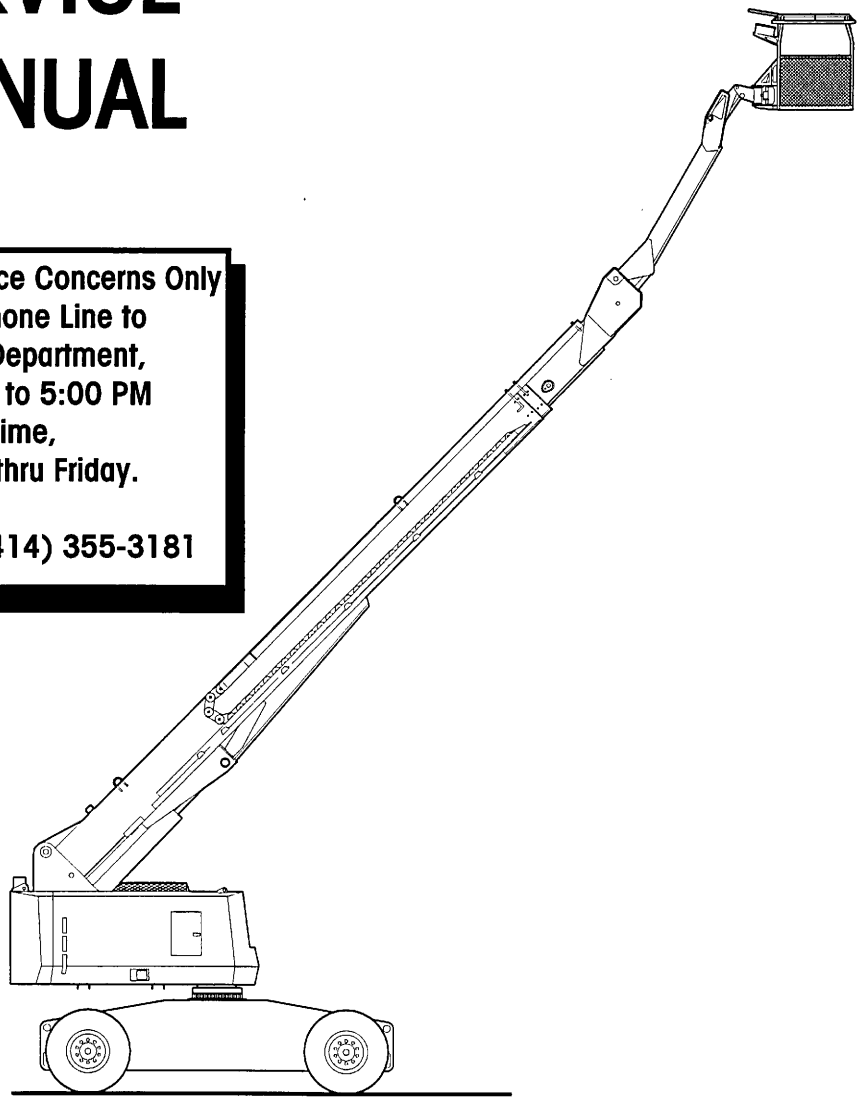
RP 86 "Reach Plus"

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



Art # A00.00179E

Part No. 89-186307 • Rev. "0.3" dated Dec. 1996 •

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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. RP86 Aerial Platform with full hydraulic 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 RP86, 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 unit prior to making any repairs. Exercise all necessary safety precautions when performing maintenance not covered in this manual.

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

⚠ DANGER

"DANGER" INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY. THIS SIGNAL WORD IS TO BE APPLIED 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 which could lead to property-damage-only accidents.

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

⚠ DANGER

MODIFICATIONS OF THIS MACHINE FROM THE ORIGINAL DESIGN 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.

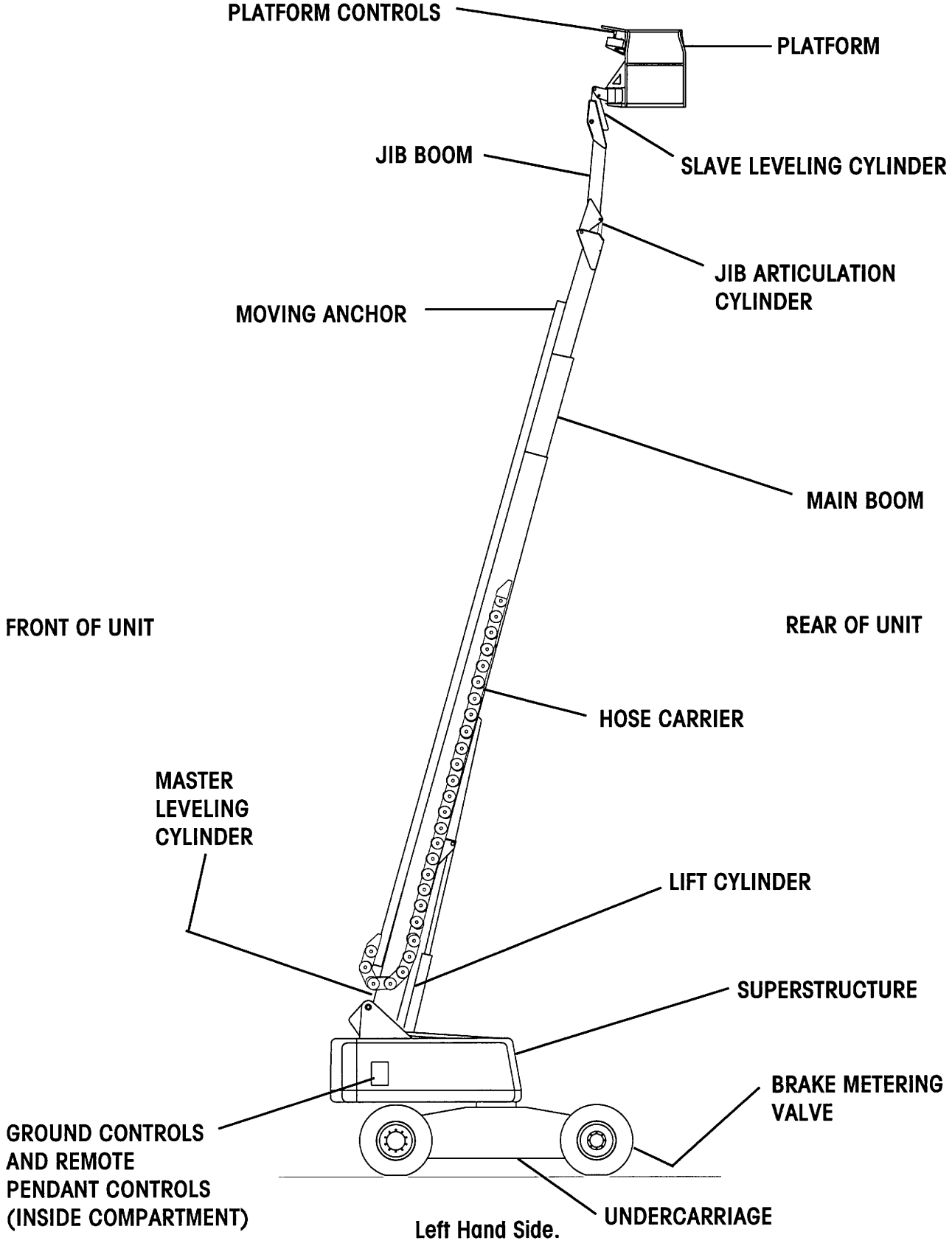
All Simon manuals are periodically updated to reflect changes that occur in the equipment. Please contact the factory with any questions you may have regarding your machine, or the availability of more recent manuals.

MACHINE SPECIFICATIONS

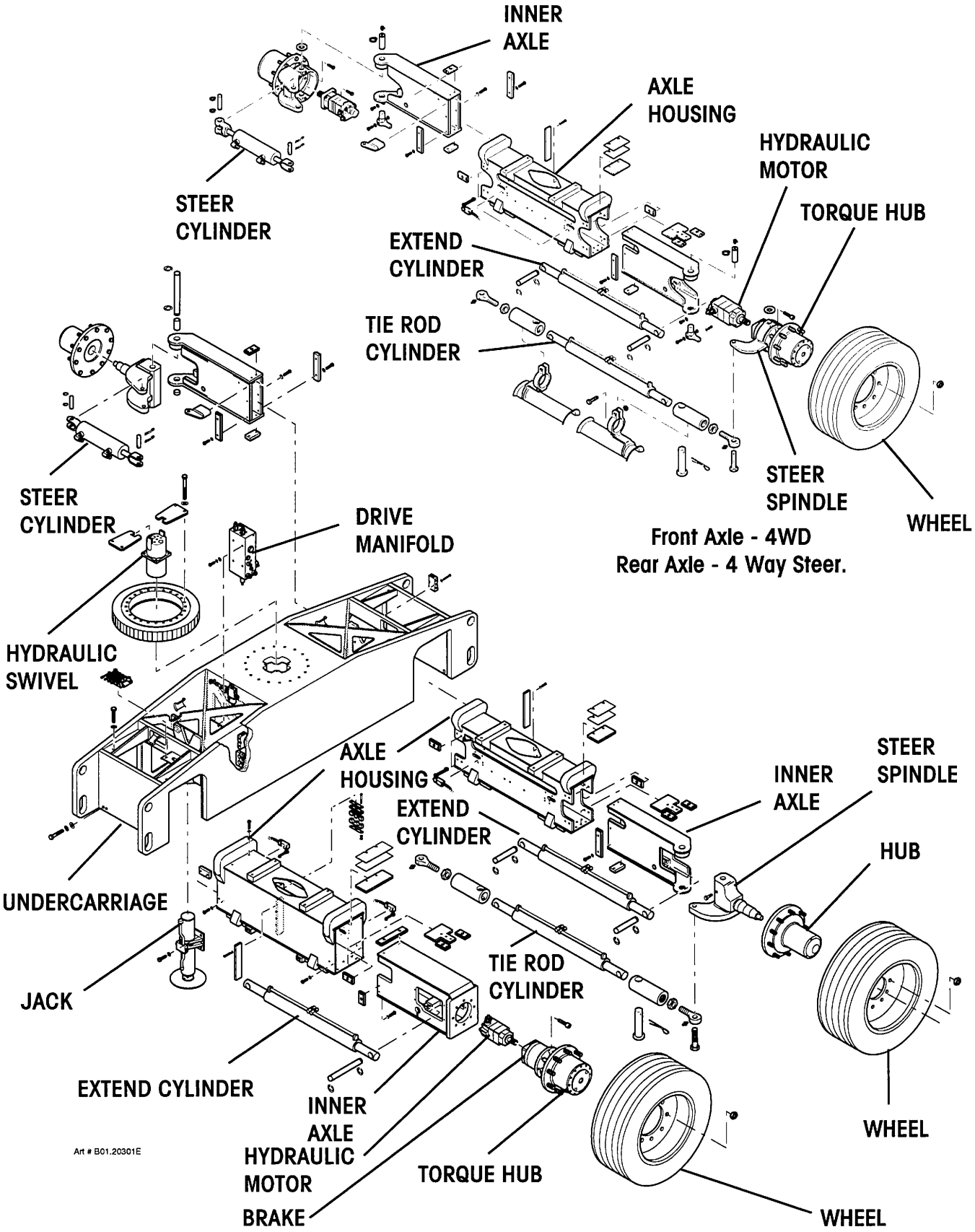
Working Height	**92 Ft /** 28.21 M
Platform Height	**86 Ft /** 26.21 M
Horizontal Reach (Boom Angle 0°)	**82 Ft /** 24.99 M
Platform Capacity (Unrestricted)	**550 LBs. /** 229 kg
Platform Size	**30 In. x 60 In. x 42 In. /** .76 M x 1.52 M x 1.07 M
Stowed Length	**36 Ft 6 In. /** 11.13 M
Stowed Height	**8 Ft 11 In. /** 2.72 M
Machine Width	
Without Axles Extended	**7 Ft 11 In./** 2.41 M
With Axles Extended	**10 Ft 6 In. /** 3.20 M
Wheelbase	**10 Ft /** 3.05 M
Ground Clearance	**10 In. /** 27 cm
Gross Weight (Approx.) (Note 1)	**31,500 LBs. /** 14,286 kg
Maximum Travel Speed:	
Boom Stowed (Note 1)	**3.9 MPH /** 6.3 KPH
Boom Extended or Elevated	**0.5 MPH /** 0.8 KPH
Turning Radius	
2 Wheel Steer	**26 Ft 2 In. /** 7.97 M
4 Wheel Steer	**14 Ft 1 In. /** 4.29 M
Gradeability (On Hard Surface) (Note 1)	
2 Wheel Drive	**12° /** 23%
4 Wheel Drive	**24° /** 45%
Platform Rotation	**180°**
Superstructure Rotation	**360° Non-continuous**
Tire Size	**15 x 19.5 - 14 Ply**
Tire Pressure (not applicable to foam filled tires)	**90 PSI /** 6.2 Bar / 6.3 kg-cm^2
Hydraulic Pressure (Maximum)	**3500 PSI /** 242 Bar / 247 kg-cm^2
Hydraulic Tank Capacity	**54 Gal. /** 204 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:	
Standard:	Ford CSG-649, 110 HP (82 Kw), Liquid Cooled, Gasoline
Optional:	Ford CSG-649, 110 HP (82 Kw), Liquid Cooled, Dual Fuel
	Deutz F4L912, 71 HP (53 Kw), Air Cooled, Diesel
	Perkins 4.236, 81 HP (60 Kw), Liquid Cooled, Diesel
	Isuzu C-240, 56 HP (41.7 Kw), Liquid Cooled, Diesel
Swing Bearing Bolt Torque (Lubricated)	**280 Ft LBs. /** 380 Nm / 38.7 kg-m
Wheel Lug Nut Torque (Lubricated)	**220 Ft LBs. /** 298 Nm / 30.4 kg-m
Drive Hub Bolt Torque	**170 Ft LBs. /** 231 Nm / 23.5 kg-m

Note 1: Weight and performance shown represent typical units, 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 unit.

