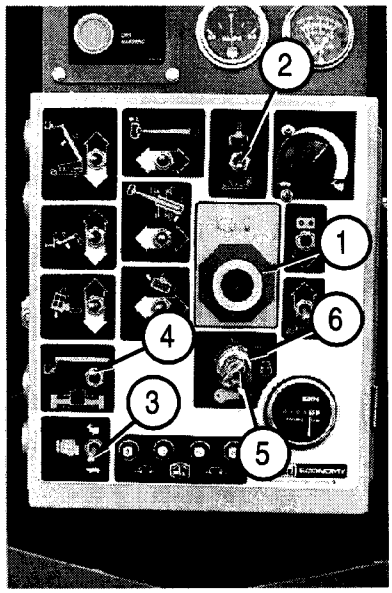
2. Set **SELECTOR SWITCH** (2) to GROUND.

3. Set **ENGINE THROTTLE** (3) to LO.

4. Set **BOOMS/AXLES SWITCH** (4) to BOOMS.

5. Insert the key (5) into the **MASTER KEY SWITCH** (6).

6. Turn the key (5) to ON and pause there a few seconds while an alarm sounds to alert others that the PRO 100 is about to start.

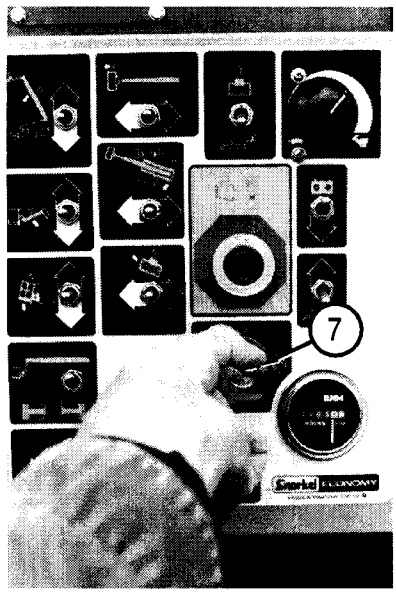


NOTE: If you pause 30 seconds or more an automatic protection feature will prevent the PRO 100 from starting. If that happens, turn the key to OFF and try again.

⚠CAUTION

If the engine fails to start (at the next step) in 20 seconds, turn the key to OFF and wait 60 seconds before turning the key to START again.

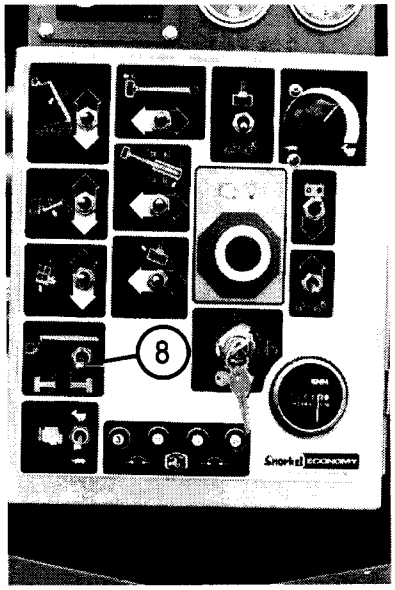
7. Turn the key (7) to START and hold it there until the engine starts (or for a maximum of 20 seconds) then release the key to ON.



The engine should now be running.

8. Set **BOOMS/AXLES SWITCH** (8) to AXLES.

NOTE: The engine rpm should automatically increase when you switch to AXLES.

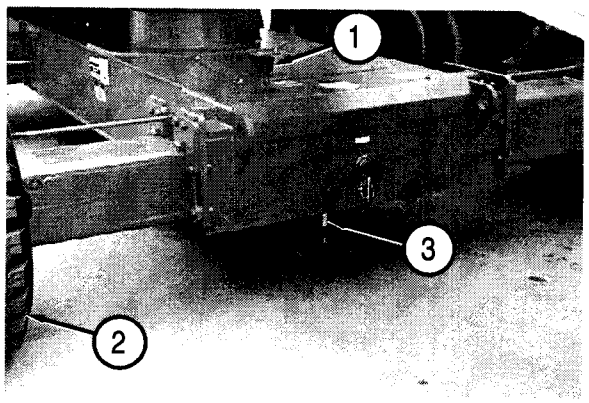


- **At the AXLES controls:**

⚠CAUTION

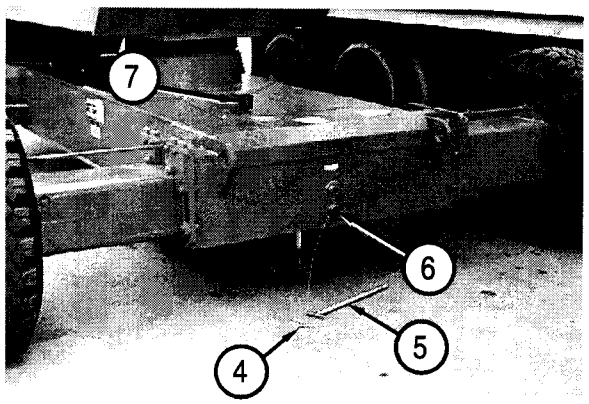
Rear axle weight is about to be lifted by the jack. Check to be sure the area under the jack shoe plate will support that weight and that the area is clear of objects that might be crushed.

1. Push and hold the jack control lever (1) to RAISE until the rear wheels (2) are off the ground and the jack (3) has stopped lifting the chassis.



2. Remove the snapper pin (4) from the pin lock (5) then remove the pin lock (5) from the lower hole in the chassis (6).

NOTE: You might have to cycle the axle control lever (7) back and forth a few times, to relieve pressure on the pin lock (5), while you pull the pin lock (5) out of the chassis.

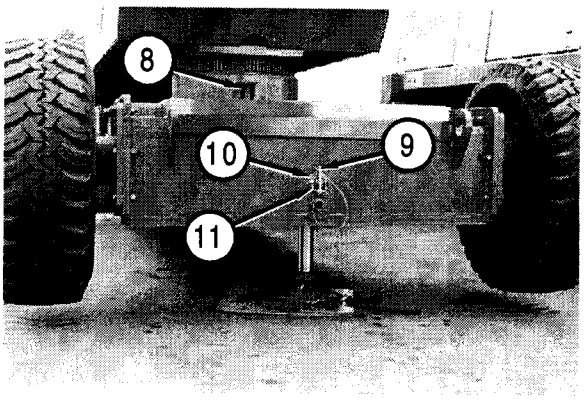


3. Push and hold the axle control lever (8) to RETRACT until the axles stop retracting.

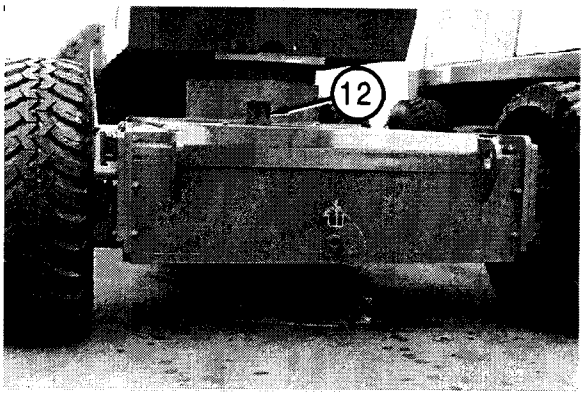
NOTE: One axle might retract before the other, they do not necessarily retract together.

4. Completely insert the pin lock (9) into the upper hole (10) in the chassis and install the snapper pin (11) through the pin lock (9) and the hole in the lip.

NOTE: You might have to cycle the axle control lever (8) back and forth a few times, to align holes inside the chassis, while you push the pin lock (9) into the chassis.

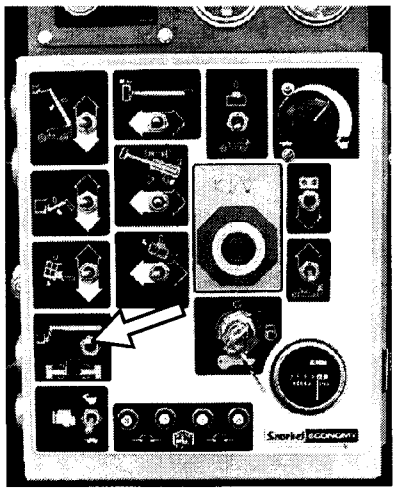


5. Pull and hold the jack control lever (12) to LOWER until the wheels are on the ground and the jack stops retracting.



- **At the ground-control box:**

1. Set the **BOOMS/AXLES SWITCH** to BOOMS.



- **What next:**

At this point you will probably want to do one of the following two things.

1. Turn the PRO 100 off by pushing the **EMERGENCY STOP** button in and turning the **MASTER KEY SWITCH** to OFF.

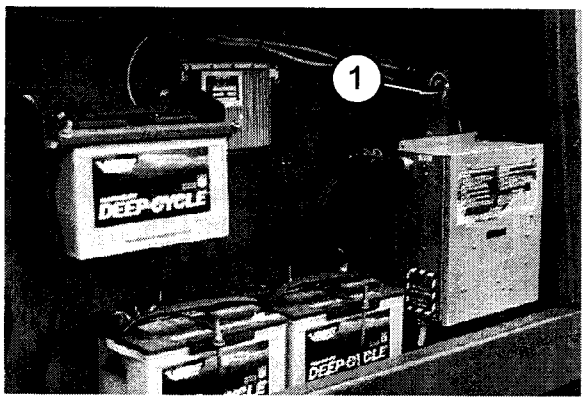
2. Or you might want to drive the PRO 100 as described under "MOVING THE PRO 100" earlier in this chapter.

The following procedures are emergency procedures only. Do not use them for normal operation. Their purpose is to get the platform and operator safely to ground when the PRO 100 motor will not start or some other problem keeps the platform from lowering in the normal way.

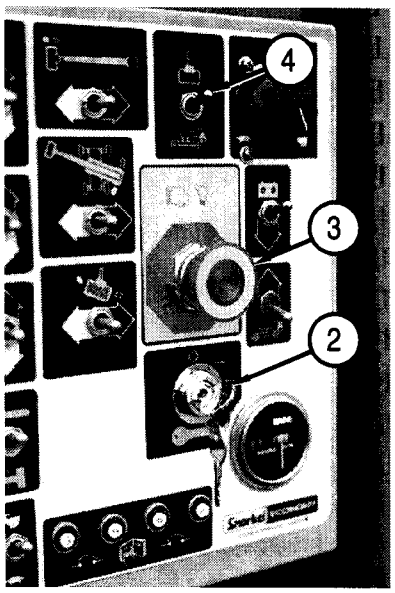
■ EMERGENCY OPERATION FROM THE PLATFORM-CONTROL BOX

Try Procedure A first. If Procedure A does not work, use Procedure B.

● Procedure A



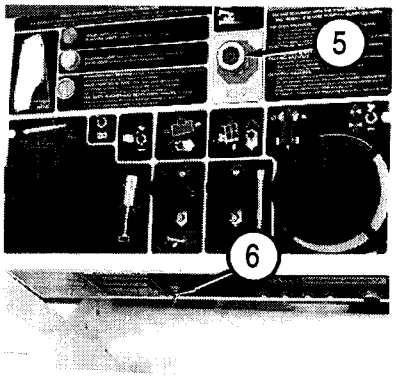
1. The **BATTERY** switch (1) must be ON.

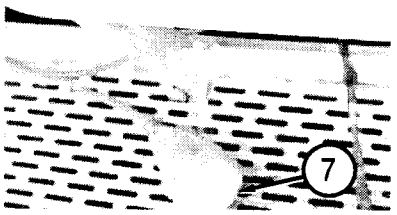


2. The **MASTER KEY SWITCH** (2) must be ON.

3. The **EMERGENCY STOP** switch (3) must be pulled out (on).

4. The **SELECTOR SWITCH** (4) must be set to PLATFORM.

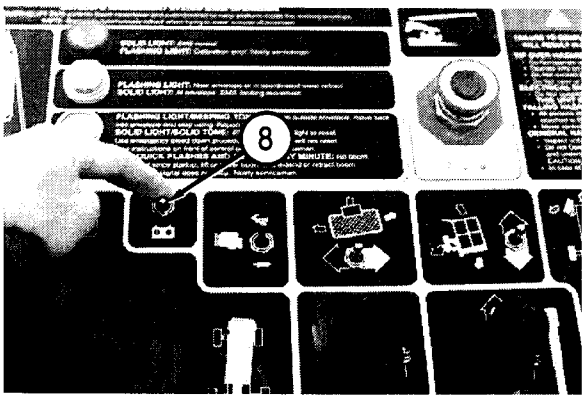




5. Set the **EMERGENCY STOP** switch (5) to on (pulled up).

6. Set the **ANTI-RESTART MASTER SWITCH** (6) to ON.

7. Step on the foot switch (7).

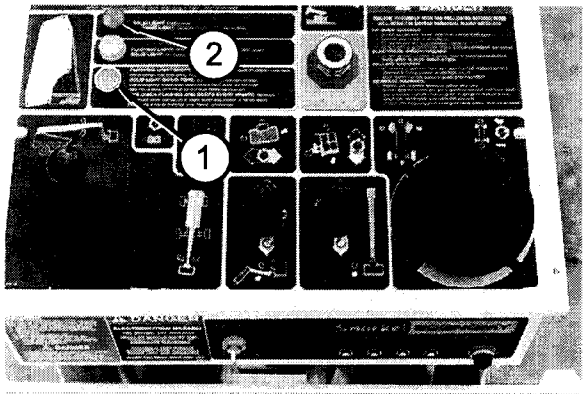


8. Pull down and hold the **EMERGENCY POWER OPERATION** switch (8).

9. Use the switches and/or controllers, on the top of the platform-control box, to move the platform as desired.

NOTE: Boom movements will be slow and have long lag times under **EMERGENCY POWER OPERATION**.

- **Procedure B**

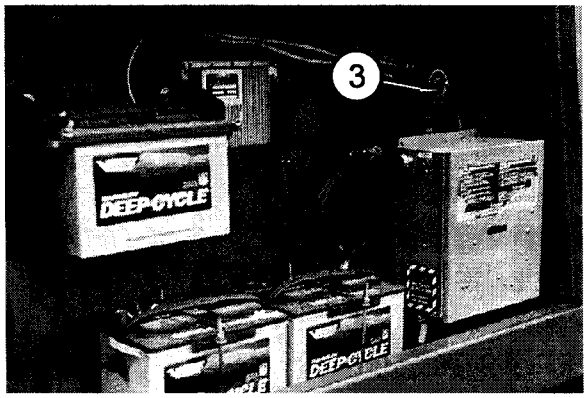


If the red **EMS WARNING** light (1) is on, try to reset it by pressing it in then releasing it several times. If the red light goes out, try to restart the motor and lower the platform in the normal way.

