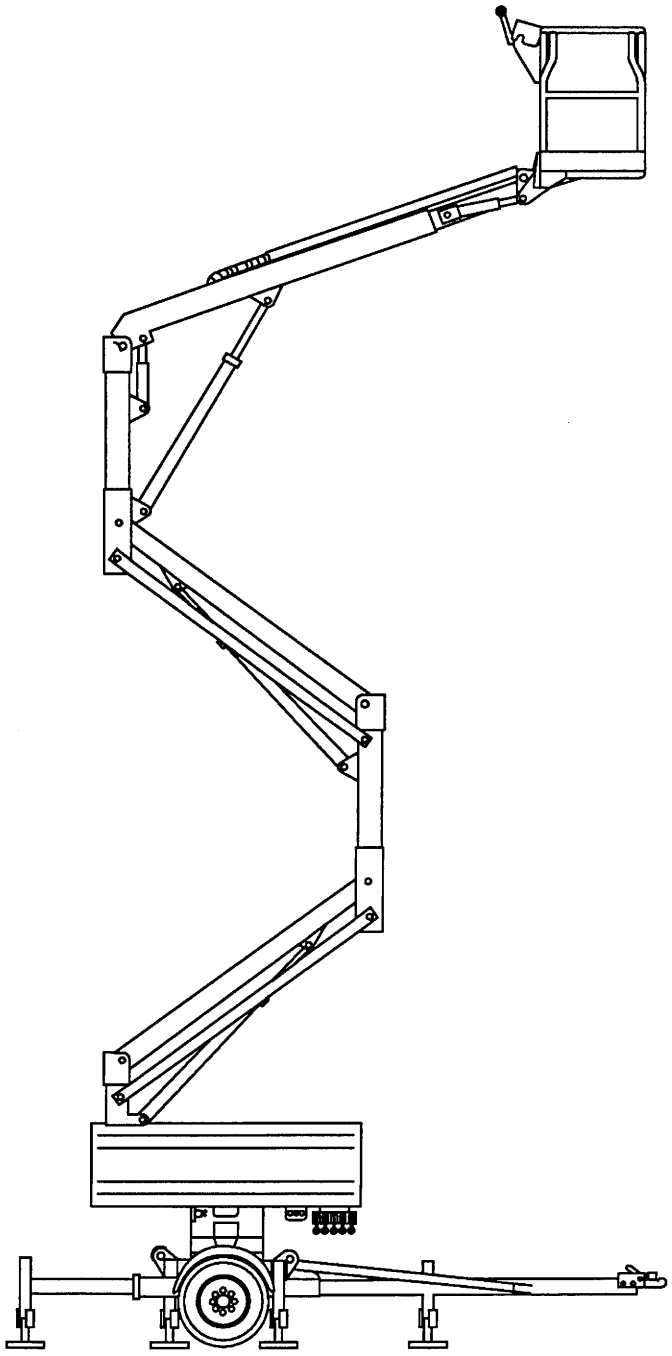
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SIMON

SERVICE MANUAL

MODEL RZB SERIES



PART NO. 89-470007

INITIAL ISSUE

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INTRODUCTION

This Service Manual is designed to provide you with the instructions needed to properly maintain the SIMON AERIALS INC. RZB Trailer Mounted Aerial Work Platform. When used in conjunction with the Operators, Parts and Component Repair manuals (provided separately) this Service Manual will assist you in making necessary adjustments or repairs.

Simon Aerial Mobile Platforms are designed and built to provide many years of safe, dependable service. To obtain full benefits from your RZB, always follow the proper operating and maintenance procedures. Only trained, authorized personnel should be allowed to operate or service this machine. Service personnel should read and study the Operators, Service, Parts and Component Repair Manuals in order to gain a thorough understanding of the unit prior to making any repairs.

Service personnel and machine operators must understand and comply with all warnings and instructional decals on the body of the machine, and at the ground and platform control stations.

MODIFICATIONS OF THIS MACHINE FROM THE ORIGINAL DESIGN ARE STRICTLY FORBIDDEN WITHOUT WRITTEN PERMISSION FROM SIMON AERIALS INC., AND WILL VOID ANY REMAINING WARRANTY.

SIMON AERIALS INC. reserves the right to change, improve, modify or expand features of its equipment. Therefore, specifications, models or equipment are subject to change without notice, and without incurring obligations.

All SIMON AERIALS INC. manuals are periodically updated to reflect changes that occur in the equipment. Please contact the factory for information regarding changes which may affect your machine.

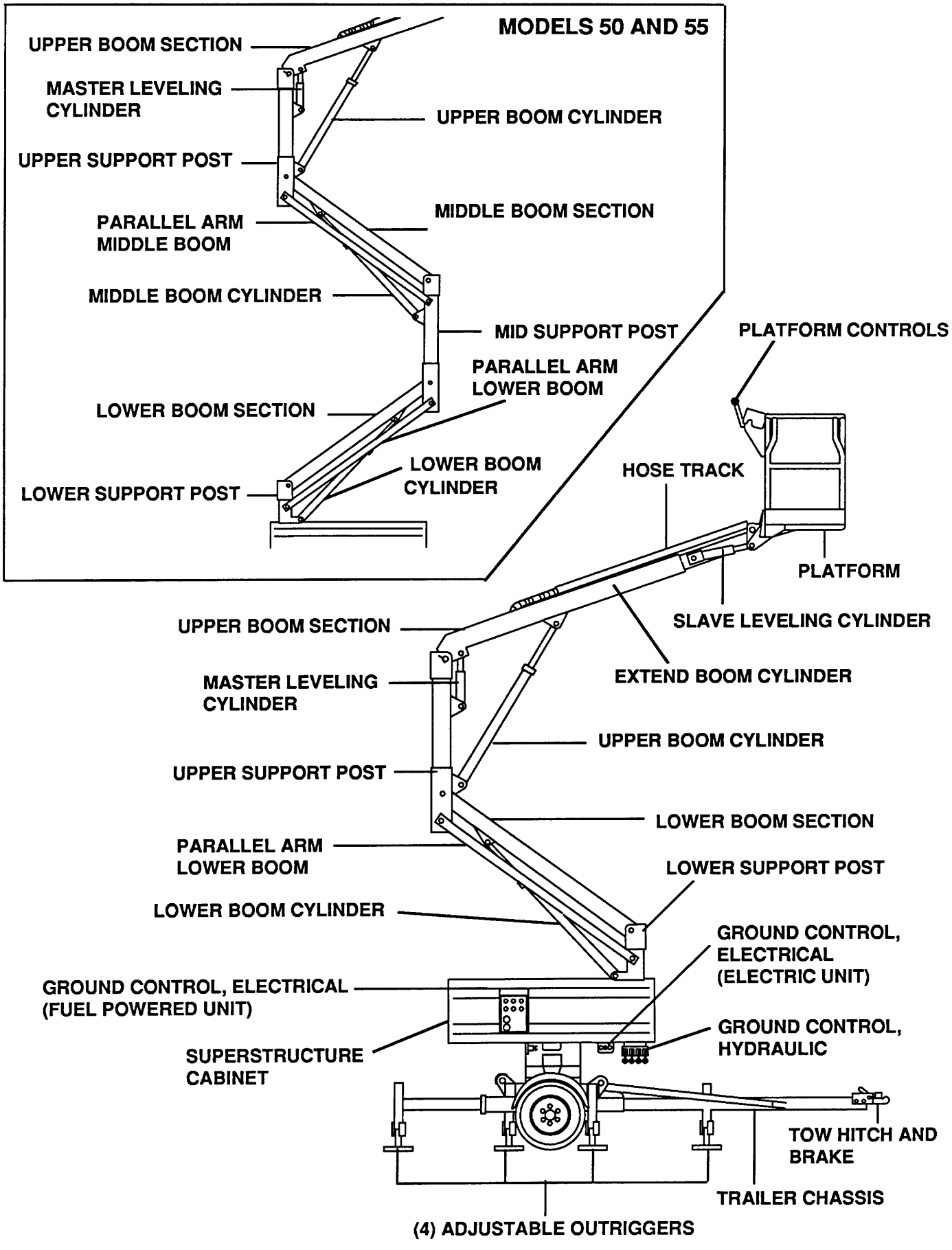
MACHINE SPECIFICATIONS
RZB 40, 50 AND 55

	RZB 40	RZB 50	RZB 55
WORKING HEIGHT	40 FT (12.19 M)	51 FT (15.56 M)	55 FT (16.76 M)
PLATFORM HEIGHT	34 FT (10.36 M)	45 FT (13.72 M)	49 FT 2 IN. (14.99 M)
HORIZONTAL OUTREACH	18 FT 10.5 IN. (5.75 M)	19 FT 6 IN. (5.94 M)	21 FT 10 IN. (6.65 M)
SUPERSTRUCTURE ROTATION	360° CONTINUOUS	360° CONTINUOUS	360° CONTINUOUS
PLATFORM CAPACITY (UNRESTRICTED)	400 LBS. (180 KG)	400 LBS. (180 KG)	400 LBS. (180 KG)
PLATFORM DIMENSIONS	60 IN. x 30 IN. (1.5 M x .76 M)	60 IN. x 30 IN. (1.5 M x .76 M)	60 IN. x 30 IN. (1.5 M x .76 M)
STOWED LENGTH	18 FT 5 IN. (5.61 M)	18 FT 7 IN. (5.66 M)	18 FT 7 IN. (5.66 M)
STOWED HEIGHT	8 FT 3 IN. (2.50 M)	9 FT 9 IN. (2.97 M)	9 FT 9 IN. (2.97 M)
WIDTH	6 FT 1 IN. (1.85 M)	6 FT 5 IN. (1.95 M)	6 FT 5 IN. (1.95 M)
STABILIZER SPREAD	9' 10" x 9' 10" (3 M x 3 M)	10' 6" x 10' 6" (3.2 M x 3.2 M)	10' 6" x 10' 6" (3.2 M x 3.2 M)
GROUND CLEARANCE	9 IN. (0.23 M)	9 IN. (0.23 M)	9 IN. (0.23 M)
GROSS WEIGHT	3,800 LBS (1725 KG)	5,780 LBS (2620 KG)	6,000 LBS (2720 KG)
TOWING SPEED (NOT TO EXCEED)	55 MPH	55 MPH	55 MPH
POWER SYSTEM - ELECTRIC			
STANDARD ELECTRIC MODEL	24 VOLT DC (4) 12 VOLT, 105 AMP/ HR BATTERIES	24 VOLT DC (4) 12 VOLT, 105 AMP/ HR BATTERIES	24 VOLT DC (4) 12 VOLT, 105 AMP/ HR BATTERIES
OPTIONAL FUEL POWERED MODEL	12 VOLT BATTERY (95 AMP/ HR)	12 VOLT BATTERY (95 AMP/ HR)	12 VOLT BATTERY (95 AMP/ HR)
OPTIONAL ENGINE			
BRIGGS GAS/ DUAL FUEL	8 HP 3000 RPM	8 HP 3000 RPM	8 HP 3000 RPM

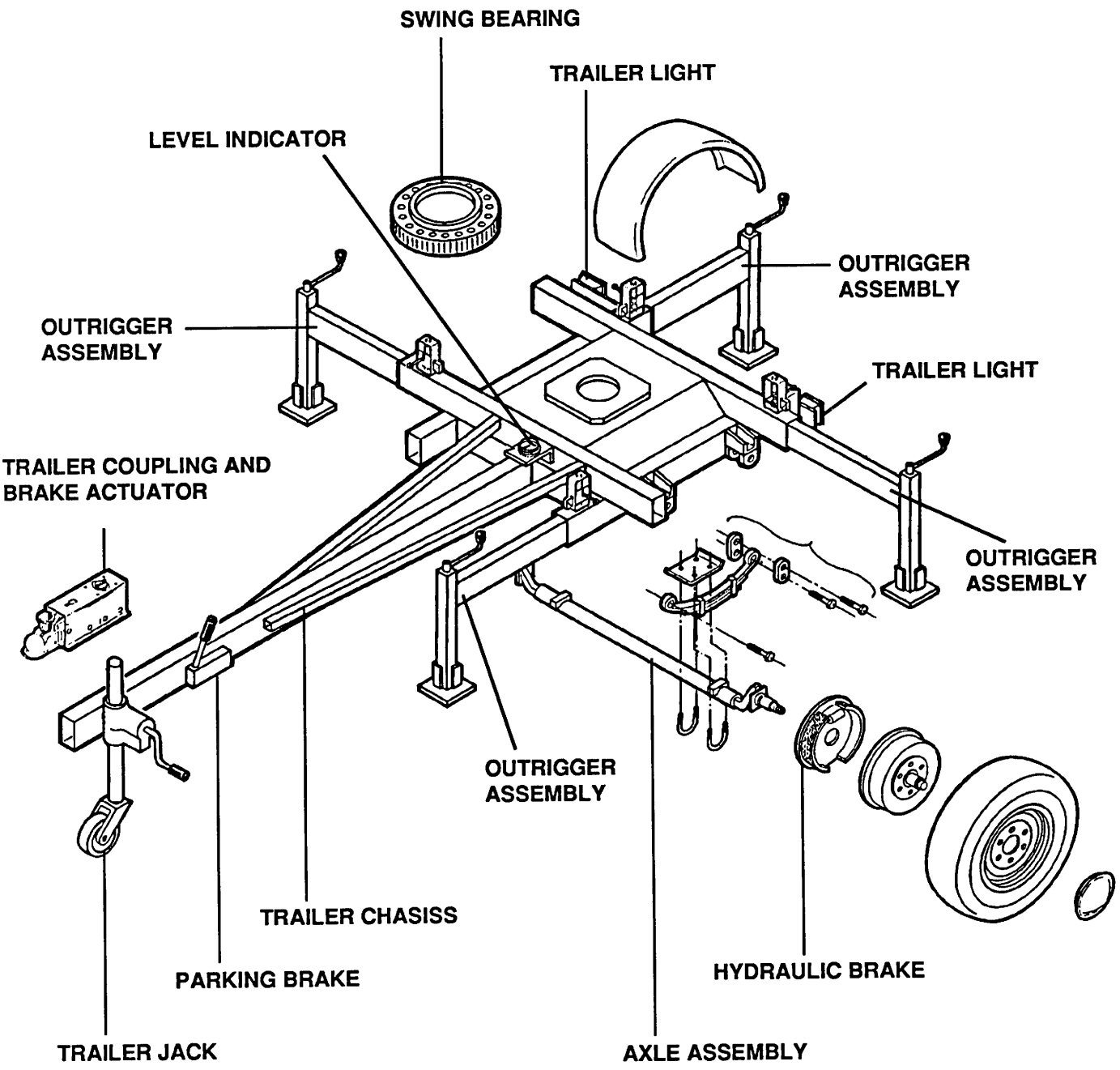
MACHINE SPECIFICATIONS

	RZB 40	RZB 50	RZB 55
HYDRAULIC OPERATING PRESSURE	2610 PSI (180 BAR)	2610 PSI (180 BAR)	2610 PSI (180 BAR)
LIFT FUNCTION SYSTEM OUTPUT			
ELECTRIC MODEL	2.75 GPM (10.4 LPM)	2.75 GPM (10.4 LPM)	2.75 GPM (10.4 LPM)
FUEL POWERED MODEL	2.25 GMP (8.5 LPM)	2.25 GPM (8.5 LPM)	2.25 GPM (8.5 LPM)
EMERGENCY PUMP RELIEF VALVE SETTING (FUEL POWERED)	2500 PSI (172 BARS)	2500 PSI (172 BARS)	2500 PSI (172 BARS)
HYDRAULIC FLUID CAPACITY			
TANK	5.5 GAL. (20.8 L)	5.5 GAL. (20.8 L)	5.5 GAL. (20.8 L)
SYSTEM (APPROX.)	16.5 GAL. (62.4 L)	16.5 GAL. (62.4 L)	16.5 GAL. (62.4 L)
FUEL CAPACITY			
GAS	1.5 GAL. (5.7 L)	1.5 GAL. (5.7 L)	1.5 GAL. (5.7 L)
PROPANE	30 LBS. (14 KG)	30 LBS. (14 KG)	30 LBS. (14 KG)
TIRES	7.00 x 15" 8 PLY	9.50 x 16.5" 10 PLY	9.50 x 16.5" 10 PLY
TIRE PRESSURE	60 PSI	75 PSI	75 PSI
WHEEL LUG NUT TORQUE	150 FT LBS.	150 FT LBS.	150 FT LBS.
AXLE MOUNTING BOLT TORQUE	55 FT LBS.	55 FT LBS.	55 FT LBS.
SWING BEARING TORQUE	83 FT LBS.	196 FT LBS.	196 FT LBS.
SWING DRIVE MOUNTING BOLT TORQUE	55 FT LBS.	55 FT LBS.	55 FT LBS.

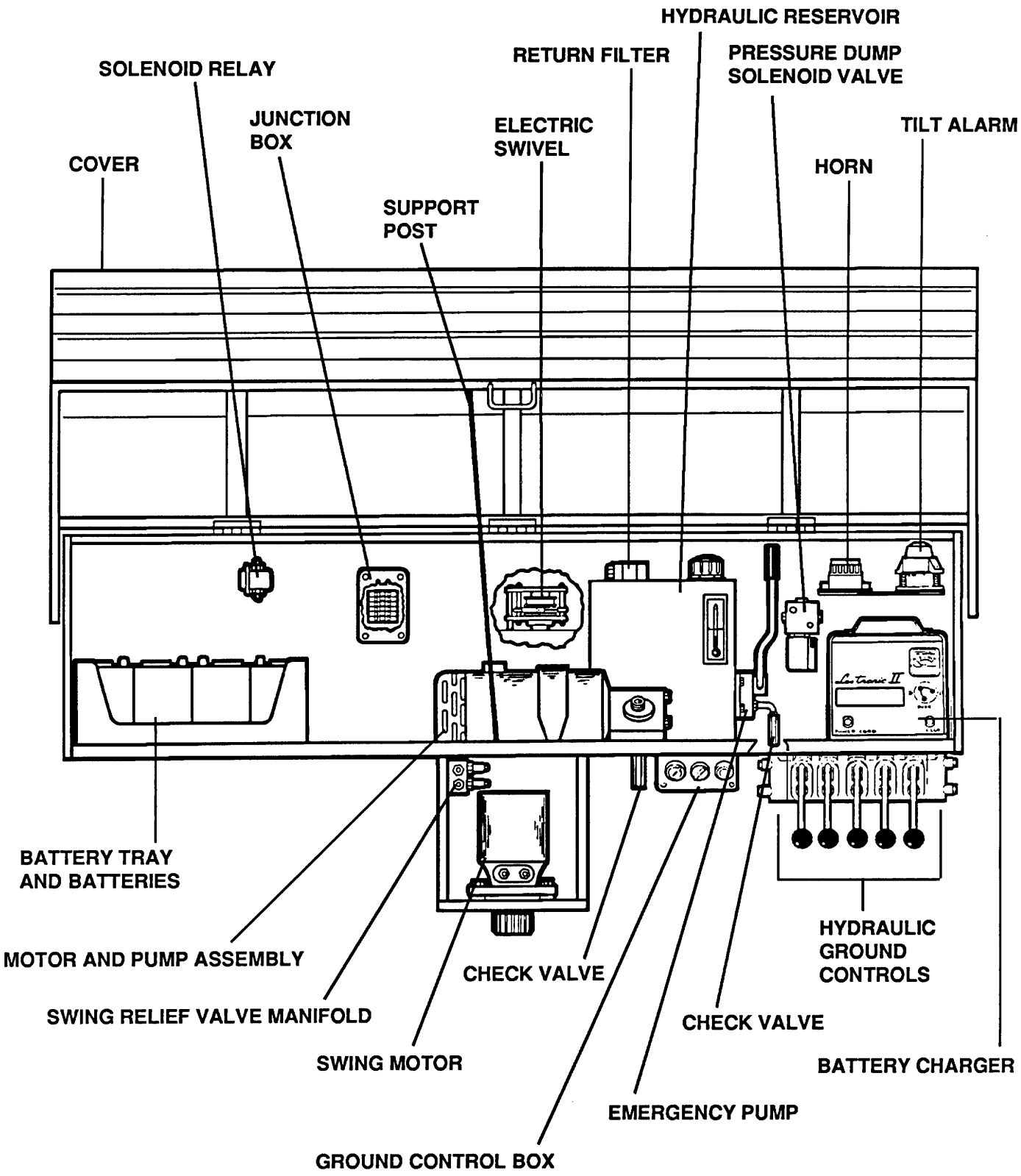
MACHINE COMPONENT LOCATOR



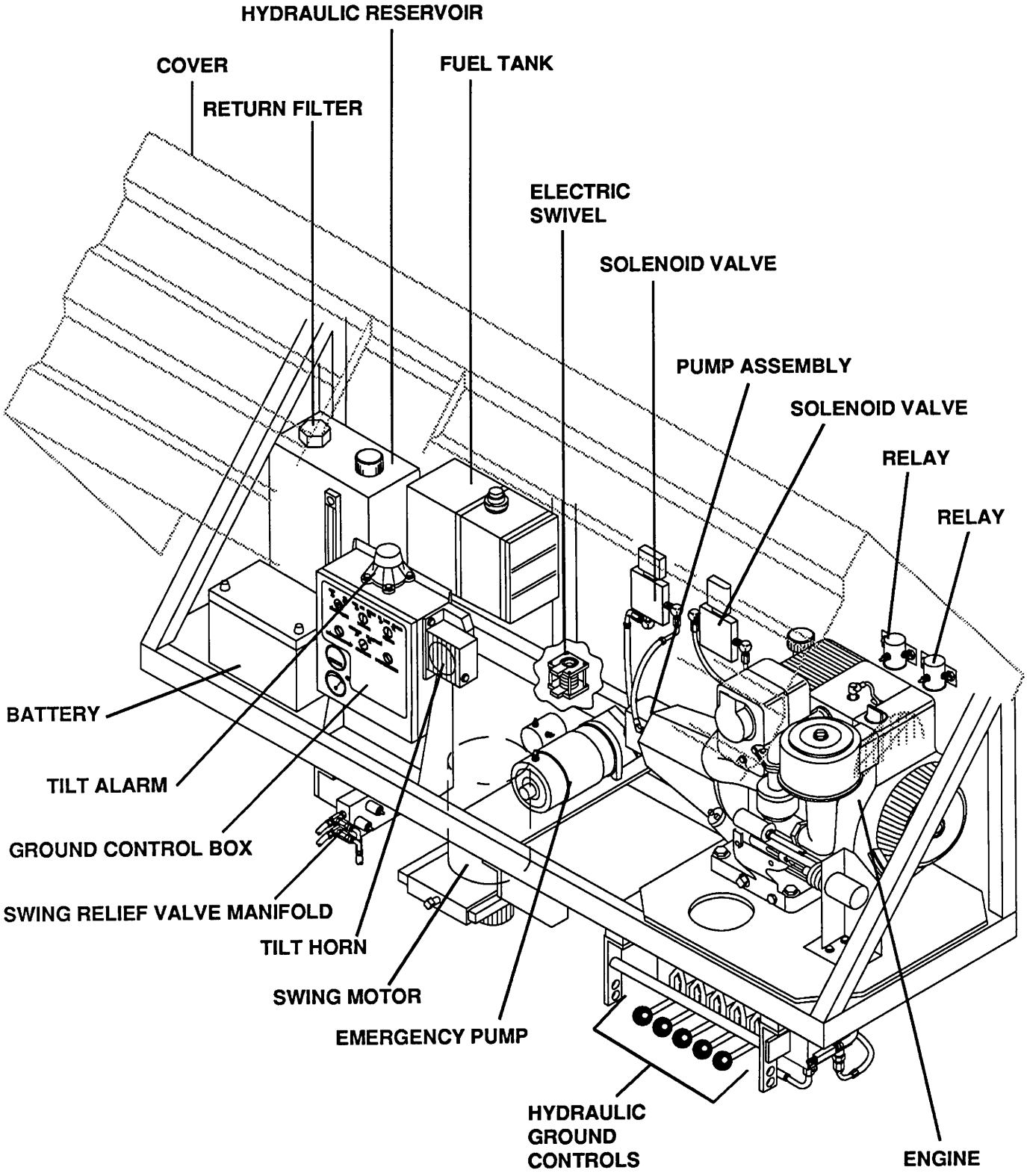
TRAILER COMPONENT LOCATOR



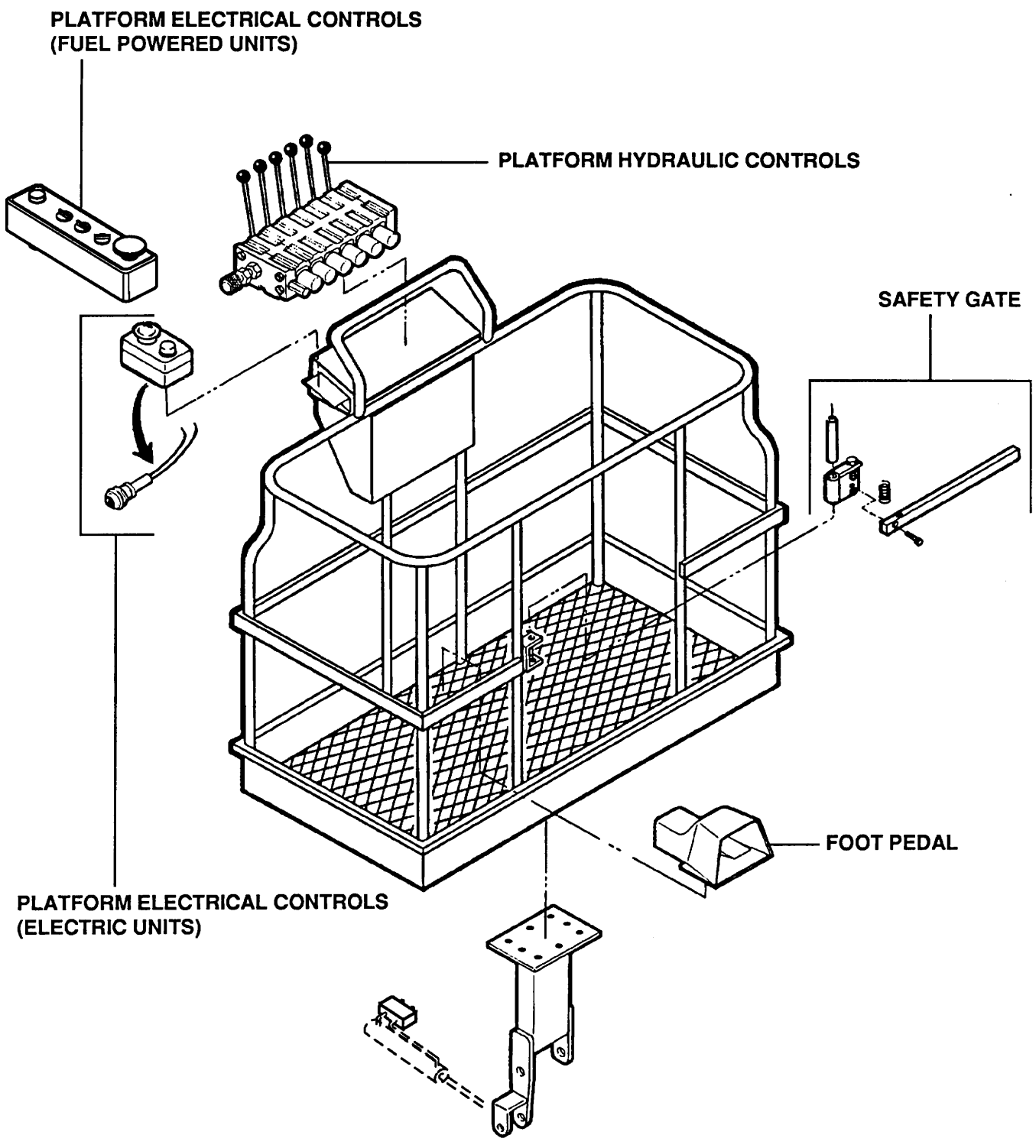
SUPERSTRUCTURE COMPONENT LOCATOR (ELECTRIC) (RZB 55 SHOWN)



