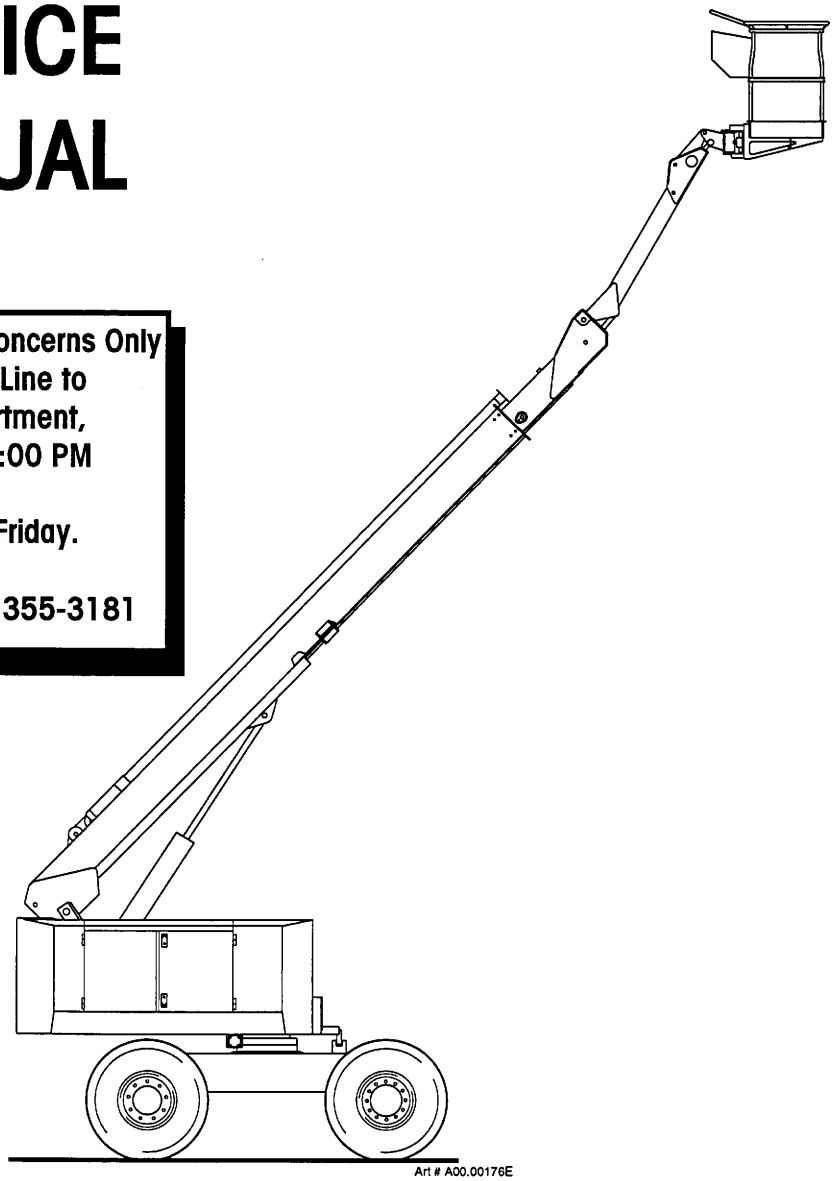
RP 46 "Reach Plus"

Featuring "Electro-Proportional" Control System

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



Part No. 89-145307 • Rev. "0.1" dated June 1996 •

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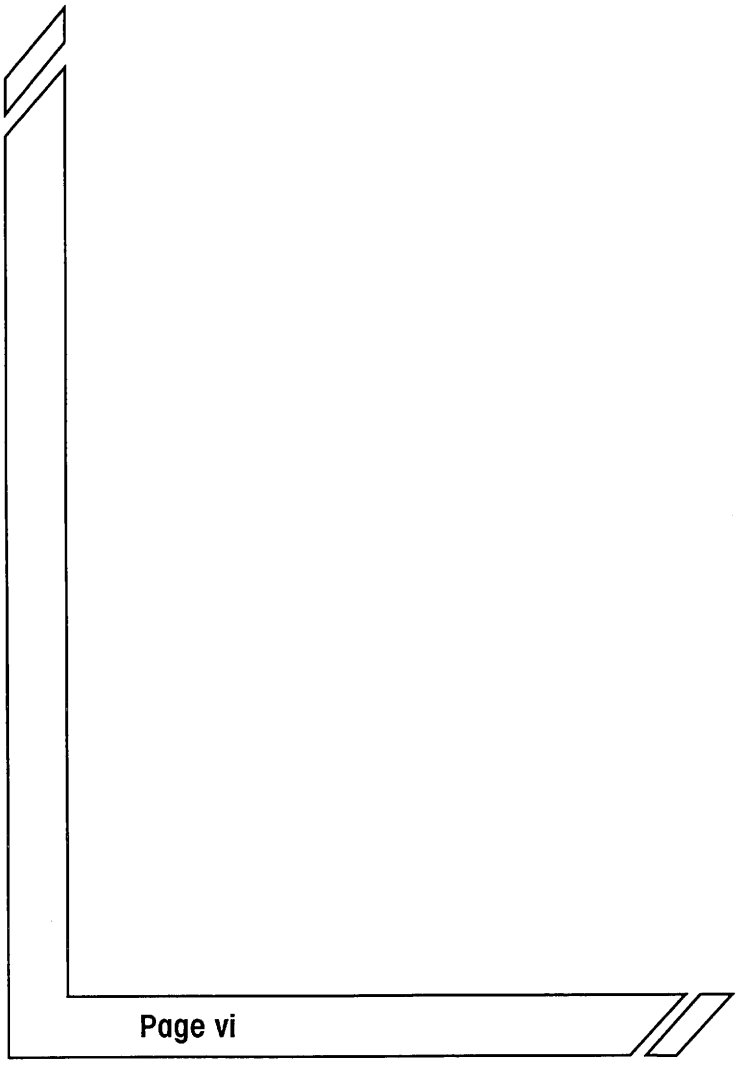
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Appendix



INTRODUCTION

This Service Manual is designed to provide you with the instructions needed to properly maintain the SIMON AERIALS INC. Aerial Platform with electro-proportional controls. When used in conjunction with the Operators and Parts manuals (provided separately) this Service Manual will assist you in making necessary adjustments or repairs.

Simon Aerials Mobile Platforms are designed and built to provide many years of safe, dependable service. To obtain full benefits from your machine, always follow the proper operating and maintenance procedures. Only trained, authorized personnel should be allowed to operate or service this machine. Service personnel should read and study the Operators, Service and Parts Manuals in order to gain a thorough understanding of the machine 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 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 is also used to alert against unsafe practices and property-damage-only situations.

INTRODUCTION (CONTINUED)

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 AND SPECIFICATION WITHOUT WRITTEN PERMISSION FROM SIMON ARE STRICTLY FORBIDDEN. A MODIFICATION MAY COMPROMISE THE SAFETY OF THE MACHINE, SUBJECTING USERS TO SERIOUS INJURY OR DEATH. ANY SUCH MODIFICATION WILL VOID ANY REMAINING WARRANTY.

Simon reserves the right to change, improve, modify or expand features of its equipment at any time. Specifications, models or equipment are subject to change without notice, and without incurring any obligations to change, improve, modify or expand features of previously delivered equipment.

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

All Simon manuals are periodically updated to reflect changes that occur in the equipment. Please contact the factory with any questions you may have regarding your machine, or the availability of more recent manuals.

MACHINE SPECIFICATIONS

Working Height	**52 Ft /** 15.85 M
Platform Height	**46 Ft /** 14.02 M
Horizontal Reach (Boom Angle 0°)	**42 Ft 6 In. /** 14.17 M
Platform Capacity (Unrestricted)	**500 LBs. /** 225 kg
Platform Size	**30 In. x 60 In. x 42 In. /** .76 M x 1.52 M x 1.07 M
Stowed Length	**26 Ft 9 In. /** 8.15 M
Stowed Height	**7 Ft 10.5 In. /** 2.40 M
Machine Width	**7 Ft. 10 In. /** 2.38 M
Wheelbase	**6 Ft 3 In. /** 1.91 M
Ground Clearance	**12.5 In. /** 31.7cm
Gross Weight (Approx.) (Note 1)	**16,000 LBs. /** 7,257 kg
Maximum Travel Speed:	
Boom Stowed (Note 1)	**2.8 MPH /** 4.5 KPH
Boom Extended or Elevated	**0.5 MPH /** 0.8 KPH
Outside Turning Radius	**14 Ft 4 In. /** 4.37 M
Gradeability (On Hard Surface) (Note 1)	**15° /** 27%
Platform Rotation	**180°**
Superstructure Rotation	**360° Non-continuous**
Tire Size	**390/ 70 x 16.5 (12 Ply)**
Tire Pressure (not applicable to foam filled tires)	**90 PSI /** 6.2 Bar / 6.3 kg/cm^2
Maximum Hydraulic Pressure	**3000 PSI /** 206 Bar / 210 kg/cm^2
Hydraulic Tank Capacity	**40 Gal. /** 151.4 Liters
Fuel Capacity:	
Gas or Diesel	**40 Gal. /** 151.4 Liters
Propane	**30 LBs. /** 14 kg
Electrical System	**Two 12 Volt DC Batteries**

Engine Availability: (Dual speed, 2200 RPM for boom functions and 3600 RPM for drive):

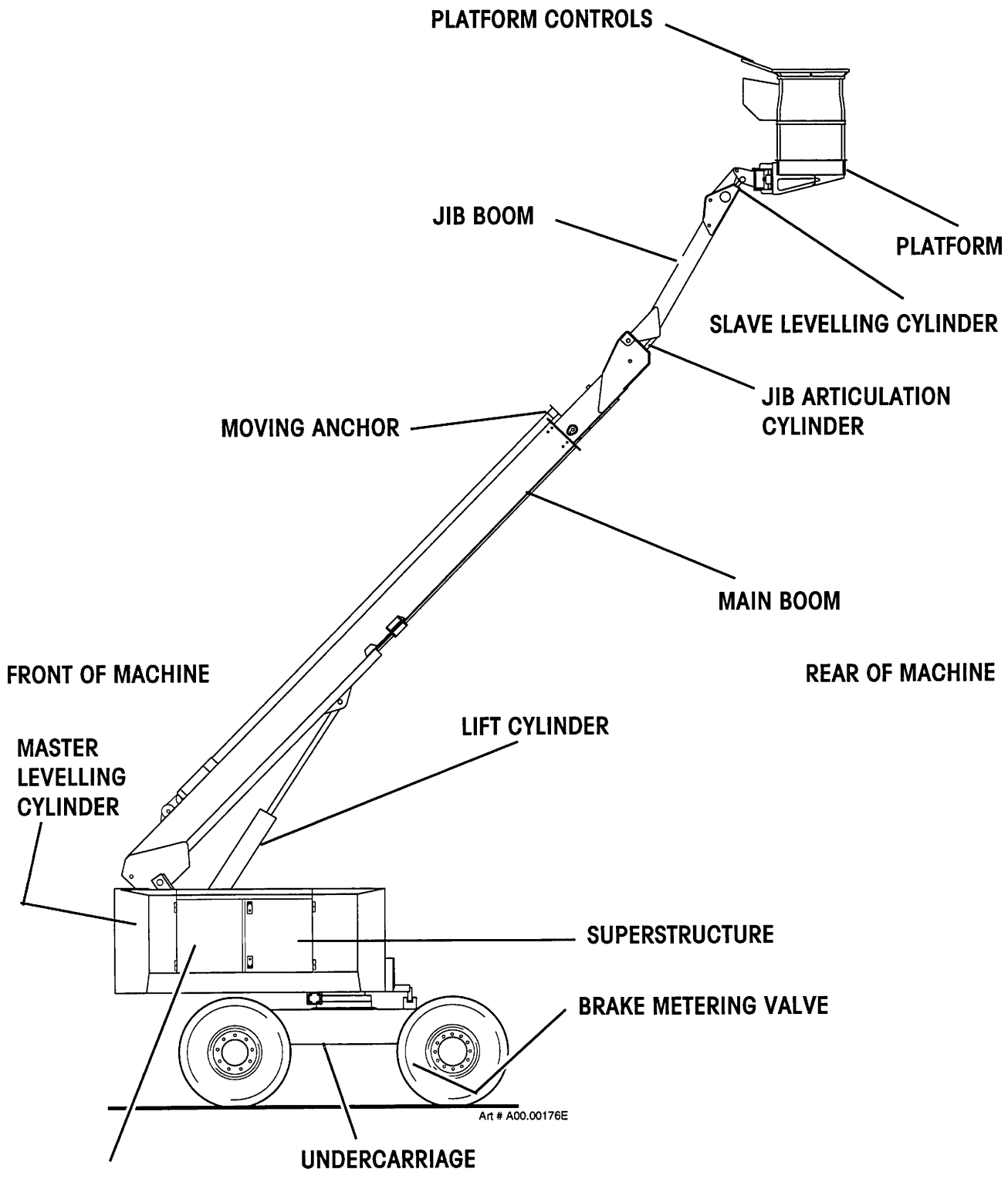
Standard: Wisconsin W41770, 35 HP (26.1 Kw), Air Cooled, Gasoline or Dual Fuel

Optional: Wisconsin V-465, 65 HP (48.5 Kw), Air Cooled, Gasoline or Dual Fuel **(Std. 4WD)**
Ford LSG 423, 63 HP (47.0 Kw), Liquid Cooled, Gasoline or Dual Fuel
Deutz F3L 1011, 42 HP (31.3 Kw), Air Cooled, Diesel
Deutz F4L 1011, 56 HP (41.7 Kw), Air Cooled, Diesel
Isuzu 3KR1, 35 HP (26.1 Kw), Liquid Cooled, Diesel
Isuzu C240, 56 HP (41.7 Kw), Liquid Cooled Diesel
Detroit Diesel/ Perkins 104.19, 43 HP (32.1 Kw), Liquid Cooled Diesel
Detroit Diesel/ Perkins 104.22, 50 HP (37.3 Kw), Liquid Cooled Diesel

Swing Bearing Bolt Torque (Lubricated)	**170 Ft LBs. /** 231Nm / 23.5 kg-m
Wheel Lug Nut Torque (Rear) (Lubricated)	**65 Ft LBs. /** 88.4 Nm / 9.0 kg-m
Wheel Lug Nut Torque (Front) (Lubricated)	**130 Ft LBs. /** 176 Nm / 18.0 kg-m
Drive Hub Bolt Torque	**65 Ft LBs. /** 88.4 Nm / 9.0 kg-m

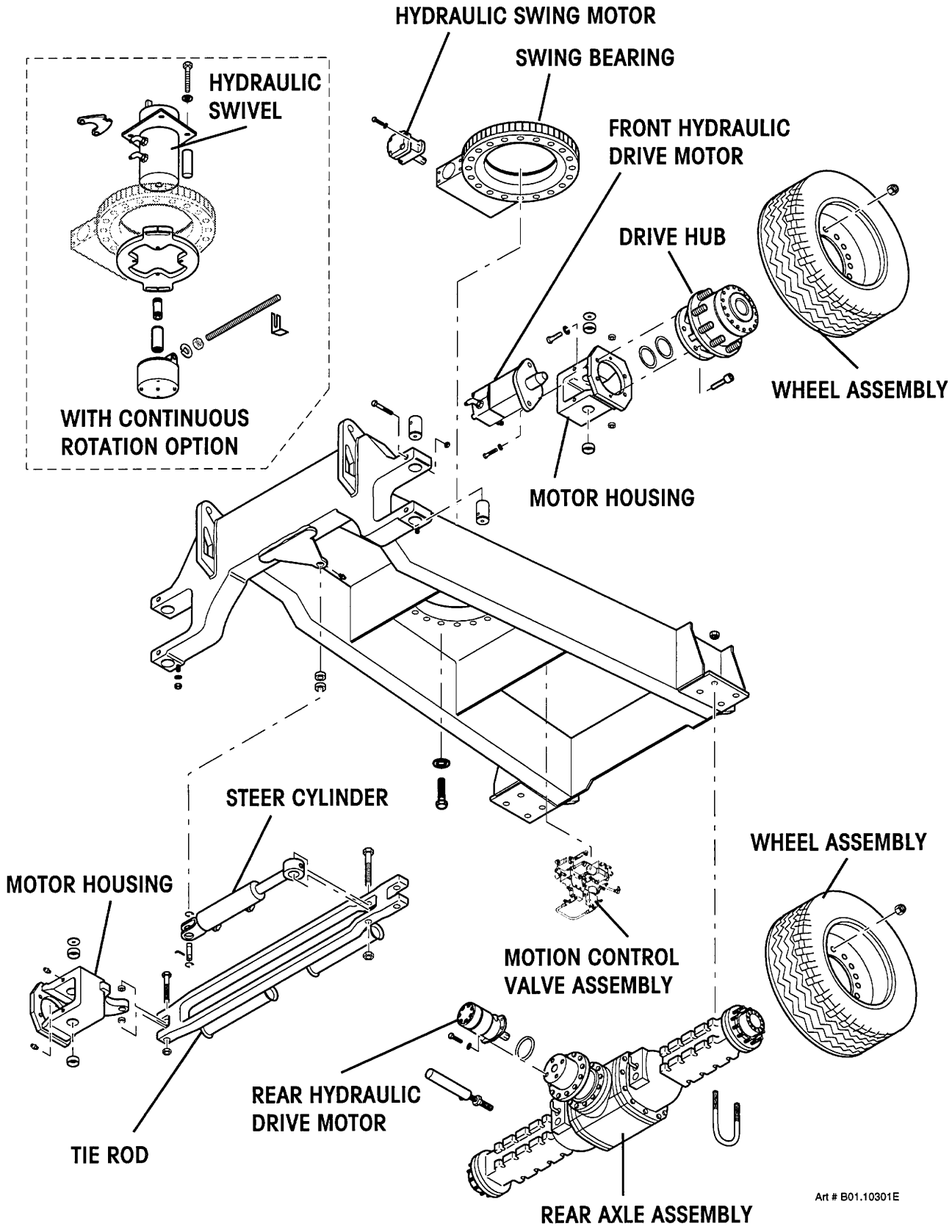
Note 1: Weight and performance shown represent typical machines, and should be used as a general guideline only. Many variables between machines can lead to significant differences in these factors. Accurate figures, when necessary for a particular application, can best be determined by testing of the specific machine.

MACHINE COMPONENT LOCATOR

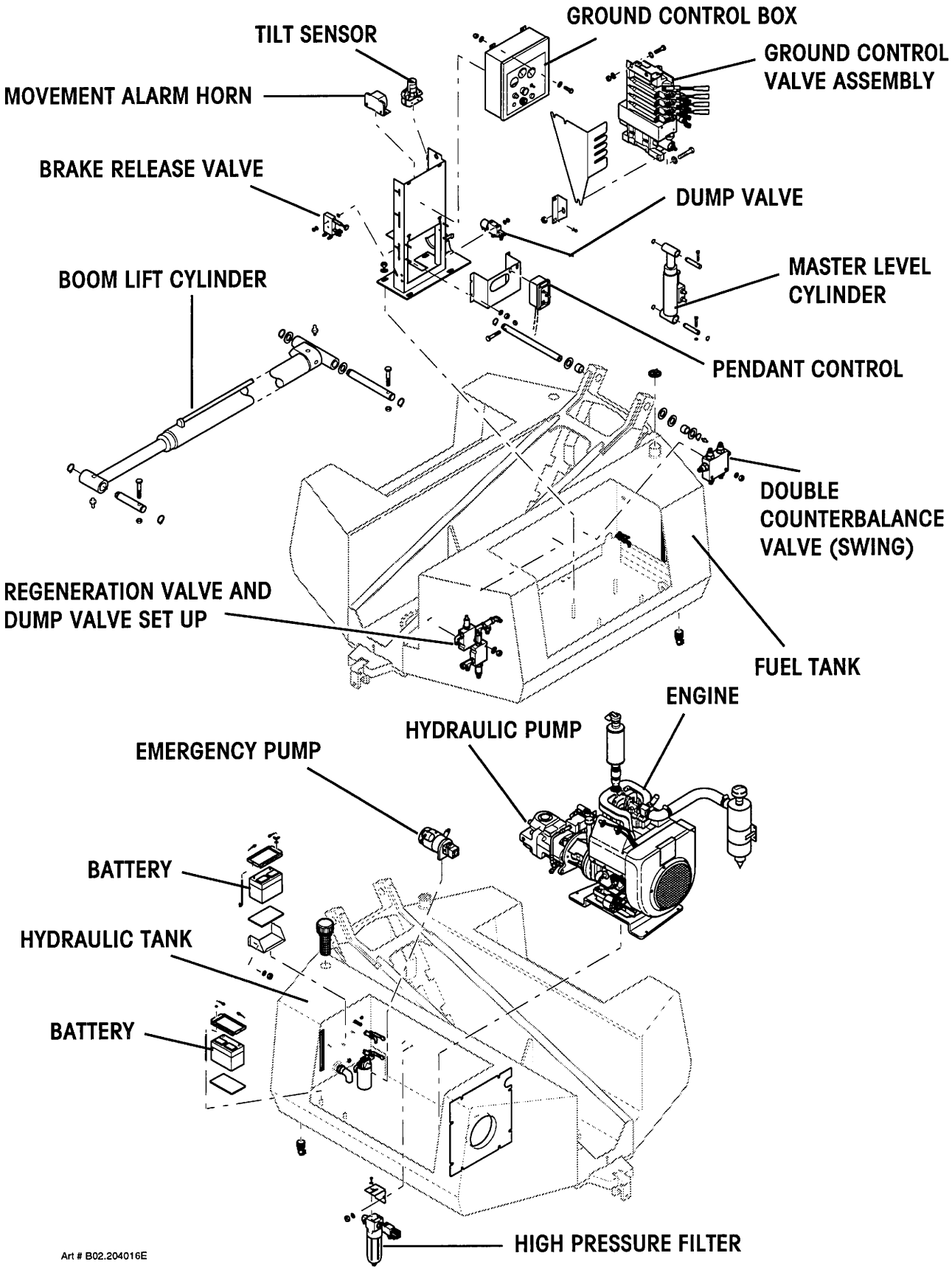


Left Hand Side.

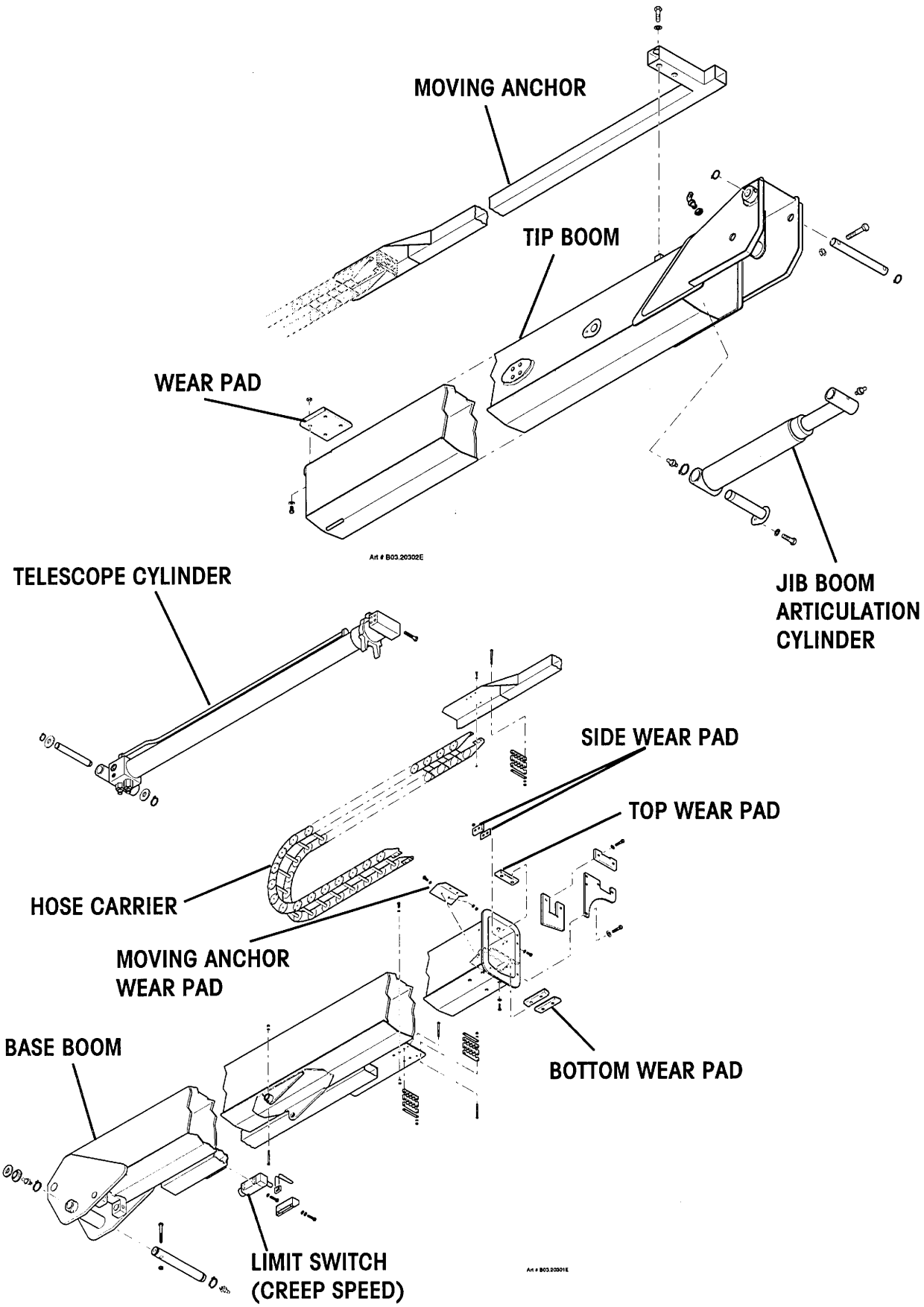
UNDERCARRIAGE COMPONENT LOCATOR



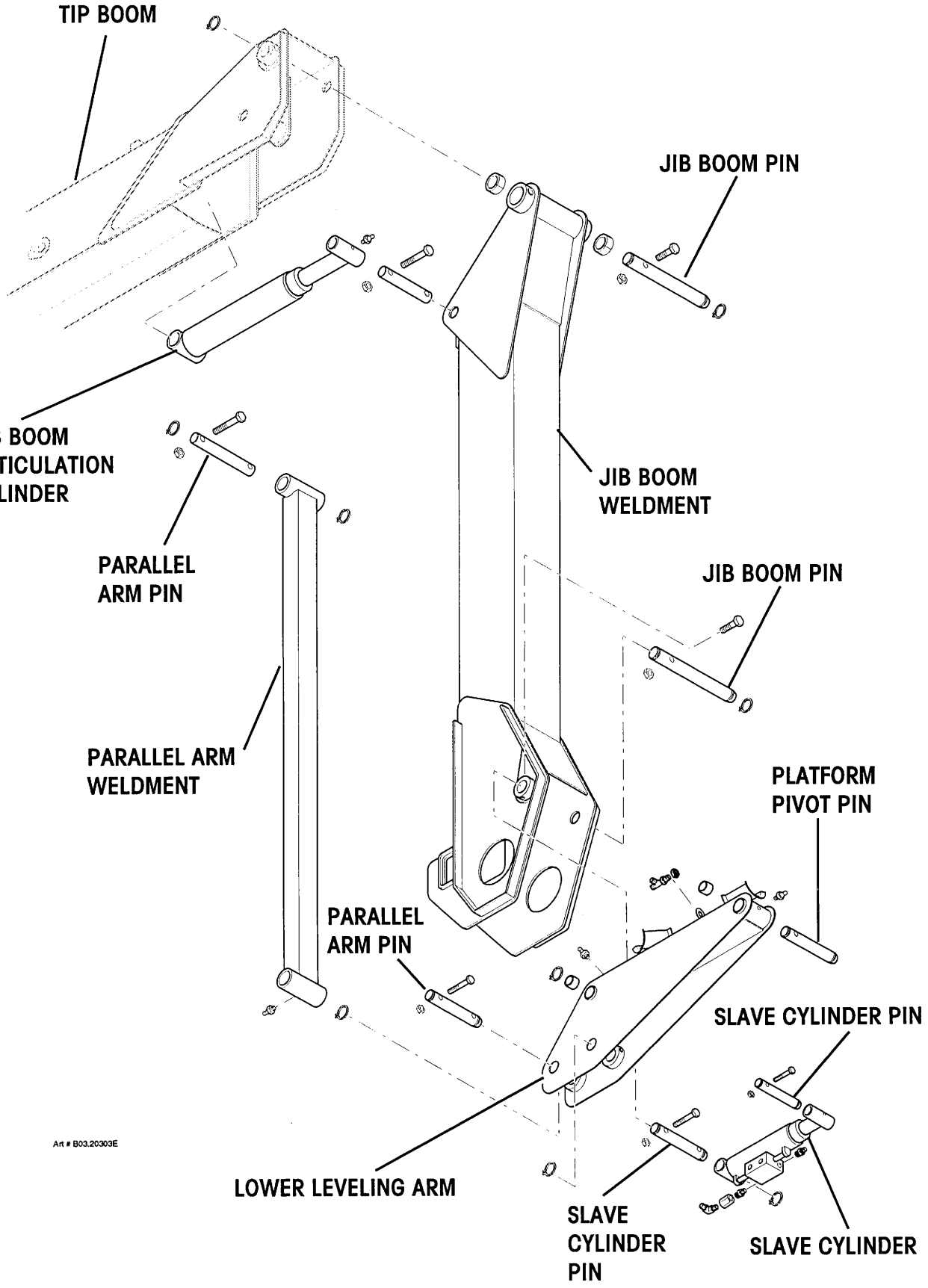
SUPERSTRUCTURE COMPONENT LOCATOR



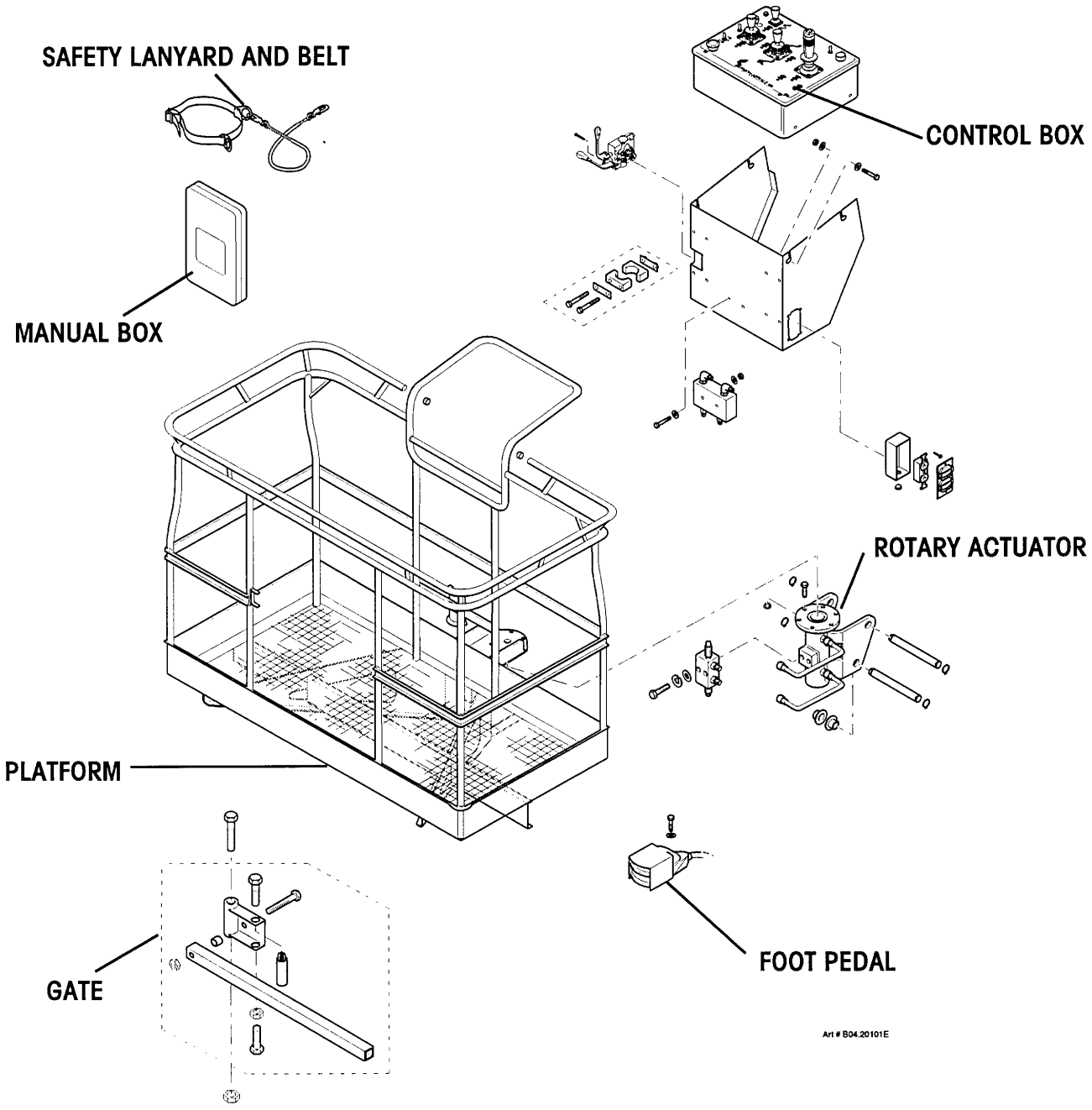
BOOM COMPONENT LOCATOR



BOOM COMPONENT LOCATOR



PLATFORM COMPONENT LOCATOR



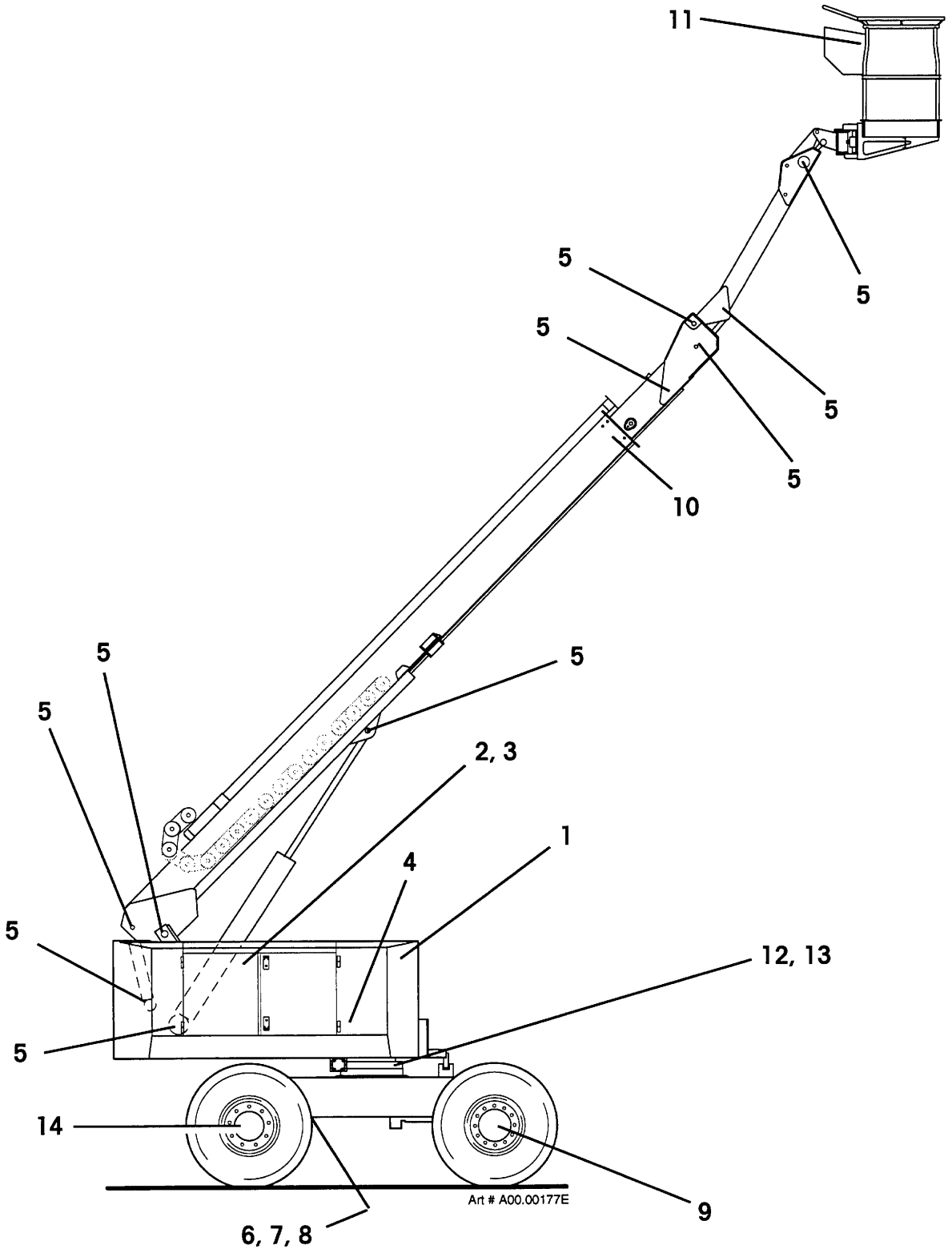
LUBRICATION CHART

NO.	ITEM	SPECIFICATION AND QUANTITY	FREQUENCY OF LUBRICATION
1.	Hydraulic reservoir	Mobil DTE-13M to "Full" mark with all cylinders retracted.	Check daily, Analyze every 6 months or 500 hours.*†, Change yearly or every 1,000 hours.*†
2.	High pressure filter	Filter element.	Change every 6 months or 500 hrs.*†
3.	Hydraulic return filter	Filter element.	Change every 6 months or 500 hrs.*†
4.	Emergency pump filter	Filter	Replace every 6 months or 500 hrs.*†
5.	Boom, cylinder pivot pins	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
6.	Steering spindles (king pin bearings)	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
7.	Steering cylinder bearings	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
8.	Tie rod bearings	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
9.	Axle and planetary ends	SAE 80/ 90 APIGL5	Check monthly.*† Change yearly or every 1,000 hours.*†
10.	Boom wear pads	Silicone spray.	Monthly or every 100 hours.*†
11.	Platform level and rotate valve lever pins	WD 40 Spray or equivalent penetrating oil.	Monthly or every 100 hours.*
12.	Swing bearing	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
13.	Swing bearing teeth	"Keystone -Moly 29 Open Gear Compound" Coat gear faces.	Monthly or every 100 hours.*†
14.	Drive wheel power hubs	SAE 80 W 90, SAE 90 or SAE 85-140, half full.	Change after first 50 hours. Check monthly or every 100 hours* Change yearly or 1,000 hours.*

* Whichever occurs first.