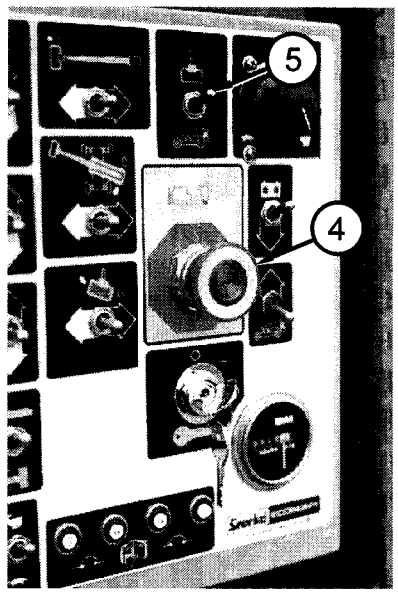
If the red light stays on and the green **EMS STATUS** light (2) is on, the main boom can be retracted in the normal way (if it is extended) or lowered in the normal way (if it is almost completely retracted). Use one or the other of those two functions to retrieve the platform as long as the green **EMS STATUS** light is on.

NOTE: If the green light goes out, try to reset the red **EMS WARNING** light again to see if the green light will come back on.

If the red light stays on and the green light stays off, continue with this procedure.

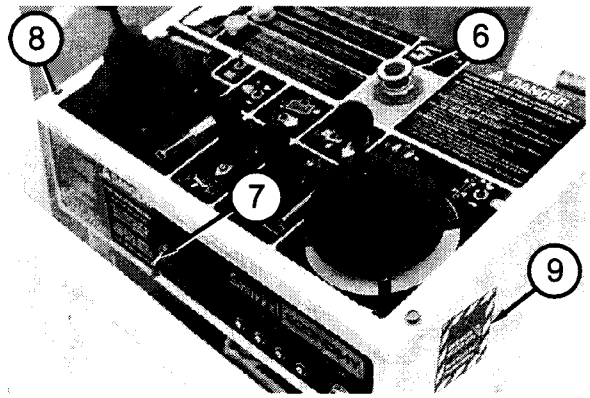


1. The **BATTERY** switch (3) must be ON.



2. The **EMERGENCY STOP** switch (4) must be pulled out (on).

3. The **SELECTOR SWITCH** (5) must be set to PLATFORM.



4. Set the **EMERGENCY STOP** switch (6) to on (pulled up).

5. Set the **ANTI-RESTART MASTER SWITCH** (7) to OFF.

⚠DANGER

Death or serious injury can result if a PRO 100 tips over. A PRO 100 can tip over if the booms lower without retracting. At the next step, stop immediately if the booms lower without retracting.

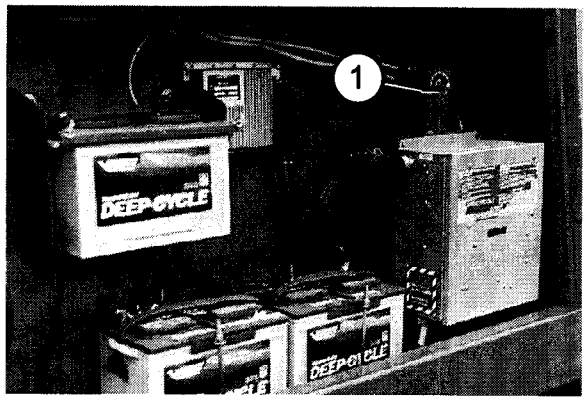
If you have control over turntable swing, align the turntable with the chassis to take advantage of the extended base of support.

6. Pull up and hold both **EMERGENCY BLEED DOWN** switches (8) (9) and watch to see that the booms retract as they lower.

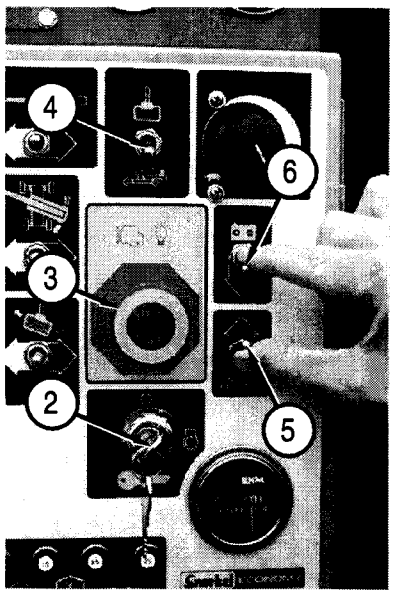
■ EMERGENCY OPERATION FROM THE GROUND-CONTROL BOX

Try Procedure C first. If Procedure C does not work, try Procedure D second and Procedure E third.

● Procedure C



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



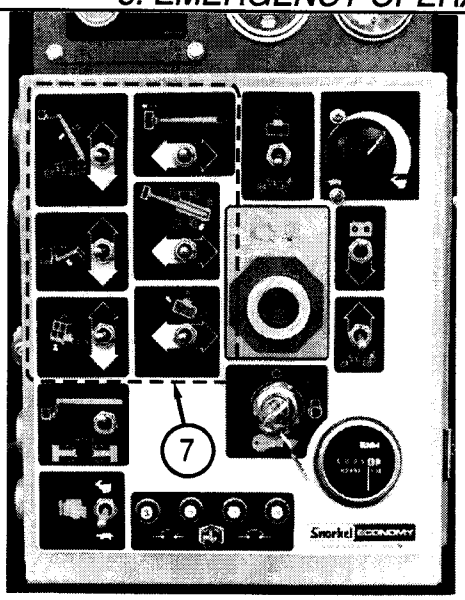
2. Set the **MASTER KEY SWITCH** (2) to ON.

3. Pull the **EMERGENCY STOP** switch (3) out (on).

4. Set the **SELECTOR SWITCH** (4) to GROUND.

5. Push and hold the **GROUND OPERATION** switch (5) up.

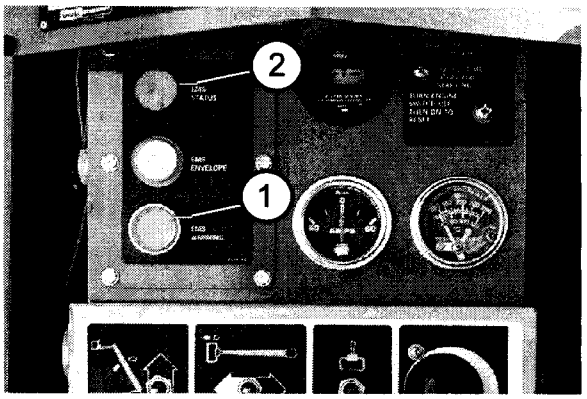
6. Push and hold the **EMERGENCY POWER OPERATION** switch (6) down.



7. Push and hold any of the six platform-moving switches (7) to move the platform as desired.

NOTE: Boom movements will be slow and have long lag times under **EMERGENCY POWER OPERATION**.

● Procedure D

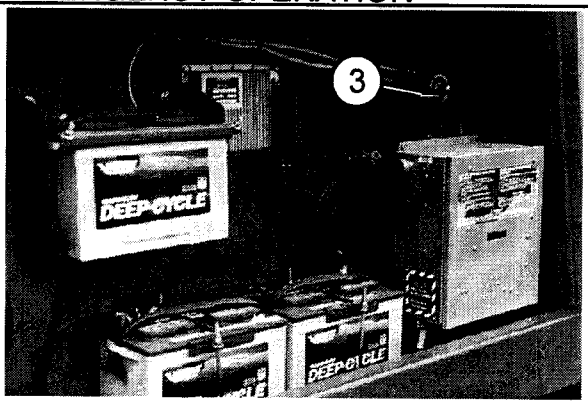


If the red **EMS WARNING** light (1) is on, try to reset it by pressing it in then releasing it. If the red light goes out, try to restart the motor and lower the platform in the normal way.

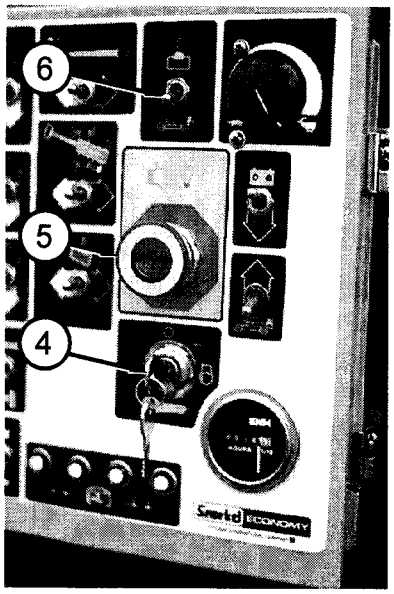
If the red light stays on and the green **EMS STATUS** light (2) is on, the main boom can be retracted in the normal way (if it is extended) or lowered in the normal way (if it is almost completely retracted). Use one or the other of those two functions to retrieve the platform as long as the green **EMS STATUS** light is on.

NOTE: If the green light goes out, try to reset the red **EMS WARNING** light again to see if the green light will come back on.

If the red light stays on and the green light stays off, continue with this procedure.



1. Set the **BATTERY** switch (3) to ON.



2. Set the **MASTER KEY SWITCH** (4) to OFF.

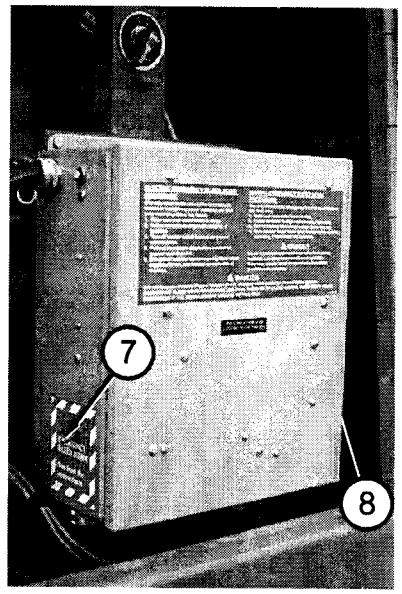
3. Pull the **EMERGENCY STOP** switch (5) out (on).

4. Set the **SELECTOR SWITCH** (6) to GROUND.

⚠DANGER

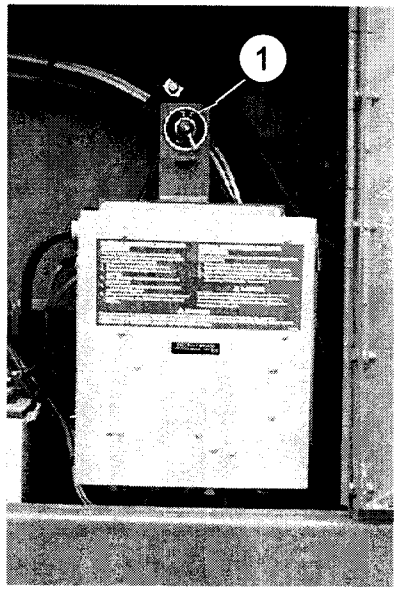
Death or serious injury can result if a PRO 100 tips over. A PRO 100 can tip over if the booms lower without retracting. At the next step, stop immediately if the booms lower without retracting.

If you have control over turntable swing, align the turntable with the chassis to take advantage of the extended base of support.



5. Pull up and hold both **EMERGENCY BLEED DOWN** switches (7) (8) and watch to see that the booms retract as they lower.

- **Procedure E**



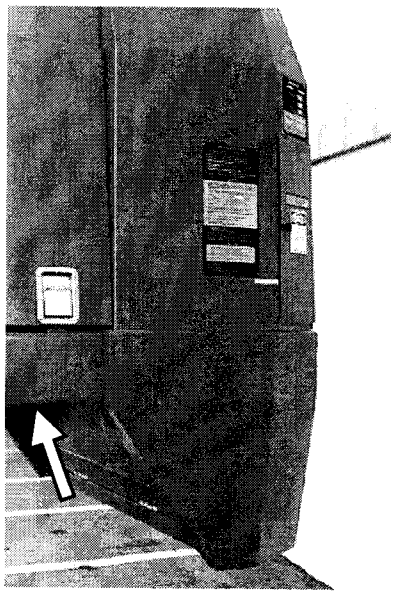
1. Set the **BATTERY** switch (1) to OFF.

⚠DANGER

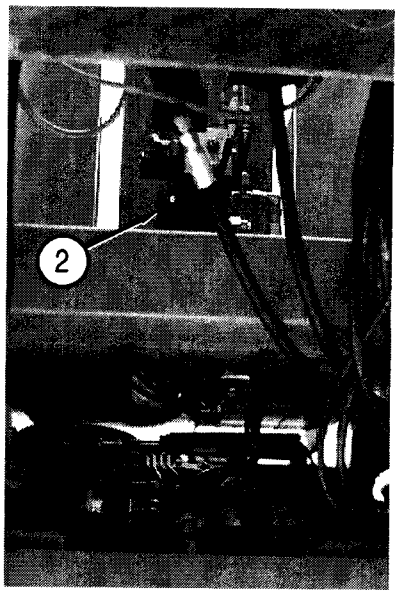
Death or serious injury can result from being crushed by the main boom as it lowers. At the next step do not reach for the manual bleed-down valve from above the turntable.

Death or serious injury can result if a PRO 100 tips over. A PRO 100 can tip over if the booms lower without retracting. At the next step, stop immediately if the booms lower without retracting.

If you have any control over turntable swing, align the turntable with the chassis to take advantage of the extended base of support.



2. Reach the manual bleed-down valve from the position shown above.



3. Very slowly open the bleed-down valve (2). The further it is opened, the faster the booms come down.

⚠DANGER

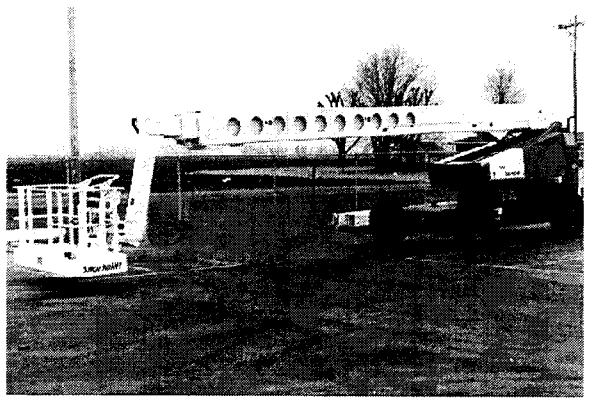
Be certain you close the emergency bleed-down valve (2) at the next step. Failure to do so prevents the main boom from remaining stationary in an elevated position.

4. Close the emergency bleed-down valve (2) when the main boom is horizontal.

■ STOWING

At the end of each work day (or in preparation for transporting, lifting, towing, or storage) a qualified operator should put the PRO 100 into its STOWED POSITION then lock it.

The correct STOWED POSITION is shown here.



