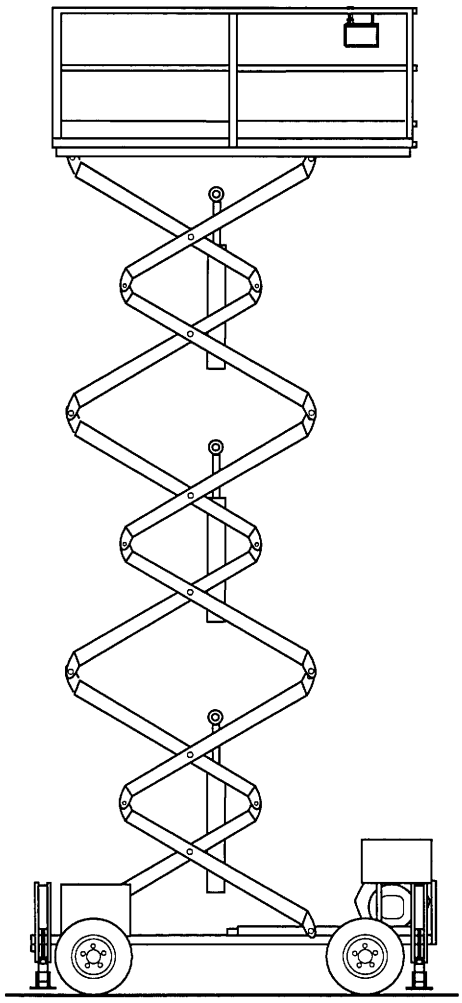
4612 RT SCISSORS

SERVICE MANUAL

For Service Concerns Only:
Direct Phone Line to Service Department,
8:00 AM to 5:00 PM Central Time,
Monday thru Friday.

Phone (414) 355-3181



Art # A00.00902E

Part No. 89-977507 • Rev. "0.1" dated Jan. 1997 •

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Appendix

INTRODUCTION

This Service Manual is designed to provide you with the instructions needed to properly maintain the SIMON AERIALS INC. Scissors Lift. When used in conjunction with the Operator's and Parts Manuals (provided separately) this Service Manual will assist you in making necessary adjustments or repairs.

Simon Aerial Scissors Lifts are designed and built to provide many years of safe, dependable service. To obtain full benefits from your Scissors Lift, 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 Operator's, Service and Parts Manuals in order to gain a thorough understanding of the unit prior to making any repairs. Exercise all necessary safety precautions when performing maintenance not covered in this manual.

To help you recognize important safety information, we have identified warnings and instructions that directly impact on safety with the following signals:

⚠ DANGER

DANGER INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY. THIS SIGNAL WORD IS TO BE LIMITED TO THE MOST EXTREME SITUATIONS.

⚠WARNING

WARNING INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠ CAUTION

Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. Caution is permitted for property-damage-only accidents.

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 controls and platform control console.

⚠ DANGER

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.

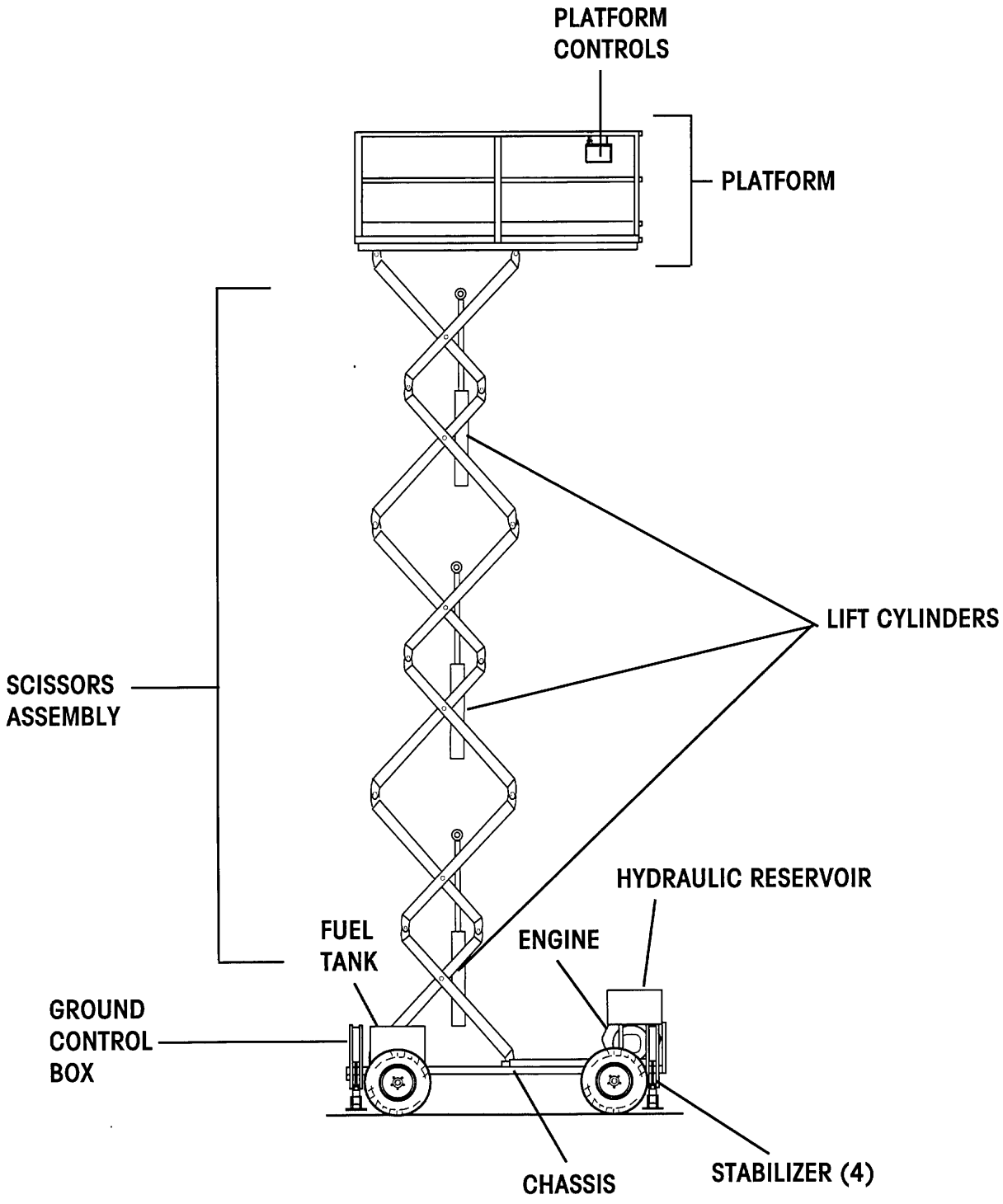
Any procedures not found within this manual must be evaluated by the individual to assure himself that they are "proper and safe", because it is not possible to cover all potential procedures.

All SIMON AERIALS INC. manuals are periodically updated to reflect changes that occur in the equipment. Please contact the factory for information regarding changes to your machine which may not be included in the manual.

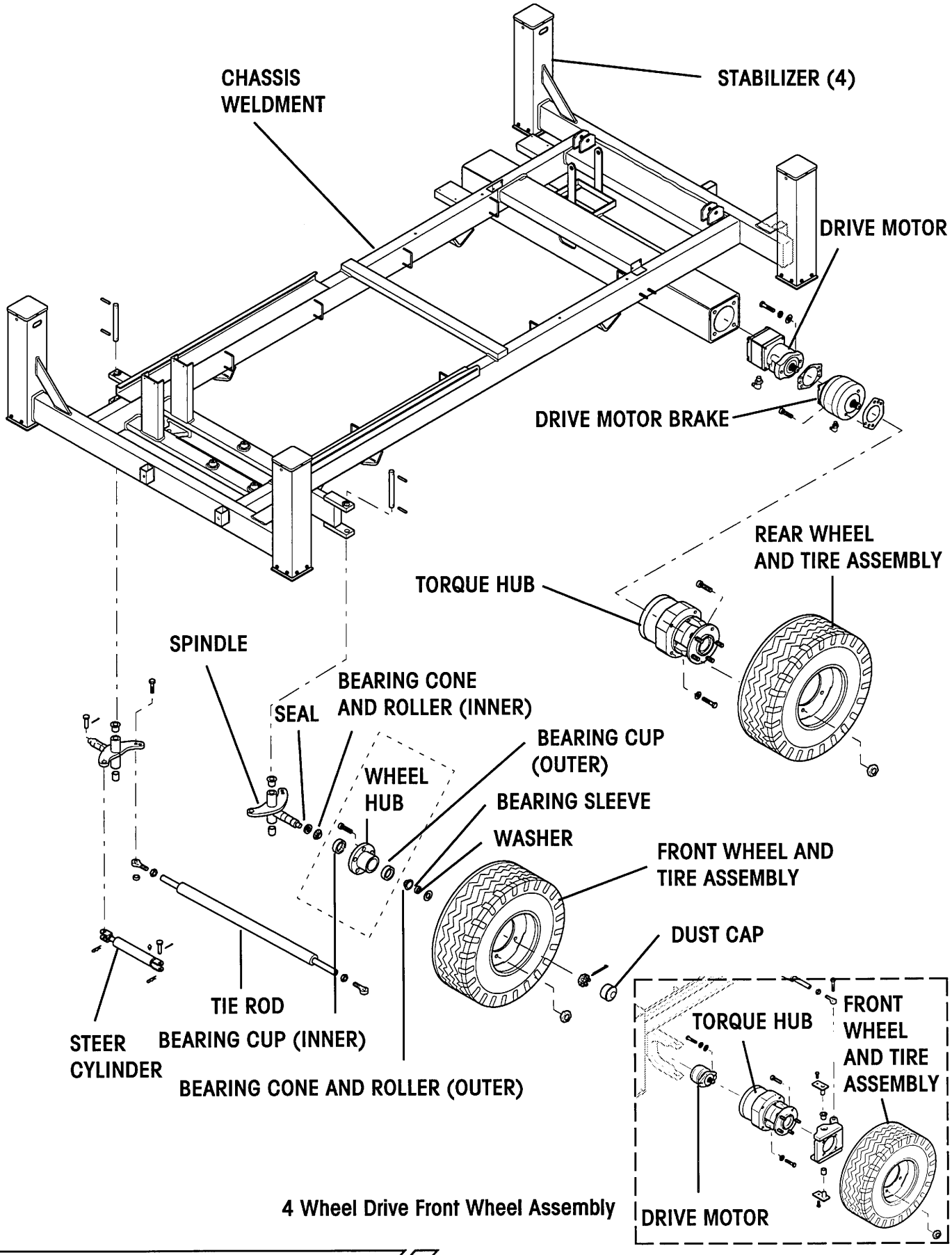
MACHINE SPECIFICATIONS

Working Height	**52 Ft.**/ 15.85 M
Platform Height	**46 Ft.**/ 14.02M
Stowed Height:	
Without Rails	**81.5 In.**/ 2.07 M
With Rails	**123.5 In.**/ 3.14M
Platform Capacity (Evenly Distributed):	
With Standard Deck	**1,250 LBs.**/ 567 Kg
With Traversing or Roll-Out Deck (Optional)	**1,000 LBs.**/ 560 Kg
Platform Dimensions:	
With Standard Deck	**76 In. x 160 In.**/ 1.93 M x 4.1 M
Guard Rail Height	**42 In.**/ 1.07 M
Toe Board Height	**6 In.**/ 1.5 Cm
Traversing Deck (Optional)	**4 Ft.**/ 1.22 M
Roll-Out Deck (Optional)	**3 Ft.**/ .91 M
Length	**14 Ft.**/ 4.27M
Width	**8 Ft. 3 In.**/ 2.52 M
Wheelbase	**9 Ft. 9 In.**/ 2.97 M
Wheel Track	**7 Ft.1 In.**/ 2.16 M
Inside Turning Radius	**13 Ft.**/ 3.96 M
Outside Turning Radius	**22 Ft.**/ 6.71 M
Ground Clearance	**10 In.**/ 2.5 Cm
Weight (Approx.)	**8,445 LBs.**/ 3109 Kg
Drive System	**Dual Range Proportional**
Drive Speed (Platform Elevated)	**0.8 MPH**/ 1.29 k.p.h.
Drive Speed (Platform Lowered)	**2.7 MPH**/ 4.35 k.p.h.
Lift/ Lower Speed (Approx.)	**50 sec / 52 sec**
Gradeability (on hard surface - refer to page vi)	**15°/ 27%**
Tire Size	**31.5 x 15.5 STG**
Tire Pressure (not applicable for foam filled tires)	**45 psi/** 3.10 Bar
Wheel Lug Nut Torque	**90 Ft. LBs.**/ 122 Nm
Power Wheel Mounting Bolt Torque	**120 Ft. LBs.**/ 162.72 Nm
Hydraulic Operating Pressure	**2900 psi/** 189.61 Bar
Hydraulic Fluid Capacity	**28 GAL.**/ 106 Liters
Fuel Capacity	**24 Gal.**/ 91 Liters
Power System	**12 Volt**
Alternator	**37 amp**
Standard Engine	**Wisconsin 35 hp Gasoline**
Engine Options:	
Propane	**35 hp Wisconsin**
Dual Fuel	**35 hp Wisconsin**
Diesel	**Deutz F2L1011**
	Deutz F3L1011
	Isuzu 3KR1
	Perkins 103-15

PRIMARY MACHINE COMPONENTS

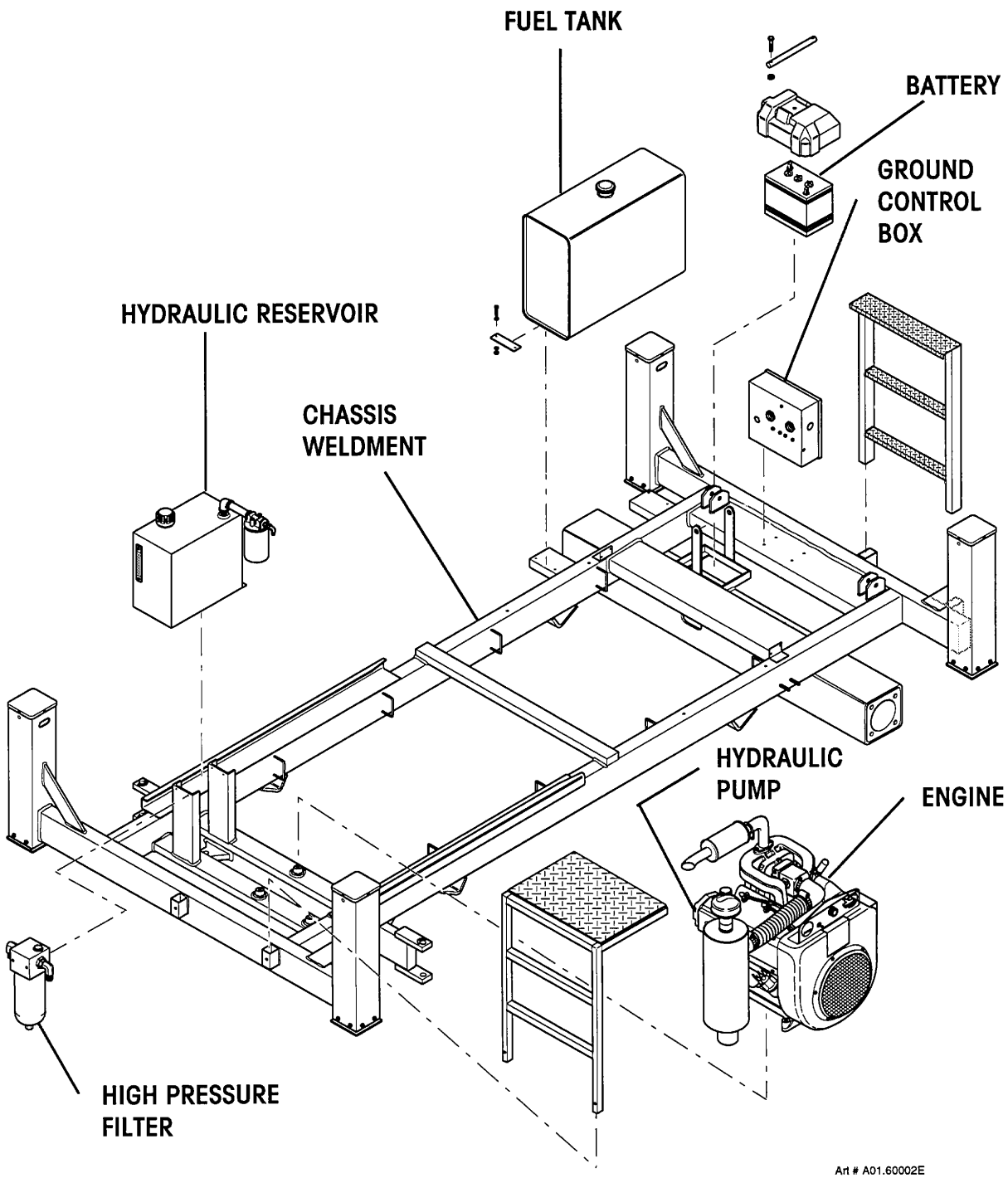


CHASSIS COMPONENTS

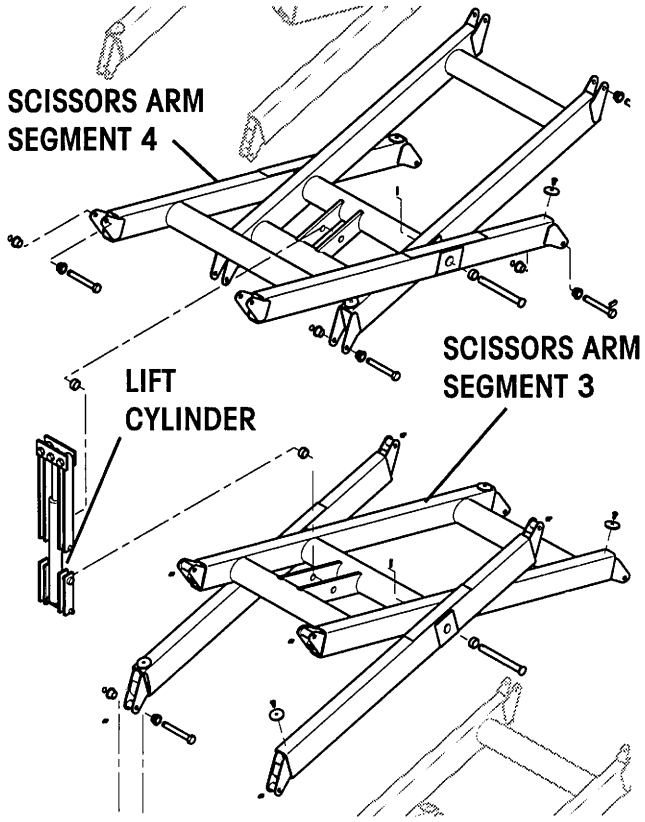


4 Wheel Drive Front Wheel Assembly

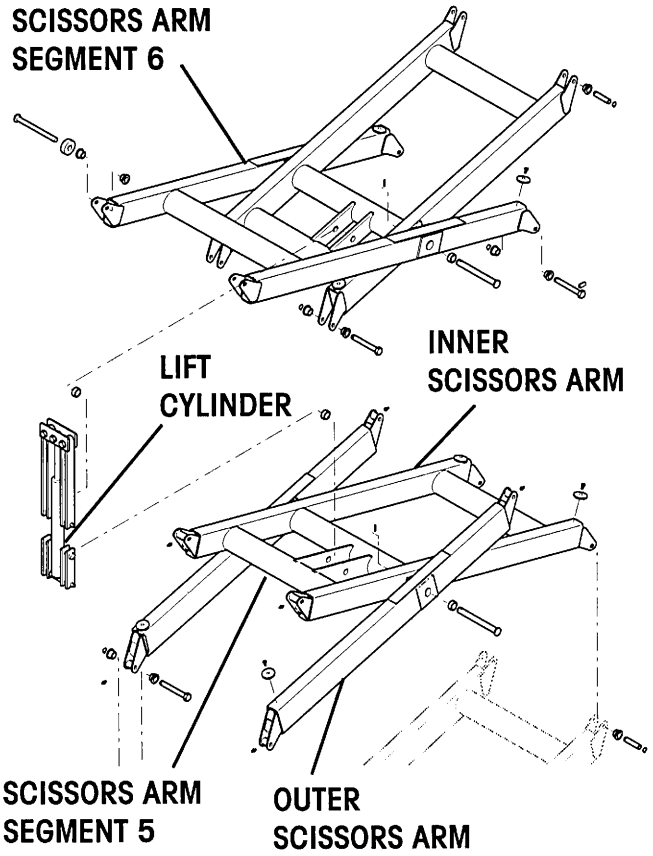
UNDERCARRIAGE COMPONENTS



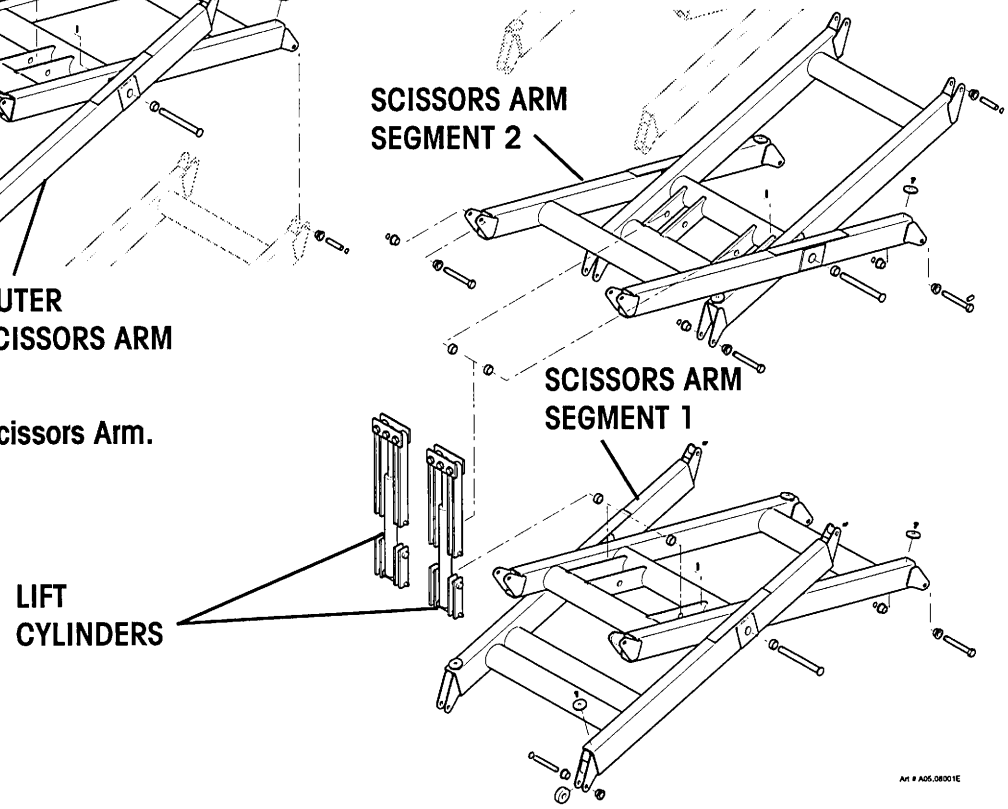
SCISSORS ARM COMPONENTS



Middle Scissors Arm.