† Different requirements for severe duty applications. See checklists.

LUBRICATION DIAGRAM



SECTION 1: TRANSPORTATION AND EMERGENCY PROCEDURES

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TRANSPORTING THE MACHINE

TOWING PROCEDURES

WITHOUT OPTIONAL TOWING PACKAGE:

- If optional towing package is not installed, refer to "UNPOWERED EMERGENCY MOVEMENT" in this section.

WITH OPTIONAL TOWING PACKAGE:

- Securely attach the machine to a tow vehicle with the tow bar provided.
- Disengage torque hubs:

⚠WARNING

WHENEVER DISENGAGING THE DRIVE TORQUE HUBS OR BEFORE DISCONNECTION FROM TOWING VEHICLE, ENSURE THAT THE MACHINE CANNOT ROLL.

Type 1: remove the plate in the center of the torque hub, turn the plate so that the boss faces in, then reinstall the plate.

Type 2: remove the large hex cap in the center of the torque hub, push in and turn screw slot in the center of the torque hub to line up with the "TOW" mark on the hub, then reinstall the cap.

- Pull steer wander control valve, located near the ground controls, to allow steering wheels to track behind tow vehicle.

The tow vehicle must have sufficient braking capability in order to safely stop itself as well as the machine. Tow speed shall not exceed 3 MPH (4.8 KPH).

TRUCK OR TRAILER TRANSPORT

⚠WARNING

ALWAYS ATTACH THE MACHINE TO A WINCH WHEN LOADING OR UNLOADING FROM A TRUCK OR TRAILER. CONNECT WINCH CABLE TO THE TIE DOWN LUGS ON THE UNDERCARRIAGE.

UNASSISTED LOADING OR UNLOADING OF ANY MOBILE PLATFORM IS NOT RECOMMENDED.

With boom in operational mode:

1. Enter the platform, and start the engine using the platform controls. Select the "OPERATING" engine speed.
2. Raise the boom to allow greater ground clearance so that the platform will clear any obstacles as the machine goes up the loading ramp.
3. Using a winch, carefully drive the machine onto the truck or trailer.
4. Lock the superstructure to the undercarriage by installing the lock pin provided.
5. Ensure that the main boom is fully retracted. Next, the jib boom tip should rest on the truck or trailer bed. Then, use the platform level lever to **rest** the platform base on the bed of the truck or trailer, but **do not** apply pressure onto bed.

TRUCK OR TRAILER TRANSPORT (CONTINUED)

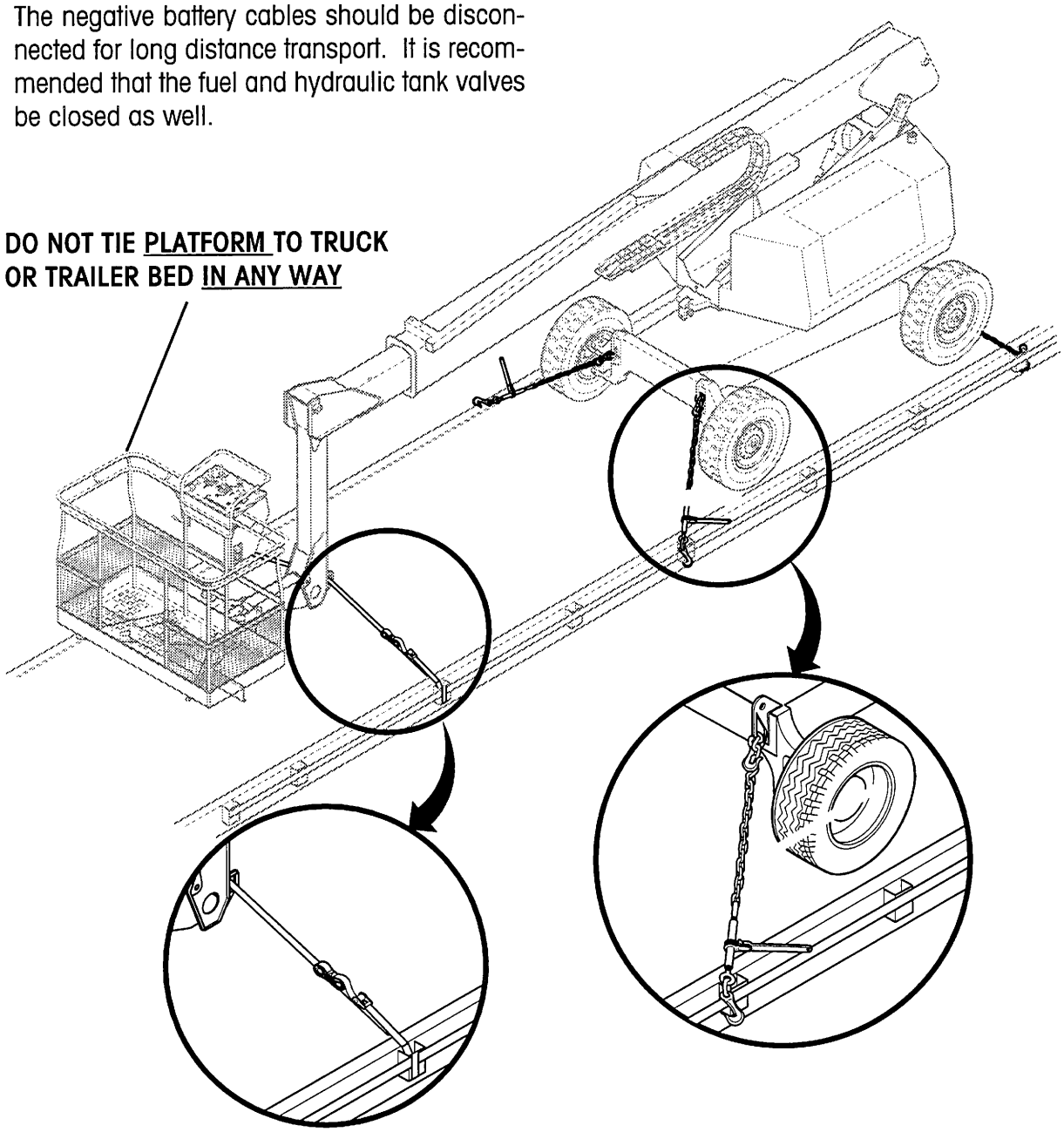
⚠ CAUTION

To avoid damaging the machine, the platform MUST NOT be tied to the trailer bed in any way and should only REST on the bed.

6. The negative battery cables should be disconnected for long distance transport. It is recommended that the fuel and hydraulic tank valves be closed as well.

7. Tie down locations are located on all four corners of the undercarriage and at the base of the jib boom. Use four (4) 1/2 inch, "Grade 7" chains from each of the tie down lugs, and run the chains as shown in the diagram below.

   Ratchet type load binders are recommended. If using lever type load binders, wire or strap them shut, or wrap chains around them to prevent opening.



Tie Down of Machine (Recommended Method).

UNLOADING PROCEDURES

⚠WARNING

TO AVOID SERIOUS PERSONAL INJURY OR DEATH, ENSURE THAT THE MACHINE IS IN "LOW" DRIVE SPEED WHILE UNLOADING FROM A TRUCK OR TRAILER.

1. Inspect the outside of the machine for damage (including the underside). Inspect all hoses, boom sections and cables for chafing or shipping damage. Confirm that all wheel lug nuts and swing bearing bolts are tight (refer to specifications).

2. Remove the pin that locks the superstructure to the undercarriage near the swing bearing. Stow the lock pin in the location provided nearby.

3. Unlock and open both side compartments. Inspect all fuel, electrical and hydraulic connections for damage and security.

4. Connect battery cables to battery if required. Check electrolyte level.

5. Open the fuel tank valves and check fuel level.

6. Check engine oil level, and add as required per engine manufacturer's recommendations.

7. Check fluid level at the sight gauge on the hydraulic tank, and add fluid as required (see Lubrication Chart). Check that shutoff valves on the hydraulic tank are open.

8. Close side compartment covers.

9. Attach the machine to a winch for the unloading procedure.

⚠WARNING

ALWAYS USE A WINCH TO ASSIST LOADING OR UNLOADING THE MACHINE FROM A TRUCK OR TRAILER. UNASSISTED LOADING OR UNLOADING OF ANY MOBILE PLATFORM IS NOT RECOMMENDED.

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

10. Turn key to "GROUND".

11. Perform Machine Startup procedures in Section 2 of the Operator's Manual. Refer to Operator Controls Descriptions, as necessary. Turn off engine.

12. Remove all machine tie downs. Remove wheel chocks, if used. Turn the Ground/Platform key switch to "PLATFORM CONTROLS".

13. Enter the platform, and restart the engine using the platform controls. Select the "HI" engine speed, and test all platform functions.

14. Raise the upper boom section so that the platform will clear any obstacles as the machine is driven down the loading ramp.

15. Connect winch cable through the tie down/lifting lugs on the undercarriage.

16. Carefully drive the machine off the truck or trailer with the assistance of a winch.

⚠ CAUTION

Winch line and machine travel must be coordinated during this procedure.

The brakes are automatically released for driving, and will automatically apply when the drive control lever is brought back to the "NEUTRAL" position.

17. Before placing the machine into service, all operators must read and understand the contents of this Operator's Manual.

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

An Operator's Manual and a Receipt Inspection Adjustment Report are included with each machine leaving the factory.

EMERGENCY SYSTEM AND PROCEDURES

⚠ DANGER

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

EMERGENCY ELECTRICAL PUMP

The Mobile Platform has a battery powered emergency pump. This pump can be activated from the operator's platform or ground control station to briefly operate the machine when the machine has lost engine power.

- Turn and hold the pump switch on the ground control console to "EMERGENCY; or

  press and hold the emergency pump button on the platform control console.

- Select the proper function as desired to fit the situation.

To prevent the battery from completely discharging and the emergency pump from overheating, release the emergency pump switch to allow a 30 second rest period after every 30 seconds of operation. Once the machine has been safely positioned, correct the cause of the failure before returning the machine to service.

UNPOWERED EMERGENCY MOVEMENT

- Every attempt should be made to restore primary power to the machine before using this procedure.

⚠ DANGER

THIS PROCEDURE REQUIRES RELEASING THE MACHINE BRAKES, WHICH RESULTS IN NO MEANS TO STOP THE MACHINE'S TRAVEL. SIMON RECOMMENDS USING THIS PROCEDURE ONLY IN CASES OF EMERGENCY, AND ONLY A SHORT DISTANCE.

BE AWARE OF MACHINE RUNAWAY ON SLOPING SURFACES. MOVEMENT SPEED SHALL NOT EXCEED 1 M.P.H. (1.6 K.P.H.).

- Secure the machine with chains or ropes.

  The machine is equipped with tie down lugs (front and rear) that can be used for towing the machine. The chains or ropes must be of sufficient capacity to move the machine.

- Chock wheels.

- Disconnect both front torque hubs by removing the plate in the center of the torque hub, turning the plate so that the boss faces in, then reinstalling the plate.

- Release brakes.

  There is a hand pump located to the left of the ground control mounting bracket. Close the valve under the pump plunger by turning it to the right (clockwise) and operate hand pump. Continue to pump until high resistance is felt in the pump plunger. At this point, wheel brakes will be released.

  After unchocking the wheels, the machine will be ready to be moved; however, there is no provision for steering the vehicle.

UNPOWERED EMERGENCY MOVEMENT (CONTINUED)

- After primary power has been restored to the machine, fully open the needle valve under the hand pump plunger to engage wheel brakes.
- Engage both front torque hubs by removing the plate in the center of the torque hub, turning the plate so that the boss faces out, then reinstalling the plate.
- The machine is now ready for normal operation.

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 machine will not respond to platform controls.

POSSIBLE CONDITION:

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

CORRECTIVE ACTION

1. Remove foot from foot pedal.
2. Push the red "Emergency Stop" Button.
3. Evaluate the nature of the failure. Return to the ground, using the emergency pump and lowering procedure (see "Emergency Pump").
4. If unable to return to the ground using the platform controls and the emergency pump, contact an experienced operator to lower the machine with the emergency pump using the ground controls (see "Emergency Pump").

⚠ DANGER

DO NOT TRY TO CLIMB DOWN THE BOOM.

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

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

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

⚠ DANGER

DO NOT TOUCH MACHINE !!!

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

CORRECTIVE ACTION

1. Check for contact with power lines.
2. Have someone summon first aid or rescue squad.
3. Attempt to talk to operator before taking any rescue measures.
4. **Check to see if the operator is in a pinned position, or would be endangered if platform is moved, before attempting emergency lowering procedure.**
5. After establishing that the machine is not in contact with live power lines, lower the platform using the emergency lowering procedure (see "Emergency Pump", earlier in this section).
6. Render first aid to the operator.
7. **Report the incident to your supervisor immediately.**

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 MACHINE !!!!

ELECTROCUTION HAZARD!!!

CORRECTIVE ACTION

1. Contact authorized personnel to disconnect power supply touching the machine.
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 procedure to bring platform with operator to a safe location to render first aid (see "Emergency Pump").
5. **Report the incident to your supervisor immediately.**

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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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, BY A DOCTOR FAMILIAR WITH THIS TYPE OF INJURY, WITHIN A FEW HOURS.

FLUID RECOMMENDATIONS

We strongly recommend the use of MOBIL DTE-13M HYDRAULIC FLUID. An EQUIVALENT substitute can be used if absolutely necessary. Mineral-based hydraulic fluids produced by different companies will USUALLY mix with each other satisfactorily, but this IS NOT RECOMMENDED. When in doubt, consult your supplier.

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

FLUID CONTAMINATION CHECKS

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 elements are plugged.
- Any time the hydraulic filter elements show signs of metal content.
- Once every six months, under normal operating conditions.
- Every 3 months, in extremely dusty or dirty operating conditions.

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

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

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

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

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

SYSTEM FLUSHING PROCEDURE

⚠WARNING

CHOCK THE WHEELS TO PREVENT UNEXPECTED MOVEMENT OF THE MACHINE.

1. With BOOMS DOWN AND FULLY RETRACTED (in stowed position), 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 hose to pump, emergency pump hose, telescope retract return hose, vent (return) hose for telescope cylinder, manifold return hose, drive hose from pump with the tee for motor drain.
3. Remove all hoses between pump and high pressure filter.
4. Flush the hoses.
5. Remove hydraulic fluid filter, and flush the filter body and attaching hoses. Discard old filter element and replace.
6. With hoses removed from the hydraulic tank, flush out the tank.
7. Reinstall all the hoses removed in the previous steps EXCEPT the return lines to tank. Temporarily tie hoses together and position these hoses so that they will drain into a clean container.
8. 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 and fill the hydraulic tank with filtered, fresh hydraulic fluid (refer to Lubrication Chart).
9. Open the suction line valve to allow fluid to flow to the hydraulic pump.
10. Loosen hose fittings at pump to allow pump to flood with hydraulic fluid. Tighten pump fittings.
11. Turn main power key switch to the "Ground" position.
12. Press "Engine Start" button to start engine.
13. Activate pump selector toggle switch on remote control pendant and hold at "Main" to activate engine powered pump.

⚠ CAUTION

Use care when operating functions as return hydraulic fluid is now being returned to container provided.

14. Cycle all cylinder functions to flush the hydraulic components of the hydraulic fluid. This will remove old fluid from the hydraulic system as the cylinder is cycled to its maximum limits.

⚠ CAUTION

Monitor the hydraulic reservoir fluid level when cycling the machine functions. Add fluid as necessary to replace that being discharged to container through system return line. This fluid may be returned to the reservoir through a filter cart, if the fluid analysis shows that it is good.

Three cycles of ALL hydraulic cylinder functions should remove old hydraulic fluid.

15. Disconnect the return hoses for the drive motors. Tie the hoses together and let them drain into a clean container.

⚠ CAUTION

ALWAYS CHOCK THE WHEELS before you raise the machine.

16. Jack the front end of the Machine so the front drive wheels are off the ground.

17. Activate pump selector toggle switch on remote control pendant and hold at "Main" to activate engine powered pump.

18. Activate the drive switch on remote control pendant to flush the drive circuit hydraulic components of the hydraulic fluid.

19. Activate the steer toggle switch on remote control pendant to flush the steer cylinder of the hydraulic fluid.

20. When the above procedures have been completed, re-connect system return hose to tank.

21. Fill hydraulic tank to full mark on sight gauge.

22. Operate all functions to their full extreme positions to ensure proper operation.

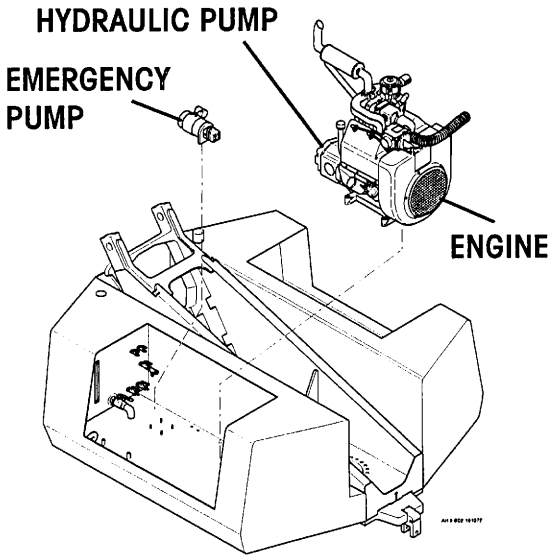
23. Check for leaks and correct as necessary. Machine is now ready to be placed back in operation.

HYDRAULIC SYSTEM COMPONENTS

Following is a description of the Electro-Proportional Circuit and the major components of the hydraulic system.

ELECTRO-PROPORTIONAL CIRCUIT

With no function activated, hydraulic fluid flows from the hydraulic reservoir to the pump, to the high pressure filter, then to the valve bank assembly. When the operator moves a control lever, this initiates the electrical signal to the proper solenoid of the valve bank. The fluid flow is metered by the platform controller. The fluid is then directed to the appropriate function and then back to the hydraulic reservoir.



Hydraulic Pumps Location.

HYDRAULIC PUMP

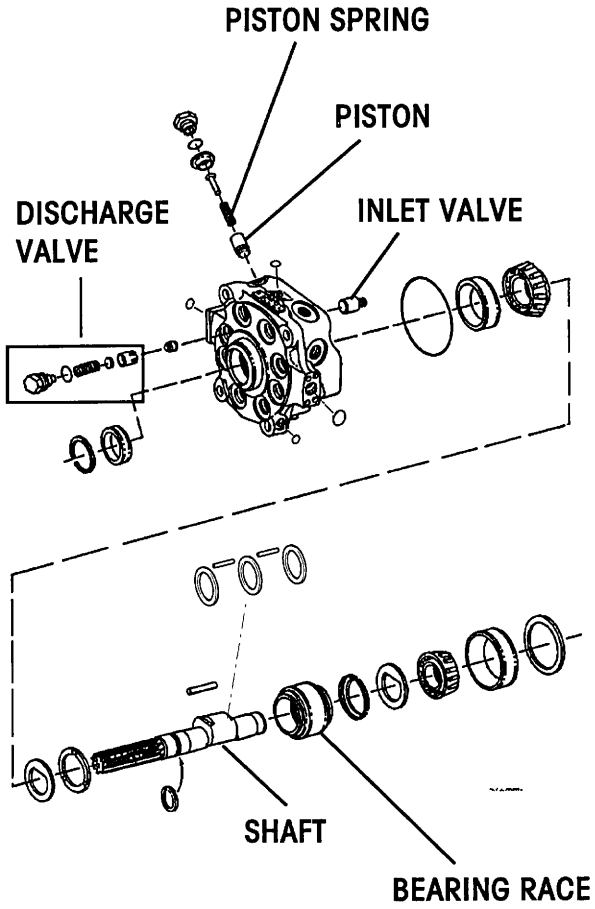
There are two pumps on the machine; the main hydraulic pump and the emergency pump.

MAIN HYDRAULIC PUMP (EARLIER MODELS)

The main hydraulic pump is a variable displacement pressure compensated radial piston pump.

Hydraulic fluid enters through the inlet ports. A common inlet gallery provides fluid to all eight inlet valves in the housing. Pistons radially surround an eccentric cam. The cam moves a bearing race upon which the pistons ride. Behind each piston is a spring which holds the pistons against the bearing race.

As the pump shaft rotates a low pressure cavity develops in the piston spring area during downward stroke of the piston. This low pressure allows the inlet valve to open filling the piston cavity with hydraulic fluid. The inlet valve closes at the end of the intake stroke of the piston.



Main Hydraulic Pump.

High pressure is developed as the race pushes the piston outward. As pressure increases a discharge valve opens allowing the fluid to pass into the outlet gallery.

At the end of the stroke, the discharge valve closes. All discharge valves share a common outlet gallery in the pump housing.

An orifice is located between the crankcase and the inlet gallery. Any fluid leakage past the pistons is routed through the orifice to the inlet gallery. This flow allows for cooling and lubrication.

Main Hydraulic Pump Adjustment

⚠WARNING

ESCAPING FLUID UNDER PRESSURE CAN PENETRATE THE SKIN CAUSING SERIOUS INJURY. RELIEVE PRESSURE BEFORE DISCONNECTING HYDRAULIC LINES. KEEP HANDS AND BODY AWAY FROM PINHOLES AND NOZZLES WHICH EJECT FLUIDS UNDER HIGH PRESSURE. USE A PIECE OF CARDBOARD OR PAPER TO SEARCH FOR LEAKS. DO NOT USE YOUR HAND.

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.

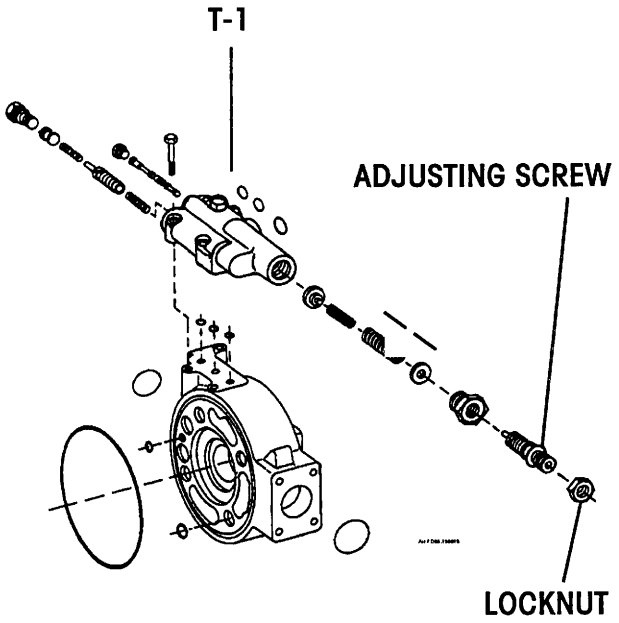
NOTE: Refer to "Machine Specifications" to determine maximum system pressure for your machine.

To adjust the system pressure:

- Install a 14 mm adapter to the high pressure test port (T-1) and connect a 5000 psi (345 Bar/ 352 Kg/cm²) gauge.
- Locate the adjusting screw on the side of the main pump adapter plate.
- Loosen the locknut and while viewing the pressure gauge, set system pressure to value specified in the "Machine Specifications".
    - Turn the adjusting screw out to decrease pressure, in to increase pressure.
- After system pressure has been set, tighten the lock nut.

⚠ CAUTION

When first starting a machine where the pump setting is unknown, the adjusting screw should be set to a minimum depth (nearly all the way out) to prevent excessive pressure at start up.



Main Hydraulic Pump Control Adjustment.

MAIN HYDRAULIC PUMP (CURRENT PRODUCTION)

All control is achieved by the proper positioning of the swash plate. This is achieved by a servo piston acting on one end of the swash plate working against the combined effect of the off-setting forces of the pistons and centering spring on the other end. The control spool acts as a metering valve which varies the pressure behind the servo piston.

The amount of flow produced by the piston pump is dependent upon the length of stroke of the pumping pistons (see Pumping Action figure). This length of stroke, in turn, is determined by the position of the swash plate. Maximum flow is achieved at an angle of 17°.

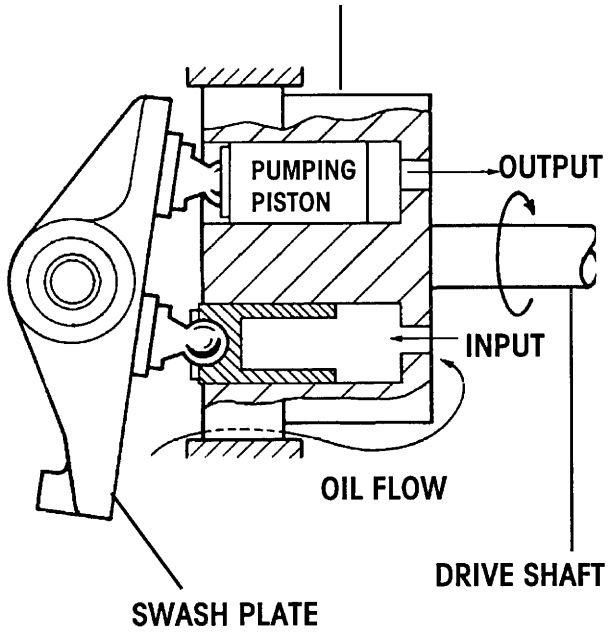
The rotating piston barrel, driven by the prime mover, moves the pistons in a circular path and the piston slippers are supported hydrostatically against the face of the swash plate. When the swash plate is in a vertical position, perpendicular to the centerline of the piston barrel, there is no piston stroke and consequently no fluid displacement. When the swash plate is positioned at an angle, the pistons are forced in and out of the barrel and fluid displacement takes place. The greater the angle of the swash plate, the greater the piston stroke.

Swash plate angle controls the output flow of the pump (see Pressure Compensated Control figure). Swash plate angle is controlled by the force generated against the swash plate by the pumping pistons and by the force of the servo piston. The force of the servo piston is greater than the force of the pumping pistons when both are at the same pressure.

By means of internal porting, pressure is connected from the output port to the servo piston via orifice "E", and to the control spool via passage "D". Also, pressure is applied to the control spool chamber through orifice "F". As long as the pressures at both ends of the control spool remain equal, the spool will remain offset to the right, due to the added force of the spring.

When pressure reaches the setting of the compensator control, the dart leaves its seat causing the pressure in the spool chamber to be reduced. The spool now moves downward causing pressure in he servo piston cavity to vent via port "A". The reduced pressure at the servo piston allows the servo piston to move to the right. This movement reduces the angle of the swash plate and thereby reduces the pump output flow.

As pump pressure on the control spool drops below pressure and spring force in the spool chamber, the control spool moves upward to maintain an equilibrium on both sides of the spool. If pump pressure falls below compensator control setting, the control spool moves up, bringing the pump to maximum displacement.



Pumping Action.

Pump Adjustment (Current Production)

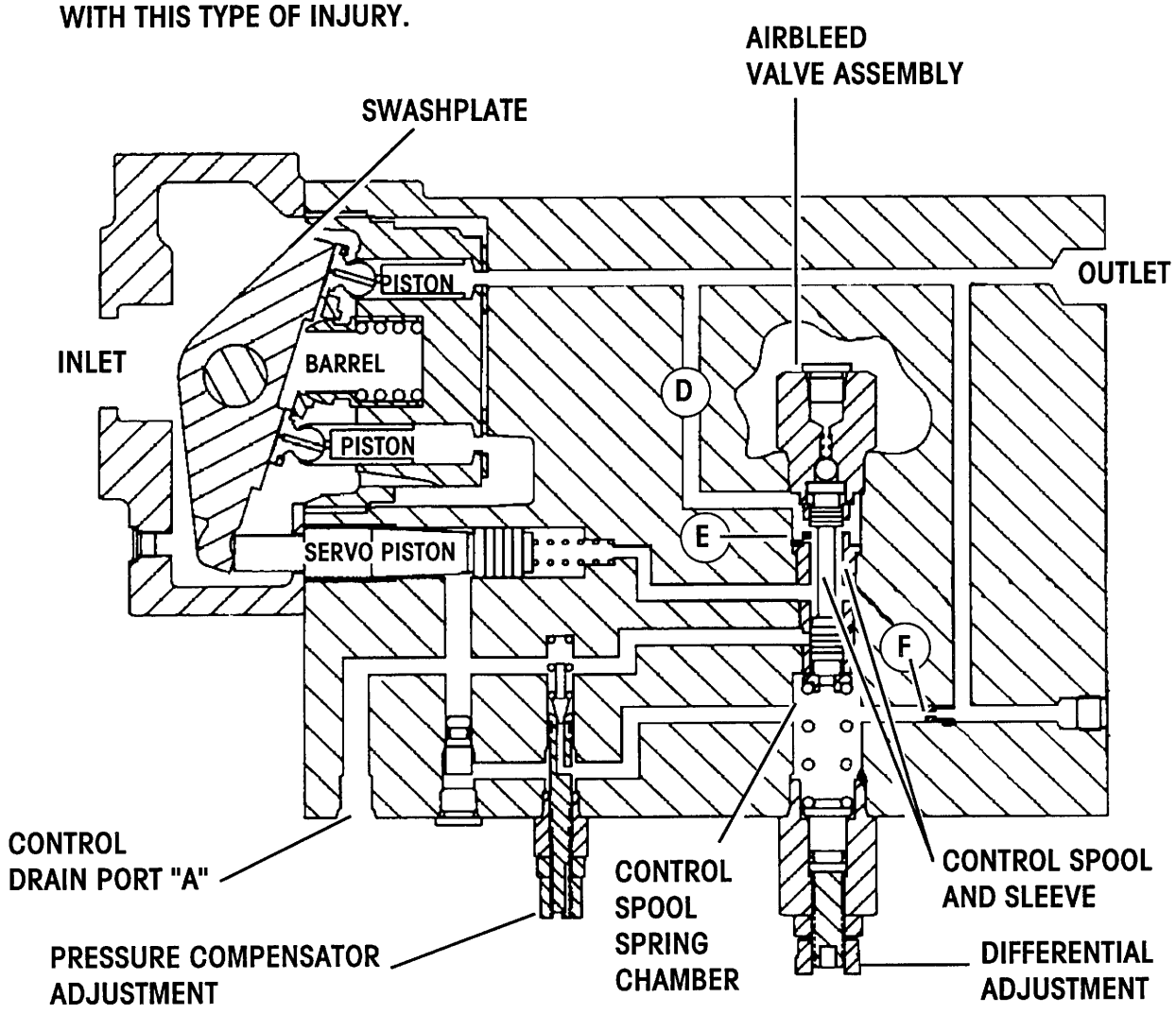
⚠WARNING

ESCAPING FLUID UNDER PRESSURE CAN PENETRATE THE SKIN CAUSING SERIOUS INJURY. RELIEVE PRESSURE BEFORE DISCONNECTING HYDRAULIC LINES. KEEP HANDS AND BODY AWAY FROM PINHOLES AND NOZZLES WHICH EJECT FLUIDS UNDER HIGH PRESSURE. USE A PIECE OF CARDBOARD OR PAPER TO SEARCH FOR LEAKS. DO NOT USE YOUR HAND.

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.

Differential pressure will not normally change through the life of the pump. If this control has been tampered with, a close approximation of the correct setting can be made by the following method.

1. Install a 0-3000 PSI (0-207 Bar) gauge in the port named "Outlet" (see Pressure Compensated Control figure).
2. Deadhead the pump (no flow).
3. Back the pressure compensator adjustment out (full counterclockwise).
4. Turn the differential adjustment knob until 400-425 PSI (28-29 Bar) is reached.



Pressure Compensated Control.

Main pump Replacement (Current Production)

1. With all ball valves closed, ensure hydraulic tank is filled with hydraulic fluid.

2. The replacement pump should be installed with the same orientation as the existing pump.

   IMPORTANT: When installing the replacement pump, the pump shaft coupling teeth must properly mate with the engine nylon element. Adjust the coupling on the pump shaft for maximum engagement.

3. Open all ball valves from hydraulic tank.

4. Fill the pump case with hydraulic fluid by loosening the vent/fill plug in the pump case, opening the inlet line and allowing gravity to pre-fill the inlet line and pump case.

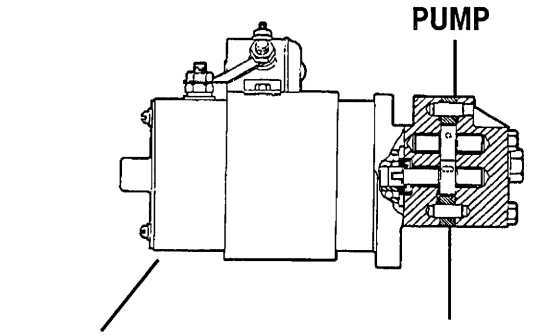
5. Disable engine ignition and crank engine for a maximum of 30 seconds to ensure that pump is primed. (For gasoline engine, pull coil wire: for Diesel engine, disconnect fuel solenoid.)

6. Tighten vent/ fill plug in the pump case.

7. Check all inlet connections to be sure they are airtight. An air leak in the inlet line can cause the pump case to drain down and cause the pump to loose prime during succeeding start-ups.

8. The pressure compensator is factory set and can be adjusted (if necessary) for start-up. Clockwise rotation increases the compensator setting and counterclockwise rotation decreases this setting. Pump compensator should be set with the system deadheaded.

9. Differential pressure adjustment and horsepower control adjustment are factory set. Readjustment is NOT recommended. Consult Simon Aerials Customer Service, if necessary.



Emergency Pump.

EMERGENCY PUMP

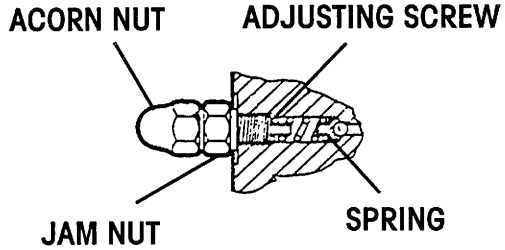
The emergency pump is driven by an electric 12 volt DC motor. This pump delivers hydraulic fluid, under pressure, to the manifold assembly. The electric motor is rated for non-continuous duty and will fail prematurely if activated continuously for extended time periods. This pump should only be used in emergency situations.

Emergency Pump Adjustment

The emergency pump pressure setting screw is located on the side of the adapter plate. To adjust the relief pressure on the pump, remove the acorn nut, loosen the jam nut and turn the adjusting screw in to increase pressure. To decrease pressure, turn the adjusting screw out. (See "Machine Specification" for correct setting.)

Emergency Pump Filter

The emergency pump has an inline, 10 micron pressure filter, which is to be changed when the other hydraulic filter(s) is changed.



Emergency Pump Adjustment.