To bring the PRO 100 into the STOWED POSITION use the controls on the ground-control or platform-control box to:

1. Fully retract the main boom.

2. Fully lower the main boom.

3. Fully lower the jib boom.

4. Center the main boom between the rear wheels.

5. Use the **AXLES** controls to completely retract the axles and completely raise the jack.

To lock the PRO 100:

1. If the engine has just been under load and is hot, set the **ENGINE THROTTLE** to LO and let the engine idle for one minute.

2. Set the **MASTER KEY SWITCH** to OFF, remove the key, and close the ground-control box door.

3. Set the **BATTERY** switch to OFF and lock the **BATTERY** switch.

4. (OPTION - LPG) For machines equipped with LPG, close the valve on the LPG-tank (completely screwed in).

5. Close and latch all other doors.

■ 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.

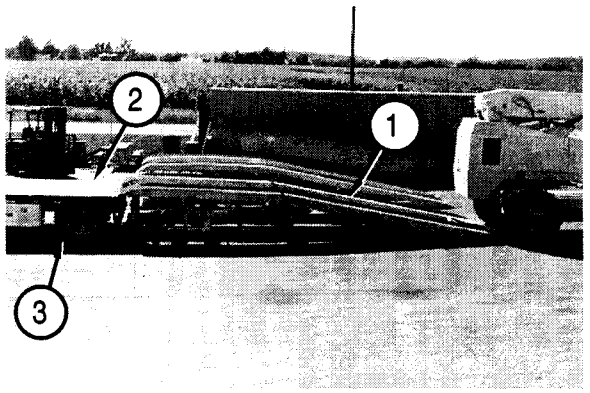
❑Trailering

⚠DANGER

A PRO 100 weighs approximately 33,000 pounds (15,000 kg). Loading ramps must be able to support that weight. Transport trailers must be able to safely transport that weight.

Do not load a PRO 100 on grades over 25% or on ramps with poor traction, uneven surfaces, or steps.

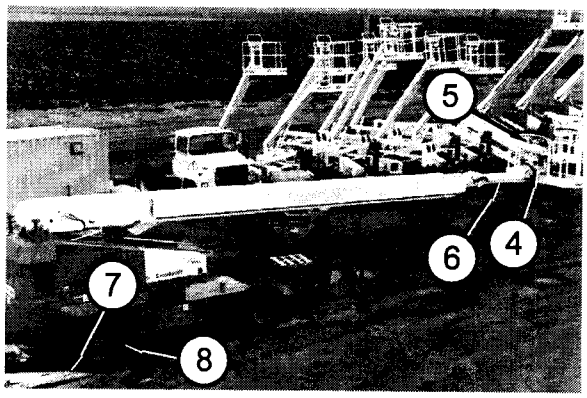
To safely drive a PRO 100 onto a transport trailer:



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 form the loading ramp (1) while the PRO 100 is being loaded.

3. Set the ground-control box for platform operation.



4. Enter the platform and attach the lanyard of your fall restraint to the anchorage point (4) on the platform.

5. Use the controls of the platform-control box (5) to raise the jib-boom (6) to its horizontal position.

6. Use the platform controls to bring the PRO 100 into the STOWED POSITION (except jib-boom horizontal) at the foot of the loading ramp (7) with the steering wheels (8) nearest the ramp.

7. Visually check (from the platform) to be sure the PRO 100 is aligned with the ramp and the ramp is still aligned with the truck or trailer. All should be in a straight line.

⚠DANGER

Death or serious injury can result from losing control of a PRO 100 while loading. Always set the ENGINE THROTTLE and DRIVE RANGE to LO anytime you drive up or down a grade.

8. Set the **ENGINE THROTTLE** to LO.

9. Set the **DRIVE RANGE** to LO.

10. Use the **LIFT/SWING** controller to move the platform slightly to the side so you are aligned with the wheels and can see them better.

11. Use the **DRIVE/STEER** controller to slowly drive the PRO 100 straight onto the ramp and trailer.

12. Use the **LIFT/SWING** controller to align the base boom between the rear wheels.

13. Lower the jib-boom until it is about a foot (0.3 m) above the trailer.

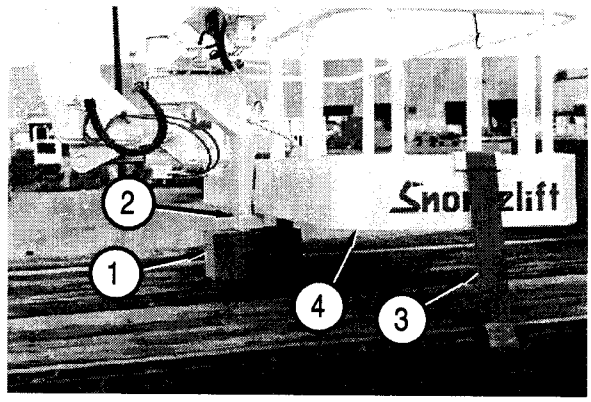
14. Leave the engine running in preparation for the next section.

15. Chock the PRO 100 wheels.

NOTE: In the stowed position (boom over rear axles), the PRO 100 front (steering) axle weighs approximately 14,300 pounds (6,500 kg) and the rear (extending) axle weighs approximately 18,700 pounds (8,500 kg). If you need to shift trailer axle-weight you can transport a PRO 100 with the booms over the front axle. However, you should drive the PRO 100 onto the trailer with the booms over the rear axle so that you do not get disoriented using the controls.

❑ Securing to a Transport Vehicle

This procedure assumes that you have just finished the previous section, that the PRO 100 engine is still running, and that the wheels are chocked.



1. Place a wooden block (1) under the rotator pylon (2) then use the controls at the platform-control box to lower the rotator pylon (2) onto the block (1).

NOTE: If the platform will not come down far enough to touch the wooden block, use a larger block. If neither a larger block nor suitable trailer is available, you may resort to Procedure B in the "Emergency Operation" chapter. However, you should not use Procedure B on a regular basis because it involves an emergency system that should be held in reserve.

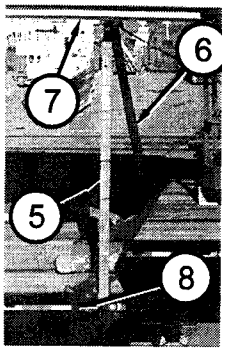
2. Set the **ANTI-RESTART MASTER SWITCH** to OFF.

3. Set the **MASTER KEY SWITCH** to OFF, remove the key, and close the ground-control box door.

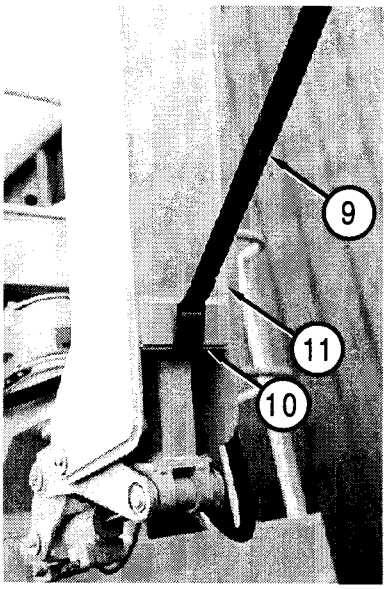
4. Set the **BATTERY** switch to OFF and lock the **BATTERY** switch.

5. (OPTION - LPG) For machines equipped with LPG, close the valve on the LPG tank (completely screwed in).

6. Use a nylon strap (3) to hold the platform (4) on the blocks (1) as shown.

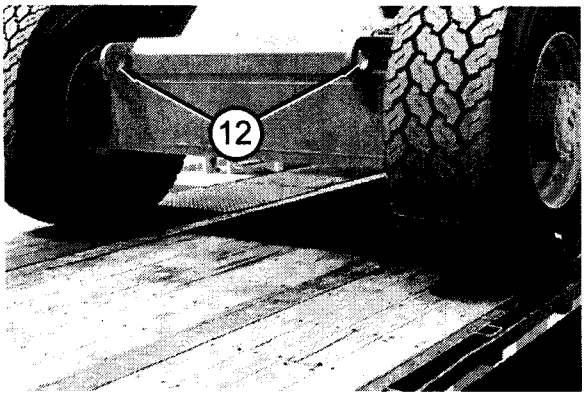


7. Attach two nylon straps (5) (6) from the underside of the base boom (7), as shown, to the trailer (8).



8. Fasten a nylon strap (9) from the underside of the base boom (7) to the weldment (10) across the lower end of the jib-boom (11).

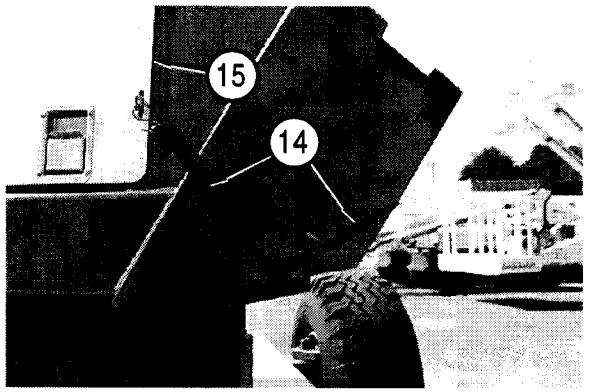
NOTE: The nylon strap (9) keeps the jib-boom from bouncing away from the chassis during transportation. In extreme cases, without the strap (9), the platform can be pushed off the wooden block (1) and into the end of the trailer or cab.



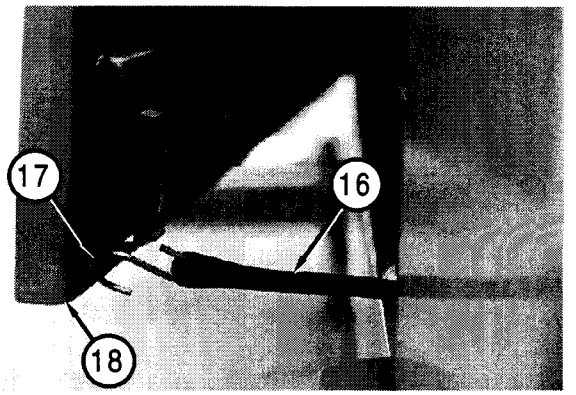
⚠DANGER

A loose PRO 100 can cause death or serious injury. Do not attach tie downs to the steering tie rods. The tie rods are not strong enough to safely hold a PRO 100.

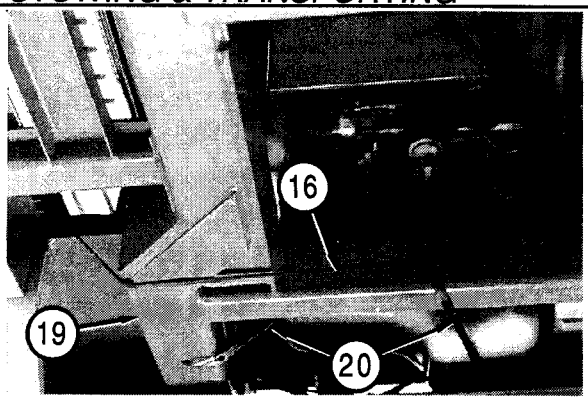
9. Attach chains to the front (12) and back (13) tie-down lugs. Chocks may be removed at this time, though it is a good idea to leave them in place.



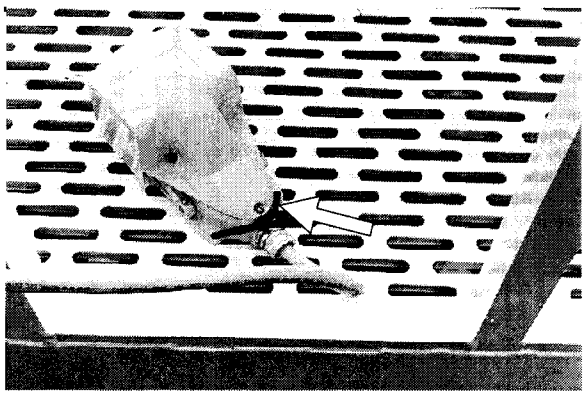
10. Use rubber straps (14), as shown, to keep the rear cowling doors (15) from opening during transport.



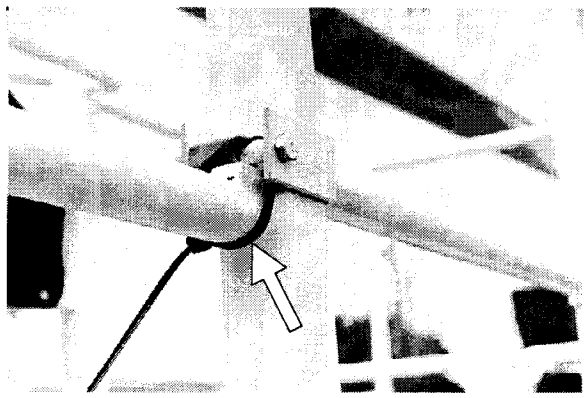
11. Hook a long rubber strap (16) through the hole (17) in the inside of one of the front cowling doors (18).



12. Stretch the rubber strap (16) under the turntable (19) to a similar hole in the opposite front cowling door. (This prevents the front doors from opening during transport.) Fasten the engine compartment door with a similar strap (20).



13. Use a wire-tie, as shown, to keep the foot switch from bouncing around the platform.



14. Use a wire-tie on each end of the gravity-gate to keep it from bouncing around.

Reverse the above procedure after transporting.

❑ Towing

Do not tow a PRO 100 unless it is equipped with the optional tow package. See the "OPTIONS" chapter.

10. DAILY INSPECTION AND MAINTENANCE

At the start of each work day (or 8 hour shift) a PRO 100 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 PRO 100 in proper working condition and to detect signs of malfunction at the earliest possible time.

⚠DANGER

Do not operate a PRO 100 that is known to be damaged or malfunctioning. Defective parts or equipment malfunctions jeopardize the safety of the operator and other people, and can cause damage to the machine.