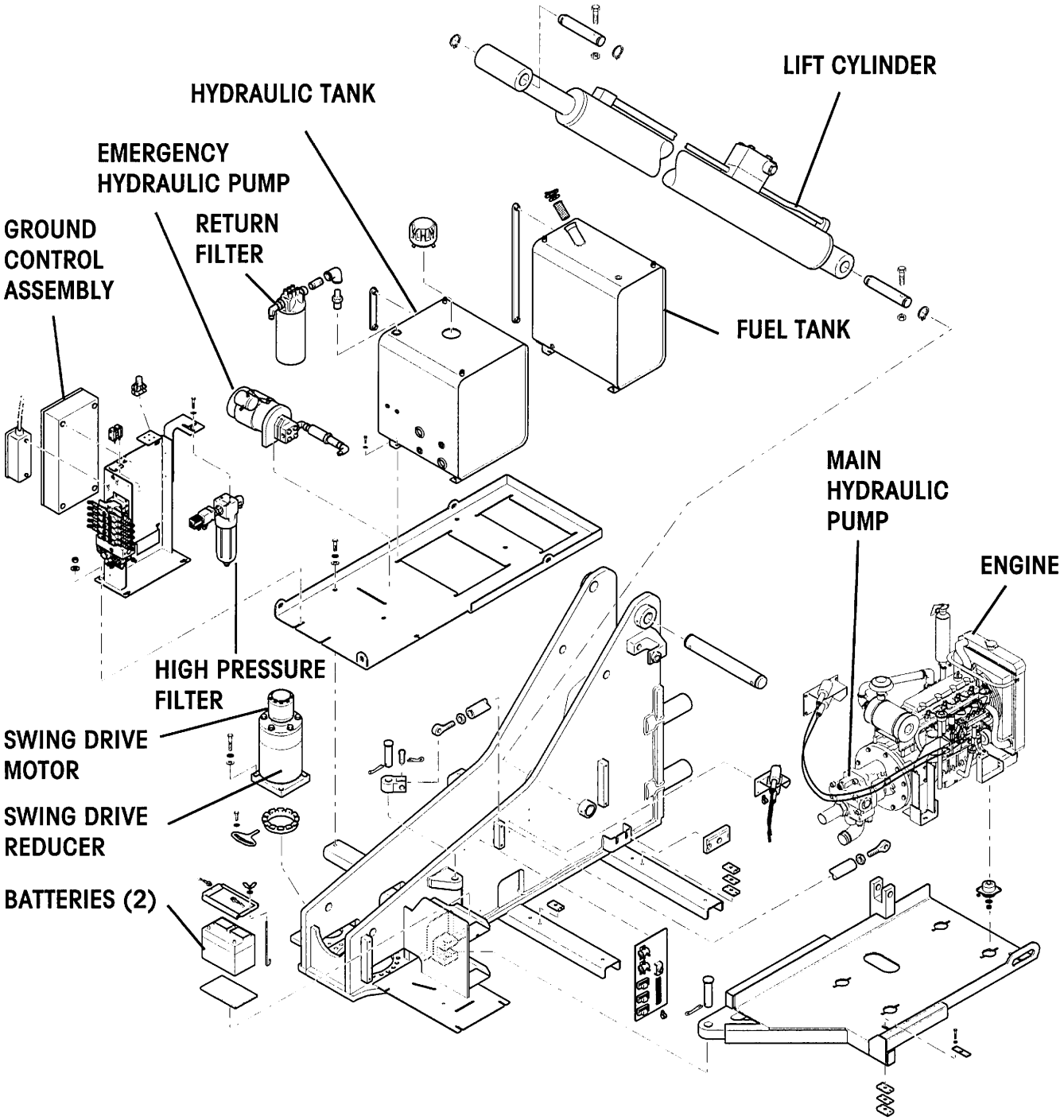
MACHINE COMPONENT LOCATOR



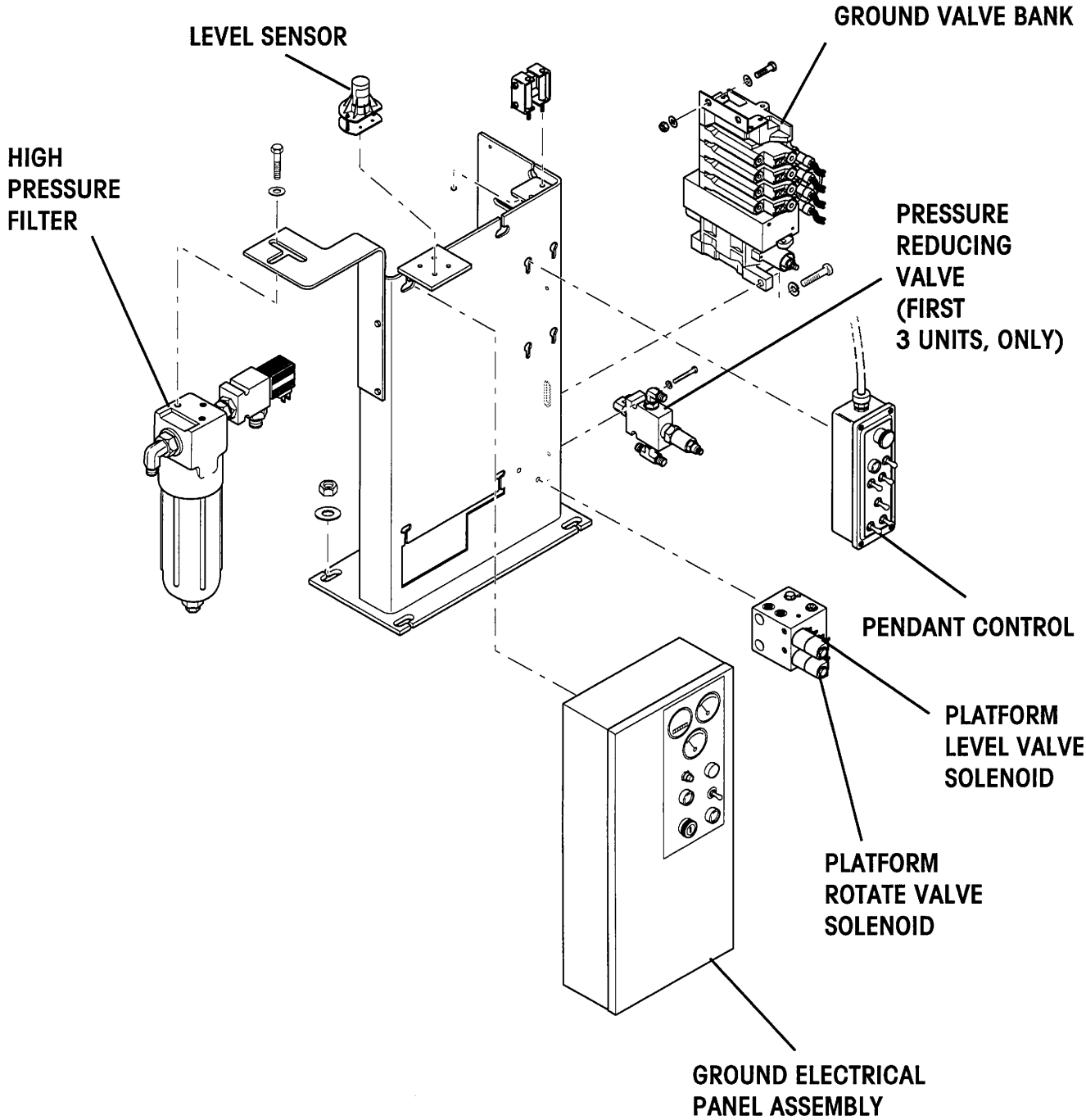
UNDERCARRIAGE COMPONENT LOCATOR



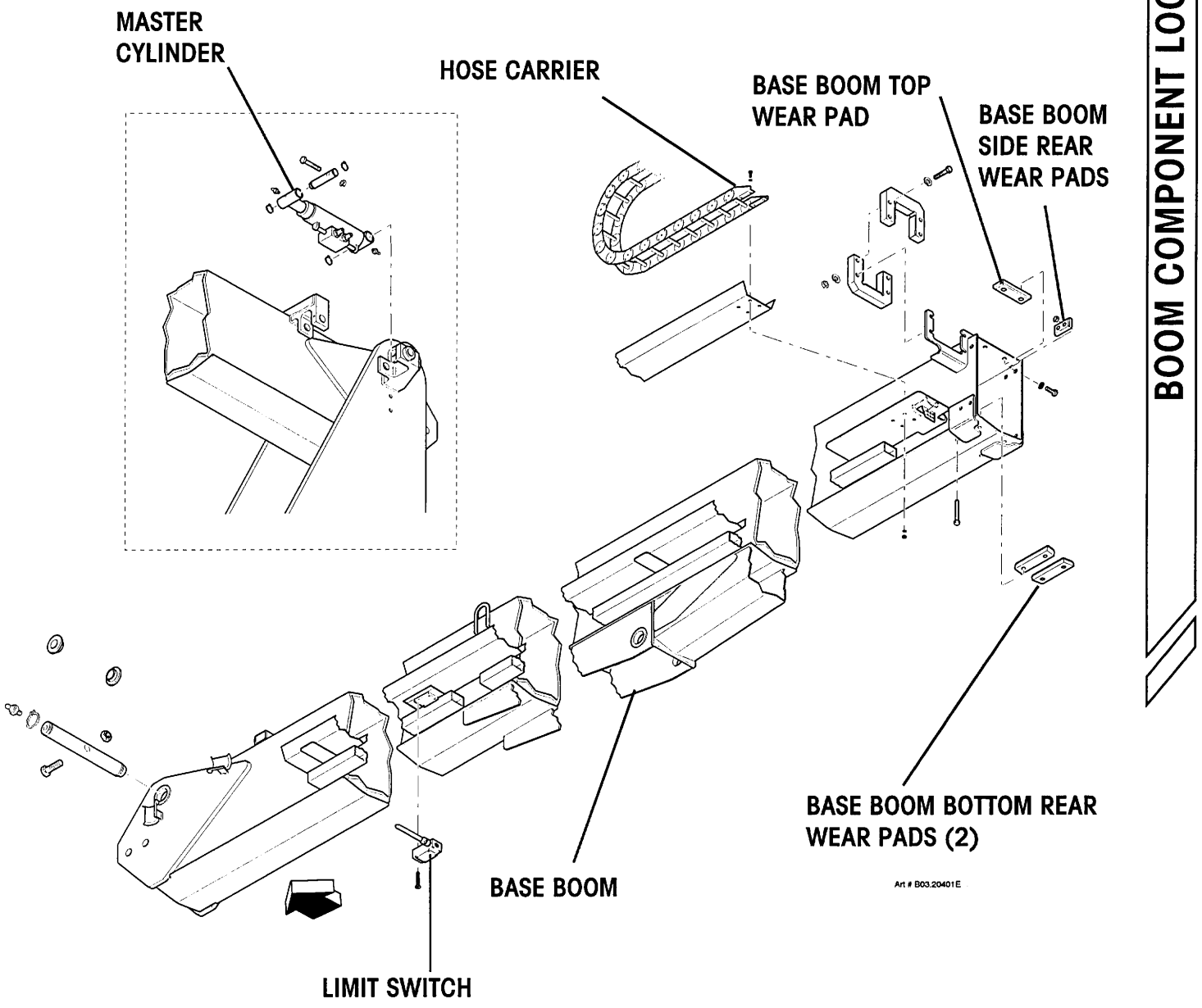
SUPERSTRUCTURE COMPONENT LOCATOR



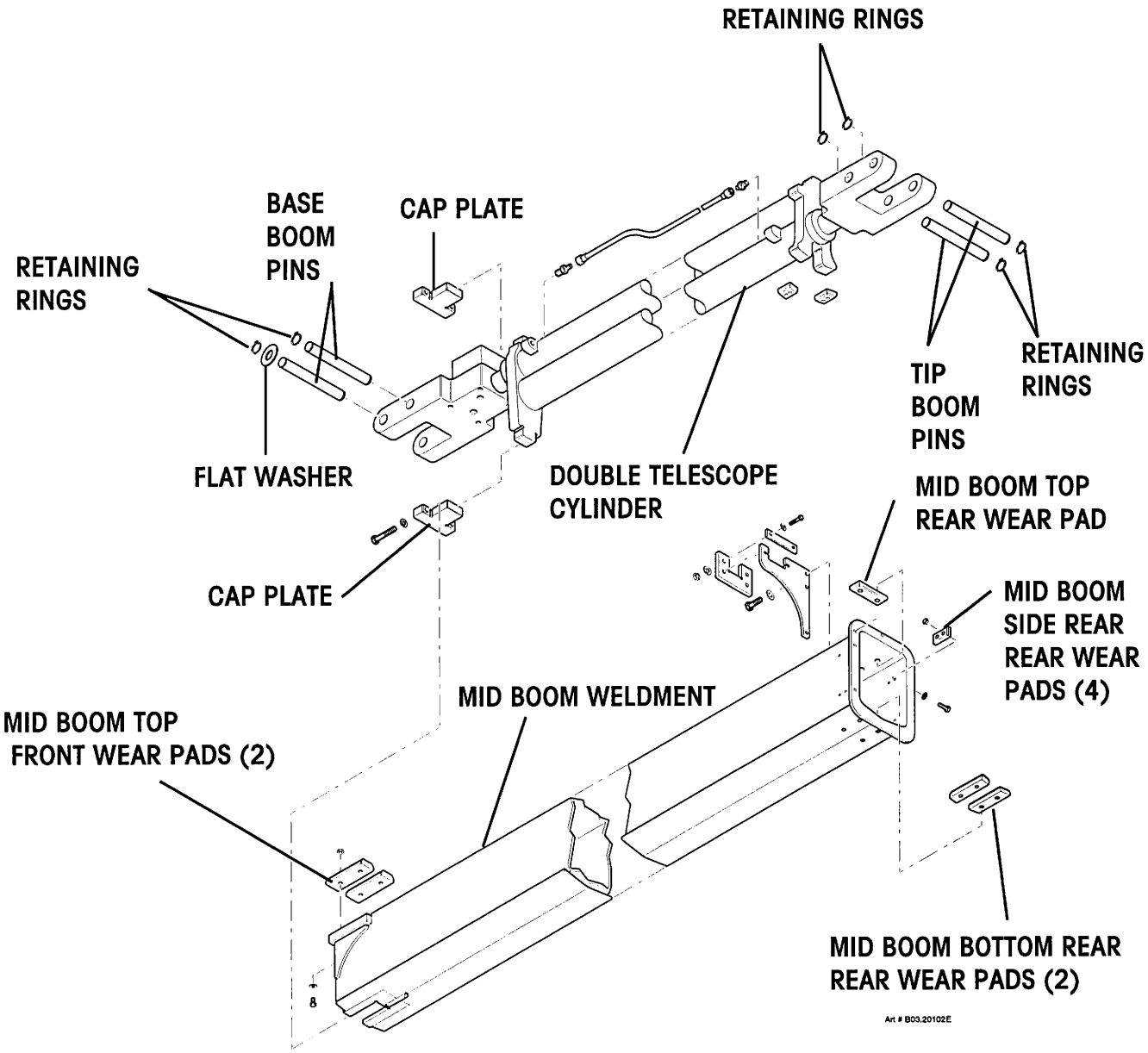
SUPERSTRUCTURE COMPONENT LOCATOR



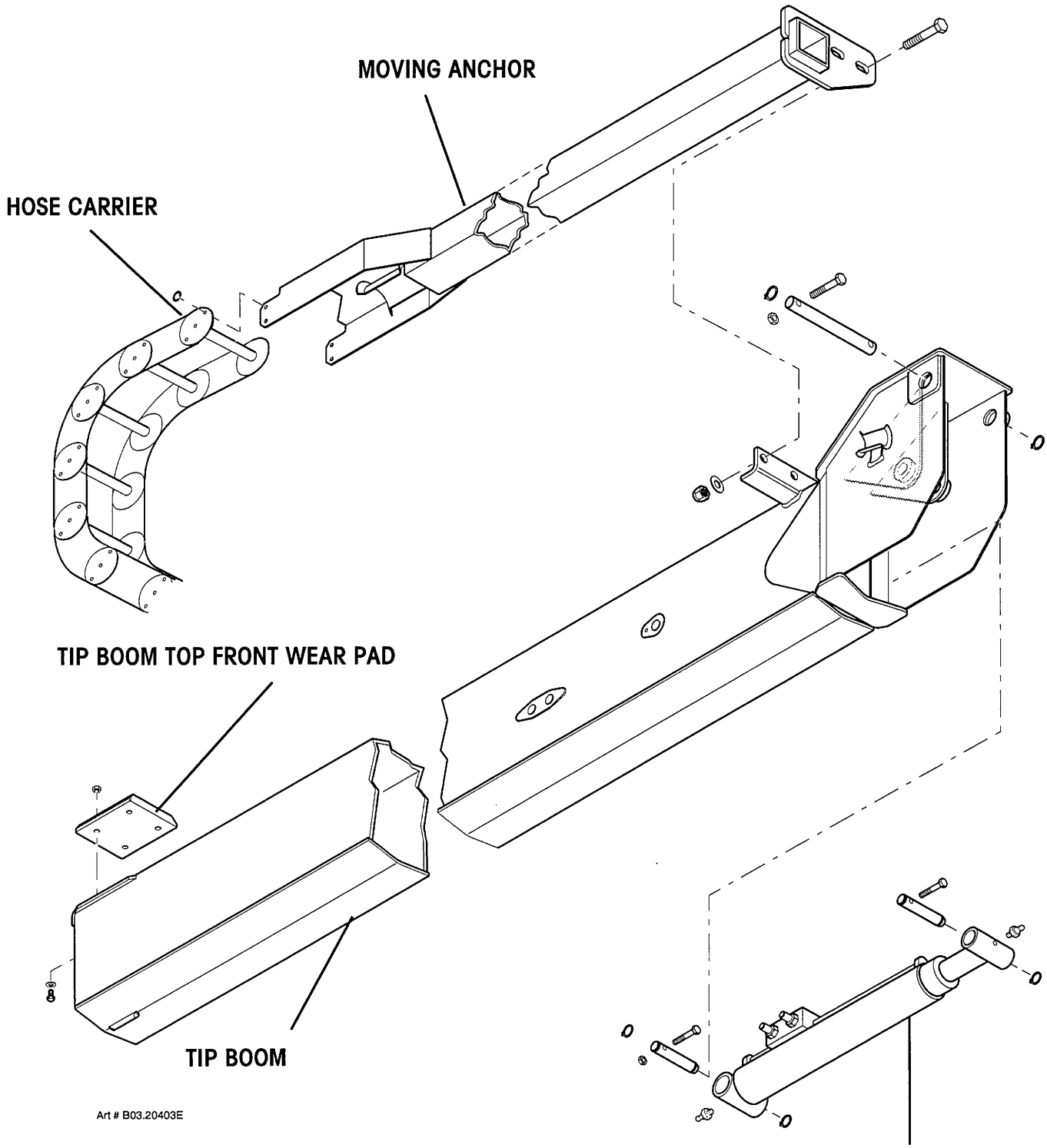
BASE BOOM COMPONENT LOCATOR



MID BOOM COMPONENT LOCATOR

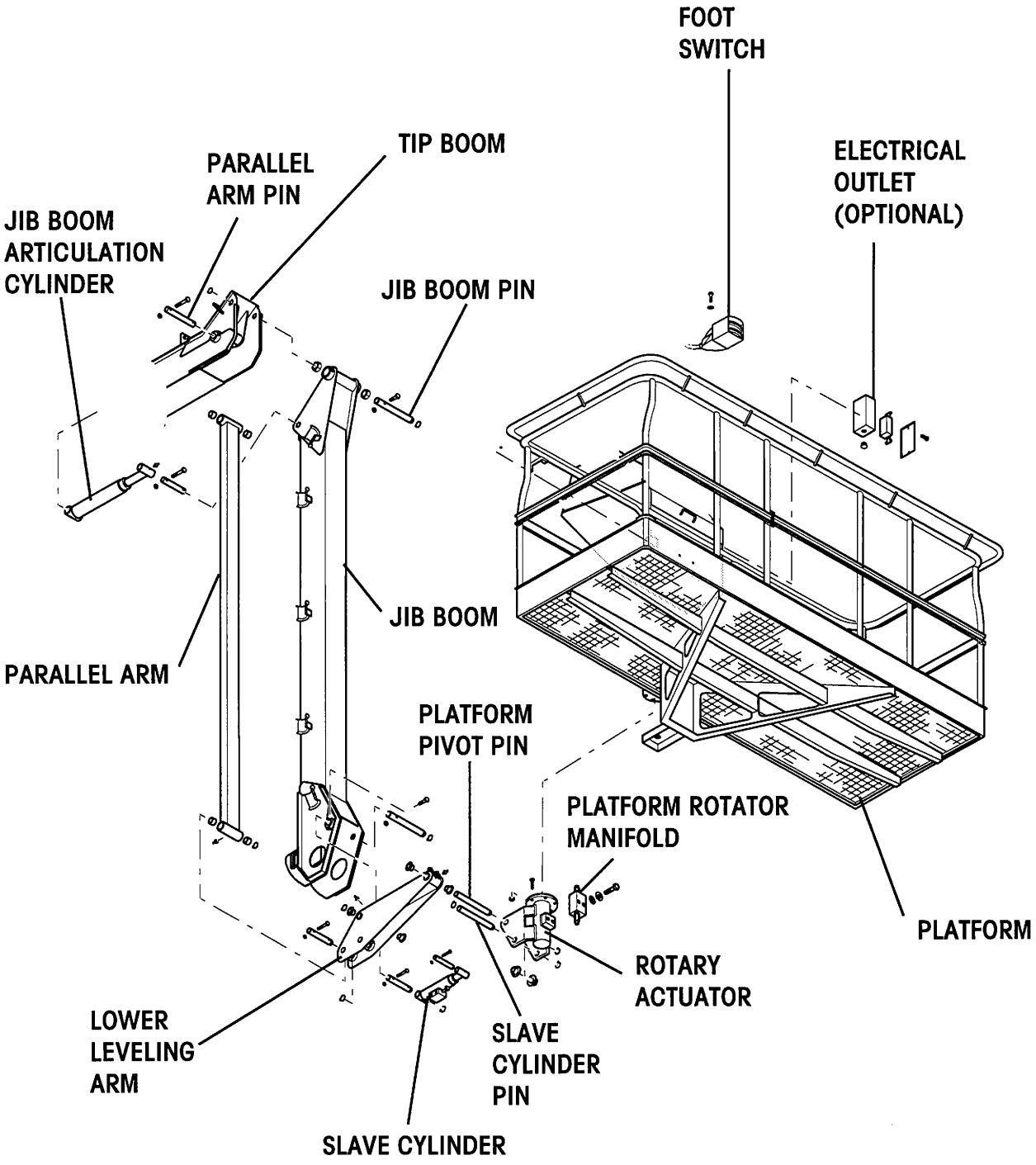


TIP BOOM COMPONENT LOCATOR

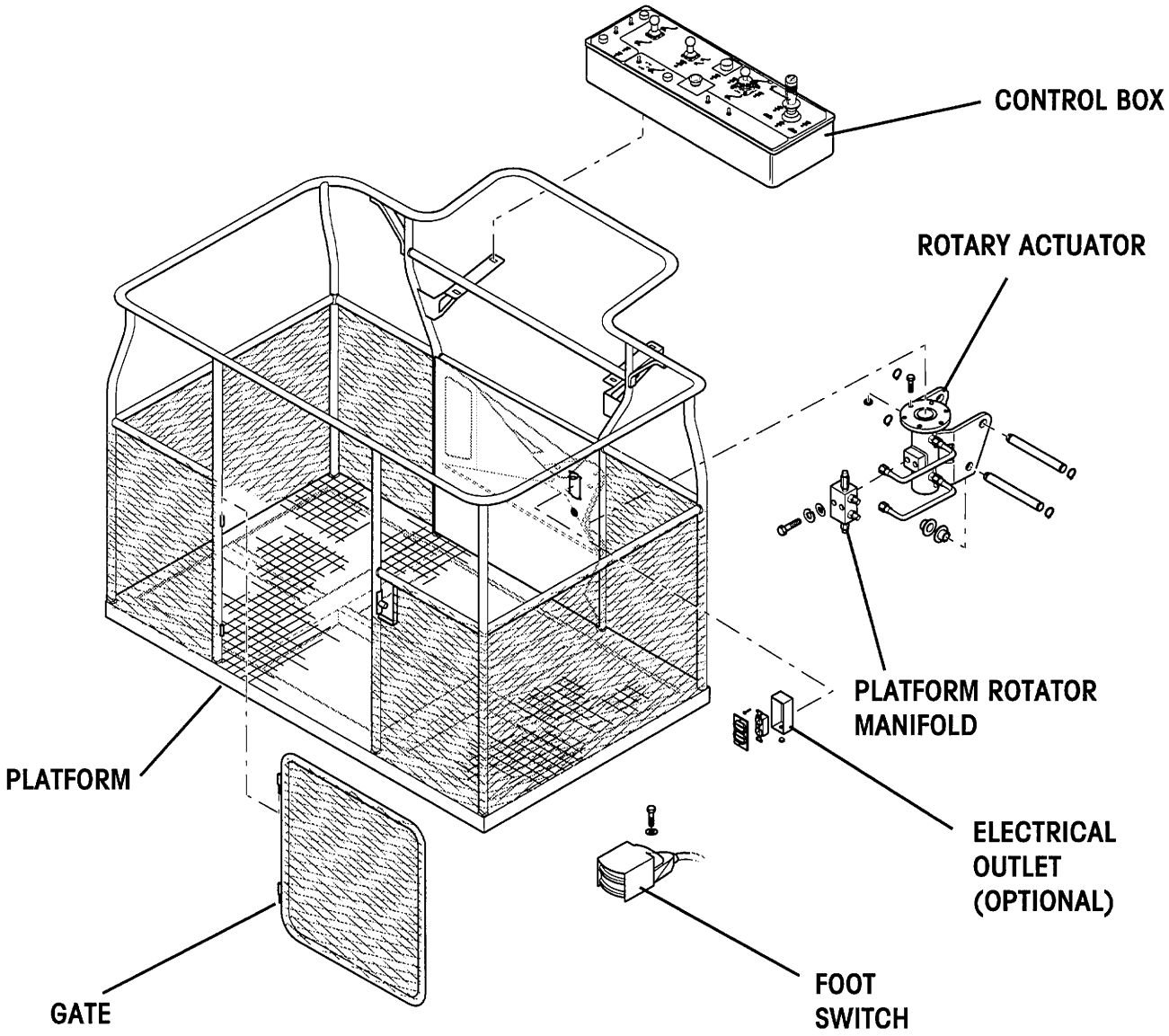


Art # B03.20403E

JIB 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 level & condition each shift. Analyze 6 months or 500 hours.*† Change yearly or 1000 hours.*†
2.	Hydraulic filters	Filter elements.	Change 6 months or 500 hours.*†
3.	Swing bearing (standard open style)	Lithium N.L.G.I. #2 EP. Purge old grease.	Weekly or every 25 hours.*†
4.	Exposed swing bearing gear teeth	Dry moly lube spray.	Every six (6) months or 500 hours.*†
5.	"Oil bath" swing bearing (optional)	SAE 80 W 90	Check monthly or every 100 hours.*† Change if contaminated.
6.	Swing drive gear box	Fill to plug. SAE 140 EP or N.L.G.I. #00 EP oil.	Check monthly or every 100 hours.*† Change every two (2) years or 2,000 hours.*
7.	Boom pivot pins and Cylinder pins	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
8.	Wheel bearings	Lithium N.L.G.I. #2 EP. Clean and repack.	Change every six (6) months or 500 hours.*†
9.	Steering spindles	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
10.	Steering linkage	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
11.	Steering tie rod ends	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
12.	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.*†
13.	Boom wear pads	Silicone spray.	Monthly or every 100 hours.*†

* Whichever occurs first.