GROUND VALVE BANK ASSEMBLY

The ground valve bank assembly of electrohydraulic valves are designed for remote directional and proportional flow control. The spools of the main valve are hydraulically piloted by a solenoid, which uses pulse-width modulated excitation to provide proportional control.

INLET SECTION

Installed in each inlet section is a 25 micron stainless steel wire cloth pilot supply filter. Also standard is a pressure reducing valve designed to provide fluid to each pilot stage with the required pressure supply.

Pressure compensation is accomplished at the pump. Therefore, the inlet section acts primarily as a manifold to inlet the main hydraulic fluid supply and to outlet the tank line to reservior.

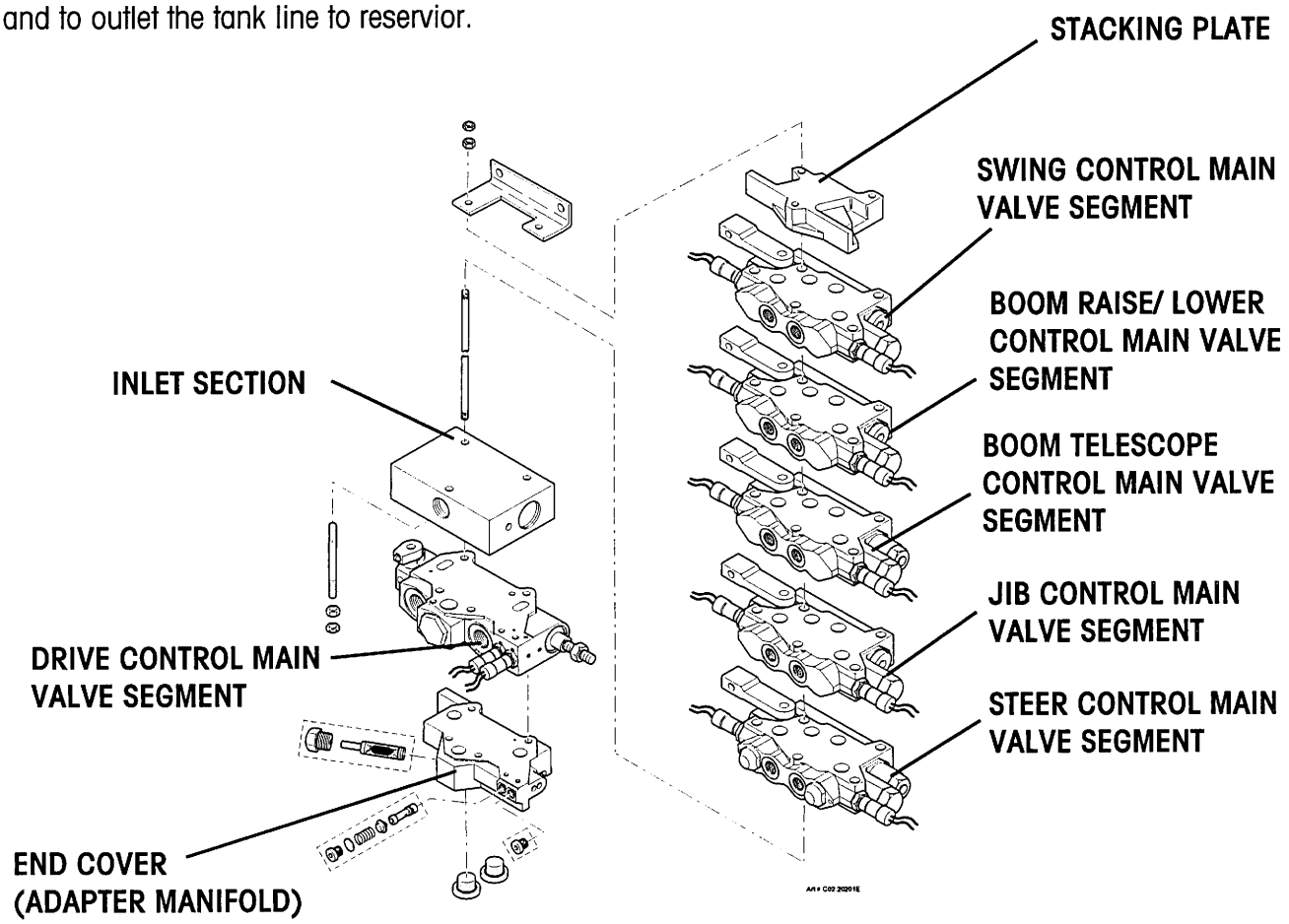
END COVER (ADAPTER MANIFOLD)

The end cover section is essentially a manifold connecting the two separate tank flow passages and serves to complete the sectional valve stacking.

MAIN VALVE SEGMENT

There are two types of main valve segments. The top valve segment is for the drive function. The four bottom valve segments are for the swing, hoist, telescope and steer functions.

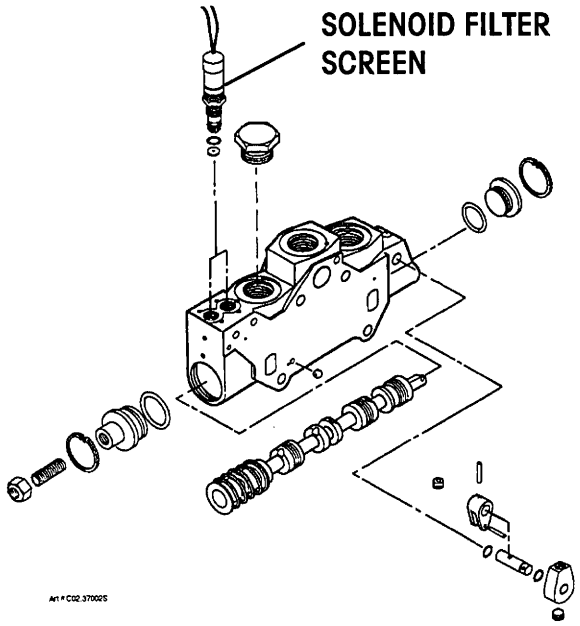
The spool in the main valve segment is a 4-way, 3-position closed center. Motion stops in the neutral position, where the pressure is blocked.



Ground Valve Bank Assembly.

OPERATION

This control valve is a normally closed, spring-biased, solenoid-actuated, high speed, digital valve. It consists of a removable, replaceable cartridge assembly specifically matched with a separate orifice plate and "O"-ring seal. To generate a proportional control pressure, the coil inside the solenoid is energized 33 times per second with a pulse-width modulated electrical signal. The resulting control pressure is directly proportional to the duty cycle, or percent of "ON" time per cycle of this electrical excitation. Fluid exiting the cartridge is restricted by a fixed orifice plate; the resulting back pressure is proportional to the operator-regulated duty cycle. This pressurized fluid is then routed within the main valve segment to the end of the main spool to furnish the control pressure to shift the main spool to the flow required.



Drive Main Valve Segment.

MAINTENANCE

Hydraulic Circuit Line Check

Inspect hydraulic lines and connections for signs of looseness or obstruction.

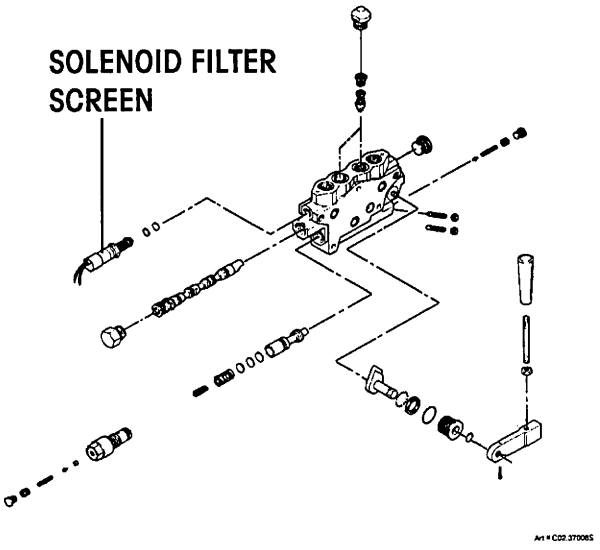
Tighten loose fittings and correct any kinked hoses:

- From pump through pressure filter to valve stack.
- Lines between valve stack and reservior.
- All hoses to the cylinders.
- Tie-downs of hoses.

NOTE: Entrapped air in the hydraulic lines is common upon start-up and may result in temporary irregular motion. However, if after a reasonable operating period this condition persists, hydraulic lines should be bled to remove entrapped air and carefully inspected for leaks, starting with pump suction line.

Main Valve Segment

The main valve segment contains one filter element which requires maintenance. Remove and clean trapped contaminants using compressed air from the inside out. Replace damaged filter elements.



Telescope, Steer, Boom and Swing Main Valve Segment.

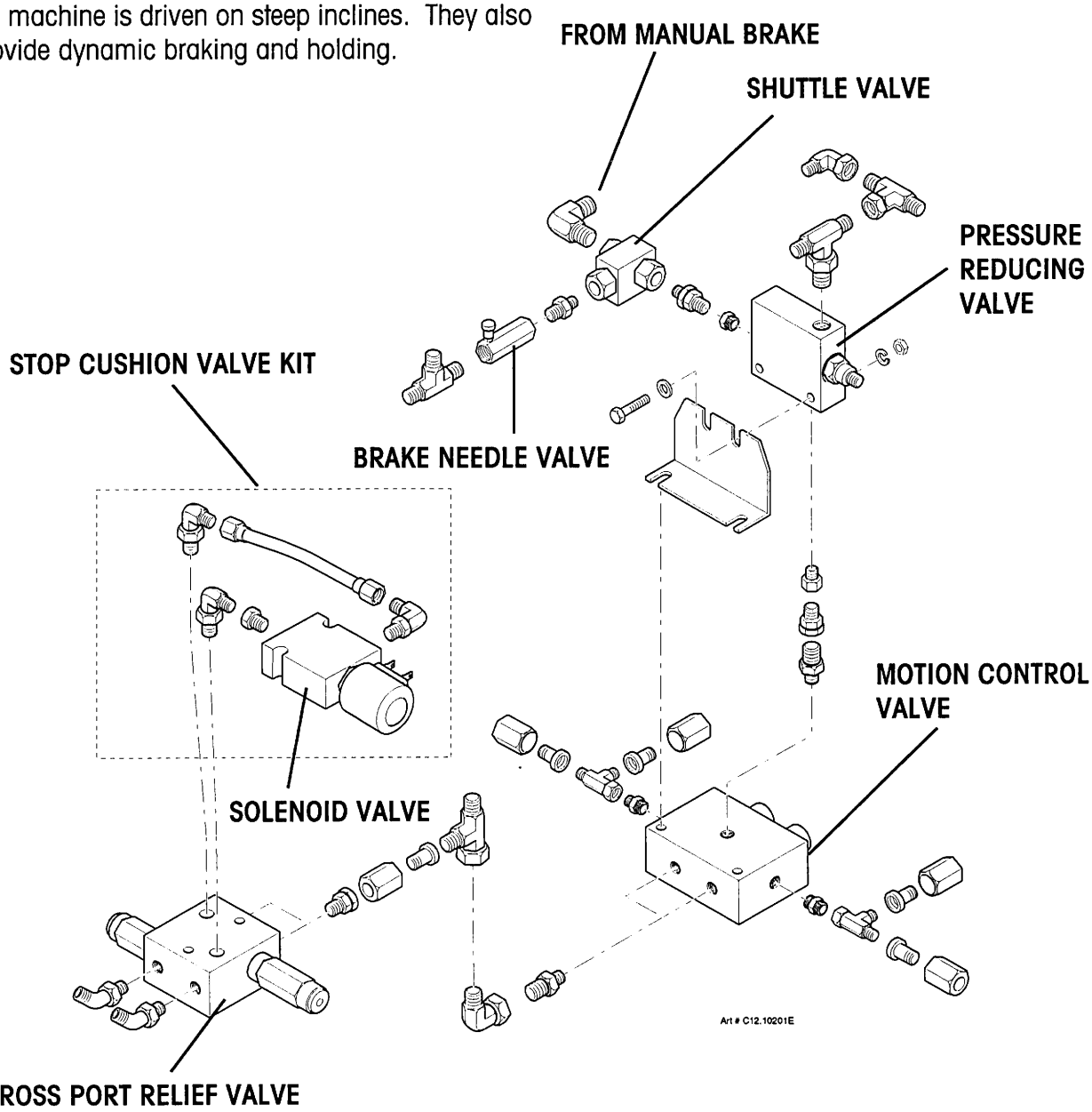
DRIVE/ BRAKE CONTROL VALVE ASSEMBLY

MOTION CONTROL VALVE

This valve has two pilot operated counterbalance cartridges. One each for the forward and reverse drive functions. It also contains a shuttle valve which directs high pressure hydraulic fluid to the axle brakes. The counter balance valves produce a back pressure in the drive system so that no uncontrolled or "runaway" movement happens when the machine is driven on steep inclines. They also provide dynamic braking and holding.

BRAKE NEEDLE VALVE

This valve regulates the hydraulic fluid flow from the brakes. Adjustment regulates the speed that the brakes are applied. When drive is selected oil free flows through the needle valve from the motion control valve to the brakes releasing the brakes in the axle.



Motion Control Valve Assembly.

SHUTTLE VALVE

The shuttle valve directs only high pressure hydraulic fluid flow to the axle brakes from either the drive pressure reducing valve or the manual brake release pump.

PRESSURE REDUCING VALVE

Reduces drive pressure to a maximum of 435 psi (30 Bar/ 30.6 Kg/cm^2) to release axle brakes.

CROSS PORT RELIEF MANIFOLD

The cross port relief manifold limits pressure to all wheel drive motors. Valves are set at 3000 psi (207 Bar/ 211 Kg/cm^2).

STOP CUSHION SOLENOID VALVE

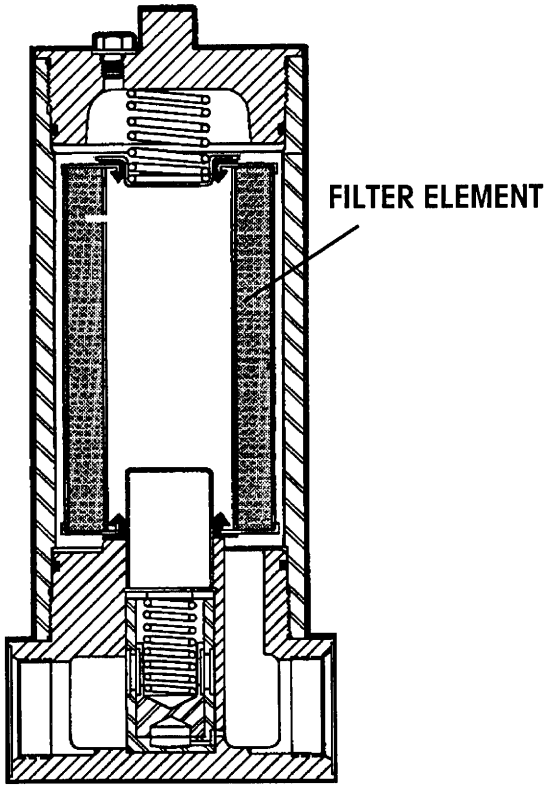
This solenoid valve opens or closes a drive motor bypass circuit. A small orifice (0.082) provides a gradual stop when the drive handle is centered to neutral. The valve and bypass circuit is closed when in creep speed or on slopes over 5°. Machine will stop instantly without cushioning when bypass circuit is closed.

HIGH PRESSURE FILTER (EARLIER MODELS)

The high pressure hydraulic filter is a non-bypassing filter. This filter allows maximum fluid flow as long as the filter element is free of contaminants. When the filter is dirty, it restricts the hydraulic flow to avoid crushing the filter element due to differential pressure across the element. The build-up of pressure across the filter will lower high speed drive performance.

HIGH PRESSURE FILTER ELEMENT

A 3 micron element is the standard element for this filter. See Lubrication Chart for frequency of changing the filter element.



Hydraulic Filter (Earlier Models).

HYDRAULIC FILTER (CURRENT PRODUCTION)

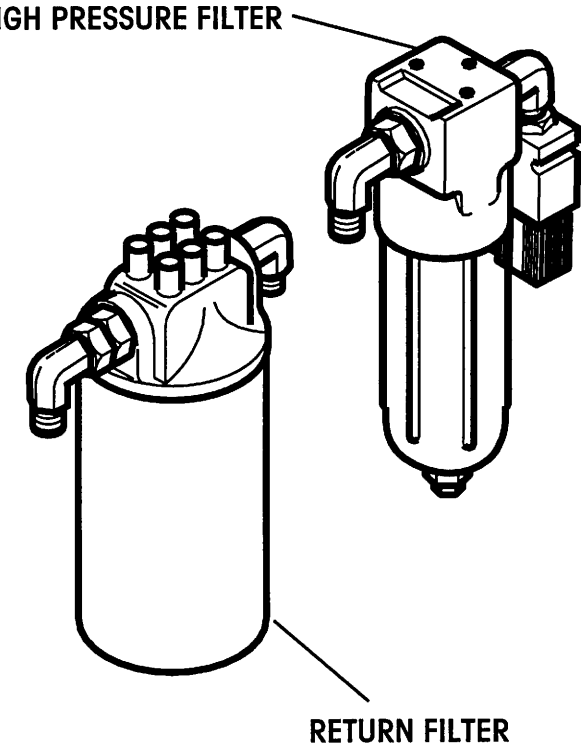
There are two hydraulic filters for machines that use a current production hydraulic pump: a return filter and a high pressure filter. They are both located near the hydraulic tank.

RETURN FILTER (CURRENT PRODUCTION)

The hydraulic return filter is a 10 micron bypassing filter, which allows maximum fluid flow as long as the filter element is free of contaminants. When the filter is clogged, hydraulic flow bypasses the filter element. The return filter element should be changed every six months or when the high pressure filter element is changed, whichever occurs first.

HIGH PRESSURE FILTER (CURRENT PRODUCTION)

The hydraulic high pressure filter is a non-bypassing, 8.6 micron filter. This filter 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.



Hydraulic Filter (Current Production).

HYDRAULIC FLUID RESERVOIR

The hydraulic fluid reservoir is a part of the superstructure weldment and consists of the tank, a fill cap assembly (breather and strainer), a drain plug, one valve for the suction line, five valves for return lines from the various functions, a drain cock and a sight gauge. **For current production, there are two suction lines (main pump and emergency pump) and only one return line.**

HYDRAULIC RESERVOIR MAINTENANCE

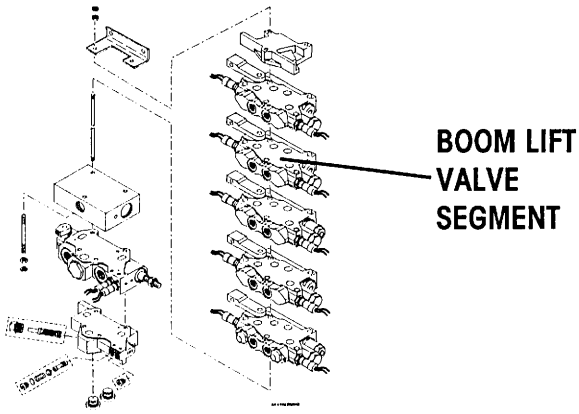
Check tank for signs of leakage. Clean cap filter by flushing with clean solvent and drying. Condensation should be drained from the tank monthly through the "drain cock'

BOOM LIFT SYSTEM

The boom lift system consists of a hydraulic valve segment on the ground valve bank, a flow control valve, a lift cylinder with a counterbalance (holding) valve, and a control lever on the platform console and at the ground control bank.

BOOM LIFT VALVE SEGMENT

When the boom control lever on the platform control or ground control valve bank is activated, an electrical signal is transmitted to the valve cartridge in the boom lift (hoist) valve segment. This allows hydraulic fluid at the correct pressure to be sent to the proper end of the lift cylinder to raise or lower the boom.



Ground Valve Bank Assembly.

FLOW CONTROL VALVE

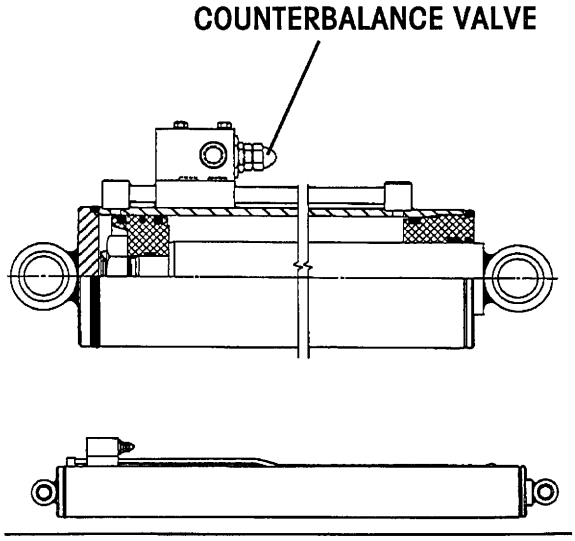
The flow control valve, located at the "boom up" outlet on the boom lift (hoist) valve segment, controls boom down speed. The flow control valve allows full hydraulic fluid flow for the boom up function. For the boom down function, the flow control valve meters the hydraulic fluid flow, thus allowing a smooth descent.

Flow Control Valve Adjustment

If boom bounces while descending, adjust the valve clockwise until the boom descends smoothly.

LIFT CYLINDER

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



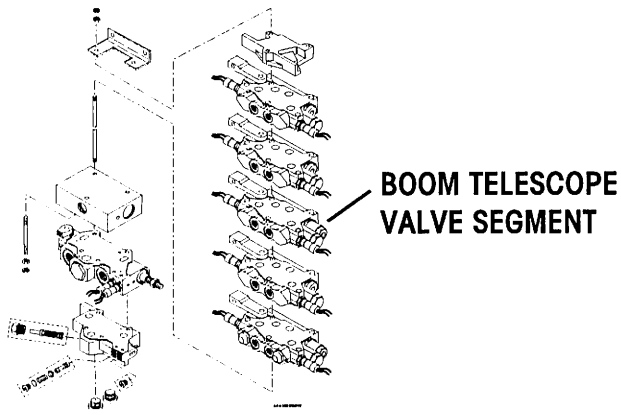
Lift Cylinder.

BOOM TELESCOPE (EXTEND) SYSTEM

The boom telescope system consists of a hydraulic valve segment on the ground valve bank, a pressure relief valve, a telescope cylinder with two counterbalance (holding) valves, and a control lever on the platform console and the ground control valve bank.

BOOM EXTEND VALVE SEGMENT

When the boom telescope control lever on the platform control or ground control valve bank is activated, an electrical signal is transmitted to the valve cartridge in the boom telescope (extend) valve segment. This allows hydraulic fluid at the correct pressure to be sent to the proper end of the telescope cylinder to extend or retract the boom.



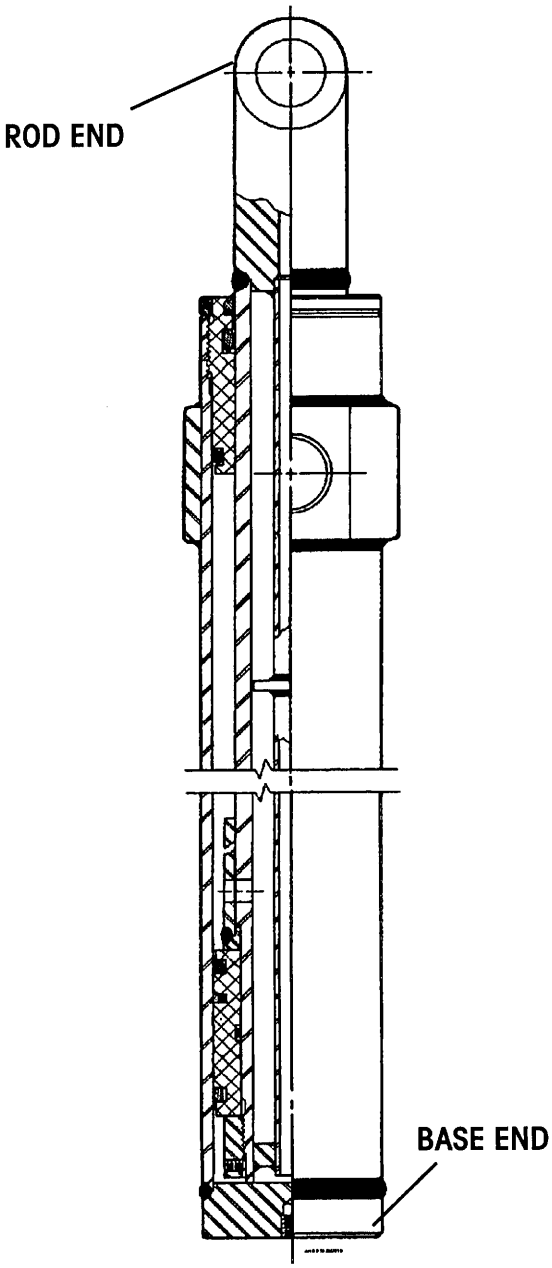
Ground Valve Bank Assembly.

PRESSURE RELIEF VALVE

The pressure relief valve limits the pressure on the base end of the cylinder to 1800 PSI (124 Bar/ 126.5 Kg/cm^2) to prevent the cylinder rod from buckling. The pressure relief vlave is factory set at 1800 PSI (124 Bar/ 126.5 Kg/cm^2) and needs no adjustment.

TELESCOPE (EXTEND) CYLINDER

A double acting telescope cylinder performs the extension and retraction of the boom. This cylinder contains two counterbalance (holding) valves, which prevents unintended movement of the cylinder should a hose or fitting develop a leak. When the boom is extended, fluid flows to the base end cylinder port and to the counterbalance valve, opening this valve and allowing fluid from the rod end of the cylinder to flow back to the reservoir.



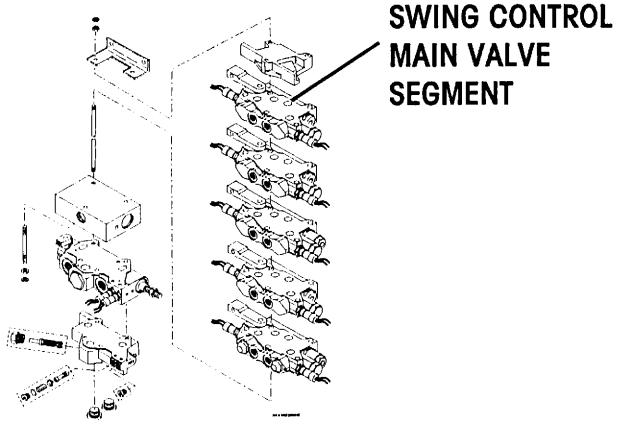
Telescope (Extend) Cylinder.

SUPERSTRUCTURE SWING SYSTEM

The superstructure swing system consists of a hydraulic directional control valve in the platform valve bank assembly, a control main valve in the ground valve bank assembly, dual counterbalance valve, a shuttle valve assembly and swing motor/ reducer and bearing.

SWING VALVE SEGMENT

When the swing control lever on the platform control or ground control bank is activated, an electrical signal is transmitted to the valve cartridge in the swing valve segment. This allows hydraulic fluid at the correct pressure to be sent to the swing drive motor.



Ground Valve Bank.

DOUBLE COUNTERBALANCE VALVE (SWING)

The double counterbalance valve acts as a hydraulic lock for the swing motor. The valve maintains resistance to flow in one direction but permits free flow in the other direction.

SWING DRIVE MOTOR/ REDUCER ASSEMBLY

The worm gear swing reducer used on the RP46 allows the motor output to be reduced to a fractional speed and greatly reduces swing drive torque. This allows the superstructure to rotate at a slow controlled speed when fluid power is applied to the swing drive motor.

The swing reducer has an automatic built in lock to prevent superstructure rotation when the swing function is not desired.

PLATFORM ROTATE SYSTEM

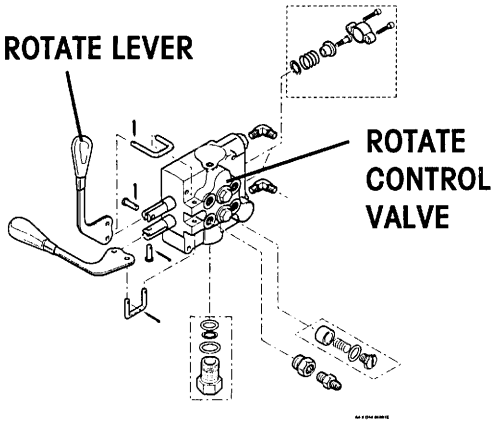
The platform rotate system consists of a platform rotate control valve, a double pilot operated check valve, a rotary actuator and a platform rotator manifold. The platform rotate system can only be operated from the platform control console.

ROTATE CONTROL VALVE

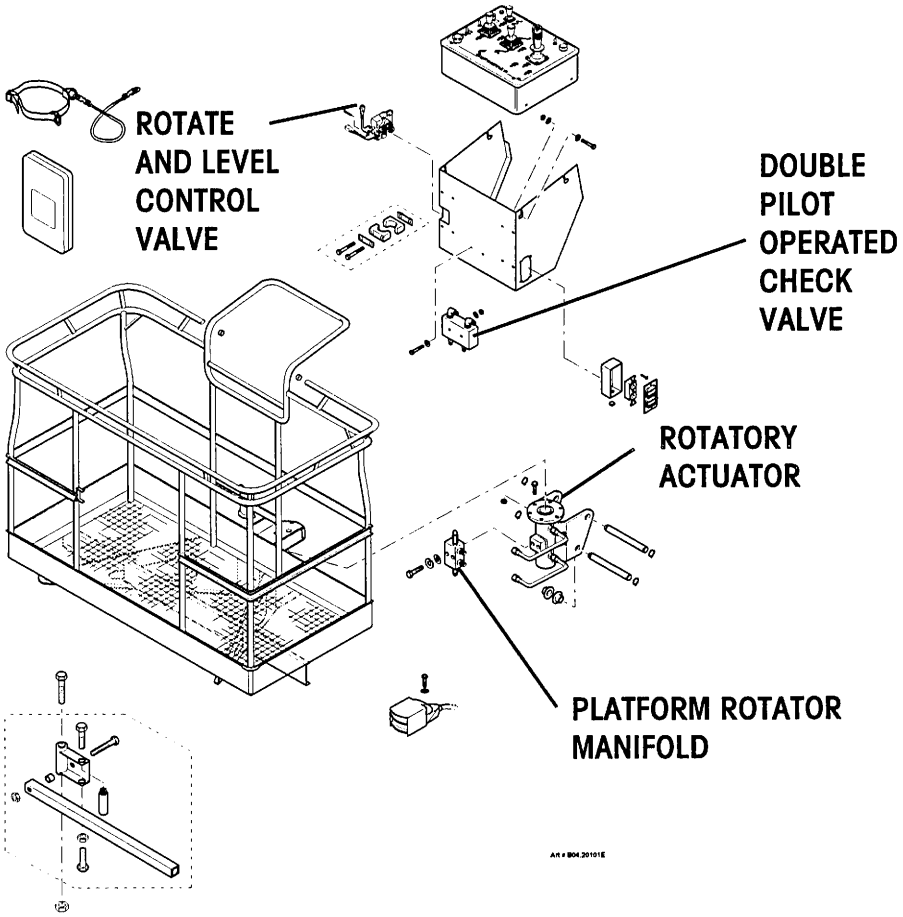
This valve is a three position, four way valve which is manually operated. This control valve directs fluid flow to the rotate functions.

DOUBLE RELIEF/ PILOT OPERATED CHECK VALVE

The double pilot operated check valve acts as a locking component for the rotary actuator and prevents the platform from rotating except when the rotate circuit is activated. When the platform rotate circuit is activated, partial flow is piloted over to the return side to unseat the check valve which has an integral relief valve and thus unlock the rotary actuator.



Rotate Control Valve.



Platform Rotate Components.

ROTARY ACTUATOR

The rotary actuator is a rack and pinion type. Hydraulic fluid enters the actuator from either side depending on the control valve direction and moves the rack, causing the pinion shaft to rotate.

Rotary Actuator Maintenance

Change the hydraulic fluid once every year (see Lubrication Chart).

PLATFORM LEVEL SYSTEM

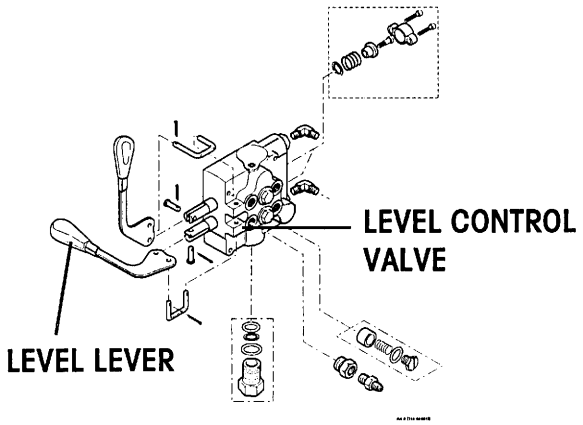
The platform level system consists of a level control valve, slave leveling cylinder with a counterbalance (holding) valve, master leveling cylinder, double pilot operated check valve and two relief valves.

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

The platform level system is only controlled from the platform.

LEVEL CONTROL VALVE

This valve is a three position, four way valve which is manually operated. This control valve directs fluid flow to the level functions.



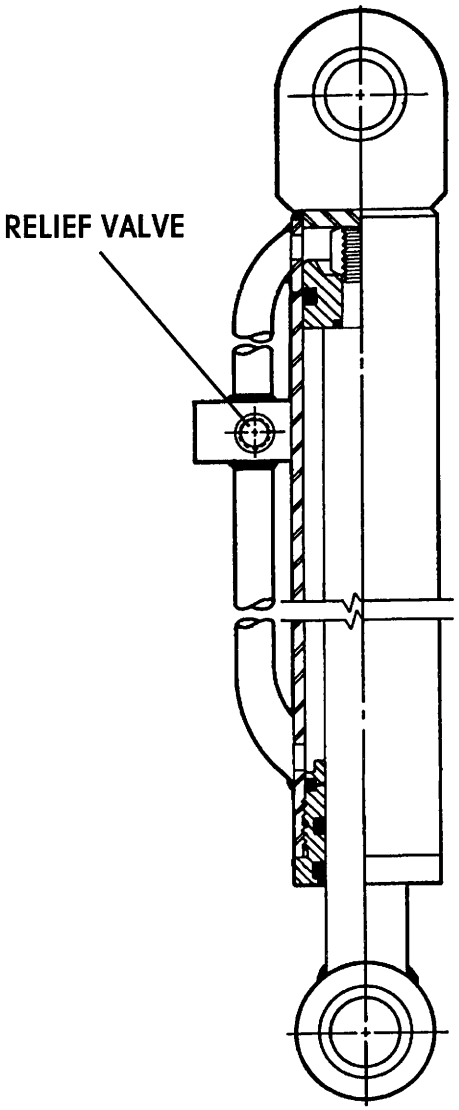
Level Control Valve.

DOUBLE PILOT OPERATED CHECK VALVE

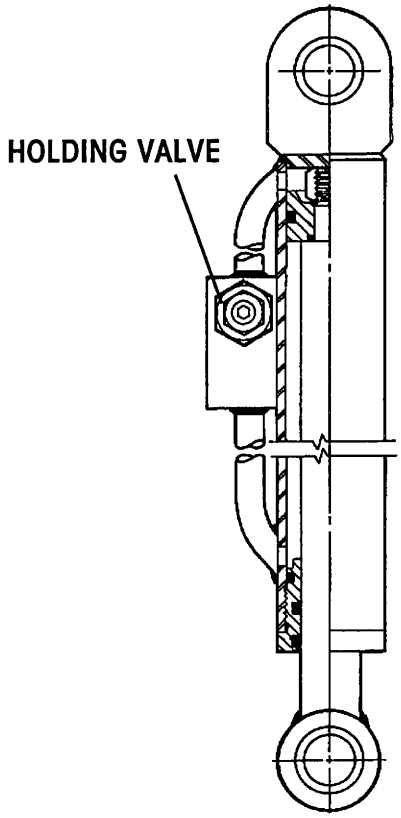
The double pilot operated check valve acts as a locking component for the leveling function and prevents the cylinders from drifting.

MASTER LEVEL CYLINDER

The master leveling cylinder is a double acting cylinder located between the upper frame of the superstructure and the boom. Whenever the boom is raised or lowered, the master cylinder is forced to extend or retract. The fluid displacement from the master level cylinder is in turn sent up the boom to the slave level cylinder. This forces the slave level cylinder to move the same distance as the master level cylinder.



Master Level Cylinder.



Slave Level Cylinder.

SLAVE LEVEL CYLINDER

The slave leveling cylinder is a double acting cylinder located between the tip boom and the platform. This cylinder controls the position of the platform relative to the tip boom.

The slave leveling cylinder contains two holding valves. The holding valves prevent platform movement in the event of hose failure.