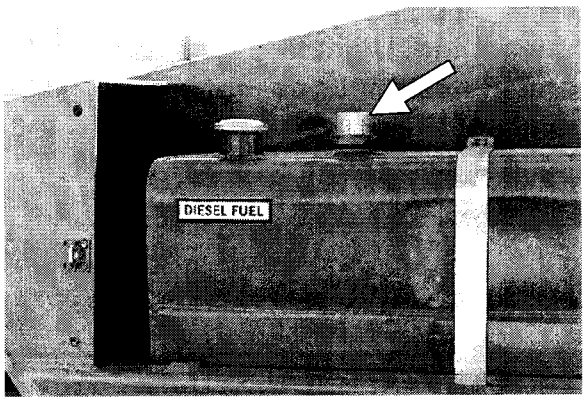
DAILY INSPECTION AND MAINTENANCE TABLE

(Set the **MASTER KEY SWITCH** to OFF before you begin this inspection)

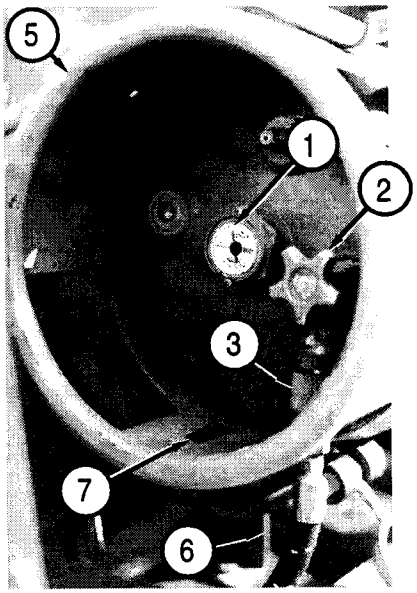
ITEM	SERVICE REQUIRED
1. Engine fuel level	Check fuel gauge (full)
2. Fuel tank cap	Visually inspect (installation)
3. Engine oil	Check oil level (between dipstick lines)
4. Fuel leaks	Visually inspect (hoses, connections, etc.)
5. Engine coolant	Check fluid level and radiator hoses
6. Wiring harnesses	Visually inspect (installation, condition)
7. Battery terminals	Visually inspect (no corrosion)
8. Battery fluid level	Check fluid level (in contact with filler neck)
9. Hydraulic oil	Check fluid level (between lines on gauge)
10. Hydraulic oil leaks	Visually inspect (hoses, tubes)
11. Tires and wheels	Visually inspect (condition)
12. Bolts and fasteners	Visually inspect (looseness)
13. Structural damage & welds	Visually inspect (weld cracks, dents)
14. Platform gravity gate	Visually inspect (operation)
15. Axle/boom interlock	Check operation
16. Emergency power motor/pump	Check operation (causes correct motion)
17. Air filter	Check condition (gauge)
18. Charging system	Visually inspect (gauge)
19. Control switches	Actuate and visually inspect for operation
20. Slide pads	Visually inspect (boom wear marks)
21. Whiffles and wire ropes	Visually inspect (even tension, condition)
22. Envelope management system	Check operation
23. Placards and decals	Visually inspect (installation, condition)
24. GFCI (Ground Fault Circuit Interrupt)	Check operation

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

1. Engine fuel level



Visually check to see that the gasoline or diesel tank is full — this one is not.



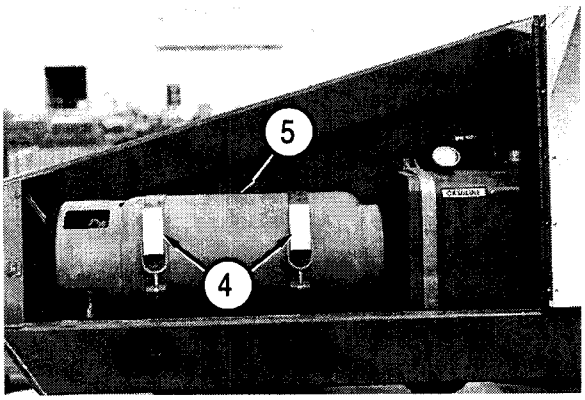
(OPTION - LPG) Visually check to see that the LPG tank is full (1).

To replace an LPG tank:

Close the valve (2).

Manually disconnect the fuel hose at the knurled ring (3).

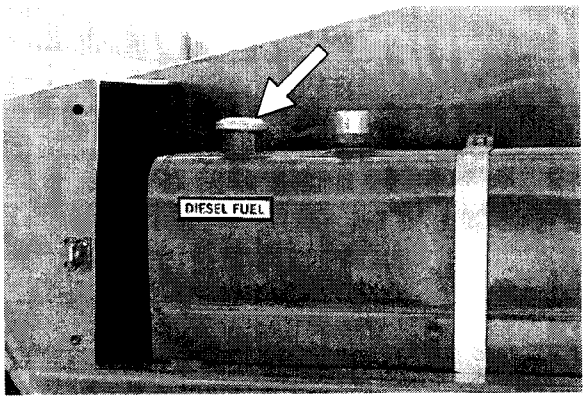
NOTE: Notice the positioning pin (6). At re-installation be sure the slot (7) in the top of the LPG tank (5) aligns with the pin (6).



Open the straps (4).

Manually lift the tank (5) out.

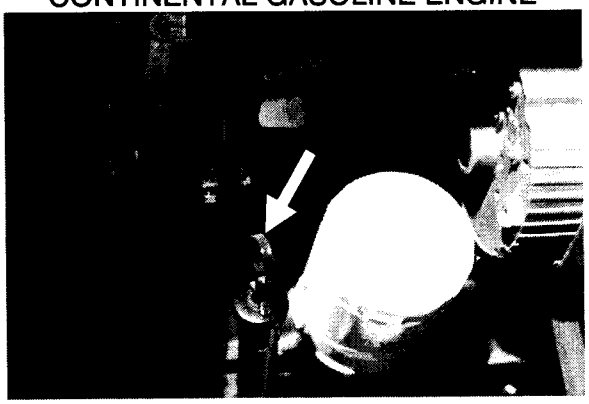
2. Fuel tank cap



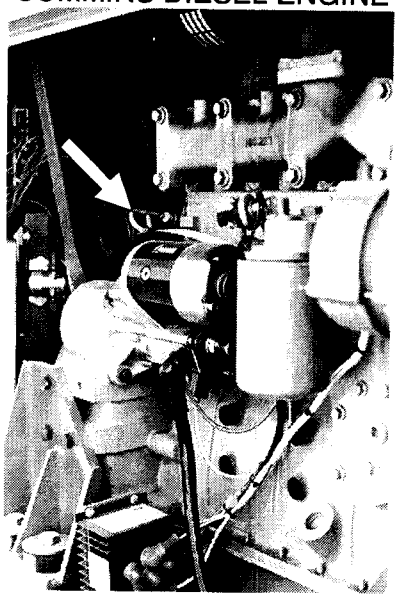
Check to see that the tank cap is in place and is tight.

3. Engine oil

CONTINENTAL GASOLINE ENGINE



CUMMINS DIESEL ENGINE

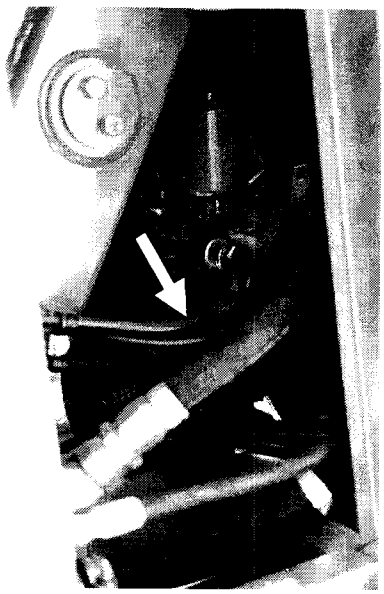


Keep the oil level between the marks on the dipsticks.

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

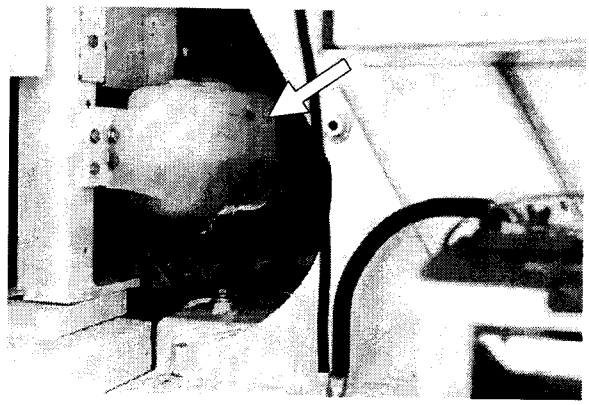
NOTE: See the "SPECIFICATIONS" chapter for the correct engine-oil grade and weight.

4. Fuel leaks



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

5. Engine coolant



Both Continental and Cummins engines are liquid cooled. At operating temperature the coolant should be at the HOT level. When cold, there should be about 1 inch (2.5 cm) of coolant in the bottom of the reservoir.

The coolant is half water and half ethylene glycol.

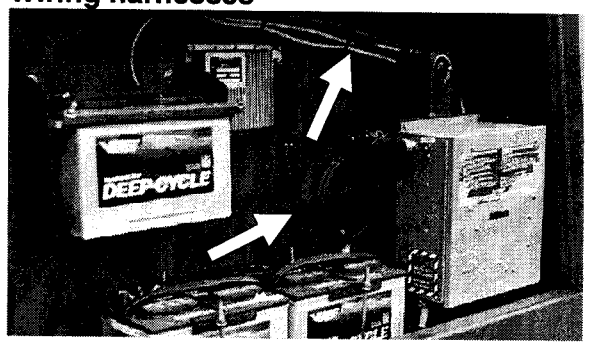
To add coolant:

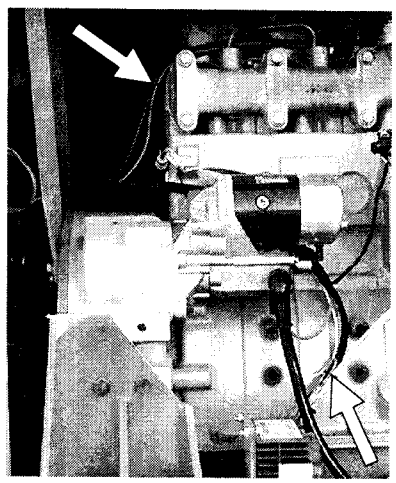
Turn the engine OFF at the ground-control box **MASTER KEY SWITCH**.

Remove the cap from the coolant reservoir.

Add coolant and replace the cap.

6. Wiring harnesses



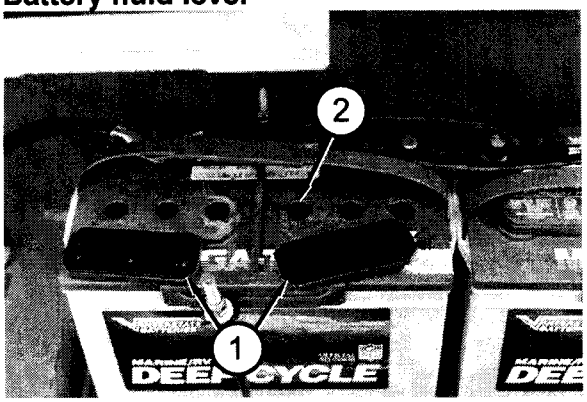


Inspect all the wiring harnesses, on the machine, for loose connections, broken wires, and frayed insulation.

7. Battery terminals

Battery terminals should be clean and free of corrosion.

8. Battery fluid level

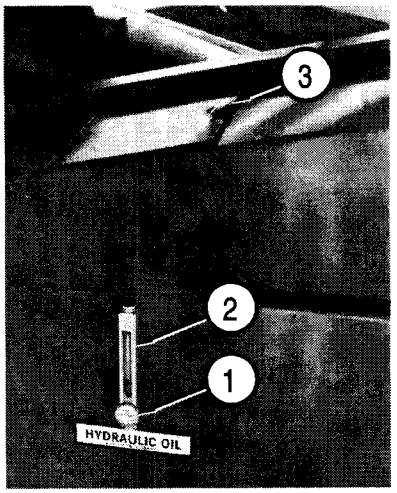


⚠DANGER

Batteries emit hydrogen and oxygen, elements that can combine explosively. Do not smoke or permit open flames or sparks when checking batteries.

Remove the caps (1) from each battery and visually check to see that the battery fluid is 1/4" (6 mm) below the bottom of the filler neck inside each hole (2).

9. Hydraulic oil



To check the hydraulic oil level:

Completely lower and completely retract the booms.

The hydraulic oil temperature (1) should be less than 200°F (93°C).

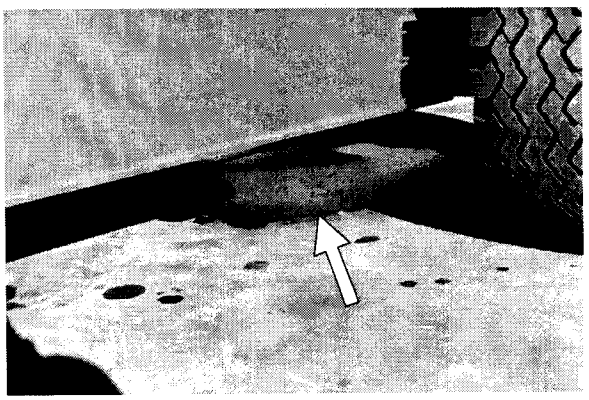
The hydraulic oil level should be between the two marks on the sight-glass gauge (2).

If necessary, add hydraulic oil at the filler cap (3). See the "SPECIFICATIONS" chapter for type and grade of hydraulic oil.

10. Hydraulic oil leaks

⚠DANGER

Leaking hydraulic oil can cause burns, fires, falls (slipping), cuts, and puncture wounds (if under high pressure). Have a qualified trained maintenance person repair all hydraulic fluid leaks before you operate the PRO 100.



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.

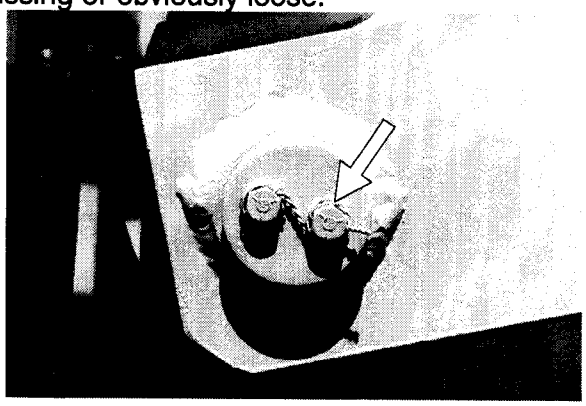
Look at the platform end of each boom. Oil can run down the inside of a boom and drip out the end.

11. Tires

PRO 100 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.

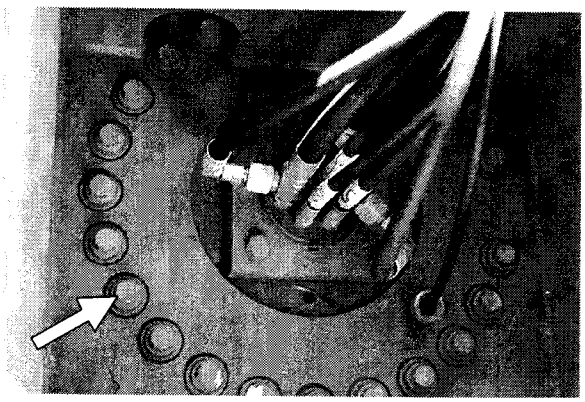
12. Bolts & fasteners

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

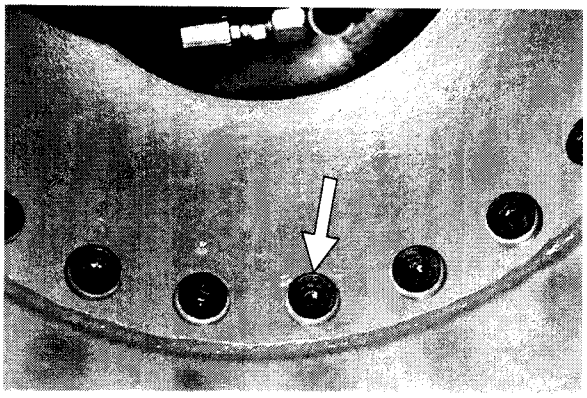


Pay particular attention to all of the safety-wired bolts. Neither the wire nor the bolt heads should be damaged in any way. (Check the turntable end of the boom and the end of the lift cylinder for other safety-wired bolts. Check both sides of the machine.)