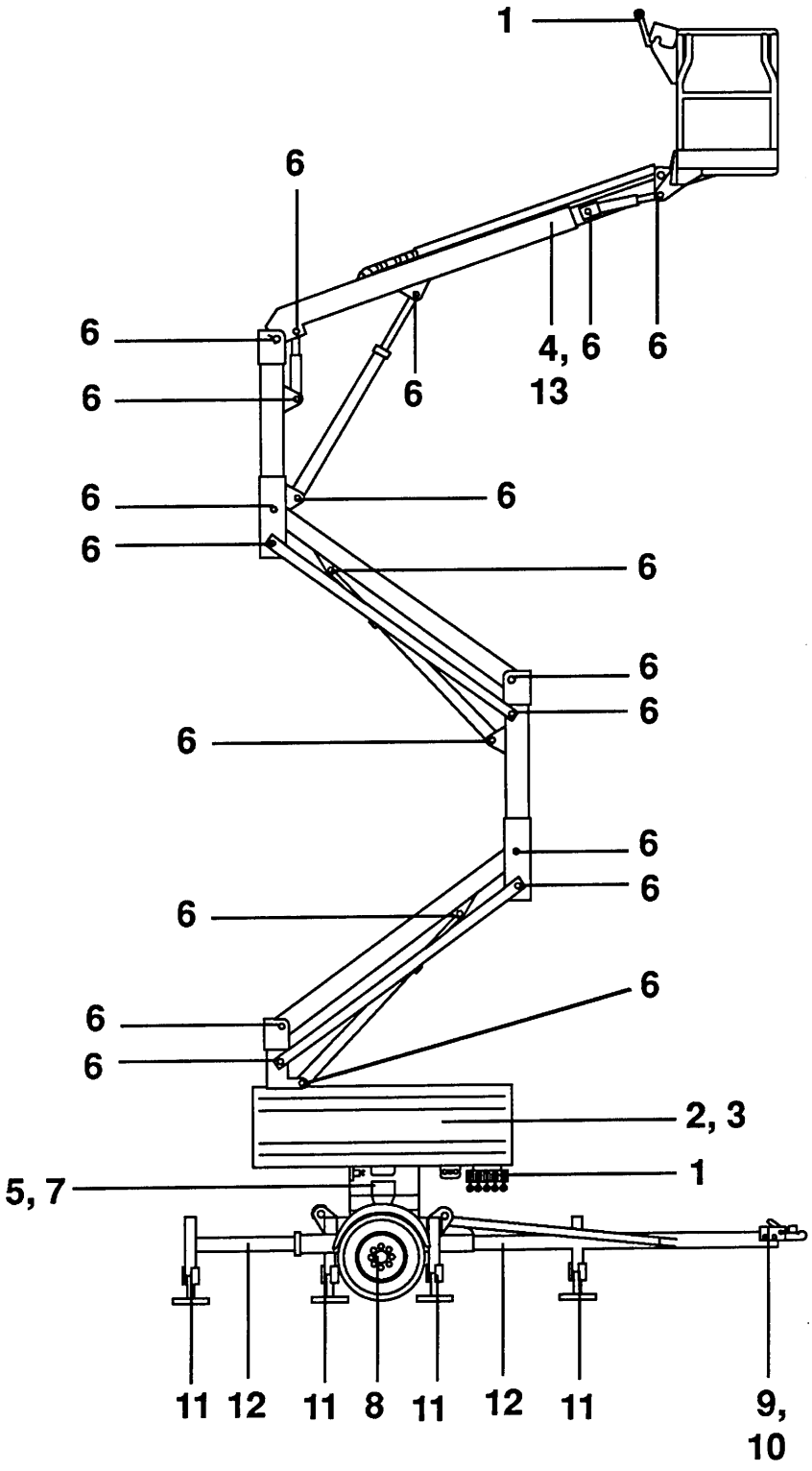
SUPERSTRUCTURE COMPONENT LOCATOR (FUEL POWERED) (RZB 55 SHOWN)



PLATFORM COMPONENT LOCATOR (RZB 55 SHOWN)



LUBRICATION DIAGRAM
(RZB 55 SHOWN)



LUBRICATION CHART

NO. ON DIAGRAM	ITEM	SPECIFICATION AND QUANTITY	FREQUENCY OF LUBRICATION
1	CONTROL VALVE HANDLE PIVOT PINS	WD 40 SPRAY	MONTHLY OR EVERY 100 HRS.
2	HYDRAULIC RESERVOIR	MOBIL DTE-15 TO FULL MARK W / ALL CYLINDERS RETRACTED	CHECK DAILY, ANALYZE EVERY 6 MONTHS, CHANGE YEARLY.
3	HYDRAULIC FILTER	FILTER ELEMENT	CHANGE EVERY 6 MONTHS
4	BOOM WEAR PADS	SILICONE SPRAY	MONTHLY OR EVERY 100 HRS
5	SWING BEARING	LITHIUM N.L.G.I. #2 EP (PURGE OLD GREASE)	MONTHLY OR EVERY 100 HRS.*
6	PIVOT PINS	LITHIUM N.L.G.I. #2 EP (PURGE OLD GREASE)	MONTHLY OR EVERY 100 HRS.*
7	SWING BEARING GEAR TEETH	DRI MOLY-LUBE	EVERY 6 MONTHS OR 500 HRS.*
8	HUB AND DRUM	REPACK WITH SAE 90 GREASE	YEARLY
9	BRAKE FLUID RESERVOIR	DOT 3 BRAKE FLUID	CHECK BEFORE TOWING UNIT
10	COUPLER ROLLERS	MOTOR OIL	AFTER PROLONGED USE OR STORAGE
11	OUTRIGGER JACKS	LITHIUM N.L.G.I. #2 EP GREASE	EVERY SIX MONTHS
12	OUTRIGGER BEAMS	DRI MOLY-LUBE	EVERY SIX MONTHS
13	INNER TELESCOPIC BOOM	SAE 90 GREASE	MONTHLY OR EVERY 100 HRS.*
14	TRAILER JACK	LITHIUM N.L.G.I. #2 EP GREASE	MONTHLY

* WHICHEVER OCCURS FIRST.

EMERGENCY PROCEDURES

WARNING!!!

IF THE POWER FAILS WHILE THE OPERATOR'S PLATFORM IS RAISED OR EXTENDED, DO NOT ATTEMPT TO CLIMB DOWN THE BOOM ASSEMBLY. SERIOUS INJURY MAY RESULT.

EMERGENCY PUMP

Each RZB has an emergency pump which can be operated from the ground control station.

Electric units have an emergency hand pump which can be operated only from the ground control panel.

Fuel powered units have an electric emergency pump which can be operated from the operator's platform or at the ground control station.

ELECTRIC UNITS

The pump on the electric RZB's is operated with a handle located on the side of the hydraulic tank.

- Raise superstructure cover.
- Locate the emergency hand pump bleed valve "T" handle, located behind the emergency pump towards the back wall.
- Close the hand pump bleed valve by turning the "T" handle clockwise approximately 180°.
- Operate and hold the appropriate function lever in the desired direction.
- Pump the hand pump handle up and down to allow function movement.

Always use caution in selecting the correct valve lever to bring the operator to safety.

NOTE

Machine function will be very slow when using the emergency hand pump.

CAUTION

The emergency pump is designed for emergency descent only and should not be operated for extended periods of time.

FUEL POWERED UNITS

Fuel powered units have an electric emergency pump which can be operated from the operator's platform or at the ground control station.

With engine off:

- Turn the key switch to "ON" position.
- Actuate and hold the emergency pump switch.
- Operate and hold the appropriate function lever in the desired direction.
- Release the emergency pump switch.
- Turn the key switch to "OFF" position.

Always use caution in selecting the correct valve lever to bring the operator to safety.

CAUTION

The emergency pump is designed for emergency descent only and should not be operated for extended periods of time.

EMERGENCY LOWERING

SITUATION: Platform elevated, operator not incapacitated, but unit will not respond to platform controls.

⚠ WARNING!!!

DO NOT CLIMB DOWN THE BOOM.

HAVE AN EXPERIENCED OPERATOR USE THE EMERGENCY PUMP TO SAFELY LOWER THE PLATFORM.

POSSIBLE CONDITION:

- One or more functions not operating correctly.
- Unit movement from unselected lever.
- Unit function will not stop unless power is switched off.

CORRECTIVE ACTION:

1. Remove foot from foot pedal.
2. Push "Emergency Stop" button.
3. Evaluate the nature of the failure. Return to the ground if possible. If the condition will not allow you to return to the ground, contact an experienced operator to lower the machine using the emergency pump lowering procedure.
4. **Report the incident to your supervisor immediately.**

SITUATION: Unit elevated with operator incapacitated at platform controls.

⚠ WARNING!!!

DANGER!!! DO NOT TOUCH UNIT!!! DETERMINE THE CAUSE OF THE PROBLEM BEFORE YOU TOUCH THE MACHINE.

CORRECTIVE ACTION:

1. Summon first aid or rescue squad.
2. Attempt to talk to operator before taking any rescue measures.
3. **Check to see if operator is in a pinned position before attempting emergency lowering procedure.**
4. After establishing that the machine is not in contact with live power lines or operator is not endangered if machine is moved, lower the platform using the emergency lowering procedure .
5. Render first aid to the operator.

SITUATION: Platform in contact with live power lines, operator incapacitated.

⚠ WARNING!!!

DANGER!!! DO NOT TOUCH UNIT!!!!

CORRECTIVE ACTION:

1. Contact authorized personnel to disconnect power supply touching unit.
2. Summon first aid or rescue squad.
3. If operator is unconscious, check to see if he is in a pinned position or would be endangered if machine is moved.
4. AFTER POWER IS CUT, use the emergency lowering procedure to bring platform with operator to a safe location to render first aid.

⚠ NOTE

Any incident involving personal injury must be immediately reported to the local Simon Aerials Distributorship as well as to Simon Aerials, Inc.

HYDRAULIC FLUID

HANDLING PRECAUTIONS

⚠ WARNING!!!

PERSONS IN REGULAR CONTACT WITH MINERAL OILS NEED TO BE AWARE OF THE IMPORTANCE OF THOROUGH HYGIENE, AND THE PROPER METHODS FOR HANDLING MINERAL OILS IN ORDER TO AVOID POTENTIAL HAZARDS TO HEALTH.

If mineral-based hydraulic fluid is SPLASHED INTO THE EYES, it must be WASHED OUT THOROUGHLY using abundant quantities of water. If irritation persists, medical advice should be sought.

Mineral oils act as solvents on the natural oils in the skin. FREQUENT AND PROLONGED SKIN CONTACT CAN CAUSE DERMATITIS OR SEVERE IRRITATION. Mineral-based hydraulic fluids normally present no health hazard when used properly. Protective clothing and proper washing facilities should be provided or be accessible.

⚠ WARNING!!!

HYDRAULIC FLUID UNDER PRESSURE CAN PENETRATE AND BURN THE SKIN, DAMAGE EYES, AND MAY CAUSE SERIOUS INJURY, BLINDNESS, AND EVEN DEATH.

FLUID LEAKS UNDER PRESSURE MAY NOT ALWAYS BE VISIBLE.

IF MINERAL-BASED HYDRAULIC FLUID HAS PENETRATED THE SKIN, IT MUST BE MEDICALLY TREATED, BY A DOCTOR FAMILIAR WITH THIS TYPE OF INJURY, WITHIN A FEW HOURS.

FLUID RECOMMENDATIONS

We strongly recommend the use of MOBIL DTE-15 HYDRAULIC FLUID. An EQUIVALENT substitute can be used if absolutely necessary. Mineral-based hydraulic fluids produced by different companies will USUALLY mix with each other satisfactorily, but this IS NOT RECOMMENDED. When in doubt, consult your supplier.

MOBIL DTE-15 has proven to be suitable for use in all climates. For continued operation in temperatures below 32° F (0° C), the use of MOBIL DTE-13 or DTE-11 may prove satisfactory.

For operation in tropical climates, the use of MOBIL DTE-16 is allowable.

FLUID CONTAMINATION CHECKS

Use the following as a guide to determine when analysis of the hydraulic fluid is necessary.

- Any time the motor driven hydraulic pump is replaced.
- If fluid discoloration is noticed in the hydraulic reservoir sight tube.
- If, after the first 50 hours of operation, the hydraulic filter elements are plugged.
- Any time the hydraulic filter elements show signs of metal content.
- If valve spools at either operator's station have continuous sticking problems which are not corrected by lubrication.
- Once a year, under normal operating conditions.
- Every 6 months, in extremely dusty or dirty operating conditions.

The hydraulic fluid analysis must be done by a qualified laboratory. To insure that you receive accurate recommendations about the fluid being analyzed, always provide the following information with the test sample.

- Type of hydraulic fluid. (See lubrication chart)
- Model and serial number of unit from which sample was taken.
- Purpose of analysis: i.e. pump failure, discoloration, etc.
- Type of analysis: i.e. complete to show additive breakdown, acid buildup, viscosity, type and percent of contaminants. Comparison to new fluid and recommendations.

Comply with contamination analysis and recommendations to achieve a clean, contamination free hydraulic system.

Following the above guide will prevent premature failure of pumps, cylinder seals and motor, and will prevent unnecessary down time.

If system flushing and replacement of fluid is recommended, refer to the following flushing procedure.

SYSTEM FLUSHING PROCEDURE

HYDRAULIC TANK

With BOOMS DOWN AND FULLY RETRACTED (in stowed position), drain hydraulic fluid from hydraulic tank into a clean, empty container. This can be done with an oil filter cart so the fluid may be reused if analysis is good.

When the hydraulic tank is empty, remove suction hoses between tank and pump. Remove hoses between pump and main valve bank. Flush the hoses. Remove hydraulic fluid filter, and flush the filter body and attaching hoses. Discard old filter element and replace.

With hoses removed from the hydraulic tank, open tank bottom drain and flush out the tank. When this is completed, all the hoses removed in the previous steps should be properly reinstalled EXCEPT the system return line to tank. This hose should be lengthened to drain into the container used for the reservoir fluid.

If the hydraulic fluid removed from the reservoir is good, it can now be pumped (through a filter cart) back into the tank. If fluid is not usable, fill hydraulic tank with filtered, fresh hydraulic fluid (refer to Lubrication Chart).

Loosen hose fittings at pump to allow pump to flood with hydraulic fluid, then tighten pump fittings.

HYDRAULIC SYSTEM (ELECTRIC UNITS)

Turn main power key switch "ON". Press "Power Control" button to engage pump.

NOTE

Use care when doing this as hydraulic fluid is now being returned to container provided above.

This will remove old fluid from the rest of the hydraulic system as each function is cycled to its maximum limits.

CAUTION

Monitor the hydraulic reservoir fluid level when cycling the unit functions, adding fluid as necessary to replace that being discharged to container at system return line. This fluid may be returned to the reservoir through a filter cart, if good.

Three cycles of ALL hydraulic cylinder functions should remove enough old hydraulic fluid from the system.

When the above procedures have been completed, re-connect all hoses including system return hose to tank. Fill the hydraulic reservoir to full mark on sight gauge.

Operate all functions to their full extreme positions to insure proper operation.

Check for leaks and correct as necessary. Unit is now ready to be placed back in operation.

HYDRAULIC SYSTEM (FUEL POWERED UNITS)

Turn main power key switch "ON". Start engine. Turn power switch clockwise to engage pump.

NOTE

Use care when starting and running the engine as hydraulic fluid is now being returned to container provided.

This will remove old fluid from the rest of the hydraulic system as each function is cycled to its maximum limits.

CAUTION

Monitor the hydraulic reservoir fluid level when cycling the unit functions, adding fluid as necessary to replace that being discharged to container at system return line. This fluid may be returned to the reservoir through a filter cart, if good.

Three cycles of ALL hydraulic cylinder functions should remove enough old hydraulic fluid from the system.

When the above procedures have been completed, re-connect all hoses including system return hose to tank. Fill the hydraulic reservoir to full mark on sight gauge.

Operate all functions to their full extreme positions to insure proper operation.

Check for leaks and correct as necessary. Unit is now ready to be placed back in operation.

HYDRAULIC SYSTEM

Following is a description of the major components of the RZB hydraulic system.

PUMPS

HYDRAULIC MOTOR PUMP (ELECTRIC UNITS)

A 24 volt DC motor drives the hydraulic gear pump which delivers hydraulic fluid to the functions via the control valves. Hydraulic fluid supplied by the pump is ported through the open center control valves directly back to the tank unless a control valve is actuated, diverting fluid to a function.

HYDRAULIC PUMP (FUEL POWERED UNITS)

The hydraulic gear pump is driven by the engine and provides hydraulic fluid flow ported through the open center control valves directly back to the tank unless a control valve is actuated, diverting fluid to a function.

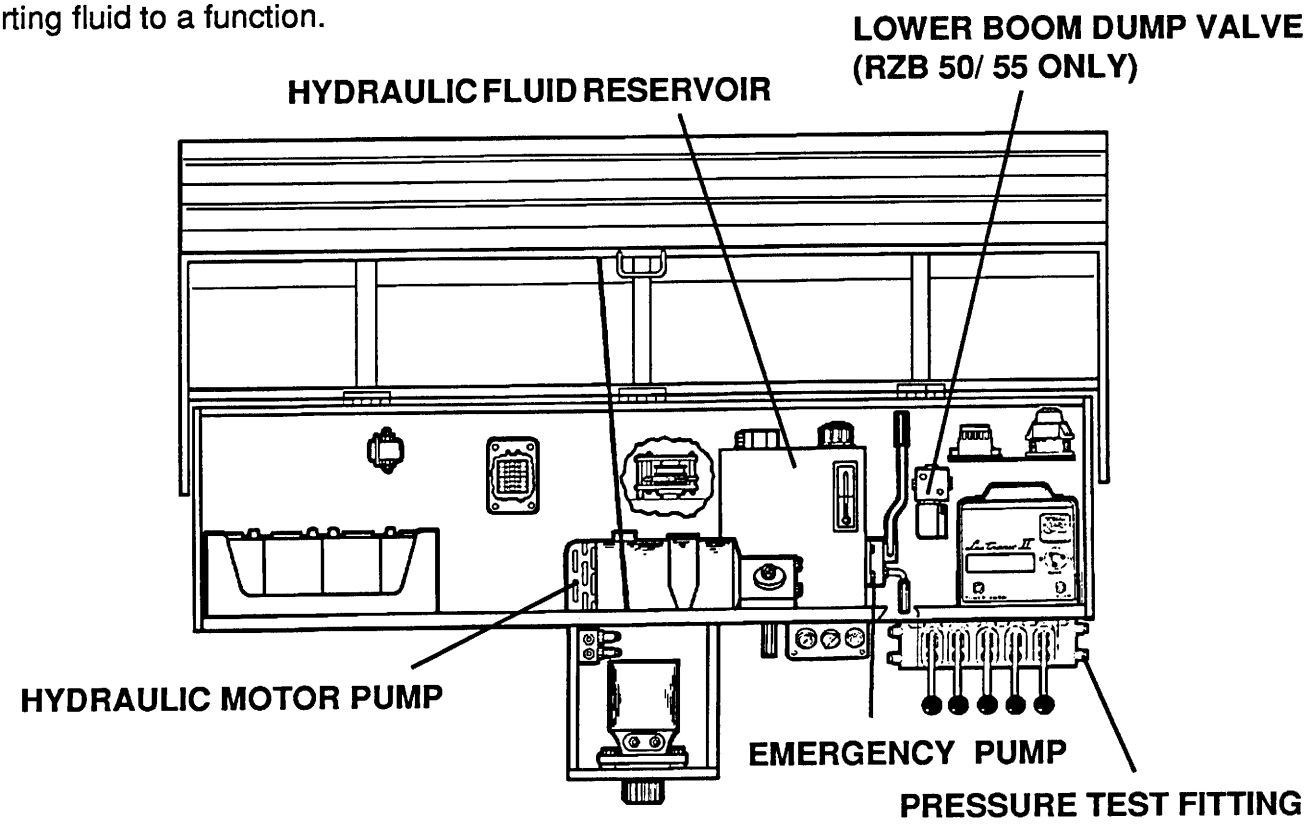
SYSTEM RELIEF VALVE

NOTE

Refer to "Machine Specifications" to determine maximum system pressure for your RZB.

To check system relief valve setting, connect pressure gauge to pressure test fitting, located at the pump input port of the ground control valve bank. Select "GROUND" at the platform/ ground selector switch. Turn the main power switch "ON". With the BOOM FULLY RETRACTED, operate the telescope lever "IN". In this situation, fluid will be directed through the system relief valve. Note pressure reading.

The system relief valve is pre-set at the factory and should not need adjustment.



Hydraulic System Components (Electric Units).

DUMP VALVES

LOWER BOOM DUMP VALVE (RZB 50 AND 55 ONLY)

The lower boom dump valve assembly is located on the back wall of the superstructure. When the lower boom is lowered using the platform controls and activates the limit switch on the lower boom post, a solenoid on the dump valve opens the valve and returns the hydraulic fluid to the reservoir, preventing the lower boom from being lowered completely from the platform controls.

PUMP DUMP VALVE (FUEL POWERED UNITS ONLY)

The pump dump valve assembly is located on the back wall of the superstructure. This valve allows hydraulic fluid to be returned to the hydraulic reservoir from the pump when the outriggers are not in position and the interlock system is de-activated. This prevents operation of the controls before the unit has been properly setup.

HYDRAULIC FLUID RESERVOIR

The hydraulic fluid reservoir consists of the tank, a filler cap with strainer and a return line filter.

HYDRAULIC RESERVOIR MAINTENANCE

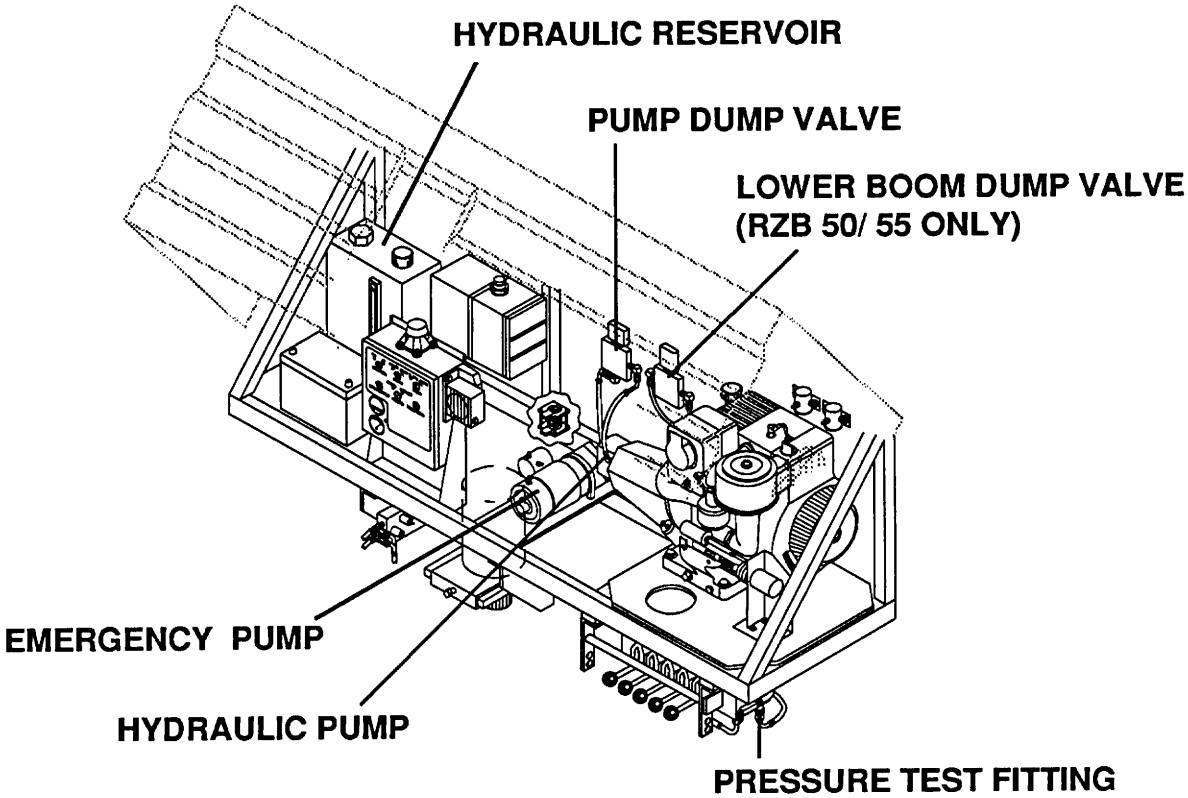
Check tank for signs of leakage. Inspect tank securing bolts for tightness.

EMERGENCY PUMP

ELECTRIC UNITS

The emergency hand pump is located on the side of the hydraulic tank. It is meant to be used only when the ground and platform controls are inoperative due to motor, pump or control system failure.

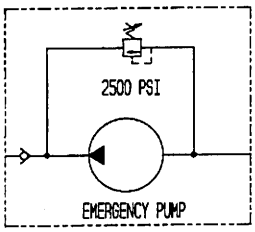
To operate the emergency hand pump, close the "T" handle on the bleed valve and operate the desired valve function while pumping the pump handle.



Hydraulic System Components (Fuel Powered Units).

There are two check valves in the system. One prevents hydraulic fluid from entering the hand pump from the hydraulic pump. The other allows the fluid to flow from the hand pump to the ground valve bank.

Check the operation of the emergency hand pump. Check for leaks around the pump gasket. If the hand pump will not operate, the internal filter may be clogged. Remove the filter and clean it by backwashing.

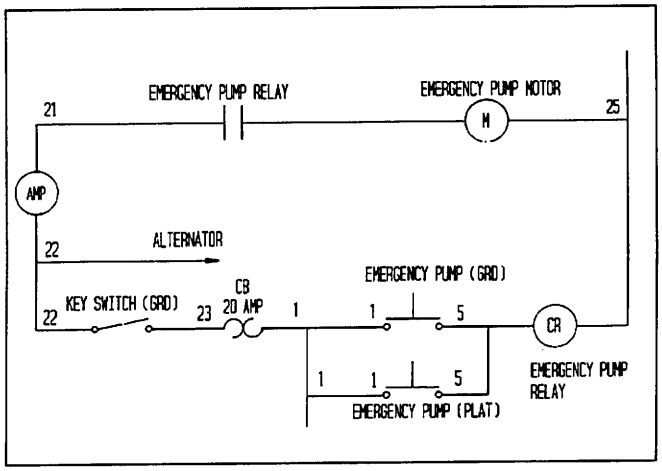


Emergency Pump Hydraulic Schematic.