RELIEF VALVES

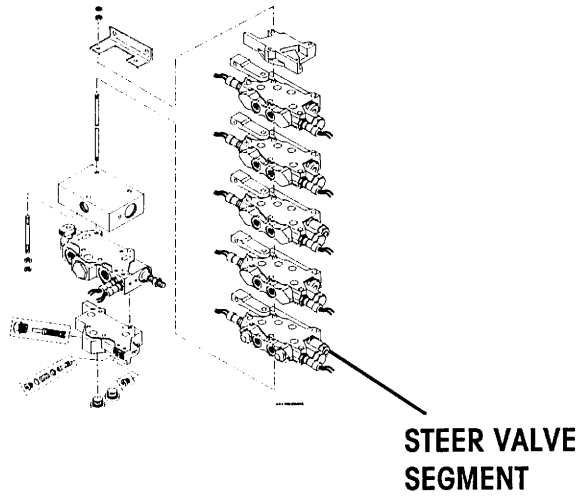
The relief valves are factory set at 3000 PSI (207 Bar/ 211 Kg/cm^2) and prevent high pressure spikes in the leveling circuit that could result in component damage. HIgh pressure spikes can occur when the platform is manually controlled for leveling, which cause the slave level cylinder to bottom out before the master level cylinder stops moving as the boom is lowered.

STEER SYSTEM

The steering system consists of a steer valve segment, hydraulic swivel, a steer cylinder, a steer toggle switch on the pendant control and a steer rocker switch on the drive lever at the platform control console.

STEER VALVE SEGMENT

When the steer control rocker switch on the platform control or the steer control toggle switch on the control pendant, is activated an electrical signal is transmitted to the valve cartridge in the steer segment. This allows hydraulic fluid to be sent to the steer cylinder.



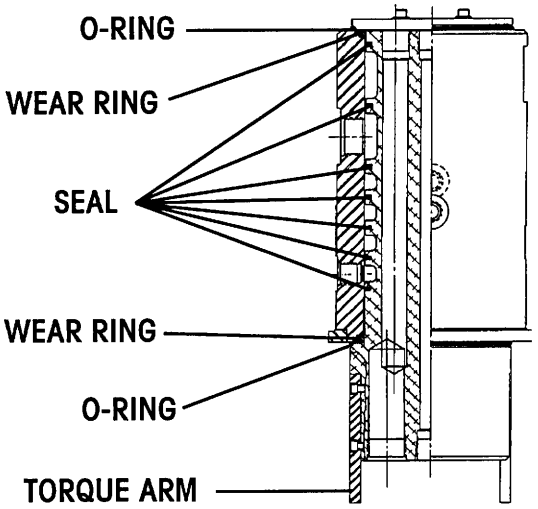
Ground Valve Bank.

HYDRAULIC SWIVEL

The hydraulic swivel allows passage of hydraulic fluid from the steer valve segment in the superstructure to the steer cylinder in the undercarraige and back. The swivel allows for 360° of continuous superstructure rotation in either direction.

STEER CYLINDER

The cylinder is double acting and is directly connected to the steering linkage assembly. This cylinder powers all steering movements.



Hydraulic Swivel.

STEER DISCONNECT KNOB (OPTION)

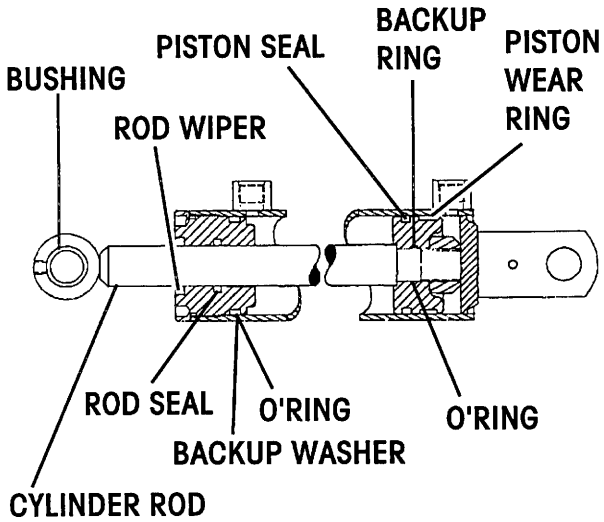
The steer disconnect knob must be pushed in to engage the steer system. Pull the steer disconnect knob out before towing to disengage steer system.

STEER SYSTEM MAINTENANCE

Check all pins on steering linkage and steer cylinder for excessive play, and ensure that all clips are in place and secure.

Lubricate linkage as required (see Lubrication Chart).

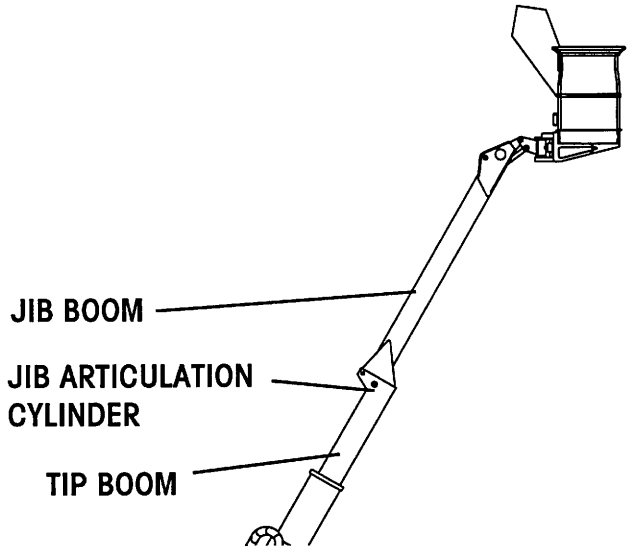
Check cylinder and hoses for hydraulic fluid leakage and security.



Steer Cylinder.

JIB BOOM SYSTEM

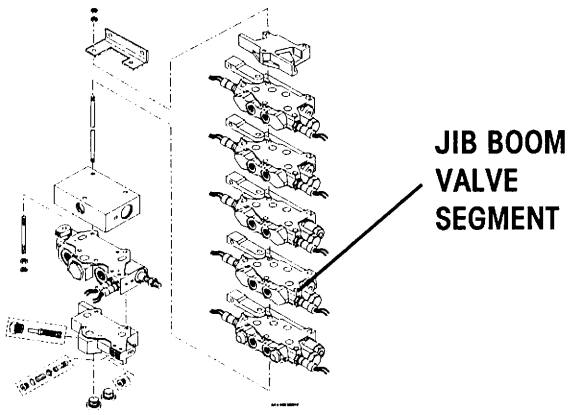
The jib boom system consists of a hydraulic valve segment on the ground valve bank, a cylinder with a counterbalance (holding) valve, and a control lever on the platform console and a toggle switch on the remote pendant..



Jib Boom System Components.

JIB BOOM VALVE SEGMENT

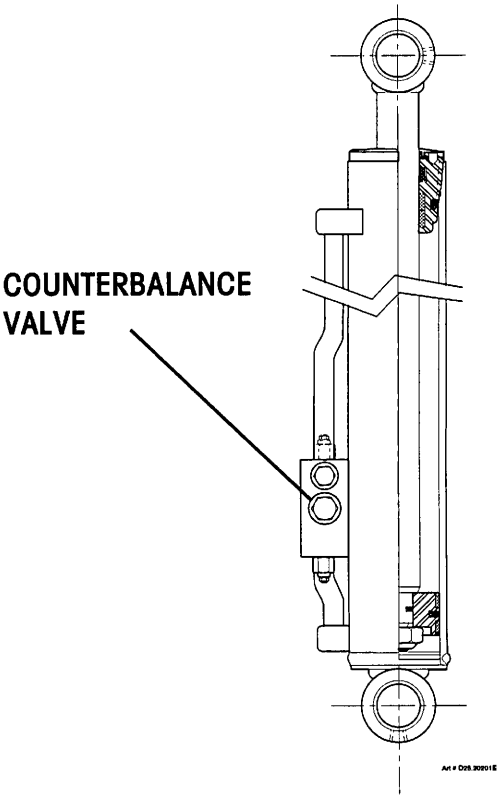
When the jib boom control lever on the platform control or ground control is activated, an electrical signal is transmitted to the valve cartridge in the jib boom valve segment. This allows hydraulic fluid at the selected flow to be sent to the proper end of the cylinder to raise or lower the jib boom.



Ground Valve Bank Assembly.

JIB ARTICULATION CYLINDER

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



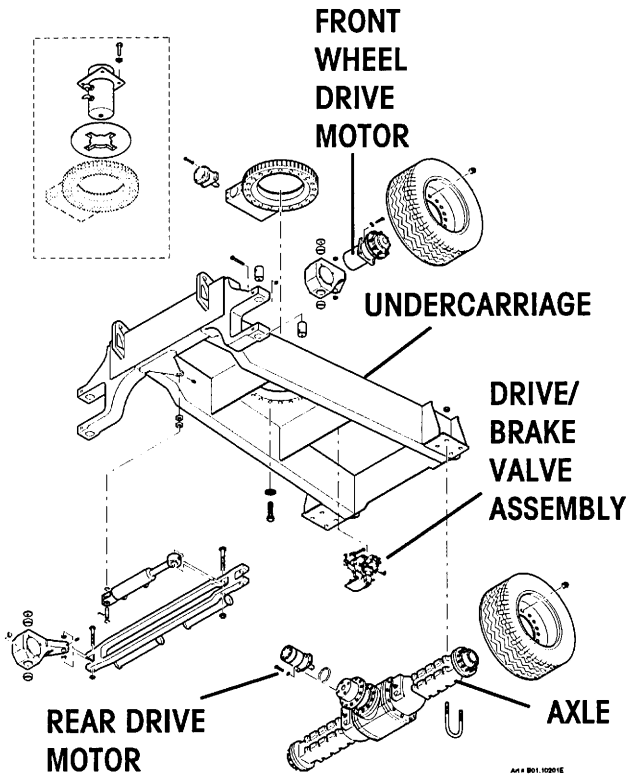
Jib Articulation Cylinder.

SECTION 3:
DRIVE SYSTEM

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DRIVE SYSTEM COMPONENTS

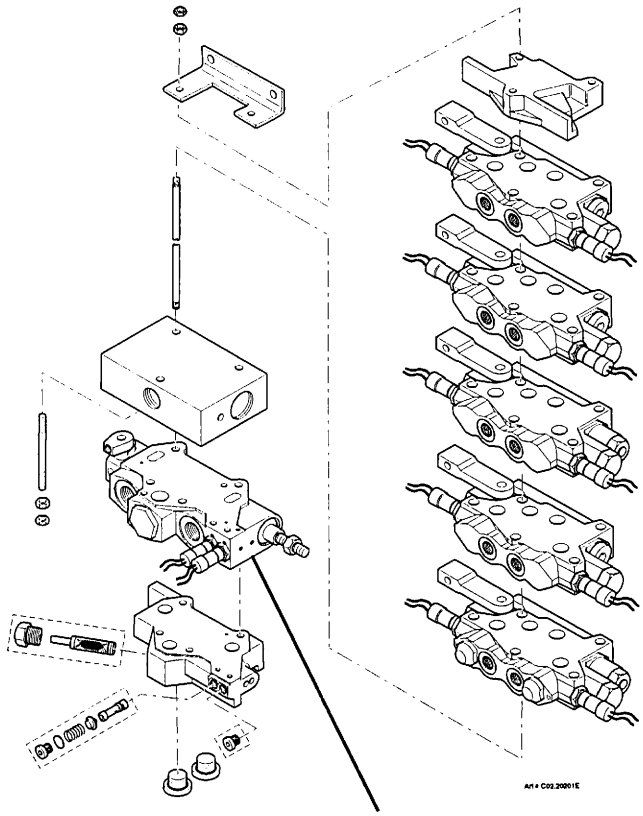


Drive System Components.

The drive circuit consists of a wheel drive motor at each front wheel and a hydraulic drive motor on the rear axle, a motion control valve assembly, a hydraulic manifold valve assembly, an optional pendant control, a drive enable valve and a platform drive control valve.

DRIVE CONTROL MAIN VALVE SEGMENT

When the drive control lever on the platform control or toggle switch on the remote control pendant is activated, an electrical signal is transmitted to the valve cartridge in the drive control main valve segment. This allows hydraulic fluid at the correct pressure to be sent to the three hydraulic motors (wheel motors and rear axle motor).



Ground Valve Bank Assembly.

DRIVE MOTORS

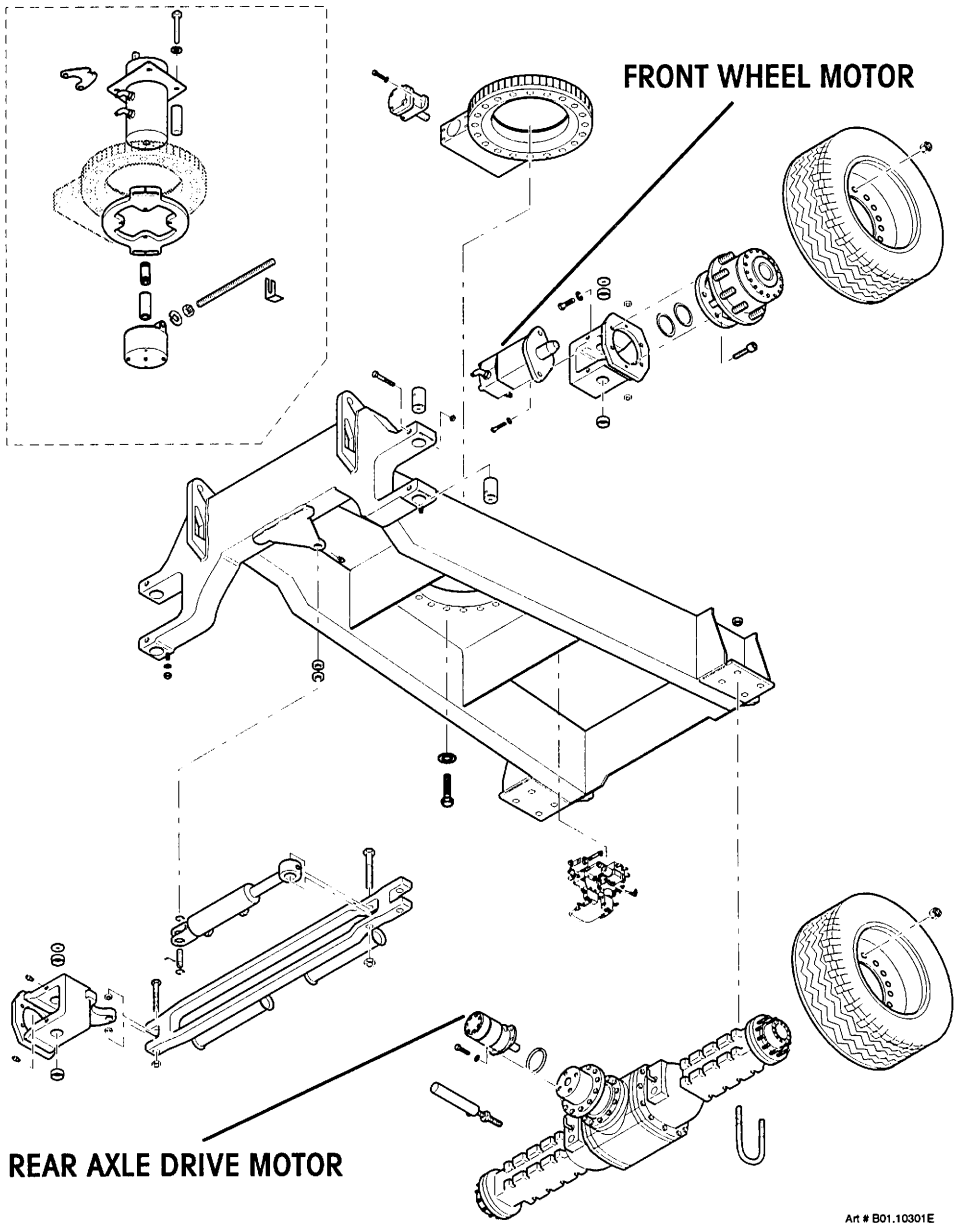
There are two types of drive motors; one roller stator drive motor with integrated hub is mounted to each front wheel and a roller stator motor is mounted to the rear axle.

FRONT WHEEL MOTOR

Two hydraulic motors drive the front wheels. See "Mechanical Components" section in this manual for motor replacement.

REAR AXLE DRIVE MOTOR

A third hydraulic motor is mounted on the rear axle assembly and drives the rear wheels. A seal kit is available (see Illustrated Parts Catalog). See "Mechanical Components" section in this manual for motor replacement.



Drive Motors.

REAR AXLE ASSEMBLY

The rear axle assembly consists of the axle with brake, wheel hub and drive motor. See "Mechanical Components" section in this manual for rear axle replacement.

REAR AXLE BRAKE ADJUSTMENT

1. Remove the socket head center plug on the brake cover.

2. Remove the hydraulic line and fitting just below the actuator shaft. Install bolt where the hydraulic line fitting was removed and screw to maximum depth to disengage the failsafe brake.

3. Install a dial indicator to the end of the actuator shaft. Indicator shaft must be in the same plane as the brake actuator shaft. Adjust the dial setting to "0".

4. Back out the bolt (M12 x 1) until the brake engages (bolt will turn free).

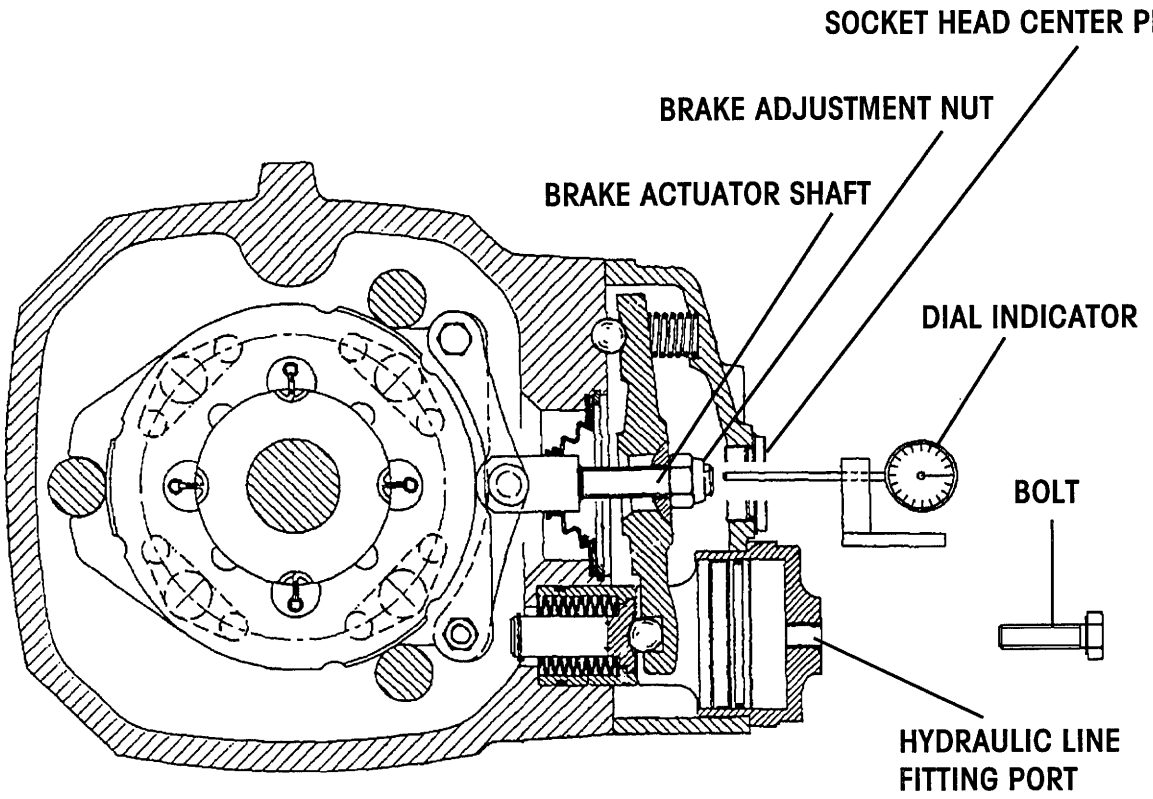
5. Read gauge setting. Proper setting range is 0.059 - 0.079 inch (1.5 - 2.0 mm).

   If the indicator setting is out of this range, the indicator should be removed so the brake adjustment nut can be adjusted for proper shaft travel.

REAR AXLE ASSEMBLY MAINTENANCE

In the axle, check the gear lube monthly and change the gear lube yearly.

Check for any leaks. Check for proper operation. Call Simon Service before checking for any bearing or gear damage. Replace rear axle assembly if components can't be replaced.



Spring Applied Hydraulic Release Brake.

DRIVE/ BRAKE CONTROL VALVE ASSSEMBLY

MOTION CONTROL VALVE

This valve has two pilot operated counterbalance cartridges. One each for the forward and reverse drive functions. It also contains a shuttle valve which directs high pressure hydraulic fluid to the axle brakes. The counter balance valves produce a back pressure in the drive system so that no uncontrolled or "runaway" movement happens when the machine is driven on steep inclines. They also provide dynamic braking and holding.

BRAKE NEEDLE VALVE

This valve regulates the hydraulic fluid flow from the brakes. Adjustment regulates the speed that the brakes are applied. When drive is selected oil free flows through the needle valve from the motion control valve to the brakes releasing the brakes in the axle.

SHUTTLE VALVE

The shuttle valve directs only high pressure hydraulic fluid flow to the axle brakes from either the drive pressure reducing valve or the manual brake release pump.

PRESSURE REDUCING VALVE

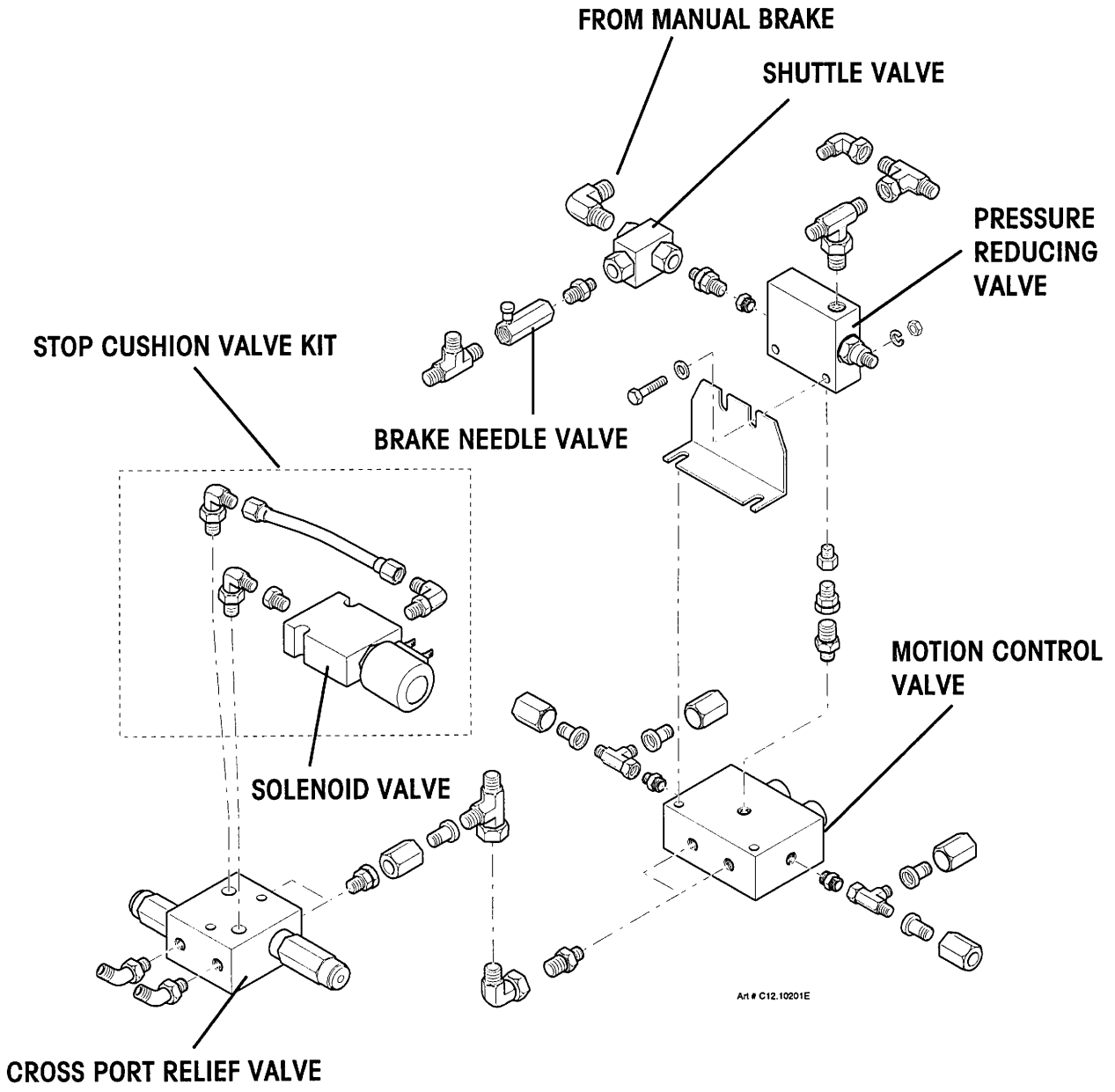
Reduces drive pressure to a maximum of 435 psi (30 Bar/ 30.6 Kg/cm^2) to release axle brakes.

CROSS PORT RELIEF MANIFOLD

The cross port relief manifold limits pressure to all wheel drive motors. Valves are set at 3000 psi (207 Bar/ 211 Kg/cm^2).

STOP CUSHION SOLENOID VALVE

This solenoid valve opens or closes a drive motor bypass circuit. A small orifice (0.082) provides a gradual stop when the drive handle is centered to neutral. The valve and bypass circuit is closed when in creep speed or on slopes over 5°. Machine will stop instantly without cushioning when bypass circuit is closed.



Motion Control Valve Assembly.

SECTION 4:
ELECTRICAL SYSTEM

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ELECTRICAL SYSTEM

The following section is a description of maintenance for the major components of the machine's electrical system.

BATTERIES

One 12 volt battery supplies the electrical power required to operate the electro-proportional controls and the second 12 volt battery supplies electrical power to the emergency pump.

BATTERY MAINTENANCE (IN STORAGE)

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

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

Never stack one battery directly on top of another, 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 to terminals.
- **Broken or frayed cables.** Be sure all cable connections are good, and that no loose or broken wires are exposed. Replace as needed.

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

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

Keep 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 the 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 variation in specific gravity. A variation of 0.03 points or more between cells is cause for concern. Mark the low cells.

Recheck specific gravity of all cells after recharging.

BATTERY REPLACEMENT

To remove the battery, follow these procedures:

⚠WARNING

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

⚠ CAUTION

Always disconnect the negative battery cables first.

Remove bolts holding battery to superstructure.

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

⚠ CAUTION

Always connect the positive battery cable first.

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

MOVEMENT ALARM

The movement alarm is activated as soon as the platform console drive controller or drive toggle switch on the pendant control 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.

The movement alarm is located behind the ground control cabinet on a support weldment. To replace it, remove the movement alarm from the weldment and disconnect the wires.

TILT ALARM

The tilt alarm gives an audible warning when the machine is five degrees or more out of level. It is located in the platform control cabinet. To replace the tilt alarm, remove it from the platform control box 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 alarm to sound as each corner is pressed (approximately a three second delay). The boom must be raised above horizontal or extended beyond limit switch.

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 to take up approximately one half of its spring's travel. During the remainder of the adjustment procedure, DO NOT ADJUST THE NUT ON THE 90° CORNER.

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

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

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

RELAYS

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

CIRCUIT BREAKERS

There is one 20 amp circuit breaker mounted on the face of the ground control cabinet.

If the 20 amp circuit breaker is tripped, re-set it by pushing in the button. If the breaker trips again, the cause of the high current draw must be corrected prior to further operation.

LIMIT SWITCHES

There are limit switches for the boom telescope, and boom hoist functions. The boom telescope limit switch is located on the lower right side of the base boom. The boom hoist limit switch is located on the center post of the superstructure. Unless the boom hoist and telescope limit switches are closed as shown on the unit electrical schematic at the end of this manual, the unit will only be able to travel at creep speed.

EMERGENCY PUMP

There is an emergency pump mounted at the base of the hydraulic tank. It is activated when the Emergency Pump push button on the platform control console is pressed or the pump toggle is pressed to EMERGENCY on the remote control pendant. When either push button is pressed and held, the emergency pump circuit is energized, allowing hydraulic functions (drive or steer functions) should the main motor powered hydraulic pump be disabled.

EMERGENCY STOP BUTTON

There is an emergency stop button on the ground control box and in the platform console.

When the emergency stop buttons are pressed, all functions stop immediately and the wheel brakes are automatically applied.

To replace the emergency stop button, open the ground control box or platform console to gain access for button removal. Remove the appropriate button mounting screws and wires.

PENDANT SWITCH REMOVAL

To replace a pendant switch or button, remove the four pendant cover screws to gain access for button removal. Remove the appropriate button mounting screws and wires.

GROUND CONTROL CABINET SWITCH REMOVAL

To replace a ground control switch or button, disengage the ground control cover retaining screws to gain access for switch or button removal. Remove the appropriate button mounting screws and wires.

PLATFORM CONSOLE SWITCH REMOVAL

To replace a platform switch or button, remove the two platform console screws and swing the console up on its hinges, to gain access for button removal. Remove the appropriate switch or button mounting screws and wires.

DRIVE/ STEER CONTROLLER

Forward or backward travel of the unit is operated by a "single axis" lever on the platform control console. Flipping the switch on top of the lever steers the unit to the left or right.

The degree of lever motion required to begin travel, and the degree of lever motion required to achieve maximum speed are individually adjusted.

On the Drive Card, located at the bottom of the telescope lever assembly, there is a separate adjustment for "Lo Threshold" (Deadband), which determines when motion starts as the control is moved from the "Neutral" position. There is another separate adjustment that determines the degree of control movement corresponding to the maximum hydraulic valve opening, "Hi Threshold" (Max. Output).

To adjust for Lo Threshold (Deadband) or Hi Threshold (Max. Output) on the Drive Card:

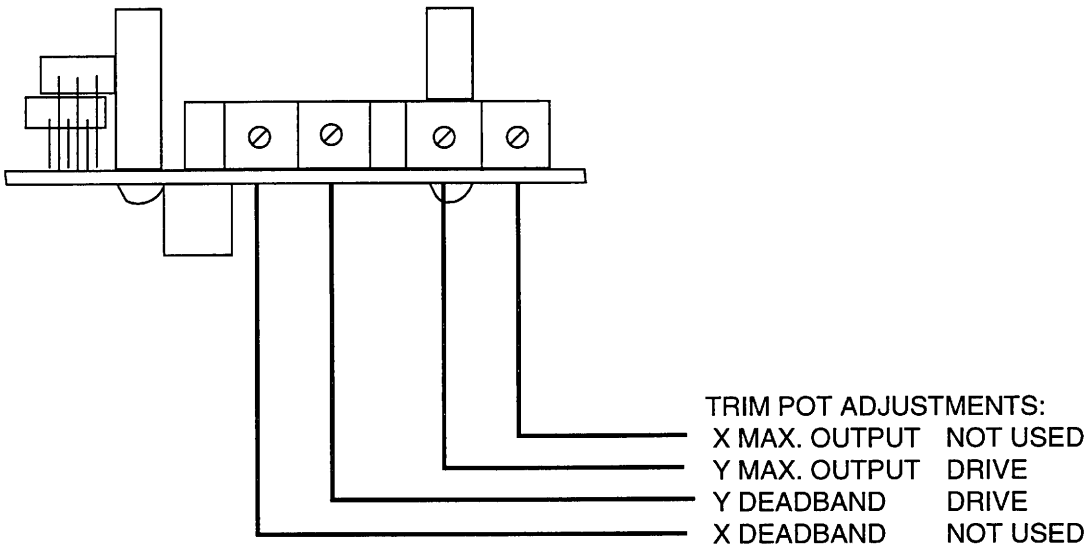
1. Turn appropriate Lo Threshold (Deadband) potentiometer fully counter-clockwise.

2. Push control lever forward until a proximity switch inside the control clicks.

3. Turn the Lo Threshold (Deadband) potentiometer clockwise to permit first flow (first movement).

4. Push control lever fully forward.

5. Turn the Hi Threshold (Max. Output) potentiometer to just permit maximum flow. If turned too high, full flow will occur at a lesser control angle and some controllability will be lost.



Drive Trim Pots.

JIB BOOM/ TELESCOPE CONTROLLER

Telescoping of the boom and jib boom functions are controlled by a "single axis" lever on the platform control console. Backward and forward movement of the telescope lever controls the extending and retracting functions of the boom. Backward and forward movement of the jib lever controls the raising and lowering functions of the jib boom.

On the telescope card, located at the bottom of the lever assembly, there is a separate adjustment for "Lo Threshold" (Deadband), which determines whenmotion starts as the control is moved from the "Neutral" position. There is another separate adjustment that determines the degree of control movement corresponding to the maximum hydraulic valve opening, "Hi Threshold" (Max. Output).

To adjust for Lo Threshold (Deadband) or Hi Threshold (Max. Output) on the Drive Card:

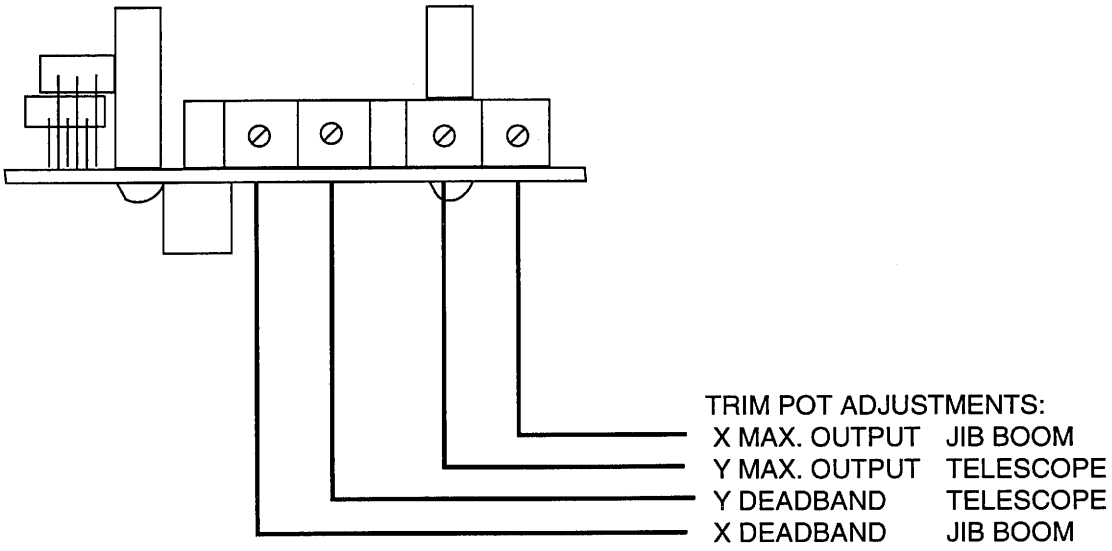
1. Turn appropriate Lo Threshold (Deadband) potentiometer fully counter-clockwise.

2. Push control lever forward until a proximity switch inside the control clicks.

3. Turn the appropriate Lo Threshold (Deadband) potentiometer clockwise to permit first flow (first movement).

4. Push control lever fully forward.

5. Turn the Hi Threshold (Max. Output) potentiometer to just permit maximum flow. If turned too high, full flow will occur at a lesser control angle and some controllability will be lost.



Jib Boom and Telescope Trim Pots.

BOOM/ SWING CONTROLLER

On the boom/ swing controller, there is a Driver Card with a total of four adjustment potentiometers. Each function has two (2) adjustments: "Threshold" and "Maximum Gain". Threshold (Deadband) is the position of the controller lever when a function motion starts. Maximum Gain (Max. Output) is the position of the controller lever when a function motion is at maximum speed.