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



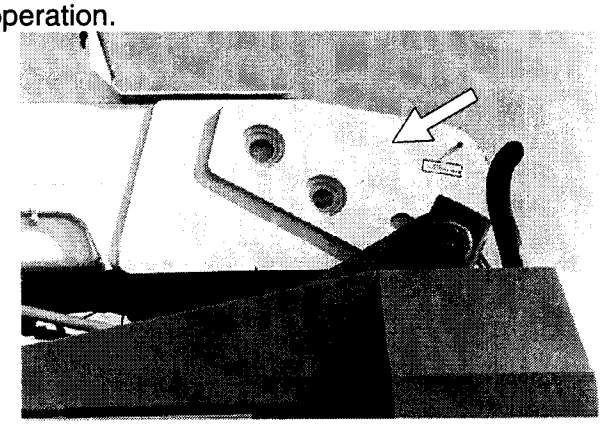
Pay particular attention to all of the upper rotation-bearing bolts. None should be visibly loose, missing, or have broken heads.



Pay particular attention to all of the lower (view from under the machine) rotation-bearing bolts. None should be visibly loose, missing, or have broken heads.

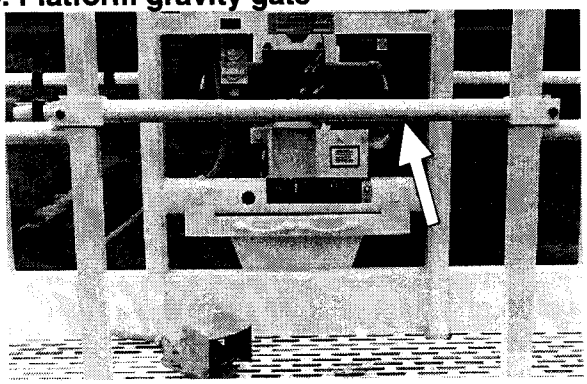
13. Structural damage & welds

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

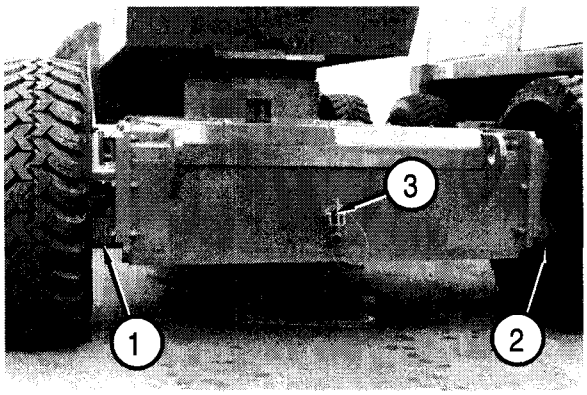


Pay particular attention to boom welds. Closely inspect boom welds, all the way around, for cracks.

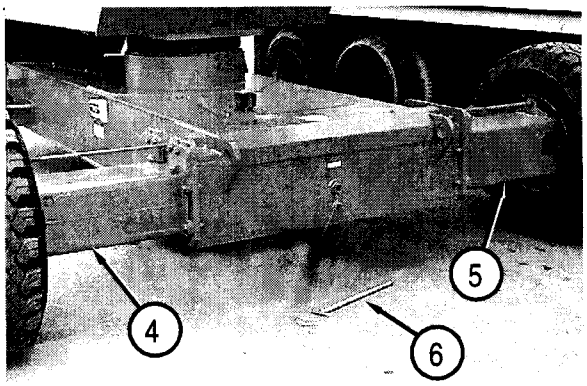
14. Platform gravity gate



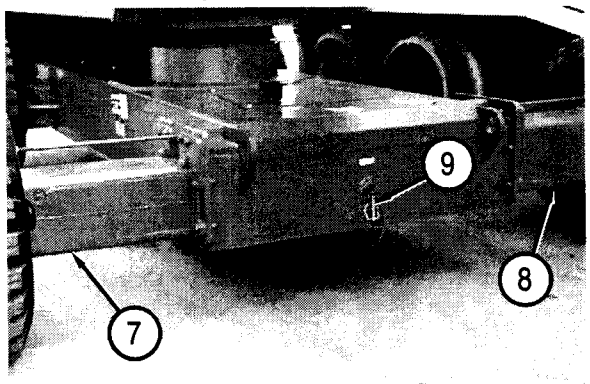
Inspect the gate to be sure it is present and moves freely.



With the axles (1) (2) retracted and the pin lock (3) in place, you should not be able to raise the main booms over a couple of degrees above the horizontal nor should you be able to extend the platform much beyond four feet (1.2m).

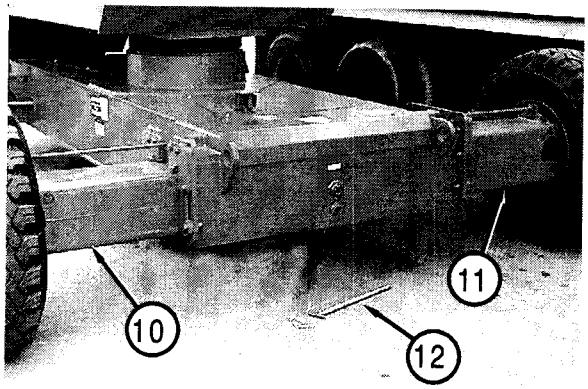


With the axles (4) (5) extended and the pin lock (6) out, you should not be able to raise the main booms over a couple of degrees above the horizontal nor should you be able to extend the platform much beyond four feet (1.2m).



With axles (7) (8) extended and pin lock (9) in lower hole, extend the main boom 10 - 20 feet (3 - 6 m).

15. Axle/boom interlock

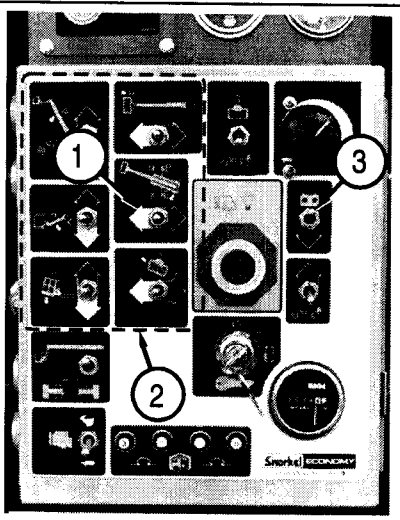


With axles (10) (11) extended and the pin lock (12) out, you should not be able to lower the jack to raise the rear axles.

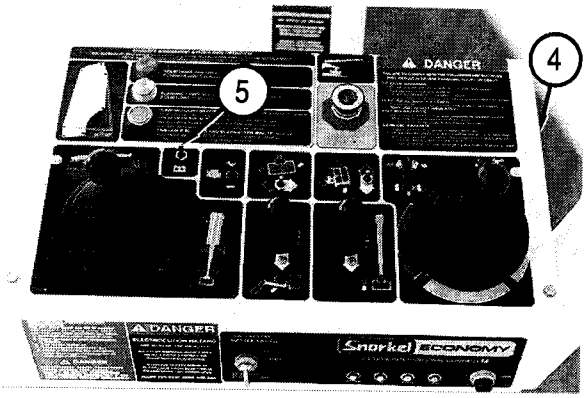
16. Emergency power motor/pump

⚠DANGER

When the turntable rotates clockwise (CW) it will move directly toward you. When you check TURNTABLE SWING at CW (1) be sure you have room to step backward.



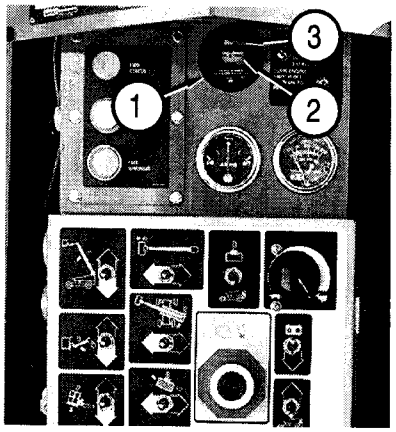
Check each of the six boom-movement switches (2), using **EMERGENCY POWER** (3), to see that they work correctly. Check both positions of each switch (2). (For correct emergency power operating procedures see the "EMERGENCY OPERATION" chapter.)



Check each of the boom-movement functions from the platform-control box (4), using **EMERGENCY POWER** (5). Check all positions of each control. (For correct emergency power operating procedures see the "EMERGENCY OPERATION" chapter.)

17. Air filter

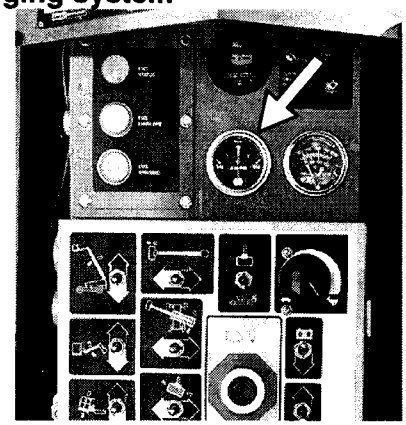
Start the engine from the ground-control box.



The **FILTER MINDER** gauge (1) has a yellow indicator in it (2). As the air filter clogs the yellow indicator raises toward the red area (3) of the sight glass. If the indicator is in the red, after the engine has been running for 30 seconds in HI **ENGINE THROTTLE**, the air filter needs to be replaced. (For further explanation of the **FILTER MINDER** gauge, see the "GAUGES" chapter.)

NOTE: Leave the engine running for the next step.

18. Charging system



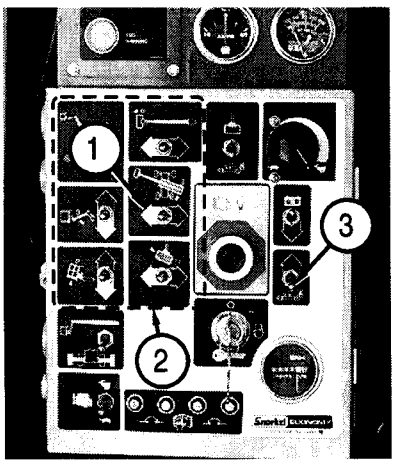
With the engine running in LO **ENGINE THROTTLE**, the needle in the **AMPS** gauge should not be to the left of "0" (left of "0" is discharging).

NOTE: Leave the engine running for the next step.

19. Control switches

⚠DANGER

When you check TURNTABLE SWING at CW (1) the turntable will move directly toward you. Be sure you have room to step backward.

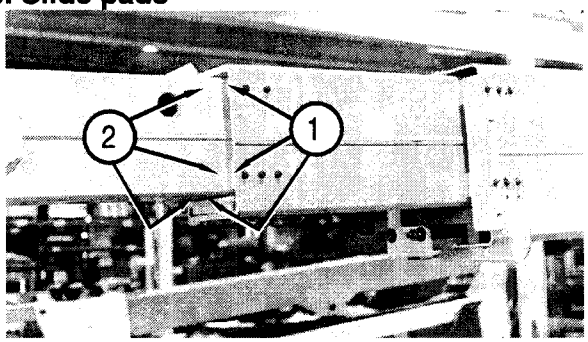


Check each of the six boom-movement switches (2) using **GROUND OPERATION** (3) to see that they cause the PRO 100 to move the way it should. Check both positions of each switch. (For correct operating procedures see the "OPERATION" chapter.)

Check all of the boom-movement, drive, and steering functions from the platform-control box (4) to see that they cause the PRO 100 to move the way it should. (For correct operating procedures see the "OPERATION" chapter.)

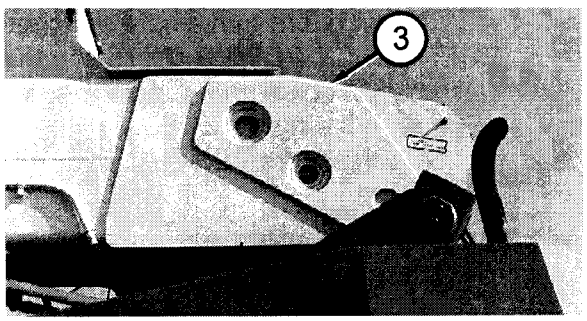
NOTE: Leave the engine running for the next step.

20. Slide pads



With the engine running, use the ground-control box to extend the booms about 10 feet (three metes). Visually inspect to see that all 12 slide pads (1) are in place at the rear end of the base and intermediate booms (six per boom).

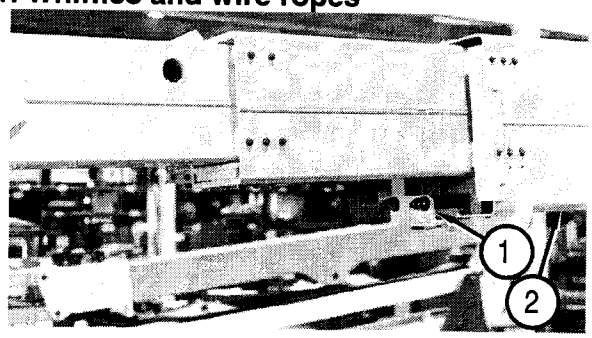
Look at the surfaces (2) that slide on each slide pad. The paint should still be in place and there should not be any signs of bare metal gouging or lubricant.



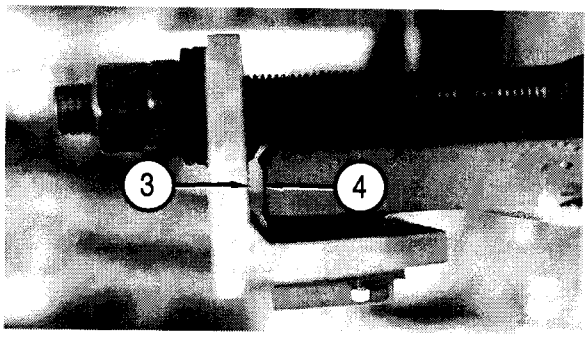
Check the slide pads and paint inside the front end (3) of the base boom similarly.

Completely retract the booms then turn the engine OFF at the ground-control box **MASTER KEY SWITCH**.