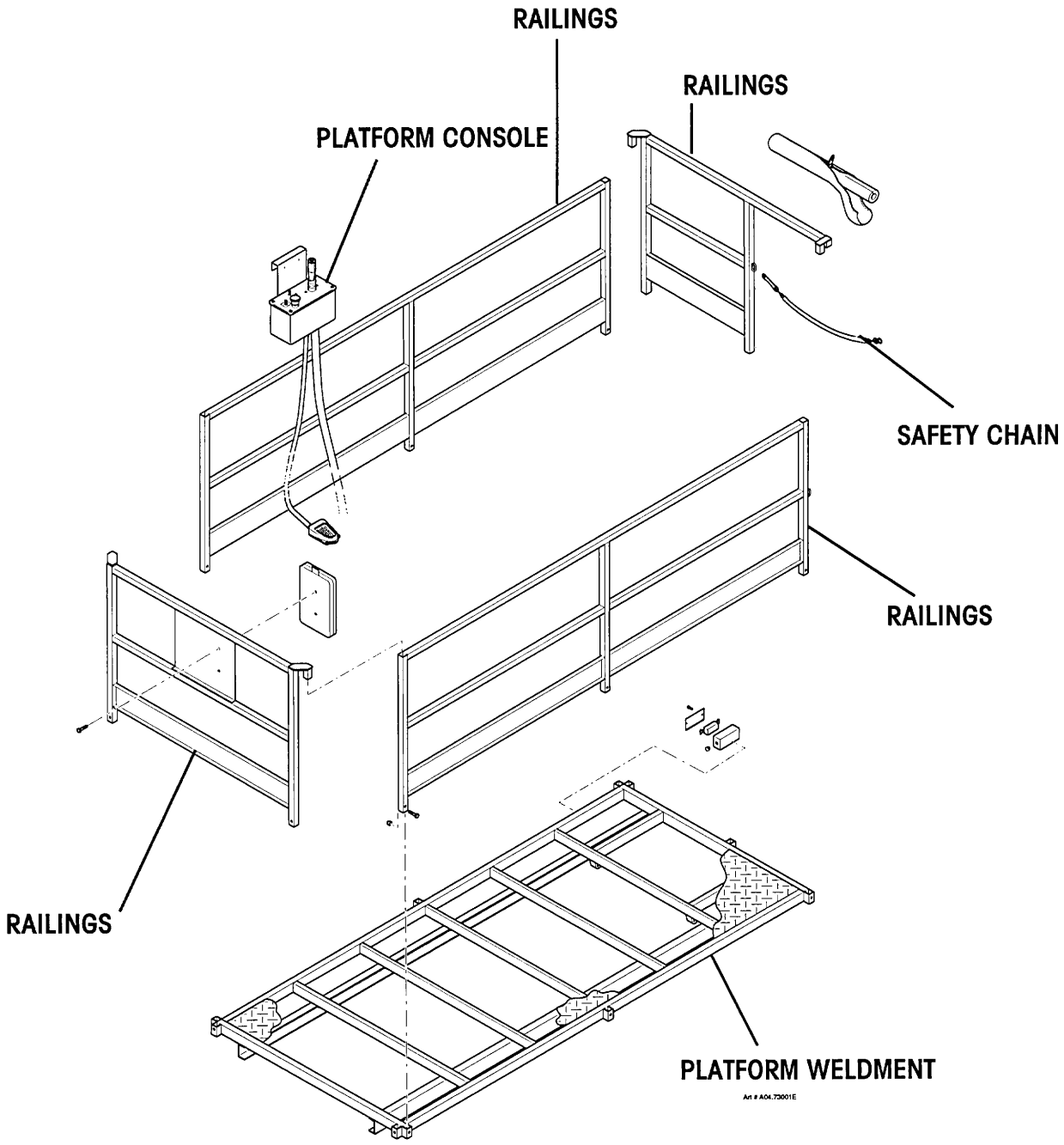


Upper Scissors Arm.



Lower Scissors Arm.

PLATFORM COMPONENTS

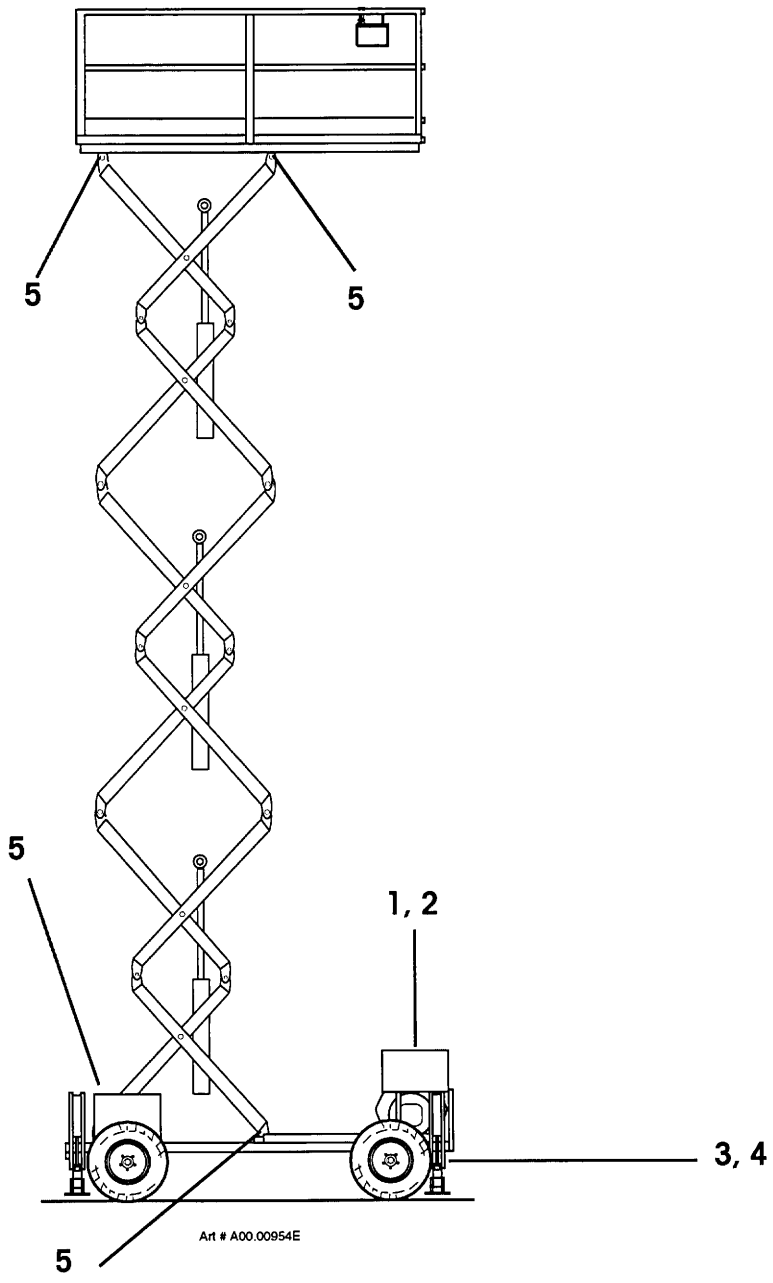


LUBRICATION CHART

NO.	ITEM	SPECIFICATION AND QUANTITY	FREQUENCY OF LUBRICATION
1.	Hydraulic reservoir	Mobil AW32. Fill to top of sight gauge with unit stowed.	Check daily. Analyze every 6 months or 500 hours.*† Change yearly or every 1,000 hours.*†
2.	Hydraulic filter	Filter element.	Change every 6 months or 500 hours.*†
3.	King pins	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
4.	Steering cylinder pivot	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
5.	Scissors arm roller and pivot ears	Light grade of oil..	Monthly or every 100 hours.*†

* Whichever occurs first.
† Different requirements for severe duty applications. See check lists.

LUBRICATION DIAGRAM



SECTION 1:
TRANSPORTATION
AND
EMERGENCY PROCEDURES

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Emergency Procedures 1-6

TRANSPORTING THE UNIT

Platform should be in the stowed position when the unit is being transported. Do not operate the unit while it is being transported.

MOVING OF THE SCISSORS LIFT

If your Scissors Lift is equipped with the TOW PACKAGE OPTION, it can be winched or moved short distances in case of power failure at speeds not to exceed 5 MPH (8.0 KPH).

To move the unit:

1. Attach tow tongue to towing vehicle.
2. Close brake valve by turning handle clockwise until fully closed.
3. Open motor valve by moving lever parallel to valve body to loop drive motors.
4. Pump brake until it releases.

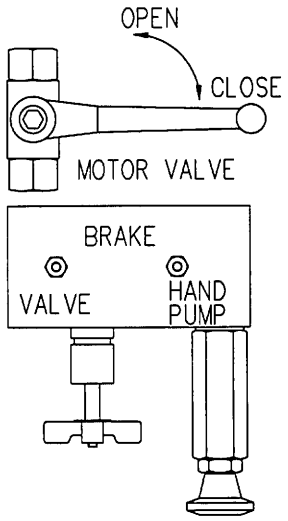
⚠WARNING

YOUR UNIT NOW HAS NO BRAKES. THE TOWING VEHICLE MUST HAVE SUFFICIENT BRAKING CAPABILITY IN ORDER TO SAFELY STOP ITSELF, AS WELL AS THE SCISSORS LIFT.

5. If towing unit on public roadway, install stop, turn and tail lamps as required. (Check local codes).
6. Check to ensure that both ground and platform Emergency Stop switches are pulled out.
7. Open emergency lowering valve.

To return to normal operation, close emergency lowering valve, close motor valve and open brake valve. Then, unhook tow tongue from tow vehicle.

IMPORTANT: All Simon scissors lifts are constructed of rigid frame. Because there is no suspension, and many hydraulic and electrical connections, do not tow over rough bumpy surfaces.



Brake Release Valve and Motor Valve.

FORK LIFTING THE SCISSORS LIFT

- Lift the Simon Scissors Lift from the sides only. Position forks under the chassis frame, between the front and rear wheels and as near to the rear (driving) wheels as possible. Ensure that lift truck used has adequate capacity to lift the machine (see Machine Specifications for gross vehicle weight).

⚠ CAUTION

Do not use tie down lugs to lift the unit.

CRANE LIFTING THE SCISSORS LIFT

- Ensure that the crane is of sufficient capacity for lifting the unit.
- Ensure that the appropriate spreader bars and chains are available.
- Attach the chains to each lifting lug. Lift the unit evenly so the machine is parallel to the ground.

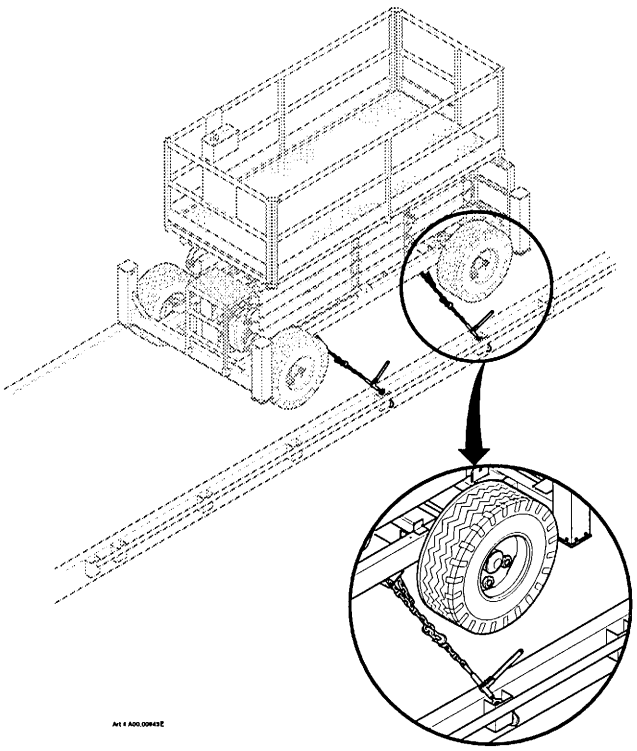
TRUCK TRANSPORT OF THE SCISSORS LIFT

- The Scissors Lift should be driven onto the transporting vehicle only with the assistance of a winch.
- If the unit is disabled, the Scissors Lift may be winched onto a transporting vehicle IF THE UNIT IS EQUIPPED WITH THE TOW PACKAGE OPTION. Ensure that all valves are returned to normal operating mode so motor and brakes are engaged.
- Securely attach the machine to the transporting vehicle using the tie down lugs, located at the sides of the chassis. Ensure that chains or straps have adequate load capacity, and DO NOT OVERTIGHTEN.

⚠ CAUTION

Do not use tie down lugs to lift the unit.

- Always chock the wheels of the unit while on the transporting vehicle.



Transportation Tie Down (Recommended)

UNLOADING PROCEDURES

- Inspect the outside of the unit for damage (including underside). Inspect all hoses, scissors arms sections and cables for chafing or shipping damage. Confirm that all wheel lug nuts are tight and secured.
- Inspect all electrical and hydraulic connections for damage and security.
- Connect battery cables to battery terminals if required. Check electrolyte level.
- Check that fluid level is to the full mark on the hydraulic tank, and add fluid as required (see Lubrication Chart).
- Attach the unit to a winch for unloading.

⚠WARNING

ALWAYS ATTACH THE UNIT TO A WINCH WHEN LOADING OR UNLOADING FROM A TRUCK OR TRAILER IF DRIVEN ON OR OFF. WE DO NOT RECOMMEND UNASSISTED LOADING OR UNLOADING OF ANY SCISSORS LIFT.

READ AND UNDERSTAND ALL SAFETY, CONTROL AND OPERATING INFORMATION FOUND ON THE MACHINE AND IN THIS MANUAL BEFORE OPERATING THE UNIT.

- Remove all machine tie downs. Remove wheel chocks.
- Enter the platform, and start the engine using the platform controls. Select the "HIGH" speed, and test all platform functions.
- Carefully drive the unit off the truck or trailer with the assistance of a winch.
- Before placing the unit into service, all operators must read and understand the contents of the Operator's Manual.

  Upon initial unloading of the machine the Receipt Inspection Adjustment Report or Predelivery Inspection Report must be completed and returned in order to activate the Simon Limited Warranty.

EMERGENCY SYSTEM AND PROCEDURES

⚠ DANGER

IF THE MOTOR OR CONTROL SYSTEM FAILS WHILE THE PLATFORM IS RAISED, DO NOT ATTEMPT TO CLIMB DOWN SCISSORS ARM ASSEMBLY. SERIOUS INJURY MAY RESULT.

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

THIS MACHINE IS NOT INSULATED AND EXTREME CARE MUST BE TAKEN WHEN WORKING AROUND POWER LINES.

DO NOT TOUCH THE UNIT IF THERE IS A CHANCE IT IS IN CONTACT WITH POWER LINES. WAIT UNTIL THE POWER TO THE LINES HAS BEEN SHUT OFF.

EMERGENCY LOWERING

⚠ CAUTION

In the event of engine failure, emergency lowering of the platform can be accomplished from ground level by opening the emergency lowering valve on the ground control console.

Report the incident immediately to your supervisor.

NOTE: The emergency lowering valve must be closed before the platform will raise and hold in position. All machine functions except platform lowering require that the engine be running.

EMERGENCY PROCEDURES

It is not possible for us to foresee every emergency situation that could arise during operation of this machine. Information on the following pages describes three typical emergency situations and lists appropriate actions that can be taken.

When faced with an emergency, above all please remember:

- Stay calm.
- Think through the situation before operating the machine.
- Get help if necessary.

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

POSSIBLE CONDITION

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

CORRECTIVE ACTION

1. Remove foot from foot switch and remove hand from the joystick.
2. Push the "Emergency Stop" button.
3. Evaluate the nature of the failure, lower the platform using platform controls if possible. If not, have an experienced operator lower the platform using the ground emergency lowering valve.

⚠ DANGER

DO NOT TRY TO CLIMB DOWN THE SCISSORS ARM ASSEMBLY.

AN EXPERIENCED OPERATOR SHOULD USE THE EMERGENCY LOWERING VALVE ON THE GROUND CONTROL CONSOLE TO SAFELY LOWER THE PLATFORM.

4. **Report the incident immediately to your supervisor.**

SITUATION: Unit elevated, with operator incapacitated at platform controls.

⚠ DANGER

DO NOT TOUCH UNIT !!!

DETERMINE THE CAUSE OF THE PROBLEM BEFORE YOU TOUCH THE MACHINE.

CORRECTIVE ACTION

1. Have someone 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 or would be endangered if platform is moved before attempting emergency lowering procedure.**
4. After establishing that the machine is not in contact with live power lines, lower platform using the emergency lowering valve located on the ground control console.
5. Render first aid to the operator.
6. **Report the incident immediately to your supervisor.**

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

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

⚠ DANGER

DO NOT TOUCH UNIT !!!

ELECTROCUTION HAZARD!!!

CORRECTIVE ACTION

1. Contact authorized personnel to disconnect power supply touching unit.

2. Have someone 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 platform is moved.**

4. **AFTER POWER IS CUT,** use the emergency lowering valve located on the ground control console to bring platform with operator to a safe location to render first aid.

5. **Report the incident immediately to your supervisor.**

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

SECTION 2:
HYDRAULIC SYSTEM

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  - Lock Valve 2-10
  - Outrigger Pressure Switch 2-10
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HYDRAULIC FLUID

HANDLING PRECAUTIONS

⚠WARNING

PERSONS IN REGULAR CONTACT WITH MINERAL-BASED HYDRAULIC FLUID 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, WITHIN A FEW HOURS, BY A DOCTOR FAMILIAR WITH THIS TYPE OF INJURY.

FLUID RECOMMENDATIONS

We strongly recommend the use of Mobil AW32 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 AW 32 has proven to be suitable for use in all climates. For continued operation in temperatures below 32° F (0° C), use of Mobil AW 32 HYDRAULIC FLUID is satisfactory.

For operation in tropical climates, the use of Mobil AW 68 is allowable.

HYDRAULIC FLUID ANALYSIS

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

- Any time the 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 element is plugged.
- Any time the hydraulic filter element shows signs of metal contamination.
- Once every six months, under normal operating conditions.
- Every 3 months, in extremely dusty or dirty operating conditions.

HYDRAULIC FLUID ANALYSIS (CONTINUED)

The hydraulic fluid analysis must be done by a qualified laboratory. To ensure 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 for recommended hydraulic fluid and/or your records).
- Model and serial number of unit from which sample was taken.
- Purpose of analysis: pump failure, discoloration, etc.
- Type of analysis: complete to show additive breakdown, acid buildup, viscosity, type and percent of contaminants; also, comparison to new fluid and recommendations.

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

Following the above guidelines will prevent premature failure of pumps, cylinder seals and drive motors, and unnecessary down time.

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

SYSTEM FLUSHING PROCEDURE

1. With platform fully down, drain hydraulic fluid from hydraulic tank into a clean, empty container. Use an oil filter cart so the fluid may be reused if analysis is good.
2. When the hydraulic tank is empty, remove suction strainer and hose.
3. Remove three (3) return line hoses at back of hydraulic tank.
4. Remove the return filter and hoses.
5. Flush the hoses with clean hydraulic fluid.
6. Discard old return filter element and replace.
7. Flush out the tank with hoses removed from the hydraulic tank.
8. Reinstall all hoses removed in the previous steps.
9. If the hydraulic fluid removed from the reservoir is good, pump it through a filter cart back into the tank. If fluid is not usable, dispose of it properly. Fill hydraulic tank with filtered, fresh hydraulic fluid (refer to Lubrication Chart).
10. Loosen output hose fittings at pump for pump to flood with hydraulic fluid. Tighten fittings.
11. Start up the unit. Briefly operate all functions. Two or three full lift cycles may be necessary to purge all air from lift cylinders.
12. When the above procedures have been completed, fill hydraulic tank to full mark on sight gauge.
13. Check for leaks and correct as necessary. Unit is now ready to be placed back in operation.

HYDRAULIC SYSTEM FUNCTIONAL DESCRIPTION

The hydraulic pump continuously pulls fluid from the reservoir, and outputs it back to the reservoir via a normally open loop valve. When a function is selected, the loop valve closes and fluid flows to operate the function. If the loop valve fails closed, the loop relief valve opens when pressure builds up to 3300 PSI (227 Bar, 232 kg/ cm^2), and returns flow to the reservoir.

When pressure builds up to 2900 PSI (200 Bar, 204 kg/cm^2) the system pressure relief valve triggers, returning hydraulic fluid back to the reservoir.