To adjust for Threshold (Deadband):

1. Turn appropriate Threshold (Deadband) potentiometer fully counterclockwise.

2. Move control lever in appropriate direction from neutral position until a proximity switch inside the control clicks.

3. Turn the appropriate Threshold (Deadband) potentiometer clockwise to permit first flow (first movement).

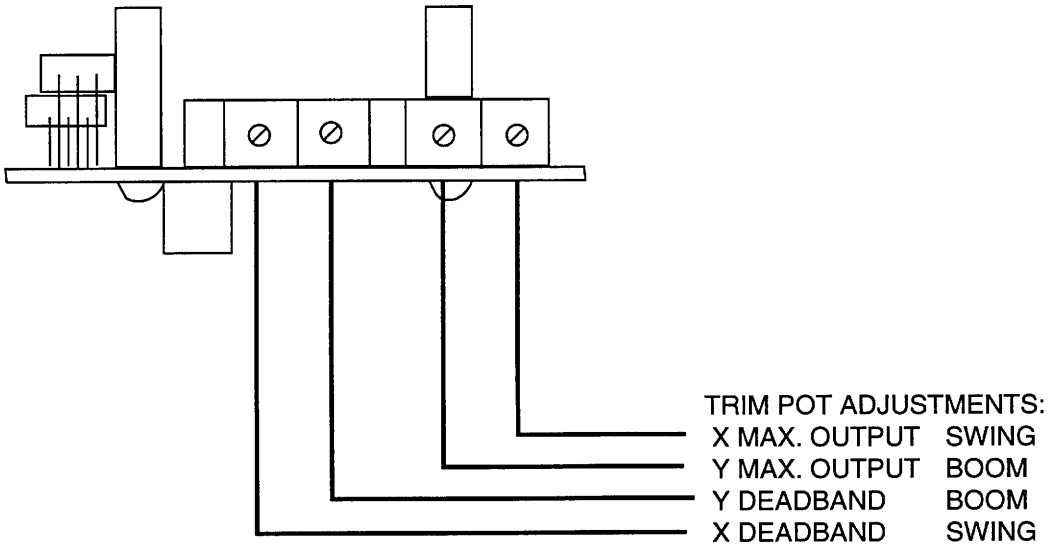
To adjust for Maximum Gain (Max. Output):

1. Move control lever fully in appropriate direction.

2. Turn the appropriate Maximum Gain (Max. Output) potentiometer to just permit function maximum speed.

⚠ CAUTION

If turned too high, full flow will occur at a lesser control angle and some controllability will be lost.



Boom and Swing Trim Pots.

SECTION 5:
MECHANICAL COMPONENTS

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MECHANICAL COMPONENTS

Following is a description of the major mechanical components of the machine.

TIRES

Tires used are calcium or optional foam filled. Inspect tires for cuts, sidewall damage or abnormal wear. Any tire faults MUST BE CORRECTED before further machine operation.

CHANGING TIRES

⚠WARNING

CALCIUM FILLED AND/OR FOAM FILLED TIRES ARE EXTREMELY HEAVY. CARE MUST BE TAKEN TO AVOID PERSONAL INJURY.

When a tire change is necessary, follow these steps:

⚠ CAUTION

ALWAYS CHOCK THE WHEELS before you raise the machine.

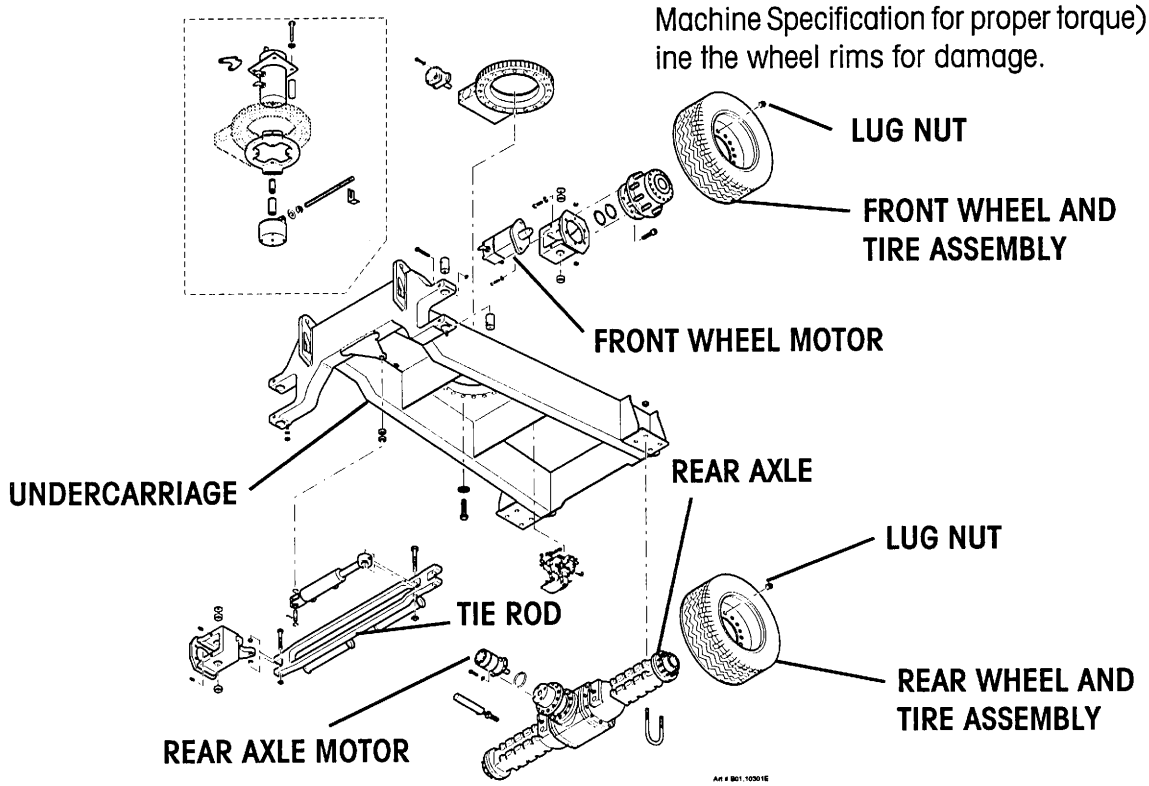
- Loosen and remove lug nuts, and pull off the wheel and tire assembly.
- Replace the tire and reinstall.

  NOTE: Tire should have the correct amount of calcium.

- Fasten lug nuts and tighten to proper torque (see Machine Specifications).
- Lower the machine and remove the blocks.

WHEELS AND LUG NUTS

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



Undercarriage Mechanical Components.

WHEEL MOTOR ASSEMBLY

- Check for any leaks. Check for proper operation. Replace hydraulic wheel motor if damaged.

- To remove front wheel motor:

1. Chock the rear wheels and raise the machine at the front end.

⚠WARNING

CALCIUM FILLED AND/OR FOAM FILLED TIRES ARE EXTREMELY HEAVY. CARE MUST BE TAKEN TO AVOID PERSONAL INJURY.

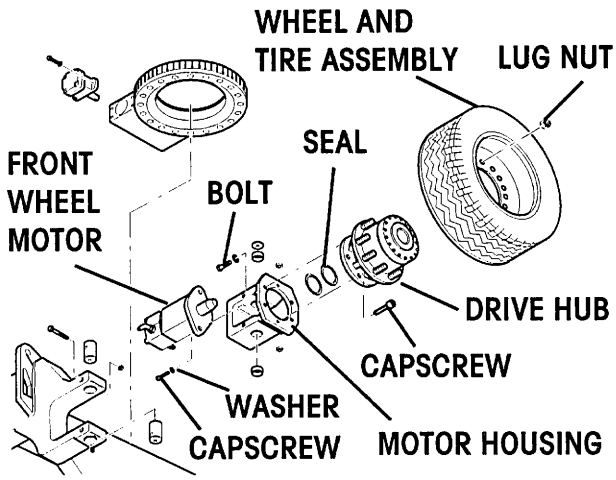
2. Loosen and remove the lug nuts and remove tire and wheel assembly.

⚠ CAUTION

Plug all open hydraulic fittings to prevent contamination by dirt or other foreign objects.

3. Disconnect hoses and fittings to the wheel motor.

4. Loosen and remove four hex head bolts and two socket head capscrews holding the drive hub and wheel motor assembly to the motor housing.



Tire and Wheel Assembly, and Wheel Motor.

5. Slide out drive hub and wheel motor from motor housing.

6. Remove two hex head capscrews and helical lockwashers holding the wheel motor to the drive hub.

7. Remove rubber seal between wheel motor and torque hub.

- Install front wheel motor:

1. With drive hub on end on a bench, lay down a thin coat of RTV Silicone (732 sealant or equivalant), install rubber seal and add a second thin coat of RTV Silcone.

2. Align the wheel motor on the torque hub.

3. Install wheel motor and torque the two capscrews with helical lockwashers. See "Machine Specification".

4. Position the wheel motor and drive hub in the motor housing.

5. Install and torque the four hex head bolts and two socket head capscrews to hold the drive hub and wheel motor to the motor housing.

6. Connect hydraulic hoses and fittings to the wheel motor assembly.

⚠WARNING

CALCIUM FILLED AND/OR FOAM FILLED TIRES ARE EXTREMELY HEAVY. CARE MUST BE TAKEN TO AVOID PERSONAL INJURY.

7. Position tire and wheel assembly and install and torque lug nuts. See "Machine Specification".

8. Lower the machine and remove the rear wheel chocks.

STEER CYLINDER

The steer cylinder is of the double acting type. Check the cylinder for hydraulic fluid leaks.

STEER CYLINDER PINS

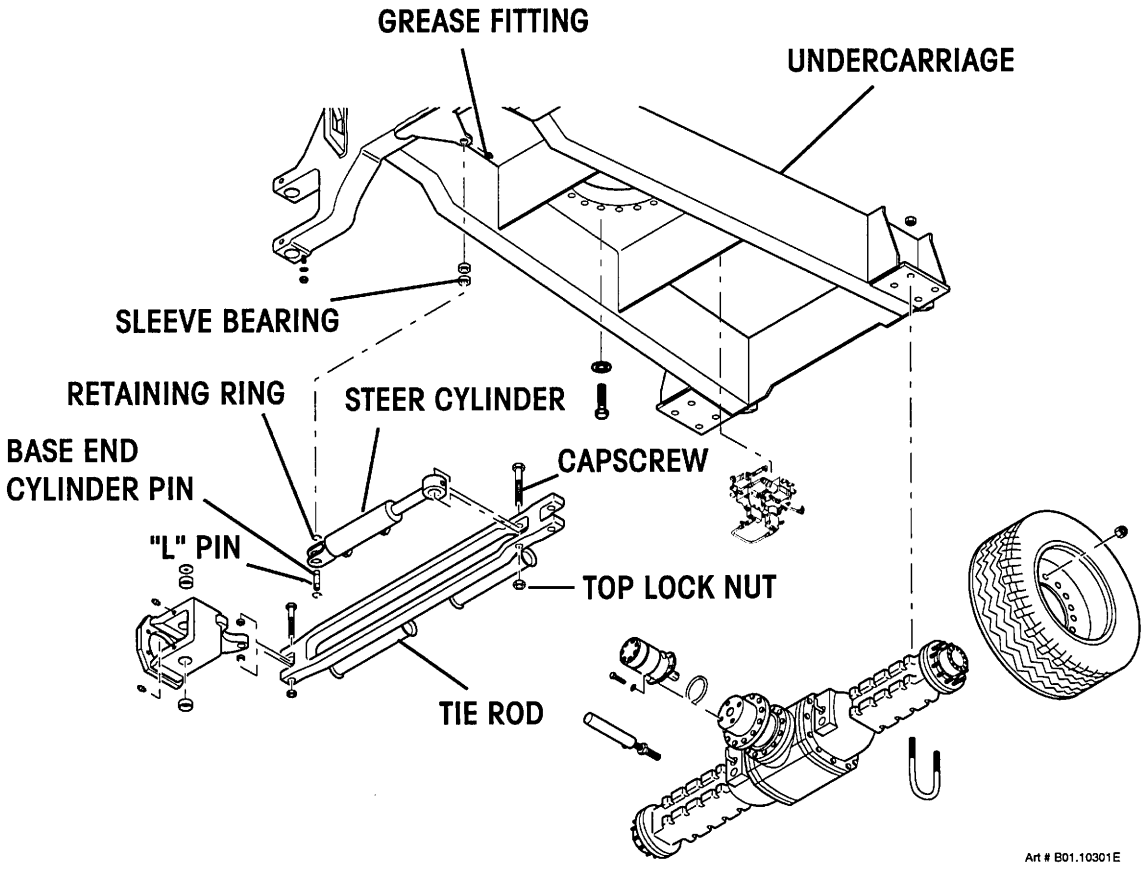
Check all pins for wear. If base end pin rotates, check for a missing retaining ring or "L" pin. If wear is detected, the pin must be replaced.

Base End Cylinder Pin Replacement

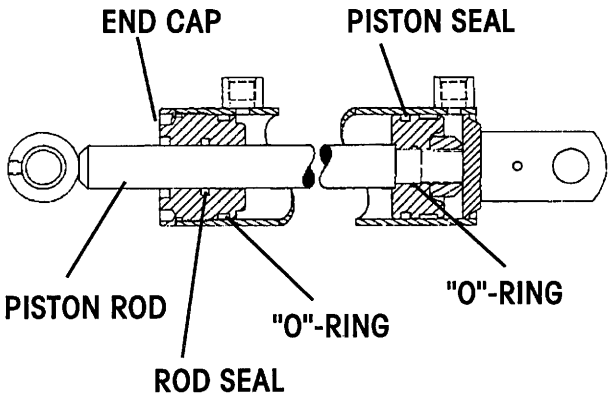
1. Remove retaining ring.
2. Remove the "L" pin.
3. Remove the base end pin.
4. Install new pin.
5. Install "L" pin and retaining ring.
6. Apply grease to sleeve bearing.

STEER CYLINDER SEAL REPLACEMENT

1. Disconnect the hydraulic hoses.
2. Remove the base end steer cylinder pin.
3. Remove capscrew and top lock nut holding the steer cylinder rod end.
4. Remove the cylinder.



Steer Cylinder and Tie Rod Assembly.



Steer Cylinder.

5. Clean the cylinder.

6. Loosen the end cap and withdraw it over the piston rod.

⚠ CAUTION

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

7. Remove the rod and piston assembly.

8. Replace the seals and "O"-rings.

9. Install the rod and piston assembly.

10. Install and tighten the end cap.

11. Install cylinder.

    - Position steer cylinder base end.
    - Install base end steer cylinder pin.
    - Install capscrew and top lock nut holding the steer cylinder rod end.

12. Connect the hydraulic hoses.

TIE ROD ASSEMBLY

Check for a bent or broken tie rod assembly. Replace if bent or broken.

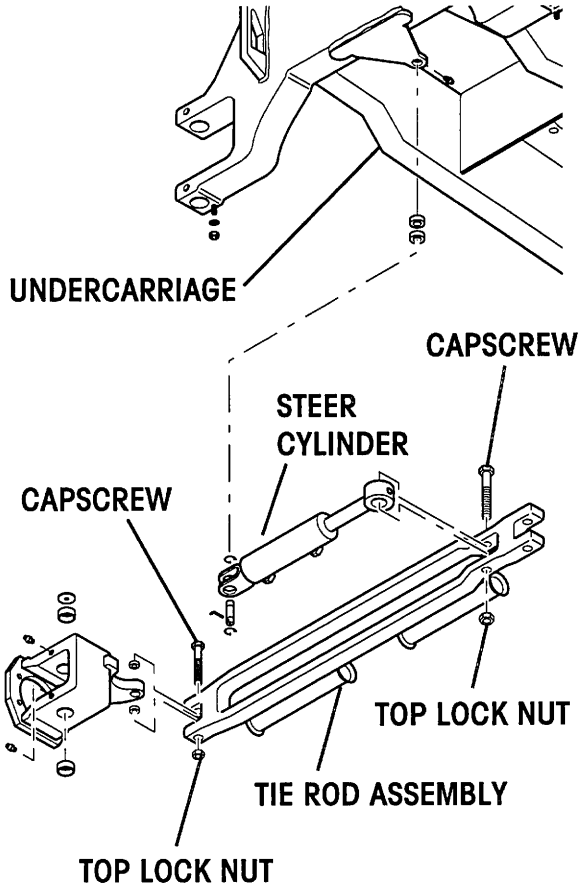
TIE ROD ASSEMBLY REPLACEMENT

1. Remove capscrews and top locknuts at both ends and steer cylinder rod end.

2. Remove tie rod assembly.

3. Install new tie rod assembly and attach it with the capscrews and top locknuts.

4. Install rod end of steer cylinder.



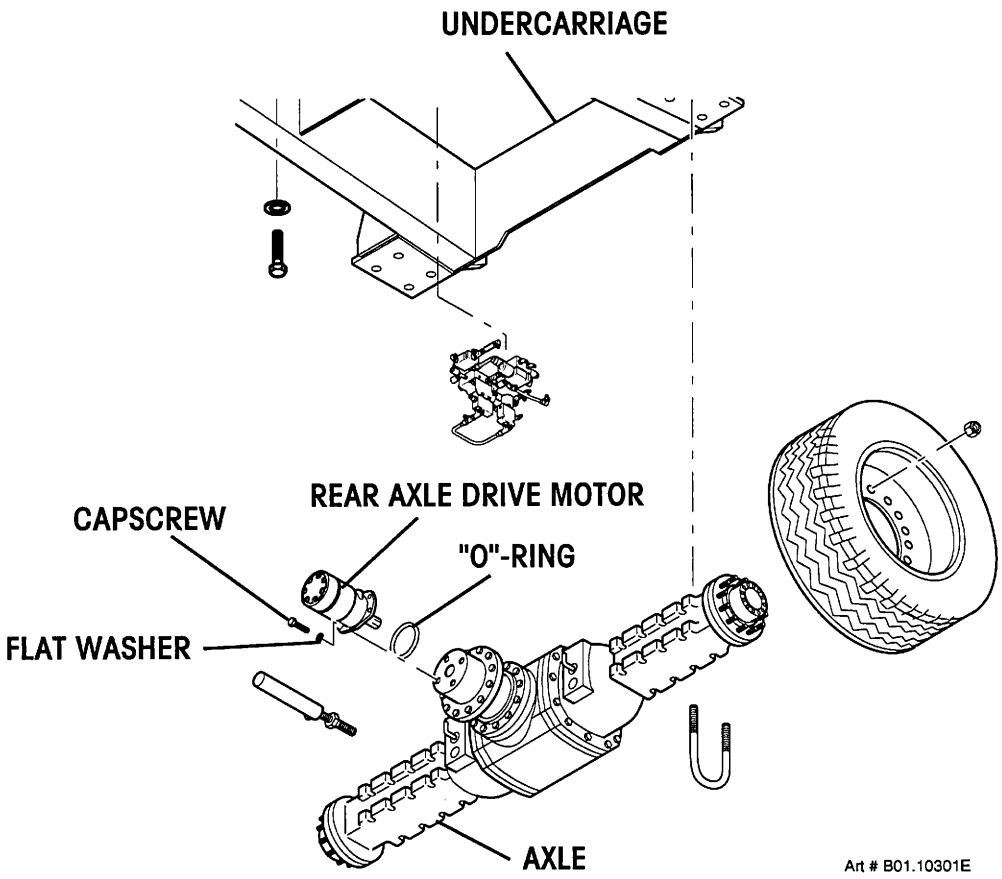
Steer Cylinder and Tie Rod Assembly.

REAR AXLE DRIVE MOTOR

Check for any leaks. Check for proper operation. Replace rear axle drive motor if damaged.

REAR AXLE DRIVE MOTOR REPLACEMENT

1. Block the front wheels and raise the rear of the machine.
2. Remove the capscrews and flat washers holding the motor to the axle.
3. Remove the rear axle drive motor.
4. Remove the "O"-ring.
5. Install a new "O"-ring.
6. Install the rear axle drive motor.
7. Install capscrews and flat washers.
8. Torque the capscrews. See "Machine Specifications".



Rear Axle Drive Motor.

REAR AXLE ASSEMBLY

Check for any leaks. Check for proper operation. Check for any bearing or gear damage. Replace rear axle assembly if components can't be replaced.

REAR AXLE ASSEMBLY REPLACEMENT

To remove the rear axle assembly:

⚠ CAUTION

ALWAYS BLOCK THE WHEELS before you raise the machine.

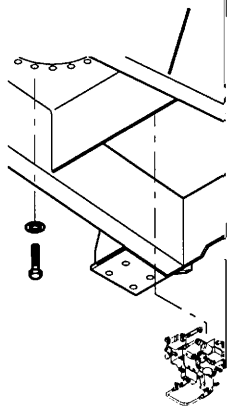
1. Block the front wheels.
2. Raise the rear of the machine and support the undercarriage structure.
3. Remove both rear wheel and tire assemblies.
4. Support both axle hub ends with a crane and chains.
5. Remove the "U"- bolts and nuts from the undercarriage. (On some machines, there is an axle mounting plate and capscrews.) This releases the axle assembly. Carefully lower the axle to the ground.

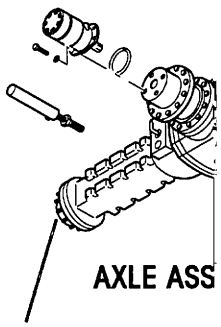
⚠ CAUTION

DO NOT let the axle drop. You may damage the axle.

To install the rear ax

1. Support both ax chains.
2. Position the rear undercarriage n
3. Install "U" - bol there is an axle n
4. Remove the sup
5. Install rear whe lug nuts and t Machine Specifi
6. Lower the mach





Rear

REAR AXLE BRAKE ADJUSTMENT

1. Remove the socket head center plug on the brake cover.

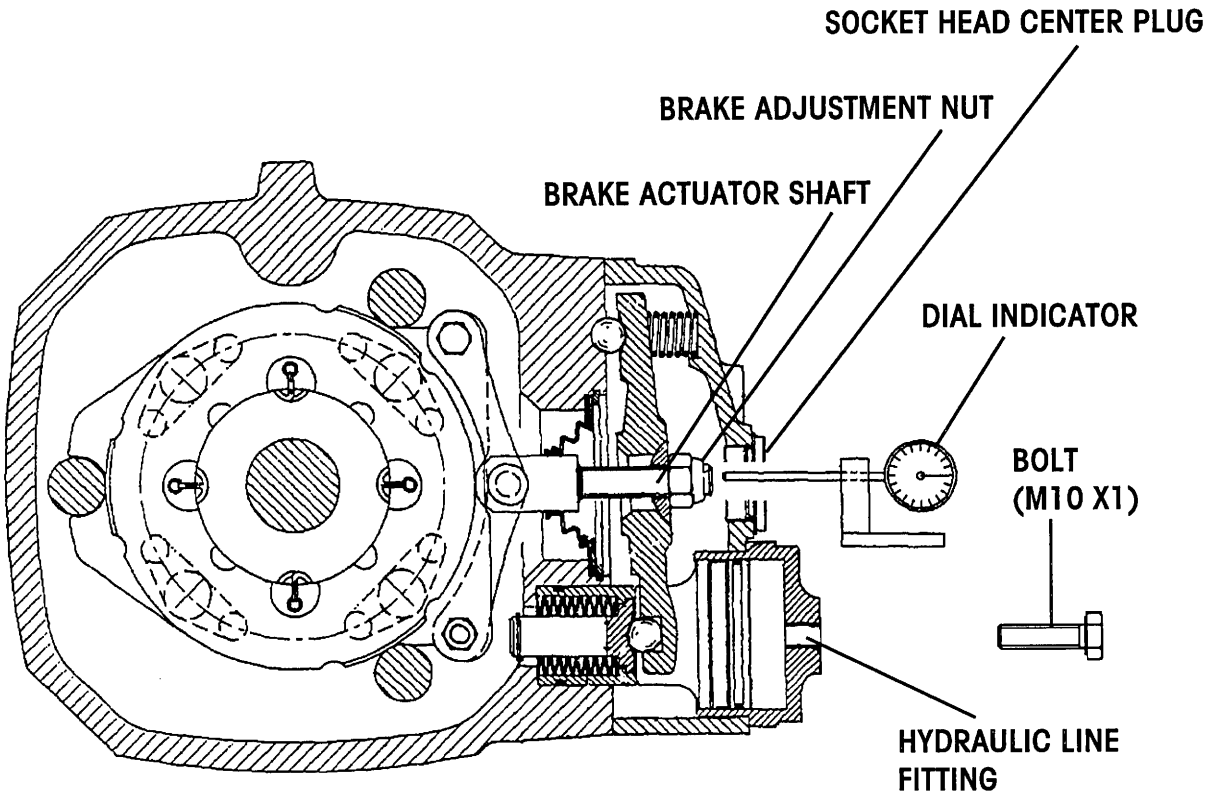
2. Remove the hydraulic line and fitting just below the actuator shaft. Install bolt where the hydraulic line fitting was removed and screw to maximum depth to disengage the failsafe brake.

3. Install a dial indicator to the end of the actuator shaft. Indicator shaft must be in the same plane as the brake actuator shaft. Adjust the dial setting to "0".

4. Back out the bolt (M12 x 1) until the brake engages (bolt will turn free).

5. Read gauge setting. Proper setting range is 0.059 - 0.079 inch (1.5 - 2.0 mm).

   If the indicator setting is out of this range, the indicator should be removed so the brake adjustment nut can be adjusted for proper shaft travel.

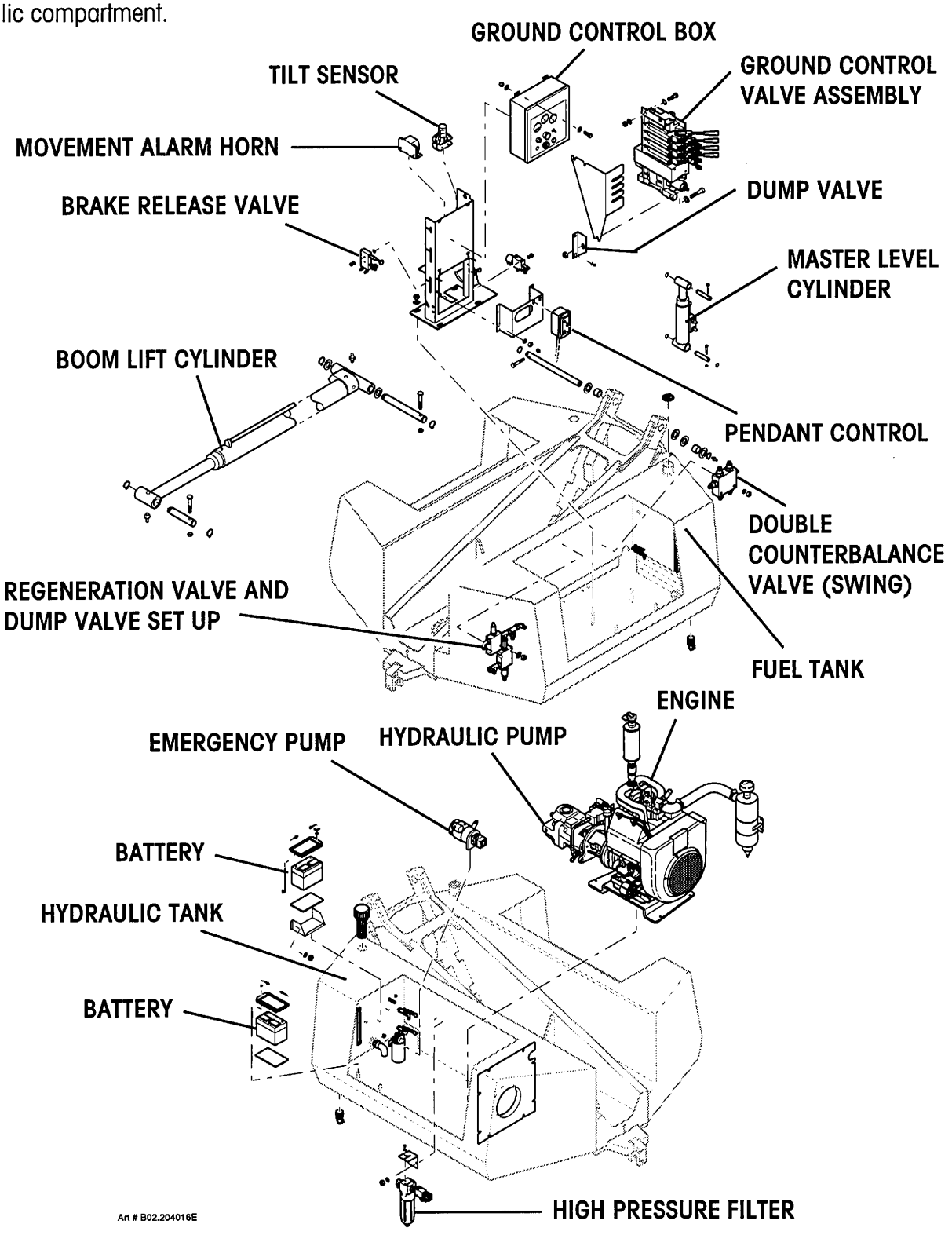


Spring Applied Hydraulic Release Brake.

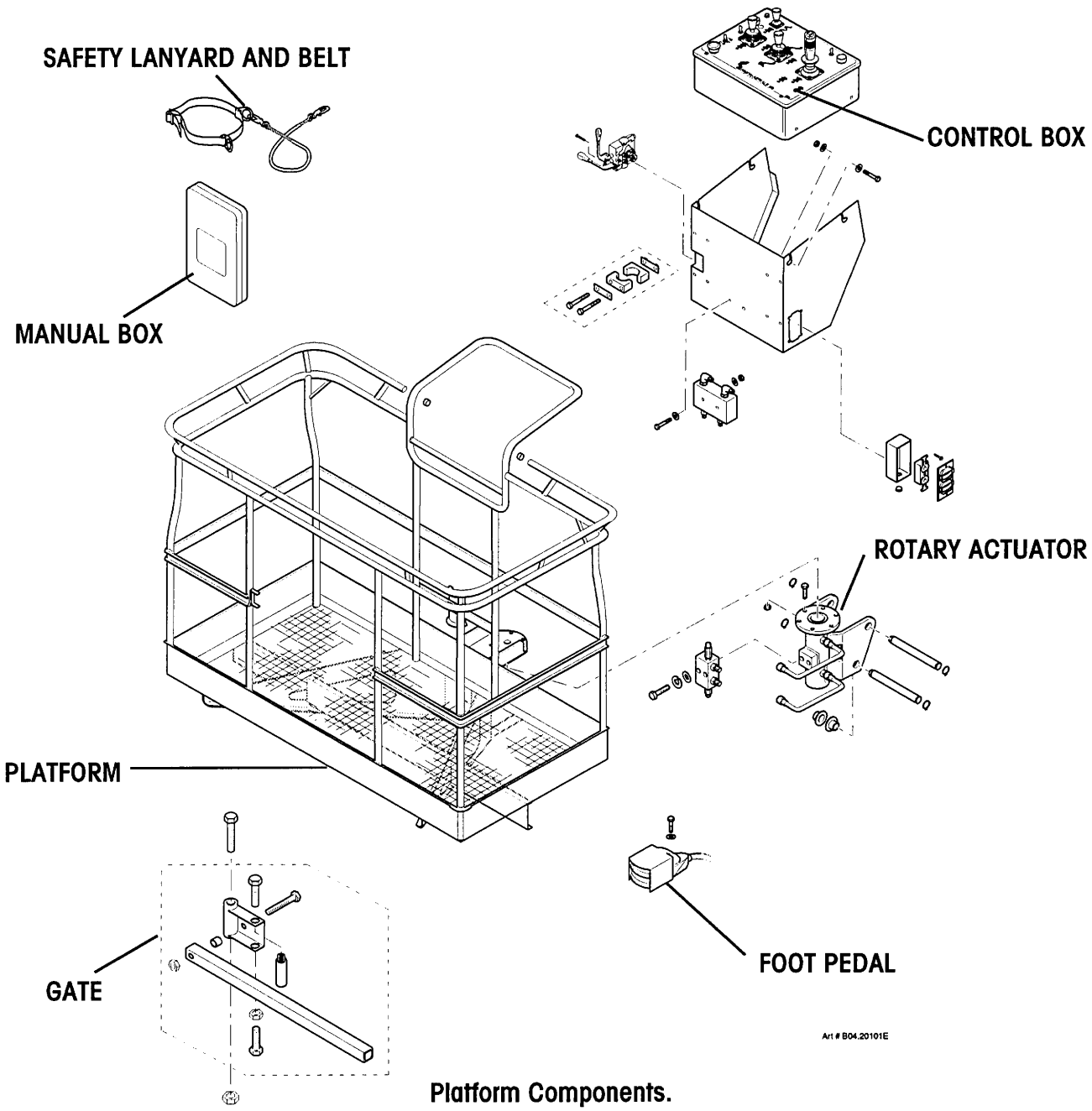
SUPERSTRUCTURE

The superstucture consists of two compartments; one is the engine compartment and the other is the hydraulic compartment.

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



Components Found on the Superstructure.



Platform Components.

PLATFORM

Steam clean the platform and inspect all welds and brackets. Check all the hydraulic and electrical components.

HOSES AND CABLES

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

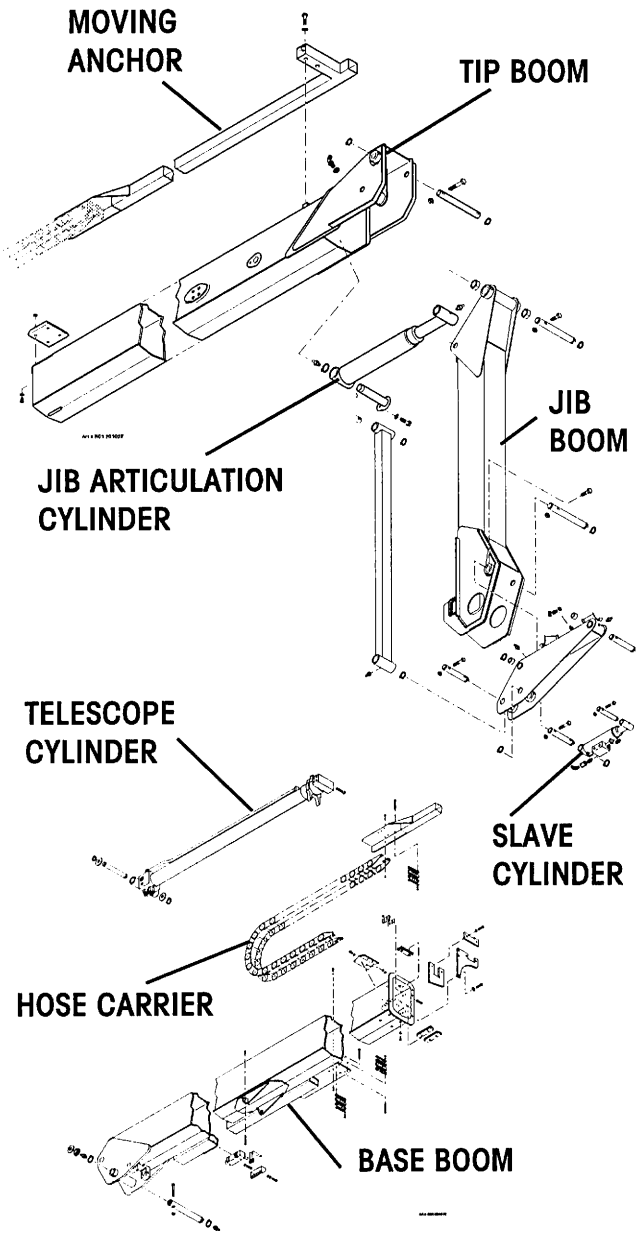
Cables and hoses should be examined for rubbing and chafing, especially in the swing bearing area and the hose track area.

MISCELLANEOUS EQUIPMENT

Check all miscellaneous equipment mounted on the machine for secure attachment. Check for evidence of oil or hydraulic fluid leakage.

BOOM

Clean the boom once a year and inspect along the boom structure, especially all welds and brackets.



Boom Components.

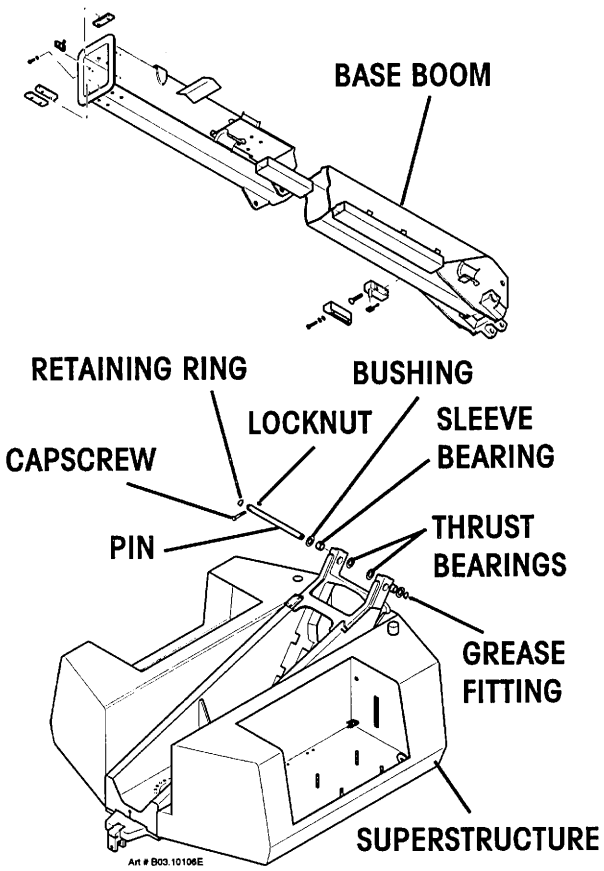
BOOM PIVOT PIN AND BUSHING REPLACEMENT

IMPORTANT: It is NECESSARY TO MAINTAIN THE CORRECT ALIGNMENT between the boom and pylon weldment during this operation. Any relative movement will make fitting of the pin more difficult.