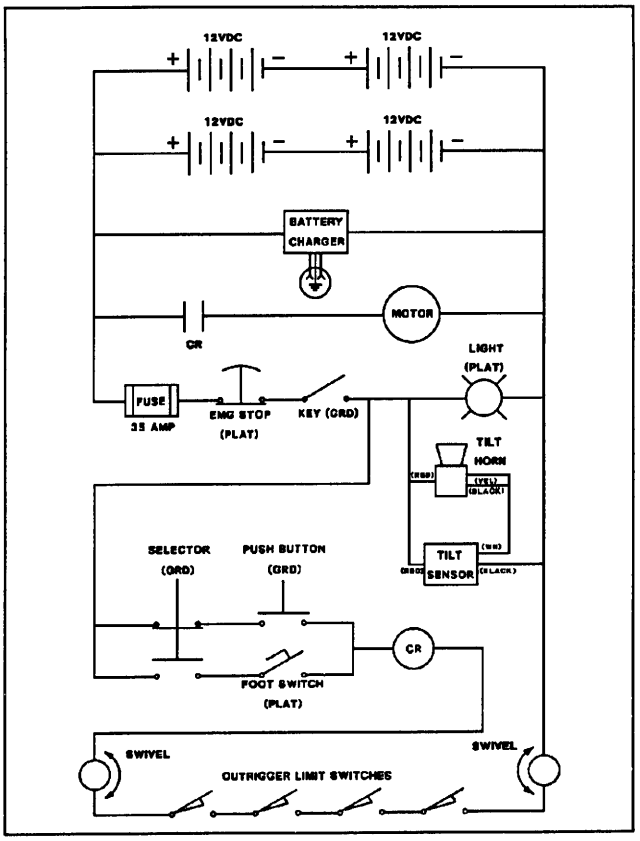
FUEL POWERED UNITS

The electric emergency pump is a 12 volt pump used to provide fluid flow to operate all boom functions and swing in case of engine failure. The pump has a built in relief valve and is connected to the ground and platform control valve banks. To operate the emergency pump, turn the emergency pump switch clockwise and operate the desired valve function. This system can be operated from either the ground or platform control station.

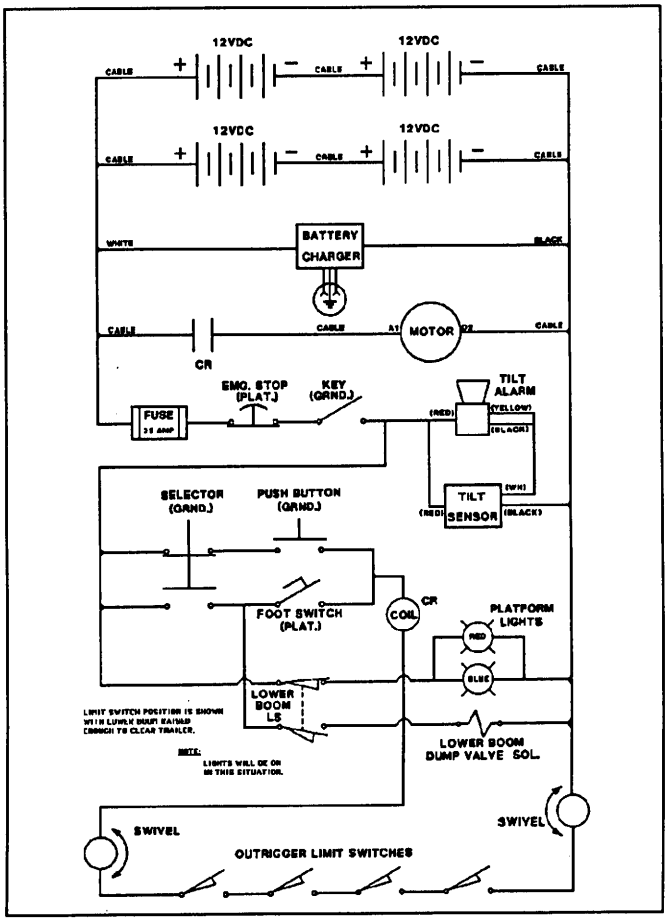
The emergency pump is meant to be used only under emergency conditions, to safely lower the operator's platform to the ground.



Emergency Pump Electrical Schematic.



Electrical Schematic (RZB 40 Electric Unit).



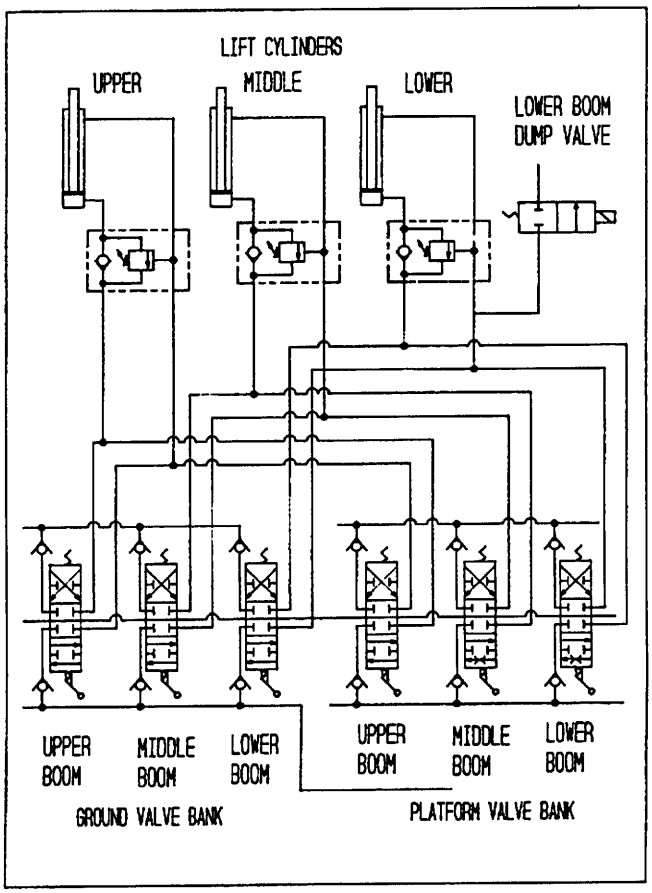
Electrical Schematic (RZB 55 Electric Unit).

BOOM LIFT SYSTEM

When the power control at the ground control station is activated and held, or the foot pedal on the platform floor is pressed and held, fluid is sent from the hydraulic pump to the ground and platform hydraulic control valve banks.

All boom sections are then controlled by moving the proper control lever in the desired direction. THE SPEED OF BOOM MOVEMENT IS PROPORTIONAL TO THE AMOUNT OF CONTROL LEVER THROW.

Each boom function is controlled by a double acting cylinder. Each cylinder contains a counterbalance (holding) valve, which will prevent unintended movement of the cylinder should a hose or fitting develop a leak. When a boom section is lowered, fluid flows to the rod end cylinder port and to the counterbalance valve, opening this valve and allowing fluid in the base end of the cylinder to flow back to the tank.



Lift System Hydraulic Schematic.

BOOM LIFT SYSTEM TROUBLESHOOTING

Problem: No boom functions operate from either ground or platform control stations.

Check boom functions from ground control station with power off, using emergency pump.

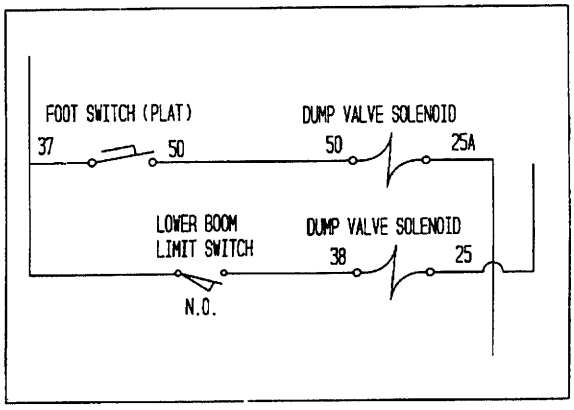
IF ALL BOOM SECTIONS CAN BE RAISED AND LOWERED slightly with the emergency pump, the ground control valve bank is good, and it will be necessary to investigate the electrical control system ahead of the control valve banks. Check outrigger limit switches.

If any boom section FAILS TO OPERATE FROM THE GROUND CONTROL PANEL using the emergency pump, the problem may be in the ground control valve bank. Check the inoperative boom function with the platform control and the emergency pump. If an assistant is not available for this procedure, the platform control lever can be tied into position.

If any boom function FAILS TO OPERATE FROM THE PLATFORM CONTROL PANEL using the emergency pump, the problem may be a defective holding valve. Remove the holding valve to check for foreign material or internal damage. If faulty, the holding valve must be replaced.

CAUTION

Always support the boom before removing the holding valve.



Lift System Electrical Schematic (Fuel Powered Units).

BOOM TELESCOPE SYSTEM

When the power control at the ground control station is activated and held, or the foot pedal on the platform floor is pressed and held, fluid is sent from the hydraulic pump to the ground and platform hydraulic control valve banks.

The boom telescope (extend) cylinder is then controlled by moving the telescope control lever in the desired direction. THE SPEED OF EXTEND OR RETRACT IS PROPORTIONAL TO THE AMOUNT OF CONTROL LEVER THROW.

The boom telescope cylinder is a double acting cylinder, and contains a pilot operated double check valve block located at its base. This check valve block prevents the cylinder from moving in or out in the event of a hose or fitting failure. Cylinder movement should only occur when the control valve lever is moved to the "IN" or "OUT" position.

When extending the boom, fluid flows to the base end of the telescope cylinder, with a pilot pressure in the base check valve going to open another check valve in the rod end. This allows the fluid displaced by the piston inside the cylinder to flow out of the rod end and back to the tank. When the boom is retracted, fluid flow to the rod end of the cylinder opens the base end check valve, allowing displaced fluid to return to the tank. This prevents the boom from extending or retracting unless called for by a control valve.

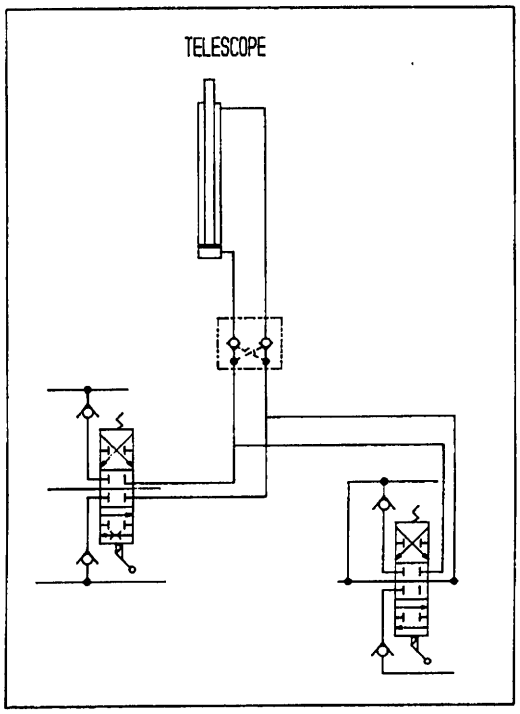
TELESCOPE SYSTEM TROUBLESHOOTING

Problem: Boom will not telescope from either ground or platform control stations.

Check boom telescope function from ground control station with motor off, using emergency pump. If boom CAN BE EXTENDED AND RETRACTED SLIGHTLY with the emergency pump, the ground control valve bank is good, and it will be necessary to investigate the electrical control system. Check outrigger limit switches.

If boom FAILS TO EXTEND OR RETRACT FROM THE GROUND CONTROL PANEL using the emergency pump, the problem may be in the ground control valve bank. Check with the platform "Boom Telescope" control and the emergency pump.

If telescope function FAILS TO OPERATE FROM THE PLATFORM CONTROL PANEL using the emergency pump, the problem may be a defective double acting check valve, or bad cylinder rod packing. Disassemble check valve to check for foreign material or internal damage. If necessary, disassemble cylinder for inspection.



Telescope System Hydraulic Schematic.

SWING SYSTEM

When the power control at the ground control station is activated and held, or the foot pedal on the platform floor is pressed and held, fluid is sent from the hydraulic pump to the ground and platform hydraulic control valve banks.

Superstructure swing (rotation) is then controlled by moving the swing control lever in the desired direction, left (clockwise) or right (counterclockwise). SPEED OF SWING IS PROPORTIONAL TO THE AMOUNT OF CONTROL LEVER THROW. Pressure relief is provided by the system relief valve.

The hydraulic swing motor is a gear motor that drives through the swing pinion gear to rotate the superstructure. The direction of the flow of hydraulic fluid through the motor will cause left or right swing.

The swing pinion gear mates with teeth on the swing bearing mounted to the trailer.

The superstructure can swing 360 degrees (continuous).

SWING SYSTEM TROUBLESHOOTING

Problem: Swing motor will not run in either direction.

Check swing function from ground control station with power off using emergency pump.

If swing FUNCTIONS with the emergency pump, check the motor relay and coil, the limit switches for the outriggers and the electric swivel.

If swing DOES NOT FUNCTION with the emergency pump, check for mechanical malfunctions.

The electric swivel may need new brushes.

The hydraulic swing motor shaft or pinion shaft may be broken. Remove and replace swing motor.

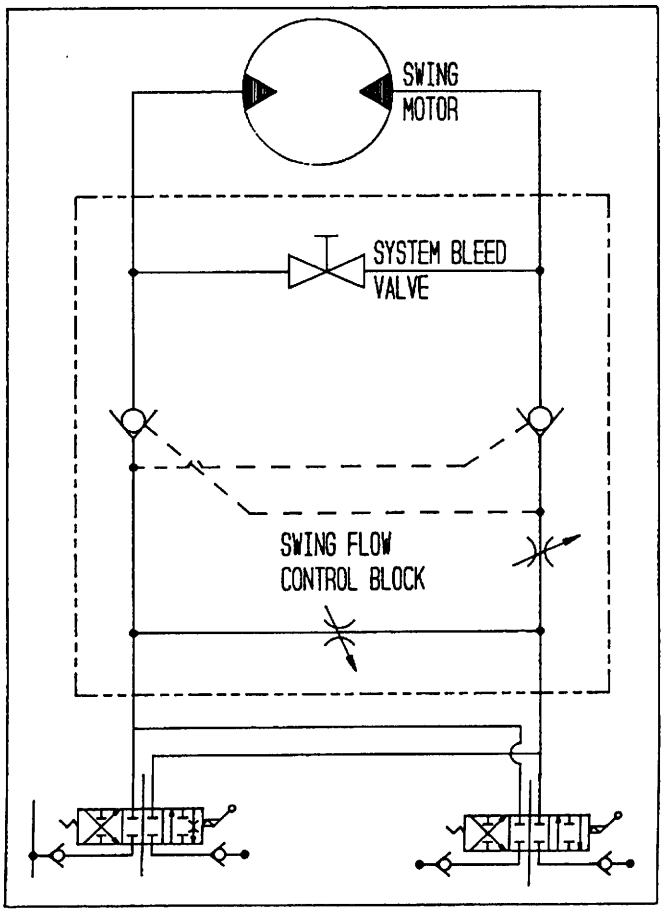
The swing motor pinion key to the gearbox may have sheared off. Remove and replace key.

SWING GEAR ADJUSTMENT

If the pinion gear teeth are not engaged properly to the teeth on the swing bearing, loosen the four mounting bolts holding the swing motor mounting bracket.

Loosen the jam nut on the adjusting screw.

Tighten the adjusting screws to obtain .004 to .006" (.10 to .15 mm) gap at gear teeth. Check for minimal backlash and NO INTERFERENCE throughout entire range of swing gear travel. Tighten jam nut on adjusting screw. Tighten the mounting bolts to the recommended torque.



Swing System Hydraulic Schematic.

LEVELING SYSTEM

The leveling system automatically keeps the platform level, using a master/ slave cylinder arrangement. As the upper boom is raised or lowered, fluid is forced from one cylinder to the other in a closed loop, which keeps the platform parallel to the ground in any boom position. Due to slight internal leakage, fluid may at times need to be added to the leveling circuit through the platform leveling control valve.

The platform level system is only controlled from the platform controls. The ground/ platform selector switch on the ground control panel must be in the "PLATFORM" position. With the foot switch depressed, you can now level the platform by moving the platform level control lever in the direction desired. AMOUNT OF CONTROL LEVER THROW CONTROLS SPEED OF LEVEL.

A holding valve on the slave cylinder acts as a safety valve in case of a hose or fitting failure. The holding valve prevents unintended travel of the platform through the use of a counterbalance valve, which is opened only by pilot pressure from the control valve or master cylinder.

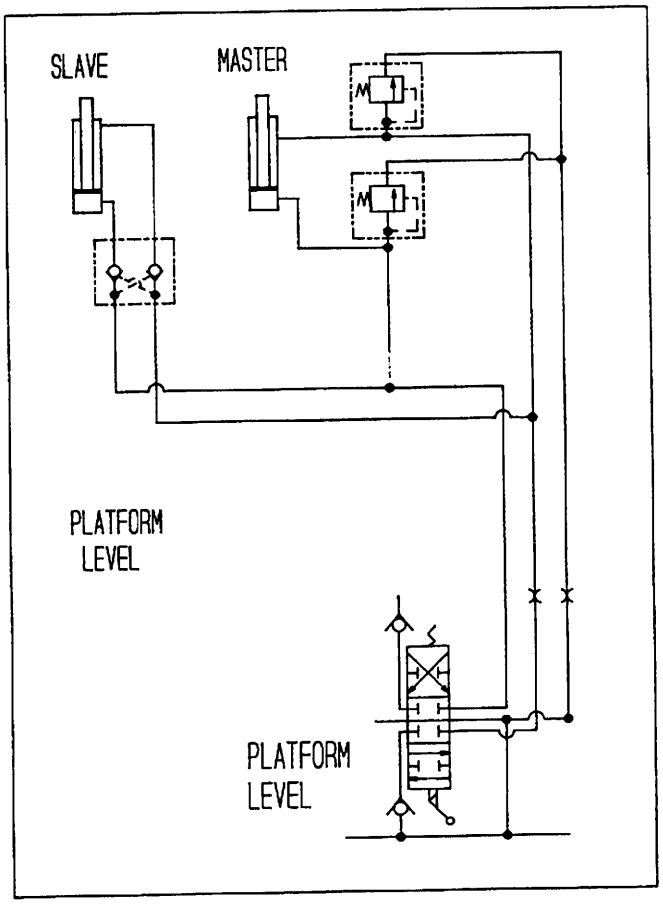
LEVELING SYSTEM TROUBLESHOOTING

Problem: Platform leaks down.

Remove line from slave cylinder holding valve to control valve.

If platform leaks down and hydraulic FLUID FLOWS from holding valve, remove holding valve and inspect it for damage or dirt. Clean or replace as necessary.

If cylinder leaks down, but NO FLUID FLOWS from holding valve, problem is in slave cylinder. Remove, inspect and repack the slave cylinder as needed.



Leveling System Hydraulic Schematic.

ELECTRICAL SYSTEM

Following is a description of the major components of the RZB electrical system.

ELECTRICAL CIRCUIT (ELECTRIC UNITS)

The electrical circuit consists of two duplicate circuits, controlling lift, telescope and swing functions from either the ground or platform control panel, and selected by a switch on the ground control panel.

BATTERIES

Four 12 volt lead-acid batteries are used to provide the power to operate all functions on the electric powered RZB. Two of the batteries are connected in parallel and then the two parallel sets are connected in series to provide a 24 volt DC power supply.

Battery Maintenance (in Storage)

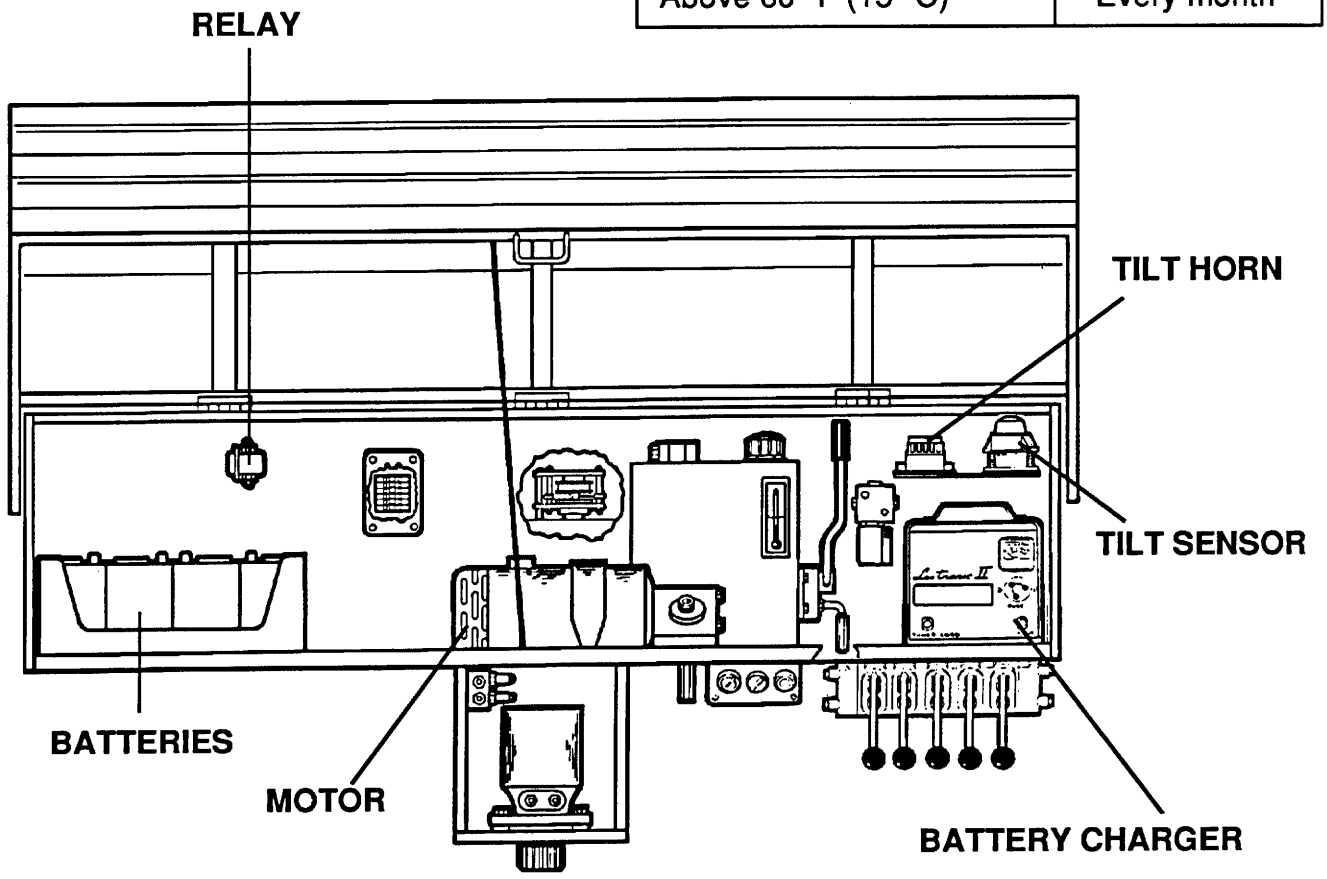
Follow these procedures for maintenance of stored batteries:

Keep batteries clean. Electrolyte of "wet" batteries should be checked regularly, and kept at proper levels.

Never stack one battery directly on top of another, as post or container damage can result. If batteries are stored individually, place supporting boards between layers. Do not stack more than three high, and rotate stock so that the oldest batteries are used first.

"Wet" batteries should be kept fully charged. A "wet" battery, while in storage, should be recharged to full charge at the following intervals:

IF STORED AT:	RECHARGE:
Below 40° F (4° C)	None required
40° to 60° F (4° to 15° C)	Every 2 months
Above 60° F (15° C)	Every month



Electrical System Components (Electric Units).

Battery Maintenance (in Use)

Check batteries and mounting frame for signs of damage or corrosion.

Check battery terminals for:

- **Corrosion.** Regularly clean connections and apply a non-metallic grease or protective spray to retard corrosion.
- **Loose connections.** Be sure all cable connections are tight, and that good contact is made to terminals.
- **Broken or frayed cables.** Be sure all cable connections are good, and that no loose or broken wires are exposed. Replace as needed.

Check battery electrolyte level. Replenish the electrolyte, if necessary. Remove vent caps before filling, and USE ONLY DISTILLED WATER. Fill all cells to the proper level. Do not overfill. Fill to level indicator (or 1/2 inch over the top of the separators if there is no level indicator). Fill after charging to prevent overflow of acid due to expansion. Do not use a hose to add water to batteries.

Allowing the electrolyte level to drop below the top of the separators will lead to shortened battery life. Excessive water usage can indicate that a battery has been overcharged, has been subjected to excessively high temperatures, or is nearing the end of its service life.

Keep batteries clean. Wash the tops of the batteries, making sure all vent caps are in place. Do not allow cleaning water or other foreign matter to enter the cells. Use a solution of bicarbonate of soda and water to wash the batteries if there is an accumulation of acid.

Battery Troubleshooting

Once a week, after the batteries have been charged, spot check the specific gravity of two or more cells. A fully charged battery should indicate between 1.25 and 1.28. If low readings are noted, check the following:

- Check battery charger to insure that a proper charge is being returned to the batteries.
- Check terminals for corrosion, loose connections and broken or frayed cables.
- Check all cells with a hydrometer for variation in specific gravity. A variation of 0.03 points or more between cells is cause for concern. Mark the low cells.

Recheck specific gravity of all cells after recharging.

Battery Replacement

To remove the batteries, follow these procedures:



BEFORE REMOVING BATTERIES FROM THE UNIT, TURN OFF THE IGNITION SWITCH. THERE SHOULD BE NO POWER TO THE MACHINE.

Be sure all power is shut off to the machine. Disconnect the battery cables.



Always disconnect the negative battery cable first.

Release the battery retaining bar, and carefully remove the battery from the tray. LEAD-ACID BATTERIES ARE HEAVY. DO NOT DROP.

To install, carefully lower the battery into the tray. Connect the battery retaining bar, and the battery cables.

CAUTION

Always connect the positive battery cable first.

BATTERY CHARGER

The battery charger supplied with the RZB is designed to recharge deep-cycle, lead-acid batteries. It is a highly reliable unit with a minimum of moving parts. A patented electronic timer determines full battery charge by measuring the rate of battery voltage increase during charge. When the voltage stops rising, the battery is fully charged and the charger automatically turns off.

To operate, connect the power supply cord to a 115 volt, 60 hertz outlet. The charger DC output cord should remain connected to the batteries.

WARNING!!!

CONNECT ONLY TO A PROPERLY GROUNDED THREE-PRONG, SINGLE PHASE OUTLET.

TO AVOID ELECTRIC SHOCK, DO NOT TOUCH UNINSULATED PARTS OF THE CHARGER DC OUTPUT CONNECTOR, BATTERY CONNECTOR OR TERMINALS.

BE SURE CHARGER IS IN GOOD CONDITION, AND THAT BATTERY CONNECTORS MAKE ADEQUATE ELECTRICAL CONTACT AND ARE NOT CRACKED OR CORRODED. OVERHEATING AND PROPERTY DAMAGE MAY RESULT.

Monitor the ammeter for the correct charge rate, which should vary from 20 to 29 amps, depending upon the condition and depth of discharge of the batteries.

CAUTION

To prevent damage from overheating, do not allow the charger to operate for more than thirty minutes with an ammeter reading of 30 amps or more.