The drive handle at the platform console controls a solenoid operated proportional flow valve that pilots open a valve should pressure exceed 2900 PSI, and a directional control valve which directs fluid to the hydraulic drive motors for forward or reverse movement.

The motion control valve with brake shuttle valve uses two counterbalance valves to prevent uncontrolled movement. It also directs fluid flow to the brake cylinder which is integrated into the brake assembly (see Mechanical Section). Then flow releases the spring applied brake, allowing the scissors lift to move. When flow is cut off to the brake cylinder the brake is applied, which functions as a parking brake, arresting motion while the unit is stationary.

Steering is accomplished via a directional control valve which directs fluid to the steer cylinder for turning left or right.

The lift valve shifts providing free flow to the lift cylinders. Rate of flow is determined by the pressure compensated flow control valve. When the platform is lowered, the lift valve spool permits fluid flow back to the reservoir through the velocity fuse, the flow control valve and holding valve. The flow control valve orifice controls the rate of descent. When pressure in the lift circuit reaches 2600 PSI, the lift pressure relief valve returns flow to the reservoir.

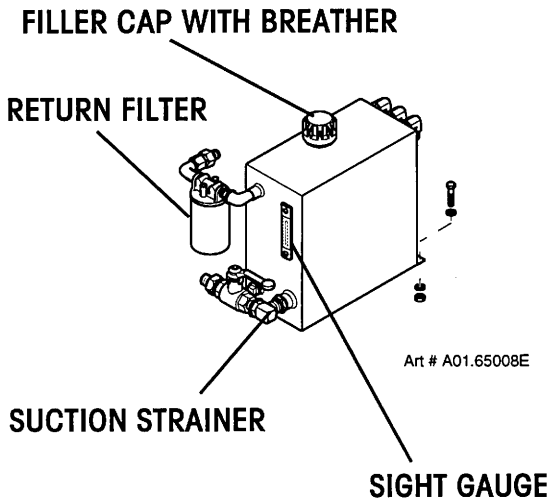
HYDRAULIC SYSTEM COMPONENTS

HYDRAULIC FLUID RESERVOIR

The hydraulic fluid reservoir consists of the tank, a filler cap with breather, a suction strainer, a drain plug, a sight gauge, a return filter and a high pressure filter (optional) with a 10 micron filter element.

Perform the following steps weekly.

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



Hydraulic Reservoir Assembly.

HYDRAULIC FILTER

All machines have a return filter. It is a 10 micron spin-on, bypassing filter. When the filter is clogged, hydraulic flow bypasses the filter element. Some machines have a high pressure filter, which is a non-bypassing filter. It allows maximum fluid flow as long as the filter element is free of contaminants. When the filter is clogged, it shuts down the hydraulic flow but will not crush the filter element due to a differential pressure limiting valve. The build-up of pressure across the filter will affect system performance and act as an indication of a clogged filter. The filter elements must be changed every 6 months or 500 hours, or when the high pressure filter element is changed, whichever occurs first.

HYDRAULIC PUMP

A gasoline or optional Diesel engine drives the single stage, hydraulic gear pump. The pump provides hydraulic fluid flow to operate the machine functions at 16 GPM. There are no adjustments on the pump.

LOOP VALVE

The loop valve is a normally open solenoid operated poppet valve. It allows hydraulic fluid to return to hydraulic reservoir when no function is selected. When a function is selected, the spool shifts, blocking the flow to the reservoir. It requires no adjustment and a seal kit is available.

LOOP PRESSURE RELIEF VALVE

The loop pressure relief valve is a differential poppet relief valve used as a pressure limiting device. It is preset at the factory to 3300 PSI (227 Bar, 232 kg/ cm^2).

To adjust loop pressure relief valve:

1. Loosen seal nut.
2. Run the engine but do not select a function, and check reading.
3. Use a hex key to adjust pressure. Backing out hex socket screw decreases pressure.
4. Tighten seal nut.

SYSTEM PRESSURE RELIEF VALVE

The system pressure relief valve is a differential poppet relief valve used as a pressure limiting device. It is preset at the factory to 2900 PSI (200 Bar, 204 kg/ cm^2).

To adjust system pressure relief valve:

1. Loosen seal nut.

2. Run the engine and activate the steer function. Check reading with the steer cylinder activated after it has reached the limit of its travel in one direction.
3. Use a hex key to adjust pressure. Backing out hex socket screw decreases pressure.

4. Tighten seal nut.

DRIVE/ STEER SYSTEM

The drive/ steer system consists of a proportional drive valve, a directional drive valve, a motion control valve, a freewheel valve, two hydraulic drive motors, and a steer valve and steer cylinder.

DIRECTIONAL DRIVE VALVE

The drive valve is a 3 position, 2-way, spring centered directional control valve. It is also a motoring spool type, open center valve. The coils can be replaced if faulty, and there is a replacement seal kit available.

DRIVE PROPORTIONAL VALVE

The drive proportional valve is a solenoid operated electrical proportional flow control valve. It also has a valve piloted to tank if the pressure in the drive circuit is greater than 2900 PSI. The coil can be replaced if faulty, and there is a replacement seal kit available.

MOTION CONTROL VALVE

The motion control valve consists of a dual piloted open, spring closed, set of dual counterbalance valves, and a brake shuttle valve. The counterbalance valves are piloted open by system pressure. The brake shuttle valve allows fluid to flow to the brake cylinders when the drive circuit is activated, thus releasing the brakes. The motion control valve requires no adjustment and a replacement seal kit is available.

FREEWHEEL VALVE

The freewheel valve is a manually operated valve. The closed position is for normal operation. The open position allows for free turning of the drive motors. It requires no adjustment.

HYDRAULIC DRIVE MOTORS

There are two hydraulic drive motors (four on four wheel drive), one for each wheel. They are not field repairable and should be replaced if leaking or faulty.

BRAKE FLOW CONTROL VALVE

The brake flow control valve is an in-line, variable orifice, hydraulic flow control. It also has a reverse free flow check. In operation, the orifice regulates the hydraulic fluid flow from the brake cylinder, which sets the time it takes for the brake to engage. To adjust this valve, close it completely, and then back off 1-1/4 turns.

BRAKE PRESSURE REDUCING VALVE

The brake pressure reducing valve is a spring opened relief valve. When pressure exceeds 400 PSI (27.5 Bar, 28 kg/ cm^2), the valve is piloted closed, diverting fluid flow back to the hydraulic reservoir. It is factory preset but can be adjusted in the field by backing out from the fully closed position 1/ 2 turn to set at 400 PSI.

BRAKE RELEASE PUMP AND VALVE

The brake release pump and valve is a manually operated system used to release the brakes when towing the machine. It requires no adjustment and a seal kit is available.

STEER VALVE

The steer valve is a 3 position, 2-way, spring centered solenoid directional control valve. It has two solenoids and is closed centered. The coils can be replaced if faulty, and there is a replacement seal kit available.

STEER CYLINDER

The cylinder is a double acting type. Refer to the Mechanical Section for cylinder assembly and disassembly, repair or replacement procedures.

LIFT SYSTEM

The lift system consists of a pressure compensated flow control valve, a lift valve on the lift/ steer manifold, a holding valve, a flow control valve and three lift cylinders equipped with velocity fuses, as well as an emergency lowering valve.

PRESSURE COMPENSATED FLOW CONTROL VALVE

The pressure compensated flow control valve is adjustable by varying the flow out the controlled flow port (CF). A handle on the valve adjusts this flow. Any remaining flow is bypassed to the excess flow port (EF). Lift speed is controlled by the pressure compensated flow control valve.

To adjust lift speed:

1. Place 1/2 the rated load capacity on the platform.
2. Position the stabilizers.
3. From fully lowered position, time the raising of the platform to full height. It should take approximately 37 seconds.
4. If required, adjust the pressure compensated flow control valve handle and repeat step 3, until raising of the platform to full height takes approximately 37 seconds.

LIFT/ LOWER VALVE MANIFOLD
(LATER MODELS)

The lift/ lower valve manifold contains a lift solenoid directional control valve, a lower solenoid directional control valve, a lift holding valve, two flow control valves (one for lift and one for lower function) and a lift pressure relief valve. The two solenoid valves are closed centered. When energized flow is metered to either raise or lower the platform. The lift pressure relief valve returns flow to the hydraulic reservoir when a pressure of 2600 PSI (179 Bar, 183 kg/ cm^2) occurs in the lift circuit.

LIFT VALVE

The lift valve is a 3 position, 2-way, spring centered solenoid directional control valve. It has two solenoids and is closed centered. The coils can be replaced if faulty, and there is a replacement seal kit available.

LIFT HOLDING VALVE (CHECK VALVES)

The holding valve is a solenoid operated valve which prevents flow from the cylinders in the de-energized state. When the solenoid coil is energized, the valve spool shifts, allowing flow from the lift cylinders to the hydraulic fluid reservoir.

LIFT FLOW CONTROL VALVE

The lift flow control valve restricts fluid flow **from** the lift cylinders, while providing free flow **to** the lift cylinders. It should be adjusted to approximately 2-1/4 turns from fully closed position for proper platform descent.

LIFT PRESSURE RELIEF VALVE

The lift pressure relief valve is a differential poppet relief valve used as a pressure limiting device. It is preset at the factory to 2600 PSI (179 Bar, 183 kg/ cm^2).

To adjust lift pressure relief valve:

1. Loosen seal nut.
2. Deploy stabilizers.

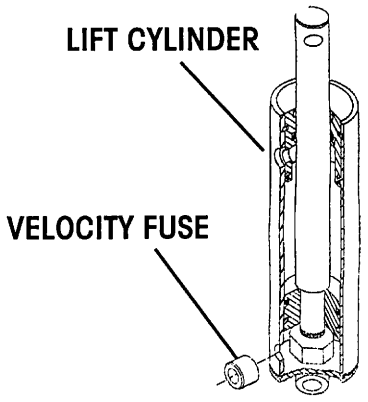
3. Run the engine and activate the lift function. Check reading with the lift cylinders activated after they have reached the maximum limit of their stroke.

4. Use a hex key to adjust pressure. Backing out hex socket screw decreases pressure.

5. Tighten seal nut.

LIFT CYLINDER

There are three hydraulic cylinders in this scissors lift circuit. The cylinders are of the double acting type. Refer to the Mechanical Section of this manual for cylinder assembly and disassembly, repair or replacement procedures.



Typical Lift Cylinder with Velocity Fuse.

VELOCITY FUSE

There is one velocity fuse on each lift cylinder which acts as a holding valve. A 5 GPM velocity fuse is used on each of the top and bottom lift cylinders and a 6 GPM velocity fuse is used on the middle lift cylinder. Replace if faulty.

EMERGENCY (MANUAL) LOWERING VALVE

This valve is a manual shut off valve located on the chassis. It is used only in emergency situations. During normal operation the valve should be in the "NORMAL OPERATION" position. Replace if faulty.

STABILIZER SYSTEM

The stabilizer system consists of a directional control valve, a pressure reducing valve, four lock valves, four stabilizer cylinders and a pressure switch.

DIRECTIONAL STABILIZER VALVE

The stabilizer valve is a 3 position, 2-way, spring centered directional control valve. It is also an open center valve. The coils can be replaced if faulty, and there is a replacement seal kit available.

STABILIZER PRESSURE REDUCING VALVE

The stabilizer pressure reducing valve is a spring opened relief valve. When pressure exceeds 600 PSI (41 Bar, 42 kg/ cm^2), the valve is piloted closed, diverting fluid flow back to the hydraulic reservoir. It is factory preset but can be adjusted in the field by backing out 3/4 turn from fully closed position to set at 600 PSI.

LOCK VALVE

The lock valve is a double cross pilot check valve. They open whenever pressure is applied in either direction. There is a lock valve for each of the four stabilizer cylinders. A replacement seal kit is available.

STABILIZER PRESSURE SWITCH

The stabilizer pressure switch is a normally open hydraulically activated control which closes at 600 PSI. When closed, it provides an electrical ground for the lift circuit so that the platform may be fully raised.

STABILIZER CYLINDER

There are four hydraulic cylinders in this stabilizer circuit. The cylinders are of the double acting type. Refer to the Mechanical Section of this manual for cylinder assembly and disassembly, repair or replacement procedures.

OUTRIGGER SYSTEM

The outrigger system consists of directional control valves, pressure reducing valve(s), four lock valves, four stabilizer cylinders and a pressure switches.

DIRECTIONAL OUTRIGGER VALVE

This outrigger valve is a 3 position, 2-way, spring centered directional control valve. It is also an open center valve. The coils can be replaced if faulty, and there is a replacement seal kit available. For the side by side outriggers, there are two dirrectional valves. For the 4 indiependent outriggers, there are four directional valves.

OUTRIGGER PRESSURE REDUCING VALVE

The outrigger pressure reducing valve is a spring opened relief valve. When pressure exceeds 600 PSI (41 Bar, 42 kg/ cm^2), the valve is piloted closed, diverting fluid flow back to the hydraulic reservoir. It is factory preset but can be adjusted in the field by backing out 3/4 turn from fully closed position to set at 600 PSI. For the side by side outriggers, there are two pressure reducing valves. For the 4 indiependent outriggers, there are four pressure reducing valves.

LOCK VALVE

The lock valve is a double cross pilot check valve. They open whenever pressure is applied in either direction. There is a lock valve for each of the four outrigger cylinders. A replacement seal kit is available.

OUTRIGGER PRESSURE SWITCH

The outrigger pressure switch is a normally open hydraulically activated control which closes at 600 PSI. When closed, it provides an electrical ground for the lift circuit so that the platform may be fully raised. For the side by side outriggers, there are two pressure switches. For the 4 indiependent outriggers, there are four pressure switches.

OUTRIGGER CYLINDER

There are four hydraulic cylinders in this outrigger circuit. The cylinders are of the double acting type. Refer to the Mechanical Section of this manual for cylinder assembly and disassembly, repair or replacement procedures.

SECTION 3:
ELECTRICAL SYSTEM

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ELECTRICAL SYSTEM

The following section is a description of maintenance for the major electrical components.

BATTERY

A 12 volt battery supplies the electrical power required to operate the electrical circuits.

BATTERY MAINTENANCE (IN STORAGE)

Follow these procedures for maintenance of battery on a machine not in use:

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

Never stack one battery directly on top of another, because 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

BATTERY MAINTENANCE (IN USE)

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 with 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 battery clean. Wash the top of the battery, 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 battery if there is an accumulation of acid.

BATTERY PREVENTIVE MAINTENANCE

Once a month, after battery has been charged, spot check the specific gravity of two or more cells. A fully charged battery should indicate 1.28 specific gravity. If low readings are noted, check the following:

- Check terminals for corrosion, loose connections and broken or frayed cables.
- Check all cells with a hydrometer for variance 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:

⚠WARNING

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

Always disconnect the negative battery cables first.

Remove bolts holding battery to chassis.

Lift the battery from the chassis. Put the battery to the side and dispose of properly.

⚠ CAUTION

Always connect the positive battery cable first.

To install battery, lift and position it on chassis. Secure battery in position with wing nuts and battery hold downs. Connect battery cables.

MOVEMENT ALARM (OPTIONAL)

The movement alarm is activated as soon as the platform console drive lever is moved off the center "Neutral" position.

⚠WARNING

THE MOVEMENT ALARM IS PROVIDED FOR YOUR PROTECTION, AND PROTECTION OF PERSONS WORKING IN IMMEDIATE AREA. DISABLING THIS IMPORTANT SAFETY DEVICE MAY RESULT IN DEATH OR SERIOUS INJURY.

TILT ALARM (OPTIONAL)

The tilt alarm gives an audible warning when the machine is five degrees or more out of level. To replace the tilt alarm, remove it from its support and disconnect the wires.

TILT ALARM TEST

The alarm can be tested by manually tipping the alarm sensor. This "Push-to-Test" feature enables tilt alarm to be tested without losing its adjustment. 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 (there is approximately a three second delay).

If the alarm does not sound, the flange nuts have been tightened too far. Loosen the nut on the 90° corner and repeat this test procedure.

TILT ALARM ADJUSTMENT

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

Level the base of the alarm by tightening each of the

three flange nuts on top of the spring loaded assembly and check it with a level.

Check that the electrical connections are correct.

DESCENT ALARM (OPTIONAL)

The descent alarm gives an audible warning when the platform is being lowered. To replace the descent alarm, remove it from the ground electrical box and disconnect the wires.

RELAY

The relays are located in the ground control box. (Refer to the schematic at the end of this manual for relay functions and interconnect.)

EMERGENCY STOP BUTTON

There are two emergency stop buttons: one on the platform control console and the other at ground control box.

When the emergency stop button is pressed, all functions stop immediately and the wheel brake is automatically applied. Pull out or turn the button clockwise to reset.

To replace the emergency stop button, remove the four control console cover screws to gain access for button removal. Remove the appropriate button mounting screws and wires.

ELECTRICAL AND CONTINUITY CHECKS

To check continuity of a toggle switch:

1. Disconnect wires and connect one probe of ohm meter to connection on toggle switch and other probe on other connection.

2. When toggle is open, there should be no reading, and when closed there should be a low reading.

To check continuity of key switch:

1. Disconnect wires and connect one probe to common of key switch and the other probe to normally open terminal.

2. When switch is flipped, there should be a low resistance.

To check continuity of emergency stop button:

1. Disconnect wires and connect one probe of ohm meter to connection on button and other probe on other connection.

2. There should be no reading with the button pressed and a low resistance with it reset.

To check relay operation:

1. With one connection grounded, apply voltage to other relay connection.

2. Confirm normally closed contacts are opening, or normally open contacts are closing.

To check limit switch operation.

1. Disconnect wires.

2. With one probe of ohm meter to common and other probe to open contact, move limit switch arm. Low resistance should be seen.

3. With one probe of ohm meter to common and other probe to closed contact. Low resistance should be seen. Move limit switch arm and no resistance should be seen.

SECTION 4:
MECHANICAL COMPONENTS

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MECHANICAL COMPONENTS

Following is a description of the major mechanical components of this Scissors Lift.

CHASSIS

⚠ CAUTION

When steam cleaning the undercarriage, cover electrical components, to prevent water damage.

Steam clean the chassis once a year, and inspect all welds and brackets. Check for cylinder pins that turn in their mountings, which will indicate sheared retaining pins.

TIRES

Inspect the tires for cuts, chunking, sidewall damage or abnormal wear. Any tire faults MUST BE CORRECTED before further machine operation. Refer to Illustrated Parts Catalog for replacement tires.

⚠ DANGER

FAILURE TO USE APPROVED PARTS MAY CAUSE DEATH OR SERIOUS PERSONAL INJURY.

NOTE: Replace tires with the correct tires to maintain the rating of this equipment.

CHANGING TIRES

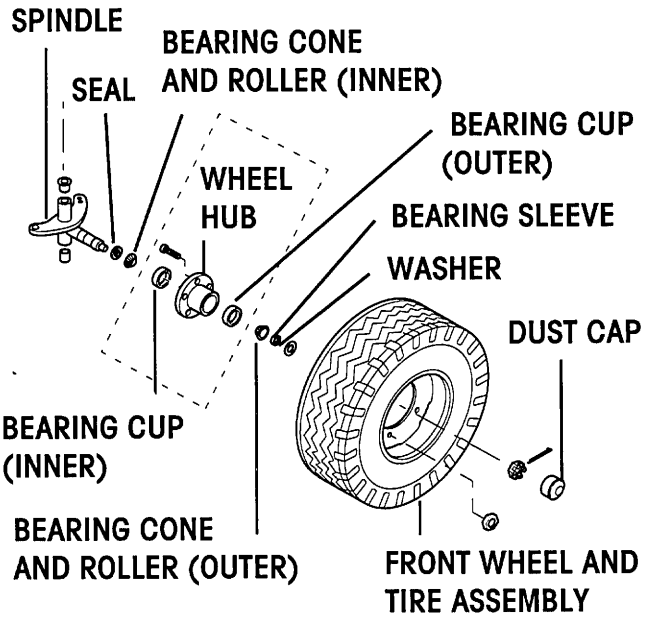
1. Chock tires on one end of unit and raise the other end of unit.
2. Loosen and remove lug nuts, and pull wheel off.
3. Install the replacement wheel.
4. Fasten lug nuts, and tighten to proper torque (see Machine Specifications).
5. Lower the machine and remove the chocks.

WHEELS AND LUG NUTS

Check the torque of the wheel lug nuts (see Machine Specification) and examine the wheel rims for tightness and damage.

REPACKING FRONT WHEEL BEARINGS (2 WHEEL DRIVE)

1. Block the rear tires and raise the front end of undercarriage.
2. Remove front wheels.
3. Remove dust cap.
4. Remove cotter pin and pull the front hub assembly from the spindle assembly.
5. Remove flat washer, outer cup bearing sleeve, outer bearing and outer bearing cup from each wheel hub.



Front Wheel Bearings.

6. Remove the inner bearing cup and cone.

7. Inspect the inner and outer bearing cups for wear. If they are excessively worn or damaged, replace the appropriate front hub assembly.

8. Thoroughly clean the inner and outer bearings. Inspect them for signs of wear. If they are excessively worn or damaged, replace them.