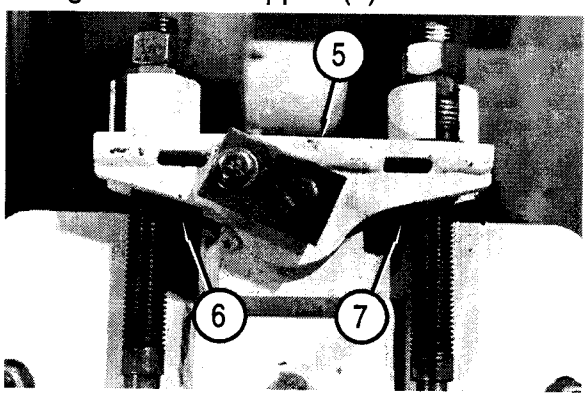
21. Whiffles and wire ropes



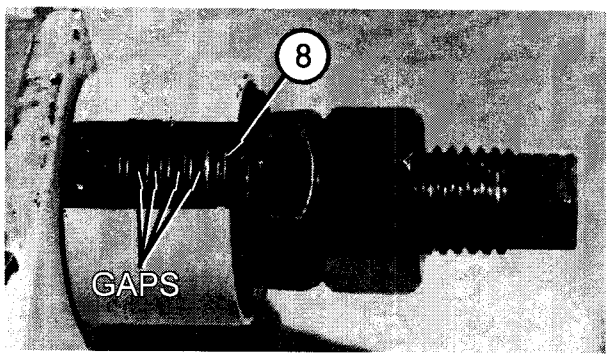
Visually inspect the whiffle (1) at the platform end of the base boom (2).



The "inside" whiffle face (3) should not be touching the whiffle support (4).



The top whiffle (5) should not be against either whiffle stop (6) (7). If either whiffle (1) (5) is canted so far it is against a stop, take the PRO 100 out of service until a qualified service technician adjusts the wire-ropes.

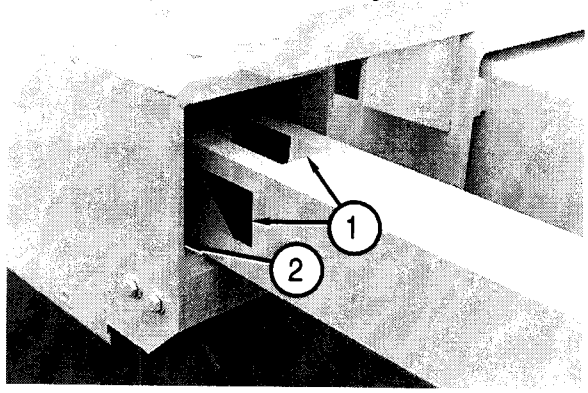


Check all spring washers (8) at both whiffles to see that they are squashed completely together. There should not be any gaps as shown here.

If any set of spring washers is found with gaps, remove the PRO 100 from service immediately and have a qualified service technician repair the condition.

While you are inspecting the whiffles check the condition of the wire ropes near the whiffles. The wire ropes should not have any broken strands or be distorted in any way.

22. Envelope management system

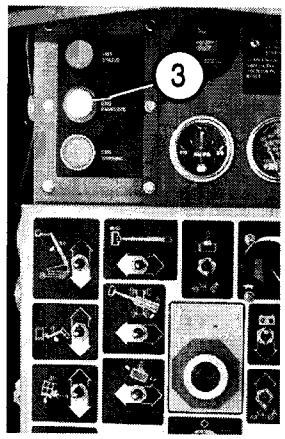


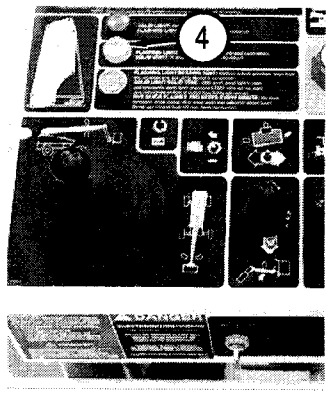
Extend and lock the rear axles.

Use the controls on the ground-control box to raise the main boom slightly above horizontal.

Use the controls on the ground-control box to extend the booms until they automatically stop.

The black & yellow tape (1) should be within 2 inches (5 cm) of being flush with the end of the hose carrier cover (2) and the **EMS ENVELOPE** lights (3) (4) should be on.





NOTE: The **EMS ENVELOPE** lights (3) (4) should start to flash a few feet before boom extension stops.

If the booms stop in the wrong place or the light does not work correctly, take the PRO 100 out of service immediately until a qualified service technician makes repairs.

23. Placards and decals

Look to see that all placards and decals are in place and legible. Replace any missing or illegible placards or decals before placing the PRO 100 into service for the daily work shift.

The **OPTIONAL PLACARDS AND DECALS**, listed below on this page, are only installed on machines that have the corresponding options.

Placard and decal kits for the PRO 100 are available from Snorkel dealers.

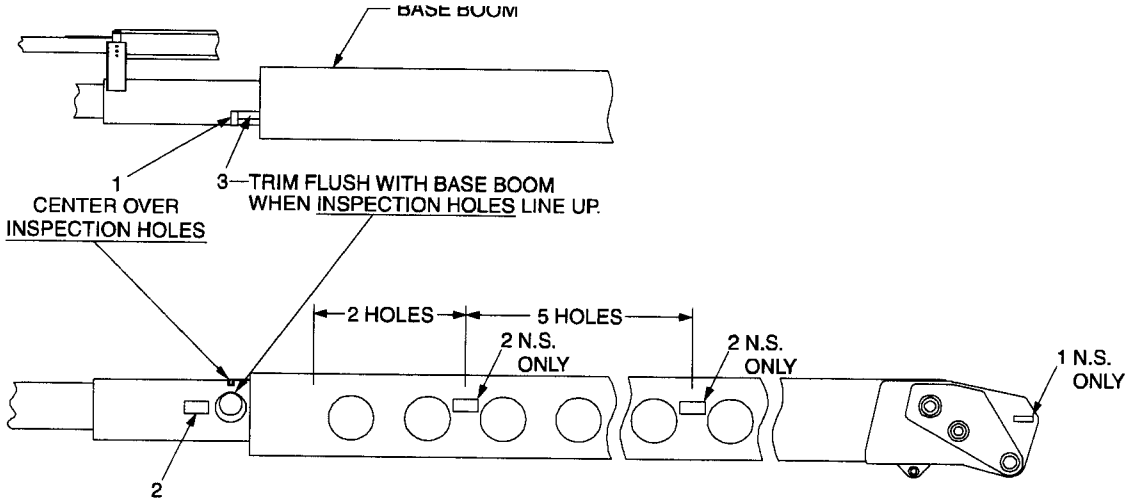
PLACARDS AND DECALS INSPECTION CHART I

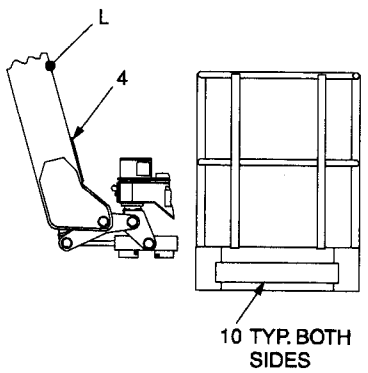
NO	PART #	DESCRIPTION	REQ
1	0073667	Inspect wire ropes	2
2	0190989	Danger - do not reach through holes	3
3	969449	Stripe 22 inches long	
4	0323899	Danger - electrocution hazard	2
5	0073668	Caution - do not use boom to lift	1
6	0072531	Danger - electrocution hazard	1
7	0070921	125 volt 20 amp	1
8	0071425	Platform identification	1
9	0074311	Danger - cylinder failure	8
10	0070418	Snorkelift logo	2
11	0191139	Danger - platform control box top	1
12	0191245	Platform control symbol definition	1
13	0150448	Attach fall restraint	1
14	0190992	Emergency bleed down	2
15	0191150	Platform control box front	1
16	0191138	Platform control box top	1
17	0190994	Danger - emergency bleed down Procedure	1

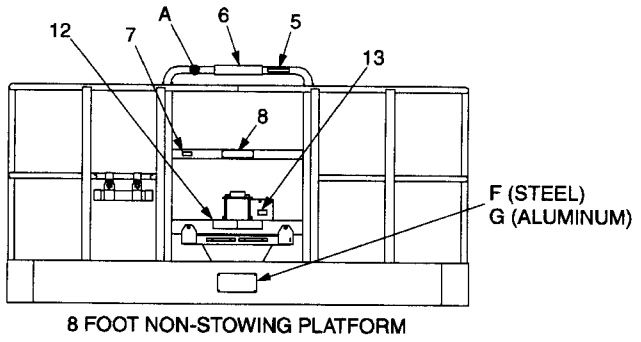
OPTIONAL PLACARDS AND DECALS

NO	PART #	DESCRIPTION	REQ
A	0111342	High range speed selector location (4x4 units only)	1
B	0181376	Lights on/off switch (head/tail light option)	1
C	0191030	Machine/generator (hydraulic AC generator option)	1
D	0191436	Warm-up at platform (hydraulic warm-up option)	1
E	0191251	Danger - platform slide controls (8ft aluminum self stow platform option)	1
F	0090589	Platform capacity 500 (8ft steel non-stow platform option or 8ft aluminum self stow platform option)	1
G	0110492	Platform capacity 600 (8ft aluminum or 5ft steel non-stow platform option)	1
H	0073085	Platform capacity 650 (5ft aluminum non-stow platform option)	1
J	0181571	Fuel empty (fuel empty indicator option)	1
K	0191253	Platform slide interlock switch (8ft aluminum self stow platform option)	1
L	0082164	Danger - do not ride platform (towing option)	1
M	0191252	Platform latches (8ft aluminum self stowing platform option)	2

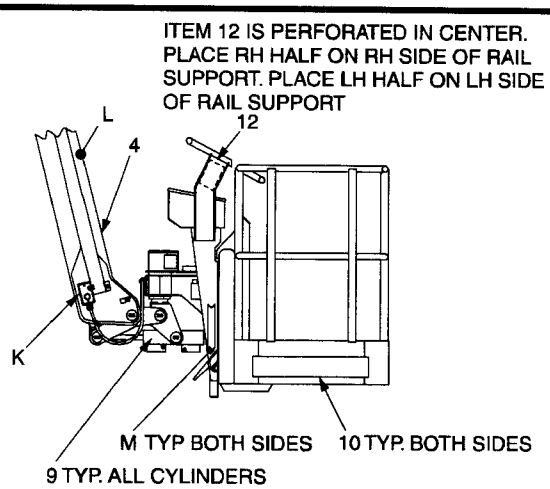
PLACARDS AND DECALS INSPECTION DRAWING I