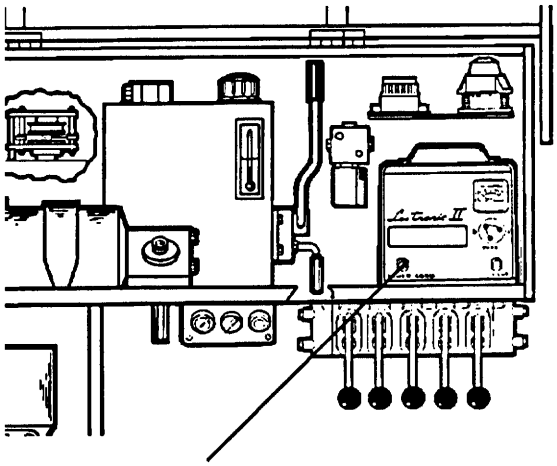
Required charge time varies with depth of discharge.

WARNING!!!

LEAD-ACID BATTERIES GENERATE EXPLOSIVE GASES. NO SMOKING! KEEP SPARKS AND FLAME AWAY FROM BATTERIES.

NEVER DISCONNECT THE DC OUTPUT CONNECTOR FROM THE BATTERIES WHILE THE CHARGER IS OPERATING.

IF THE CHARGE CYCLE MUST BE INTERRUPTED, DISCONNECT THE POWER SUPPLY CORD FROM ITS OUTLET; DO NOT DISCONNECT THE DC OUTPUT CONNECTOR FROM THE BATTERY CONNECTOR.



BATTERY CHARGER

Battery Charger Location.

Battery Charger Troubleshooting

CAUTION

Always unplug the electrical cords from the AC outlet and the batteries before attempting any repairs to the charger.

WARNING!!!

HIGH VOLTAGE! WITH THE CHARGER ON, THE INTERNAL CHARGER CAPACITOR VOLTAGE IS APPROXIMATELY 650 VOLTS.

NOTE

Modifying the charger for use other than that for which it was specifically intended, repairs by unqualified persons or use of other than original equipment replacement parts will void the warranty.

If the charger malfunctions, identify the symptoms and refer to the following procedures.

Problem: Charger does not turn on.

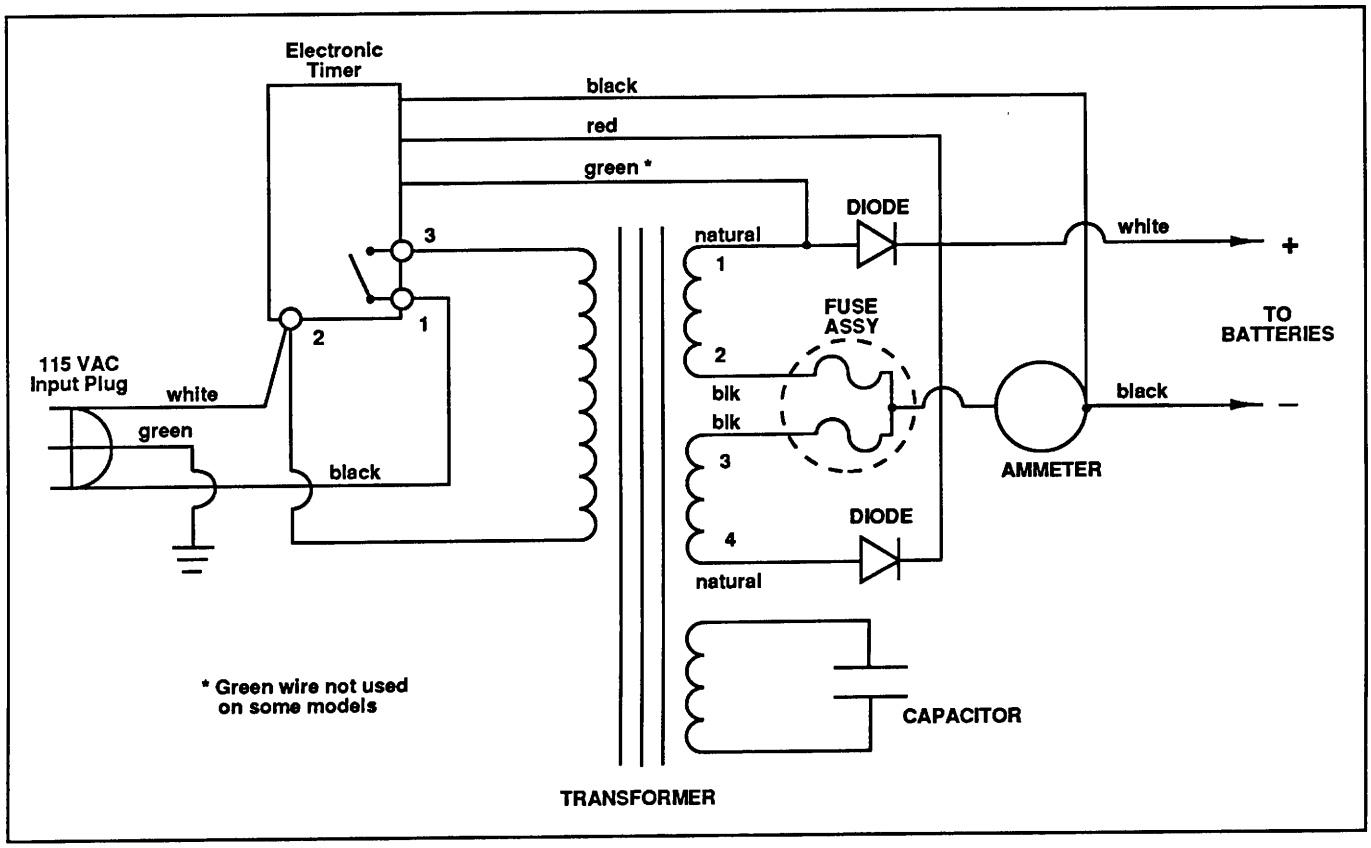
The charger DC output cord normally remains connected to the batteries. When the charger is turned on, a time delay of two to five seconds is provided before the charger switches on. After this time delay, the POWER RELAY CLOSES WITH AN AUDIBLE "CLICK", and AC power is supplied to the transformer.

When operating properly, the TRANSFORMER HUMS and the AMMETER INDICATES THE CHARGE RATE. If the charger does not turn on properly, one of three situations will exist:

1. Relay DOES NOT CLOSE, Transformer DOES NOT HUM, and Ammeter DOES NOT REGISTER.

2. Relay CLOSES, but Transformer DOES NOT HUM, and Ammeter DOES NOT REGISTER.

3. Relay CLOSES and Transformer HUMS, but Ammeter DOES NOT REGISTER.



Battery Charger Schematic.

Following are the procedures to be used in each of the above circumstances.

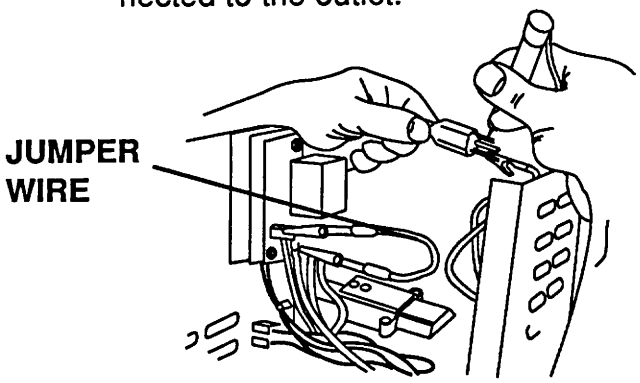
1. If Relay DOES NOT CLOSE, Transformer DOES NOT HUM, and Ammeter DOES NOT REGISTER:

   Check that both the power supply cord and DC output connector are securely connected. If so, disconnect the power supply cord from the power outlet. Measure the voltage at the battery connector using a suitable DC voltmeter.

   The voltage reading SHOULD BE THE SAME as the battery terminal voltage (between 20 and 50 volts DC). If the DC voltage is within these limits, remove the charger cover and check the wiring against the wiring diagram. If correct, a malfunction in the electronic timer has probably occurred.

   To verify a malfunction in the electronic timer, bypass the timer, then check for transformer hum and normal charging current.

   To bypass the timer, disconnect the charger power supply cord from the outlet, and the DC output connector from the battery connector. Place a jumper wire between terminals "1" and "3". The transformer should hum when the power supply cord is reconnected to the outlet.



Bypassing Electronic Timer.

   If the transformer HUMS, disconnect the power cord. Reconnect the DC output connector to the battery connector. Reconnect the cord. If ammeter shows normal charging current , the timer is defective and must be replaced.



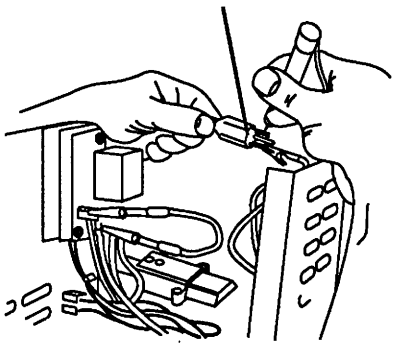
DO NOT CHARGE BATTERIES WITH THE TIMER BYPASSED. The charger will remain on as long as the power supply cord is connected to a power source, and severe damage to batteries will result.

   If the transformer DOES NOT HUM and the ammeter does not register with the timer bypassed, check the continuity of the charger AC circuit. Disconnect the power cord from the outlet, and the DC output connector from the battery connector. With a suitable Continuity Tester, check the circuit across the power cord prongs. If the circuit is not complete, check the continuity of the power supply cord, primary transformer coil and all connections.

2. If Relay CLOSES, but Transformer DOES NOT HUM, and Ammeter DOES NOT REGISTER:

   Check to be sure the power supply cord is securely connected to a live outlet.

   Disconnect the cord from the outlet, and the DC output connector from the battery connector. Bypass the electronic timer (refer to situation #1), and with a suitable Continuity Tester, check the circuit across the power cord prongs. If the circuit is complete, check the relay wiring and all connections. If the circuit is not com-



Charger AC Circuit Continuity Test.

plete, check the wiring of the power supply cord, transformer primary coil leads and the electronic timer.

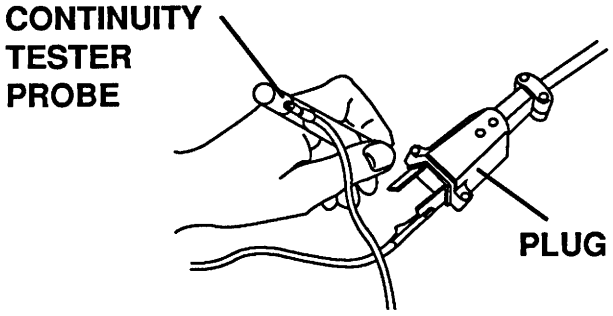
Remove the charger cover, and check the wiring against the diagram. If correct, individually check the continuity of the power supply cord, transformer primary coil and relay.

3. If Relay CLOSES and Transformer HUMS, but Ammeter DOES NOT REGISTER:

In this situation, the charger AC circuit and electronic timer are functioning properly, and a fault in the charger DC circuit exists. A continuity check must be performed.

Disconnect the power cord from the outlet and the DC output connector from the battery connector. Check the charger fuse. If a fuse link is blown, further testing is required (see "Charger Fuse Blows", later in this section). If the fuse is good, use a low voltage Continuity Tester to perform the following tests:

3A. Connect the Tester leads to the charger DC output connector and note the reading. Reverse the Tester leads and check the reading again. The circuit should be complete IN ONLY ONE DIRECTION.



Charger DC Circuit Continuity Test.

If the circuit DOES NOT CONDUCT IN EITHER DIRECTION and the fuse is good, check the continuity of the DC output cord, ammeter, diodes and all connections.

If the circuit CONDUCTS IN BOTH DIRECTIONS, a short exists in the charger DC circuit. Check the DC output cord. Check if one or both diodes have shorted (see "Charger Fuse Blows").

3B. Check the capacitor. Disconnect the power cord from the outlet and the DC output connector from the battery connector. Disconnect both transformer coil leads from the capacitor terminals, taking care that the wires do not break. Connect an Ohmmeter (with the scale set to R x 10K ohms) to the capacitor terminals, and test the capacitor.

If, when the Ohmmeter leads are connected to the capacitor terminals:

- the meter needle JUMPS TO MID-SCALE and RAPIDLY MOVES TO HIGH RESISTANCE, the capacitor is GOOD.

- the meter needle DOES NOT MOVE, and instead stays at high resistance, the capacitor is OPEN. A bulge in the top of the capacitor may be visible.

- the meter needle JUMPS IMMEDIATELY TO ZERO OHMS and stays there, the capacitor is SHORTED.

If the capacitor is "open" or "shorted", it must be replaced.

CAUTION

Use only a "6 mfd, 660 volt ac" rated capacitor for replacement. The use of a capacitor of a different value may result in improper charging, capacitor failure, transformer burnout or battery damage.

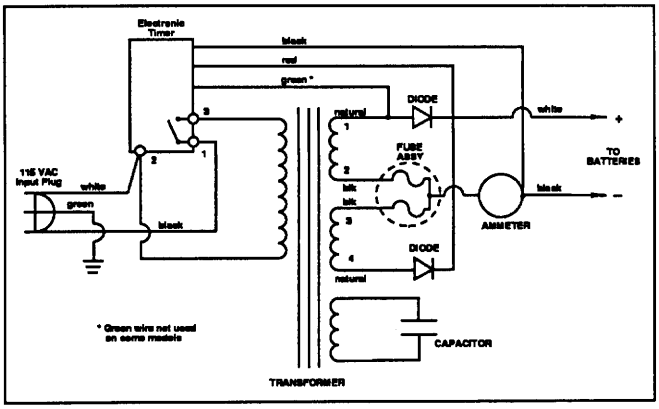
3C. If the charger DC circuit and capacitor are good, test the transformer (see "Transformer Short or Burn-Out", later in this section).

Problem: Charger fuse blows.

The charger fuse consists of two fusible links mounted as a single assembly on the charger front panel. Each link is connected in series with one diode to provide protection for the transformer in the event of diode failure. Visually check the fuse to determine if one or both links are blown.

CAUTION

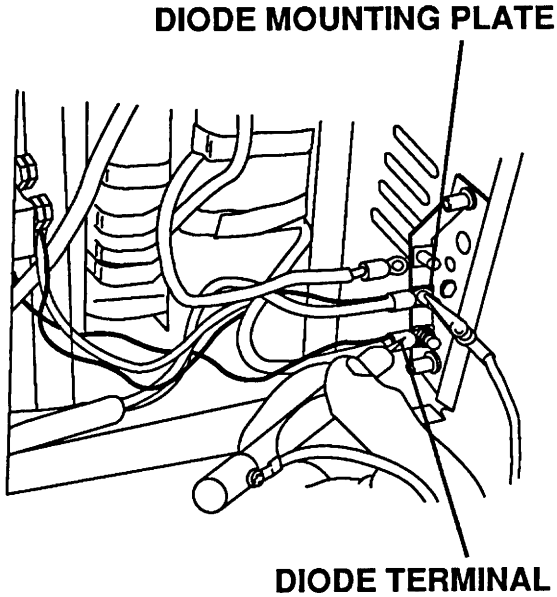
Replace the complete fuse assembly if blown. DO NOT ATTEMPT TO REPAIR THE FUSIBLE LINK, as inadequate charger protection may result.



Battery Charger Schematic.

If a SINGLE FUSIBLE LINK BLOWS, the cause is normally a short circuit failure of one diode. The link will blow when the charger DC output connector is connected to the battery connector, whether or not the power cord is connected.

To check the diodes, disconnect the power cord and the DC output connector. Disconnect one transformer secondary coil lead from the diode terminal. Using a low voltage Continuity Tester, connect one Tester lead to the diode mounting plate and the other to a diode terminal. Note the reading and then reverse the Tester leads and check each diode again. If a diode CONDUCTS CURRENT IN BOTH DIRECTIONS, it is SHORTED. The complete heat sink assembly with diodes must be replaced.



Diode Continuity Test.

Occasionally, a single fusible link may melt due to excessive heat caused by a loose internal fuse connection. Check that all three fuse connections inside the charger are clean and tight. Tighten the fuse connector nuts to the proper torque (see "Machine Specifications").

If BOTH FUSE LINKS BLOW, the cause is normally a reverse polarity connection between the charger DC output connector and the battery connector. Check the battery pack and connections. Check the voltage and polarity at the battery connector with a DC voltmeter.

Check the charger DC output connector for correct polarity. The white wire should be connected to the positive (+) blade, and the black wire to the negative (-) blade. If polarity is reversed between the charger and batteries, BOTH FUSIBLE LINKS WILL BLOW whether or not the power supply cord is connected to an outlet.

BOTH FUSIBLE LINKS MAY ALSO BLOW due to a short circuit failure of both diodes. A lightning strike at the charging location can be a cause. Excessive heat due to a loose connection may also cause both fusible links to melt.

Problem: Ammeter reads 30 amps for more than 30 minutes.

If the charger is connected to a battery system of less than 24 volts, the charge rate may not go below 30 amps within 30 minutes. Check that all batteries are correctly wired, and also check the battery pack voltage at the battery connector using a DC Voltmeter. For a 24 volt battery system, the charging voltage should be 22.5 to 25.5 volts DC.

This condition could also result if there is a shorted cell in one of the batteries.



Do not connect the charger to battery systems of other than 24 volts. Overheating and transformer burnout will result.

Problem: Charger output is low.

Low charger output is normally caused by a single fusible link blowing as the result of a short circuit failure of one diode (refer to "Charger Fuse Blows", in this section), or the transformer coils (refer to "Transformer Short or Burnout", in this section).



Do not use the charger if the output is low. Batteries will not reach full charge, and the possibility of a harmful deep discharge exists in subsequent usage.

Problem: Charger does not turn off.

The electronic timer turns the charger on and off. Proper charge time is determined by many factors, but larger, severely discharged batteries require more time to reach full charge than do smaller, lightly discharged batteries. Charge time should not exceed 18 hours.

If the charger remains on longer than that, verify that the green wire from the electronic timer and the secondary transformer coil lead are securely connected to the diode lead. The charger will not turn off if this wire is loose or disconnected. If the green wire is secure, the timer has malfunctioned and must be replaced (see "Electronic Timer needs replacement", later in this section).

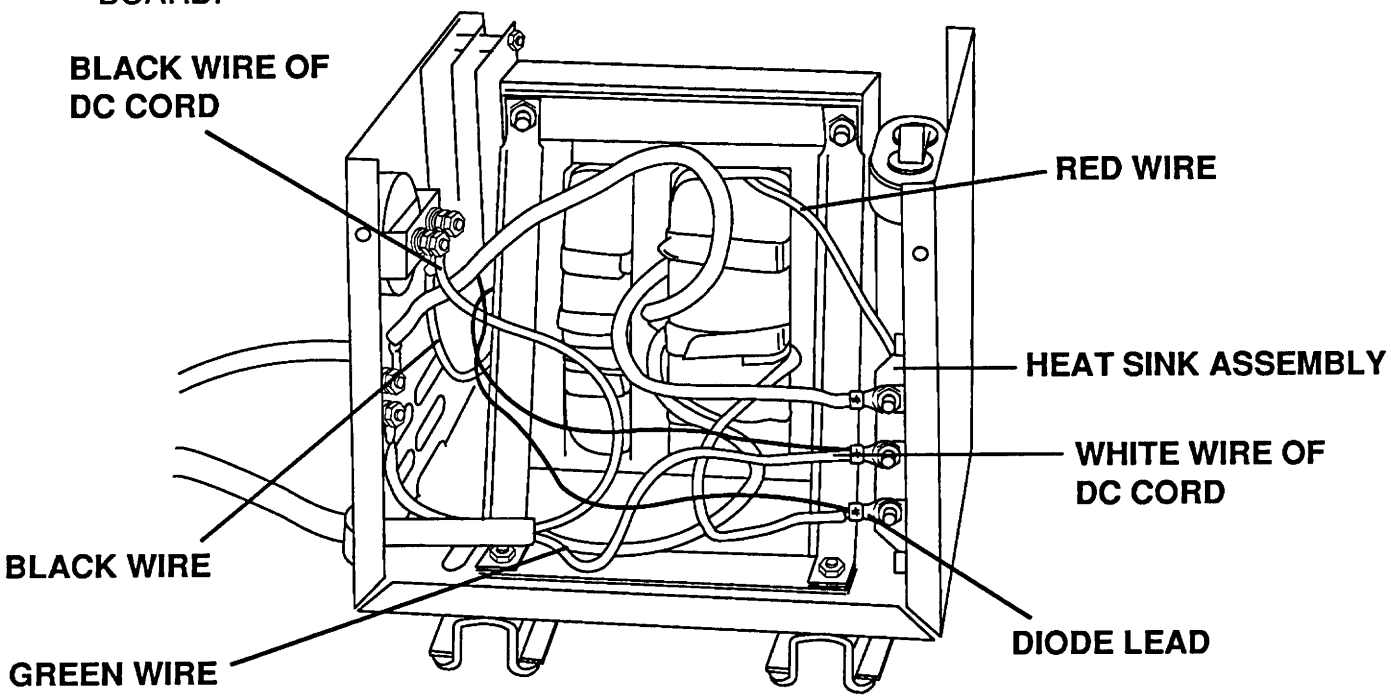
Problem: Electronic timer needs replacement.

The electronic timer kit should always be replaced as a complete assembly. Tools required are a Phillips Head Screwdriver, Pliers, a 3/8" Wrench, and an 11/32" Wrench. To replace the timer kit, follow the procedures listed below:

- Disconnect the charger power cord from the outlet, and the DC output connector from the battery connector. Remove the charger cover.
- Disconnect the green, black and red wires of the timer kit. Remove the black and white leads of the power cord and both primary transformer coil leads from the timer kit terminals. Remove the three mounting screws on the charger front panel, and the entire timer kit. Save all hardware for reassembly.
- Install the replacement timer kit by reversing the above steps. When reconnecting the wires to the timer terminals, YOU SHOULD SUPPORT THE TERMINAL BOARD TO PREVENT DAMAGE TO THE ELECTRONIC CIRCUIT BOARD.
- Connect one transformer primary lead to terminal "2", and the remaining lead to terminal "3".
- Connect the black lead of the power supply cord to terminal "1" on the timer kit, and the white lead to terminal "2".
- Connect the red wire of the timer kit and the white lead of the DC output cord to the heat sink assembly.
- Connect the black wire of the timer kit and the black lead of the DC output cord to the ammeter post. DO NOT ALLOW THE POST TO TURN WHEN TIGHTENING THE NUT.
- Connect the green wire of the timer kit and the transformer secondary lead to the diode lead terminal.

CAUTION

Be sure all connections are clean and tight. Insure that all wires and terminals are positioned so they do not short to the charger case or each other.



Electronic Timer Kit Wiring.

- Replace the charger cover and check the timer kit for proper operation as follows:
  - With the DC output connector disconnected from the battery connector, plug the power cord into a suitable outlet. A DC Voltmeter connected across the DC output connector should indicate zero volts.
  - Disconnect the power cord from the outlet, and connect the DC output connector to the battery connector. The relay on the timer kit should close with an audible click after a two to five second delay.
- If the timer does not operate as indicated above, refer to the wiring diagram to insure the charger is wired correctly. If the timer operates properly, the charger is ready for use. Monitor the first charge cycle to verify that the charger turns off properly.

Problem: AC fuse or circuit breaker blows.

If this occurs when the charger is connected to an AC power source, but not to the batteries, the power cord may be shorted. Disconnect the cord from the outlet and the DC output connector from the battery connector. Check that the electronic timer kit has not been bypassed.

With a suitable Continuity Tester, check the circuit across the power cord prongs. The circuit should be open. If the circuit is complete, check the relay contacts to be sure they are open, and have not welded closed. If the relay contacts are open, the power cord is shorted and must be replaced.

If the power cord is good, the transformer coils may be shorted.

Problem: Transformer shorted or burned out.

Transformer failure may be caused by natural aging, or shorting of adjacent coil turns. A low or complete lack of output will be observed on the ammeter, while the transformer may hum. The AC line fuse or circuit breaker may blow when the charger is turned on.

To test the transformer, disconnect the power cord from its outlet and the DC output connector from the battery connector. Disconnect transformer secondary coil leads "1" and "4" from the diode terminals, and the transformer capacitor coil leads from the capacitor terminals. When disconnecting capacitor leads, use care to avoid breaking wires .

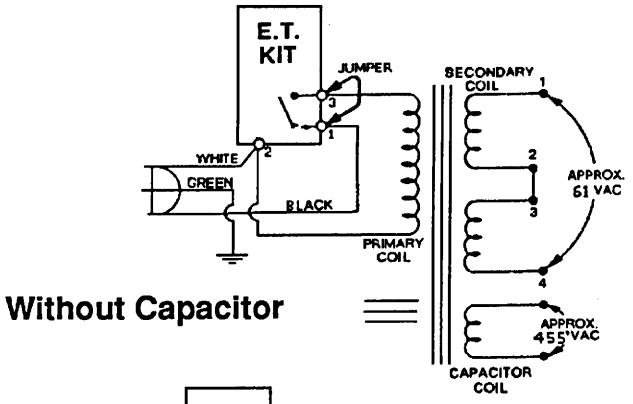


HIGH VOLTAGE!

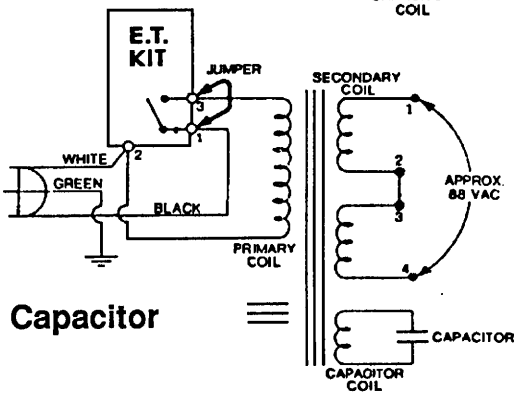
WITH THE CHARGER ON, THE INTERNAL CHARGER CAPACITOR VOLTAGE IS APPROXIMATELY 650 VOLTS. USE EXTREME CAUTION WHEN WORKING NEAR CAPACITOR TERMINALS.

In order to apply AC power directly to the transformer primary coil, the timer must be bypassed. With the timer bypassed, and TAKING CARE FOR PERSONAL SAFETY, connect the power cord to a proper outlet. If the AC line fuse or circuit breaker blows, the transformer is shorted internally and must be replaced. If the fuse or breaker does not blow, check the transformer secondary and capacitor coil voltages using a suitable AC voltmeter. If the measured voltages are substantially lower than those shown, the transformer is shorted internally and must be replaced.

If the transformer output voltages are good, disconnect the power cord from the outlet.



Without Capacitor



With Capacitor

Transformer Coil Voltage Test.

Check the capacitor rating (should be 6 Mfd, 660 volts AC), then carefully reconnect the capacitor coil leads to the capacitor terminals. Then, TAKING CARE FOR PERSONAL SAFETY, reconnect the power cord to the outlet and again measure the transformer secondary and capacitor coil voltages.

If both read 88 volts AC, the transformer and capacitor are good (see DC Circuit Test Procedures under "Charger does not turn on"). If the secondary coil voltage reading is 61 V AC, and capacitor coil 455 V AC, the capacitor may be defective (see Capacitor Test Procedures under "Charger does not turn on", earlier in this section) or the capacitor coil leads may not be making proper electrical contact .

If replacement of a transformer lead terminal is required, the new terminal MUST be crimped and soldered.