9. Pack the inner and outer bearings with grease. (Refer to lubrication chart, earlier in this manual.)

10. Assemble the front hub and install it on the spindle assembly. Install grease cap.

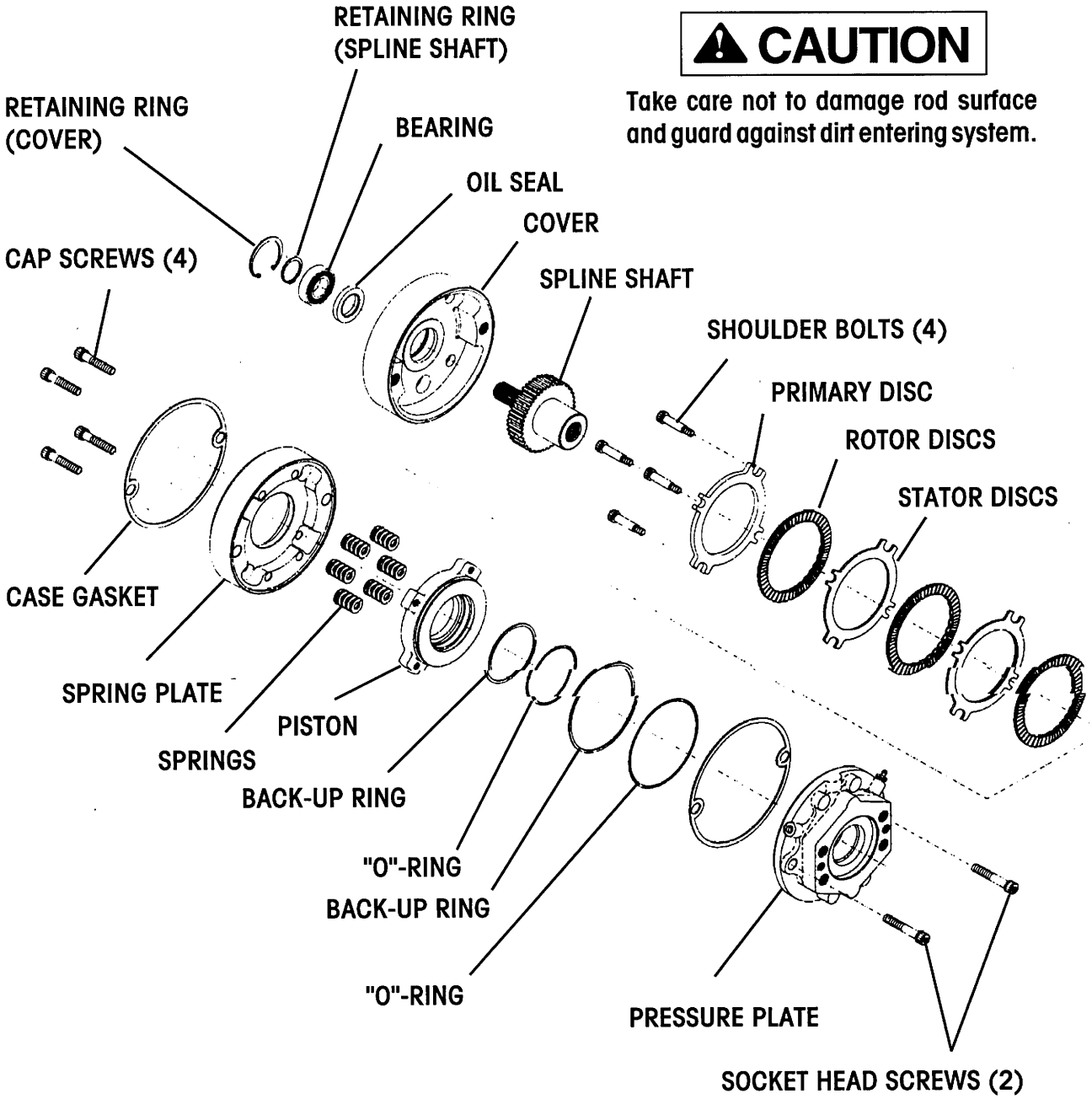
11. Replace the wheels and tighten to proper torque. (Refer to "Machine Specifications".)

STEER CYLINDER SEAL REPLACEMENT

The steer cylinder is of the double acting type. During operation, the cylinder should not leak, but a slight dampness at the rod seal is acceptable. The pins should be checked for wear.

⚠ CAUTION

Take care not to damage rod surface and guard against dirt entering system.



Brake Assembly.

1. Disconnect and plug the two hydraulic hoses to cylinder and cylinder ports.
2. Take the steer cylinder from the chassis by removing the two pins that hold it in place.
3. Remove rod gland.
4. Remove cylinder rod and piston.
5. Replace seals.
6. Carefully, slide the cylinder rod and piston into the cylinder body assembly.
7. Secure the rod gland in place.
8. Secure the steer cylinder in place with the two pins.
9. Unplug and reconnect the two hydraulic hoses.

BRAKE DISASSEMBLY

1. Remove two socket head assembly screws from pressure plate. A suitable holding fixture is useful to keep brake in position.
2. Remove pressure plate and spring plate assembly from cover.
3. Remove cover and spline shaft assembly from reducer.
4. Remove retaining ring from spline shaft.
5. Remove spline shaft from cover by tapping male end of spline shaft with soft mallet.
6. Remove retaining ring from cover and press out oil seal and bearing, if required.
7. Remove four socket head shoulder bolts. A suitable holding fixture is useful to hold brake in position.

⚠ CAUTION

Do not remove shoulder bolts without pressurization of brake (approximately 300 psi/ 20.7 Bar/ 21 Kg-m) or damage may result.

8. Remove primary disc, rotor discs and stator discs.
9. Release pressure to brake before removing four socket head cap screws.
10. Remove case gasket from spring plate.
11. Before removing springs, note pattern and color for reassembly purposes.
12. Remove piston by carefully exerting hydraulic pressure through brake release port on pressure plate.
13. Remove "O"-rings and back-up rings from piston. Care must be taken not to scratch or mar piston.
14. Remove case gasket from pressure plate.

BRAKE ASSEMBLY

1. Lubricate all rubber components from repair kit with clean Mobil AW32. Clean all parts thoroughly before assembling.
2. Install back-up rings on piston toward spring pockets.
3. Install "O"-rings on piston toward spring pockets. Be sure "O"-rings are flat and all twists removed. Care must be taken not to scratch or mar piston.
4. Lubricate piston with clean Mobil AW32. Carefully press piston into pressure plate. Be sure piston is oriented such that threaded holes in piston are in alignment with thru holes in spring plate when installed.

5. Install springs according to pattern and color noted during disassembly. Different colored springs must be alternated.

6. Affix case gaskets to pressure plate and spring plate.

7. Place pressure plate assembly on a press. Using fixture, depress spring plate, and install four socket head assembly bolts. After applying one or two drops of Loctite #242 to threads, torque bolts to 35 - 40 ft-lbs. (47.5 - 54.2 Nm/ 4.8 - 5.5 Kg-m) A suitable holding fixture is useful to hold brake in position.

8. Install rotor discs and stator discs. Begin with a rotor disc and alternate with stator discs. For high torque models with four rotors and four stators, the last stator should be assembled next to the primary disc.

9. Install primary disc.

10. Align discs using spline shaft and partially screw in four socket head shoulder bolts. Bolts should have one or two drops of Loctite #242 applied to threads. Inspect for free movement of stack. Pressurize brake release port (approximately 300 psi/ 20.7 Bar/ 21 Kg-m) to release discs. Torque shoulder bolts to 15-18 ft-lbs. (20.3 - 24.4 Nm/ 2 - 2.5 Kg-m) and release pressure. A suitable holding fixture is useful to hold assembly in position.

11. Recheck that rotors are in line and centered in assembly with spline shaft. The shaft should move smoothly through lining stack.

12. Press oil seal with open side facing pilot end of cover until flush with bearing shoulder.

13. Press bearing into position until it bottoms out on oil seal borestep.

14. Install retaining ring into cover.

15. Press spline shaft into bearing until shaft bottoms on shaft shoulder. Bearing inner race must be supported during this operation.

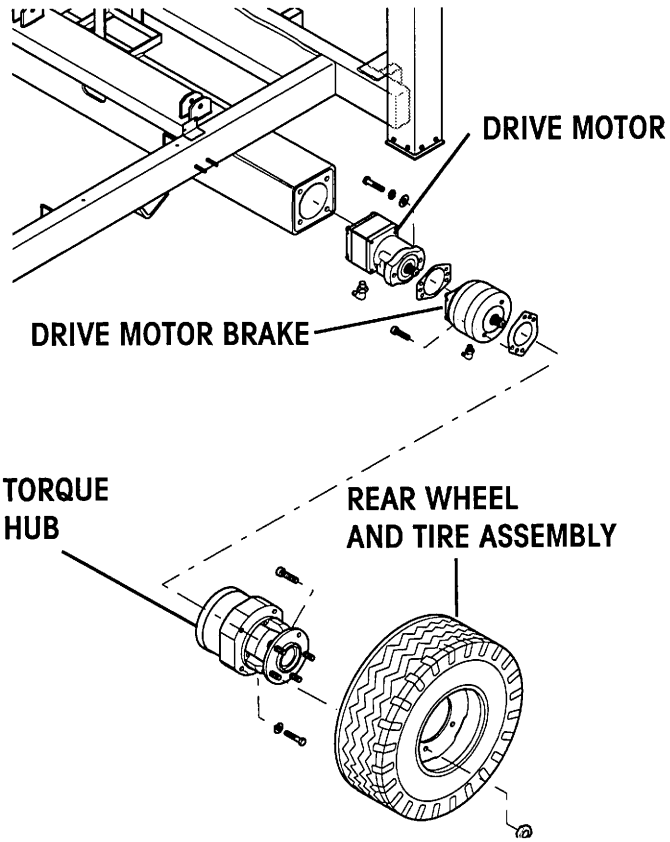
16. Install retaining ring on spline shaft.

⚠ CAUTION

If hydrostatic bench testing is performed on the brake assembly, release pressure should not exceed 1000 psi (69 Bar/ 70.3 Kg/cm²), unless four additional bolts are used for supplemental clamping.

DRIVE MOTORS

The drive motors are not field repairable. If they are leaking or damaged, replace them. To remove them, the tire and wheel assembly must be removed before unbolting drive motors.



Rear Drive Assembly.

HOSES AND CABLE

Inspect all hoses and electrical cable for security and damage. Hoses and cable should be examined for rubbing and chafing. Check for leaks at fittings. REPLACE ANY DAMAGED HOSES OR CABLE.

PLATFORM REMOVAL

1. Raise platform about three feet (one meter) and block the arms in the raised position. Also, connect hoist to platform.

2. Disconnect all platform hydraulic hoses from the platform console (traversing deck cylinder and traversing deck position sensing valve, if so equipped), and thread it through the access hole in the floor.

3. Remove the two (2) pins from each platform bracket at the rear of the unit.

4. Slide platform off the back end of the unit.

PLATFORM INSTALLATION

1. With scissors arms raised about three feet, slide platform onto back of machine.

2. Secure platform with pins to upper scissors arm brackets at the rear of the unit.
3. Connect platform cable to the platform console by threading it through the access hole in the floor.

4. If so equipped, connect hydraulic hoses to the traversing deck cylinder and traversing deck position sensing valve.

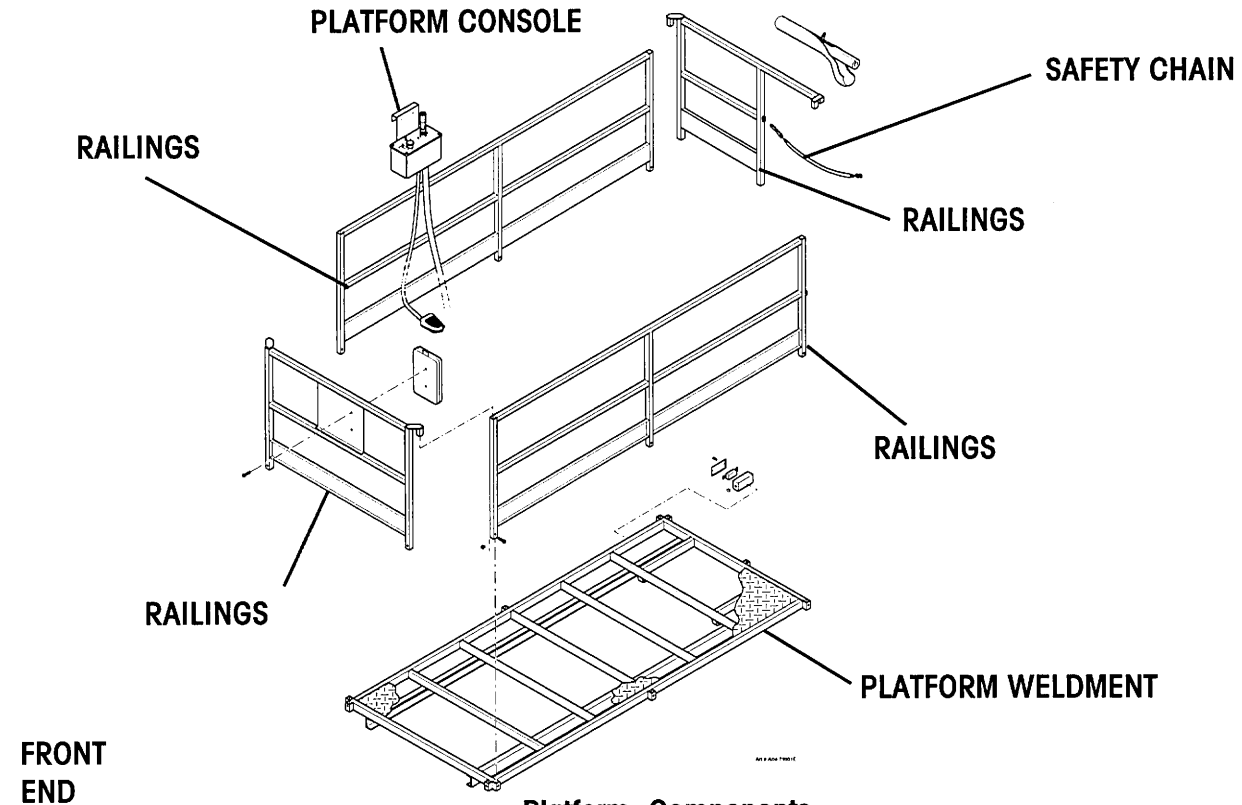
PLATFORM RAIL REPLACEMENT

To remove the railings:

1. Support the railing.

2. Remove the lock nut and hex head capscrew at each post.

3. Lift railing away.



Platform Components.

To install the railings:

1. Support railing in position.
2. Install hex head capscrew and lock nut. Tighten hex head capscrew.

TRAVERSING DECK CYLINDER REMOVAL (OPTIONAL)

NOTE: The traversing deck cylinder can be removed with the platform installed or removed from the scissors arm. If traversing deck cylinder is removed with platform in position, the platform must be raised about three feet (one meter) and the scissors arm blocked in the raised position. Also, connect hoist to platform.

1. Disconnect hoses to the traversing deck cylinder.
2. Remove roll pin from the rod end cylinder pin.
3. Slide out rod end cylinder pin and any flat washers.
4. Support the cylinder.
5. Remove roll pin from base end cylinder pin.
6. Slide out base end cylinder pin.
7. Traversing deck cylinder is now free to be removed from the platform.

TRAVERSING DECK CYLINDER INSTALLATION (OPTIONAL)

1. Position traversing deck cylinder and support it in position.
2. Install base end cylinder pin and secure it with the roll pin.
3. Install rod end cylinder pin and secure it with roll pin. Flat washers may be added between cylinder and cylinder mounting ears to avoid end play.

TRAVERSING DECK CYLINDER SEAL REPLACEMENT (OPTIONAL)

1. Remove traversing deck cylinder.

⚠ CAUTION

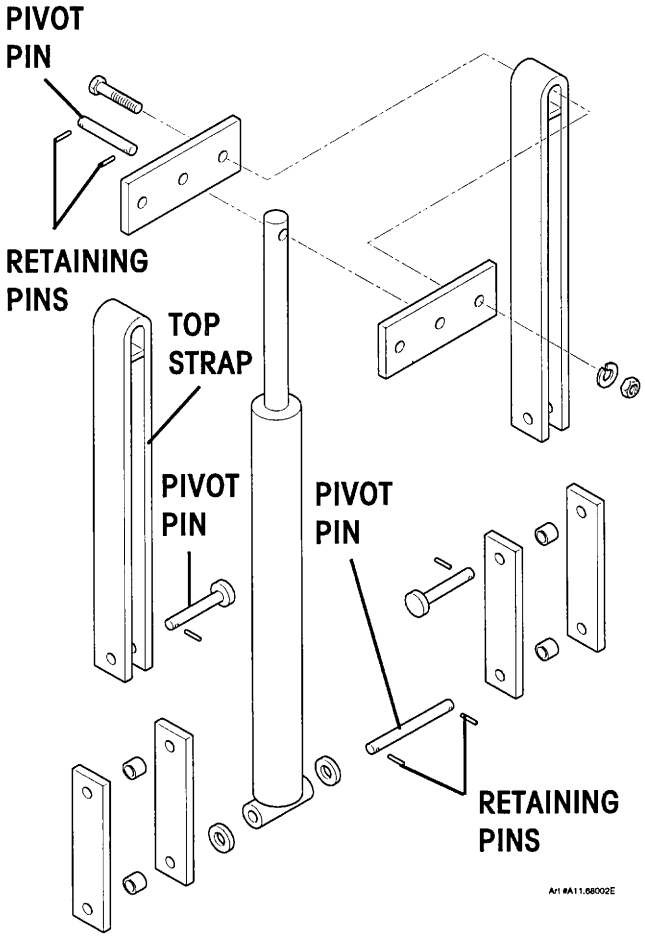
Take care not to damage rod surface. Guard against dirt entering the system.

2. Remove end gland from cylinder.
3. Remove cylinder shaft and piston.
4. Remove seals.
5. Replace traversing deck cylinder seals.
6. Replace cylinder shaft and piston.
7. Secure end gland to cylinder.
8. Replace traversing deck cylinder in the unit.

LIFT CYLINDER REMOVAL

1. Support extended scissors arm assembly.
2. Disconnect hoses to the lift cylinder.
3. Remove retaining pins and rod end pivot pin, and rest rod end of lift cylinder.
4. Remove retaining pins and base end pivot pin. There is a spacer and washer on each side of the base end of the cylinder.
5. The lift cylinder is now free to be removed from the unit.

NOTE: If required to replace lift cylinder mounting assembly, remove the pivot pins and retaining pins that secure it to the corresponding scissors arm.



Lift Cylinder Mounting Assembly.

LIFT CYLINDER INSTALLATION

NOTE: Scissors arm assembly must be installed in the unit to perform this procedure.

If required to install lift cylinder mounting assembly, attach it to the corresponding scissors arm with the pivot pins and retaining pins.

1. Support extended scissors arm assembly.
2. Slide base end of lift cylinder into position and secure it in place with pivot pin and retaining pins. Ensure that spacers and washers are in place.
3. Reconnect hoses.
4. Slide rod end of lift cylinder into position and secure it in place with pivot pin and retaining pins.

LIFT CYLINDER SEAL REPLACEMENT

1. Remove scissors lift cylinder.

⚠ CAUTION

Take care not to damage rod surface. Guard against dirt entering the system.

2. Remove end gland from lift cylinder.
3. Remove cylinder shaft and piston.
4. Remove seals.
5. Replace scissors lift cylinder seals.
6. Replace cylinder shaft and piston.
7. Secure end gland to lift cylinder.
8. Replace scissors lift cylinder in the unit.

SCISSORS ARMS ASSEMBLY

Clean the scissors arms once a year and inspect along the scissors structure, especially welds and brackets.

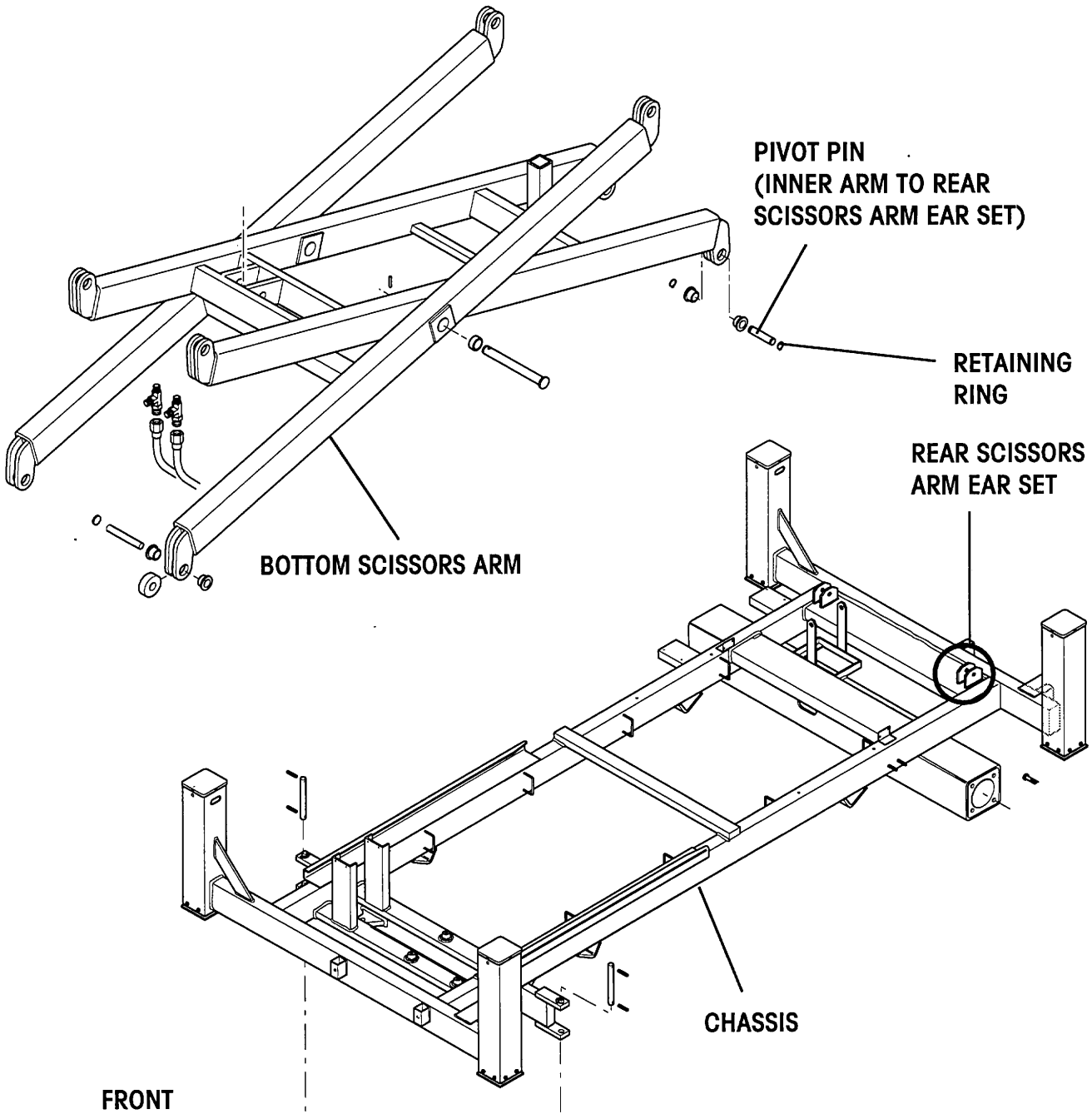
SCISSORS ARM REMOVAL

1. Remove platform. (See Platform Removal.)
2. Disconnect hoses and cable between scissors arms and undercarriage.
3. Remove four lift cylinders and hoses. (See Lift Cylinder Removal.)
4. Grind out welded front bottom scisors arm roller pins and remove pins and rollers.
5. Remove retaining pins from rear bottom scissors arm and remove pivot pins.
6. Lift off scissors arm assembly with a hoist.