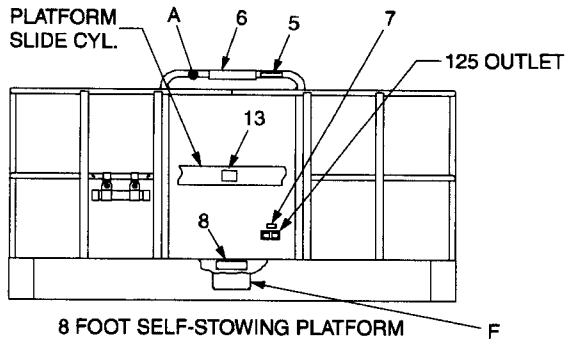




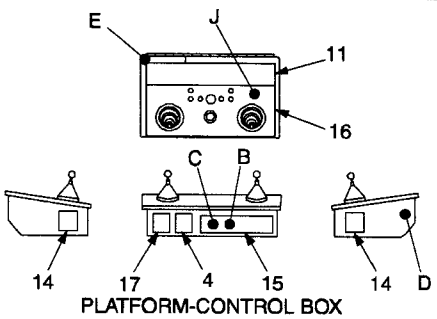


8 FOOT NON-STOWING PLATFORM

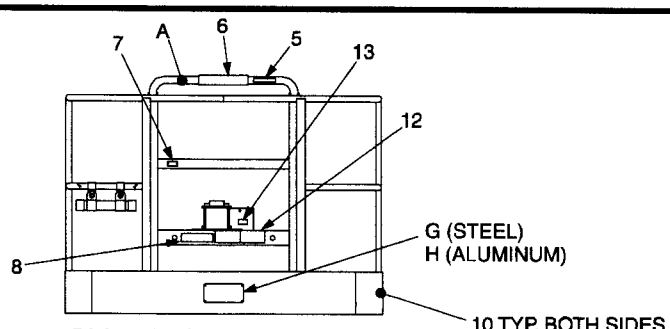




8 FOOT SELF-STOWING PLATFORM



PLATFORM-CONTROL BOX



5 FOOT NON-STOWING PLATFORM

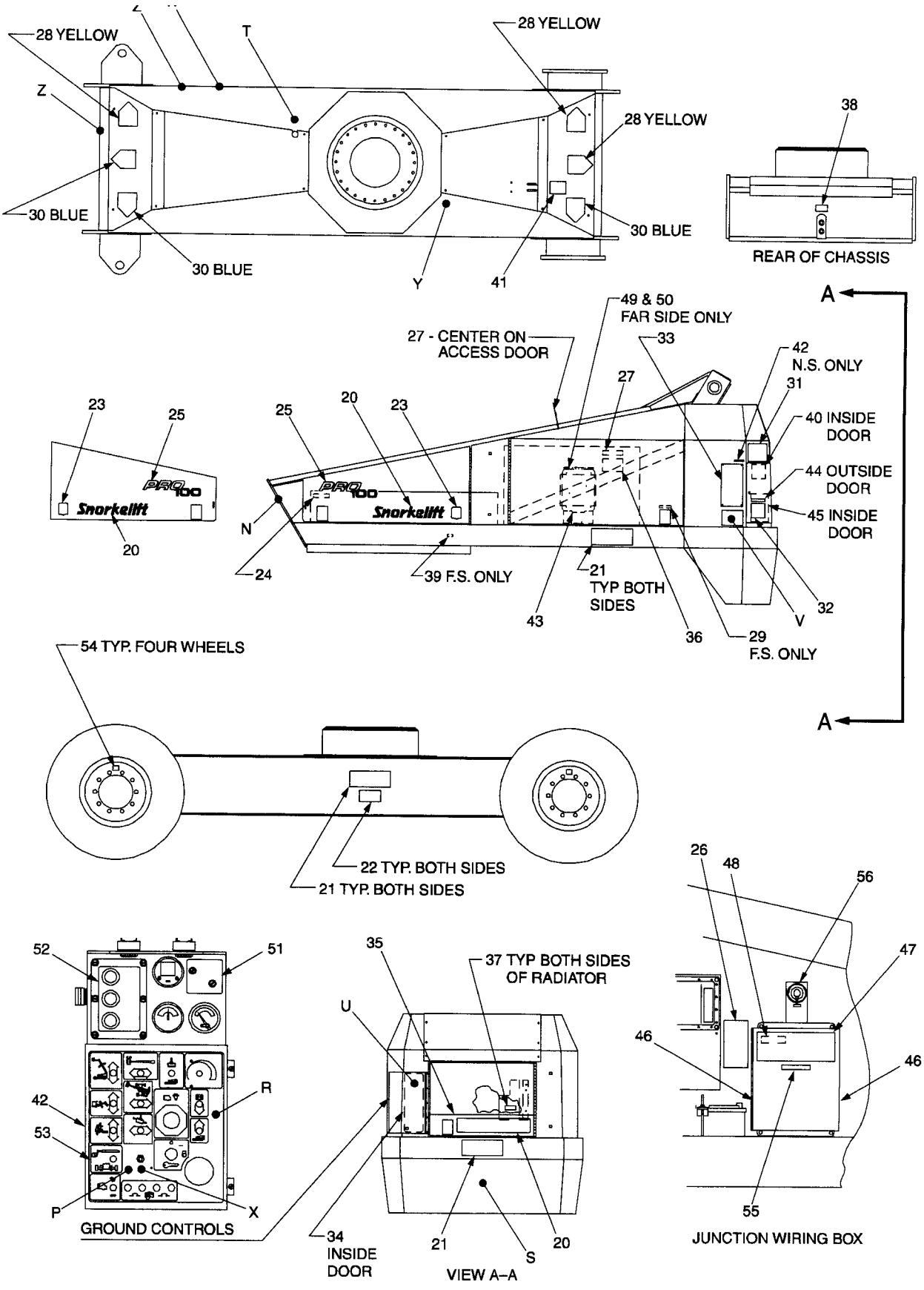
PLACARDS AND DECALS INSPECTION CHART II

NO	PART #	DESCRIPTION	REQ
20	0070418	Snorkelift logo	3
21	0323896	Danger - electrocution hazard	5
22	0073298	Danger - foam/solid tires	2
23	0073585	Made in USA	2
24	0071925 0071926	Gasoline fuel (gasoline units only) Diesel fuel (diesel units only)	1 1
25	0191390	PRO100 logo	2
26	0191491	Danger - EMS tampering	1
27	0071927	Hydraulic oil	2
28	0070540	Yellow arrow	3
29	0073491	Safe operation information	1
30	0070541	Blue arrow	3
31	0070901	Caution - serial number	1
32	0323897	Danger - you must not operate	1
33	0190988	Danger - ground control instructions	1
34	0191173	EMS ground operation	1
35	0190937	Rear door (white stripe)	1
36	7030003	Lube recommendations	1
37	0151410	Danger - rotating engine parts	2
38	451986	Danger - do not alter limit switch	1
39	0070921	125 volt 20 amp	1
40	0323899	Danger - electrocution hazard	1
41	0110708	Danger - axles/jack	1
42	0073492	Rotate while greasing	2
43	7050004	Record pouch	1
44	0181562	ANSI A92.5-1992	1
45	0191244	Ground control symbol definition	1
46	0190992	Emergency bleed down	2
47	0190995	Danger - emergency bleed down procedure	1
48	0190999	EMS status	1
49	0073224	Notice manual re-order	1
50	0073043	Manual holder	1
51	0111623	Engine protection system	1
52	0191174	EMS lights	1
53	0191137	Ground controls	1
54	0072276	Lug nut torque 450-500ft lb	4
55	0191236	EMS circuit breaker location	1
56	0073089	Battery disconnect switch	1

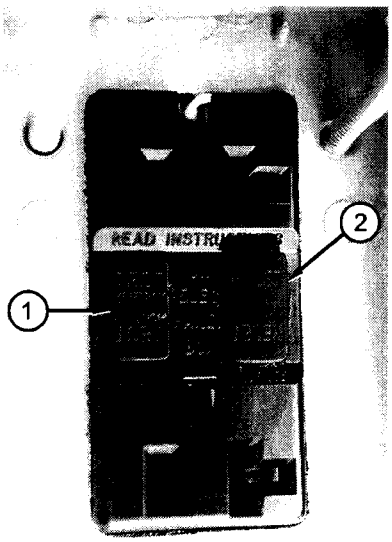
OPTIONAL PLACARDS AND DECALS

NO	PART #	DESCRIPTION	REQ
N	0081441	Caution - liquid withdrawal (dual fuel & LP only option)	1
P	0090492	Dual fuel switch (dual fuel option)	1
R	0191435	Warm-up at ground (hydraulic warm-up option)	1
S	0082203	Danger - crushing hazard (tow package option)	1
T	0111343	High range speed selector valve (4x4 units only)	1
U	0071793	Hydraulic warm-up system instructions (hydraulic warm-up option)	1
V	0090493	Dual fuel instructions (dual fuel options)	1
W	0082160	Danger - towing hazard (tow package option)	1
X	0073080	Cold start (cold start option)	1
Y	0090760	Steering float valve (tow package option)	1
Z	0082171	Towing instructions (tow package option)	2

PLACARDS AND DECALS INSPECTION DRAWING II



24. GFCI (Ground Fault Circuit Interrupt)



Connect the power-input connector (at the rear of the turntable) to a source of 125 V ac, 20 A electrical power. (If the PRO 100 is equipped with the optional ac generator, connect the power-input connector to the ac generator, start the engine, then set the **AC GENERATOR** 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. (Set the **AC GENERATOR** switch to OFF if you used the optional ac generator.)

11. TROUBLESHOOTING

All of the actions described in this chapter may be performed by a PRO 100 *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 PRO 100 *service technician.*

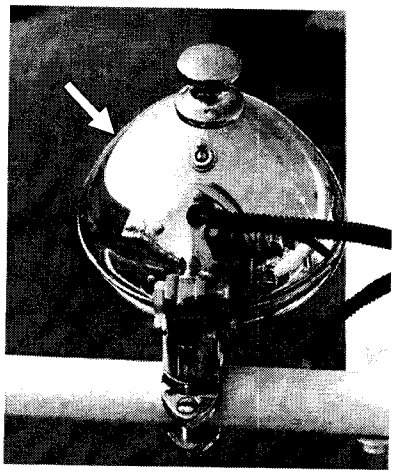
The first column, of the following chart, lists some common problems encountered by PRO-100 operators. The second column lists some of the causes for each problem. The third column lists remedies.

PRO 100 OPERATOR'S TROUBLESHOOTING CHART

PROBLEM	CAUSE	REMEDY
Engine will not start from the *ground-control box.*	1. Switches are set wrong. (Engine will not crank.)	**A.** Set **BATTERY** switch to ON. *At the ground-control box:* **B.** Set **MASTER KEY SWITCH** to OFF. **C.** Pull **EMERGENCY STOP** out (on). **D.** Set **SELECTOR SWITCH** to GROUND. **E.** Set **MASTER KEY SWITCH** to ON for 5 seconds then turn **MASTER KEY SWITCH** to START.
	2. The **MAIN SYSTEM** circuit breaker, on the ground-control box, has tripped. (Engine will not crank.)	Push the **MAIN SYSTEM** (25) button back in. If the button pops out again, refer the problem to a qualified service technician.
	3. Out of fuel. (Gasoline or diesel engine cranks but will not start.)	Add fuel to tank then alternately crank engine for 20 seconds and let starter motor cool for 60 seconds (20 on / 60 off).
	4. LPG OPTION. **FUEL** switch on the ground-control box is set wrong. (Engine cranks but will not start.)	**A.** Set **FUEL** switch (ground-control box) to L.P.-GAS or GASOLINE. **B.** Check the fuel gauge, on top of the tank, to see if there is fuel in tank. **C.** For L.P.-GAS only: Check to see that fuel valve, on top L.P. tank, is open. **D.** Alternately crank engine for 20 seconds then let starter motor cool for 60 seconds.
Engine will not start from the *platform-control box.*	1. Stepping on foot switch. (Engine will not crank.)	Be sure you are not stepping on the foot switch, or that the foot switch is not "blocked" in any way, while you are trying to start the engine.
	2. Switches are set wrong. (Engine will not crank.)	**A.** Set **BATTERY** switch to ON. *At the ground-control box:* **B.** Set **MASTER KEY SWITCH** to ON. **C.** Pull **EMERGENCY STOP** out (on). **D.** Set **SELECTOR SWITCH** to PLATFORM. *At the platform-control box:* **E.** Set the **ANTI-RESTART MASTER SWITCH** to OFF. **F.** Pull the **EMERGENCY STOP** button up. **G.** Turn the **ANTI-RESTART MASTER SWITCH** to ON. **H.** Turn the **ANTI-RESTART MASTER SWITCH** to START.

PRO 100 OPERATOR'S TROUBLESHOOTING CHART		
PROBLEM	**CAUSE**	**REMEDY**
Engine will not start from the *platform-control box.* (Continued)	3. The **MAIN CIRCUIT BREAKER**, on the platform-control box, and/or the **MAIN SYSTEM** circuit breaker, on the ground-control box, has tripped. (Engine will not crank.)	Push the circuit breaker button(s) in. If the button pops out again, refer the problem to a qualified service technician.
	4. Out of fuel. (Gasoline or diesel engine cranks but will not start.)	Add fuel to tank then alternately crank engine for 20 seconds and let starter motor cool for 60 seconds.
	5. LPG OPTION. **FUEL** switch on the ground-control box is set wrong. (Engine cranks but will not start.)	**A.** Set **FUEL** switch (ground-control box) to L.P.-GAS or GASOLINE. **B.** Check the fuel gauge, on top of the tank, to see if there is fuel in tank. **C.** For L.P.-GAS only: Check to see that fuel valve, on top L.P. tank, is open. **D.** Alternately crank engine for 20 seconds then let starter motor cool for 60 seconds.
Cannot raise or extend the main boom.	1. Rear axles not extended.	Extend rear axles.
	2. Pin lock not installed.	Install pin lock.
Jerky platform movement during extension.	Loose cables.	Report problem to a trained & qualified service technician.
Cannot attain maximum speed (3 mph, 4.8 km/hr).	1. Booms are not completely down and completely retracted.	Completely lower & completely retract the booms.
	2. **DRIVE RANGE** set to LO.	Set **DRIVE RANGE** to HI.
	3. 4x4 OPTION machines only: **HIGH RANGE SPEED SELECTOR VALVE** is down.	Pull the **HIGH RANGE SPEED SELECTOR VALVE** up.
Tilt alarm does not work.	Booms are completely down and completely retracted. (Tilt alarm is not designed to work under these conditions as a convenience to personnel loading and unloading PRO 100 onto/from transport vehicle.)	Extend and raise the booms a little.
Boom raises but will not stay elevated.	Manual bleed-down valve is open.	Close the manual bleed-down valve.
Front wheels do not turn during STEER RIGHT or STEER LEFT.	1. Drive controller must be in DRIVE FORWARD or DRIVE REVERSE for steer wheels to turn.	Push drive controller slightly forward or backward when using STEER RIGHT or STEER LEFT.
	2. TOW OPTION machines only: The **STEERING FLOAT VALVE** is open.	Close the **STEERING FLOAT VALVE.**

■ PLATFORM WORK LIGHTS



The platform work lights are located on top the platform guard rail. For the lights to work the **BATTERY** switch must be ON and the following switches, on the ground-control box, must be set as indicated:

SELECTOR SWITCH.....PLATFORM
EMERGENCY STOP.....UP FOR RUN
MASTER KEY SWITCH...ON

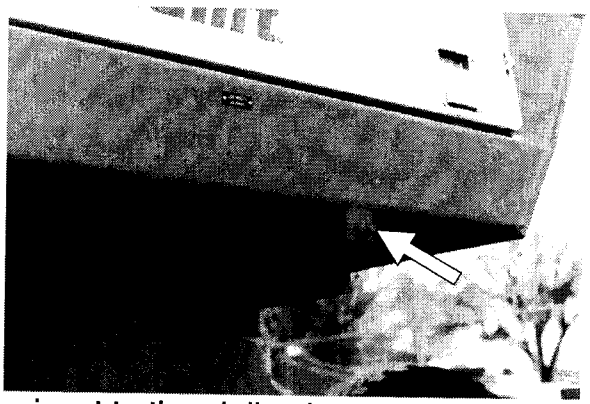
The toggle switch on the back of a light turns it on.

If you want to change the direction a light points, use two 1/2" box-end wrenches to loosen the clamp immediately below the light, point the light where you want it, then retighten the clamp.

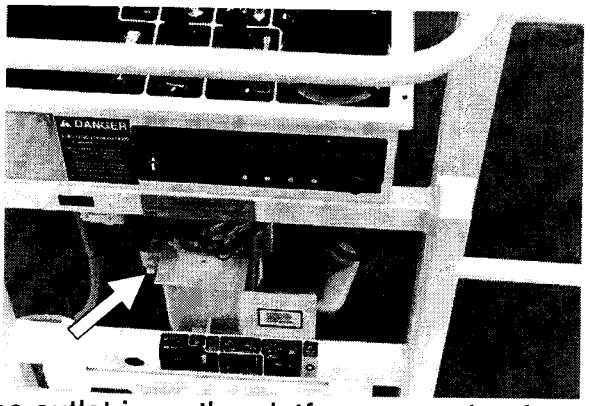
⚠CAUTION

Incandescent lights draw three amperes (35 watts) each. Halogen lights draw four amperes (50 watts) each. If you work with the lights turned on and the engine turned off, the batteries can discharge to the point they will neither start the engine nor run the **EMERGENCY POWER** hydraulic pump. If you cannot leave the engine running while the lights are on, start and run the engine at least 15 minutes in each hour.

■ AIR LINE TO PLATFORM



The input to the air line is on the bottom left-rear of the turntable.



The outlet is on the platform mounting frame. The maximum safe working pressure for the air line is 250 psi (1725 kPa).

⚠CAUTION

Water or anti-freeze solution in the air line might damage some air tools. If you use the air line to conduct water or anti-freeze solution be sure to drain and blow out the air line before attaching air tools.

The air line can be used to conduct air, water, or anti-freeze solution. If you want to conduct other liquids, contact the Snorkel Engineering Department for compatibility information.

To drain the air line:

1. Close the turntable end of the air line.
2. Open the platform end of the air line.
3. Raise the jib boom completely up.
4. Raise the main boom slightly above the horizontal.
5. Open the turntable end of the air line.

■ DRIVING LIGHTS

⚠CAUTION

Together the four lights draw seven amperes. If you work with the lights turned on and the engine turned off, the batteries can discharge to the point they will neither start the engine nor run the **EMERGENCY POWER** hydraulic pump. If you cannot leave the engine running while the lights are on, start and run the engine at least 15 minutes in each hour.