⚠WARNING

THE BOOM WILL FALL IF NOT SUPPORTED WHEN THE PIVOT PIN IS REMOVED.

1. SUPPORT THE BOOM securely (on a boom stand or similar rigid platform).
2. Remove the retaining rings, capscrew, and locknut and drive out the boom pivot pin, taking care not to damage the inner bore, bushings, sleeve bearings or thrust bearings.
3. Check bushings, sleeve bearings and thrust bearings and replace if necessary.
4. Install new pivot pin.
5. Install capscrew, locknut and retaining rings.
6. Apply grease to pin through the grease fitting.



Boom Pin and Bushing.

WEAR PADS

Wear to boom sections, due to in and out movement, is prevented by the installation of nylon wear pads at several points along the boom length. The nylon wear pads should be checked for wear approximately every six months. Fully retract the boom, and check the gap between the wear pad and the boom section.

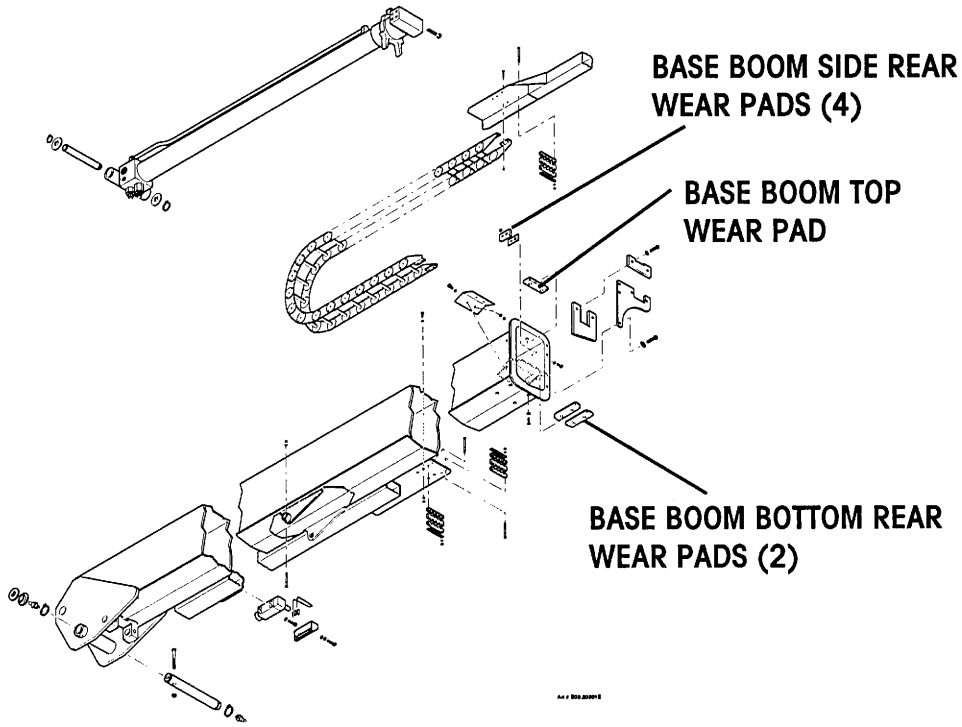
Wear pads are located at the top front of the tip boom and at the top, bottom and side rear of the base boom. There is also a moving anchor wear pad mounted on a weldment located on the side of the base boom.

⚠ CAUTION

If a pad wears to approximately 3/8" (9.5 mm) thick, it should be replaced or shimmed. Generally, only the bottom pad at the upper end and the top pad at the lower end of the boom will show wear.

Base Boom Top Wear Pad Replacement

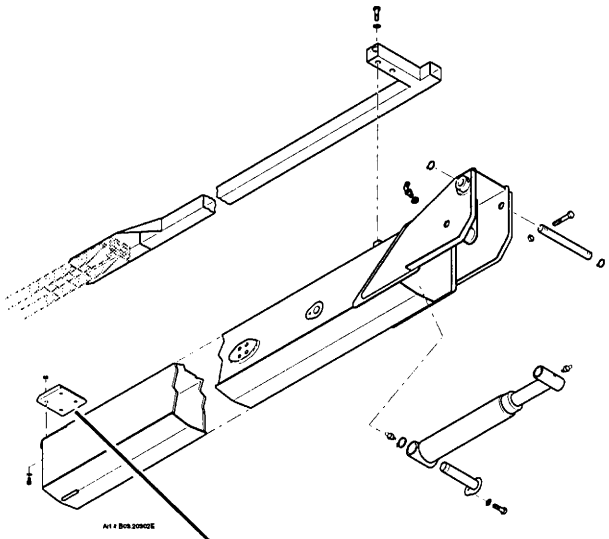
1. Fully retract and lower the boom.
2. Remove the capscrews, lockwashers and jam nuts holding the top and side wear pads.
3. Slide out the top and side wear pads.
4. Use a crane to hold the tip boom section off the bottom wear pad.
5. Remove the capscrews, lockwashers and jam nuts holding the bottom wear pad.
6. Remove the bottom wear pad.
7. Install new bottom wear pad with capscrews, lockwashers and nuts.
8. Rest the tip boom section on the new bottom wear pad.
9. Install new base boom top and side wear pads.
10. Install capscrews, lockwashers and jam nuts.

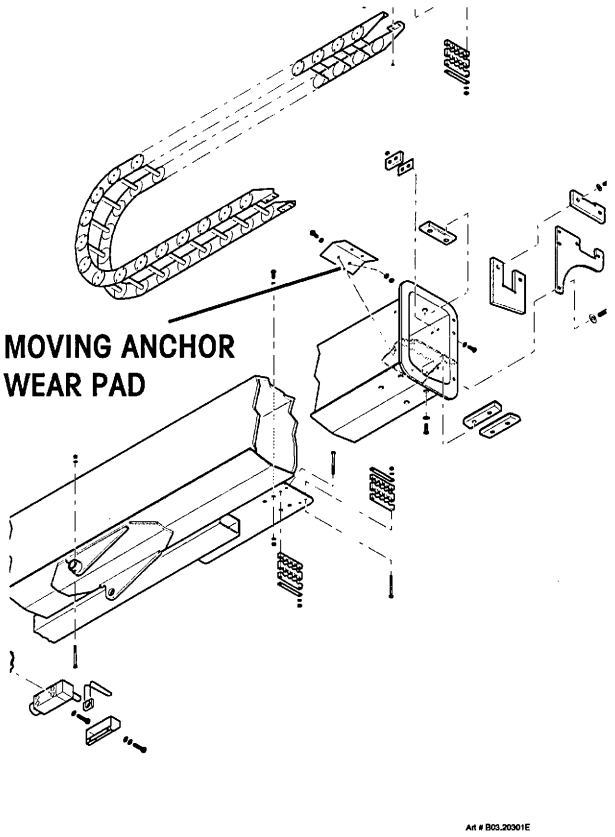


Base Boom Wear Pads.

Tip Boom Top Front Wear Pad Replacement

1. Fully retract the boom and support the boom in the horizontal position.
2. Remove the telescope cylinder pin retaining rings and flat washers.
3. Remove telescope cylinder pin and lower the end of the telescope cylinder.
4. Access can now be gained to the tip boom top front wear pad retaining bolts, lockwashers and nuts.
5. Remove bolts, washers and nuts; wear pad will easily fall out.





Art # B03.20301E

6. Install new wear pad with bolts, lockwashers and nuts.
7. Raise cylinder and install cylinder pin, retaining rings and flat washers.

Moving Anchor Wear Pad Replacement

1. Fully retract and lower the boom.
2. Remove the capscrews, flat washers and locknuts holding moving anchor wear pad.
3. Remove wear pad.
4. Install new wear pad.
5. Install capscrews, flat washers and locknuts.

Tip Boom Wear Pads.

BOOM LIFT CYLINDER

The boom lift 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. Check the pin capscrew for tightness. The cylinder and holding valve should be inspected for fluid leakage, damage and security.

LIFT CYLINDER PIVOT PIN REPLACEMENT

⚠ CAUTION

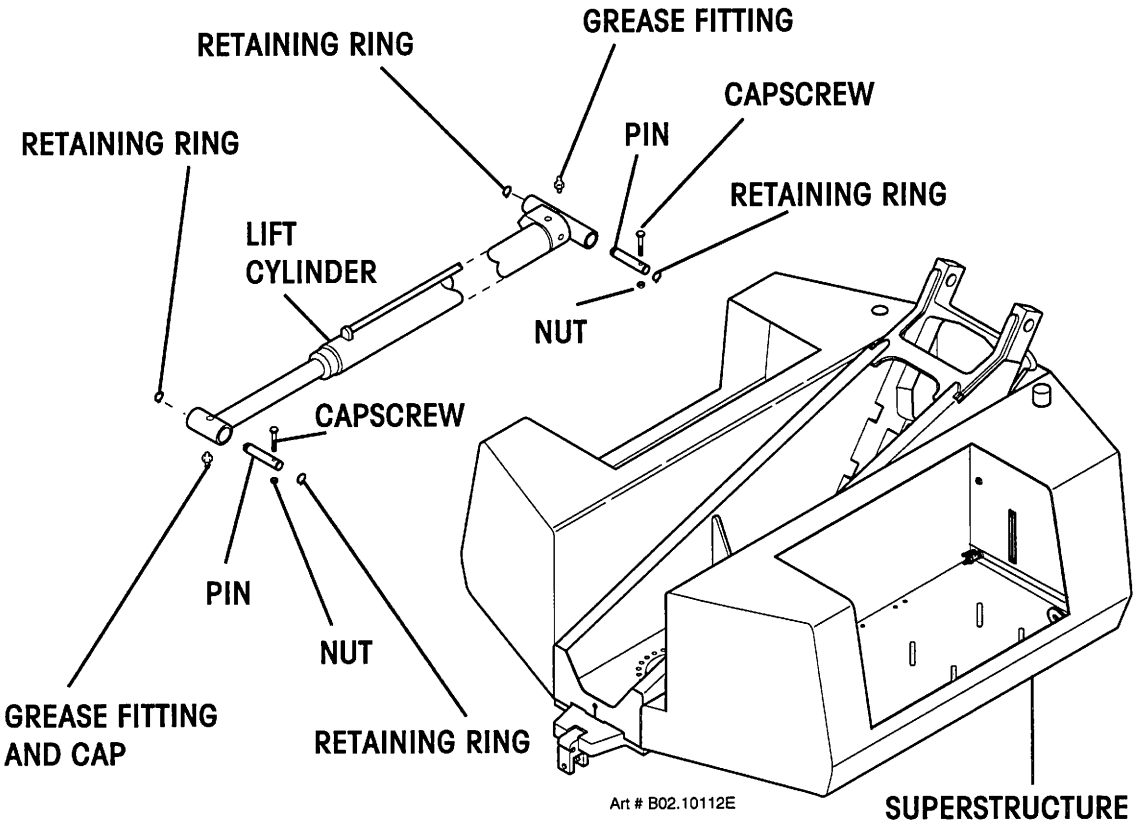
Support the boom any time maintenance is required on the boom or boom cylinders.

1. Support the boom securely (on a boom stand or similar rigid platform).
2. Operate the boom lift control to release hydraulic pressure and remove any load on the lift cylinder.
3. Remove the retaining rings.
4. Remove the capscrews and nuts.

⚠ CAUTION

The cylinder will fall if not supported when the pivot pin is removed.

5. SUPPORT THE LIFT CYLINDER and remove the pin.
6. Install new pin, capscrews, nuts and retaining rings.
7. Apply grease to pin through grease fitting.



Lift Cylinder Pivot Pin.

LIFT CYLINDER SEAL REPLACEMENT (ON MACHINE)

⚠ CAUTION

Support the boom any time maintenance is required on the boom or boom cylinders.

1. Support the boom securely in the horizontal position (on a boom stand or similar rigid platform).
2. Operate the boom lift control to release hydraulic pressure and remove any load in the lift cylinder circuit.
3. Clean the cylinder, and loosen the cylinder end cap by several turns.

⚠ CAUTION

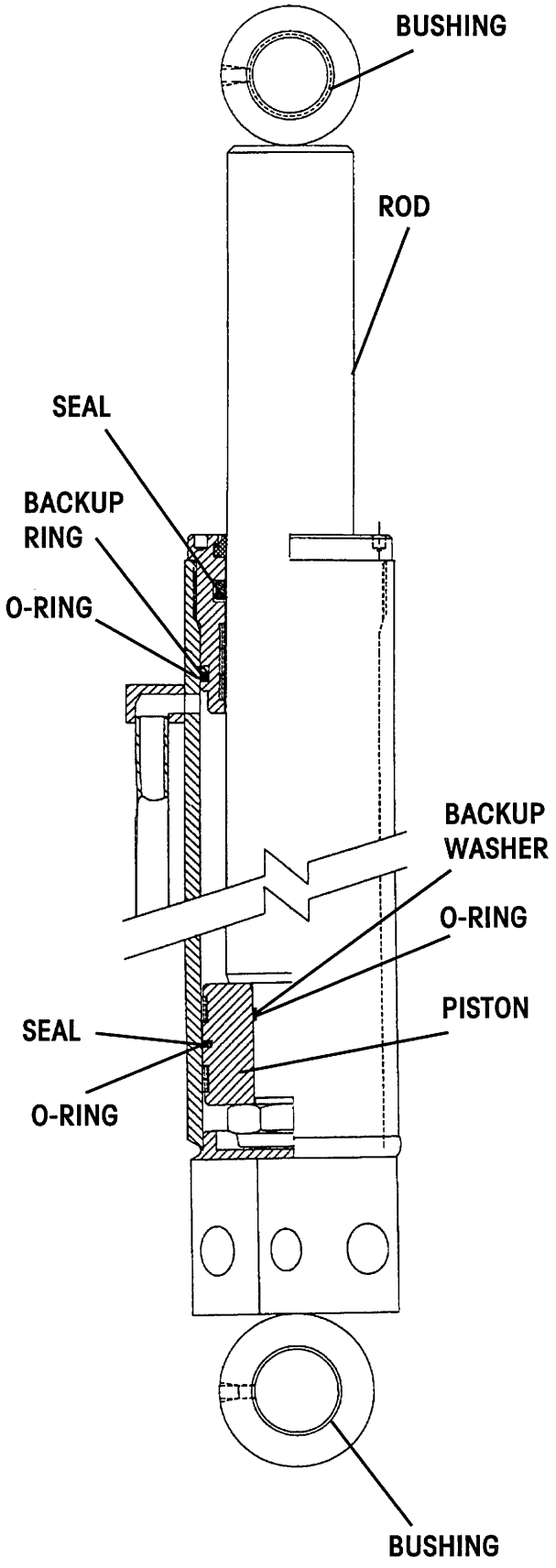
The cylinder barrel will fall if not supported when the pivot pin is removed.

4. Remove the rod end pivot pin, and support the cylinder barrel.
5. Loosen the end cap completely, and withdraw it carefully over the piston rod.

⚠ CAUTION

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

6. Remove the rod and piston assembly.
7. Replace the "O"-rings, seals and backup rings.
8. Reassemble the lift cylinder, again AVOIDING DIRT AND ROD DAMAGE.
9. Tighten the end cap.
10. Install rod end pin.



Lift Cylinder.

BENCH REPLACEMENT OF LIFT CYLINDER SEALS

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

1. Operate boom lift to horizontal position.

⚠ CAUTION

Support the boom any time maintenance is required on the boom or boom cylinders.

2. SUPPORT THE BOOM (on a boom stand or similar rigid platform) at the horizontal position.

3. Disconnect the hydraulic hoses from the cylinder.

⚠ CAUTION

The cylinder will fall if not supported when the rod end pin is removed.

4. Support the cylinder with a crane.

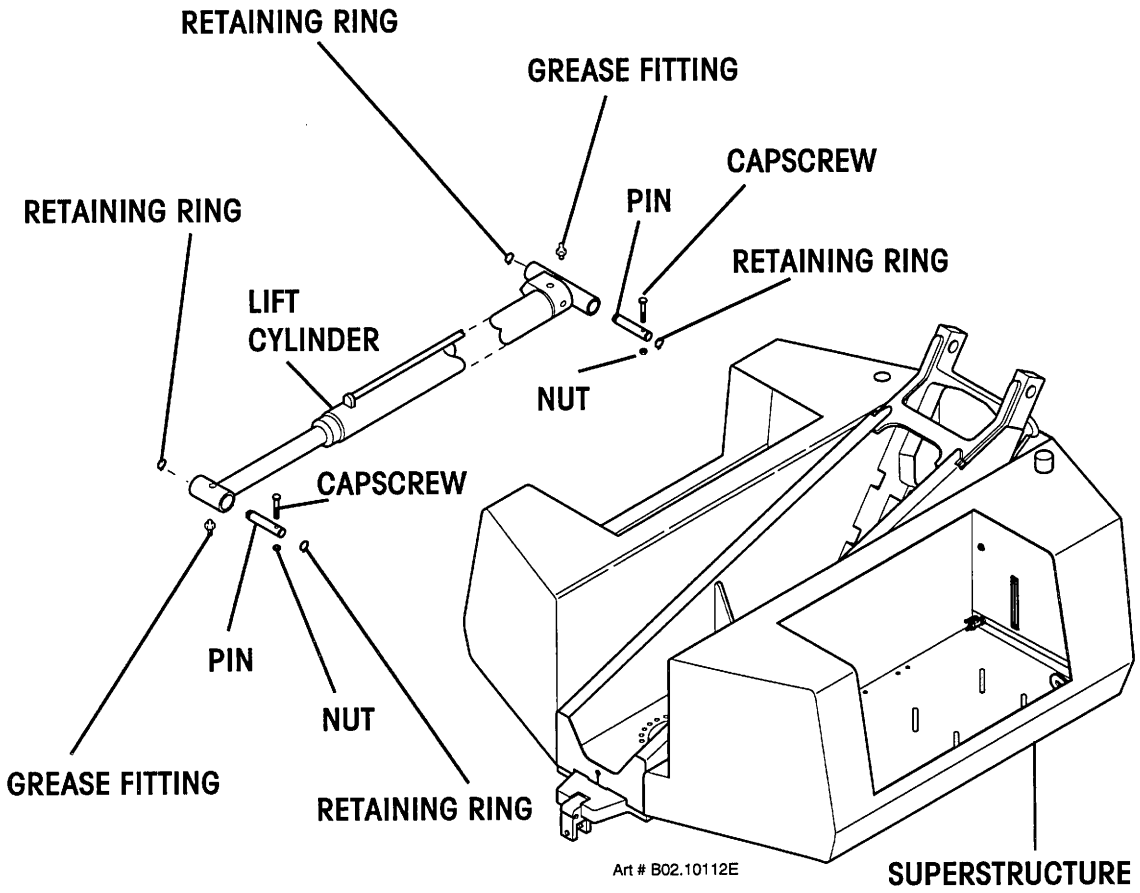
5. Remove the rod end cylinder pin.

6. With the cylinder supported, remove the base end cylinder pin.

7. Move the cylinder to a bench for examination.

8. Extend the cylinder, and examine the protruding rod for score marks and damage.

9. Clean the holding valve and examine for signs of leakage.



Lift Cylinder Pivot Pin.

10. Clean the end of the cylinder.

11. Loosen the end cap, and withdraw it carefully over the piston rod.

⚠ CAUTION

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

12. Remove the rod and piston assembly.

NOTE: It is recommended that the backup rings be replaced when seals are changed.

13. Replace the seals and backup rings and reassemble the cylinder; AVOIDING DIRT AND ROD DAMAGE.

14. Tighten the end cap.

15. Install the base end of the cylinder on the machine.

16. Connect all the hydraulic hoses.

17. Extend the lift cylinder and install the rod end to the boom.

18. Remove cylinder support.

19. Remove boom support.

20. BLEED THE SYSTEM after reinstalling the cylinder.

COUNTERBALANCE VALVE INSPECTION

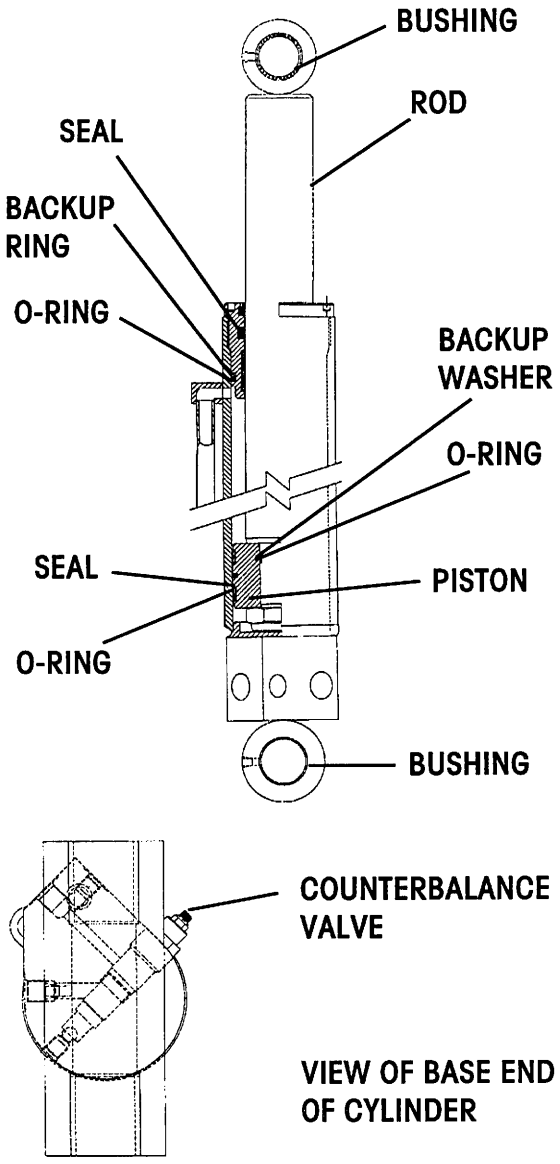
1. Place rated load in platform, raise the boom to the horizontal position, extend the boom to full side reach and stop the engine.

2. If the cylinder subsequently begins to move, the counterbalance valve is faulty and the cartridge should be replaced.

⚠ DANGER

BOOM MUST BE SUPPORTED WHEN CHANGING THE COUNTERBALANCE VALVE. CYLINDER WILL RETRACT WHEN CARTRIDGE IS REMOVED.

NOTE: The counterbalance valve is pre-set at the factory and is not field adjustable.



Lift Cylinder.

JIB BOOM REMOVAL

⚠ CAUTION

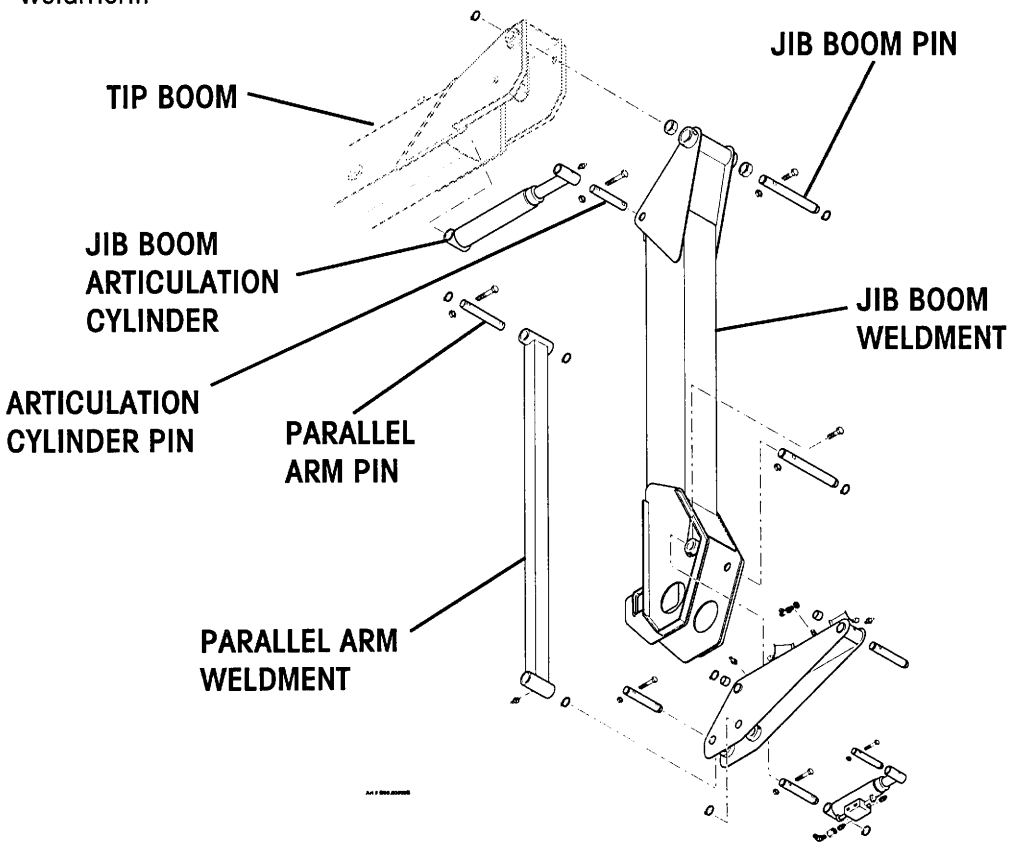
Plug all open hydraulic fittings to prevent contamination by dirt or other foreign objects.

1. Raise jib boom and support the platform.
2. Disconnect all electrical cables and hydraulic hoses at the platform and from the jib boom. **Note the connection of cables and hoses for ease of proper assembly.** Also, unbolt the jib angle sensor.
3. Remove articulation cylinder pin.
4. Remove parallel arm pin to free upper parallel arm weldment.
5. Remove upper jib boom pin to free jib boom weldment.

JIB BOOM INSTALLATION

To install jib boom and platform.

1. Attach jib boom weldment to tip boom with jib boom pin.
2. Attach parallel arm weldment to tip boom with parallel arm pin.
3. Attach jib boom articulation cylinder to jib boom weldment with articulation cylinder pin.
4. Ensure that all pin securing devices are in place.
5. Connect all electrical cables and hydraulic hoses at the platform and to the jib boom.



Jib Boom Assembly.

BOOM TELESCOPE CYLINDER

The function of the telescope cylinder is to extend and retract the upper boom segment to allow positioning of the work platform. The double acting cylinder must be removed from the machine before a thorough inspection can be accomplished.

TELESCOPE BOOM CYLINDER PIN REPLACEMENT

1. Operate boom lift to horizontal position.

⚠ CAUTION

Support the boom any time maintenance is required on the boom or boom cylinders.

2. SUPPORT THE BOOM (on a boom stand or similar rigid platform) at the horizontal position.

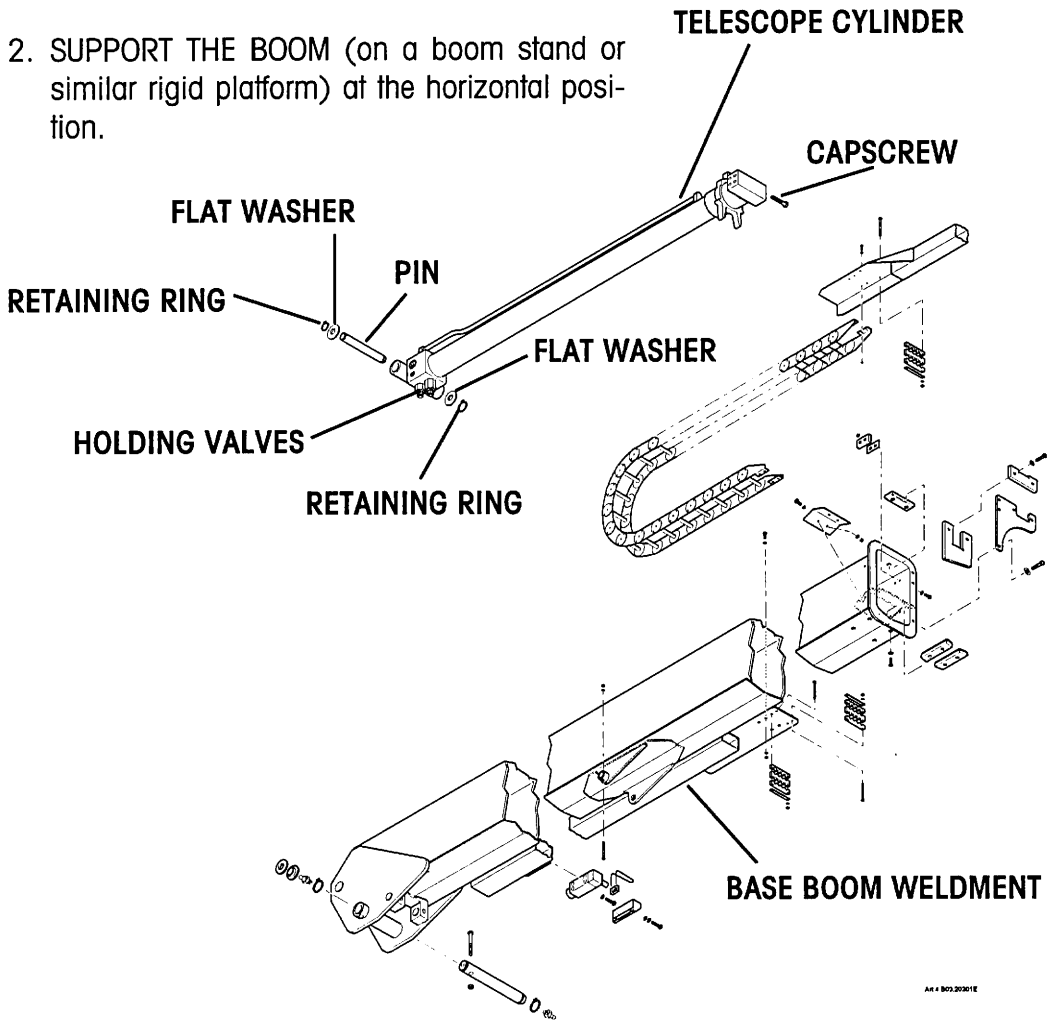
3. Remove the retaining ring and flatwasher.

⚠ CAUTION

The cylinder will fall if not supported when the rod end pin is removed.

4. SUPPORT THE CYLINDER and remove the base end pin.

5. Install new pin, flat washers and retaining rings. Cylinder must be lined up for ease of installation.



Telescope Cylinder Replacement.

TELESCOPE CYLINDER REMOVAL

1. Elevate the boom to the horizontal position.

⚠ CAUTION

Support the boom any time maintenance is required on the boom or boom cylinders.

2. Extend the boom until the telescope cylinder rod end mounting capscrews are exposed.
3. SUPPORT THE EXTENDED TIP BOOM (on a boom stand or similar rigid platform).
4. Remove the eight capscrews holding the rod end of the telescope cylinder to the tip boom.
5. Disconnect the hydraulic hoses from the telescope cylinder.
6. Remove the retaining rings, flat washers and pin from the base end of the cylinder.
7. Using a crane, withdraw the cylinder from the boom.

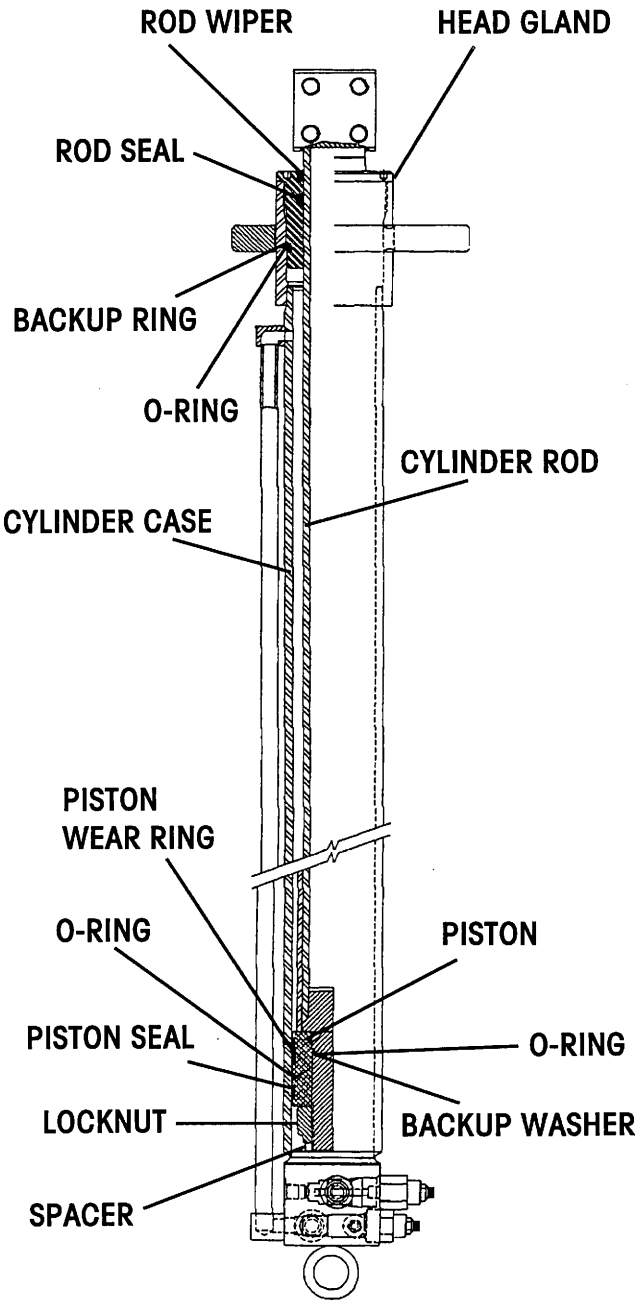
TELESCOPE CYLINDER SEAL REPLACEMENT

1. Remove the end cap from the cylinder.

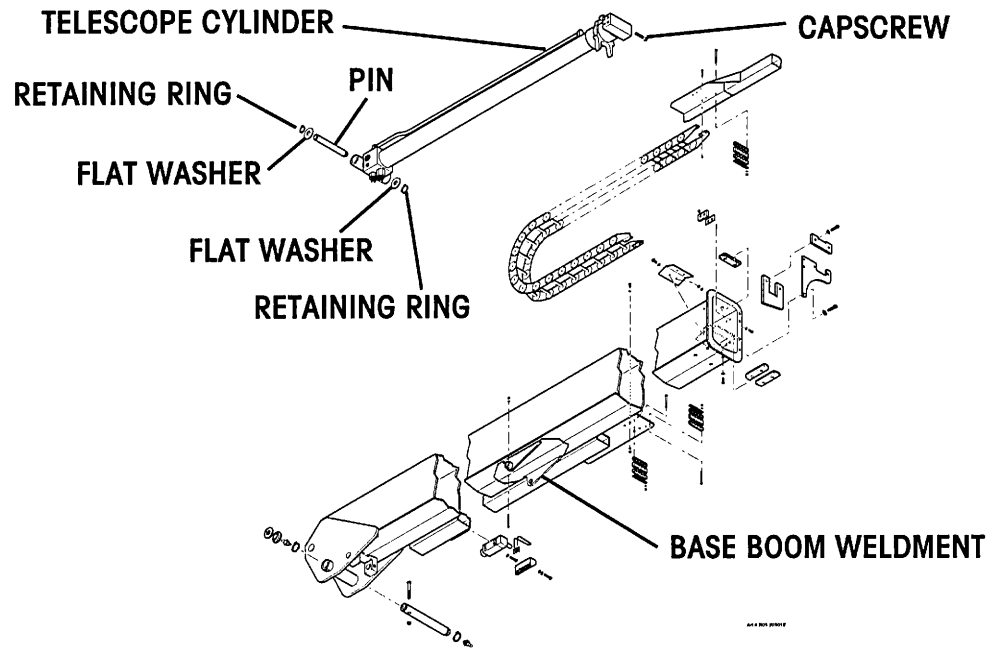
⚠ CAUTION

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

2. Pull the cap and rod straight out of the cylinder barrel.
3. Remove the nut from the end of the rod.
4. Slip off the piston.
5. Examine the rod and seals for signs of damage or wear.
6. Remove the old seals and backup rings.
7. Install new seals and backup rings.



Telescope Cylinder.



Telescope (Extend) Cylinder Replacement.