SCISSORS ARM INSTALLATION

1. Lower scissors arm assembly onto chassis with a hoist.
2. Install pivot pins and retaining pins onto rear bottom scissors arm and scissor arm ears.
3. Install roller pins and rollers onto front bottom scissors arm, but do not weld them in place.
4. Check alignment of scissors arm.
   a. At the rear, the bottom scissors arm outer tube must align with the outer frame rail.
   b. At the front, the rollers must fit squarely with the chassis frame and roller track.
5. If scissors arm is aligned with the chassis, proceed to step 16.

   If scissors arm is **NOT** aligned with the chassis, proceed to step 6.
6. Remove retaining pins from rear bottom scissors arm and remove pivot pins.
7. Lift rear of scissors arm assembly with a hoist.
8. Carefully, grind out one set of rear scissors arm ears welded to the chassis.
9. Weld the set of scissors arm ears removed in step 8 onto rear bottom scissors arm.
10. Lower the scissors arm assembly in place and secure it to the remaining set of scissors arm ears.
11. Align scissors arm to chassis.
    a. At the rear, the lower scissors arm outer tube must align with the outer frame rail.
    b. At the front, the rollers must fit squarely with the chassis frame and roller track.
12. Tack weld scissors arm ears removed in step 8.
13. Remove retaining pins from rear bottom scissors arm and remove pivot pins.
14. Lift rear of scissors arm assembly, and finish welding scissors arm ears in place.
15. Lower rear of scissors arm assembly, and install pivot pins and retaining pins onto rear bottom scissors arm and scissor arm ears.
16. Weld arm roller pins in place.
17. Install lift cylinders and platform. (See Lift Cylinder Installation and Platform Installation.)
18. Connect hoses and cable between scissors arms and chassis.

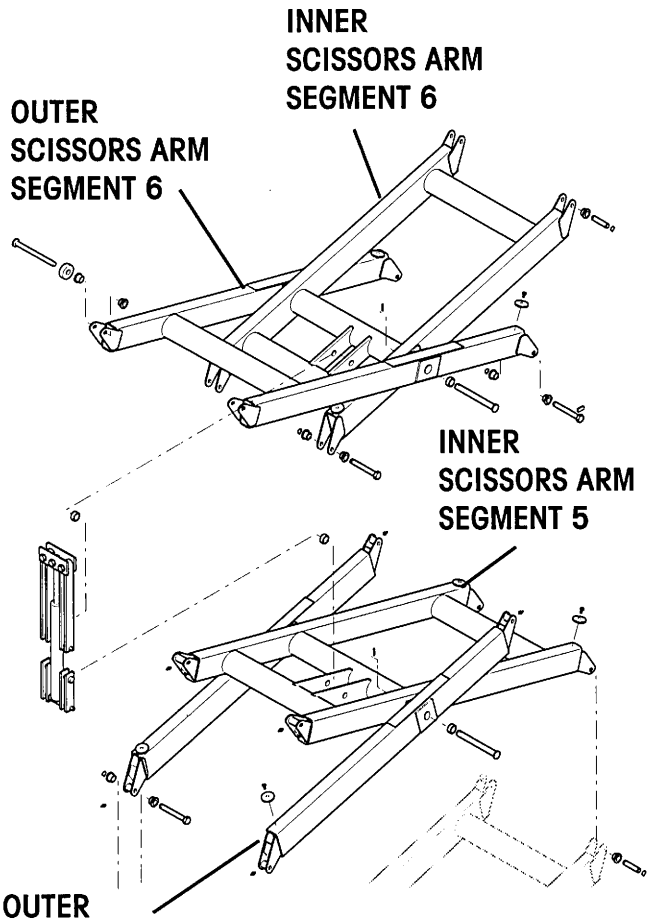


Scissors Arm Removal/ Installation.

SCISSORS ARM DISASSEMBLY

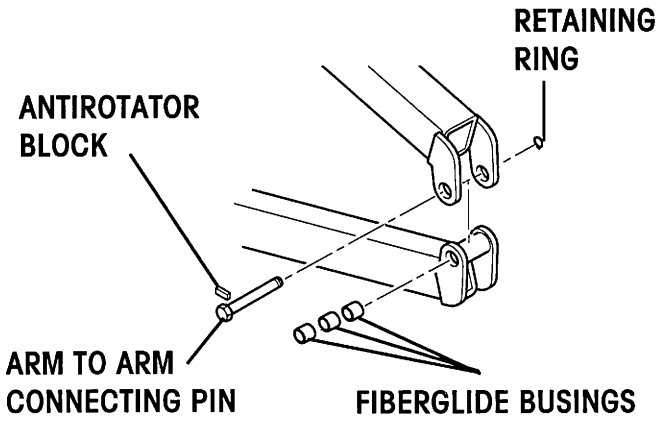
There are six sets of arms that comprise the vertical lifting mechanism. Each set is to be replaced as a pair. If one scissors pin or bushing is suspect, check all pins and bushings for wear or damage.

1. Remove platform from scissors arms. (Refer to Platform Removal in this section.)
2. Remove scissors arms from chassis. (Refer to Scissors Arm Removal in this section.)
3. Remove lift cylinders from scissors arm assembly. (Refer to Lift Cylinder Removal in this section.)
4. Remove electrical cables and corresponding hardware from scissors arm assembly.

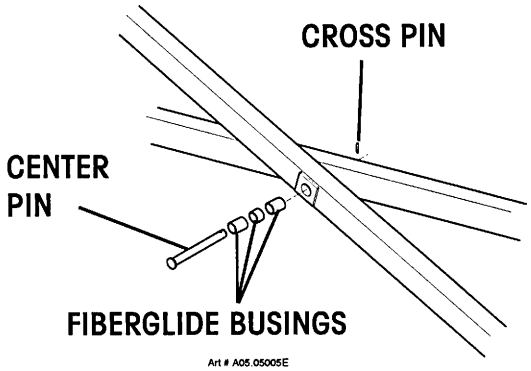


Upper Scissors Arm.

5. Lower the scissors arm assembly with a hoist.
6. Grind out tack welds on segment 6 outer scissors arm antirotator block that secure arm to arm connecting pin.
7. With a hoist, raise scissors arms for access to retaining rings.



Scissors Arm End Detail.



Scissors Arm Center Detail.

8. Remove retaining rings and remove arm to arm connecting pin.
9. Remove center cross pin and center pin.
10. With a hoist, lift off segment 6 outer scissors arm.
11. Raise the scissors arm assembly with a hoist.

12. Grind out tack welds on segment 6 inner scissors arm antirotator block that secure arm to arm connecting pin.

13. Remove retaining rings and remove arm to arm connecting pin.

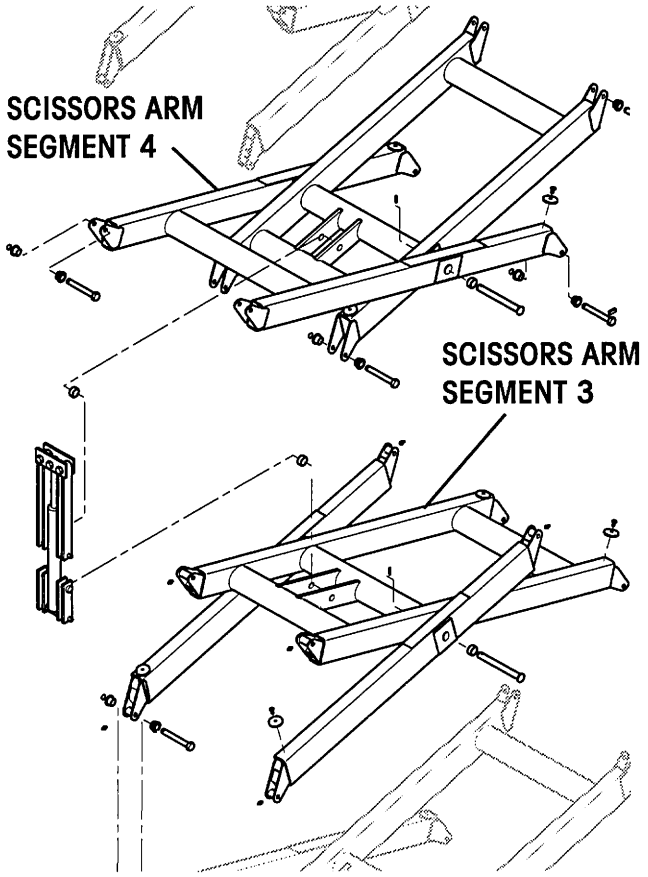
14. Remove center cross pin and remove center pin.

15. With a hoist, lift off segment 6 inner scissors arm.

16. Repeat steps 6 through 15 to disassemble segments 5, 4, 3, 2 scissors arms (in turn). For ease of disassembly remove the outer scissor arm and then remove the inner scissor arm.

17. Remove center cross pin and remove center pin from segment 1 scissors arm.

18. Remove retaining pins from rear inner scissors arm (segment 1) and remove pivot pins. Then, lift it off with a hoist.



Middle Scissors Arm.

SCISSORS ARM ASSEMBLY

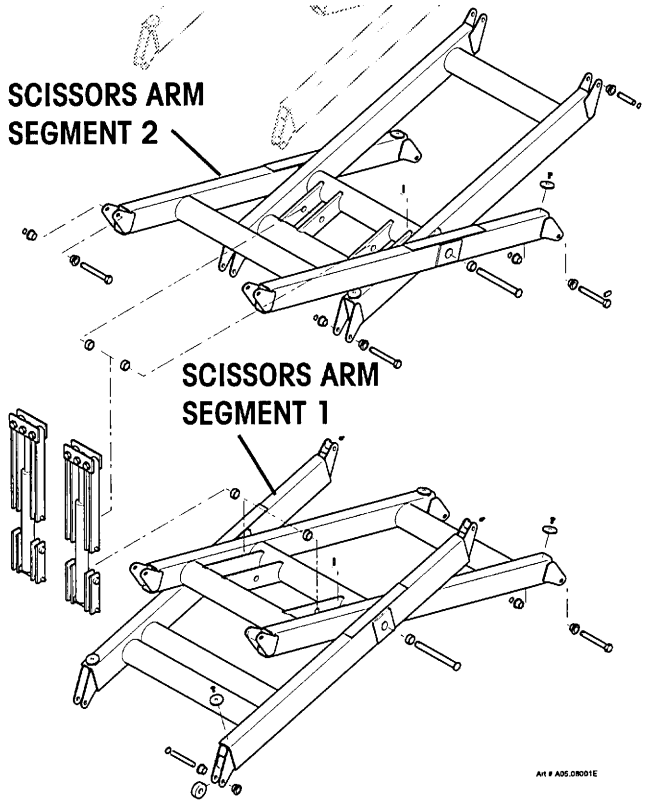
NOTE: For ease of assembly, coat all pins with a thin coat of high viscosity oil.

1. Inspect all pins and bushings for wear or damage.

   - If any scissors arm is damaged or worn, it is necessary to replace inner and outer arms as a set.

2. Assemble each segment of the scissors arms by inserting center pin through the outer and inner scissors arms, and secure them in place with center cross pin.

3. Block segment 1 in a slightly raised position.



Lower Scissors Arm.

4. With a hoist, position segment 2 over segment 1, and insert arm to arm connecting pins for both the inner and outer scissors arms. Also, install retaining rings onto the pins.

5. Tack weld the hex head of the pin to the antirotator blocks.

6. Block segment 2 in a slightly raised position.

7. With a hoist, position segment 3 over segment 2, and insert arm to arm connecting pins for both the inner and outer scissors arms. Also, install retaining rings onto the pins.

8. Tack weld hex head of the arm to arm connecting pin to the antirotator blocks.

9. Block segment 3 in a slightly raised position.

10. With a hoist, position segment 4 over segment 3, and insert arm to arm connecting pins for both the inner and outer scissors arms. Also, install retaining rings onto the pins.

11. Tack weld hex head of the arm to arm connecting pin to the antirotator blocks.

12. Block segment 4 in a slightly raised position.

13. With a hoist, position segment 5 over segment 4, and insert arm to arm connecting pins for both the inner and outer scissors arms. Also, install retaining rings onto the pins.

14. Tack weld hex head of the arm to arm connecting pin to the antirotator blocks.

15. Block segment 5 in a slightly raised position.

16. With a hoist, position segment 6 over segment 5, and insert arm to arm connecting pins for both the inner and outer scissors arms. Also, install retaining rings onto the pins.

17. Tack weld hex head of the arm to arm connecting pin to the antirotator blocks.

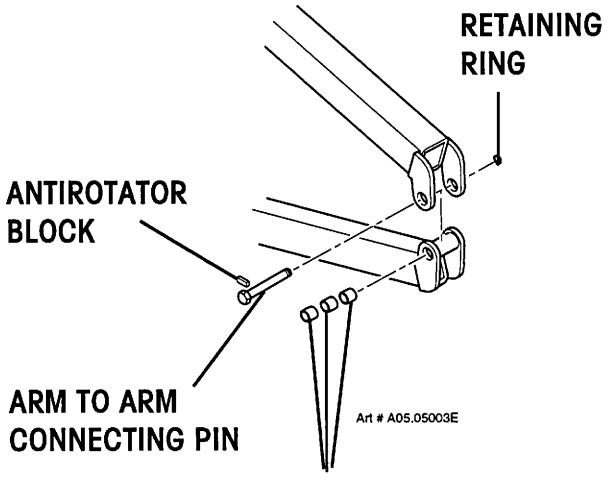
BUSHING REPLACEMENT

1. Disassemble the scissors arms. (See Scissors Arm Disassembly.)

2. Remove fiberglide bushings with bushing driver.

3. Replace fiberglide bushings with bushing driver.

4. Reassemble the scissors arms. (See Scissors Arm Assembly.)



Scissors Arm End Detail.

EMERGENCY HAND PUMP

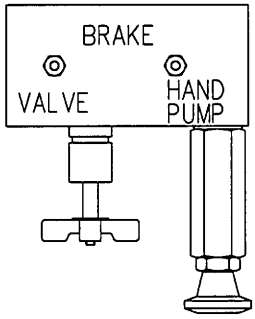
The hand pump is part of the brake release manifold located on the left rear of the chassis, and may be replaced if damaged or have o-rings replaced.

HAND PUMP REPLACEMENT

- Screw out the hand pump.
- Screw in the new hand pump.

HAND PUMP O-RING REPLACEMENT

1. Remove the hand pump from the brake release manifold.
2. Remove the bad "o"-ring (s).
3. Install the new "o"-ring (s).
4. Install the hand pump in the brake release manifold.



Brake Release Valve.

SECTION: 5
TROUBLESHOOTING

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GENERAL TROUBLESHOOTING TIPS

Before investigating a malfunction, check the following items:

- Check that battery connections are secure and battery is fully charged.
- Check that the Emergency Stop Button is released (pulled up).
- Check that hydraulic fluid is at the correct level.
- Check that the Emergency Lowering Valve is in normal operation position.
- Check that the Motor Release Valve is closed.
- Check that the Break Release Valve is open.
- Check that the Circuit Breaker is in the "ON" position.

Common Causes of Hydraulic System Malfunctions:

- Incompatible hydraulic fluids mixed, destroying the additives and causing varnish build up resulting in the valves to stick.
- Water in the hydraulic fluid due to a damp climate.
- Improper hydraulic fluid used; viscosity too high cold climates, viscosity too low warm climates.

NOTE: Mobil AW 32 is a multiple viscosity oil that is light enough for cold climates and resists thinning in warm climates.