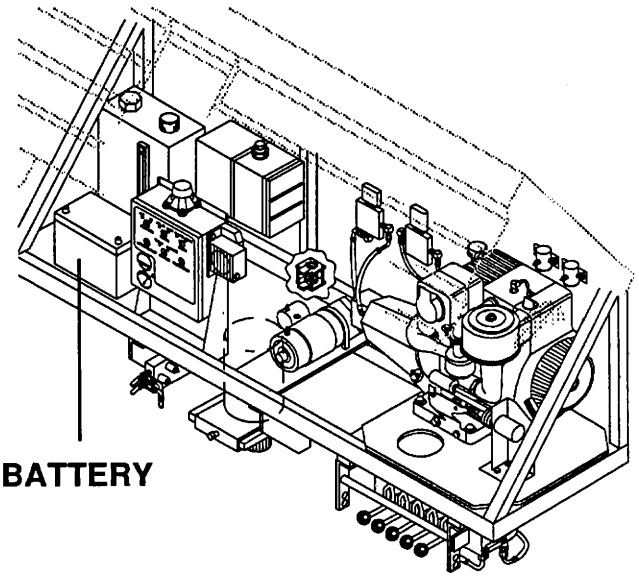
NOTE

Some transformer lead wires may be aluminum, and a solder intended for aluminum MUST be used.

ELECTRICAL CIRCUIT (FUEL POWERED UNITS)

12 VOLT BATTERY

One 12 volt battery supplies the electrical current required to operate the electrical circuit. The battery is located on the superstructure, near the engine and hydraulic fluid tank.



Battery Location.

Battery Replacement

To remove the battery, follow these procedures:

WARNING!!!

BEFORE REMOVING THE BATTERY FROM THE MACHINE, TURN OFF THE IGNITION SWITCH. THERE SHOULD BE NO POWER TO THE MACHINE.

Be sure all power to the machine is shut off. Disconnect the battery cables.

CAUTION

Always disconnect the negative battery cable first.

Loosen the bolt holding the battery hold down bracket, and remove the battery.

To install, place the battery in its proper location. Position the battery hold down bracket and tighten the bolt. Connect the battery cables.



Always connect the positive battery cable first.

Battery Maintenance

Check battery and surrounding area for signs of damage or corrosion.

Check battery terminals for:

- **Corrosion.** Regularly clean connections and apply a non-metallic grease or protective spray to retard corrosion.
- **Loose connections.** Be sure all cable connections are tight, and that good contact is made to terminals.
- **Broken or frayed cables.** Be sure all cable connections are good, and that no loose or broken wires are exposed. Replace as needed.

Check battery electrolyte level. Replenish the electrolyte, if necessary.



NEVER ADD ADDITIONAL ACID TO THE BATTERY.

Remove vent caps before filling and USE ONLY DISTILLED WATER. Fill all cells to the proper level. Do not overfill. Fill to level indicator (or 1/2 inch over the top of the separators if there is no level indicator). Do not allow the electrolyte level to drop below the top of the separators, since this will lead to shortened battery life.

Excessive water usage can indicate that the battery has been overcharged, has been subjected to excessively high temperatures, or is nearing the end of its service life.

Keep battery clean. Wash the top of the battery, making sure the vent caps are in place. Do not allow cleaning water or other foreign matter to enter the cells. Use a solution of bicarbonate of soda and water to wash battery if there is an accumulation of acid.

Battery Troubleshooting

Check battery terminals for corrosion, loose connections and broken or frayed cables.

Check all cells with a hydrometer for variation in specific gravity. A variation of 0.03 points or more between cells is cause for concern. Mark the low cells.

Recharge the battery as recommended by the manufacturer.

Recheck specific gravity of all cells after recharging. A fully charged battery should indicate between 1.25 and 1.28. A variation of more than 0.03 points between cells is an indication that the battery should be replaced.

EMERGENCY STOP BUTTON

An emergency stop button (on the platform control panel) act as a power "on/ off" switch. This switch must be "ON" to operate the machine. When the emergency stop button is depressed, all functions stop immediately.

When troubleshooting the electrical circuit; if there is a problem with the emergency stop button, check the wiring to the button. If the wiring is correct, replace the button.

FOOT PEDAL SWITCH

The foot pedal is a double pole, double throw switch which must be fully depressed before any machine function can be operated from the platform. When the foot pedal switch is released, power to the hydraulic pump is terminated, and all machine functions stop. The foot pedal switch is located on the floor of the platform.

When troubleshooting the electrical and hydraulic circuits to the platform, ensure that the foot pedal switch is depressed. Check the wiring to the foot pedal switch. If the wiring is correct, but there is a problem with the foot pedal circuit, replace the entire switch.

TILT ALARM

The tilt alarm gives an audible warning when the machine is five degrees or more out of level. The alarm can be tested by manually tipping the alarm sensor (see test procedure, below). If the tilt alarm does not function, check the horn, then check the output relay.

Check the wiring. If wiring is correct, replace the alarm.

TILT ALARM ADJUSTMENT

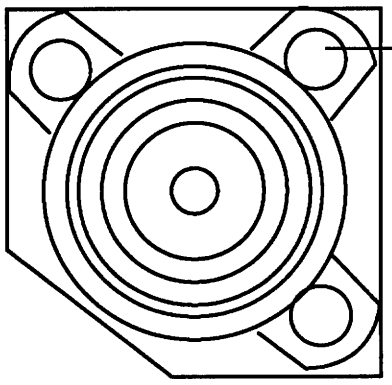
The tilt alarm can be adjusted. Before attempting to adjust the alarm, park the machine on a flat, level surface. Fill the tires to the proper pressure.

Level the base of the alarm by tightening each of the three flange nuts to take up approximately one half of its spring's travel. During the remainder of the adjustment procedure, DO NOT ADJUST THE NUT ON THE 90° CORNER.

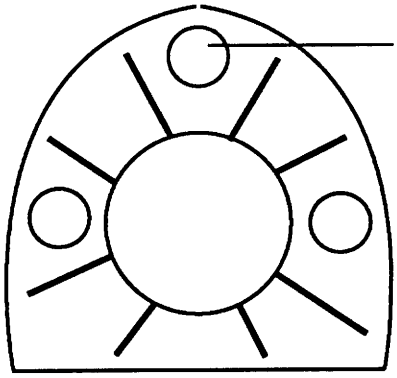
Check to be sure the electrical connections are correct. Slowly tighten the nut on one of the two corners ADJACENT to the 90° corner until the light-emitting diode (LED) just turns on, indicating that the circuit is closed. Note the position of the nut.

Loosen the nut (LED will go out), carefully counting the number and fraction of turns until the LED lights up again. Divide that number by two, and tighten the nut by this number of turns.

Adjust the nut on the OTHER corner adjacent to the 90° corner in the same manner. The alarm is now level, to the degree of accuracy determined by the nut adjustments and the surface on which the machine is sitting. Test the tilt alarm for proper function.



SUNDSTRAND ALARM



P/Q ALARM

Tilt Alarm 90° Corner.

TILT ALARM TEST

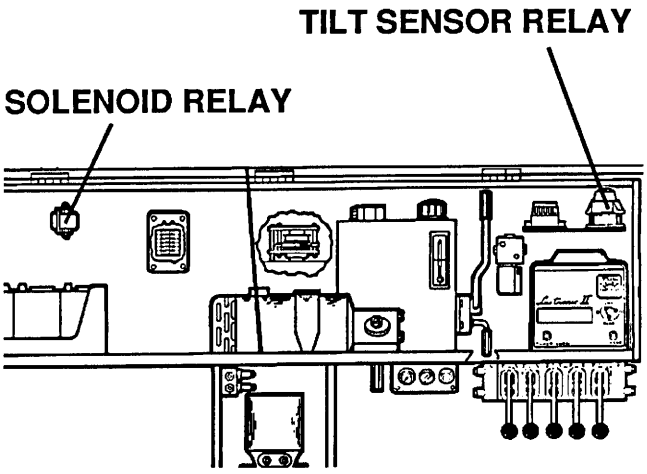
Individually push down on each of the three fastened corners of the tilt alarm. There should be enough travel to cause the alarm to sound as each corner is pressed. If not, the flange nuts have been tightened too far. Loosen the nut on the 90° corner, and repeat the adjustment procedure above. This "Push-to-Test" feature enables the tilt alarm to be tested without losing its adjustment.

RELAYS

ELECTRIC UNITS

There are two relays associated with machine functions (refer to Electrical Schematic at the back of this manual). They are:

1. Solenoid
2. Tilt Sensor

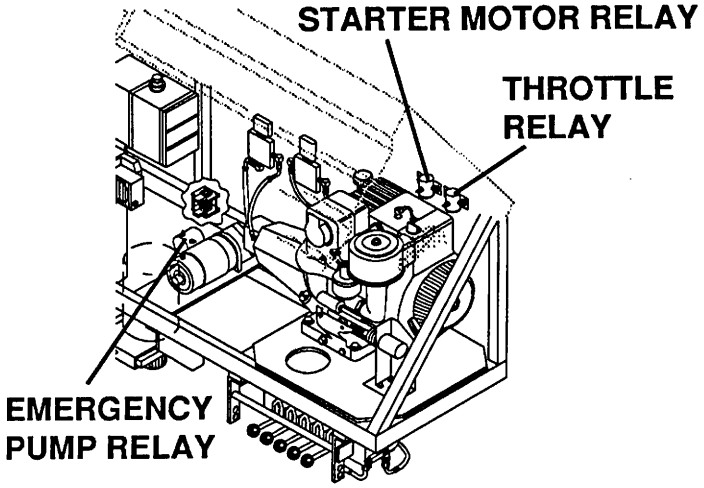


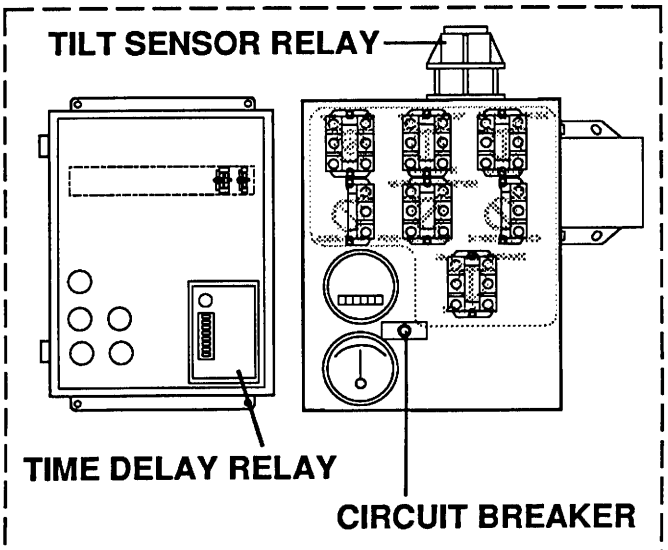
Relay Location (Electric Units).

FUEL POWERED UNITS

There are five relays associated with machine functions (refer to Electrical Schematic at the back of this manual). They are:

1. Emergency Pump
2. Time Delay
3. Starter Motor
4. Throttle
5. Tilt Sensor





Electrical Ground Control Box.

Relay and Circuit Breaker Location (Fuel Powered Units).

FUSE (ELECTRIC UNITS)

One 35 amp fuse is found on the machine.

Check for a blown fuse. Be sure to REPLACE A BLOWN FUSE WITH A FUSE OF THE CORRECT SIZE.

CIRCUIT BREAKER (FUEL POWERED UNITS)

There is one 20 amp circuit breaker mounted on the ground control box.

Check for a tripped breaker and reset by pushing in the button. If the breaker trips again, the cause of the high current draw must be corrected prior to further operation.

LIMIT SWITCH

There are a number of limit switches located on the boom post and the outriggers. These limit switches must be operational for the system functions to operate. Replace any faulty limit switches.

MECHANICAL COMPONENTS

The following information will assist you in servicing the major mechanical components of the RZB.

TRAILER

Steam clean the trailer, and inspect all welds and brackets. Check for any items interfering with mechanical movement.

SUPERSTRUCTURE

Steam clean the superstructure, and inspect all welds and brackets. Check for bent or damaged sheet metal which may be interfering with mechanical movement or damaging wires or hoses. Check for cylinder pivot pins that turn in their mountings, which can indicate sheared retaining pins.

BOOMS

Clean the booms if necessary, and inspect the boom structure, especially all welds and brackets. Check for cylinder pivot pins that turn in their mountings, which can indicate a missing or worn retaining ring.

PLATFORM

Steam clean the platform and inspect all welds and brackets. Check for any items interfering with mechanical movement or damaged hoses.

TIRES AND WHEELS

Pneumatic 7.00 x 15", 8 ply tires are standard for the RZB 40. Pneumatic 9.50 x 16.5", 10 ply tires are standard for the RZB 50 and 55. Check tires for correct pressure, and inspect for cuts, sidewall damage or abnormal wear. Any tire faults MUST BE CORRECTED before further machine operation.

WHEELS AND LUG NUTS

Check the security of the wheel lug nuts and examine the wheel rims for damage.

CHANGING TIRES

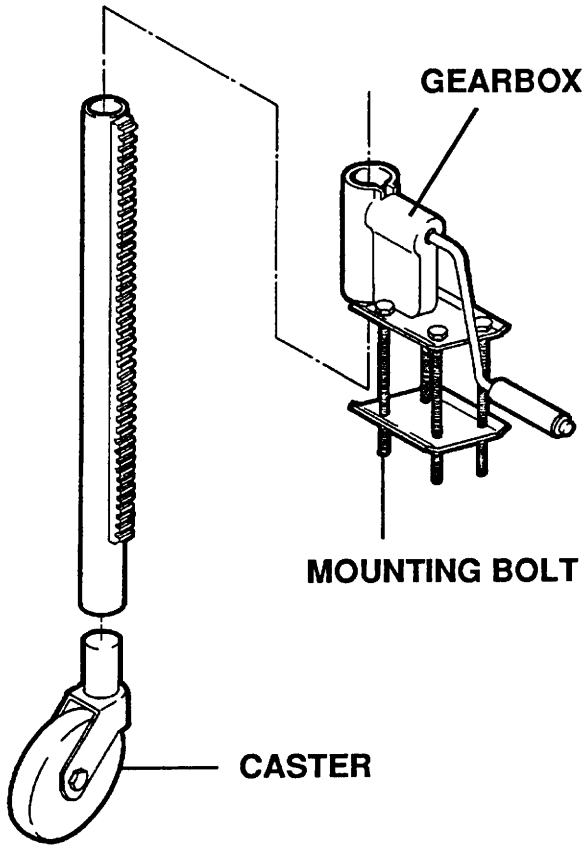
When a tire change is necessary, ALWAYS BLOCK THE WHEELS before you raise the trailer. Loosen and remove lug nuts, and pull off the wheel. Replace the tire, and reinstall. Fasten lug nuts, and tighten to proper torque. Lower the trailer and remove the blocks.

TRAILER JACKS

Check that all mounting bolts are secure.

Check that the gearbox is operating properly. Replace gearbox if necessary.

Check caster for wear and replace if necessary.



Trailer Jack Components.

OUTRIGGERS

Remove outrigger beams and inspect for cracks.

Check welds on outrigger jacks.

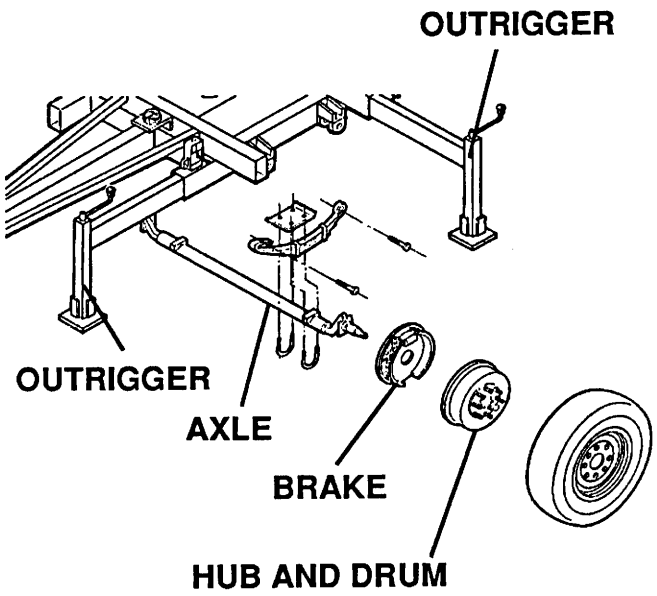
Check that the outrigger jacks are operating properly.

Check that the locking pin operates freely and the microswitch centers itself in the locking pin groove.

Check the limit switch interlock system. All four limit switches must be operating for the unit functions to operate.

! DANGER !

DO NOT DISABLE LIMIT SWITCHES.



Outrigger and Axle Assembly Locations.

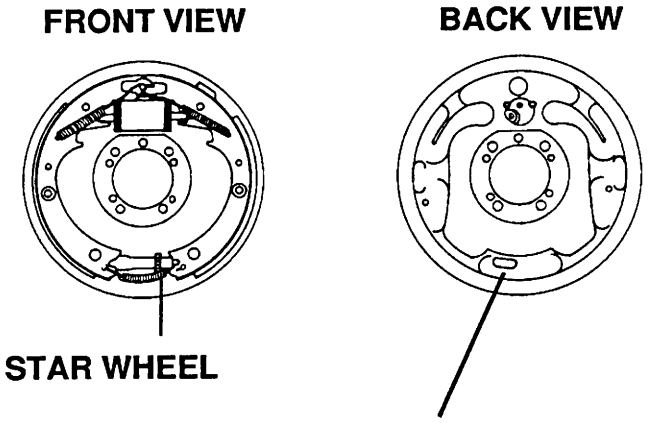
AXLE ASSEMBLY

Check all nuts and bolts for proper torque and tighten if necessary.

HUB AND DRUM

Inspect and repack the bearings with SAE wheel bearing grease at 20,000 miles or annually.

Replace the oil seal anytime it is removed from the hub or if it is damaged. Replace the seal and wear sleeve of hub and drum every 100,000 miles or if an oil leak develops through the seal.

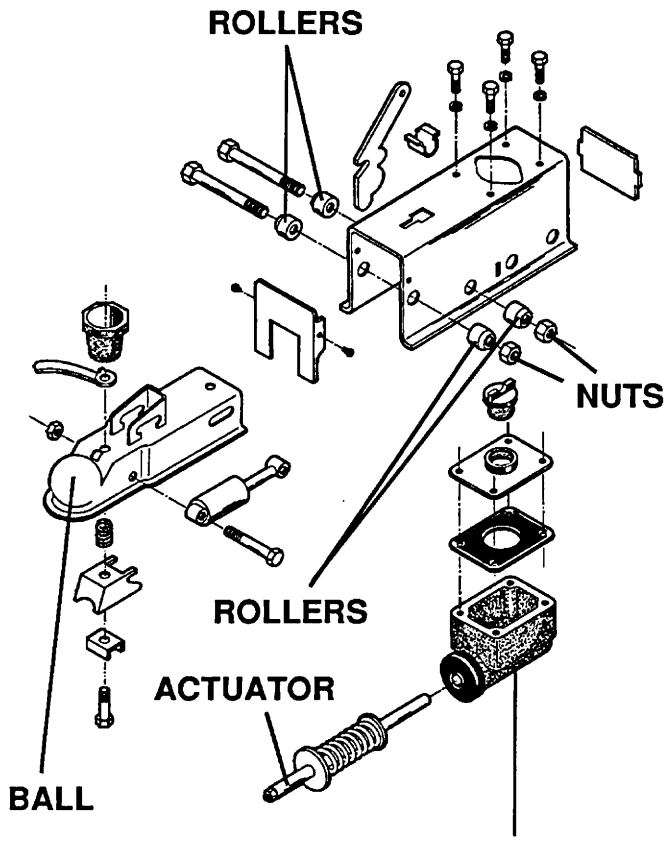


Brake adjustment (Left Hand Shown).

BRAKES

Check brake adjustment annually and adjust if necessary. To adjust the brake, the wheel must be off the ground. Spin the wheel without applying the brakes. When properly adjusted, the wheel should only make between a half and a full revolution when spun. To adjust, turn the star wheel inside the brake adjustment hole (on the back face of the brake plate). Turn the star wheel with a standard brake adjustment tool or a screwdriver; upward to tighten the brake, and downward to loosen the brake. Once the brake has been adjusted, test for proper operation by applying the brake and trying to spin the wheel. It should not turn.

Replace the brake lining when worn to 0.060 inch.



Trailer Coupling Components.

TRAILER COUPLING

Check actuator for bent parts and wear. Check mounting bolts for tightness. Check brake fluid reservoir (must be half full). Refill if necessary with DOT 3 brake fluid.

A film of clean grease on the ball will extend coupler and ball life while eliminating squeaking.

After prolonged use or storage, lubricate the rollers with motor oil.

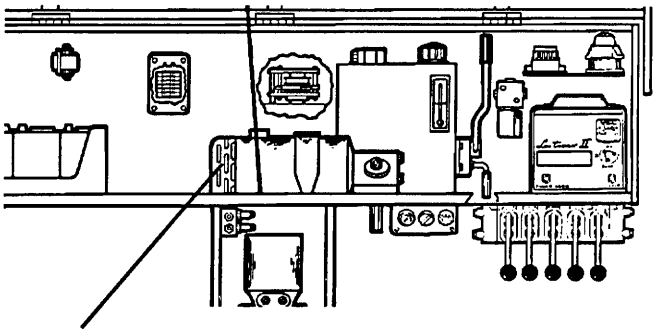
Check that the self-locking nuts on the roller bolts are not overtightened. Correct adjustment is half a turn back from zero side play.

If actuator travels more than one inch, adjust the brakes.

HOSES AND CABLES

Inspect all hoses and electrical cables for security and damage. Check for leaks at fittings. ANY DAMAGED HOSES OR CABLES SHOULD BE REPLACED.

Cables and hoses should be examined for rubbing and chafing.



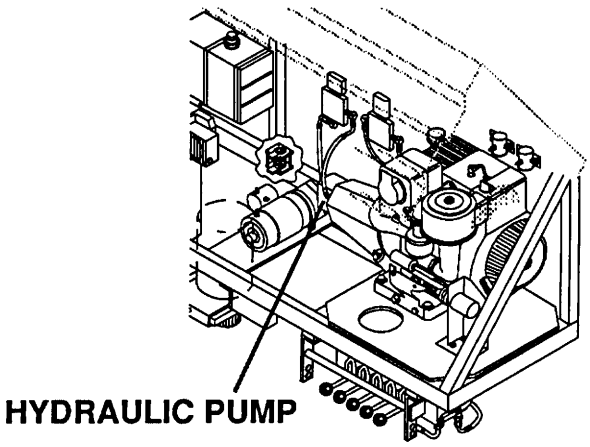
Pump/ Motor Assembly Location.

PUMP/ MOTOR ASSEMBLY (ELECTRIC UNITS)

Operate the motor, and check all securing bolts for tightness. Check cables and hoses for security and leaks.

HYDRAULIC PUMP (FUEL POWERED UNITS)

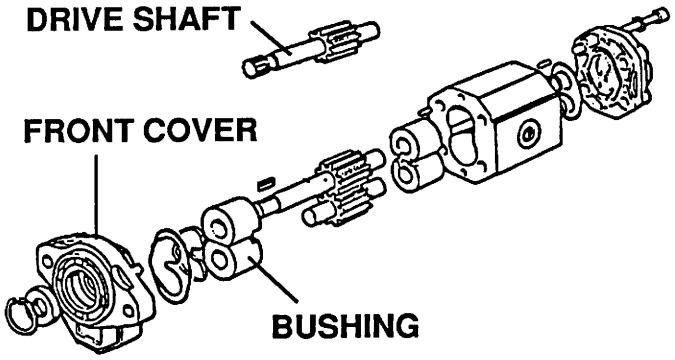
Check all securing bolts for tightness. Check hoses for any leaks.



Hydraulic Pump Location.

HYDRAULIC PUMP DRIVE SHAFT REPLACEMENT

- Remove the front cover.
- Remove the front bushings from the front cover.
- Remove both gears.
- Remove old drive shaft.
- Install new drive shaft.
- Install both gears in the original position.
- Install front bushings in the original position.
- Install front cover.



Hydraulic Pump Components.

ENGINE (FUEL POWERED UNITS)

The 8 HP engine provides the energy to operate the hydraulic pump which supplies the hydraulic fluid flow for system functions.

Refer to the engine manual for any service information.

MISCELLANEOUS EQUIPMENT

Check all miscellaneous equipment mounted on the machine for secure attachment. Check for evidence of oil or hydraulic fluid leakage. Check all cables and hoses for security and damage.

CYLINDER PIVOT PINS AND PIN BUSHINGS

Check all cylinder pivot pins and pin bushings for wear. Elevate the booms and check each pin individually for rotation or movement. If pins rotate, check for a missing retaining ring. If wear is detected, the pin or bushing must be replaced.