TELESCOPE CYLINDER INSTALLATION

⚠ CAUTION

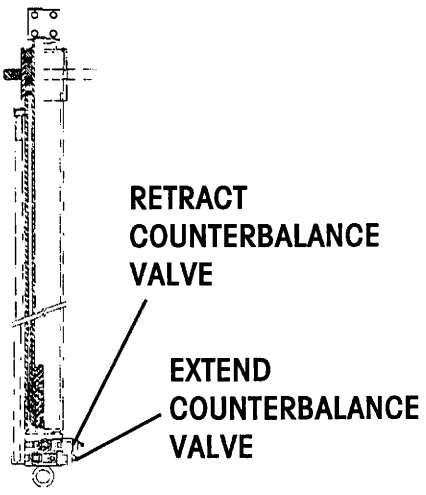
Support the boom any time maintenance is required on the boom or boom cylinders.

1. SUPPORT THE EXTENDED TIP BOOM (on a boom stand or similar rigid platform) IN THE HORIZONTAL POSITION.
2. Using a crane, slide the telescope cylinder into the boom until the rod end mounting holes align with the holes in the tip boom.
3. Install the eight capscrews holding the rod end of the telescope cylinder to the tip boom.
4. Install the pin, flatwashers and retaining rings in the base end of the cylinder.
5. Connect the hydraulic hoses to the telescope cylinder.
6. Cycle the telescope cylinder several times to BLEED THE SYSTEM.

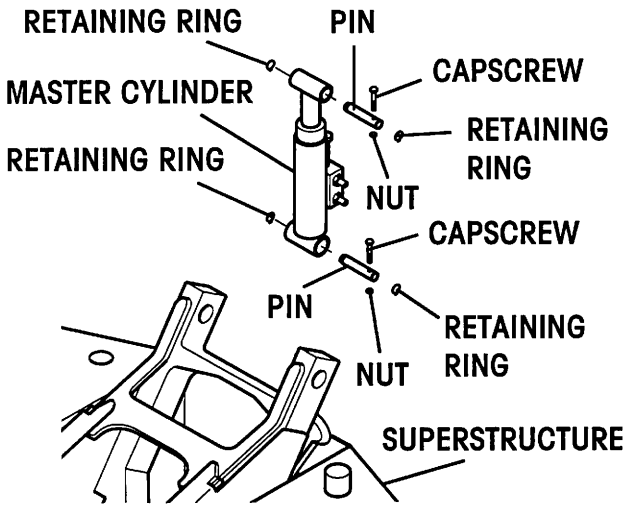
COUNTERBALANCE VALVE INSPECTION

1. Place rated load in the platform, hoist the boom to full elevation and extend the telescope cylinder, then stop the engine.
2. If the telescope cylinder subsequently begins to move, the counterbalance valve is faulty and the cartridge should be replaced.

NOTE: The counterbalance valve is pre-set at the factory and is not adjustable.



Telescope Cylinder.



Master Cylinder Pin Replacement.

PLATFORM LEVEL CYLINDERS

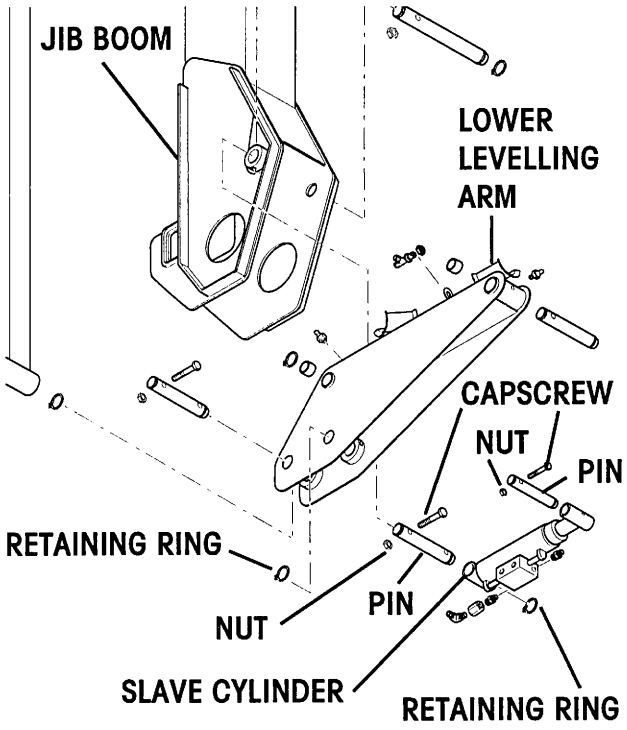
The platform level system automatically keeps the platform level, using a master/ slave cylinder arrangement. Whenever the boom is raised or lowered, the master cylinder is forced to move. The fluid displacement from the master cylinder is in turn sent up the boom to the slave cylinder. This forces the slave cylinder to move the same distance as the master cylinder, which keeps the platform parallel to the ground in any boom position.

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

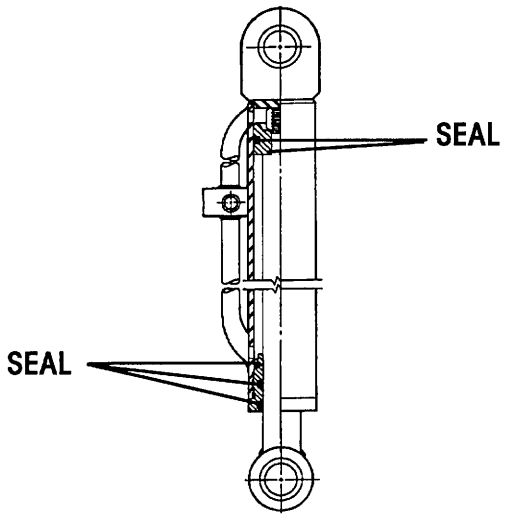
PLATFORM LEVEL CYLINDER PIN REPLACEMENT

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

Install new pin, locking bolts and nuts (lubricate bolts before installation) and retaining ring. Apply grease to pin.



Slave Cylinder Pin Replacement.

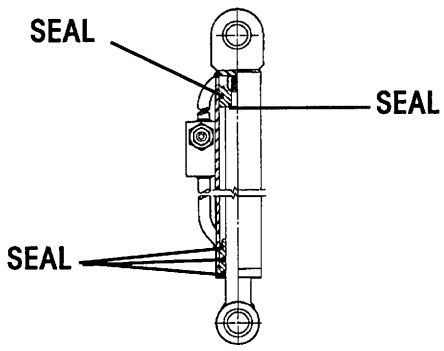


Master Level Cylinder.

LEVEL CYLINDER SEAL REPLACEMENT

Lower the main boom. SUPPORT THE PLATFORM to remove the load on both master and slave leveling cylinders. Remove the lock collar and pin. Slave cylinder seals can be replaced on the machine. Master cylinder must be removed for seal replacement.

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



Slave Level Cylinder.

PLATFORM LEVELING PROCEDURE

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

With the platform near ground, operate the platform level control to move the platform fully backward and forward. Perform procedure five (5) times in order to expel any air from the system.

⚠ CAUTION

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

SECTION 6:
MAINTENANCE

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First Three Months of Operation 6-3
Routine Servicing 6-3
Shift Operational Checklist 6-6
Monthly Operational Checklist 6-9
Semi-Annual Operational Checklist 6-11

MAINTENANCE

The Simon RP 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

- ALWAYS clean the surrounding area before opening hydraulic components.
- Never open a hydraulic system when there are contaminants in the air.
- Never leave components or hoses open. They must be protected from contamination (including rain) at all times.
- Use only recommended lubricants (see Lubrication Chart in this manual). Improper lubricants or incompatible lubricants may be as harmful as no lubrication.
- Watch for makeshift "fixes", which can jeapordize safety as well as lead to more costly repairs.
- Any work platform found not to be in safe operating condition should be removed from service until repaired. All repairs should be made by authorized personnel in conformance with the manufacturer's operating, maintenance, and repair manuals.

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.

The hydraulic pump, electric motor, 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 machine 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 machine booms are stowed in the traveling position, and the machine is standing on level ground. Fluid level must be to full mark on sight gauge, located on the side of tank. 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 tank.

Tire Condition

Check that the tires are in good condition.

Platform Rails and Safety Gate

Check security of platform and safety gate.

Control Valves

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

Steering

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

Batteries

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

Pivot Pins

Examine all pivot pins on booms 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 all machine boom functions.

Checklist

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

MONTHLY SERVICE

Hydraulic System

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

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.

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 weldments and platform frame members are in good condition.

Checklist

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

SEMI-ANNUAL SERVICE

Boom Cylinders

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

Fully retract, then extend the boom telescope cylinder. At each extreme position, check that there is no movement of the cylinder pin.

Filter

Change the high pressure and return filter elements. Replace the emergency pump filter.

In severe use applications, more frequent filter changes will be necessary.

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

Hydraulic Fluid

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

Hydraulic Fluid 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 the 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 machine.

These checklists can be copied as needed to aid in performing these inspections.

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 machine 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. 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, flat or damaged tires etc. Open both compartment doors to inspect components inside.
_____	2. Check battery electrolyte level and connections. Check fuel, engine oil and coolant levels.
_____	3. Check hydraulic fluid level. The level should be at the line marked on the sight gauge with the machine in stowed position.

Continued on following page . . .

SHIFT OPERATIONAL CHECKLIST (CONTINUED)

INITIAL	DESCRIPTION
_____	4. Check that all shutoff valves on hydraulic tank are open (parallel to flow).
_____	5. Check tires for damage.
_____	6. Check tire pressure (see "Machine Specifications").
_____	7. Check wheel lug nuts for tightness.
_____	8. Check hoses for worn areas.
_____	9. Check hose carrier to verify that it is not bent or sagging.
_____	10. Inspect safety belt connections, and check for worn areas on the belts.
_____	11. Check platform rails and gate latch for damage.
_____	12. Check pivot pins for security.
_____	13. Check that all warning and instructional labels are legible and secure.
_____	14. Start engine. Check that hydraulic pressure is as stated on the data plate.
_____	15. Check that the tilt alarm is working properly.
_____	16. Check that no attempt has been made to override the drive interlock system by a previous operator.
_____	17. When all pre-inspection checks have been completed, the operator is ready to test the ground controls for proper operation.
_____	18. Check platform controls for proper operation.
_____	19. With the platform raised, check for the smooth operation of creep speed drive.
_____	20. Follow engine daily service requirements. Refer to the Engine Maintenance Manual supplied with your machine.

Continued on following page . . .

SHIFT OPERATIONAL CHECKLIST (CONTINUED)

ADDITIONAL MAINTENANCE REQUIREMENTS FOR HARSH ENVIRONMENTS

NOTE: Do not grease boom slide pads in dusty or sandblast environments. There are boom seals and covers available to extend the life of these items in these applications. Consult Simon Aerials Service Department.

INITIAL	DESCRIPTION
_____	21. Inspect cylinder boots, valve spool boots, etc., for cuts or other damage after every eight (8) hours of service. Repair or replace if necessary.
_____	22. Check hydraulic system for leakage after every eight (8) hours of operation.
_____	23. Follow engine severe usage service requirements. Refer to the Engine Maintenance Manual supplied with your machine.

WEEKLY

INITIAL	DESCRIPTION
_____	24. Inspect condition of hydraulic fluid in the reservoir. Fluid should have a clear amber color.
_____	25. Lubricate all grease fittings (see Lubrication Chart).
_____	26. Check oil level in swing drive (see Lubrication Chart).
_____	27. Check oil level in power hubs (see Lubrication Chart).
_____	28. Wash and lubricate hose track chain.

MONTHLY OPERATIONAL CHECKLIST

DATE: _____ INSPECTED BY: _____

MODEL NUMBER: _____ SERIAL NUMBER: _____

These checklists can be copied as needed to aid in performing these inspections.

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 machine clean!!

⚠WARNING

THIS CHECKLIST MUST BE USED AT MONTHLY INTERVALS OR EVERY 100 HOURS OF OPERATION, 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. Lubricate all grease fittings (see Lubrication Chart).
_____	3. Inspect condition of hydraulic fluid in the reservoir. Fluid should have a clear amber color.
_____	4. Check hydraulic system for leaks, examine hoses for signs of excessive wear, chafing or twisting. Adjust the hoses and/ or replace them if necessary (refer to Service Manual).
_____	5. Inspect the work platform and boom structure for signs of damage and broken welds. Check all bolts (including cab rotate bolts) for tightness.
_____	6. Check for machine damage, broken welds, loose bolts, improper or makeshift repairs.
_____	7. Check protective rubber cover around hoses at moving anchor, tip boom, boom hose passages, and at swing bearing.
_____	8. Check torque of swing bearing bolts (see "Machine Specifications").

Continued on following page . . .

MONTHLY OPERATIONAL CHECKLIST (CONTINUED)

INITIAL	DESCRIPTION
_____	9. Check torque of swing drive mounting bolts (see "Machine Specifications").
_____	10. Check that wheels are not leaning in or out.
_____	11. Check that steer wheel spindles turn freely, with no end play.
_____	12. Check torque of axle mounting bolts (see "Machine Specifications").
_____	13. Check wheel lug nut torque (see "Machine Specifications").
_____	14. Check that the jib and main boom do not drift down with a full load, no hydraulic pressure (engine off) and the control valves in the "BOOM DOWN" position.
_____	15. Check to make sure boom sections are not dented or bent.
_____	16. Check that all jam nuts on adjustable flow valves are locked. Check settings if any are not locked.
_____	17. Check fuel shutoff rack for proper operation. Loosen lever arm and lubricate with WD-40 or equivalent.
_____	18. Check axle and planetary ends. Refer to Lubrication Chart.
_____	19. Check swing bearing and swing bearing teeth. Refer to Lubrication Chart.
_____	20. Follow engine monthly service requirements. Refer to the Engine Maintenance Manual supplied with your machine.

ADDITIONAL MAINTENANCE REQUIREMENTS FOR SEVERE USAGE APPLICATIONS

EVERY 90 DAYS

INITIAL	DESCRIPTION
_____	21. Replace high pressure and return filter elements.
_____	22. Replace emergency pump filter.

SEMI-ANNUAL OPERATIONAL CHECKLIST

DATE: _____ **INSPECTED BY:** _____

MODEL NUMBER: _____ **SERIAL NUMBER:** _____

These checklists can be copied as needed to aid in performing these inspections.

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 machine clean!!

⚠WARNING

THIS CHECKLIST MUST BE USED AT SIX MONTH INTERVALS OR EVERY 500 HOURS OF OPERATION, 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 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. **NOTE:** If hydraulic fluid has been regularly maintained, it should only require changing once every year, depending on maintenance, temperature, application, duty cycle, and atmospheric conditions.
_____	3. Clean and lubricate all electrical switches with an electrical contact cleaner and ensure that the switches operate freely in all positions.
_____	4. Check the electrical mounting and hardware connections for security.
_____	5. Replace high pressure filter element and return filter element. Replace emergency pump filter.
_____	6. Spray all hydraulic valve spool linkages with WD-40.
_____	7. Follow engine semi-annual service requirements. Refer to the Engine Maintenance Manual supplied with your machine.

SECTION 7:
TROUBLESHOOTING

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Troubleshooting Chart 7-4
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Boom drifts down without lever activation 7-11
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GENERAL TROUBLESHOOTING TIPS

Before investigating a malfunction, check the following items:

- The Main Power Key Switch should be in the "GROUND" or "PLATFORM" position.
- The Foot Pedal Switch is pressed and held for platform console operation.
- Pump Selector Switch is pressed and held for ground control operation.
- Check that battery connections are secure and battery is fully charged.
- Check that the Emergency Stop Button(s) are released.
- Check that the hydraulic reservoir ball valves are open.
- Check that hydraulic fluid is at the correct level.

Common Causes of Hydraulic System Malfunctions:

- Mixing incompatible hydraulic fluids, destroying the additives and causing varnish build up resulting in sticking valves.
- Water in the hydraulic fluid due to a damp climate and loss of reservoir pressurization.
- Improper viscosity hydraulic fluid; too high in a cold climate, too low in a warm climate.

  NOTE: Mobil DTE-13M is recommended as a general purpose fluid suitable for all but the most extreme environmental conditions.

- Fuel in the hydraulic fluid, which lowers the viscosity and lubricity of the fluid.

TROUBLESHOOTING CHART

Problem	Probable Cause	Solution
• Excessive heat causing excessive wear on seals and metal parts due to lowered hydraulic fluid viscosity. Symptoms to watch for are: pump case turns brown, hydraulic fluid darkens and premature pump failure.	• Excessive water in the hydraulic fluid.	• Drain, flush and refill hydraulic system.
	• Improper oil viscosity.	• Drain, flush and refill hydraulic system with the correct fluid.
	• Improper lubrication and hydraulic fluid.	• Drain and flush hydraulic system.
	• Pump cam bearing failure.	• Rebuild pump as required.
	• Foot pedal blocked to the "ON" position.	• Unblock foot pedal.
• Water in hydraulic fluid. Symptoms to watch for are: pitting and etching of pump pistons and pump piston cam wear causing heat build up and premature pump failure.	• Damp climate.	• Drain and flush hydraulic system.
	• Hydraulic fitting or port open to contaminants.	• Drain and flush hydraulic system. Replace worn pump components.
	• Reservoir not pressurized.	• Check pressure. Check reservoir for leaks.
• Varnish, the dark brownish residue left from oxidation of hydraulic fluids. Symptoms to watch for are: pistons, spools and moving parts with close tolerances tend to stick and hang up.	• Mixing of incompatible fluids or poor quality fluids.	• Drain and flush hydraulic system, then fill with recommended hydraulic fluid.
	• Excessive heating of the fluids.	• Drain and flush hydraulic system, then fill with recommended hydraulic fluid.
• Poor lubrication, parts break through lubricant causing metal to metal contact. Symptoms to watch for are: heads of pump pistons worn and excessive heat build up.	• Hydraulic fluid viscosity low.	• Drain and flush hydraulic system, then fill with recommended hydraulic fluid.
	• Improper or poor grade hydraulic fluid or lubricant without anti-wear additives.	• Drain and flush hydraulic system, then fill with recommended hydraulic fluid.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• 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: pitting and etching of pump pistons.	• Low reservoir fluid level.	• Add hydraulic fluid.
	• Air leaks in suction line.	• Repair any suction hose leaks.
	• Improper hydraulic fluid.	• Have fluid analyzed regularly and drain and flush hydraulic system, then fill with recommended hydraulic fluid.
	• Vaporization of water.	• Have fluid analyzed regularly and drain and flush hydraulic system, then fill with recommended hydraulic fluid.
	• Hydraulic fluid system has not been warmed before using full system pressure.	• Warm up system before using full system pressure.
	• Pump speed too high.	• Ensure reservoir pressurization is operating properly and adjust engine speed.
• Boom track cross braces breaking.	• Hoses skiving in the boom trac.	• Check hydraulic pressure and adjust if necessary.
	• System pressure too high, causing boom hoses to shrink more than normal.	• Check hydraulic pressure and adjust if necessary.
	• Hoses too tight in the track.	• Adjust hose tension.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Boom track sagging.	• Track pin holes stretched usually caused by a damaged "I" beam support.	• Check "I" beam support and replace if necessary.
	• Overhead guard is damaged. If the guard is damaged, the track could get caught and could also tear off the moving anchor.	• Replace overhead guard and any other items damaged due to a damaged guard.
	• Improper lubrication and cleaning.	• Follow proper lubrication and cleaning procedures.
• Engine won't crank.	• Starter motor relay. • Starter motor interlock relay. • Oil pressure switch stuck in open position. • Power relay. • Ground/ platform switch. • Ground/ platform ignition switch. • Engine failure.	• A breakdown in any one of these components will cause the engine not to crank. Trace the available voltage to starter motor relay. Replace the faulty component(s).
	• Footswitch blocked	• Unblock footswitch.
• Throttle actuator doesn't work.	• Throttle high speed relay. • An actuator failure. • Throttle timer relay.	• A breakdown in any one of these components will cause the actuator not to function. Trace the available voltage to the throttle solenoid. Replace the faulty component(s).

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Movement alarm will not sound.	• Broken wire or connection in the horn circuit. • Horn or horn relay is faulty.	• Trace the available voltage to the horn. • A breakdown in any one of these components will cause the alarm not to function. Replace the faulty component(s).
• Lift cylinder drifts down.	• Counterbalance valve cartridge dirty or faulty. • Cylinder packing is damaged.	• Clean, repair or replace the counterbalance valve. • Replace cylinder packing.
• No hydraulic pump output	• Water in hydraulic fluid. • Improper oil viscosity. • Faulty pump stroke valve. • Hydraulic fittings loose or ports open. • Pump cam bearing failure. • Broken pump drive shaft. • Compensator valve malfunction. • Fluid leaks.	• Drain and flush hydraulic system. • Use correct fluid. See Lubrication Chart. • Check solenoid operation. • Close ports and tighten fittings. Drain and flush hydraulic system. • Replace pump. • Check for broken pump drive shaft and replace if broken. • Check for improper compensator adjustment and correct adjustment or replace valve. • Check for circuit leakage and fluid at pump inlet.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Low hydraulic pump output.	• Low pressure.	• Check and adjust for correct pressure if necessary.
	• Component failure.	• Check for compensator valve, seat, spring or packing failure and replace if damaged.
		• Check for worn or scored pistons and bores; replace if damaged.
		• Check for broken discharge valve or spring; replace if damaged.
		• Check for restricted inlet or insufficient inlet fluid.
• Hydraulic functions slow.	• Low hydraulic pump pressure.	• Check and adjust for correct pressure if necessary.
	• Hydraulic high pressure filter.	• Check for plugged hydraulic high pressure filter; replace filter element.
	• Pump component failure.	• Check for compensator valve, seat, spring or packing failure and replace if damaged.
	• Plugged orifice in pump.	• Clean orificel.
	• Valve spool not completely shifting.	• Check/ clean valve spool.
• Slow hydraulic pump response.	• High pressure filter.	• Check for plugged high pressure filter.
• Excessive hydraulic pump pressure.	• Improper compensator adjustment.	• Adjust compensator valve and replace if necessary.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Function chatter.	• Hydraulic fluid low.	• Check for sufficient inlet fluid and add fluid.
	• Hydraulic tank not pressurized.	• Check hydraulic tank cap.
	• Broken pump components.	• Check for sticking pump pistons; replace if necessary. • Check for broken discharge valve or spring; replace if necessary. • Check for broken inlet valve; replace if necessary. • Check for charge system leakage. • Check for pump suction air leak.
• Hydraulic pump and fluid line vibration.	• Component failure.	• Check for broken discharge valve or spring; replace if damaged. • Check for leaking or broken inlet valve; replace if damaged.
• Hydraulic pump shaft seal failure.	• High pressure.	• Check for overpressurized seal drain line; reduce pressure and replace seal. • Check for plugged case drain line.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Hydraulic pump noise or squeal.	• Low pressure.	• Check for low deadhead pressure and adjust for correct pressure.
	• Component failure.	• Check for compensator valve, seat, spring or packing failure and replace if damaged.
		• Check for leaking inlet valve; replace if damaged.
		• Check for air leak at inlet connections.
		• Check for insufficient inlet fluid (cavitation).
• All hydraulic functions inoperable.	• Low fluid in reservoir.	• Fill to proper level.
	• Hydraulic pump compensator out of adjustment.	• Adjust or repair
	• Hydraulic pump defective.	• Repair or replace.
• Telescope, swing, or lift functions don't operate using ground control.	• Faulty stroke valve.	• Repair or replace.
	• Pendant toggle switches have no voltage.	• Check voltage available to the toggle switches.
	• Valve is stuck.	• Manually engage spool.
	• Defective counterbalance valve.	• Check counterbalance valve; replace if damaged.
	• Faulty coils	• Check coils for operation.
• Boom drifts down without lever actuated with power on or off.	• Defective counterbalance valve.	• Check counterbalance valve; replace if damaged.
	• Bad cylinder packing.	• Check for leaking cylinder and repack, as required.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Boom drifts down without lever activation but with power on; does not drift down with power off.	• Mechanical failure.	• Check that ground and platform boom control levers return to their neutral position.
• Drive function does not operate from ground.	• No voltage at toggle switch. • Bad coil.	• Check voltage available to the toggle switches. • Check coil for operation.
• No steer function from ground.	• Steer toggle switch is bad. • Steer valve or valve coil. • Faulty steer cylinder.	• Check voltage available to the toggle switch. • Check valve engaging. • Possibly plugged steer ports or damaged cylinder packing. Inspect, repair or replace steer cylinder.
• No drive function from platform.	• Faulty valve coil or driver card. • No hydraulic fluid flow available to the drive motors. • Drive motors are damaged. • Drive valve spool is stuck. • Broken wire to drive coil.	• Check coil for operation. Adjust/ replace driver card. • Test for available fluid flow at the drive motors. • Inspect, repair or replace. • Manually engage and check for proper operation. Replace if faulty. • Check wire continuity.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• No lift function from platform.	• Mechanical failure.	• Check that ground and platform boom control levers return to their neutral position.
	• Lift spool valve stuck.	• Manually engage lift (hoist) spool and check for operation.
	• Defective counterbalance valve.	• Check counterbalance valve for foreign material or internal damage; replace if damaged.
	• Faulty cylinder.	• Plugged lines, cylinder ports or damaged cylinder packings. Inspect, repair or replace cylinder.
	• Pump not coming on stroke.	• Check pump stroke circuit.
	• Faulty valve coil or driver card.	• Check coil for operation. Adjust/ replace driver card.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• No extend or retract function from platform.	• Spool valve stuck.	• Manually engage spool and check for proper operation. Replace if faulty.
	• Mechanical failure.	• Check that ground and platform boom control levers return to neutral position.
	• Pressure reducing valve possibly leaking to tank.	• Inspect, clean and retest. Replace if faulty.
	• Defective counterbalance valve.	• Check counterbalance valve for foreign material or internal damage; replace if damaged.
	• High pressure filter dirty.	• Check for a dirty high pressure filter; replace if dirty.
	• Faulty valve coil or driver card.	• Check coil for operation. Adjust/ replace driver card.
• No swing function from platform.	• Spool valve stuck.	• Manually engage swing spool and check for proper operation. Replace if faulty.
	• Faulty valve coil or driver card.	• Check coil for operation. Adjust/ replace driver card.
• Swing motor will not run in either direction.	• Mechanical malfunction.	• Check for an obstruction between the pinion gear and swing bearing; remove the obstruction.
		• Swing gearbox worm gear is broken; replace it.
		• Swing motor shaft is broken or seized; replace the swing motor.
	• Counterbalance failure.	• Check for operation.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Swing worm gear failure.	• Excessive side loading of boom.	• Check for excessive side loading of boom; correct the situation and replace rotation bearing if teeth damaged.
	• Unit throttling not being used, causing instant on and off of the swing motor.	• Check that the foot pedal is depressed before the lever is activated.
• Platform will not react to platform rotate control movement.	• Double pilot operated check valve (relief valve).	• Install valve correctly. Check the valve cartridge and replace if necessary.
	• Valve spool leakage.	• Check for internal leakage of the valve spool; replace.
	• Mechanical malfunction.	• If platform rotates only in one direction, check for physical constraints or foreign material restricting platform rotation; remove foreign material.
	• Plugged valve orifice.	• Clean orifice.
• Platform rotate selector valve body cracked or blown body seal.	• Excessive system pressure.	• Check that there is no back pressure on the return port. Check that inlet and return hoses are connected.
	• Blocked hoses.	• Check for blocked or partially blocked return hoses.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Platform does not level properly (platform drifting).	• Damaged parts.	• Check for damaged parts such as bent pins or elongated pin holes; replace damaged parts. May need to replace slave cylinder.
	• Defective counterbalance valve.	• Check counterbalance valve for foreign material or internal damage; replace if damaged.
	• Defective double pilot operated check valve.	• Repair or replace as necessary.
• Platform level selector valve body cracked or blown body seal.	• Excessive system pressure.	• Check that there is no back pressure on the return port. Check that inlet and return hoses are connected.
	• Blocked hoses.	• Check for blocked or partially blocked return hoses.
• Unit will not steer; all other functions operate.	• Steer cylinder may not be mechanically connected to steering linkage.	• Check for disconnected, binding or damaged steering linkage; connect or replace steering linkage as necessary.
	• Steering directional control valve.	• The steering directional control valve may not be shifting. The valve spools may be stuck. Remove valve and inspect, clean, repair or replace as needed.
	• Faulty steer coils.	• Check steer coils.
	• Faulty steer switch.	• Check steer switch.
	• Faulty cylinder packing.	• Replace packing.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Steer selector valve body cracked or blown body seal.	• Excessive system pressure.	• Check that there is no back pressure on the return port. Check that inlet and return hoses are connected.
	• Blocked hoses.	• Check for blocked or partially blocked return hoses.
• Wheel drive motor failure.	• Contaminated hydraulic fluid.	• Check for contamination of hydraulic fluid; drain, flush system and replace with the correct grade of hydraulic fluid.
	• Wheel drive motor component failure.	• Replace the motor. If one motor failed, internal loose or broken pieces will eventually flow into the opposite motor causing that motor to fail; unless lines are properly cleaned. Drain, flush system and replace hydraulic fluid after replacing broken component.
	• Wheel bearing failure.	• Check for proper installation of wheel bearing.
	• Machine has been towed with drive motor engaged.	• Do not tow the machine if not equipped with the tow package.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Low speed drive valve inoperative in low speed drive mode only.	• Faulty switch.	• Check switch continuity.
• Unit will not go into high speed drive with boom retracted and lowered.	• High pressure filter dirty. • Boom limit switches faulty or broken limit switch arm. • Faulty switch.	• Replace filter element. • Check wiring or replace switches. • Check switch continuity.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• No jib function.	1. Loose wires on Y-axis driver board. 2. Driver board out of adjustment or faulty board. 3. Jib spool valve stack. 4. Holding valves not operating properly. 5. Faulty cylinder.	1. Tighten Y-axis wires on driver board. 2. Adjust driver board to specifications or replace faulty board. 3. Manually engage jib spool and check for operation. 4. Remove, clean, inspect, replace and test unit operation. 5. Possibly plugged lines, cylinder ports or damaged cylinder packings. Inspect, repair or replace cylinder.
• Jib cylinder drifts down.	1. Holding valve cartridge dirty or faulty. 2. Cylinder packing is damaged.	1. Clean, repair or replace the holding valve. 2. Replace cylinder packing.

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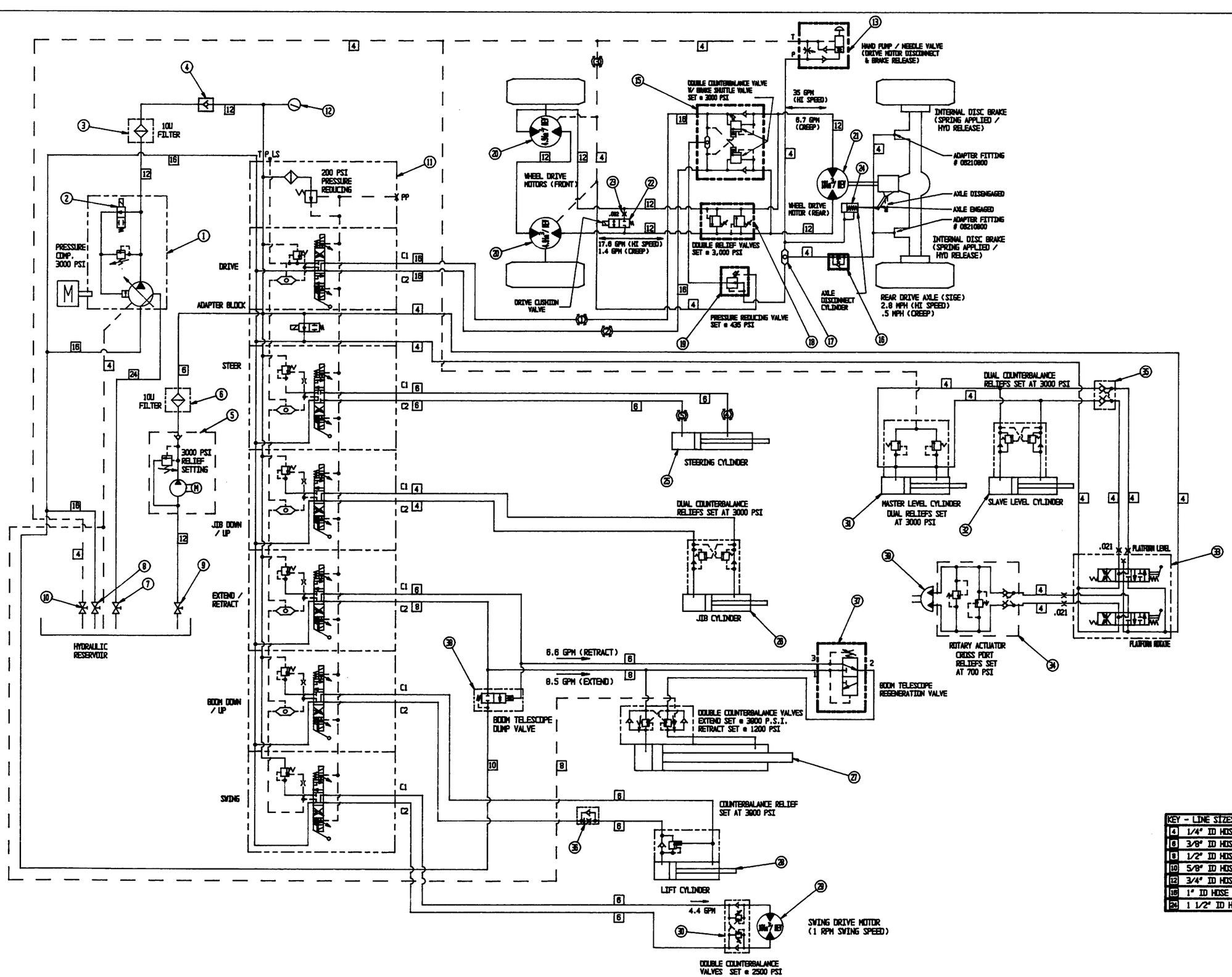
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KEY - LINE SIZES	
4	1/4" ID HOSE
6	3/8" ID HOSE
8	1/2" ID HOSE
10	5/8" ID HOSE
12	3/4" ID HOSE
16	1" ID HOSE
24	1 1/2" ID HOSE

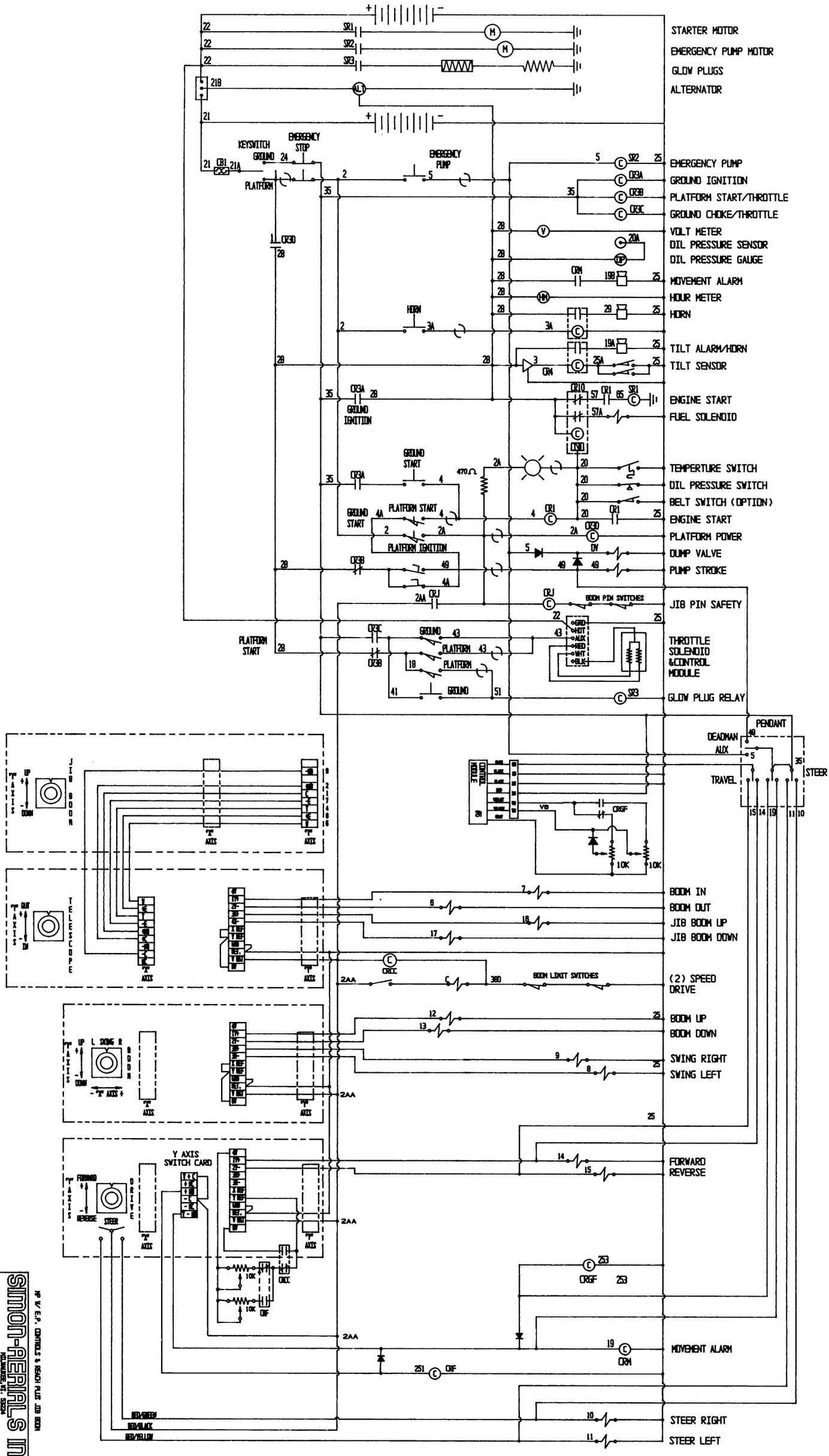
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MILWAUKEE, WI. 53224