TROUBLESHOOTING CHART

Problem	Probable Cause	Solution
• Excessive heat will cause abnormal wear on seals and metal parts due to lowered viscosity. Symptoms to watch for are: pump case turns brown, hydraulic fluid darkens and premature pump failure.	1. Excessive water in the hydraulic fluid.	1. Drain and flush hydraulic system. See Section 2, System Flushing Procedure.
	2. Improper oil viscosity.	2. Replace hydraulic fluid with the correct fluid. See Section 2, Fluid Recommendations.
	3. Improper lubrication and hydraulic fluid.	3. Drain and flush hydraulic system. See Section 2, System Flushing Procedure.
	4. Loop valve stuck closed.	4. Check loop valve operation. See Section 2, Loop Valve.
• Water in hydraulic fluid. Symptoms to watch for are: pitting and etching of pump gear causing heat build up and premature pump failure.	1. Damp climate or condensation in the reservoir.	1. Drain and flush hydraulic system. See Section 2, System Flushing Procedure.
	2. Hydraulic fitting or port open to contaminants.	2. Drain and flush hydraulic system. See Section 2, System Flushing Procedure. Replace worn pump. See Illustrated Parts Catalog.
• Varnish, the dark brownish residue left from oxidation of hydraulic fluids. Symptoms to watch for are: residue will cause spools to stick and will hang up moving parts with close tolerances.	1. Incompatible fluids or poor quality fluids.	1. Drain and flush hydraulic system, then fill with recommended hydraulic fluid. See Section 2, System Flushing Procedure.
	2. Excessive heating of the fluids.	2. Drain and flush hydraulic system, then fill with recommended hydraulic fluid. See Section 2, System Flushing Procedure.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Poor lubrication, parts break through lubricant causing metal to metal contact. Symptoms to watch for are: pump gear wear and excessive heat build up.	1. Hydraulic fluid viscosity low.	1. Drain and flush hydraulic system, then fill with recommended hydraulic fluid. See Section 2, System Flushing Procedure.
	2. Improper or poor grade hydraulic fluid or lubricant without proper anti-wear additives.	2. Drain and flush hydraulic system, then fill with recommended hydraulic fluid and lubricant. See Section 2, System Flushing Procedure.
• Cavitation, a gaseous condition within the fluid stream where the pressure is reduced to the vapor pressure of the fluid. The higher the system pressure the more violent the reaction will be. Symptoms to watch for are: catastrophic pump failure or loss of pump pressure.	1. Low reservoir fluid level.	1. Add hydraulic fluid. See Section 2, Fluid Recommendations.
	2. Air leaks in suction strainer and line.	2. Tighten hose clamps on suction line. Check fittings for tightness. Check shutoff valve.
	3. Improper hydraulic fluid.	3. Have fluid analyzed regularly and drain and flush hydraulic system, then fill with recommended hydraulic fluid. See Section 2, System Flushing Procedure.
	4. Vaporization of water.	4. Have fluid analyzed regularly and drain and flush hydraulic system, then fill with recommended hydraulic fluid. See Section 2, System Flushing Procedure.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Lift cylinders drift down.	1. Holding valve faulty.	1. Replace holding valve. Refer to Illustrated Parts Catalog.
	2. Cylinder packing is damaged.	2. Replace cylinder packing. Refer to Illustrated Parts Catalog.
	3. Emergency lowering valve.	3. Replace emergency lowering valve. Refer to Illustrated Parts Catalog.
• No pump output.	1. Broken pump drive shaft.	1. Replace pump. Refer to Illustrated Parts Catalog.
	2. Fluid leaks.	2. Tighten hose clamps at pump inlet.
	3. Engine relay not engaging.	3. Check for proper engine relay operation and replace if broken. See Electrical and Continuity Checks, Section 3.
	4. Loop valve stuck open	4. Check loop valve operation. See Section 2, Loop Valve.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Hydraulic functions slow.	1. Low pressure.	1. Check for low system pressure and adjust to correct pressure. Refer to Pressure Relief Valve in Section 2.
	2. Pump component failure.	2. Replace pump. Refer to Illustrated Parts Catalog.
	3. Slow engine speed.	3. Check engine RPM. • Refer to Engine Maintenance Manual.
	4. Damaged pump.	4. Replace pump. Refer to Illustrated Parts Catalog.
• Excessive pump pressure.	• Loop relief valve.	• Readjust loop relief valve. See Loop Relief Valve in Section 2.
• Pump noise or squeal.	1. Low pressure.	1. Check for low system pressure and adjust for pressure. See System Pressure Relief Valve, Section 2.
	2. Pump cavitation.	2. Check hydraulic reservoir oil level.
• No steer function.	1. Steer valve not shifting.	1. See Steer Valve in Section 2. Replace valve. Refer to Illustrated Parts Catalog.
	2. Faulty relief valve.	2. See System Pressure Relief Valve in Section 2.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Unit will not steer; all other functions operate.	1. Mechanical malfunction.	1. Steer cylinder may not be mechanically connected to steering linkage. Check for disconnected or damaged steering linkage; connect steering linkage and/ or replace. Refer to Illustrated Parts Catalog.
	2. Steer valve not shifting.	2. See Steer Valve in Section 2. Replace valve. Refer to Illustrated Parts Catalog.
	3. Faulty relief valve.	3. See Pressure Relief Valve in Section 2.
• Cannot raise platform above 25 feet.	1. Stabilizers not used.	1. Deploy stabilizers.
	2. Stabilizer pressure switch or wiring faulty.	2. Check stabilizer pressure switch operation and wiring. See Section 2, Stabilizer Pressure Switch.
• Unit will not go into high speed drive with platform lowered.	1. Faulty drive proportional valve.	1. Check and replace if failed. Refer to Illustrated Parts Catalog.
	2. Faulty joystick.	2. Check for a minimum of 8 VDC output on "A" terminal of joystick.
	3. Faulty relief valve.	3. See Loop Pressure Relief Valve in Section 2.
	4. Faulty pump.	4. Check system pressure. See Machine Specifications.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• No drive function.	1. Drive valve not shifting.	1. See Drive Valve in Section 2. Replace valve. Refer to Illustrated Parts Catalog.
	2. Brake cylinder does not release.	2. Check pressure supply to brake cylinder. Install gauge in line at brake cylinder. If no pressure, consult factory.
	3. Motor shaft key is sheared.	3. Inspect, repair or replace. Refer to Illustrated Parts Catalog.
	4. Faulty relief valve.	4. See System or Loop Relief Valve in Section 2.
	5. Leaking stabilizer lock valve or cylinder.	5. Check for leaking stabilizer lock valve or cylinder. Replace or repair, as required.
• Drives forward, but not reverse.	• Faulty drive valve.	• See Drive Valve in Section 2. Replace valve. Refer to Illustrated Parts Catalog.
	• Faulty drive controller (joystick).	• Check for variable output (0-8 VDC) of controller and that microswitch in forward is operational.
• Drives reverse, but not forward.	• Faulty drive valve.	• See Drive Valve in Section 2. Replace valve. Refer to Illustrated Parts Catalog.
	• Faulty drive controller (joystick).	• Check for variable output (0-8 VDC) of controller and that microswitch in reverse is operational.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Wheel drive motor failure.	1. Hydraulic Fluid.	1. Check for contamination of hydraulic fluid. See Hydraulic Fluid Analysis, Section 2. • Check that the hydraulic system has been flushed after component failure in the drive system. • Check that the correct grade of hydraulic fluid is used. See Fluid Recommendations, Section 2.
	2. Wheel drive motor.	2. Wheel drive motor failure; replace motor. Refer to Illustrated Parts Catalog.
	3. Motor shaft key sheared.	3. Check and replace if failed. Refer to Illustrated Parts Catalog.
• Parking brake doesn't release.	1. Faulty motion control valve with brake shuttle.	1. Replace motion control valve with brake shuttle. Refer to Illustrated Parts Catalog.
	2. Brake cylinder piston seal leaking or bad "o"-rings.	2. Check brake cylinder for piston seal leakage. Replace as necessary. Refer to Section 4.
	3. Pressure reducing valve pressure set too low.	3. Refer to Pressure Reducing Valve, Section 2.
	4. Discs frozen.	4. Replace disc stack Refer to Section 4.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Parking brake doesn't engage.	1. Brake cylinder spring failure.	1. Check brake cylinder for broken spring. Repair or replace as necessary. Refer to Mechanical Components, Section 4.
	2. Plugged brake control needle valve or out of adjustment.	2. Clean needle valve or replace as necessary. Refer to Illustrated Parts Catalog.
• Brake slips.	1. Brake flow control not open enough.	1. Adjust valve. Refer to Flow Control Valve, Section 2.
	2. Oil in brake if designed for dry use.	2. Replace oil seal in brake. Check motor seal. Check piston seals. Internal components will need to be inspected, cleaned and replaced as required. Refer to Section 4.
	3. Disc plates worn.	3. Check disc thickness.
	4. Springs broken or have taken a permanent set.	4. Check release pressure.
• Brake drags.	1. Pressure reducing valve set to low.	1. Adjust valve. Refer to Pressure Reducing Valve, Section 2.
	2. Bearing failure.	2. Replace bearing. Refer to Section 4.
	3. Oil in brake.	3. Drain oil and refill as specified for brakes. Switch to flow thru cooling.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• No lift function.	1. Possibly plugged lines, cylinder ports or damaged cylinder packings.	1. Inspect, repair or replace cylinder. Refer to Illustrated Parts Catalog.
	2. Main relief pressure setting too low.	2. Adjust system pressure. See Pressure Relief Valve in Section 2.
	3. Lift valve stuck in closed position or not getting voltage to open.	3. See Lift Valve in Section 2. Refer to Illustrated Parts Catalog.
	4. Pressure compensated flow control valve is faulty.	4. See Pressure Compenasted Flow Control Valve in Section 2.
• No lower function.	1. Faulty lift valve.	1. See Lift Valve in Section 2. Replace valve.
	2. Descent needle valve is closed or open too far causing velocity fuse to close.	2. Check needle valve or replace as necessary. Refer to Illustrated Parts Catalog.
	3. Faulty lift holding valve	3. Replace lift holding valve. Refer to Illustrated Parts Catalog
	4. Faulty velocity fuse.	4. Replace velocity fuse. Refer to Mechanical Components, Section 4.
• No traversing deck function.	1. Possibly plugged lines, cylinder ports or damaged cylinder packings.	1. Inspect, repair or replace cylinder. Refer to Illustrated Parts Catalog.
	2. Main relief pressure setting too low.	2. Adjust system pressure. See Pressure Relief Valve in Section 2.
	3. Traversing deck valve stuck in open position or not getting voltage.	3. Check valve coil for voltage. Refer to Illustrated Parts Catalog.

SECTION 6:
MAINTENANCE

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MAINTENANCE

The Simon Scissors Lift 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.

⚠ DANGER

DEATH OR SERIOUS INJURY MAY RESULT IF MACHINE IS OPERATED IN AN UNSAFE CONDITION. DO NOT OPERATE ANY MACHINE IF IN UNSAFE OPERATING CONDITION.

GENERAL MAINTENANCE TIPS

⚠WARNING

IMMEDIATELY REPORT TO YOUR SUPERVISOR ANY DEFECT OR MALFUNCTION WHICH BECOMES EVIDENT DURING OPERATION. ANY DEFECT THAT AFFECTS THE SAFETY OF OPERATORS OR NEARBY PERSONNEL SHALL BE REPAIRED PRIOR TO CONTINUED USE OF THE WORK PLATFORM.

Correct lubrication is an essential part of preventive maintenance to minimize wear of working parts and ensure against premature failure. By maintaining correct lubrication, the possibility of mechanical failure and resulting downtime is reduced to a minimum.

⚠WARNING

INSPECTION AND MAINTENANCE SHOULD BE PERFORMED BY QUALIFIED PERSONNEL FAMILIAR WITH THE EQUIPMENT.

The actual operating environment of the machine governs the inspection schedule. The following operational checklists indicate the areas of the machine to be checked and the intervals at which they should be checked under normal operating conditions.

Regular inspection and conscientious maintenance is the key to efficient economical operation. It will help to assure that your equipment will perform satisfactorily with a minimum of service and repair.

⚠WARNING

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

FLUID LEAKS UNDER PRESSURE MAY NOT ALWAYS BE VISIBLE.

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

ALWAYS CLEAN UP HYDRAULIC FLUIDS AND LUBRICATING OILS SPILLED ON THE UNIT. SPILLS CAN CAUSE FALLS, AND ARE A SERIOUS FIRE HAZARD.

⚠ DANGER

NEVER PERFORM SERVICE ON THE UNIT (WITH PLATFORM ELEVATED) WITHOUT FIRST BLOCKING THE ELEVATING ASSEMBLY IN PLACE !

- ALWAYS clean the surrounding area before opening hydraulic components.
- Never open a hydraulic system when there are contaminants in the air.
- Never leave hydraulic components or hoses open. They must be protected from contamination (including rain) at all times.
- Use only recommended lubricants (see Lubrication Chart in front of this manual). Improper lubricants or incompatible lubricants may be as harmful as no lubrication.
- Watch for makeshift "fixes" which can jeopardize 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.

UNPOWERED RAISING OF PLATFORM

To repair or maintain many of the parts on the chassis, it is necessary to raise the platform. This procedure is to be followed in the event that the platform cannot be operated hydraulically. The unit is not field repairable in this case.

1. Secure platform to an overhead lifting device with strap.
2. Raise the platform with an overhead lifting device.
3. Brace scissors arms.

FIRST THREE MONTHS OF OPERATION

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 reimbursable expenses under the Simon Limited Warranty.

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

ROUTINE SERVICING

NOTE: The following recommendations are based on advice of our component 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.

IMPORTANT: Make certain that the unit is inspected per the operational checklists at the end of this section.

SHIFT SERVICE

Hydraulic System

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

Ensure that the filler cap is secure to prevent entry of water or other impurities into the reservoir.

Tire Condition

Check that the tires are not damaged.

Platform Rails and Safety Chain

Check security of platform rails and safety chain.

Batteries

Check battery electrolyte level and connections.

Steering

Check the steering cylinder for fluid leakage. Inspect steering linkage for signs of wear.

Pivot Pins

Examine all pivot pins on scissors arms and cylinders to ensure that they are positively secured in position.

Test All Machine Systems

Test the operation of the drive assembly, including drive motor and steering.

Test the operation of the lift/ lower functions.

Test the operation of the traversing deck function (optional).

Checklist

Perform all items on the Shift Checklist found later in this section.

WEEKLY SERVICE

Hydraulic System

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

Checklist

Perform all items on the Weekly Checklist found later in this section.

MONTHLY SERVICE

Hydraulic System

Check hydraulic fluid color. If the hydraulic fluid does not appear 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.

Chassis Bolts

Check all bolts for signs of looseness. Refer to individual items in the Monthly Checklist found later in this section.

Cylinders

Check all cylinders for hydraulic fluid leakage.

Pivot Pins and Grease Fittings

Lubricate all pivot pins and grease fittings.

Platform Mounting

Check that platform weldment and platform frame members are in good condition.

Checklist

Perform all items on the Monthly Checklist found later in this section.

SEMI-ANNUAL SERVICE

Lift Cylinders

Fully lower, then raise the platform. At each extreme position, check that there is no movement between cylinder rod and bearing housing, or between cylinder cap and tube.

Hydraulic Filter

Replace hydraulic filter element.

Checklist

Perform all items on the Semi-Annual Checklist found later in this section.

ANNUAL SERVICE

NOTE: Machine Annual Inspection Report Forms are available from Simon.

Flexible Hoses

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

Hydraulic Fluid

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.

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 oil 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.

Clean or replace the suction hose, and close the drain tap. Refill the tank to the correct level.

Structural Examination

A thorough examination of the machine should be carried out for signs of corrosion, misalignment, material fractures, and other damage. Particular attention should be given to the condition of welded joints.

FOUR YEAR INTERVAL SERVICE

Pivot Pins and Bearings

Remove all pivot pins for examination. Check the pivot pin bearings with the pivot pins removed. Replace with the correct type of pins and bearings, as necessary.

SHIFT OPERATIONAL CHECKLIST

All checks must be completed before operation of the Simon SCISSORS LIFT.

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 SCISSORS LIFT clean!!

⚠WARNING

THIS CHECKLIST MUST BE USED AT DAILY INTERVALS OR AFTER EVERY 6 TO 8 HOURS OF USE, WHICHEVER IS SOONER. 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 fluid leaks, torn or disconnected wires, damaged tires etc. Replace components as necessary.
_____	2. Check battery electrolyte level and connections.
_____	3. Check hydraulic fluid level with the platform fully lowered.
_____	4. Check tires for damage. Check wheel lug nuts for tightness.
_____	5. Check tire pressure (not required for solid tires).
_____	6. Check hoses and cables for worn areas or chafing.
_____	7. Check platform rails and safety chains for damage.

Continued on following page . . .

SHIFT OPERATIONAL CHECKLIST (CONTINUED)

INITIAL	DESCRIPTION
_____	8. Check pivot pins for security.
_____	9. Check that all warning and instructional labels are legible and secure.
_____	10. Inspect work platform control console. Ensure the load capacity is clearly marked.
_____	11. Check hydraulic system pressure (see Machine Specifications).
_____	12. Check the ground controls for proper operation. Check all switches and push buttons for proper operation.
_____	13. Check platform controls for proper operation. Check all switches and push buttons, as well as ensuring that the drive controller returns to neutral.
_____	14. Follow instructions for servicing engine daily. Refer to the Engine Maintenance Manual supplied with your machine.

ADDITIONAL MAINTENANCE REQUIREMENTS FOR SEVERE USAGE APPLICATIONS

INITIAL	DESCRIPTION
_____	15. Remove debris from electrical controls and hydraulic components.
_____	16. Check hydraulic system for leakage after every eight (8) hours of operation.
_____	17. Inspect cylinder boots and controller boot for cuts or other damage. Repair or replace as required.
_____	18. Follow instructions for servicing engine when used severely. Refer to the Engine Maintenance Manual supplied with your machine.

WEEKLY 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 SCISSORS LIFT clean!!

⚠WARNING

THIS CHECKLIST MUST BE USED AT WEEKLY INTERVALS OR EVERY 25 HOURS, WHICHEVER OCCURS FIRST. 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 Shift Operational Checklist.
_____	2. Check wheel lug nuts for proper torque (see Machine Specifications).
_____	3. Inspect all arms and pivot points for signs of wear and/ or damage.
_____	4. Check general operation.
_____	5. Check all wire connections.
_____	6. Follow instructions for servicing engine weekly. Refer to the Engine Maintenance Manual supplied with your machine.

ADDITIONAL MAINTENANCE REQUIREMENTS FOR SEVERE USAGE APPLICATIONS

INITIAL	DESCRIPTION
_____	7. Inspect condition of hydraulic fluid in the reservoir. Oil should have a clear amber color.
_____	8. Lubricate all grease fittings (see Lubrication Chart).
_____	9. Lubricate all steering linkages and pivot points.
_____	10. Follow instructions for servicing engine when used severely. Refer to the Engine Maintenance Manual supplied with your machine.

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 SCISSORS LIFT clean!!

⚠WARNING

THIS CHECKLIST MUST BE USED AT MONTHLY INTERVALS OR EVERY 100 HOURS, WHICHEVER OCCURS FIRST. 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 Shift and Weekly Operational Checklists.
_____	2. Lubricate all grease fittings (see Lubrication Chart).
_____	3. Lubricate all steering linkages and pivot points.
_____	4. Lubricate scissors arm rollers and deck extension roller surfaces (if so equipped).
_____	5. Inspect condition of hydraulic fluid in the reservoir. Oil should have a clear amber color.
_____	6. Inspect the entire machine for signs of damage, broken welds, loose bolts, improper or makeshift repairs.
_____	7. Check pin joints and retaining bolts for security.
_____	8. Check hydraulic system pressure (see Machine Specifications).
_____	9. Check left and right spindles for free turning with no end play.

Continued on the following page...

MONTHLY OPERATIONAL CHECKLIST (CONTINUED)

INITIAL	DESCRIPTION
_____	10. Check if tires are leaning in or out.
_____	11. Check that all adjustable flow valves are locked.
_____	12. Follow instructions for servicing engine monthly. Refer to the Engine Maintenance Manual supplied with your machine.

ADDITIONAL MAINTENANCE REQUIREMENTS FOR SEVERE USAGE APPLICATIONS

INITIAL	DESCRIPTION
_____	13. Follow instructions for servicing engine when used severely. Refer to the Engine Maintenance Manual supplied with your machine.
_____	14. After 90 days change high pressure filter element.

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 SCISSORS LIFT clean!!

⚠WARNING

THIS CHECKLIST MUST BE USED AT SIX MONTH INTERVALS OR EVERY 500 HOURS, WHICHEVER IS SOONER. 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 Shift, Weekly and Monthly Operational Checklists.
_____	2. Have hydraulic fluid sample analyzed at a test laboratory. Comply with test results and recommendations to ensure long, trouble free operation. **IMPORTANT:** 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 hydraulic system for leaks, examine hoses for signs of excessive wear, chafing or twisting. Replace worn hoses if necessary.
_____	4. Check hydraulic system pressure (see Machine Specifications). If the pressure is low, determine the reason and repair in accordance with accepted procedures as outlined in the service manual.
_____	5. Inspect the work platform structure for damage and condition of welds.
_____	6. Check operating speeds to ensure they are within specified limits.
_____	7. Check emergency lowering system.
_____	8. Clean and lubricate all push button switches with dry lubricant and ensure that the switches operate freely in all positions.

Continued on the following page ...

SEMI-ANNUAL INSPECTION (CONTINUED)

IINITIAL	DESCRIPTION
_____	9. Check tightness of platform frame and linkage pins.
_____	10. Check overall platform stability.
_____	11. Check the electrical mounting and hardware connections for security.
_____	12. Replace return filter element.
_____	13. Repack front wheel bearings.
_____	14. Check king pins for excessive play.
_____	15. Check that the platform does not drift down with a full load.

ADDITIONAL MAINTENANCE REQUIREMENTS FOR SEVERE USAGE APPLICATIONS

INITIAL	DESCRIPTION
_____	16. Follow instructions for servicing engine when used severely. Refer to the Engine Maintenance Manual supplied with your machine.

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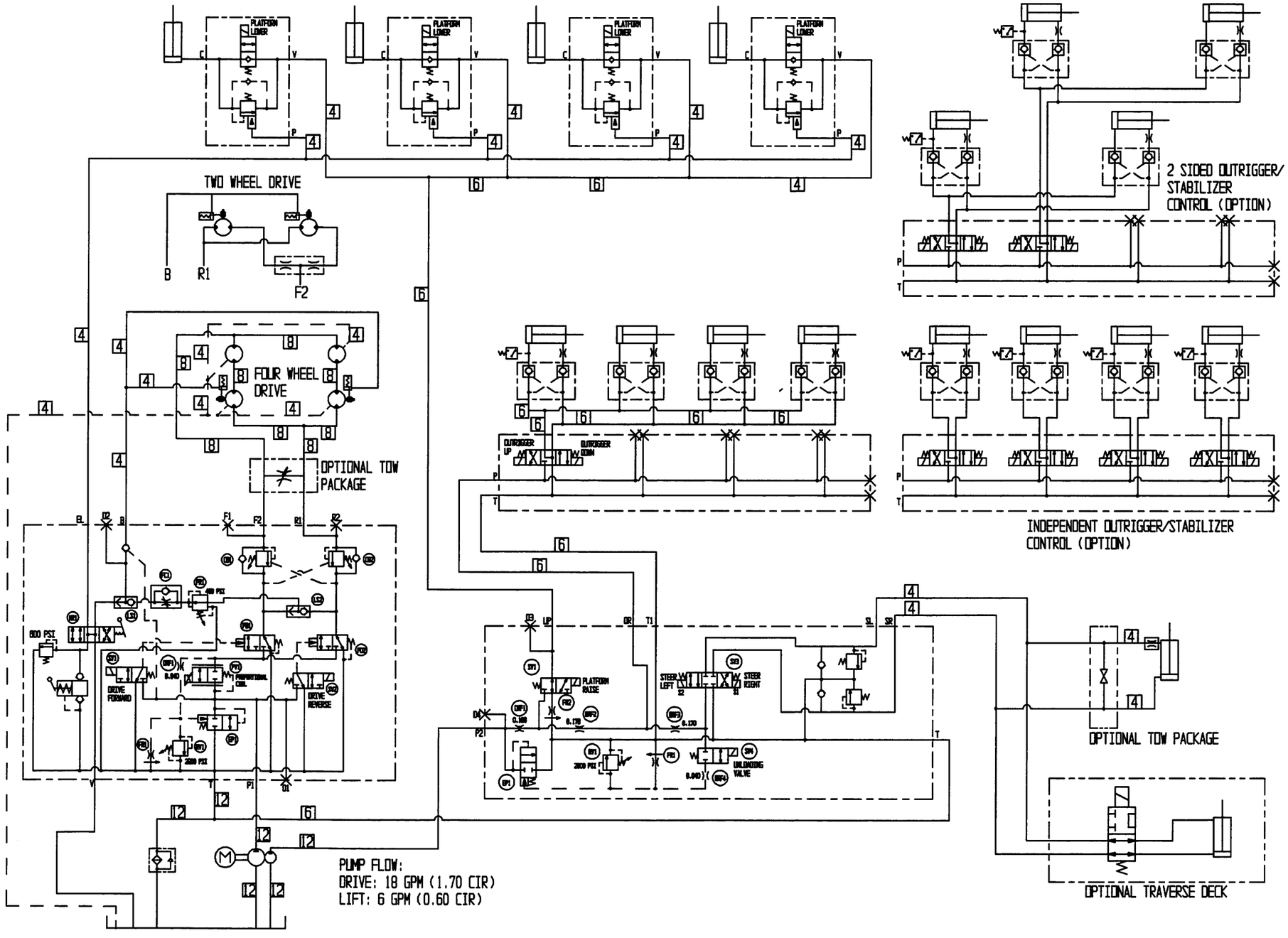
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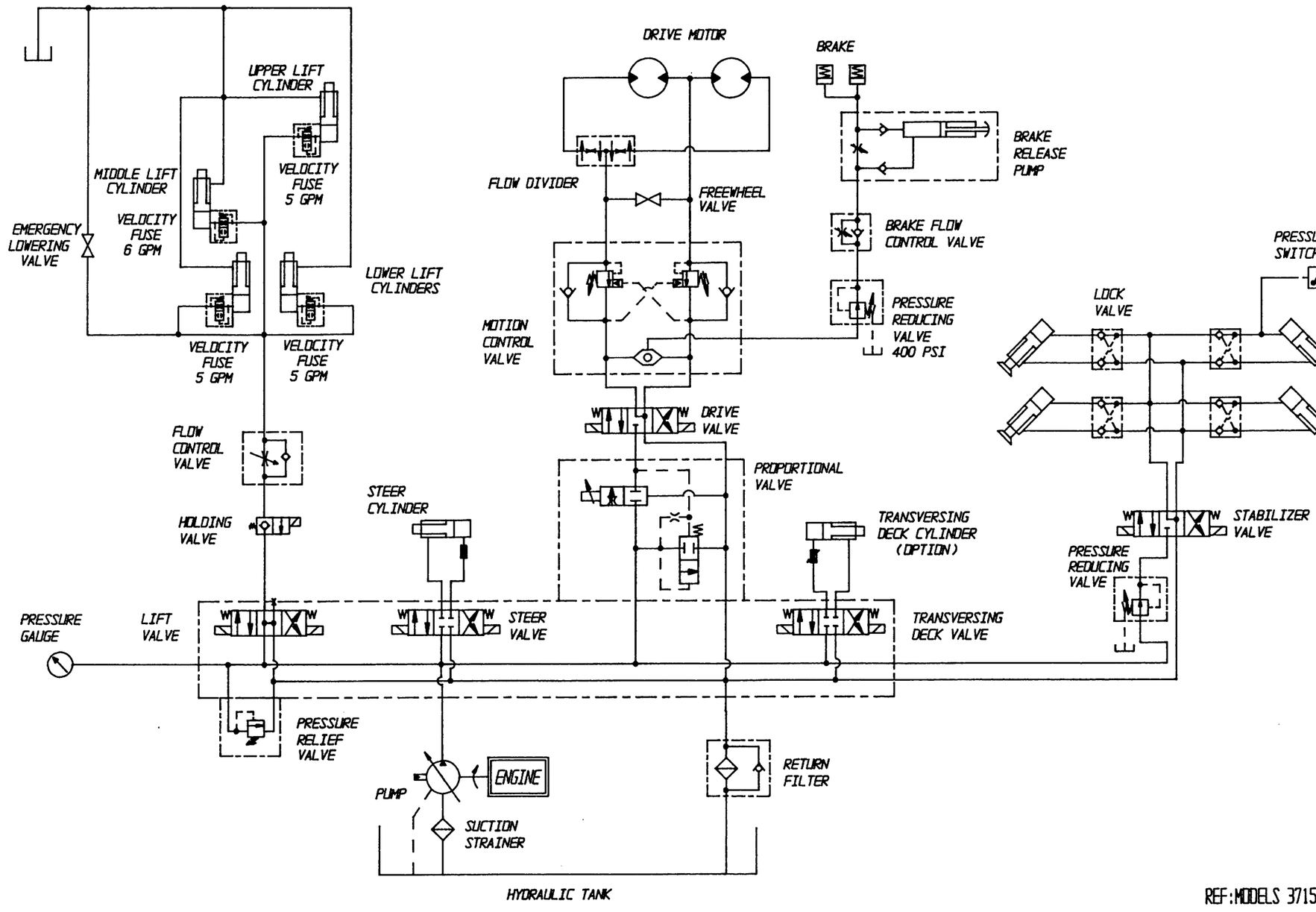