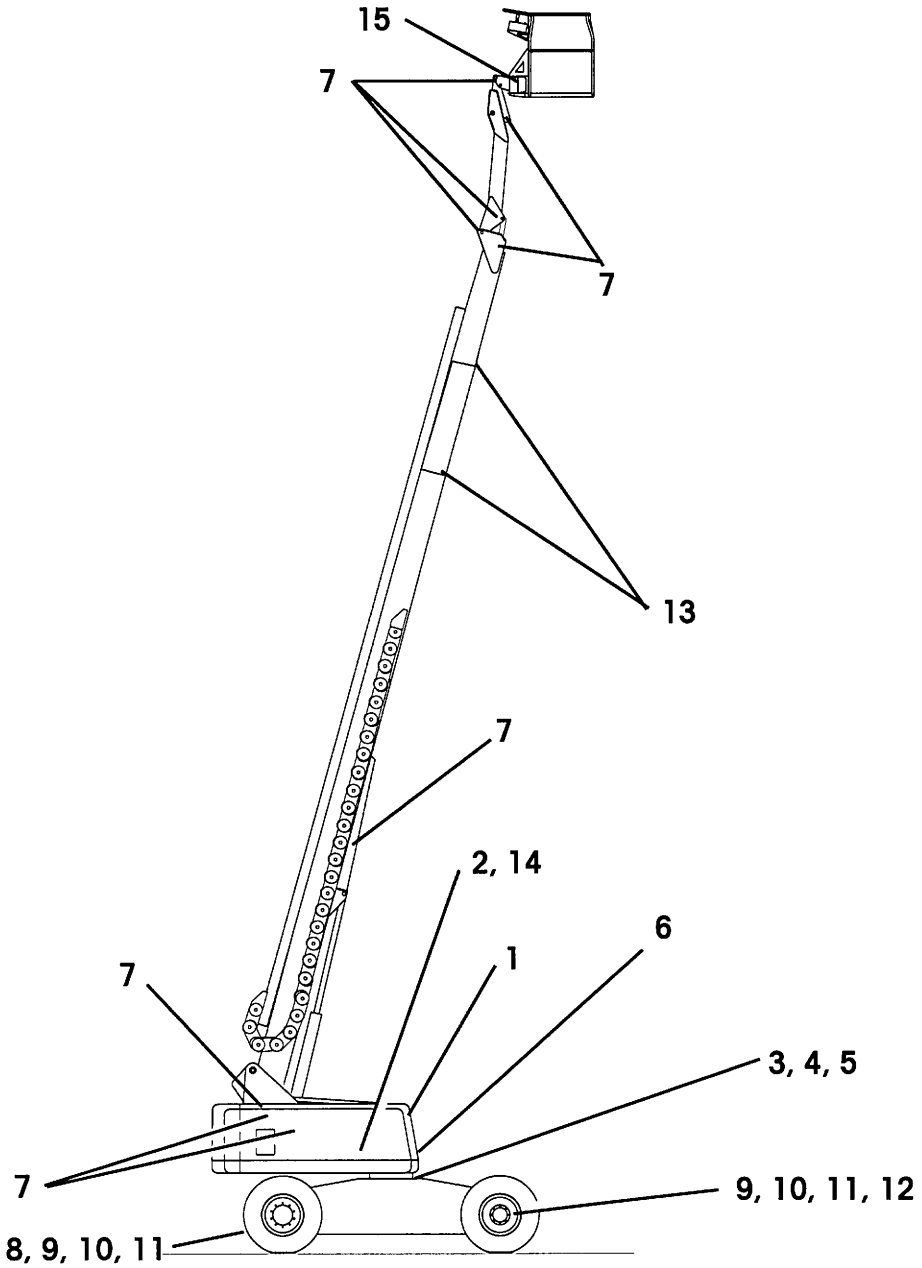
† Different requirements for severe duty applications. See check lists.

LUBRICATION CHART (CONTINUED)

NO.	ITEM	SPECIFICATION AND QUANTITY	FREQUENCY OF LUBRICATION
14.	Valve spool linkage	WD 40 Spray or equivalent penetrating oil.	Monthly or every 100 hours.*
15.	Platform rotate mechanism	Hydraulic fluid.	Yearly.

* Whichever occurs first.

† Different requirements for severe duty applications. See check lists.



SECTION 1: TRANSPORTATION AND EMERGENCY PROCEDURES

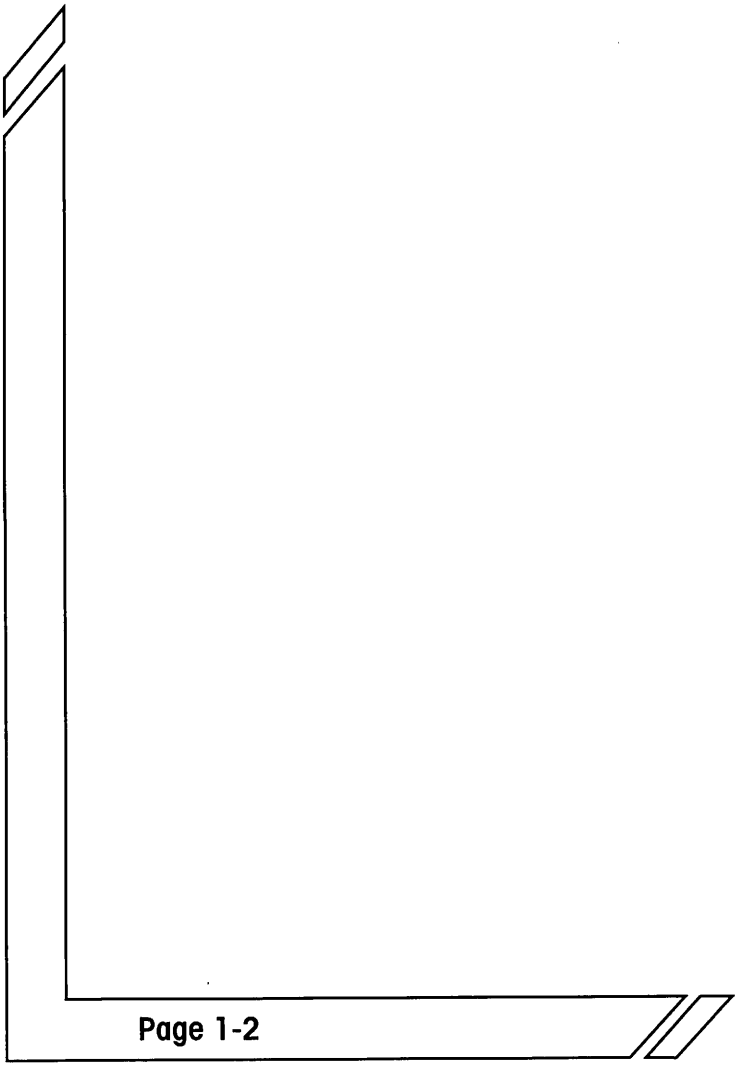


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TRANSPORTING THE UNIT

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 RP to a tow vehicle with the tow bar provided.
- Disengage torque hubs:

⚠WARNING

WHENEVER DISENGAGING THE DRIVE TORQUE HUBS OR BEFORE DISCONNECTING FROM TOWING VEHICLE, ENSURE THAT THE UNIT 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 RP. Tow speed shall not exceed 3 MPH (4.8 KPH).

TRUCK OR TRAILER TRANSPORT

⚠WARNING

ALWAYS ATTACH THE UNIT 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.

1. Enter the platform, secure the safety gate, and start the engine using the platform controls. Select the engine "OPERATING SPEED".
2. Raise the main and jib booms 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 unit 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.

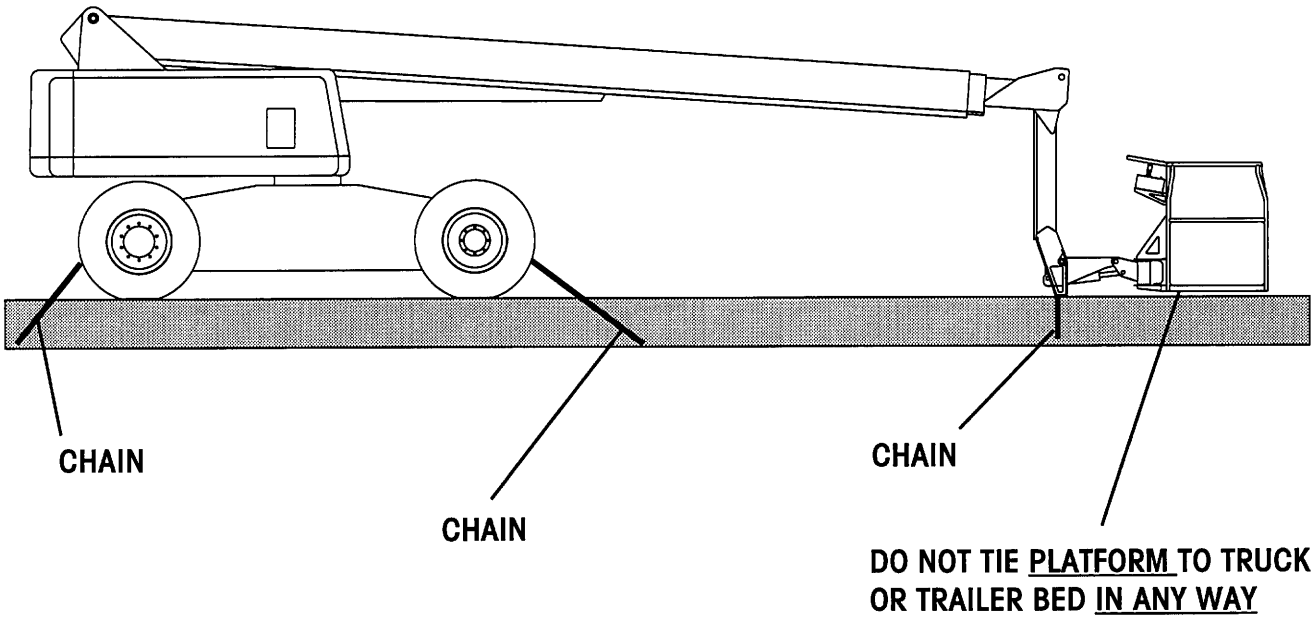
⚠ CAUTION

To avoid damaging the unit, 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 Unit (Recommended Method).

UNLOADING PROCEDURES

⚠WARNING

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

- Inspect the outside of the unit for damage (including the underside). Inspect all hoses, boom sections and cables for chafing or road damage. Confirm that all wheel lug nuts and swing bearing bolts are tight (refer to specifications).
- Remove the pin that locks the superstructure to the undercarriage near the swing bearing. Stow the lock pin in the location provided nearby.
- Unlock and open both side compartment doors. Inspect all fuel, electrical and hydraulic connections for damage and security.
- Connect battery cables to batteries if required. Check electrolyte level.
- Check engine oil level, and add as required per engine manufacturer's recom-mendations.
- 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.
- Close side compartment doors.
- Attach the unit to a winch for the unloading procedure.

⚠WARNING

ALWAYS ATTACH THE UNIT 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.

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

- Switch the "GROUND/ PLATFORM" key switch to "GROUND". Start engine, using the ground controls.

NOTE: Refer to Startup Procedures and Operator Controls Descriptions in this section.

While pressing the "DEADHEAD" button on the remote pendant controls, press and hold the "JIB UP" toggle. This is called "deadheading", and will lead to maximum system pressure registering on the gauge at the ground control valve assembly. Check the hydraulic pressure (see Machine Specifications). Turn off engine.

- Remove all machine tie downs (see Transporting the Unit). Remove wheel chocks, if used. Switch the "GROUND/ PLATFORM" key switch to "PLATFORM".

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

- Raise the boom and the jib so that the platform will clear any obstacles as the machine is driven down the loading ramp.

- Carefully drive the unit off the truck or trailer with the assistance of a winch.

  NOTE: The brakes are automatically released for driving, and will automatically apply when the unit stops.

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

EMERGENCY SYSTEM AND PROCEDURES

⚠ DANGER

IF THE UNIT FAILS TO OPERATE WHEN THE PLATFORM IS RAISED OR EXTENDED, DO NOT ATTEMPT TO CLIMB DOWN THE BOOM ASSEMBLY. SERIOUS INJURY MAY RESULT.

EMERGENCY PUMP

The RP has an emergency pump which can be operated from the operator's platform or ground controls to safely return the platform to the ground position when the unit has lost engine/ pump power. **Operation from the ground controls overrides platform controls.**

- Press and hold the "PUMP" toggle to "EMERGENCY" on the remote pendant controls, **OR**
- Press and hold the "EMERGENCY PUMP" button on the platform control console.

Select the proper function (boom retract, boom lower, or swing) as required to safely lower the platform to ground level.

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

UNPOWERED EMERGENCY MOVEMENT

- Every attempt should be made to restore engine/ pump power to the unit before using this procedure.

⚠ DANGER

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

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

1. Secure the unit with chains or ropes.

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

⚠ WARNING

ALWAYS CHOCK THE WHEELS BEFORE YOU RELEASE THE BRAKES TO PREVENT UNEXPECTED UNIT MOVEMENT ON SLOPES.

2. Chock wheels.
3. Close brake circuit needle valve located at the center rear of the undercarriage.
4. Disengage torque hubs:

⚠WARNING

WHENEVER DISENGAGING THE DRIVE TORQUE HUBS OR BEFORE DISCONNECTION FROM TOWING VEHICLE, ENSURE THAT THE UNIT 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.

5. Disconnect steer cylinder.

After unchocking the wheels, the unit will be ready to be moved.

After engine/ pump power has been restored to the machine, engage the torque hubs, reset the brake circuit needle valve, and connect steer cylinder. The machine is now ready for normal operation.

EMERGENCY LOWERING

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

When faced with an emergency, **above all please remember:**

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

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

POSSIBLE CONDITION:

- One or more functions not operating correctly.
- Unit movement from unselected control lever.
- Unit 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: Unit elevated, with operator incapacitated at platform controls.

⚠ DANGER

DO NOT TOUCH UNIT !!!

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

CORRECTIVE ACTION

1. 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 UNIT !!!!

ELECTROCUTION HAZARD!!!

CORRECTIVE ACTION

1. Contact authorized personnel to disconnect power supply touching unit.
2. Have someone summon first aid or rescue squad.
3. If operator is unconscious, check to see if he is in a pinned position, or would be endangered if platform is moved.
4. **AFTER POWER IS CUT,** use the emergency lowering 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 FLUID 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 ensure that you receive accurate recommendations about the fluid being analyzed, always provide the following information with the test sample.

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

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

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

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

SYSTEM FLUSHING PROCEDURE

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

When the hydraulic tank is empty, remove suction hoses and return line hose. Remove all hoses between pump and high pressure filter. Flush the hoses. Remove hydraulic fluid filter, and flush the filter body and attaching hoses. Discard old filter element and replace.

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

Fill hydraulic tank with filtered, fresh hydraulic fluid (refer to Lubrication Chart).

Make sure the suction lines are open to allow fluid to flow to the hydraulic pump. Loosen hose fittings at pump to allow pump to flood with hydraulic fluid, then tighten pump fittings.

Turn the main power key switch to the "GROUND" position. Press engine start button to start engine. After a brief warmup period, select the "HIGH" engine RPM setting. Briefly cycle all boom functions to flush the hydraulic components of the hydraulic fluid. Use care when doing this as hydraulic fluid is now being returned to container provided. This will remove old fluid from the hydraulic system as the boom is cycled to its maximum limits.

⚠ CAUTION

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

Three cycles of <u>all</u> hydraulic cylinder functions should remove old hydraulic fluid.