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REVISION

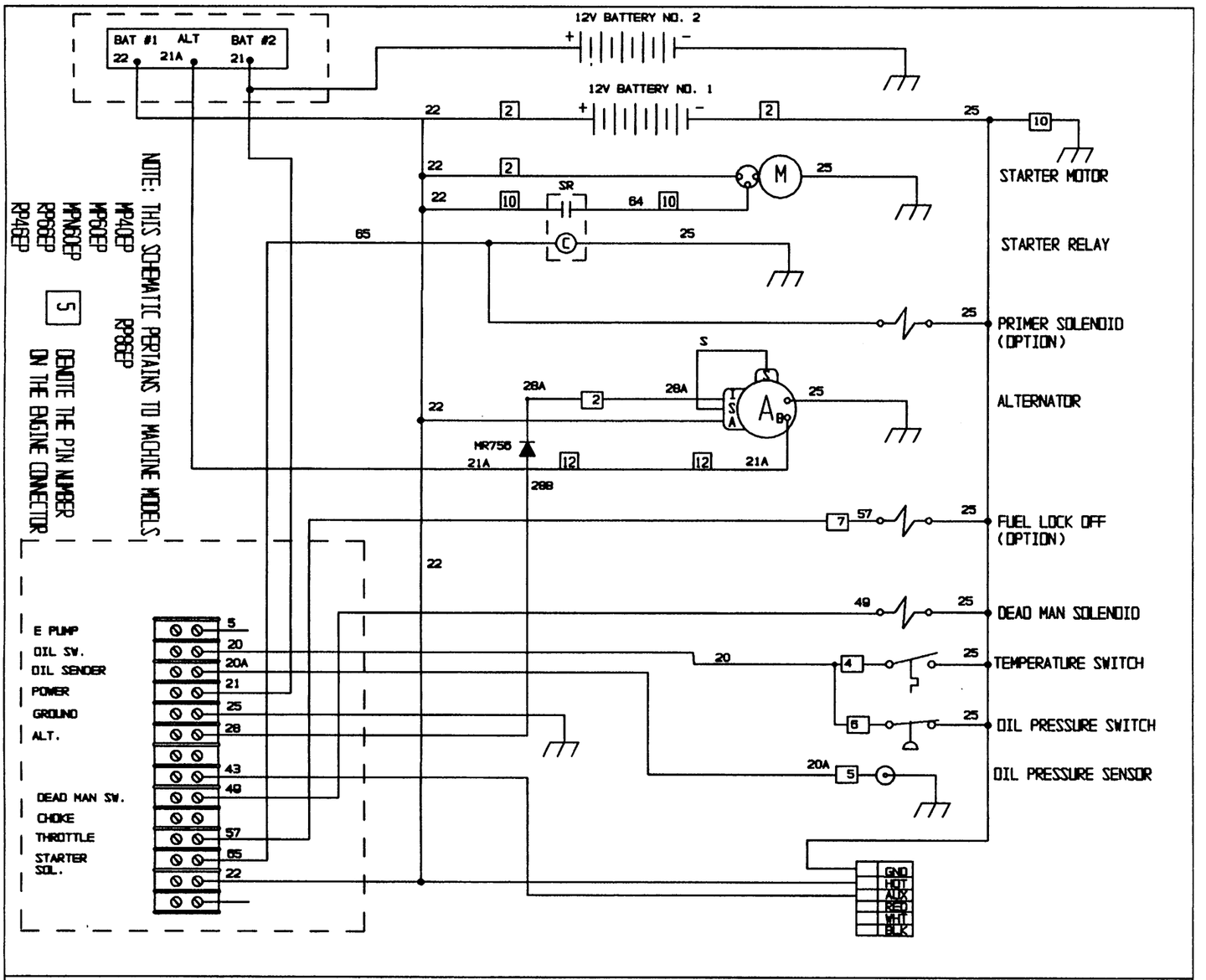
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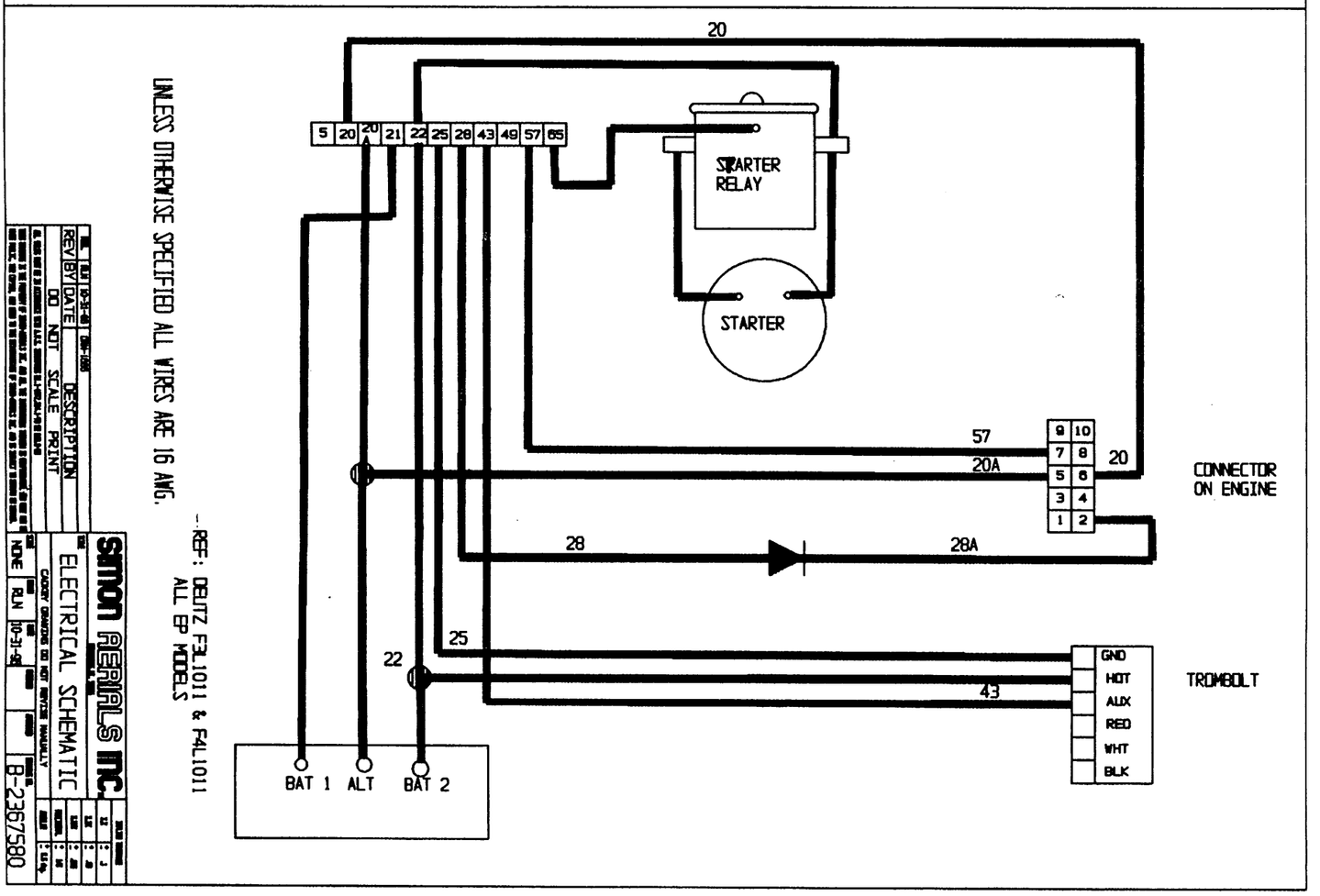


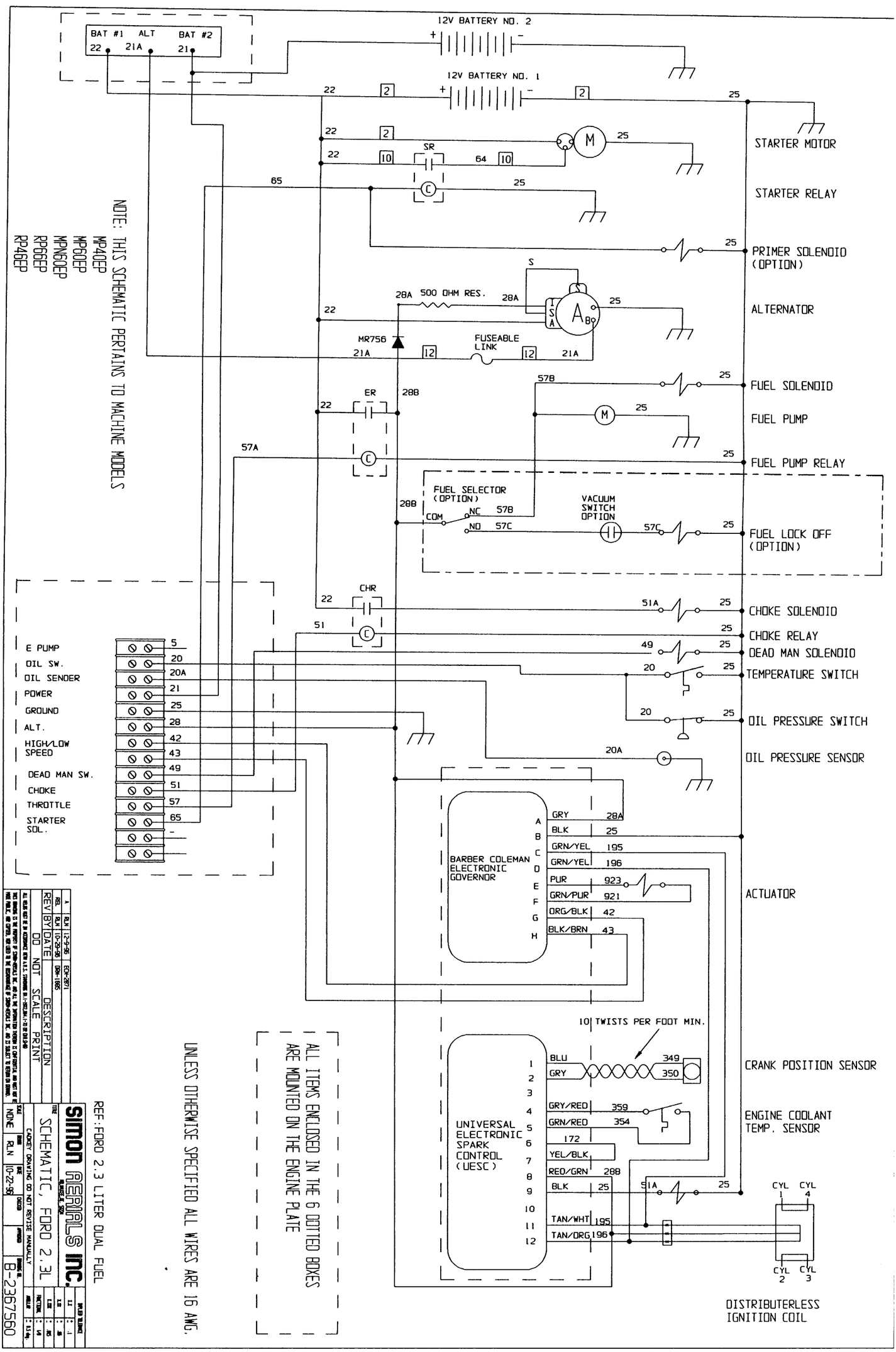
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HOLMWOOD, WI. 53224
HP IV E.P. CONTROLS & REACH PLUS JIB BOOM

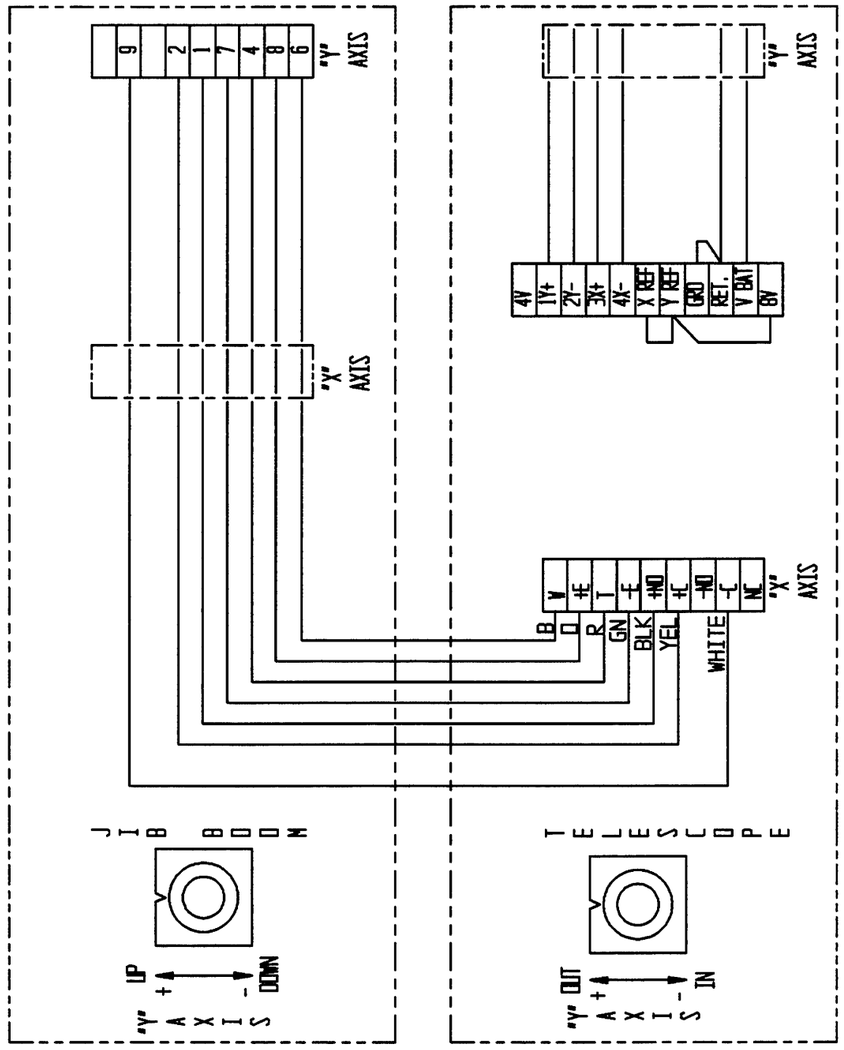
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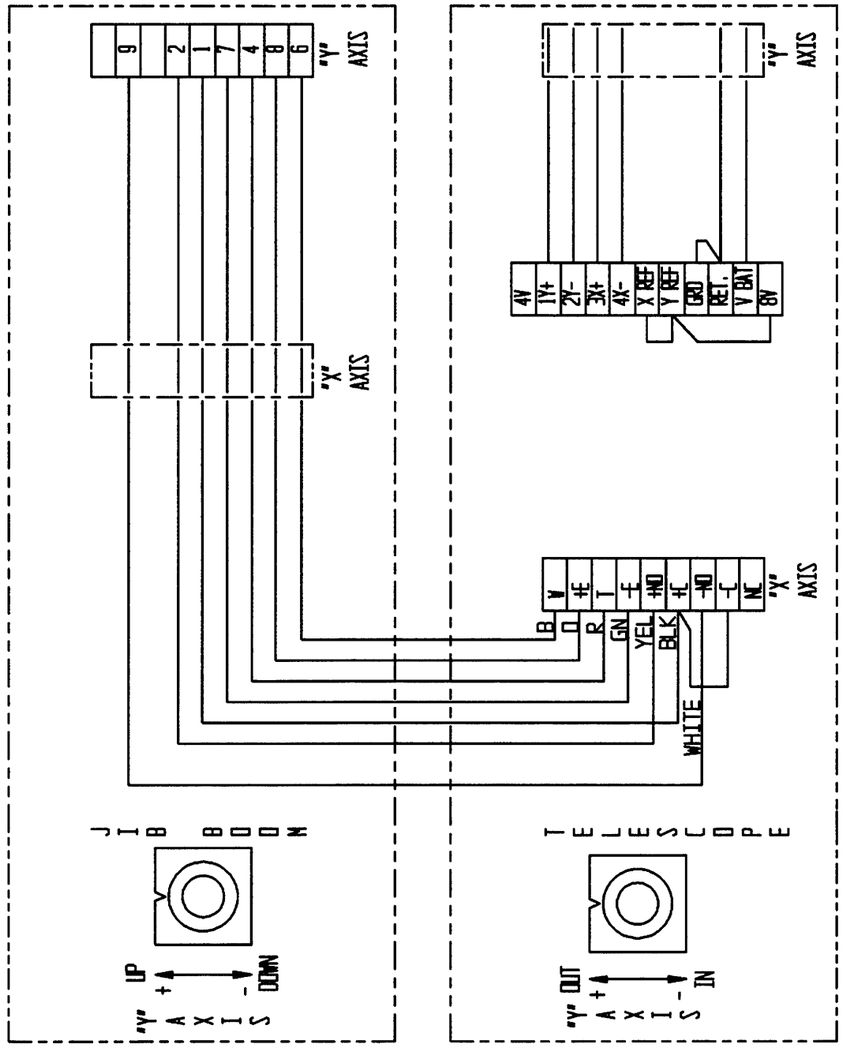

12V BATTERY NO. 2
BAT #1 ALT BAT #2
22 21A 21
12V BATTERY NO. 1
STARTER MOTOR
STARTER RELAY
PRIMER SOLENOID (OPTION)
ALTERNATOR
FUEL LOCK OFF (OPTION)
DEAD MAN SOLENOID
TEMPERATURE SWITCH
OIL PRESSURE SWITCH
OIL PRESSURE SENSOR
MR756
E PUMP
OIL SW.
OIL SENDER
POWER
GROUND
ALT.
DEAD MAN SW.
CHOKE
THROTTLE
STARTER SOL.
GND
HOT
AUX
RED
WHT
BLK
NOTE: THIS SCHEMATIC PERTAINS TO MACHINE MODELS
MP40EP
MP50EP
MP60EP
RP66EP
RP86EP
RP46EP
5 DENOTE THE PIN NUMBER ON THE ENGINE CONNECTOR


20
5 20 20A 21 22 25 28 43 49 57 65
STARTER RELAY
STARTER
57
20A
20
CONNECTOR ON ENGINE
28
28A
25
22
43
GND
HOT
AUX
RED
WHT
BLK
TROMBOLT
BAT 1 ALT BAT 2
UNLESS OTHERWISE SPECIFIED ALL WIRES ARE 16 AWG.
REF: DEUTZ F3L1011 & F4L1011
ALL EP MODELS
SIMON AERIALS INC.
ELECTRICAL SCHEMATIC
B-2367580


NOTE: THIS SCHEMATIC PERTAINS TO MACHINE MODELS
MP40EP
MP60EP
MPN60EP
RP66EP
RP46EP
BAT #1
ALT
BAT #2
22
21A
21
12V BATTERY NO. 2
12V BATTERY NO. 1
STARTER MOTOR
STARTER RELAY
PRIMER SOLENOID (OPTION)
ALTERNATOR
500 OHM RES.
MR756
FUSEABLE LINK
FUEL SOLENOID
FUEL PUMP
FUEL PUMP RELAY
FUEL SELECTOR (OPTION)
VACUUM SWITCH OPTION
FUEL LOCK OFF (OPTION)
CHOKE SOLENOID
CHOKE RELAY
DEAD MAN SOLENOID
TEMPERATURE SWITCH
OIL PRESSURE SWITCH
OIL PRESSURE SENSOR
E PUMP
OIL SW.
OIL SENDER
POWER
GROUND
ALT.
HIGH/LOW SPEED
DEAD MAN SW.
CHOKE
THROTTLE
STARTER SOL.
BARBER COLEMAN ELECTRONIC GOVERNOR
ACTUATOR
10 TWISTS PER FOOT MIN.
CRANK POSITION SENSOR
UNIVERSAL ELECTRONIC SPARK CONTROL (UESC)
ENGINE COOLANT TEMP. SENSOR
DISTRIBUTERLESS IGNITION COIL
CYL 1
CYL 4
CYL 2
CYL 3
ALL ITEMS ENCLOSED IN THE 6 DOTTED BOXES ARE MOUNTED ON THE ENGINE PLATE
UNLESS OTHERWISE SPECIFIED ALL WIRES ARE 16 AWG.
REF:FORD 2.3 LITER DUAL FUEL
SCHEMATIC, FORD 2.3L
simon AERIALS INC.
8-2367560



CURRENT WIRING



NEW WIRING

THIS WIRING CHANGE MUST BE DONE WITH EXTEND/RETRACT JOYSTICK REPLACEMENT

REF: RP46, RP66, RP120

WIRING CHANGES ARE AS FOLLOWS:

1. MOVE YEL WIRE TO NO+
2. MOVE BLK WIRE TO C+
3. MOVE WHITE WIRE TO NO-
4. ADD JUMPER FROM C+ TO C-

REL	JTS	12/16/96	ECN-02878
REV	BY	DATE	DESCRIPTION

DO NOT SCALE PRINT

ALL WELDS MUST BE IN ACCORDANCE WITH A.W.S. STANDARDS D1.1-1972,D14.1-70 OR D10.9-69

THIS DRAWING IS THE PROPERTY OF SIMON-AERIALS INC. AND ALL THE INFORMATION THEREON IS CONFIDENTIAL AND MUST NOT BE MADE PUBLIC, NOR COPIED, NOR USED TO THE DISADVANTAGE OF SIMON-AERIALS INC. AND IS SUBJECT TO RETURN ON DEMAND.

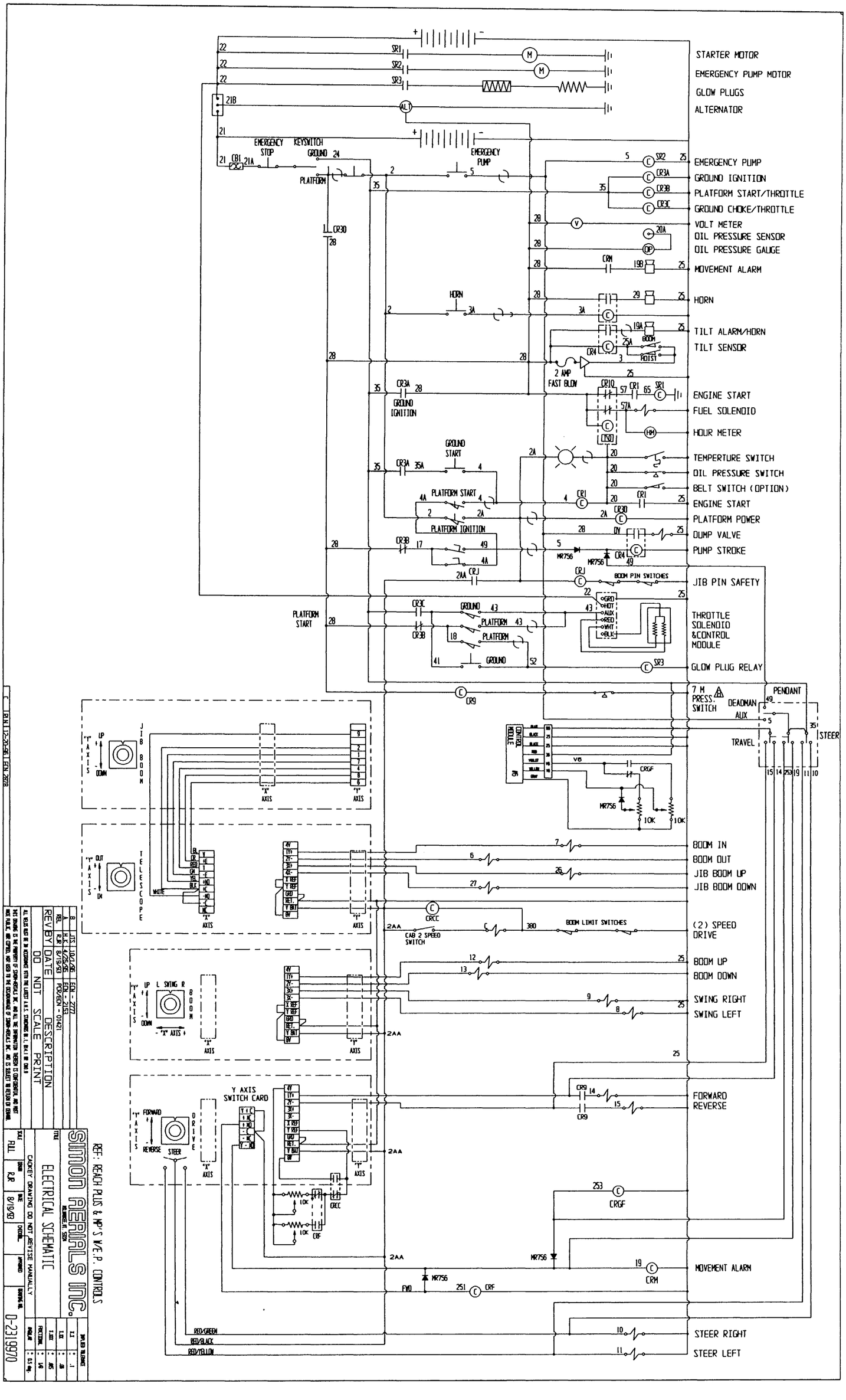
SIMON AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: WIRING, JOYSTICK

CADKEY DRAWING DO NOT REVISE MANUALLY

SCALE	DRAWN	DATE	CHECKED	APPROVED	DRAWING NO.
FULL	JTS	12/16/96			B-2369400

IMPLIED TOLERANCE	
X.X	± .1
X.XX	± .06
X.XXX	± .015
FRACTIONAL	± 1/8
ANGULAR	± 0.5 deg.



REF: REACH PLUS & MP'S W.E.P. CONTROLS

SIMON AERIALS INC.

ELECTRICAL SCHEMATIC

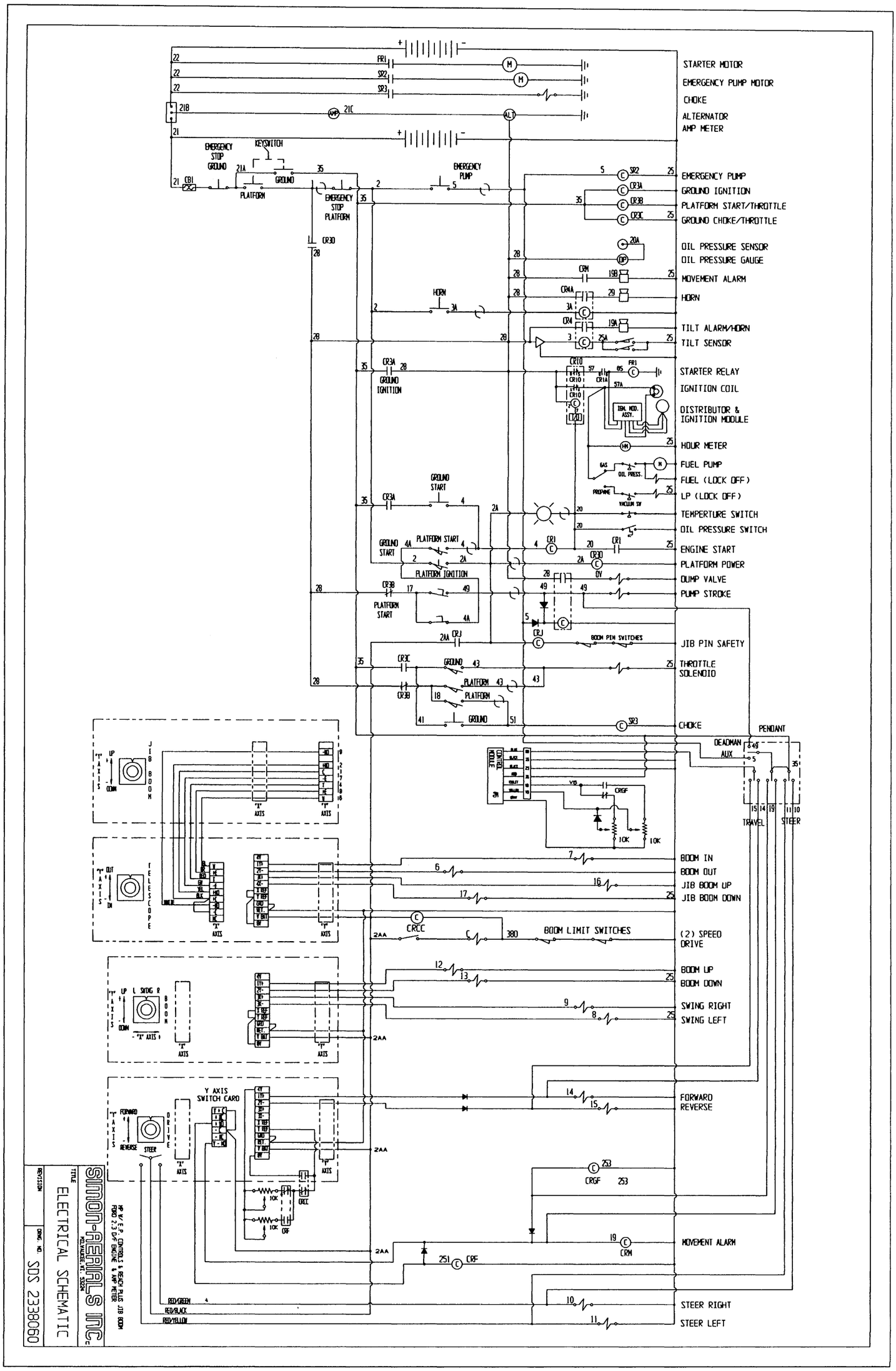
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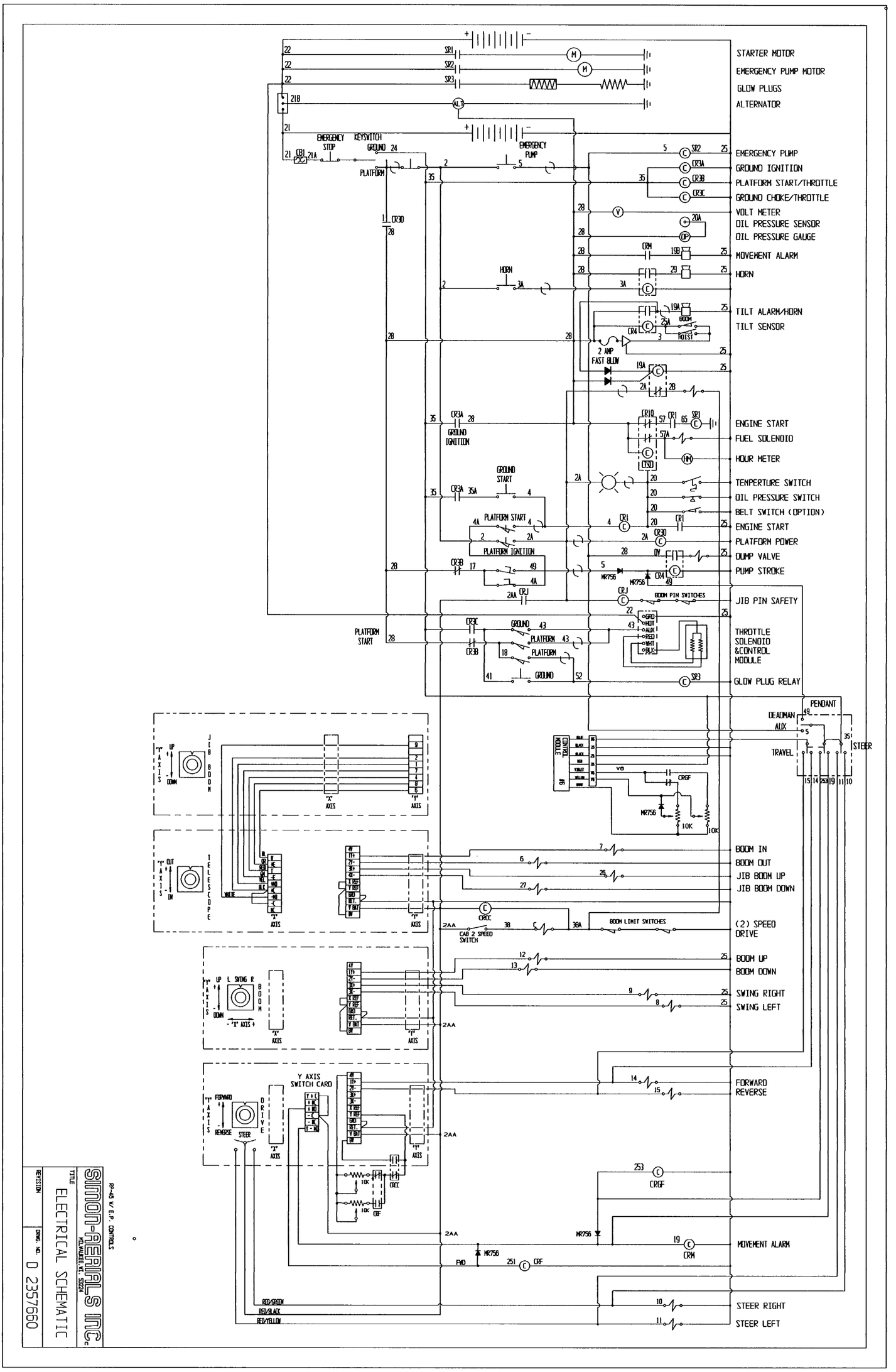
REV	BY	DATE	DESCRIPTION
B	J.T.S.	10/4/96	ECN - 2777
A	K.K.	4/28/95	ECN - 2153
REL	E.J.P.	8/19/93	RELEASED - 01421

DRAWN: E.J.P. DATE: 8/19/93 CHECKED: FULL

CADKEY DRAWING DO NOT REVISE MANUALLY

DRAWING NO. D-231970


STARTER MOTOR
EMERGENCY PUMP MOTOR
CHOKE
ALTERNATOR
AMP METER
EMERGENCY PUMP
GROUND IGNITION
PLATFORM START/THROTTLE
GROUND CHOKE/THROTTLE
OIL PRESSURE SENSOR
OIL PRESSURE GAUGE
MOVEMENT ALARM
HORN
TILT ALARM/HORN
TILT SENSOR
STARTER RELAY
IGNITION COIL
DISTRIBUTOR & IGNITION MODULE
HOUR METER
FUEL PUMP
FUEL (LOCK OFF)
LP (LOCK OFF)
TEMPERTURE SWITCH
OIL PRESSURE SWITCH
ENGINE START
PLATFORM POWER
DUMP VALVE
PUMP STROKE
JIB PIN SAFETY
THROTTLE SOLENOID
CHOKE
PENDANT
DEADMAN
AUX
TRAVEL
STEER
BOOM IN
BOOM OUT
JIB BOOM UP
JIB BOOM DOWN
(2) SPEED DRIVE
BOOM UP
BOOM DOWN
SWING RIGHT
SWING LEFT
FORWARD
REVERSE
MOVEMENT ALARM
STEER RIGHT
STEER LEFT
BOOM LIMIT SWITCHES
Y AXIS SWITCH CARD
HP V.E.P. CONTROLS & BOSCH PLUG JIB BOOM FORD 2.3 D-F ENGINE & AMP METER
SIMON-AERIALS INC.
ELECTRICAL SCHEMATIC
SDS 2338060



RP-40 V, E.P. CONTROLS

SIMON-AERIALS INC.
MILWAUKEE, WI. 53209

TITLE
ELECTRICAL SCHEMATIC

REVISION

DRWG. NO. D 235760