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HYDRAULIC SCHEMATIC

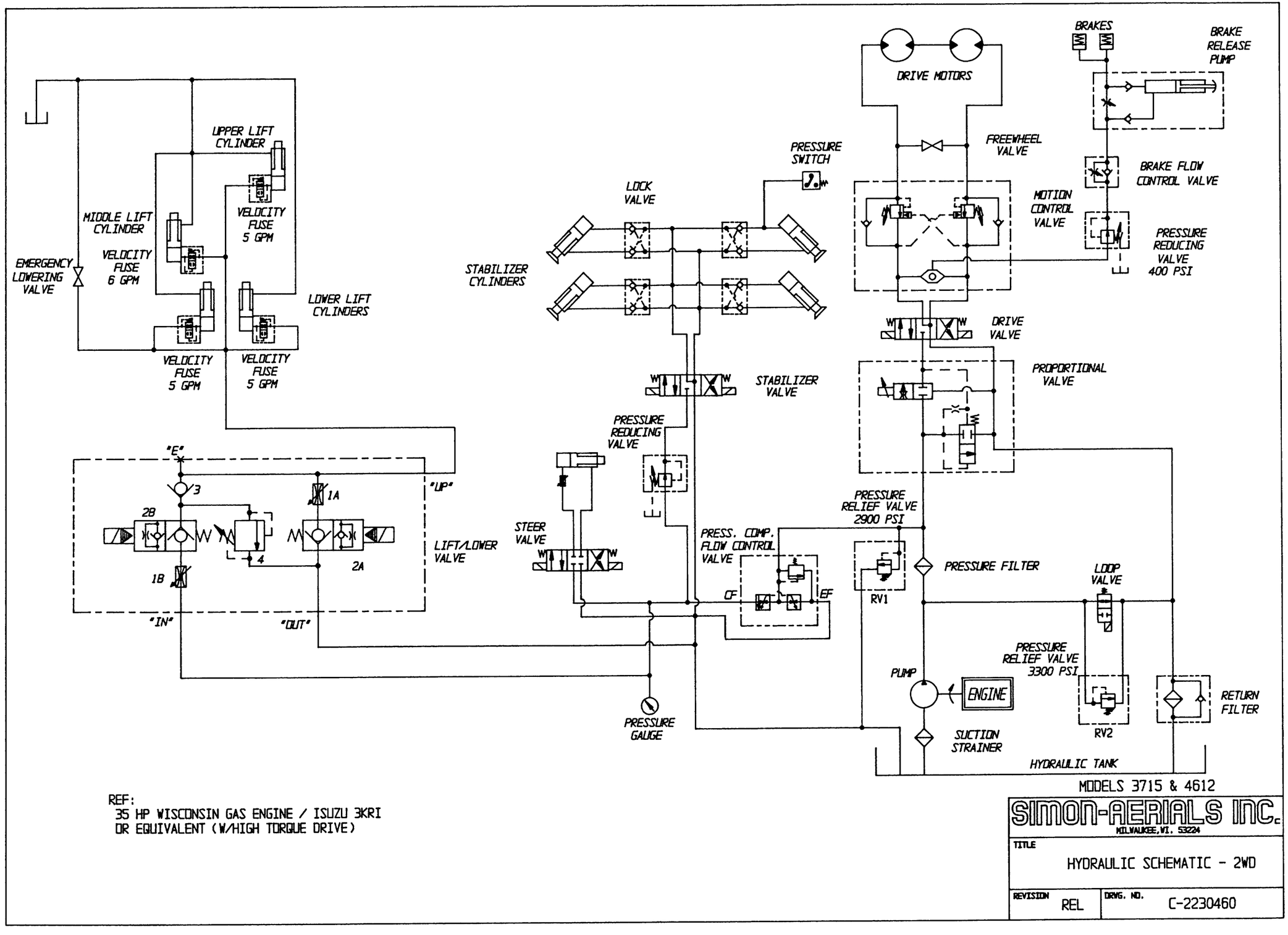
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A	D-2362420



REF:MODELS 3715 & 4612

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE	
HYDRAULIC SCHEMATIC - 2WD	
REVISION B	DRWG. NO. C-2223120



REF:
35 HP WISCONSIN GAS ENGINE / ISUZU 3KR1
OR EQUIVALENT (W/HIGH TORQUE DRIVE)

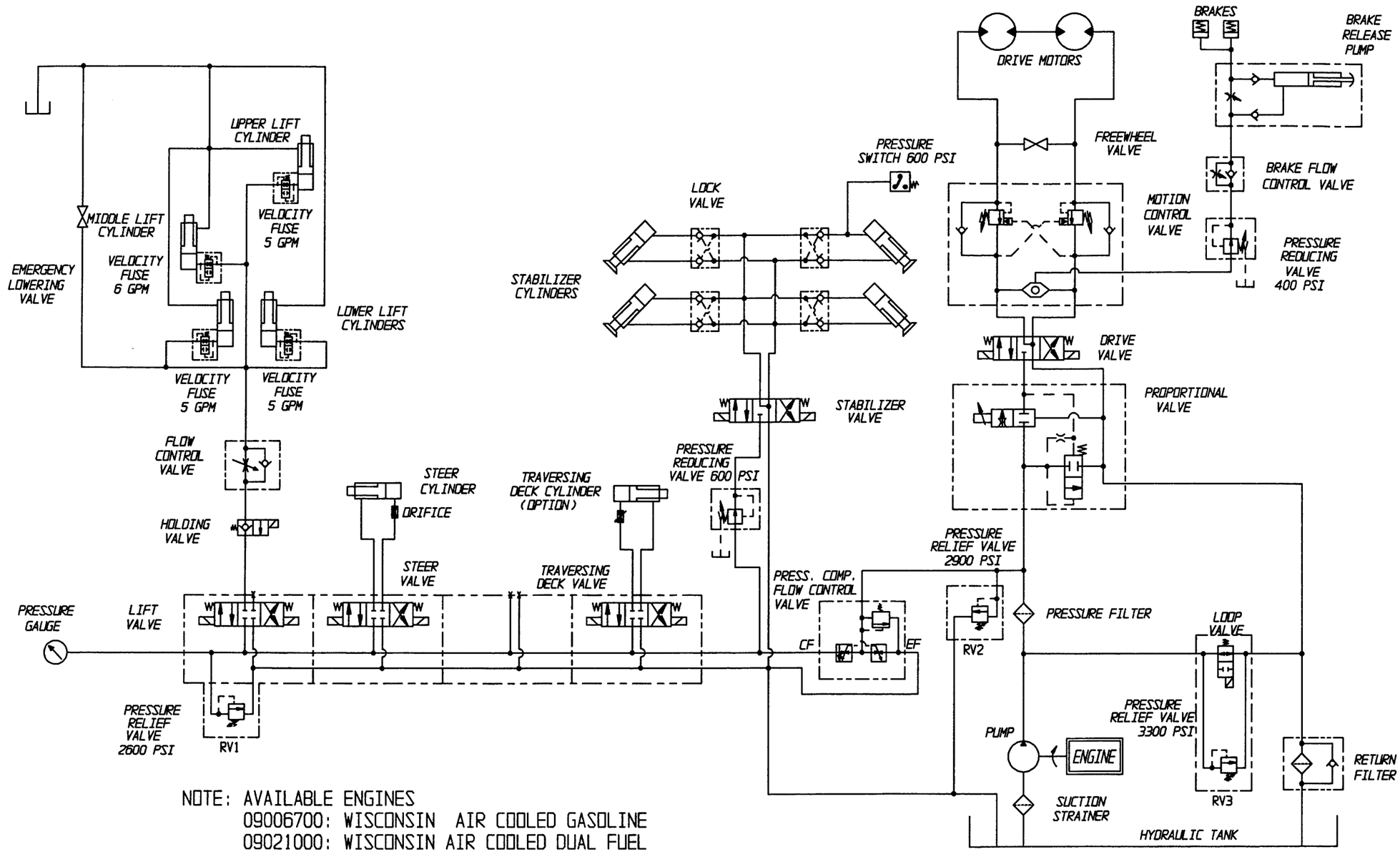
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MILWAUKEE, WI. 53224

TITLE: HYDRAULIC SCHEMATIC - 2WD

REVISION: REL

DRWG. NO.: C-2230460



NOTE: AVAILABLE ENGINES

09006700: WISCONSIN AIR COOLED GASOLINE
09021000: WISCONSIN AIR COOLED DUAL FUEL
09047500: DEUTZ 2-CYLINDER AIR COOLED DIESEL
09044800: DUETZ 3-CYLINDER AIR COOLED DIESEL
09049700: ISUZU LIQUID COOLED DIESEL
09042200: PERKINS LIQUID COOLED DIESEL
09041000: KUBOTA LIQUID COOLED DIESEL

REF:
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OR EQUIVALENT (W/HIGH TORQUE DRIVE)

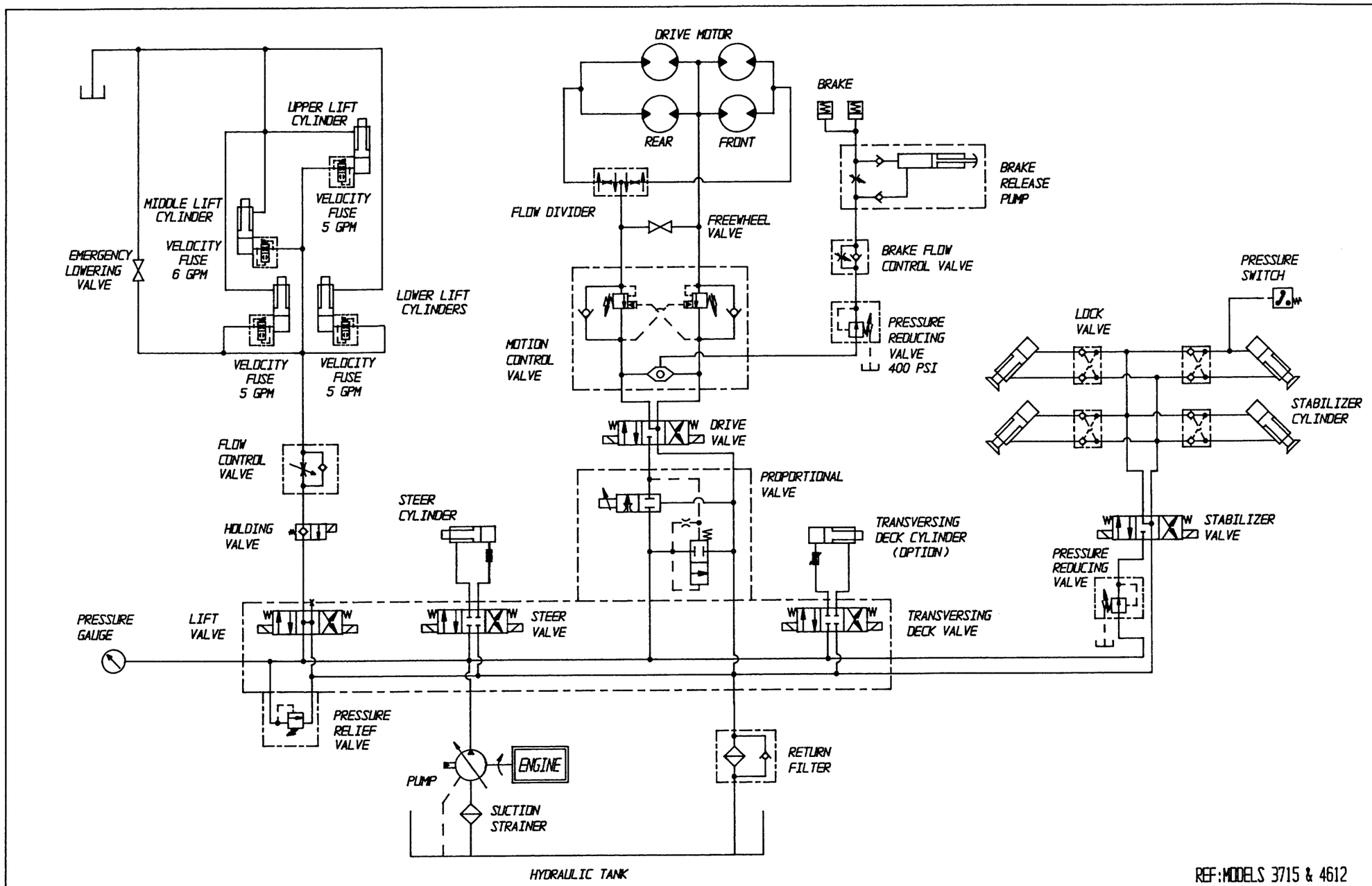
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TITLE: HYDRAULIC SCHEMATIC - 2WD

REVISION: B

DRWG. NO.: D-2223320



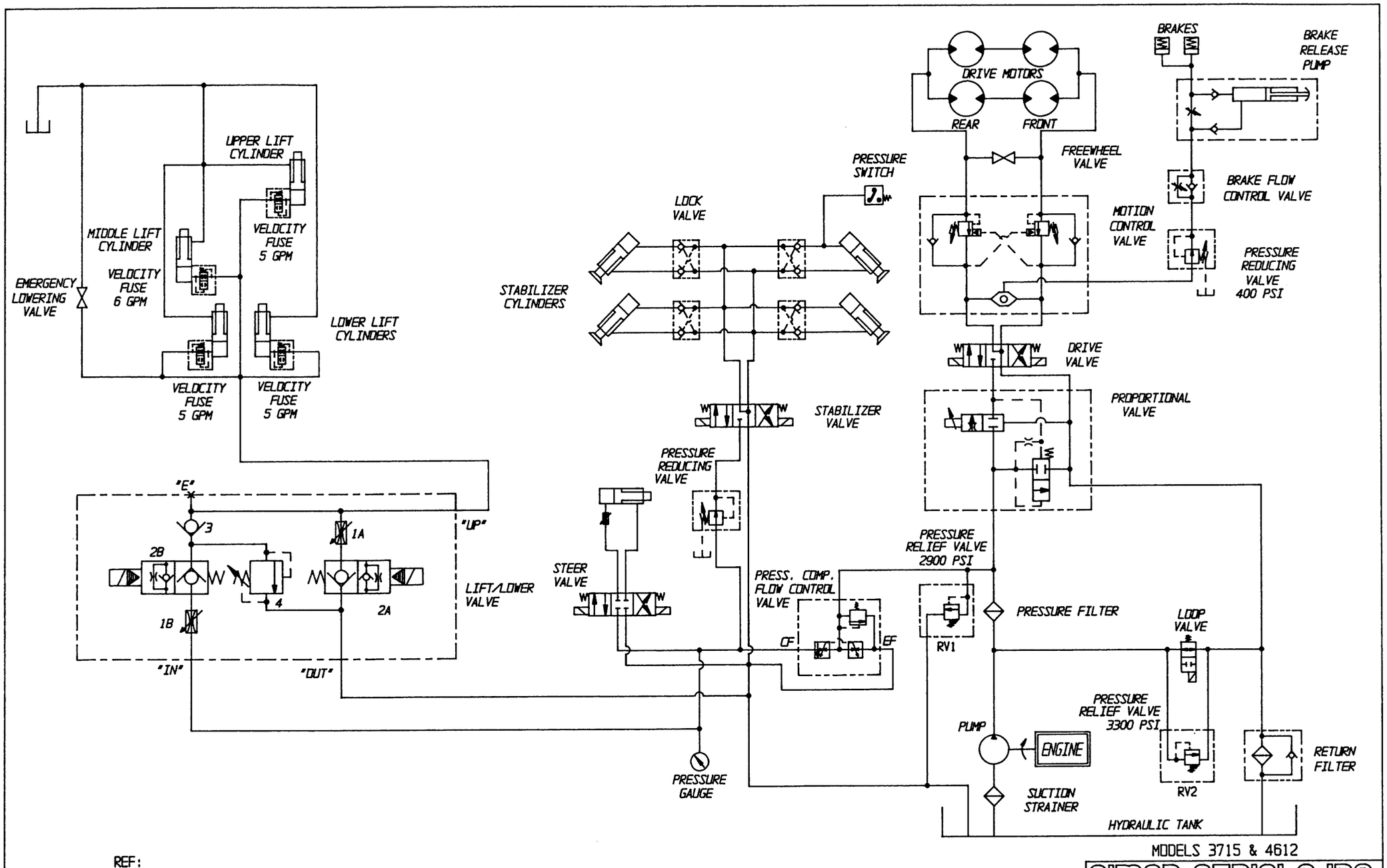
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REVISION: REL

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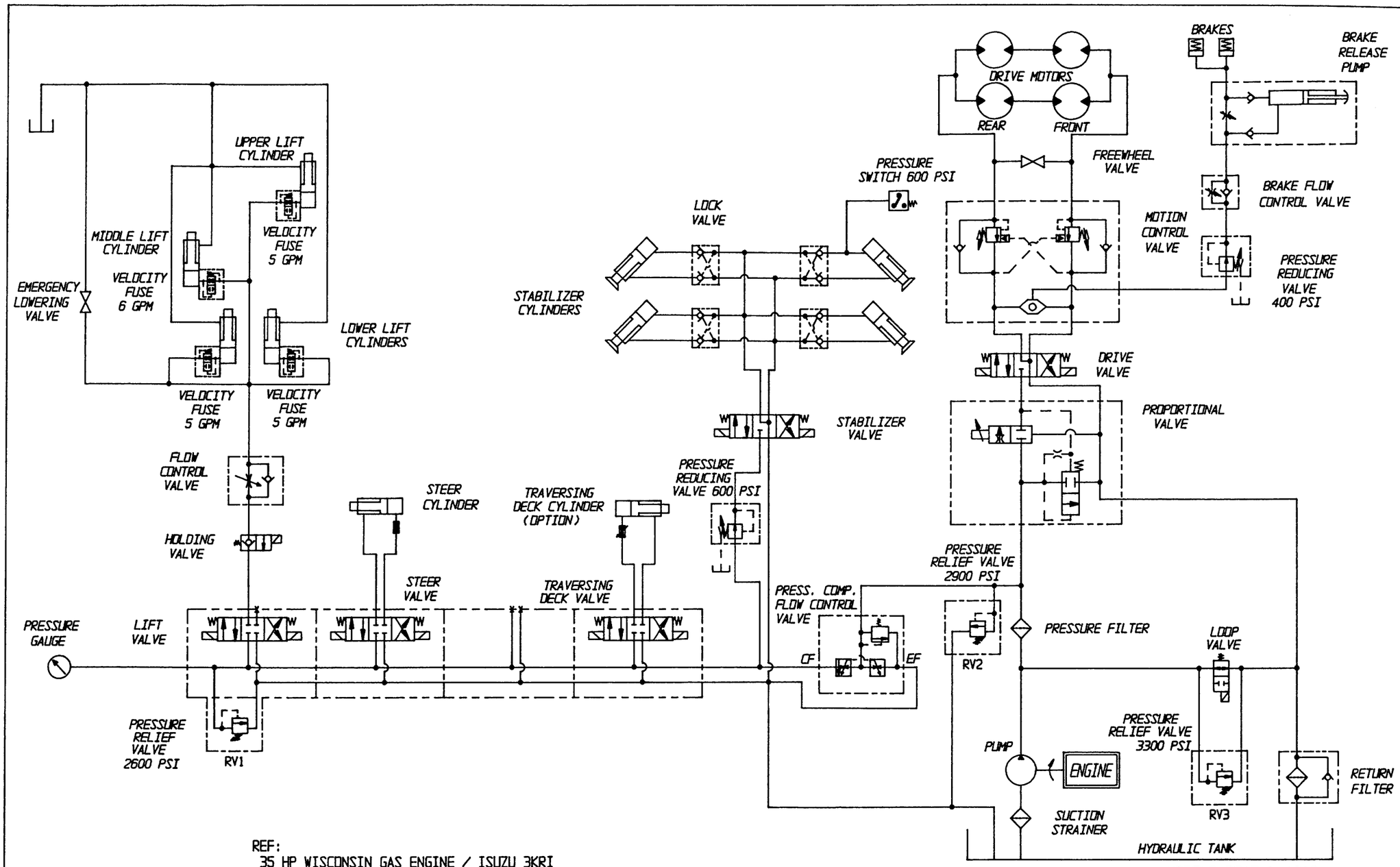