When the above procedures have been completed, re-connect system return hose to tank. Fill hydraulic tank to full mark on sight gauge. Operate all functions to their full extreme positions to ensure proper operation. Check for leaks and correct as necessary. Unit 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

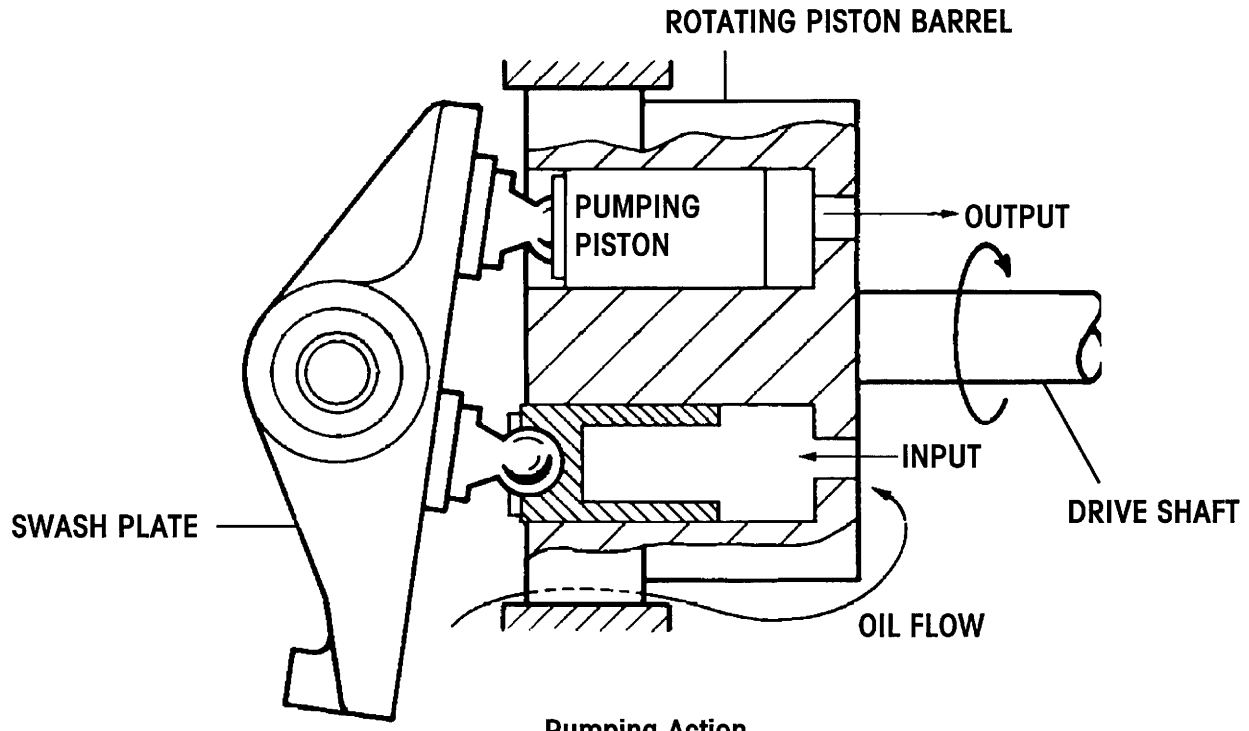
With no function activated, hydraulic fluid flows from the hydraulic reservoir to the pump, to the high pressure filter, then to the valve bank assembly and back to the hydraulic reservoir. When the operator moves a control lever, this initiates the electrical signal to the proper solenoid of the valve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

MAIN HYDRAULIC PUMP

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.



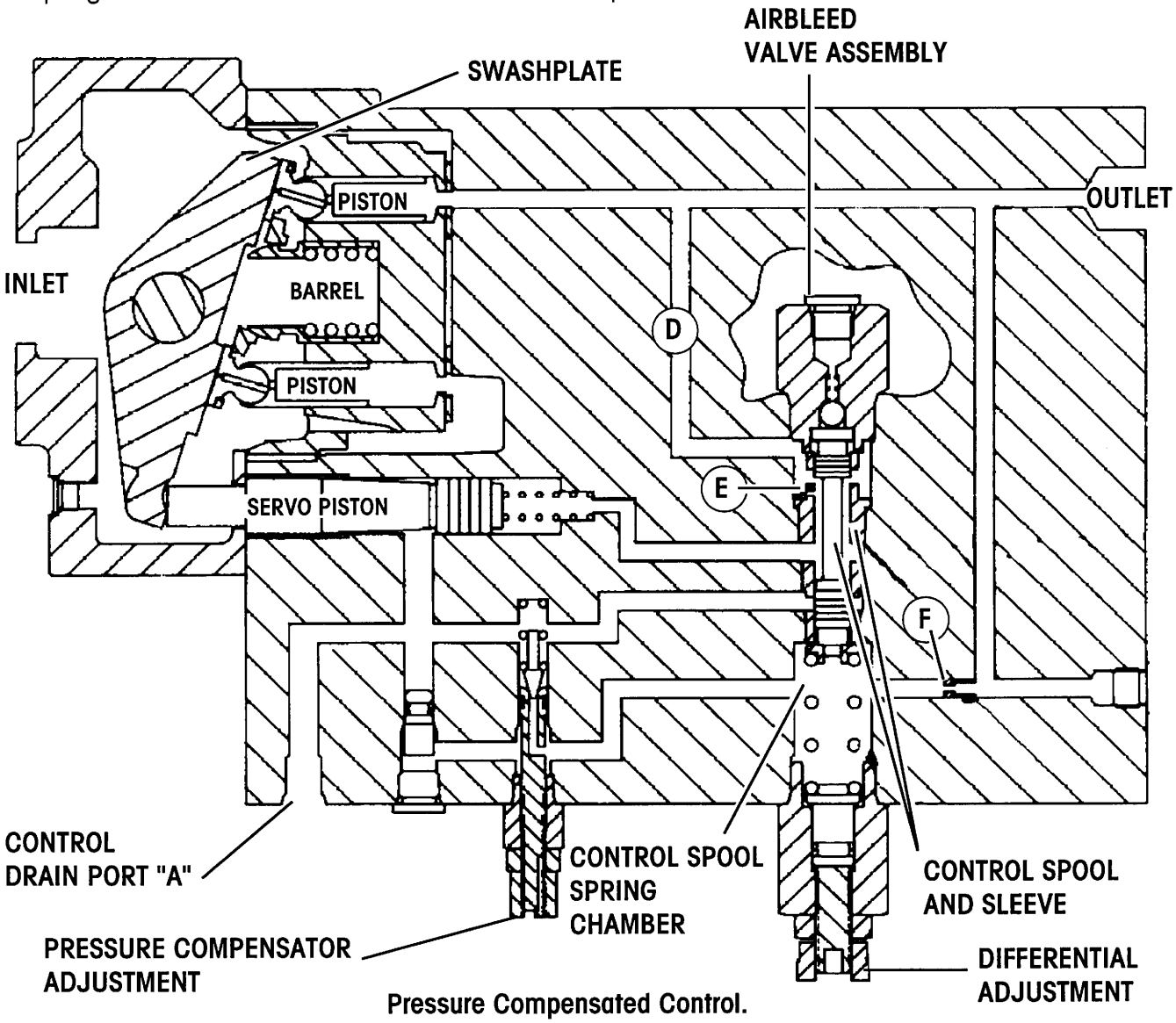
Pumping Action.

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 the 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.



Pressure Compensated Control.

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.

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.

MAIN PUMP REPLACEMENT

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

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 air-tight. 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.

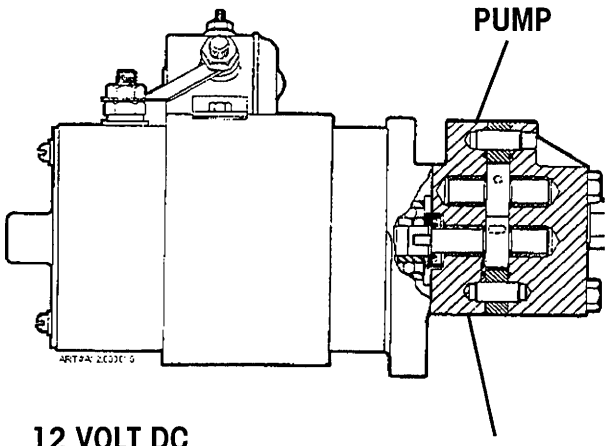
EMERGENCY PUMP

The emergency pump is driven by a 12 volt DC electric 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.

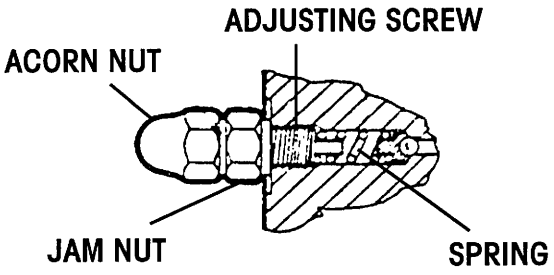
NOTE: This pump should only be used in emergency situations.

EMERGENCY PUMP ADJUSTMENT

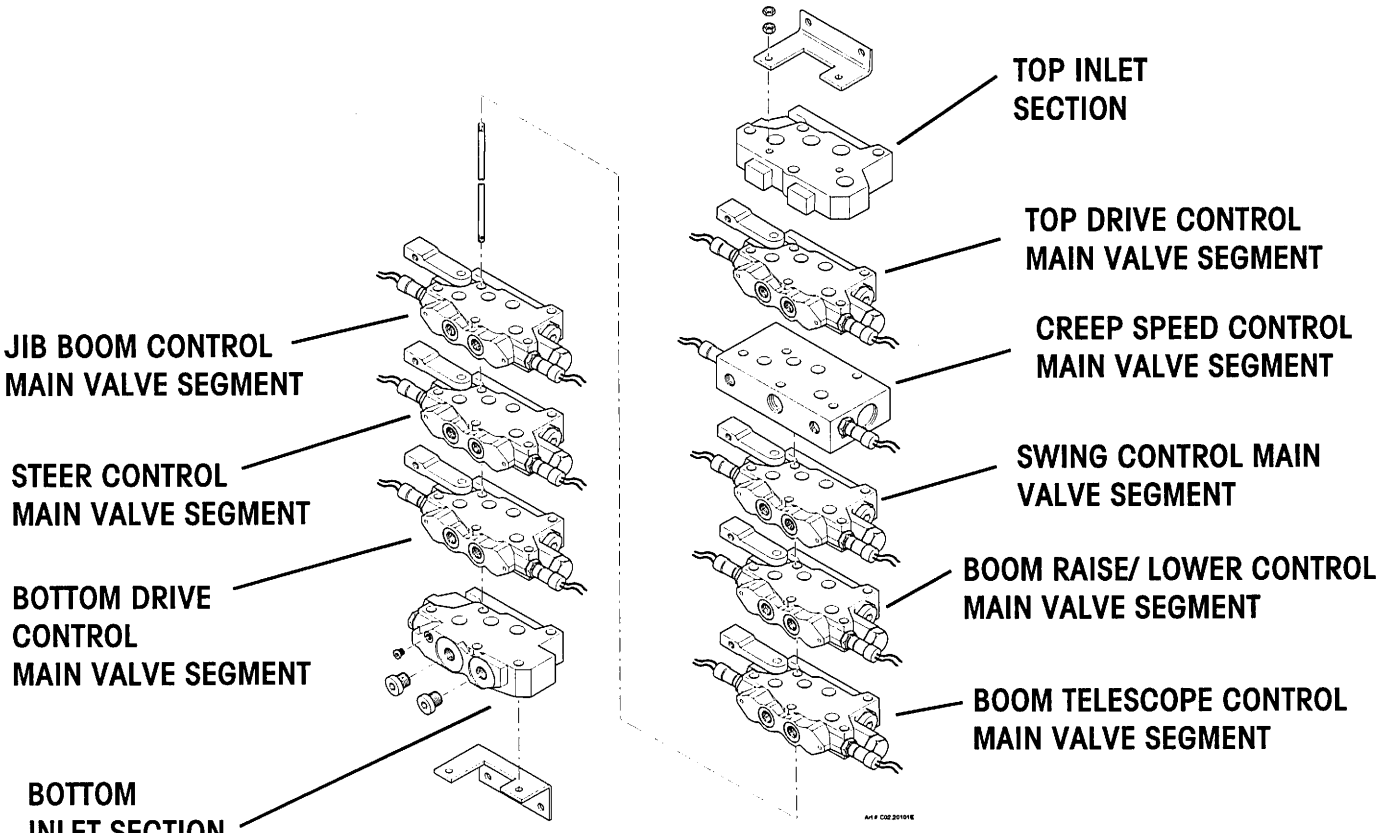
The emergency pump pressure setting screw is located on the side of the adapter plate. To adjust the relief pressure on the pump, remove the acorn nut, loosen the jam nut and turn the adjusting screw in to increase pressure. To decrease pressure, turn the adjusting screw out. (See "Machine Specification"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



Emergency Pump.



Emergency Pump Adjustment.



Ground Valve Bank Assembly.

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 reservoir.

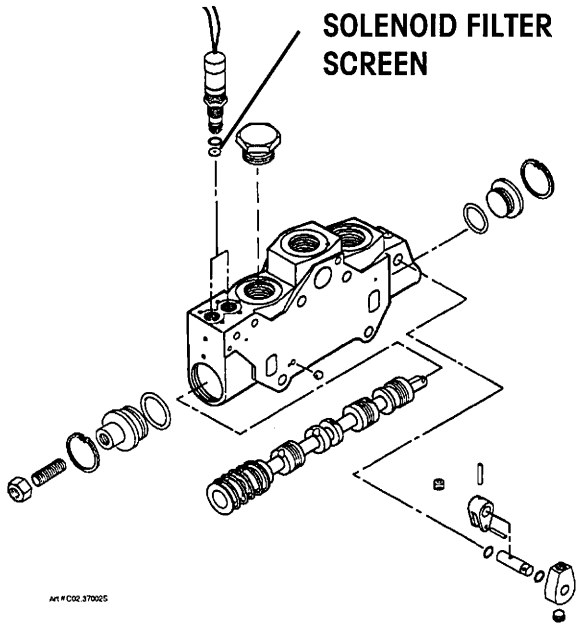
MAIN VALVE SEGMENT

There are two types of main valve segments. The bottom valve segment is for the drive function. The five top valve segments are for the swing, main boom lift, telescope, jib boom 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. The valves require no adjustment and seal kits are available (see Illustrated Parts Catalog).