PIN REPLACEMENT

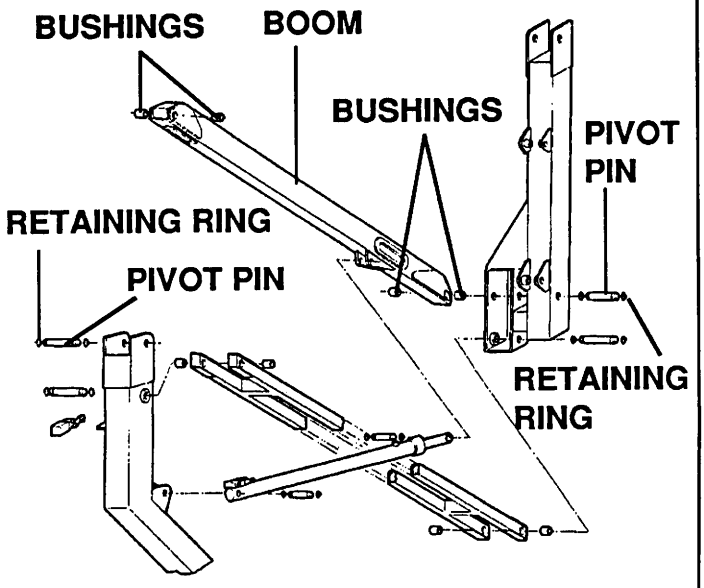
BOOM PIVOT PIN REPLACEMENT



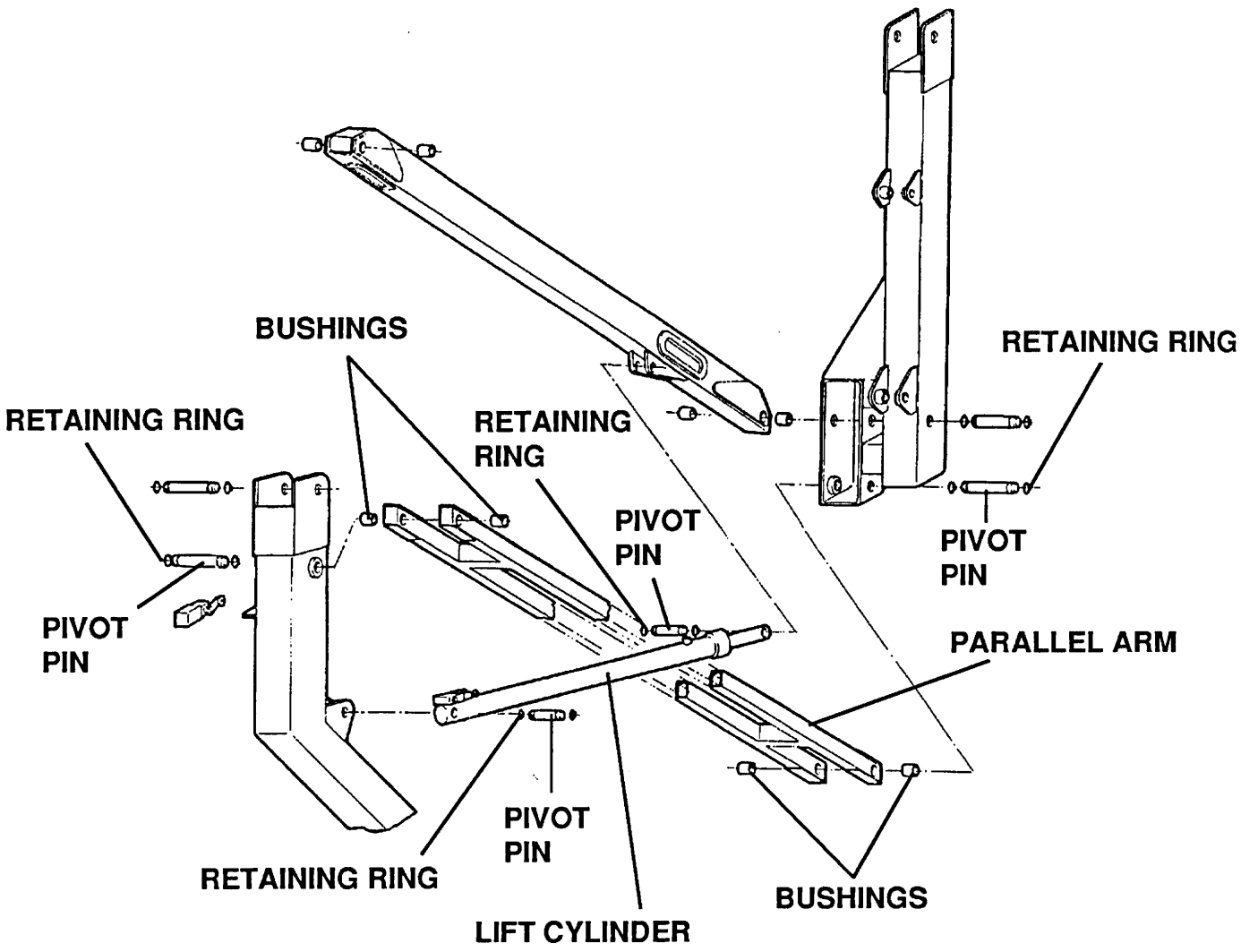
It is IMPORTANT TO MAINTAIN CORRECT ALIGNMENT between the boom and side plates during this operation. Any relative movement will make fitting of the pins more difficult.

Support the boom and upper structure securely (on a boom stand or similar rigid platform). Remove the pin retaining ring, and drive out the pivot pin, taking care not to damage the inner bore.

Check bushing and replace if necessary. Install new pin and retaining ring. Apply grease to pin.



Boom Pivot Pin Replacement.



Parallel Arm Pivot Pin and Lift Cylinder Pivot Pin Replacement.

PARALLEL ARM PIVOT PIN REPLACEMENT

SUPPORT THE BOOM SECURELY. Remove the pin retaining ring, and drive out the pivot pin.

CAUTION

Upon removal of the pin, the parallel arm WILL DROP if not held. The arm is relatively light, and can be held manually in position while the new pin is installed.

Check bushing and replace if necessary. Install new pin and retaining ring. Apply grease to pin.

LIFT CYLINDER PIVOT PIN REPLACEMENT

SUPPORT THE BOOM. Operate the proper boom lift control to release hydraulic pressure and remove any load on the lift cylinder. Remove the pin retaining ring, SUPPORT THE LIFT CYLINDER and remove the pin.

Check bushing and replace if necessary. Install new pin and retaining ring. Apply grease to pin.

PLATFORM LEVEL CYLINDER PIVOT PIN REPLACEMENT

SUPPORT THE PLATFORM to remove the load on both master and slave leveling cylinders. Remove the pin retaining ring, and remove the pin.

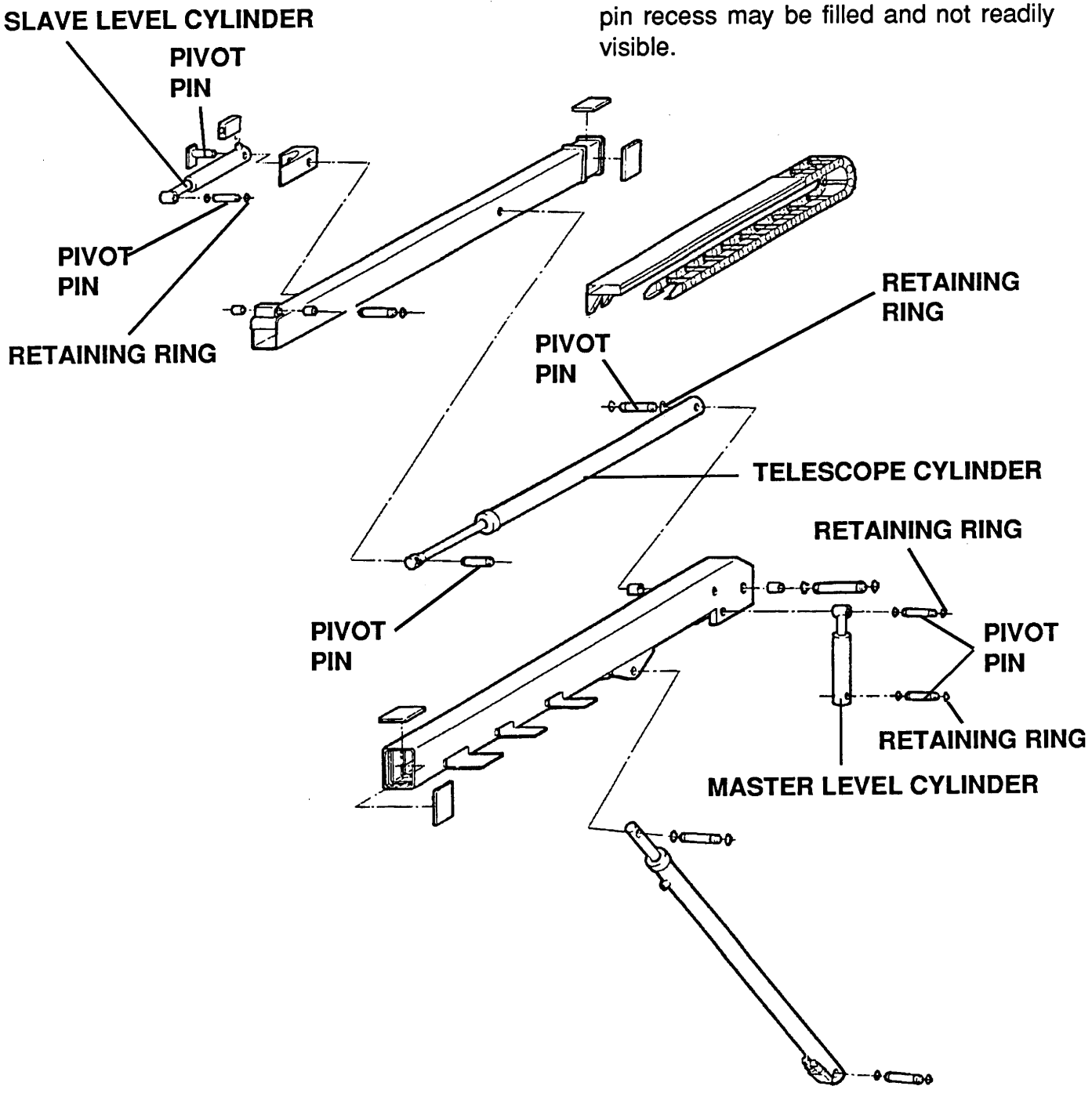
Check bushing and replace if necessary. Install new pin and retaining ring. Apply grease to pin.

TELESCOPE (EXTEND) BOOM CYLINDER PIVOT PIN REPLACEMENT

Remove the pin retaining ring, SUPPORT THE CYLINDER and remove the pin. When changing the rod end pivot pin, it may be necessary to extend the boom out to expose the pin.

NOTE

If the extend boom has been greased, the pin recess may be filled and not readily visible.



Platform Level Cylinder Pivot Pin and Telescope Boom Cylinder Pivot Pin Replacement.

BOOM LIFT CYLINDERS

The boom lift cylinders are of the double acting type. During operation, the cylinders should not leak, but a slight dampness at the rod seal is acceptable. The pivot pins should be checked for wear. Check the pin retaining ring for tightness. The cylinder and holding valve should be inspected for fluid leakage, damage and security.

LIFT CYLINDER SEAL REPLACEMENT (ON MACHINE)

SUPPORT THE BOOM. Operate the proper boom lift control to release hydraulic pressure and remove any load in the lift cylinder circuit. Clean the end of the cylinder, and loosen the cylinder end cap by several turns.

Remove the rod end pivot pin, and support the cylinder barrel. Loosen the end cap completely, and withdraw it carefully over the piston rod. TAKE CARE NOT TO DAMAGE THE ROD SURFACE, AND GUARD AGAINST DIRT ENTERING THE SYSTEM.

Replace the seals in the end cap, and reassemble the lift cylinder, again AVOIDING DIRT AND ROD DAMAGE.

BENCH REPLACEMENT OF LIFT CYLINDER SEALS

The lift cylinder can also be removed from the machine for seal replacement.

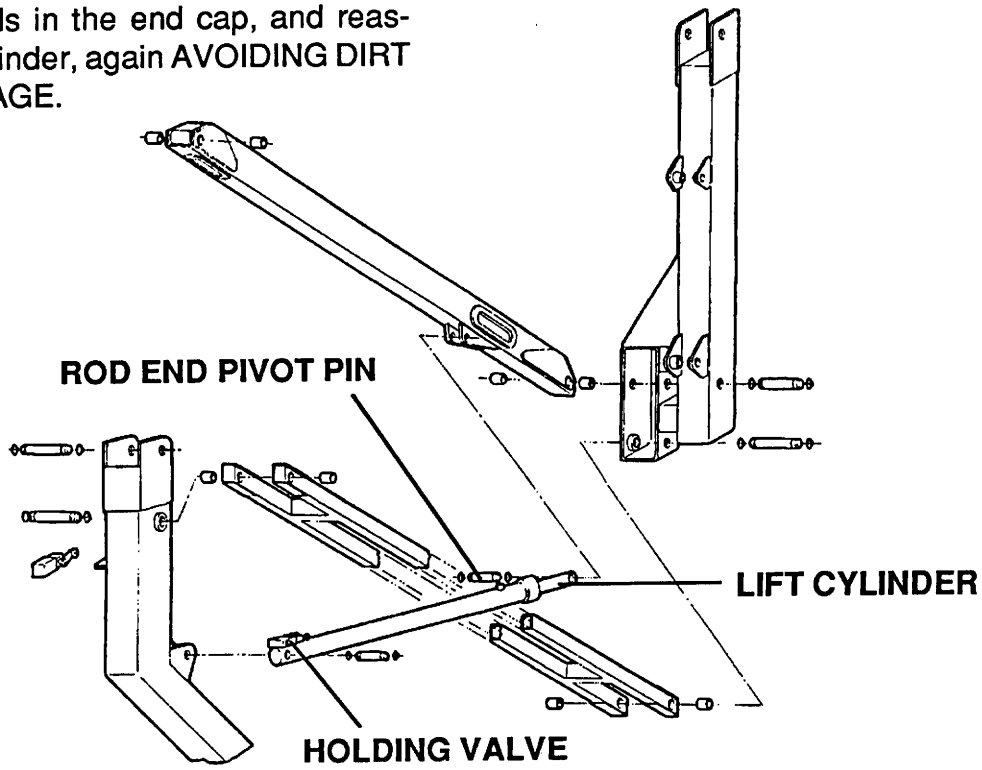
Extend the cylinder, and examine the protruding rod for score marks and damage. Clean the holding valve, and examine for signs of leakage. BLEED THE SYSTEM after reinstalling the cylinder.

CHECKING HOLDING VALVES

Stop the motor or engine, and activate the appropriate control lever several times to dissipate residual pressure. If the cylinder subsequently begins to move, the valve is faulty and the cartridge should be replaced.

NOTE

The holding valve is pre-set at the factory.



Lift Cylinder and Holding Valve.

BOOM TELESCOPE (EXTEND) CYLINDER

The boom telescope (extend) cylinder is a double acting cylinder. It must be removed from the machine before a thorough inspection can be carried out.

TELESCOPE CYLINDER REMOVAL

Elevate the upper boom to the horizontal position. Extend the boom just enough to expose the upper cylinder pivot pin on the inner boom. Disconnect the hydraulic hoses from the cylinder. Remove the pivot pins from the inner and outer boom, and withdraw the cylinder from the boom.

CAUTION

With the telescope cylinder disconnected, CARE MUST BE TAKEN TO PREVENT THE INNER BOOM FROM SLIDING OUT OF THE OUTER BOOM. Wedges placed between boom sections will secure the outer boom.

TELESCOPE CYLINDER SEAL REPLACEMENT

Remove the end cap from the cylinder. Pull the cap and rod straight out of the cylinder barrel. Remove the split pin and nut from the end of the rod. Slip off the collar. Examine the rod and seals for signs of damage or wear.

Remove the old seals, and install a new set.

TELESCOPE CYLINDER INSTALLATION

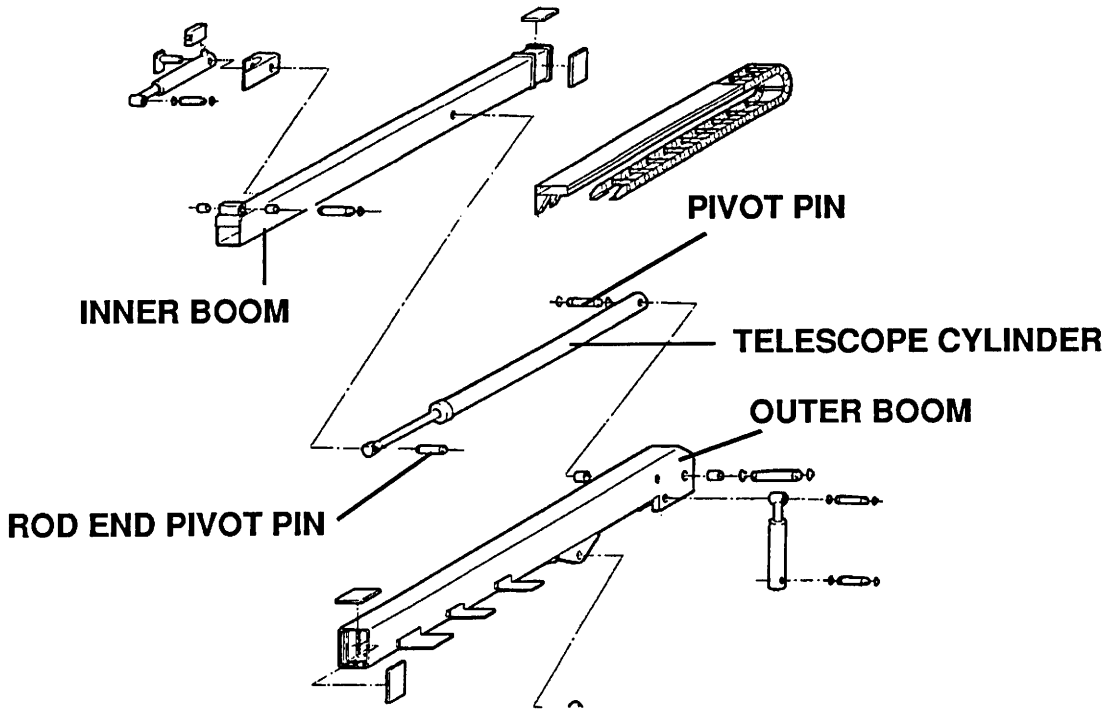
WITH THE UPPER BOOM IN THE HORIZONTAL POSITION, slide the telescope cylinder into the boom. Install the pivot pins and hoses.

CHECKING HOLDING VALVES

Stop the motor or engine, and activate the appropriate control lever several times to dissipate residual pressure. If the cylinder subsequently begins to move, the valve is faulty and the cartridge should be replaced.

NOTE

The holding valve is pre-set at the factory.



Telescope Cylinder Removal and Telescope Cylinder Seal Replacement.

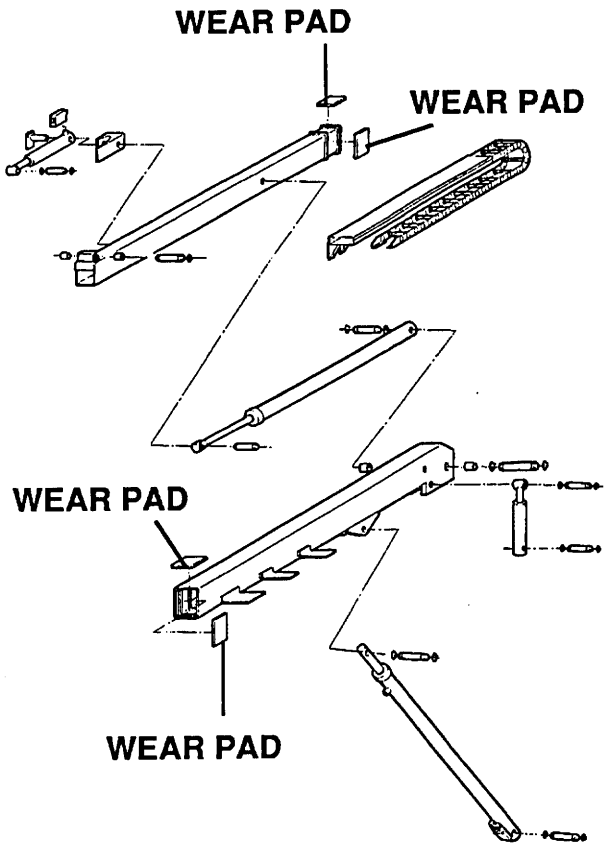
WEAR PADS

The wear pads should be checked for wear approximately every six months. Fully retract the telescope boom, and check the gap between the top wear pad and the outer boom section, at the front (lower) end of the boom. Inspect the side and bottom pads as well.

Then, extend the boom out, and check the gap between the bottom wear pad and the inner boom section, at the rear (upper) end of the outer boom section. Inspect the side and top pads as well.

CAUTION

If either gap is more than 0.020 inches, the pads should be replaced. Generally, only the bottom pad at the upper end of base boom, and the top pad at the lower end of the tip boom will show wear.



Wear Pad Locations.

STEEL WEAR PADS (IF SO EQUIPPED)

Rear (Upper End) Base Boom Pad Replacement

Support the boom to remove the load from the pad. Grind out the weld to the bottom pad and remove the pad (the boom may need to be extended out a short distance). Install the new pad by hammering gently into place, weld and repaint. Repeat this procedure for the side and top pads if required.

CAUTION

To much heat could warp the boom.

Front (Lower End) Tip Boom Wear Pad Replacement

Remove the front telescope cylinder pin and platform leveling brackets bolted to the rear of the tip boom Retract the tip boom until the pads are accessible. Grind out the weld to the pad and remove the pad. Install the new pad by hammering gently into place, weld and repaint. Repeat this procedure for the other pads if required.

NYLON WEAR PADS (IF SO EQUIPPED)

Rear (Upper End) Base Boom Wear Pad Replacement

Support the boom to remove the load from the pad. Ground out welds on support blocks and press out pads. Install replacement pad. Replace support block and weld into position. Repeat this procedure for the side and top pads if required.

Front (Lower End) Tip Boom Wear Pad Replacement

With the booms in stored position, extend the upper boom until the platform rests on the ground. Remove the platform pivot pin and the platform leveling slave cylinder upper pin.

Remove the three bolts holding the upper end of the moving anchor to the tip boom section, and set it down. Be careful not to damage the hose track or hoses.

Retract the tip boom until the upper (rear) telescope cylinder pivot pin approaches the base boom section. Remove the pin and the rear wear pads, then raise the upper boom to clear the platform. Carefully slide the tip boom out of the base boom section, supporting the boom as it is removed. The front pads are retained by steel support blocks. Replace the front pads, trimming as necessary for proper fit.

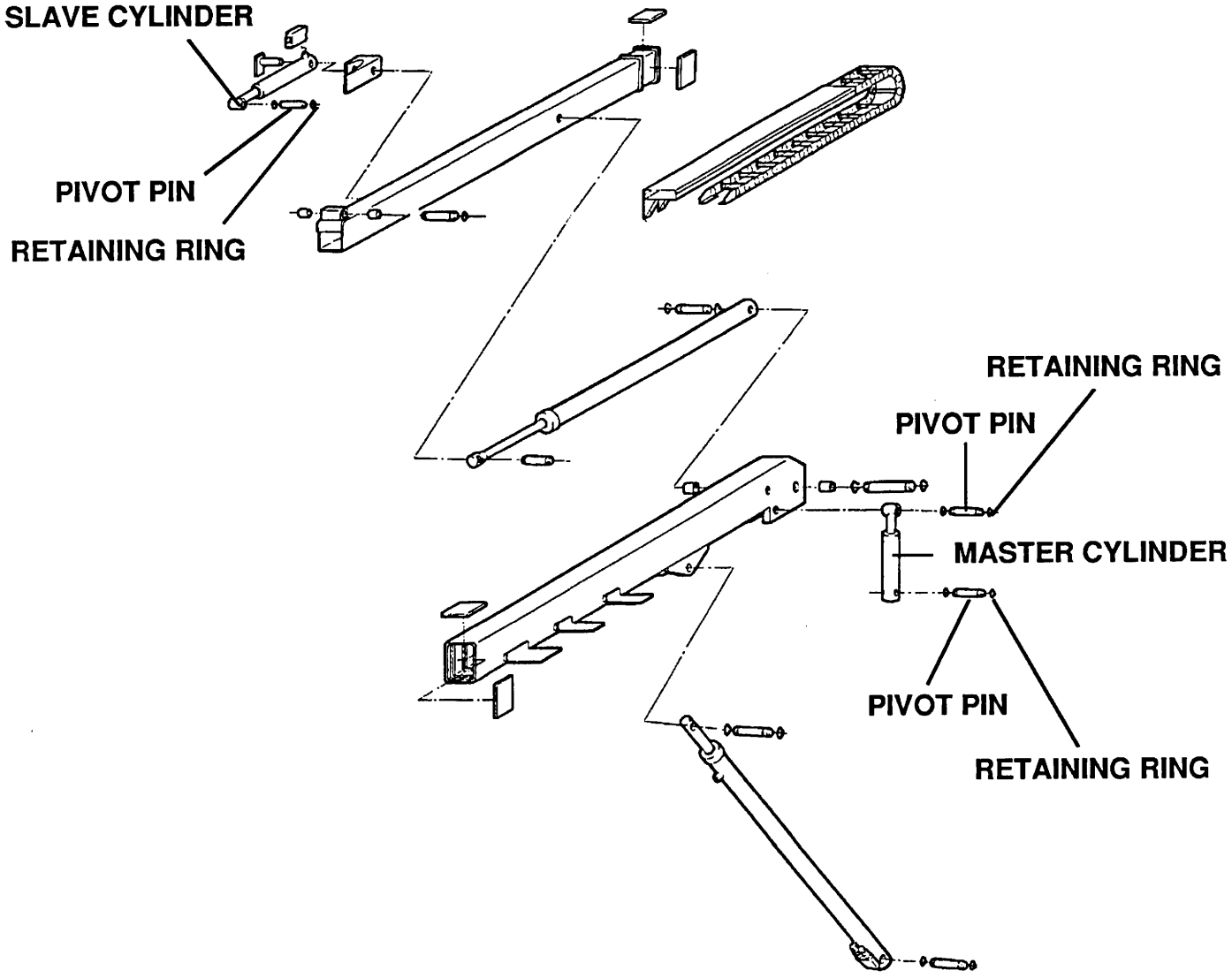
Reassemble the boom, making sure the pads are aligned properly as the tip boom section is inserted into the base boom.

PLATFORM LEVEL CYLINDERS

The platform level cylinders are of the double acting type. The pivot pins should be checked for wear. Check the pivot pin retaining rings for tightness. The cylinders should be inspected for fluid leakage, damage and security. The seals should be replaced whenever the cylinder is serviced.

LEVEL CYLINDER SEAL REPLACEMENT

Lower the upper boom. SUPPORT THE PLATFORM to remove the load on both master and slave leveling cylinders. Remove the pin retaining rings and remove the pin.



Master and Slave Leveling Cylinders.

Clean the end of the cylinder, and pull the cap and rod straight out of the cylinder barrel. TAKE CARE NOT TO DAMAGE THE ROD SURFACE, AND GUARD AGAINST DIRT ENTERING THE SYSTEM. Remove the split pin and nut from the end of the rod. Slip off the collar. Examine the rod and seals for signs of damage or wear.

Remove the old seals, and install a new seal kit.

CHECKING HOLDING VALVES

Stop the motor or engine, and activate the appropriate control lever several times to dissipate residual pressure. If the cylinder subsequently begins to move, the valve is faulty and the cartridge should be replaced.

NOTE

The holding valve is pre-set at the factory.

PLATFORM LEVELING PROCEDURE

After a platform level cylinder has been repaired or replaced, or if the platform does not remain level with the raising and lowering of the boom, the Platform Leveling Circuit may need to be bled.

NOTE

Assistance is required in order to perform the bleeding procedure. One person is needed to operate the platform level control while the second person bleeds the system.

WARNING!!!

CARE MUST BE TAKEN WHEN OPERATING LEVEL CONTROL. AIR IN CYLINDERS CAN CAUSE UNCONTROLLED PLATFORM MOTION.

With all booms retracted, check the hydraulic fluid level in the tank. Slightly loosen the bleed nipple at the base of the leveling cylinder.

WARNING!!!