REF:
35 HP WISCONSIN GAS ENGINE / ISUZU 3KR1
OR EQUIVALENT (W/HIGH TORQUE DRIVE)

MODELS 3715 & 4612

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TITLE	
HYDRAULIC SCHEMATIC - 4WD	
REVISION: REL	DRWG. NO.: C-2230470



REF:
35 HP WISCONSIN GAS ENGINE / ISUZU 3KRI
OR EQUIVALENT (W/HIGH TORQUE DRIVE)

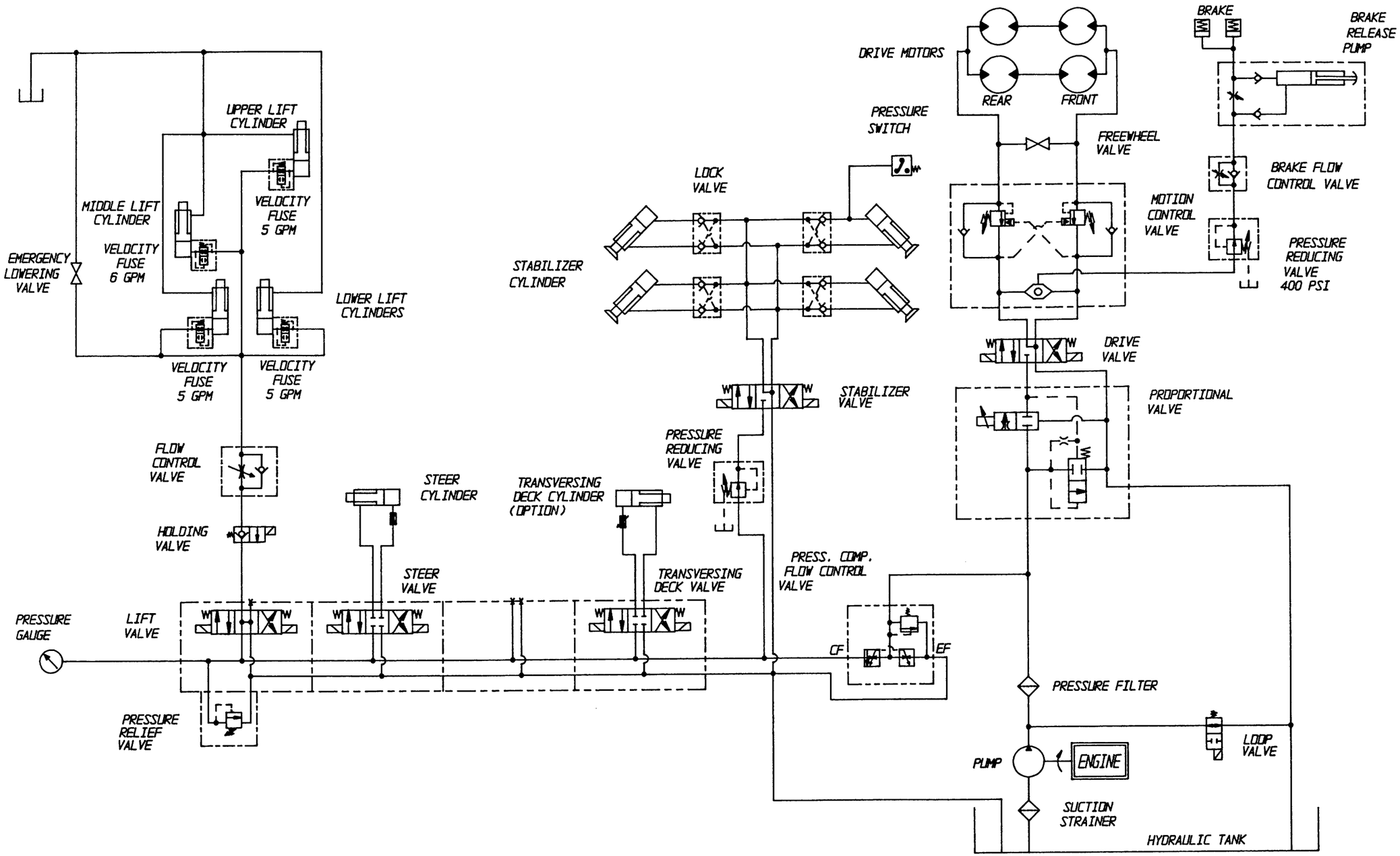
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HYDRAULIC SCHEMATIC - 4WD

REVISION
REL

DRWG. NO.
C-2230790



REF:
35 HP WISCONSIN GAS ENGINE
OR EQUIVALENT (W/HIGH TORQUE DRIVE)

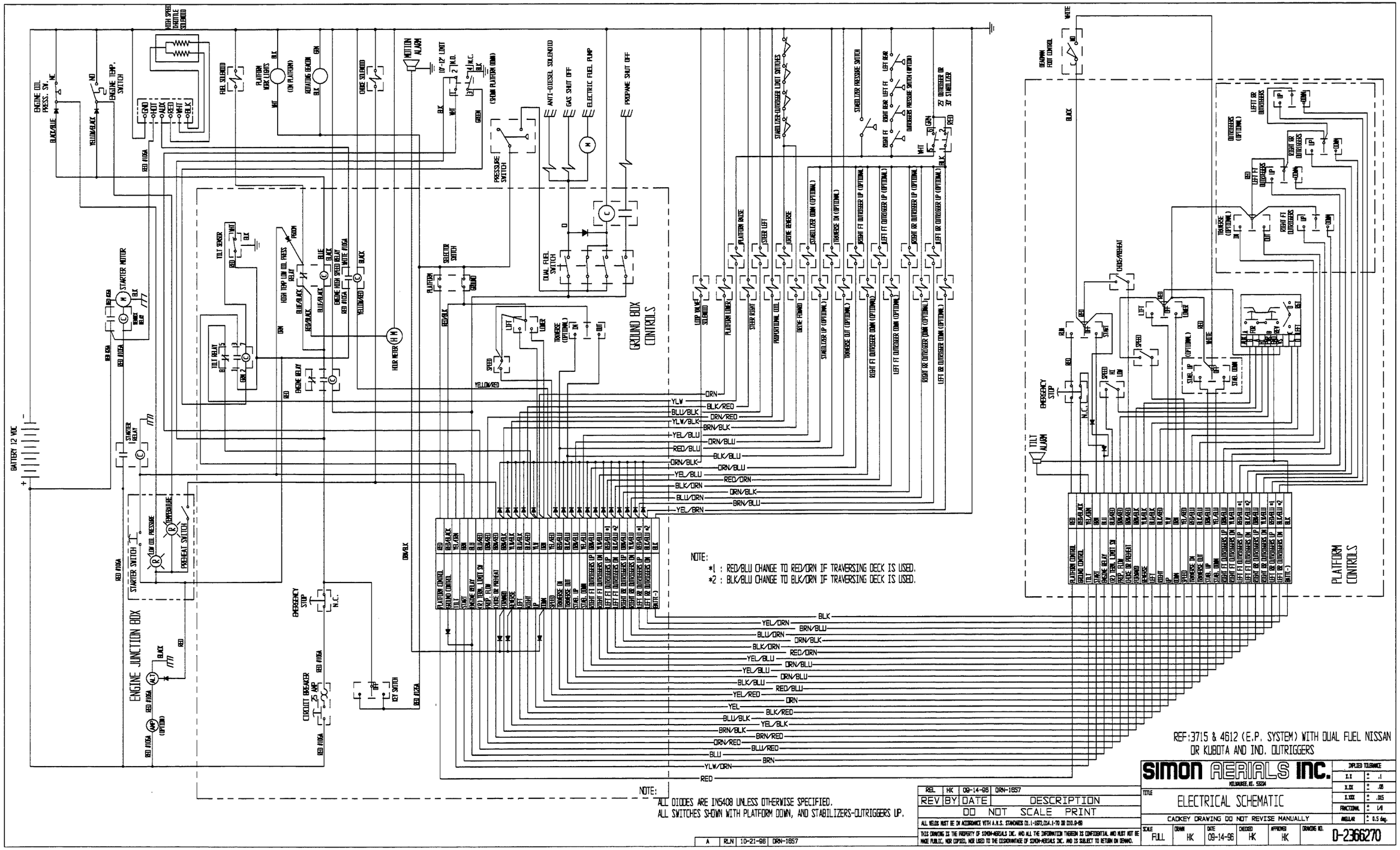
MODELS: 3715G & 4612G

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MILWAUKEE, WI. 53224

TITLE: HYDRAULIC SCHEMATIC 4WD

REVISION: B

DRWG. NO.: C-2223330



REV	BY	DATE	DESCRIPTION
A	RLN	10-21-96	DRN-1657
REL	HK	09-14-96	DRN-1657

DO NOT SCALE PRINT

ALL WELDS MUST BE IN ACCORDANCE WITH A.N.S. STANDARDS D1.1-1972,D4.1-70 OR D10.8-69

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MILWAUKEE, WI. 53224

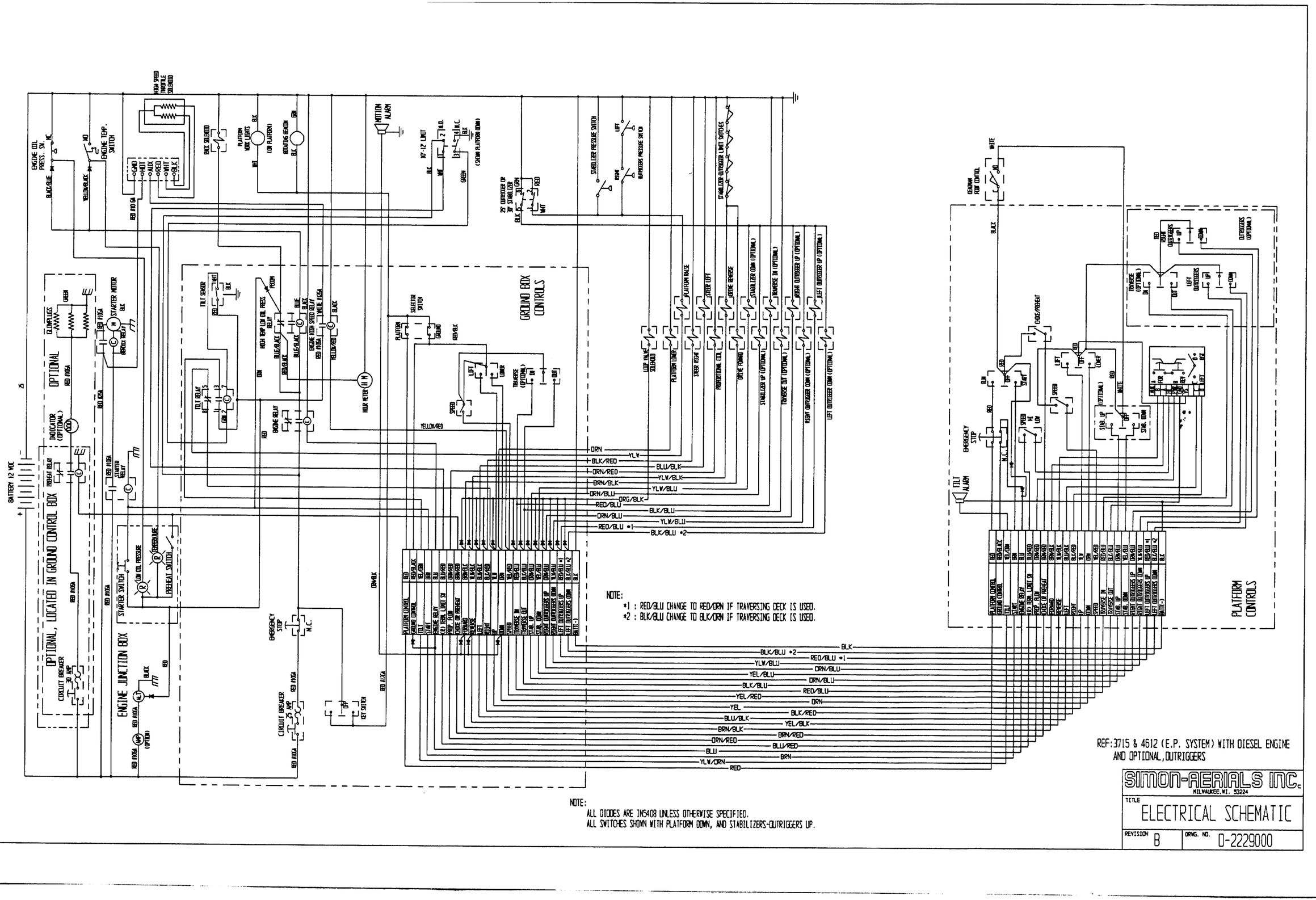
TITLE: ELECTRICAL SCHEMATIC

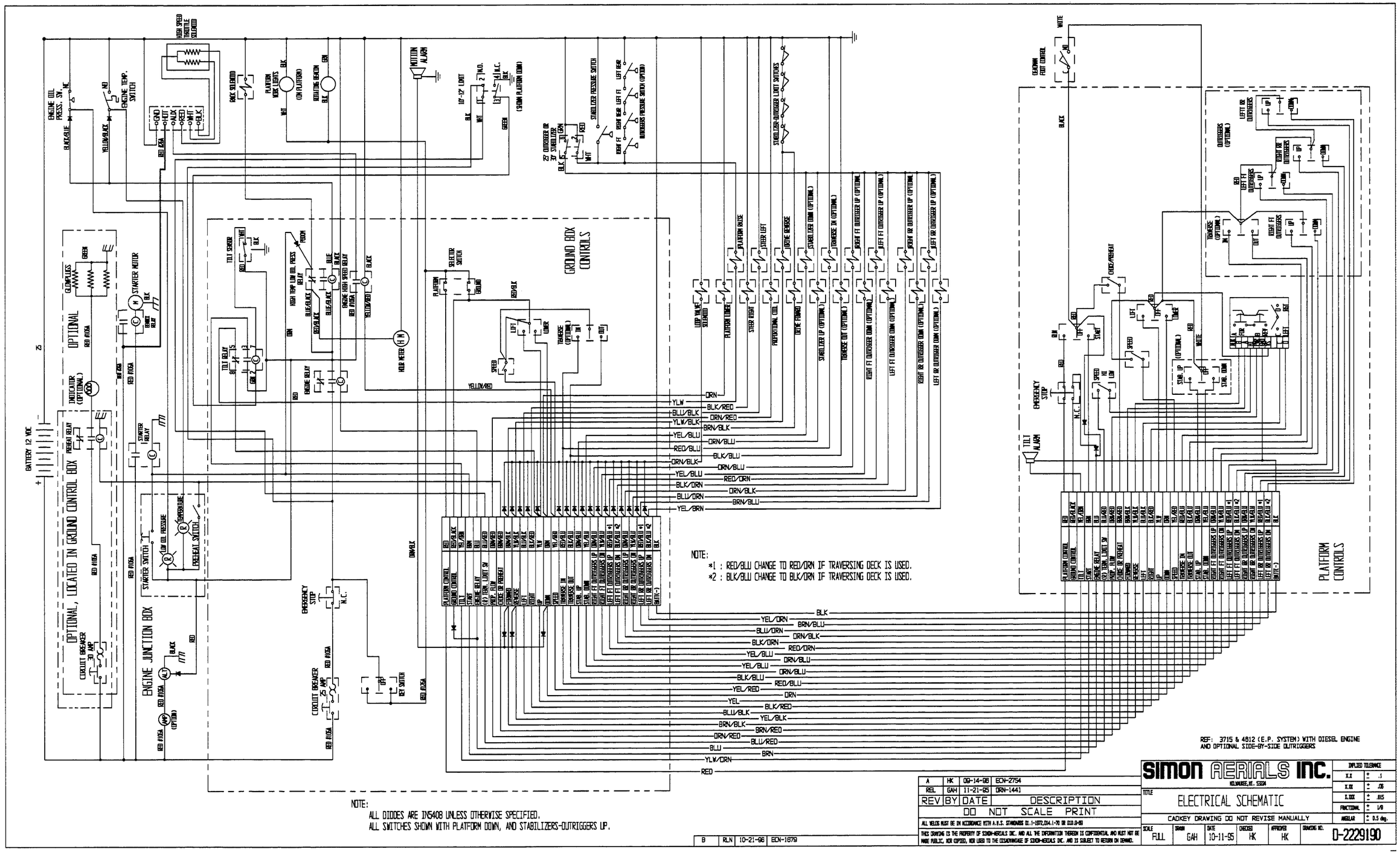
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SCALE	DRAWN	DATE	CHECKED	APPROVED	DRAWING NO.
FULL	HK	09-14-96	HK	HK	D-2366270

UNLESS OTHERWISE TOLERANCE

X.X	± .1
X.XX	± .03
X.XXX	± .005
FRACTIONAL	± 1/6
ANGULAR	± 0.5 deg.


GROUND BOX CONTROLS
PLATFORM CONTROLS
OPTIONAL, LOCATED IN GROUND CONTROL BOX
ENGINE JUNCTION BOX
BATTERY 12 VDC
ENGINE OIL PRESS. SW.
ENGINE TEMP. SWITCH
HIGH SPEED THROTTLE SOLENOID
PACE SOLENOID
PLATFORM WORK LIGHTS
(ON PLATFORM)
ROTATING BEACON
MOTION ALARM
10'-12' LIMIT
(SNORKEL PLATFORM ONLY)
25' OUTRIGGER OR 30' STABILIZER
STABILIZER PRESSURE SWITCH
STABILIZER-OUTRIGGER LIMIT SWITCHES
OUTRIGGERS (OPTIONAL)
TILT ALARM
TILT SENSOR
HOUR METER
SELECTOR SWITCH
LOOP VALVE SOLENOID
PROPORTIONAL COIL
DRIVE FORWARD
DRIVE REVERSE
STEER LEFT
STEER RIGHT
PLATFORM RAISE
PLATFORM LOWER
STABILIZER IN (OPTIONAL)
STABILIZER OUT (OPTIONAL)
TRAVERSE IN (OPTIONAL)
TRAVERSE OUT (OPTIONAL)
RIGHT OUTRIGGER UP (OPTIONAL)
RIGHT OUTRIGGER DOWN (OPTIONAL)
LEFT OUTRIGGER UP (OPTIONAL)
LEFT OUTRIGGER DOWN (OPTIONAL)
OPTIONAL
INDICATOR (OPTIONAL)
GLOWPLUGS
STARTER MOTOR
STARTER RELAY
PREHEAT RELAY
TILT RELAY
HIGH RPM LOW OIL PRESS RELAY
ENGINE HIGH SPEED RELAY
ENGINE RELAY
PREHEAT SWITCH
LOW OIL PRESSURE
CIRCUIT BREAKER 30 AMP
CIRCUIT BREAKER 25 AMP
EMERGENCY STOP
KEY SWITCH
PLATFORM CONTROL
GROUND CONTROL
TILT
START
ENGINE RELAY
(-) PWR. LIMIT SW
PROP. FLOW
FUNCTION ENABLE
FORWARD
REVERSE
LEFT
RIGHT
UP
DOWN
SPEED
TRAVERSE IN
TRAVERSE OUT
STAB. UP
STAB. DOWN
RIGHT OUTRIGGERS UP
RIGHT OUTRIGGERS DOWN
LEFT OUTRIGGERS UP
LEFT OUTRIGGERS DOWN
BATT.(-)
NOTE:
*1 : RED/BLU CHANGE TO RED/ORN IF TRAVERSING DECK IS USED.
*2 : BLK/BLU CHANGE TO BLK/ORN IF TRAVERSING DECK IS USED.
NOTE:
ALL DIODES ARE IN5408 UNLESS OTHERWISE SPECIFIED.
ALL SWITCHES SHOWN WITH PLATFORM DOWN, AND STABILIZERS-OUTRIGGERS UP.
REF:3715 & 4612 (E.P. SYSTEM) WITH DIESEL ENGINE AND OPTIONAL, OUTRIGGERS
SIMON-AERIALS INC.
MILWAUKEE, WI. 53224
TITLE
ELECTRICAL SCHEMATIC
REVISION
B
DRWG. NO.
D-2229000



REV	BY	DATE	DESCRIPTION
A	HK	09-14-95	ECN-2754
REL	GAH	11-21-95	DRN-1441
B	RLN	10-21-96	ECN-1879

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MILWAUKEE, WI. 53224

TITLE: ELECTRICAL SCHEMATIC

CADKEY DRAWING DO NOT REVISE MANUALLY

SCALE	DRAWN	DATE	CHECKED	APPROVED	DRAWING NO.
FULL	GAH	10-11-95	HK	HK	D-2229190

UNLESS TOLERANCE

X.X	± .1
X.XX	± .05
X.XXX	± .015
FRACTIONAL	± 1/8
ANGULAR	± 0.5 deg.