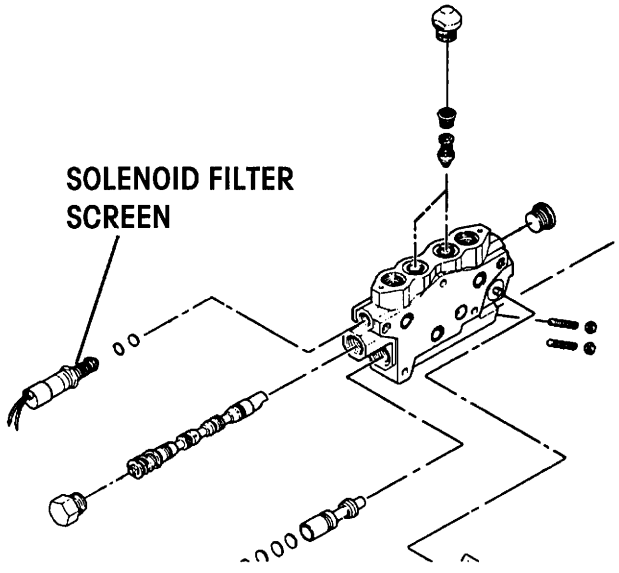
OPERATION

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



Drive Control Main Valve Segment.

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.



Steer, Telescope, Jib Boom, Main Boom and Swing Control Main Valve Segments.

MAINTENANCE

Hydraulic Circuit Line Check

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

Tighten loose fittings and correct any crimped 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 the pump suction line.

Main Valve Segment

The main valve segment contains two filter elements of which one requires maintenance. The solenoid filter screen on the inlet section is the filter element that requires cleaning. Remove and clean trapped contaminants using compressed air from the inside out. Replace damaged filter element.

DRIVE VALVE MANIFOLD - TWO WHEEL DRIVE

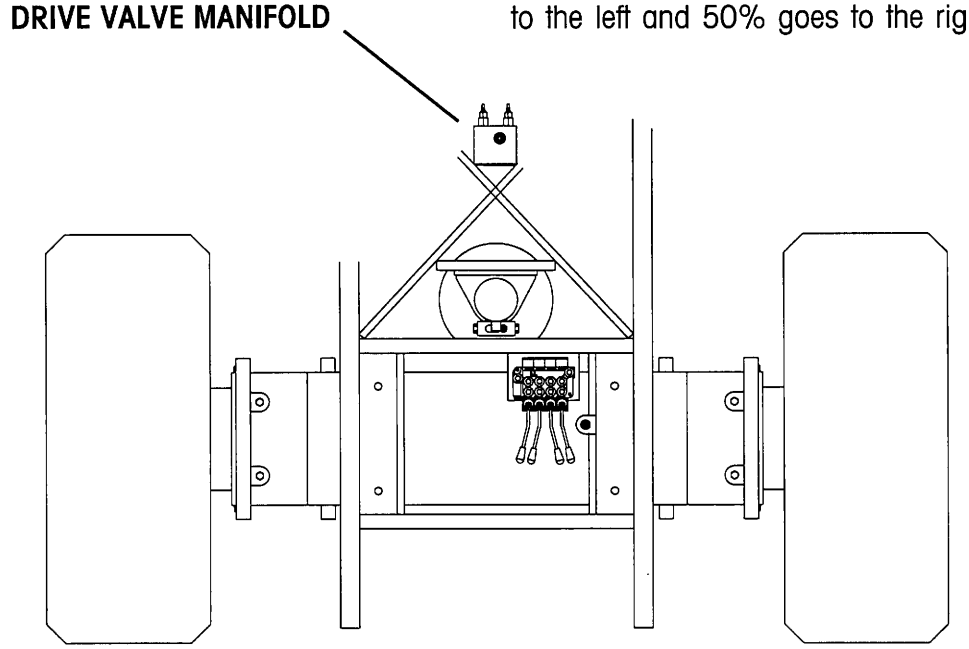
NOTE: Refer to "Machine Specifications" for maximum system pressure.

HI SPEED DRIVE ENABLE VALVE

The hi speed drive enable valves are 2 position, 2 way solenoid valves that bypass the flow divider valve and are used to control the fluid flow for travel speed. The valves require no adjustment and seal kits are available (see Illustrated Parts Catalog).

FLOW DIVIDER/ COMBINER VALVE

In the forward direction, this valve divides flow, and in the reverse direction it combines the flow. The single flow divider directs the flow so that 50% goes to the left and 50% goes to the right. The valve



Drive Valve Manifold Location.

requires no adjustment and a seal kit is available (see Illustrated Parts Catalog).

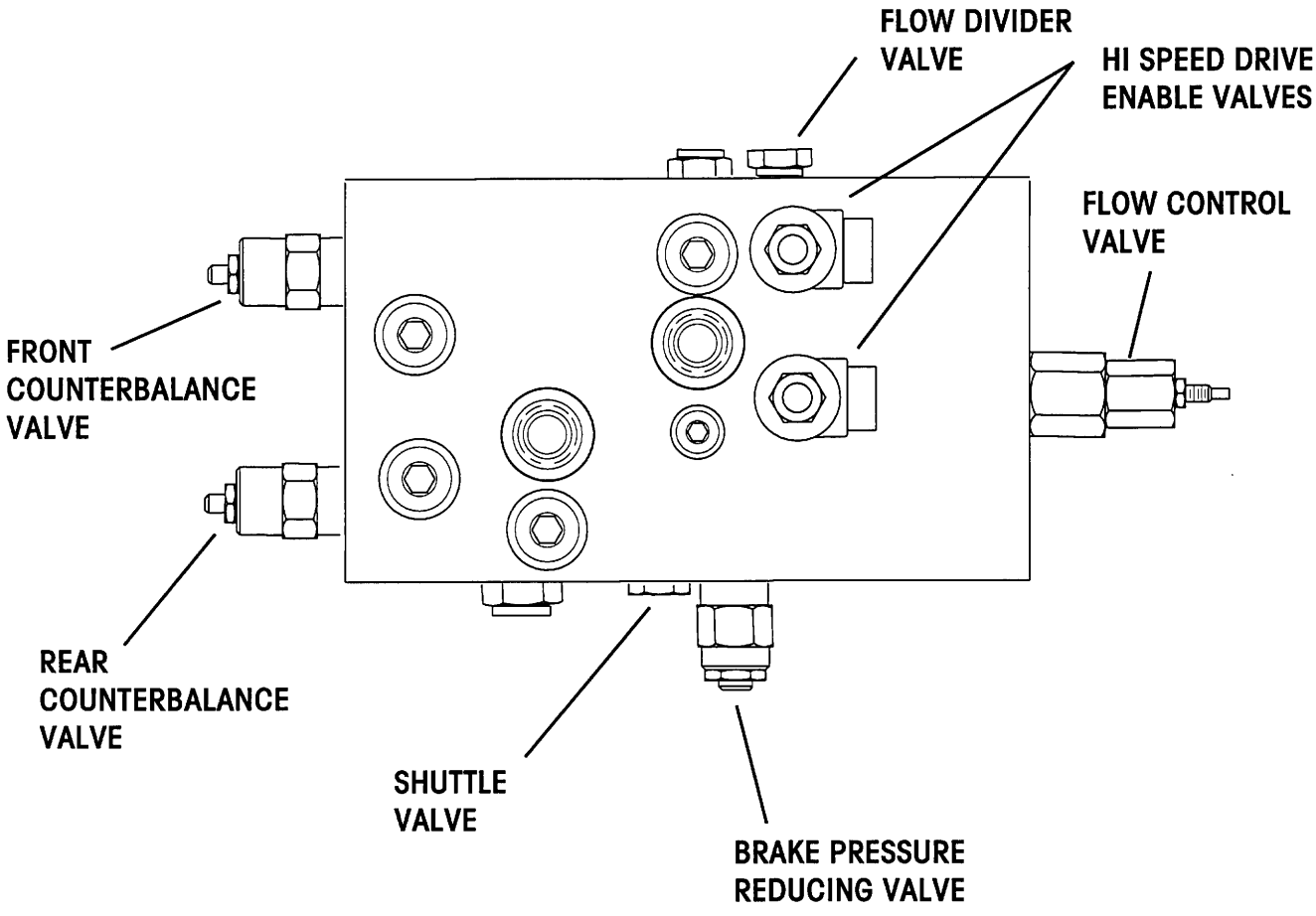
There is a non-serviceable, fixed orifice that allows hydraulic fluid to transfer from one drive motor to the other. When making turns, the outside tire turns faster and requires more hydraulic fluid flow. Since the flow divider gives each motor equal flow, this orifice will allow the transfer of hydraulic fluid from the inside wheel to the outside wheel and prevent tire scrubbing on hard surfaces.

COUNTERBALANCE VALVE

The counterbalance valves are used as a secondary brake circuit that controls the machines movement unless enough drive pressure is supplied to open the valve. It prevents runaway and cavitation when coasting down a slope. The valves require no adjustment and seal kits are available (see Illustrated Parts Catalog).

BRAKE VALVE CIRCUIT

The brake valve circuit consists of a shuttle valve, a pressure reducing valve and a flow control valve. The shuttle valve diverts maximum pressure from either the forward or reverse supply ports and sends it to the pressure reducing valve which reduces it to 500 PSI maximum. The flow control valve delays the application of the spring applied hydraulically released brake when releasing the drive handle. This delay allows for a smooth stop by restricting the return flow of oil. The valves require no adjustment and seal kits are available (see Illustrated Parts Catalog).



Two Wheel Drive Valve Manifold.

DRIVE VALVE MANIFOLD - FOUR WHEEL DRIVE

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

FLOW DIVIDER/ COMBINER VALVE

In the forward direction, these valves divide flow, and in the reverse direction they combine the flow. The single flow divider directs the flow so that 50% goes to the left and 50% goes to the right. The remaining two flow dividers direct the flow for each side so that 50% goes to the front and 50% goes to the rear. These two valves guarantee flow to all wheels (4 wheel positraction) and are only active while the function speed switch at the platform console is in low. The valves require no adjustment and seal kits are available (see Illustrated Parts Catalog).

There is a non-serviceable, fixed orifice that allows hydraulic fluid to transfer from one drive motor to the other. When making turns, the outside tire turns faster and requires more hydraulic fluid flow. Since the flow divider gives each motor equal flow, this orifice will allow the transfer of hydraulic fluid from the inside wheel to the outside wheel and prevent tire scrubbing on hard surfaces.

HI SPEED DRIVE ENABLE VALVE

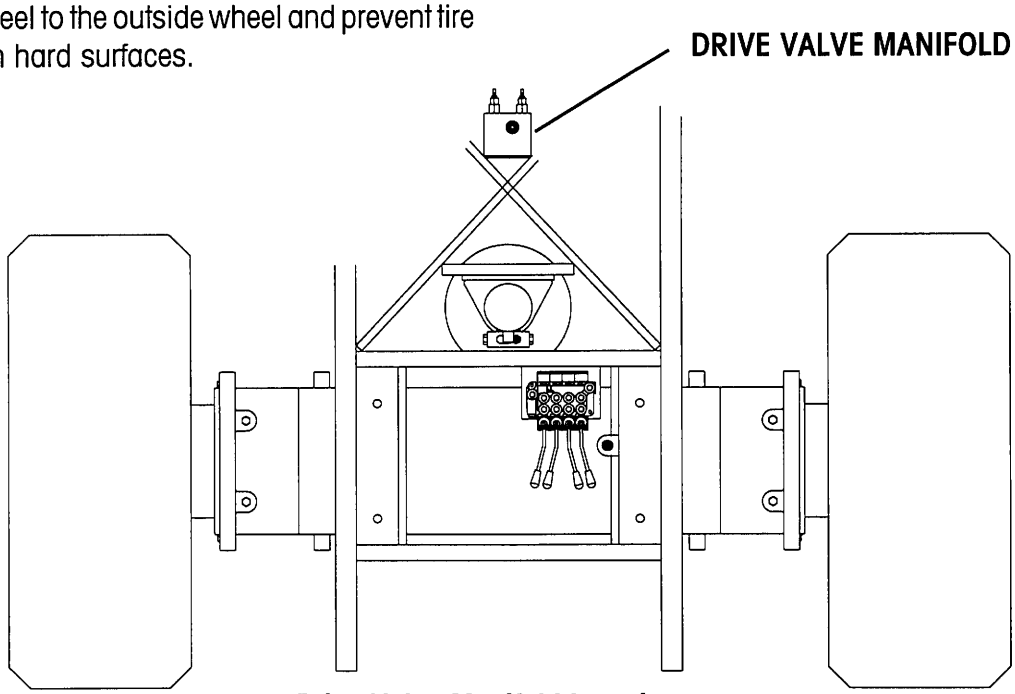
The hi speed drive enable valves are 2 position, 2 way solenoid valves that bypass the flow divider valve and are used to control the fluid flow for travel speed. The valves require no adjustment and seal kits are available (see Illustrated Parts Catalog).

COUNTERBALANCE VALVE

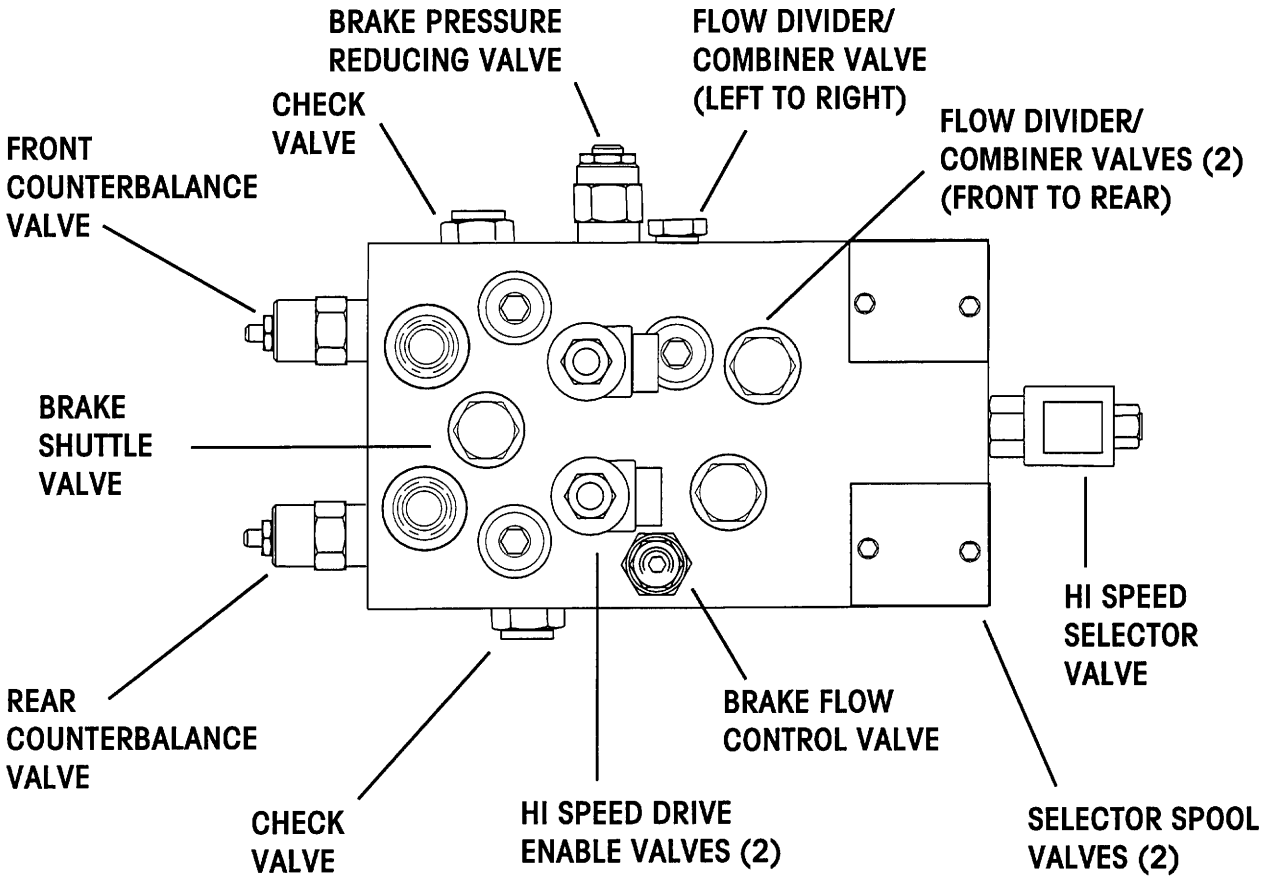
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BRAKE VALVE CIRCUIT

The brake valve circuit consists of a shuttle valve, a pressure reducing valve and a flow control valve. The shuttle valve diverts maximum pressure from either the forward or reverse supply ports and sends it to the pressure reducing valve which reduces it to 500 PSI maximum. The flow control valve delays



Drive Valve Manifold Location.