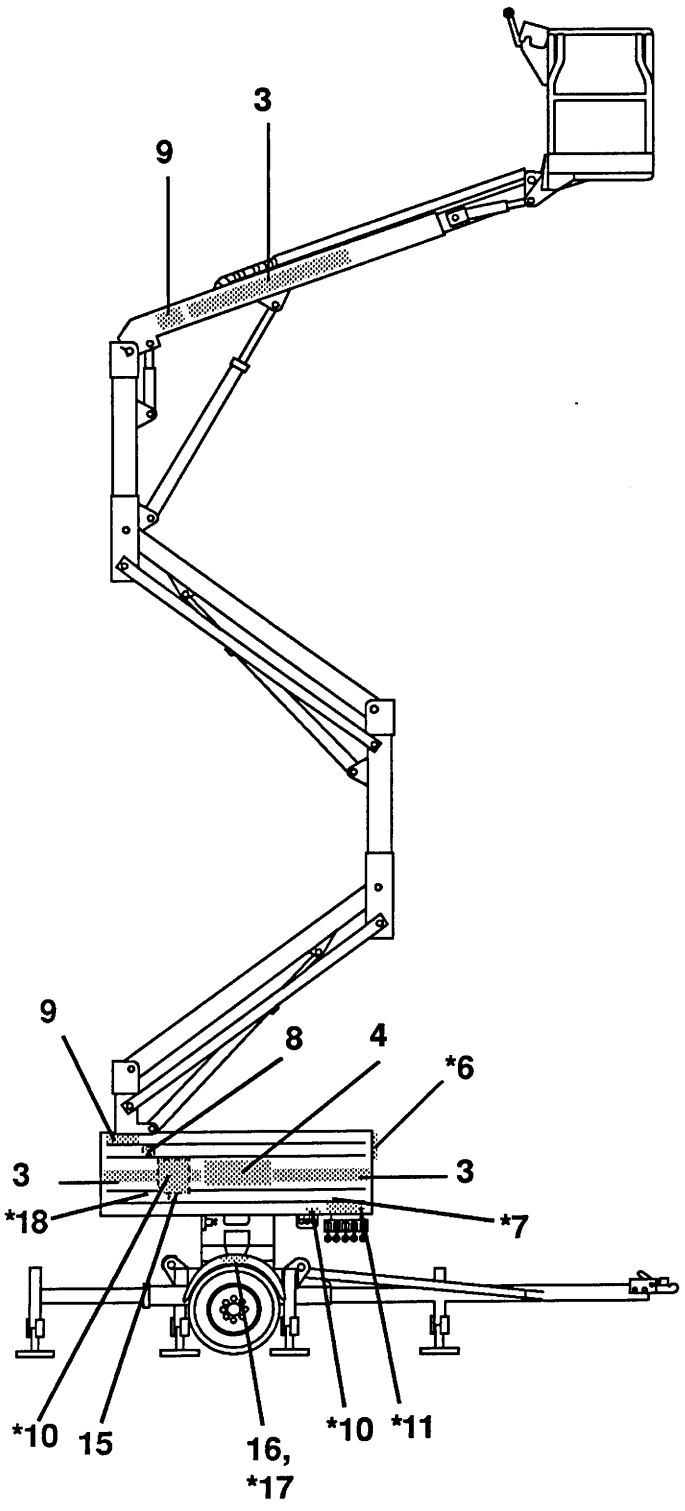
HYDRAULIC FLUID WILL BE FORCIBLY EJECTED FROM THE BLEED NIPPLE. LOOSEN NIPPLE SLOWLY.

With the platform near ground, operate the platform level control to move the platform fully backward and forward, repeating as necessary in order to expel any air from the system. Tighten the bleed nipple, and top off the hydraulic tank. Repeat the procedure as required until all air is expelled.

After bleeding the leveling circuit, raise upper boom to full elevation and then fully lower boom. Check platform leveling operation.

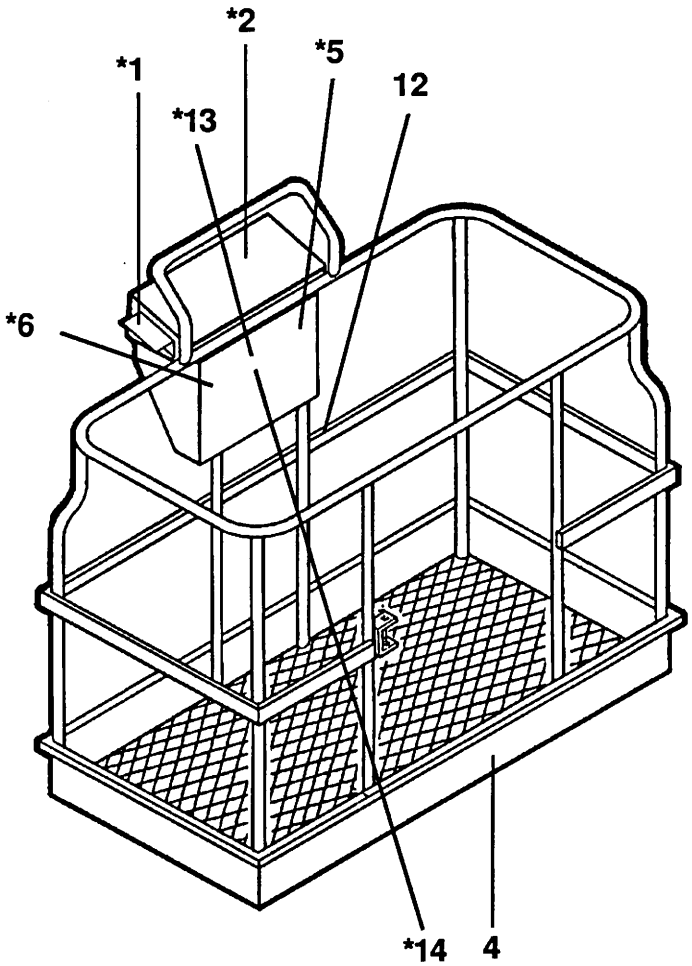
SAFETY AND INSTRUCTIONAL LABELS

Insure that all safety and instruction labels are in place and legible. Refer to Parts Catalog for proper part number when ordering.



Index for decal location.
NOTE: asterisk indicates safety-related item.

* 1 - Platform Control Panel Decal
* 2 - Platform Control Lever Decal
3 - Stripe
4 - "Simon" Decal
* 5 - "Beware, Potential Hazard" Decal
* 6 - "Danger, Electrocution Hazard" Decal
* 7 - "400 LBS Payload Capacity" Decal
8 - "Caution For Hydraulic Fluid Use Decal
9 - Model Designation
*10 - Ground Electrical Box Decal
*11 - Ground Control Operating Instructions
12 - "120 VAC" Decal
*13 - Platform Operating Instructions
*14 - "Danger, Improper Use" Decal
15 - "20 Amp Circuit Breaker" Decal
16 - "Tire Pressure" Decal
*17 - "Danger, Outriggers Fully Extended" Decal
*18 - "Attention: Stater Interlock" Decal



TROUBLESHOOTING

Before investigating a malfunction, check the following items:

- The main power switch should be in the "ON" position.
- Be sure that the fuel tank is not empty and that engine is operating properly (Fuel Powered Units).
- The "Emergency Stop" buttons on the platform control panel should be released (turn clockwise to reset).
- The ground/ platform selector switch on the ground control panel should be at the correct setting.
- When attempting to operate any function (other than starting the engine) from the ground control panel, the "Power Control" push button (Electric Units) or "Power Switch" (Fuel Powered Units) must be activated.
- When attempting to operate any function (other than starting the engine) from the platform, the foot pedal on the platform floor must be depressed.
- Check that battery connections are secure, and batteries have sufficient charge.
- Hydraulic fluid should be at the correct level.
- Check for a blown fuse (Electric Units).
- Check that the 20 amp circuit breaker is not tripped (Fuel Powered Units).

Problem: Pump motor will not operate (Electric Units).

Operate pump and check voltage at batteries.

Check voltage at pump.

Examine electrical circuit for loose connections.

Check the solenoid relay for proper operation.

Inspect pump motor brushes.

Check pump for mechanical defect

Problem: Pump will not operate properly (Fuel Powered Units).

Examine pump for mechanical defect.

Check relief valve pressure.

Problem: Pump motor or engine operates, but pump does not generate hydraulic pressure.

Check for hydraulic fluid leaks.

Examine pump assembly for mechanical defect.

Check pressure relief valve for correct pressure setting.

Check hydraulic return filter on hydraulic reservoir.

Problem: Pump function operation is slow.

Check that the safe working load has not been exceeded.

Check pressure relief valve for correct pressure setting.

Verify that the correct grade of hydraulic fluid is being used.

Check for sufficient battery output (Electric Units).

Check electrical circuit for bad or loose connections.

Ensure engine is operating at correct speed (Fuel Powered Units).

Check pins and bushings for grease and proper fit.

Problem: Booms will not raise or lower.

Check that outriggers are in the locked position.

Check that Ground/ Platform selector switch is in correct position.

Check ground power control and platform foot pedal for proper operation.

Check for mechanical restrictions.

Check pressure relief valve for correct pressure setting.

Check for sufficient battery output (Electric Units).

Ensure engine is operating at correct speed (Fuel Powered Units).

Check for hydraulic fluid leaks.

Check holding valves for sticking or damage.

Problem: Telescope boom does not operate.

Check that outriggers are in the locked position.

Check that Ground/ Platform selector switch is in correct position.

Check ground power control and platform foot pedal for proper operation.

Check pressure relief valve for correct pressure setting.

Check for sufficient battery output (Electric Units).

Ensure engine is operating at correct speed (Fuel Powered Units).

Inspect boom assembly for damage, or for obstruction between the inner and outer boom sections.

Check boom sliding surfaces for proper lubrication. Lubricate as necessary with SAE 90 grease.

Check for hydraulic fluid leaks.

Check holding valves for sticking or damage.

Problem: Swing function does not operate.

Check that outriggers are in the locked position.

Check that lower boom is raised enough to clear the trailer (RZB 50 and 55).

Check that Ground/ Platform selector switch is in correct position.

Check ground power control and platform foot pedal for proper operation.

Check for obstruction at the swing gearbox or swing bearing gear surfaces.

Inspect hydraulic swing motor for proper operation.

Problem: "EMERGENCY STOP" function does not work.

Check that the "Emergency Stop" button is operating correctly.

Check foot pedal switch for correct operation.

Problem: Battery charger does not operate (Electric Units).

See troubleshooting section under "Battery Charger".

MAINTENANCE SCHEDULE

The Simon RZB is designed to require a minimum amount of maintenance. However, it is essential that the specified services be performed at the indicated intervals, and that the instructions contained in this manual are followed to ensure safety and reliability.

The hydraulic pump, electric motor, cylinders and pressure valves are self-lubricating.

Consult the accompanying engine manual for service and maintenance instructions specific to the engine supplied with each machine.

NOTE

As with any new machine, minor fluid leaks may occur until the various hydraulic components and pipe fittings are fully seated. It is particularly important that, for the first three months of operation, all hydraulic components, hoses and pipe fittings be checked regularly for leaks and tightness, and corrective action taken as required. Correction of minor fluid leaks and general tightening of machine components during this initial period are not considered as reimbursible expenses under the Simon Limited Warranty.

Pivot Pins and Bearings

All pivot pins are treated with a high oil absorption, corrosion resistant coating.

All pivot pin bearings use special steel backed bushings.

In tropical climates or other adverse conditions, pins and bearings may require more frequent lubrication.

General Maintenance Tips

Never leave components or hoses open. They must be protected from contamination (including rain) at all times.

Never open a hydraulic system when there are contaminants in the air.

Use only recommended lubricants. Improper lubricants or incompatible lubricants may be as harmful as no lubrication.

ALWAYS clean the surrounding area before attempting to open hydraulic or engine systems.

Watch for makeshift "fixes", which can jeapordize safety as well as lead to more costly repairs.

Any work platform found not to be in safe operating condition should be removed from service until repaired. All repairs should be made by authorized personnel in conformance with the manufacturer's operating, maintenance, and repair manuals.

ROUTINE SERVICING

NOTE

The following recommendations are based on the advice of suppliers, and the requirements of various safety regulations. They should be followed with discretion based on factors such as amount and type of machine usage, environmental conditions, and local safety regulations.

DAILY SERVICE

Hydraulic System

Before checking the hydraulic fluid level, ensure that the machine booms are stowed in the traveling position, and the machine is standing on level ground. Fluid level must be to full mark on sight gauge, located on the side of the tank. If the reservoir requires additional fluid, refer to the Lubrication Chart for the correct grade.

After checking the fluid level, ensure that the filler cap is secure to prevent entry of water or other impurities into the tank.

Pressurize the hydraulic circuit and inspect the system for any signs of fluid leakage, particularly at flexible hoses, connections and hydraulic components.

Check system operating pressure. Energize the unit and, with boom in the stowed position, operate the lower boom control lever. Check the pressure.

Check emergency pump pressure (Fuel Powered Units). Turn the engine off, then activate the emergency pump button. Check the pressure while operating the lower boom control lever.

Machine Structure

Inspect entire machine for damage and condition of welds.

Tire Condition

Check that the machine tires are in good condition. Check tire pressure.

Platform Safety Gate

Check the security of the platform safety gate and latching mechanism.

Batteries (Electric Units)

Check battery terminals for corrosion and security.

Check the electrolyte level in battery cells. Replenish with distilled water, if necessary.

Hose Track

Check hose track to verify it is not bent or sagging.

Pivot Pins

Examine all pivot pins on booms, cylinders and leveling system to ensure that they are positively secured in position.

Test All Machine Systems

Test the operation of the swing bearing and motor.

Test the operation of all machine boom functions.

Engine (Fuel Powered Units)

Check engine oil and fuel level. Check the engine manual provided with the machine for daily service requirements.

WEEKLY SERVICE

Control Valves

Platform and ground control valves must be checked for correct operation. Check that all control valve handles automatically return to the center (neutral) position.

Battery (Fuel Powered Units)

Check the electrolyte level in battery cells. Replenish with distilled water, if necessary.

Engine (Fuel Powered Units)

Check the engine manual provided with the machine for weekly service requirements.

MONTHLY SERVICE

Hydraulic System

Check fluid color. If the hydraulic fluid does not flow clear amber, but has a cloudy appearance, it is usually an indication that water is present. A dark brown color, accompanied by a strong "burnt" smell, indicates that the fluid has overheated. If either condition occurs, a complete hydraulic fluid and filter change will be necessary.

The cause of hydraulic fluid deterioration should be investigated and rectified. Have fluid analyzed by a qualified laboratory.

Check for hydraulic system leaks.

Wheel Lug Nuts

Check the wheel lug nuts for proper torque.

Chassis Bolts

Check all bolts for signs of looseness.

Swing Bearing

Remove any dirt from between the swing bearing gear teeth, and lubricate.

NOTE

If solvents or a high-pressure washer are used for cleaning the machine, re-lubricate the swing bearing teeth (see Lubrication Chart).

Grease the swing bearing while rotating the superstructure as necessary to insure proper lubrication.

Lubrication

Lubricate all small pivots (but not the main pin pivots) throughout the machine with any good quality medium grade oil. Special attention should be given to the platform control lever pivots.

Trailer Jack

Lubricate the trailer jack.

Pivot Pins

Examine all pivot pins on booms, cylinders and leveling system to ensure that they are positively secured in position.

Engine (Fuel Powered Units)

Check the engine manual provided with the machine for monthly service requirements.

SEMI-ANNUAL SERVICE

Hydraulic System

Have hydraulic fluid sample analyzed at a test laboratory.

Change return line filter element.

Electrical System

Check electrical mounting and hardware for loose connections. Check for worn or broken wires.

Clean and lubricate all push button switches with an electrical contact cleaner, and ensure that the switches operate smoothly in all positions.

Platform Leveling

Examine both platform leveling cylinders, particularly at the pivot points, for any sign of wear or damage. Ensure that the end fittings are secure.

Check cylinders and hose fittings for leaks.

Platform Pivots

The main pivots on the booms, cylinders and leveling system are fitted with corrosion resistant pins, and pre-lubricated bearings. Check the bearings with the pivot pins removed.

The bearings use special steel backed bushings. If the bearings should show any defect, they must be replaced with the correct type.

Boom Cylinders

Fully retract, then extend each boom lift cylinder, and the upper boom telescope cylinder. At each extreme position, check that there is no movement between cylinder rod and bearing housing, or between cylinder cap and tube.

Check all cylinders for hydraulic fluid leakage.

Engine (Fuel Powered Units)

Check the engine manual provided with the machine for semi-annual service requirements.

ANNUAL SERVICE

Flexible Hoses

Inspect all hoses over their complete length. Replace any hoses showing looseness or corrosion at the end fittings. Replace hoses exhibiting cracking, blistering or excessive wear of outer protective covering.

Hydraulic Fluid

If the hydraulic system has been properly maintained, the fluid should only need to be changed once each year. This, of course, will depend on machine application, amount of use, temperature, atmospheric conditions and other factors.

Hydraulic fluid, when in good condition, is clear amber in color. If the fluid has a cloudy appearance, this indicates the presence of water. If it is dark brown, with a strong "burnt" smell, overheating of the fluid has occurred. The presence of either condition requires a complete fluid change.

The cause of hydraulic fluid deterioration should be investigated and rectified. Have fluid analyzed by a qualified laboratory.

Hydraulic Fluid Tank

Carefully check the condition of the fluid inside the tank to ensure that it flows easily and is of clear, amber color. In cases of gross contamination, it will be necessary to completely drain and refill the entire hydraulic system.

Place a suitable waste fluid container under the drain tap, or attach a suitable hose from the drain tap to the container.

Open the drain tap, and completely drain the fluid from the tank. Remove the tank top plate for internal inspection and cleaning.

Clean or replace the suction hose, and close the drain tap. Reinstall the tank top plate, replacing the gasket if necessary, and refill the tank to the correct level.

Engine (Fuel Powered Units)

Check the engine manual provided with the machine for annual service requirements.

FOUR YEAR INTERVAL SERVICE

Pivot Pins and Bearings

Remove the pivot pins for examination. Check the pivot pin bearings with the pivot pins removed. Replace bearings as necessary. Pivot pins are treated with an oil absorbing, corrosion resistant coating. The bearings are steel backed, and copolymer lined. Replace with the correct type of pins and bearings.

DAILY OPERATIONAL CHECKLIST

All checks must be completed before operation of the Simon RZB.

DATE _____ **INSPECTED BY** _____

MODEL NUMBER _____ **SERIAL NUMBER** _____

GENERAL INFORMATION:

1. Keep inspection records up-to-date.
2. Record and report all discrepancies to your supervisor.
3. A dirty machine cannot be properly inspected. **Keep your Simon RZB clean!!**



THIS CHECKLIST MUST BE USED DAILY. FAILURE TO DO SO COULD ENDANGER THE LIFE OF THE OPERATOR. ALWAYS REMEMBER, A LITTLE PREVENTIVE MAINTENANCE CAN SAVE MUCH MORE THAN IT COSTS.

INITIAL	DESCRIPTION
_____	1. Perform a visual inspection of all machine components, i.e. missing parts, torn or loose hoses, hydraulic oil leaks, torn or disconnected wires, flat or damaged tires etc. Check for transportation damage. The superstructure cover can be raised to inspect components inside.
_____	2. Check engine oil and fuel tank levels (fuel powered units only).
_____	3. Check battery electrolyte level and connections.
_____	4. Check battery charger (electric units only) to verify that charge is adequate.
_____	5. Check hydraulic fluid level with all cylinder retracted.
_____	6. Check tires for damage.
_____	7. Check tire pressure (60 psi, RZB 40; 75 psi, RZB 50 and 55).
_____	8. Check hoses for worn areas.
_____	9. Check for bent or sagging hose track.
_____	10. Check safety belts and connections.
_____	11. Check platform and gate for damage.
_____	12. Check pivot pins for security. Ensure that all snap rings and securing bolts are in place on each pin.
_____	13. Check warning and operating instruction decals for legibility.
_____	14. Check outrigger locking pins for proper operation and signs of fatigue.

DAILY OPERATIONAL CHECKLIST

INITIAL	DESCRIPTION
_____	15. Check the safety outrigger interlocks to verify proper engagement.
_____	16. Check the leveling gauge to verify leveling accuracy.
_____	17. Check tow hitch for signs of damage or loosening.
_____	18. Check the brake linkage. Check operation of surge brake before towing the RZB on public roadways.
_____	19. Check that no attempt had been made to override the interlock system by a previous operator.
_____	20. If all pre-inspection checks have been completed, the operator is ready to test the Simon RZB's ground control station for proper operation.



Unplug battery charger before placing the RZB into operation (electric units only).

_____	21. Check emergency pump for operation.
_____	22. Follow engine daily service requirements. Refer to the Engine Maintenance Manual supplied with your fuel powered RZB.

ADDITIONAL MAINTENANCE REQUIREMENTS FOR SEVERE USAGE APPLICATIONS

INITIAL	DESCRIPTION
	DAILY
_____	23. Inspect cylinder boots, valve spool boots, etc., for cuts or other damage after every eight hours of service. Repair or replace if necessary.
_____	24. Check hydraulic system for leakage after every eight hours of operation.
	WEEKLY
_____	25. Inspect condition of hydraulic fluid. Fluid should have a clear amber color.
_____	26. Lubricate all grease fittings.
_____	27. Apply Moly-Kote 321 R bonded lubricant to swing bearing.

MONTHLY OPERATIONAL CHECKLIST

DATE _____ **INSPECTED BY** _____

MODEL NUMBER _____ **SERIAL NUMBER** _____

GENERAL INFORMATION

1. Keep inspection records up-to-date.
2. Record and report all discrepancies to your supervisor.
3. A dirty machine cannot be properly inspected.
   Keep your Simon RZB clean!!



THIS CHECKLIST MUST BE USED AT MONTHLY INTERVALS. FAILURE TO DO SO COULD ENDANGER THE LIFE OF THE OPERATOR. ALWAYS REMEMBER, A LITTLE PREVENTIVE MAINTENANCE CAN SAVE MUCH MORE THAN IT COSTS.

INITIAL	DESCRIPTION
_____	1. Perform all checks listed on Daily Operational Checklist.
_____	2. Lubricate all grease fittings.
_____	3. Inspect condition of hydraulic fluid in the reservoir. Fluid should have a clear amber color.
_____	4. Check hydraulic system for leaks. Examine hoses for signs of excessive wear, chafing or twisting. Replace worn hoses if necessary.
_____	5. Clean and lubricate all valve spool linkages.
_____	6. Check tires for cracks and other damage.
_____	7. Check wheel lug nuts for tightness (150 ft. lbs.).
_____	8. Check for unit damage, broken welds, improper or makeshift repairs.
_____	9. Torque nuts on U-bolts used for axle mounting to 55 ft. lbs.
_____	10. Check protective rubber cover around hoses at moving anchor tip boom, support posts, boom hose passages and at swing bearing.
_____	11. Check torque of swing bearing bolts. The correct torque is 83 ft. lbs. for RZB 40. The correct torque is 196 ft. lbs. for RZB 50 and 55.
_____	12. Check adjustment and security of swing drive. Correct torque of mounting bolts is 80 ft/lbs. There should be a slight amount of backlash between the superstructure and trailer when properly adjusted.

MONTHLY OPERATIONAL CHECKLIST

INITIAL	DESCRIPTION
_____	13. Lubricate swing bearings.
_____	14. Follow engine monthly service requirements. Refer to the Engine Maintenance Manual supplied with your fuel powered RZB.

ADDITIONAL MAINTENANCE REQUIREMENTS FOR SEVERE USAGE APPLICATIONS

INITIAL	DESCRIPTION
	90 DAYS
_____	15. Replace return filter element.
_____	16. Change engine oil and filter (fuel powered units only), and follow all other engine severe usage requirements. Refer to the Engine Maintenance Manual supplied with your RZB.

SEMI - ANNUAL OPERATIONAL CHECKLIST

DATE _____ **INSPECTED BY** _____

MODEL NUMBER _____ **SERIAL NUMBER** _____

GENERAL INFORMATION

1. Keep inspection records up-to-date.
2. Record and report all discrepancies to your supervisor.
3. A dirty machine cannot be properly inspected.
   Keep your Simon RZB clean!!

⚠ WARNING!!!

THIS CHECKLIST MUST BE USED AT 6 MONTH INTERVALS. FAILURE TO DO SO COULD ENDANGER THE LIFE OF THE OPERATOR. ALWAYS REMEMBER, A LITTLE PREVENTIVE MAINTENANCE CAN SAVE MUCH MORE THAN IT COSTS.

INITIAL	DESCRIPTION
_____	1. Perform all checks listed on Daily and Monthly Operation Checklists.
_____	2. Have hydraulic fluid sample analyzed at a test laboratory. Follow the recommendations of test results.

⚠ NOTE

If hydraulic fluid has been regularly maintained, it should only require changing once every year, depending on maintenance, temperature, application, duty cycle, and atmospheric conditions.

_____	3. Check operating speeds to ensure they are within specified limits.
_____	4. Clean and lubricate all pushbutton switches with an electrical contact cleaner and ensure that the switches operate freely in all positions.
_____	5. Check all electrical mounting and hardware connections for security.
_____	6. Check that engine RPM is as stated on data plate (fuel powered units only).
_____	7. Replace return filter element.
_____	8. Inspect entire machine for worn or damaged components. Replace as necessary.
_____	9. Tune engine (fuel powered units only), and follow all other engine semi-annual service requirements. Refer to the Engine Maintenance Manual supplied with your RZB.

SEMI - ANNUAL OPERATIONAL CHECKLIST

ADDITIONAL MAINTENANCE REQUIREMENTS FOR SEVERE USAGE APPLICATIONS

INITIAL	DESCRIPTION
_____	10. Replace fuel filter (fuel powered units only), and follow all other engine severe usage requirements. Refer to the Engine Maintenance Manual supplied with your RZB.

MAINTENANCE CHART

NOTE

This Maintenance Chart is only to be used as a reminder of the detailed instructions given in this manual. All detailed servicing instructions must be implemented.