Driving lights are for driving on dimly lit construction sites, they are not for driving on public thoroughfares. Two 30 watt headlights are located on top of the front cowling, two 25 watt blinking taillights are on the sides of the rear cowlings. Each headlight has a toggle switch to turn it on and off. Both blinking taillights are controlled by a switch just in front of the right taillight. For any of the lights to work both the **BATTERY** switch and the **MASTER KEY SWITCH** must be ON.

■ COLD WEATHER START KIT

❑ Block Heaters

⚠CAUTION

Unplug the block heater just before starting the engine. That will keep you from driving off while the heater is still plugged in.

The block heater in a Continental or Cummins engine is a freeze-plug type block-heater. The engine is heated by convection of water that is warmed by the heater. The heater is located in a freeze-plug hole just below the engine exhaust manifold. If the engine starting temperature is expected to be 32°F (0°C) or below, plug the power cord from the heater into 110 - 120 V ac, 600 watt source eight hours before starting the engine.

❑ Ether Injection

A Cummins diesel engine might have ether injection instead of a block heater. Ether injection should only be used to start a cold engine when the ambient temperature is below 32°F (0°C).

Check to see that there is a can of ether installed in the holder in the battery compartment. If there is no can of ether:

1. Turn the **BATTERY** switch to OFF.
2. Unscrew the holding cup.
3. Put a can of ether in the cup.
4. Screw the cup firmly back into place.
5. Set the **BATTERY** switch to ON.

Start the engine from the ground-control box in the normal way. While the **MASTER KEY SWITCH** is in START (and the engine is cranking) press the **COLD START** button. Pressing the **COLD START** button injects a measured amount of ether into the intake manifold regardless of how long you hold the button in.

NOTE: Do not crank the engine longer than 20 seconds. If the engine does not start, wait two minutes then try again.

■ HYDRAULIC SYSTEM COLD WEATHER WARM-UP KIT

The control switch for the HYDRAULIC SYSTEM COLD WEATHER WARM-UP KIT is located on the ground-control box near the **MASTER KEY SWITCH** and/or on the left side of the platform-control box. When the ambient air temperature is below 32°F (0°C) and boom movement is sluggish because of cold hydraulic oil, turn the **WARM-UP** switch to ON until the hydraulic oil temperature, in the hydraulic oil tank, reaches 50°F.

For the warm-up system to work, the engine must be running and you must turn the **WARM-UP** switch ON from the same station that you started the engine. (If you started the engine from the ground-control box, turn the **WARM-UP** switch on from the ground-control box. If you started the engine from the platform-control box, turn it on there.)

■ 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, 120 V ac generator can be used anytime the PRO 100 engine is running and the PRO 100 is completely stationary. Turning the generator on stops all machine movement.

Set the **MACHINE/GENERATOR** switch, on the platform-control box, to GENERATOR 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 one 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.

■ MOTION ALARM

The motion alarm emits a loud ...beep...beep...beep..., at ground level, anytime the **DRIVE/STEER** controller is in FORWARD or REVERSE. This alarm alerts people on the ground that the PRO 100 is traveling along the ground.

■ TOW KIT

⚠DANGER

Improper towing can cause a PRO 100 to break away from the towing vehicle. A "runaway" PRO 100 can cause death or serious injury.

Do not tow a PRO 100 faster than 10 mph (16 km/hr). A PRO 100 can behave erratically above 10 mph (16 km/ hr).

Check with the tow vehicle manufacture or manufacturer's literature to be sure the towing vehicle can safely tow and stop a 33,000 pound (15,000 kg) PRO 100 on the steepest grade and type of surface you will encounter. Remember, the PRO 100 does not have brakes when it is towed.

When you tow the PRO 100 around a corner or a curve do not turn so sharply that either of the tow bar chains is pulled tight. If a chain is pulled tight the steering mechanism might be damaged or the tow vehicle and PRO 100 might jackknife.

1. Remove the tow bar and tie rod weldment from the storage cradles and lay them near the front of the chassis.

2. Rotate the turntable until the counterweight is to the side of the chassis.

⚠DANGER

Death or serious injury can result from being crushed between the counterweight and tow vehicle. Do not attempt to attach the tow bar to the tow vehicle unless the counterweight is to the side.

3. Attach the tow bar to the towing lug with the tow pin and snap pin.

4. Attach the tie rod weldment to the tow bar and the right hand steering yoke.

5. Attach the two tow bar chains to the tie down lugs.

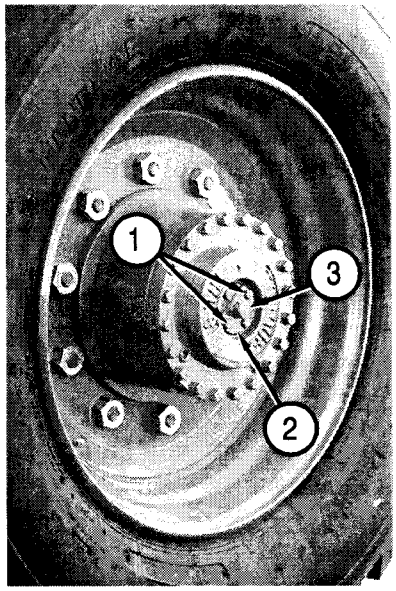
6. Attach the ring-end of the tow bar to the tow vehicle.

7. Rotate the turntable until the counterweight is to the front, then raise the platform about 3 feet (1 m) to keep it from hitting the ground when you start up a grade.

8. Pull the **STEERING FLOAT VALVE** (top front of chassis) knob out.

⚠DANGER

A "runaway" PRO 100 can cause death or serious injury. Disconnecting the disconnect-plates will allow the PRO 100 drive wheels to turn freely. Before proceeding, be certain the tow bar is installed and connected to a towing vehicle that can safely control both itself and the 33,000 pound (15,000 kg) PRO 100. Be certain the tow vehicle brakes are set.



9. Remove the two bolts that hold each drive-wheel disconnect-plate.

10. Turn each disconnect-plate over so that the nipple points inward, then retighten the bolts.

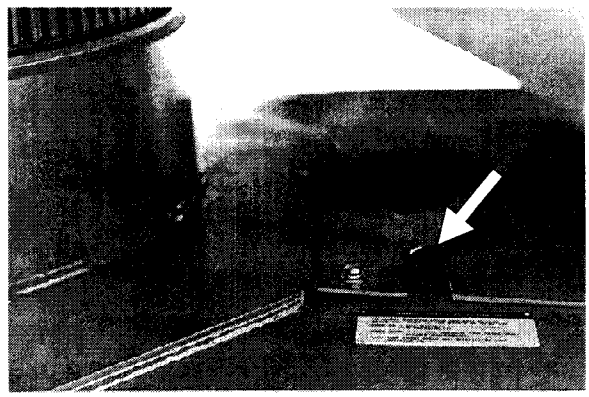
⚠DANGER

At the end of the tow, before you disconnect the PRO 100 from the towing vehicle, turn the disconnect-plates back over so the nipples are out. This will prevent the PRO 100 from rolling when you disconnect it from the tow vehicle.

11. Reverse the above procedure at the end of the tow.

■ FOUR-WHEEL DRIVE (4x4)

From the operational point of view, the only difference between the optional four-wheel drive (4x4) and the standard two-wheel drive is that the maximum speed of the 4x4 is determined, in part, by the settings of both the **DRIVE RANGE** switch and the **HIGH RANGE SPEED SELECTOR (HRSS) VALVE**.



The **HRSS VALVE** works with the **DRIVE RANGE** switch and boom position, according to the following table, to determine the maximum speed the chassis can travel along the ground.

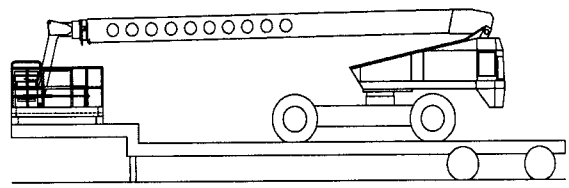
DRIVE RANGE Table

MAX. SPEED	**DRIVE RANGE**	**HRSS VALVE**	boom position
3.0 mph (4.8 km/hr)	HI	up	stowed
1.5 mph (2.4 km/hr)	HI	down	stowed
0.75 mph (1.2 km/hr)	LO	--	stowed
0.75 mph (1.2 km/hr)	--	--	extended but below mid-elevation
creep	--	--	above mid-elevation

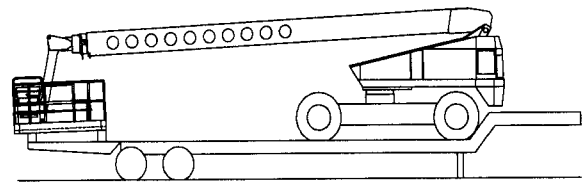
NOTE: **ENGINE THROTTLE**, at the platform-control box, must be set to HI for MAX. SPEED.

■ SELF-STOWING PLATFORM

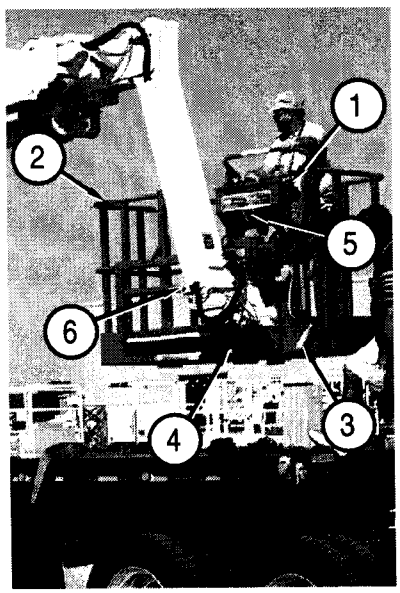
Here is the recommended transport position for a PRO 100, with a self-stowing platform, on a conventional step-deck trailer. Drive the machine forward onto the trailer, then rotate the turntable 180°.



Here is the recommended transport position for a PRO 100, with a self-stowing platform, on a folding tail (beaver tail) trailer. Drive the machine forward onto the trailer as far as possible.



The following procedure shows how to transport a PRO 100. This procedure assumes that you have loaded the PRO 100 as described in the "STOWING & TRANSPORTING" chapter, that the PRO 100 engine is still running, and that the wheels are chocked.



1. Use the platform-control box (1) to rotate the platform (2) completely to the side as shown.

2. Release both over-center hook latches (3) (4).

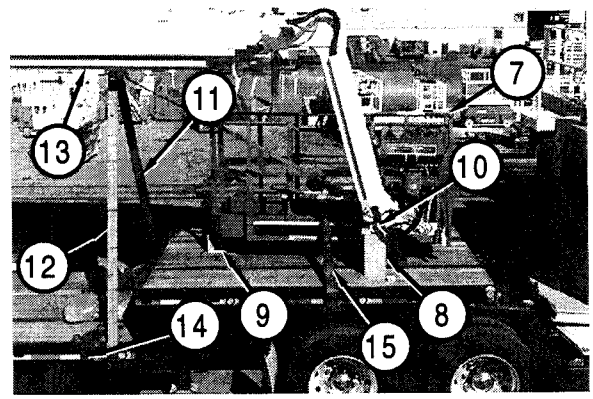
DANGER

Death or serious injury can result from being crushed between the platform and the rotator frame. Do not reach through any part of the platform when the over-center hooks are undone. Do not operate the slide controls from inside the platform.

3. Push in and hold the **SLIDE INTERLOCK** button (6) at the same time that you push and hold the **SLIDE ACTUATOR SWITCH** (5) toward the chassis. Continue to hold both switches (5) (6) until the platform (7 below), moves as far back toward the chassis as it will go.

DANGER

Death or serious injury can result from falling from the platform. Do not work from a PRO 100 that has the platform slid to the side or that has the over-center hook latches open. The platform should only be slid to the side to save space during transportation.



4. Place wooden blocks (8, 9) under the bellcrank (10) and platform (7) then use the controls on the platform-control box to lower the bellcrank (10) and platform (7) onto the blocks (8, 9).

5. Set the **ANTI-RESTART MASTER SWITCH** to OFF.

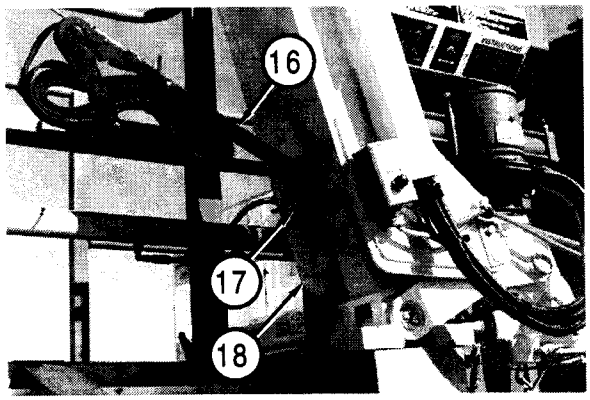
6. Set the **MASTER KEY SWITCH** to OFF, remove the key, and close the ground-control door.

7. Set the **BATTERY** switch to OFF and lock the **BATTERY** switch.

8. (OPTION - LPG) For machines equipped with LPG, close the valve on the LPG tank (completely screwed in).

9. Attach two nylon straps (11, 12) from the underside of the base boom (13) , as shown, to the trailer (14).

10. Use a nylon strap (15) to hold the platform (7) on the blocks (8, 9) as shown.



11. Fasten a nylon strap (16) from the underside of the base boom (13) to the bar (17) across the lower end of the jib-boom (18).

■ FLASHING LIGHTS

The flashing lights alert people that the PRO 100 is present. The lights flash at about one flash per second any time the **BATTERY**, **EMERGENCY STOP** (at the ground), and **MASTER KEY SWITCH** are all ON. There is no ON/OFF switch for the flashing lights.

13. FIRE FIGHTING & HAZARDOUS CHEMICAL CONTAINMENT

A PRO 100 contains the following materials and objects that potentially could become significant fire or environmental hazards during the lifetime of a PRO 100:

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 manufacturers' information you will need if you ever have to control any of the above items during an upset or emergency.

■ ANTI-FREEZE (UN 1993)

Fire extinguishing media: Dry Chemical, foam, or CO_2.

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 CO_2.

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 CO_2.

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 CO_2.

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 CO_2.

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 CO_2.

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 over-heating. 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 <u>not</u> responsible for normal maintenance, service adjustments and replacements, including but not limited to hydraulic fluid, filters and lubrication.
4. Normal wear of any Snorkel component part(s). Normal wear of component parts may vary with the type application or type of environment in which the machine may be used; such as, but not limited to sandblasting applications.
5. Any Snorkel product that has come in direct contact with any chemical or abrasive material.
6. Incidental or consequential expenses, losses, or damages related to any part or equipment failure, including but not limited to freight cost to transport the machine to a repair facility, downtime of the machine, lost time for workers, lost orders, lost rental revenue, lost profits or increased cost.

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

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

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

Effective July 1995

CALIFORNIA
Proposition 65 Warning

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

CALIFORNIA
Proposition 65 Warning

Diesel and gasoline engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects or other reproductive harm.

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