Four Wheel Drive Valve Manifold.

the application of the spring applied hydraulically released brake when releasing the drive handle. This delay allows for a smooth stop by restricting the return flow of oil. The valves require no adjustment and seal kits are available (see Illustrated Parts Catalog).

SELECTOR SPOOL VALVE CIRCUIT

The hi speed selector valve is a 2 position, 4 way solenoid valve that pilots the two selector spools open when energized in high speed. This results in a series - parallel flow operation. When the hi speed selector valve is not energized, the system diverts 25% of the flow to each wheel motor. The selector spool flow valves divert flow from the flow dividers and reduce heat generation.

DRIVE MOTORS

For two wheel drive systems, there are two drive motors on the rear wheels, and for four wheel drive systems there are four drive motors (front and rear wheels). The drive motor connects to the gear reducer if it has an internal brake, or to a separate brake if needed. For four wheel drive machines, only the rear wheels have brakes. (See Illustrated Parts Catalog.)

HYDRAULIC FLUID RESERVOIR

The hydraulic fluid reservoir consists of the tank, a sight gauge, a filler cap with filter, a strainer, a vent, a sump with drain plug, one valve for suction line, five valves for return lines and a valve for the emergency pump suction line.

HYDRAULIC RESERVOIR MAINTENANCE

Check tank for signs of leakage. Inspect tank securing bolts for tightness. Clean cap filter by flushing with clean water and dry thoroughly.

HYDRAULIC FILTER

There are two hydraulic filters: a return filter and a high pressure filter. They are both located near the hydraulic tank.

RETURN FILTER

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

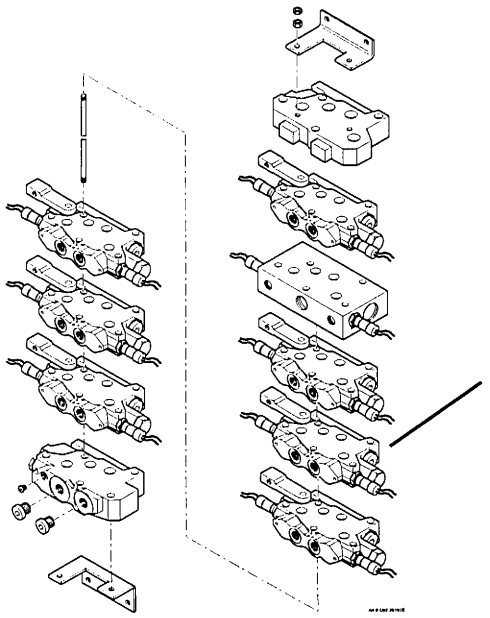
The hydraulic high pressure filter is a non-bypassing, 8.6 micron filter. This filter allows maximum fluid flow as long as the filter element is free of contaminants. When the filter is clogged, it shuts down the hydraulic flow but will not crush the filter element due to a differential pressure limiting valve. The build-up of pressure across the filter will affect system performance and act as an indication of a clogged filter.

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 valve, a lift toggle switch on the remote control pendant and a control lever on the platform console.

BOOM LIFT VALVE SEGMENT

When the boom control lever on the platform console or the boom control toggle switch on the control pendant is activated, an electrical signal is transmitted to the valve cartridge in the boom lift 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 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.

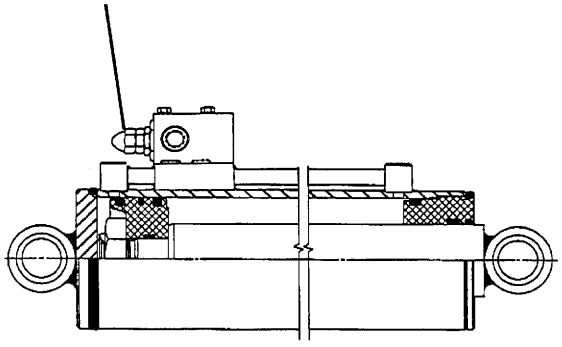
Flow Control Valve Adjustment

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 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 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.

COUNTERBALANCE VALVE



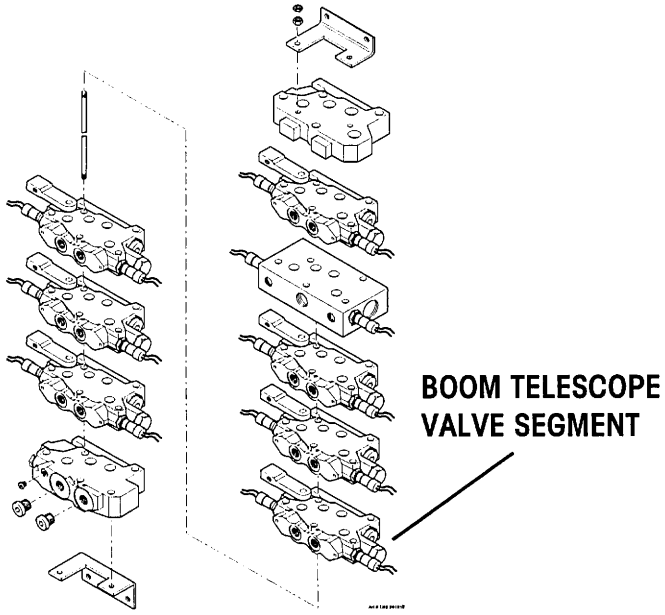
Lift Cylinder.

BOOM TELESCOPE SYSTEM

The boom telescope system consists of a hydraulic valve segment on the ground valve bank, a pressure relief valve, a double telescope cylinder with two counterbalance valves, an extend toggle switch on the remote control pendant and a control lever on the platform console.

BOOM TELESCOPE VALVE SEGMENT

When the boom telescope control lever on the platform console or the boom telescope control toggle switch on the remote control pendant is activated, an electrical signal is transmitted to the valve cartridge in the boom telescope 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.



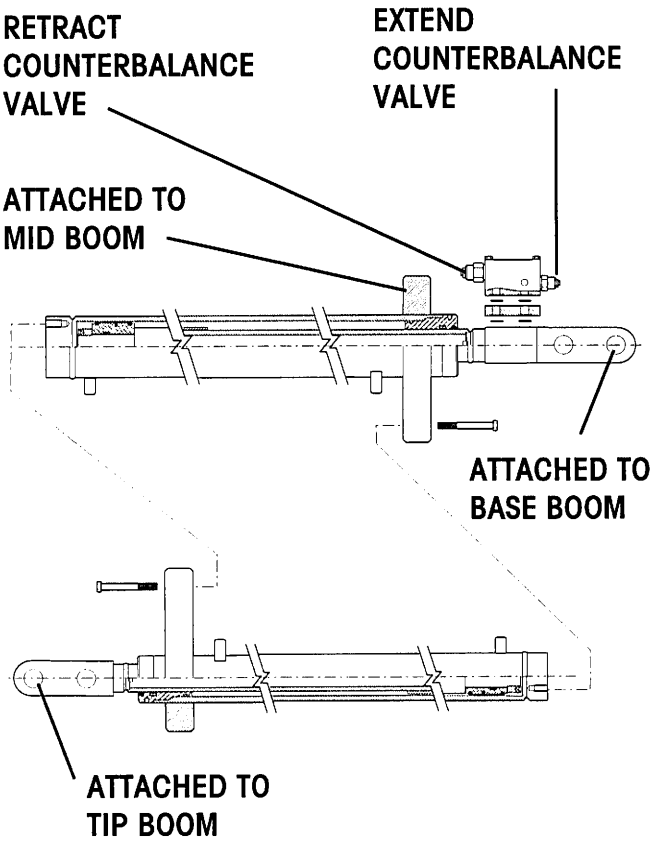
Ground Valve Bank Assembly.

PRESSURE RELIEF VALVE

The pressure relief valve limits the pressure on the base end of the cylinder to 1500 PSI (103 Bar, 105.5 Kg/cm^2) to prevent the cylinder rod from buckling. The pressure relief valve is factory set and needs no adjustment.

TELESCOPE CYLINDER

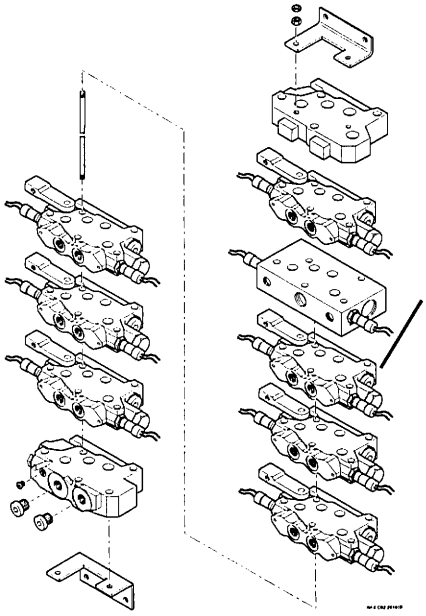
The telescope cylinders control the extending and retracting of the boom. The telescope function is controlled by two double acting cylinders. The lower cylinder contains two counterbalance valves, which prevent unintended movement of the cylinders should a hose or fitting develop a leak. When the boom is extended, fluid flows to the base end cylinder ports and to the extend counterbalance valve, opening this valve and allowing fluid in the rod end of the cylinders to flow back to the reservoir. When the boom is retracted, fluid flows to the rod end cylinder ports and to the retract counterbalance valve, opening this valve and allowing fluid in the base end of the cylinders to flow back to the reservoir.



Telescope (Extend) Cylinder.

SUPERSTRUCTURE SWING SYSTEM

The superstructure swing system consists of a hydraulic valve segment on the ground valve bank, swing drive/ reducer assembly, hydraulic motor, an intregal brake assembly, a toggle switch on the remote control pendant and a control lever on the platform console.



Ground Valve Bank.

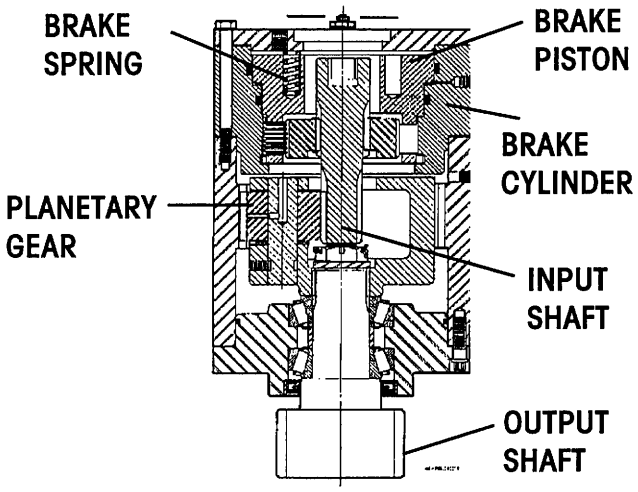
SWING VALVE SEGMENT

When the swing control lever on the platform console or the swing control toggle switch on the remote control pendant 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.

PLANETARY GEAR SWING REDUCER WITH INTEGRAL BRAKE

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

The intregal brake assembly, part of the reducer, is spring applied and hydraulically released at a pressure of approximately 250 PSI (17 Bar, 17.6 Kg/ cm^2). Hydraulic fluid flow is transferred through a directional control valve which directs fluid flow to the swing motor to provide clockwise and counterclock-wise superstructure rotation.



Planetary Gear Type Swing Reducer with Integral Brake.

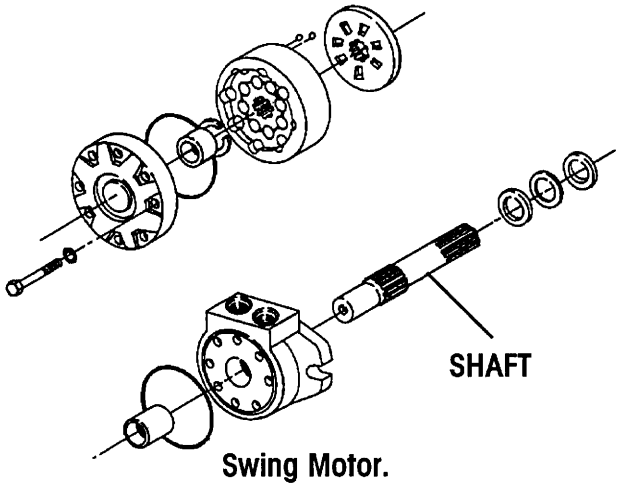
Swing Reducer/ Motor Assembly Adjustment

To adjust the swing reducer/ drive assembly, the eccentric bushing located under the reducer must be turned. Remove the eccentric lock plate that holds the eccentric bushing in place. The eccentric lock plate is located on the superstructure in front of the swing reducer.

Next loosen the mounting bolts and turn the eccentric bushing with a screwdriver.

> **NOTE:** Adjust so the swing reducer pinion gear mates to the large swing bearing gear with zero backlash and no preload. Excessive backlash will lead to jerky or erratic rotation and possible breakage of gear teeth. Excessive preload will lead to premature wear and possible breakage of gear teeth.