Maintenance Item	Daily	Weekly	Monthly	Semi-Annual	Annual	4 Year
Check machine structure	X					
Check platform structure	X					
Check boom structure	X					
Check unit for broken welds	X					
Check tire condition	X					
Check tire pressure	X					
Check wheel lug nuts	X					
Check hose track	X					
Check platform door latch	X					
Check pivot pin security	X					
Check battery terminals	X					
Check battery charger	X					
Check engine oil level	X					
Check fuel level	X					
Check hydraulic fluid level	X					
Check hydraulic pressure	X					
Inspect hydraulic system	X					
Check platform leveling	X					
Check emergency pump operation	X					
Test all machine systems	X					
Check battery electrolyte		X				
Check control valves		X				
Check for tangled hoses			X			
Check chassis bolts			X			

MAINTENANCE CHART

Maintenance Item	Daily	Weekly	Monthly	Semi-Annual	Annual	4 Year
Check moving anchor			X			
Check boom/cylinder pins			X			
Check torque on swing bearing bolts			X			
Torque bolts on axle mounting blocks			X			
Check hydraulic fluid contamination			X			
Lubricate all grease fittings			X			
Clean and lubricate valve controls			X			
Grease swing gear teeth			X			
Lubricate pivot pins			X			
Check engine RPM				X		
Replace fuel filter				X		
Engine tune-up				X		
Check platform mountings				X		
Check swing drive mounting bolts				X		
Check electrical system				X		
Check operating speeds				X		
Replace return filter element				X		
Clean and lubricate push button switches				X		
Lubricate hydraulic valve control linkages				X		
Analyze hydraulic fluid				X		
Check pivots for wear					X	
Check hoses for wear					X	
Change hydraulic fluid					X	
Grease swing bearings					X	

MAINTENANCE CHART

Maintenance Item	Daily	Weekly	Monthly	Semi-Annual	Annual	4 Year
Examine pivot pins						X
Examine bearings						X

ELECTRICAL AND HYDRAULIC SCHEMATICS

RZB 40 (ELECTRIC POWERED)

ELECTRICAL SCHEMATIC ..... NO DRAWING NUMBER
HYDRAULIC SCHEMATIC ..... REF. DWG. NO. SDS

RZB 40 (FUEL POWERED)

ELECTRICAL SCHEMATIC ..... REF. DWG. NO. SDS-214355-0
HYDRAULIC SCHEMATIC ..... REF. DWG. NO. SDS-214354-0

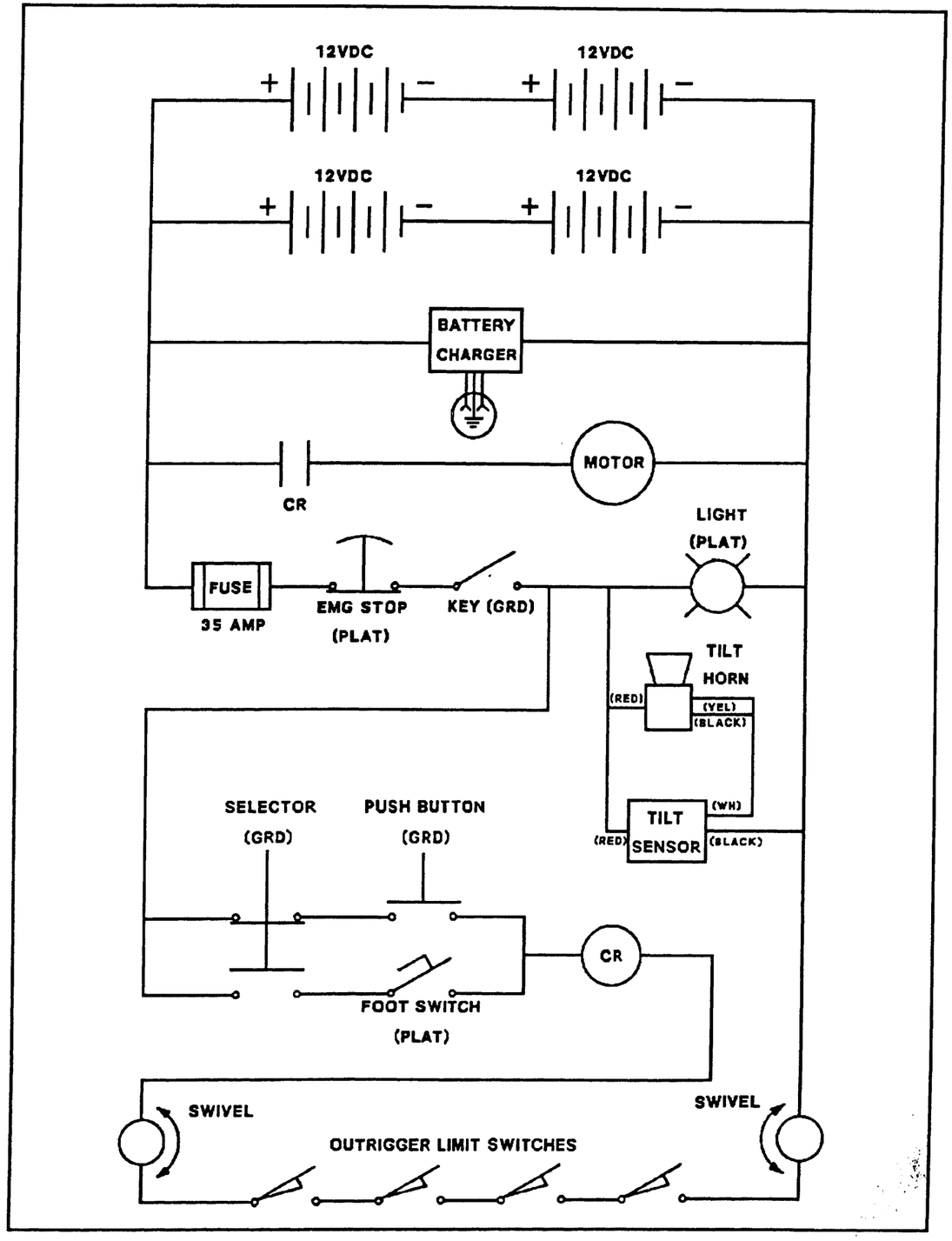
RZB 50 & 55 (ELECTRIC POWERED)

ELECTRICAL SCHEMATIC ..... NO DRAWING NUMBER
HYDRAULIC SCHEMATIC ..... REF. DWG. NO. SDS

RZB 50 & 55 (FUEL POWERED)

ELECTRICAL SCHEMATIC ..... REF. DWG. NO. SDS-215672-0
HYDRAULIC SCHEMATIC ..... REF. DWG. NO. SDS-215673-0

ELECTRICAL SCHEMATIC FOR RZB 40 (ELECTRIC POWERED)



ITEM	QTY.	PART NO.	DESCRIPTION	MAT'L.	WT.

TELESCOPE

SWING

LIFT CYLINDERS

PLATFORM LEVELLING

ALTERNATE LIFT CYLINDER
SINGLE ACTING

MAIN PUMP

AUXILIARY HAND PUMP

TANK

GROUND CONTROLS

PLATFORM CONTROLS

XX

SIMON-AERIALS INC. MILWAUKEE, WI 53224

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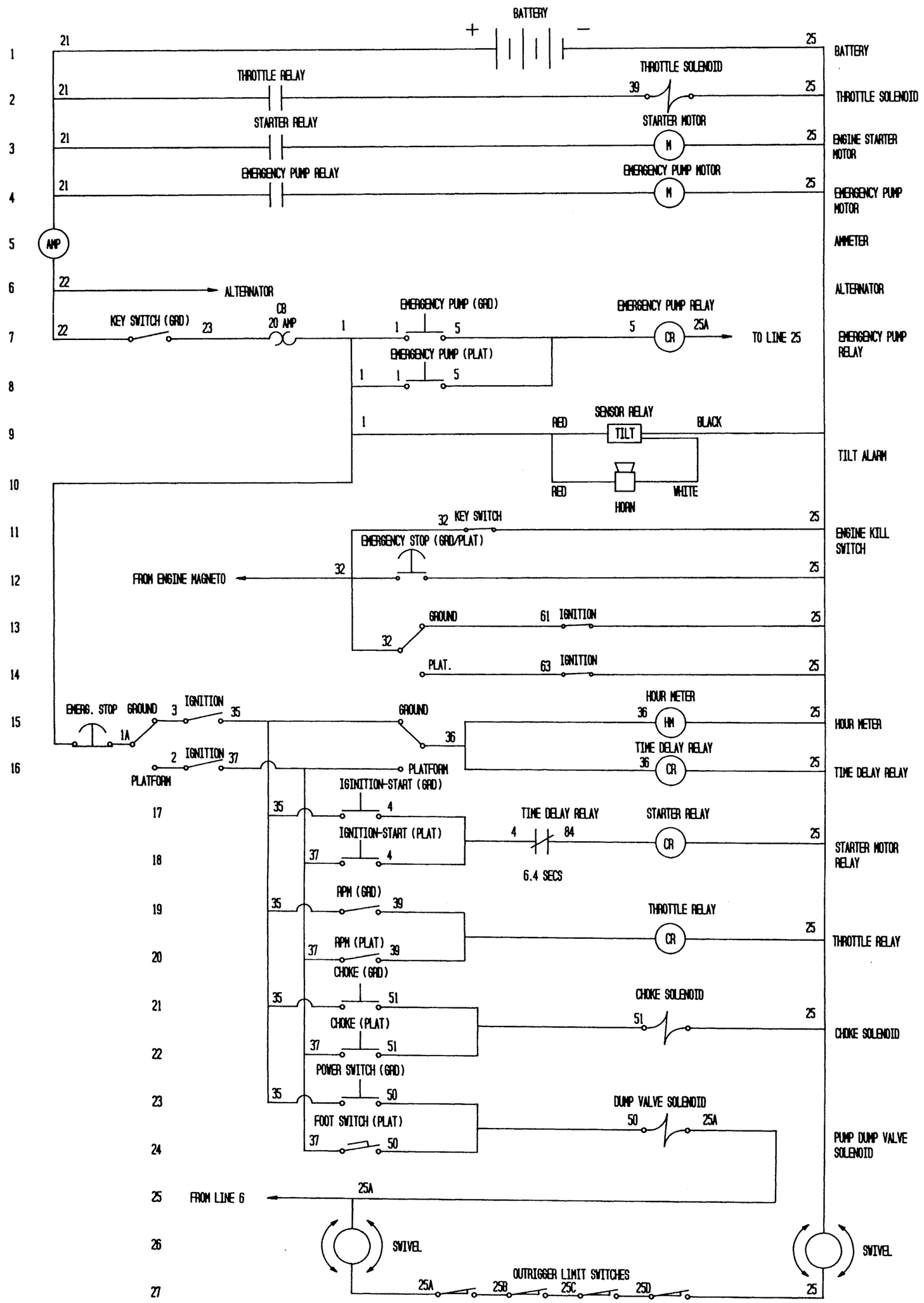
ALL WELDS MUST BE IN ACCORDANCE WITH AWS STANDARDS D1.1-1972 2nd I-75 OR D1.2-83

IMPLIED TOLERANCE	
X.X	±.1
X.XX	±.06
X.XXX	±.015
FRACTIONAL	±1/8
ANGULAR	±0.5°
SCALE ~	DO NOT SCALE PRINT

HYDRAULIC SCHEMATIC
RZB 40

REVISION	BY	DATE	DESCRIPTION

DRAWN	DATE	CHECKED	APPROVED	DRAWING NO
BJT	8-20-86			SDS



EMERGENCY STOP SWITCH SHOWS IN LINES 12,15

KEY SWITCH SHOWS IN LINES 7, 11

GROUND SELECTOR SWITCH SHOWS IN LINE 13 & TWICE IN LINE 15. DRAWN IN GROUND POSITION

GROUND IGNITION SWITCH SHOWS IN LINES 13, 15, 17. DRAWN IN OFF POSITION

PLATFORM IGNITION SWITCH SHOWS IN LINE 14, 16, 18. DRAWN IN OFF POSITION

GROUND THROTTLE SWITCH SHOWS IN LINES 19, 21. DRAWN IN OFF POSITION

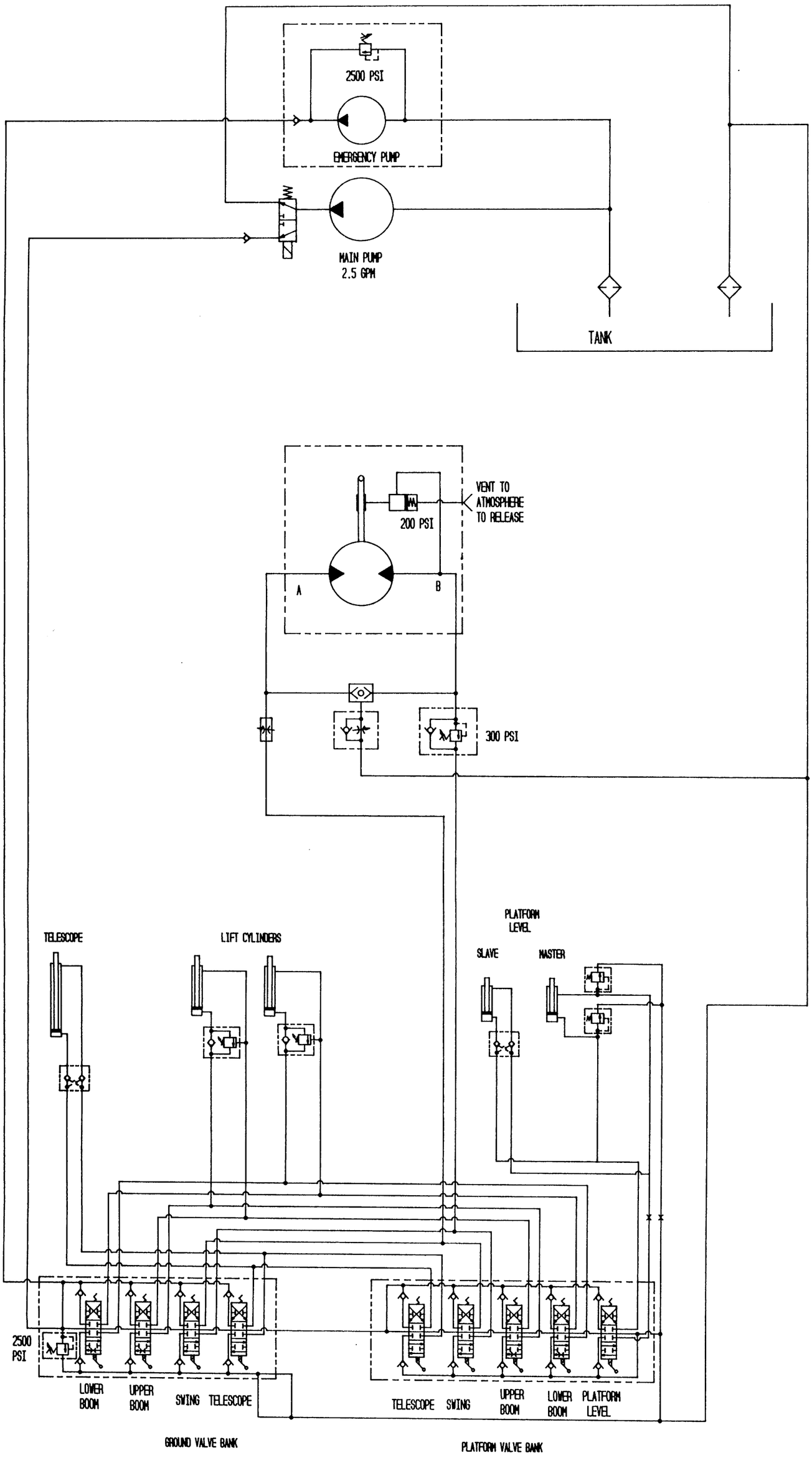
PLATFORM THROTTLE SWITCH SHOWS IN LINES 20, 22. DRAWN IN OFF POSITION

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: ELECTRICAL SCHEMATIC - HDB 40 6WS BRIDGE

DRWG. NO. SDS-21435-0

REVISION



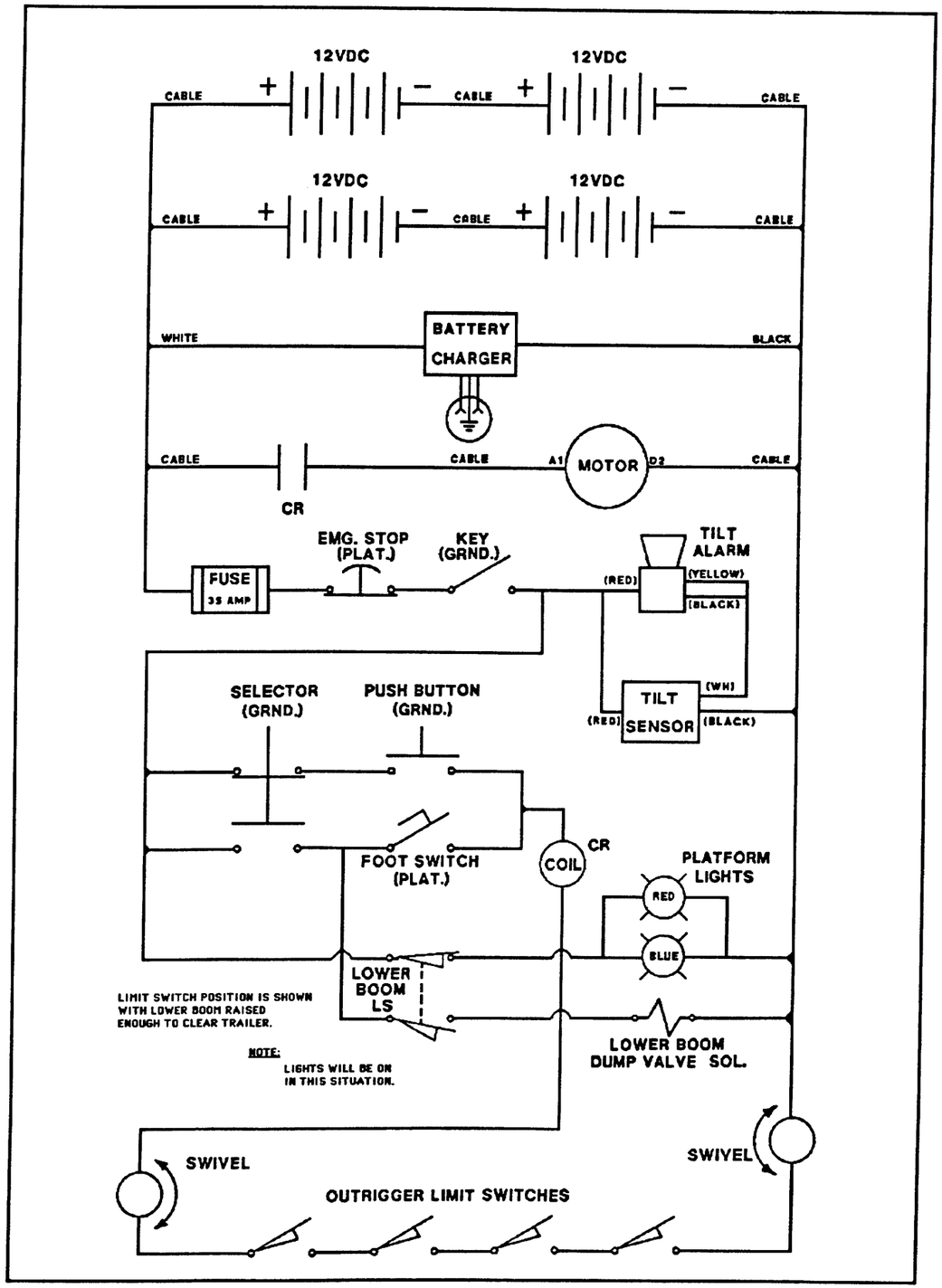
simon-AERIALS inc.
MILWAUKEE, WI. 53209

TITLE
HYDRAULIC SCHEMATIC
ROD-HO 86B ENGINE

DRWG. NO.
SDS-21435A-0

REVISION

ELECTRICAL SCHEMATIC FOR RZB 50 & 55 (ELECTRIC POWERED)



BILL OF MATERIAL				TOTAL WT.	
ITEM	QTY.	PART NO.	DESCRIPTION	MAT'L.	WT.

TELESCOPE

SWING

LIFT CYLINDERS

PLATFORM LEVELLING

ALTERNATE LIFT CYLINDER
SINGLE ACTING

LOWER BOOM
DUMP VALVE

MAIN
PUMP

AUXILIARY
HAND PUMP

TANK

GROUND CONTROLS

PLATFORM CONTROLS

XX

SIMON-AERIALS INC. MILWAUKEE, WI 53224

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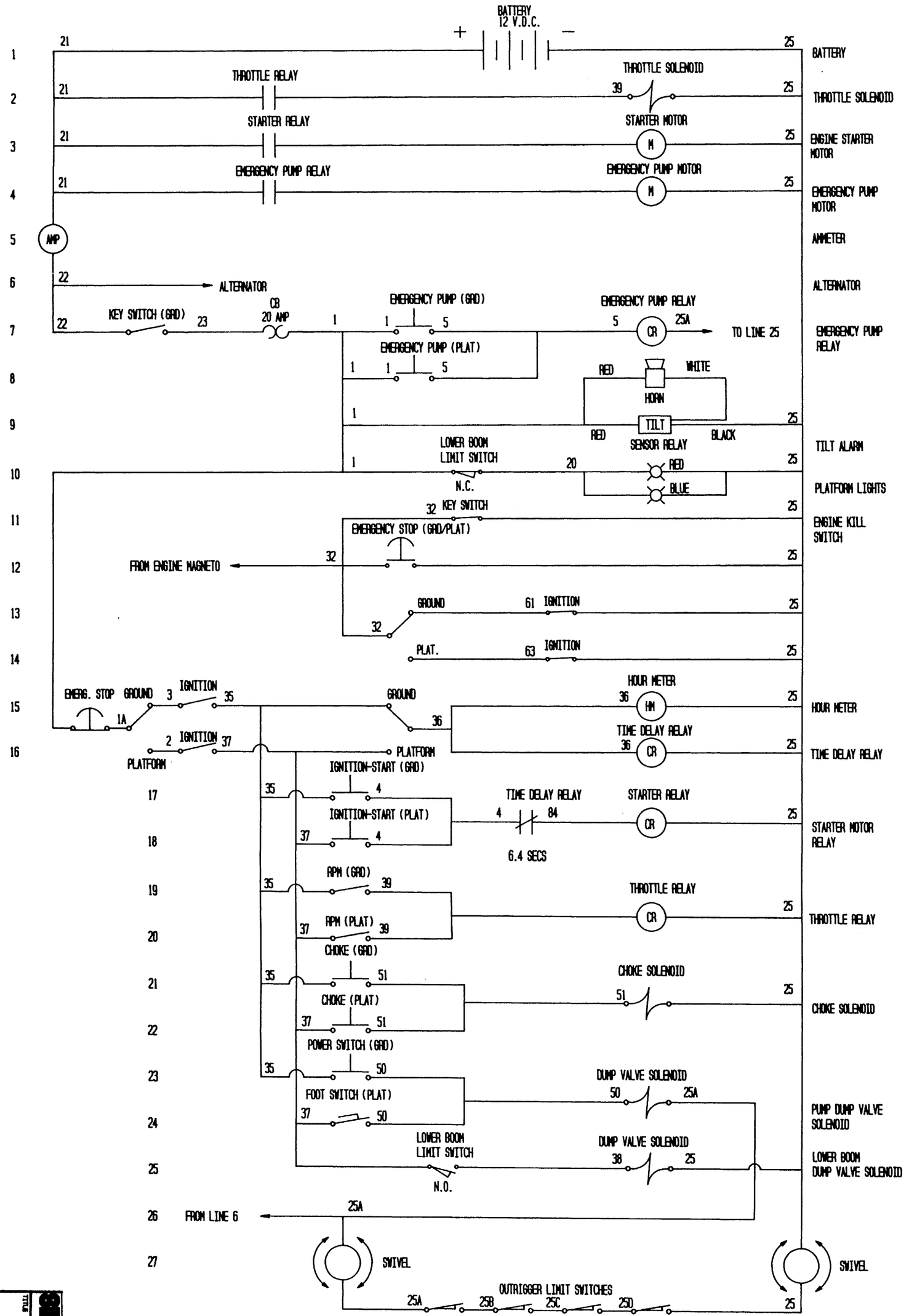
ALL WELDS MUST BE IN ACCORDANCE WITH A.W.S. STANDARDS 01.1-1972, 2M 1-10 OR D1.0-66

IMPLIED TOLERANCE	
X.X	±.1
XXX	±.06
X.XXX	±.015
FRACTIONAL	±1/8
ANGULAR	±0.5°
SCALE	DO NOT SCALE PRINT

TITLE **HYDRAULIC SCHEMATIC RZB 50 & 55**

REVISION	BY	DATE	DESCRIPTION

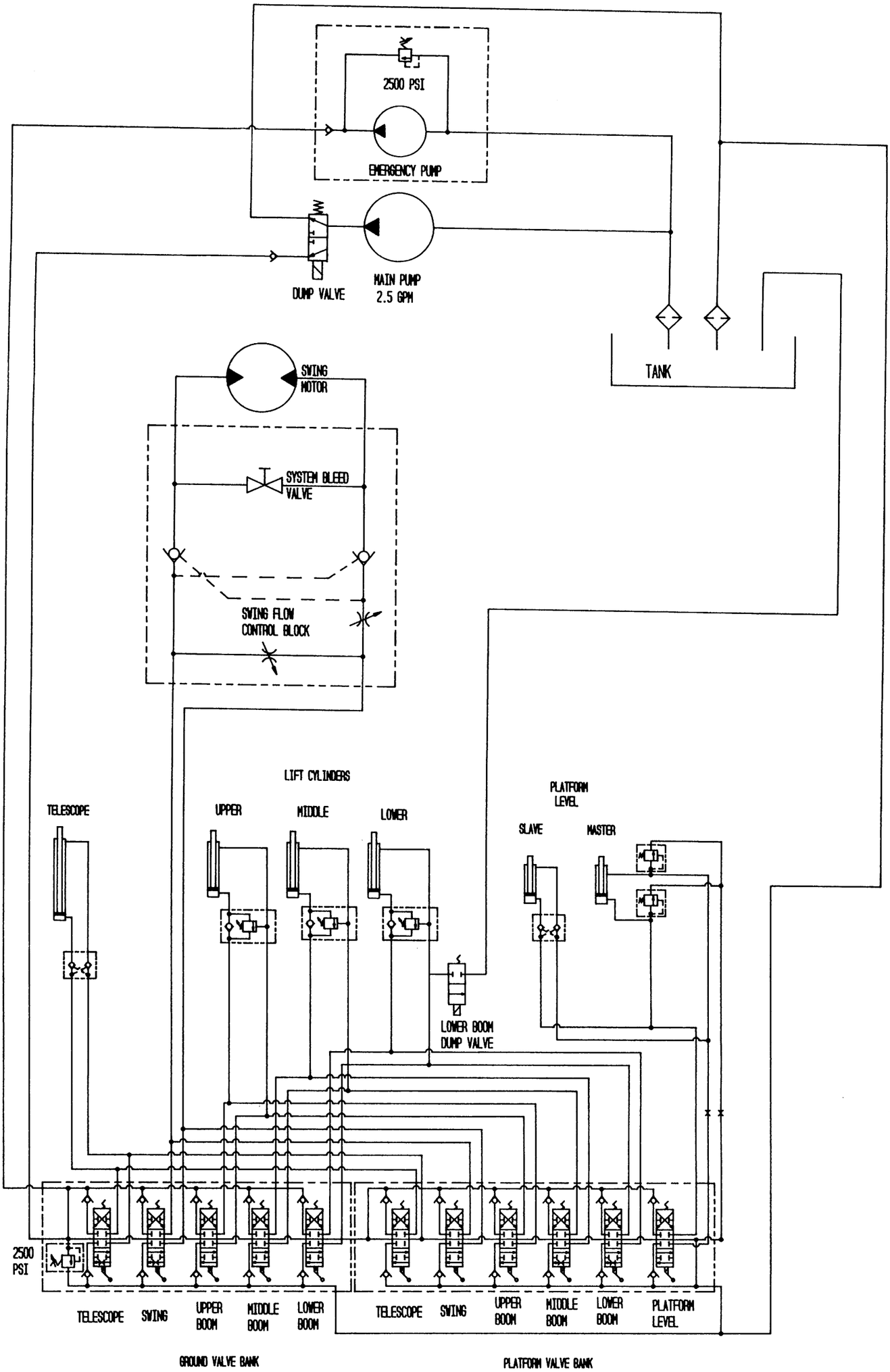
DRAWN BJT 8-20-86 CHECKED APPROVED DRAWING NO. SDS



EMERGENCY STOP SWITCH SHOWS IN LINES 12,15
KEY SWITCH SHOWS IN LINES 7, 11
GROUND SELECTOR SWITCH SHOWS IN LINE 13 & TWICE IN LINE 15. DRAWN IN GROUND POSITION
GROUND IGNITION SWITCH SHOWS IN LINES 13, 15, 17. DRAWN IN OFF POSITION
PLATFORM IGNITION SWITCH SHOWS IN LINE 14, 16, 18. DRAWN IN OFF POSITION
GROUND THROTTLE SWITCH SHOWS IN LINES 19, 21. DRAWN IN OFF POSITION

LOWER BOOM LIMIT SWITCH SHOWS IN LINES 10, 25. DRAWN WITH LOWER BOOM RAISED TO CLEAR TRAILER
LINE 10 IN ON POSITION
LINE 25 IN OFF POSITION
PLATFORM THROTTLE SWITCH SHOWS IN LINES 20, 22. DRAWN IN OFF POSITION

SIMON-ARERIALS INC.	TITLE: ELECTRICAL SCHEMATIC RZB 50/55 GAS ENGINE	DWG. NO. SGS-21507Z-0



TITLE	HYDRAULIC SCHEMATIC RJD-50/55 GAS ENGINE
REVISION	
DRWG. NO.	SDS-21573-0

SIMON-ARERIALS INC.
MILWAUKEE, WI. 53224