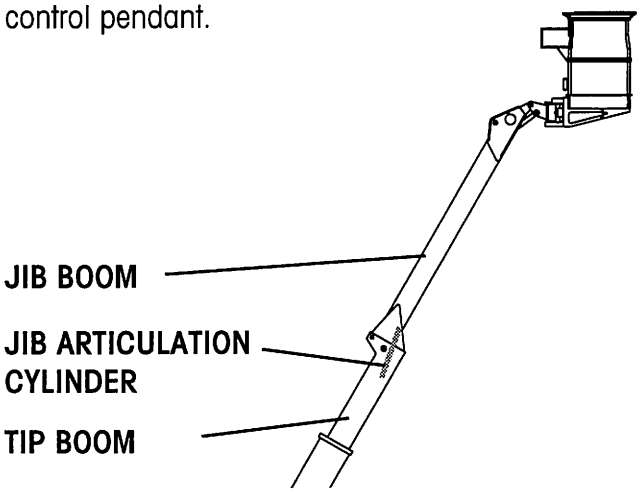
Replace the eccentric lock plate and torque the mounting bolts (see "Machine Specification").



Swing Motor.

JIB BOOM SYSTEM

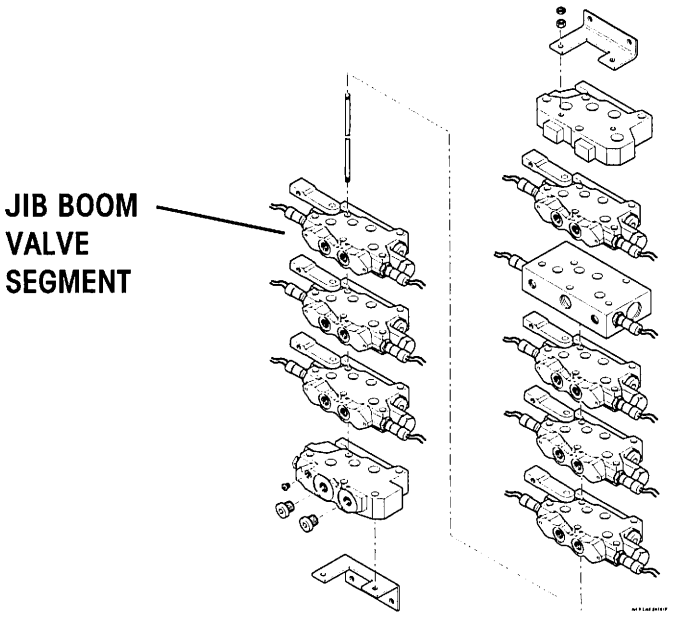
The jib boom system consists of a hydraulic valve segment on the ground valve bank, a cylinder with a counterbalance valve, and a control lever on the platform console and a toggle switch on the remote control pendant.



Jib Boom System Components.

JIB BOOM VALVE SEGMENT

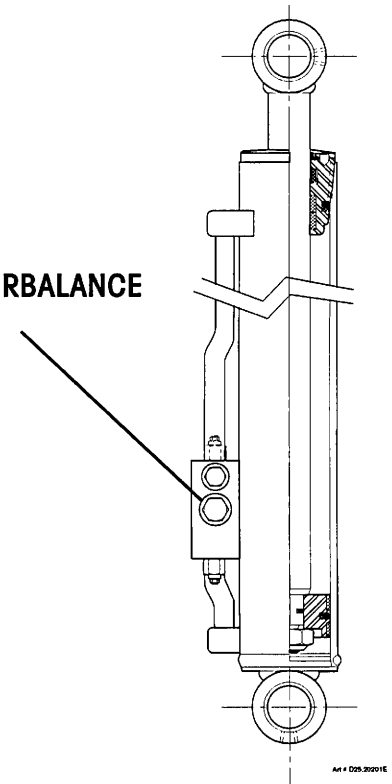
When the jib boom control lever on the platform console or ground control station is activated, an electrical signal is transmitted to the valve cartridge in the jib boom valve segment. This allows hydraulic fluid at the selected flow to be sent to the proper end of the cylinder to raise or lower the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



Ground Valve Bank Assembly.

JIB ARTICULATION CYLINDER

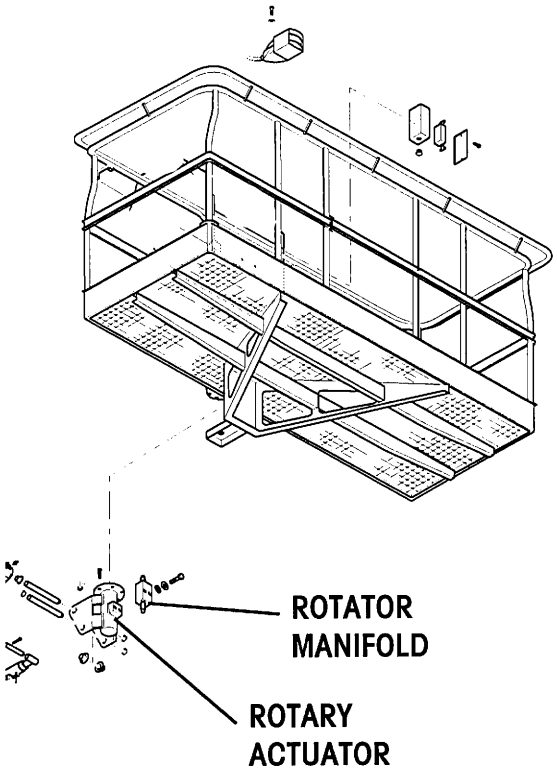
The jib boom function is controlled by a double acting cylinder. The cylinder contains a counterbalance valve, which will prevent unintended movement of the cylinder should a hose or fitting develop a leak. When the boom is lowered, fluid flows to the rod end cylinder port and to the counterbalance valve, 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.

PLATFORM ROTATE SYSTEM

The platform rotate system consists of a platform rotate toggle switch and 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 console.



Platform Rotate System Components.

ROTATE CONTROL VALVE

This valve is a 3 position, 4 way valve which is operated by a toggle switch on the platform console. This control valve directs fluid flow to the rotate function. It is located by the ground controls.

ROTARY ACTUATOR

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

Rotary Actuator Maintenance

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

PLATFORM ROTATOR MANIFOLD

The platform rotator manifold is mounted as an integral part of the rotary actuator. The platform rotator manifold acts as a pressure relief valve to prevent damage to the rotary actuator. It also has a double pilot operated check valve which 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 and thus unlock the rotary actuator.

PLATFORM LEVELLING SYSTEM

The platform levelling system consists of a level control toggle switch and valve, slave levelling cylinder with a counterbalance valve, master levelling cylinder, double pilot operated check valve and two relief valves.

The platform levelling 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 levelling system is only controlled from the platform console.

Refer to "Boom Component Locators" in the introduction of this manual for platform levelling system component locations.

LEVEL CONTROL VALVE

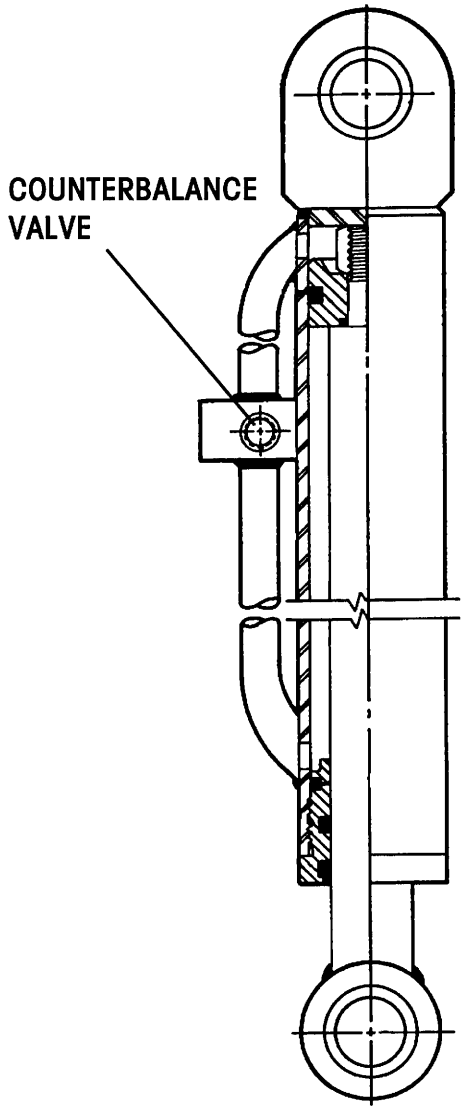
This valve is a 3 position, 4 way valve which is operated by the platform level toggle. This control valve directs fluid flow to the level functions.

DOUBLE PILOT OPERATED CHECK VALVE

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

MASTER LEVELLING CYLINDER

The master levelling 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 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 levelling cylinder; thereby keeping the platform level.



Master Level Cylinder.

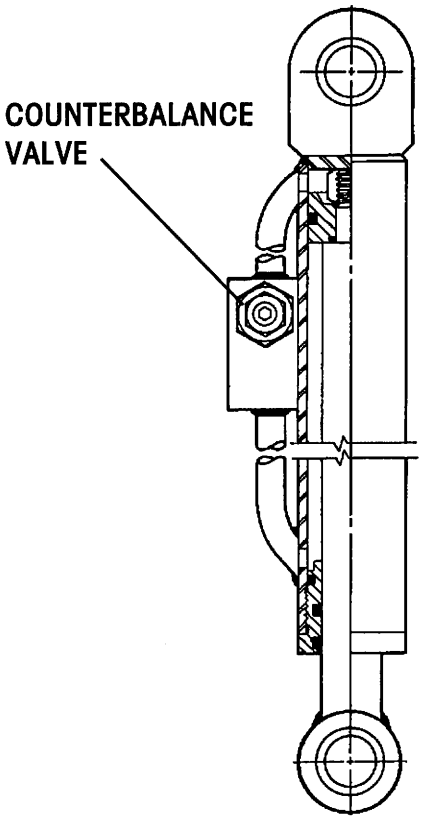
SLAVE LEVELLING CYLINDER

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

The slave levelling cylinder contains two counterbalance valves. The counterbalance 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.



Slave Level Cylinder.

STEER SYSTEM

The two wheel steering system consists of a selector valve assembly, a steer valve segment, hydraulic swivel, a steer cylinder, a steer toggle switch on the remote control pendant and a steer rocker switch on the drive lever at the platform console. Refer to "Component Locators in the introduction of this manual.

The four wheel steering system also includes a diverter valve located on the undercarriage, that is activated by a toggle switch at the platform controls. This valve is used to select front or rear steer.

STEER VALVE SEGMENT

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

STEER PRESSURE RELIEF VALVE

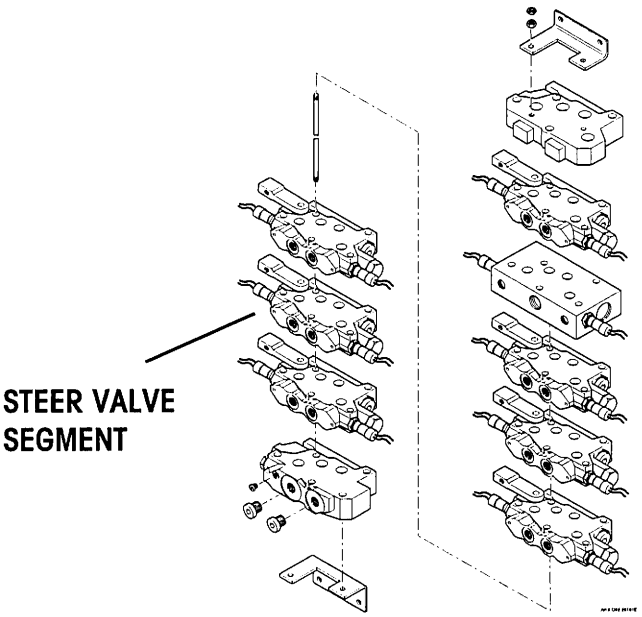
The steer pressure relief valve limits the pressure on the base end of the cylinder to 1900 PSI (131 Bar, 133.5 Kg/cm^2) to prevent the cylinder rod from buckling. The pressure relief valve is factory set and needs no adjustment.

STEER CYLINDER

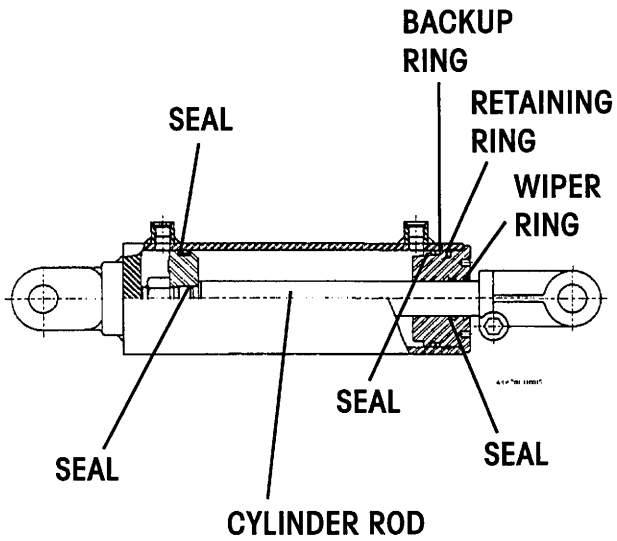
The cylinder is double acting and is directly connected to the steering linkage assembly. This cylinder powers all steering movements.

STEER DISCONNECT KNOB

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.



Ground Valve Bank.



Steer Cylinder.

STEER SYSTEM MAINTENANCE

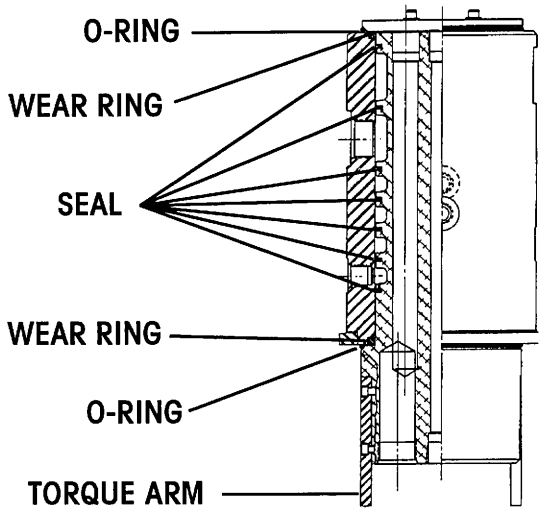
Check all pins on steering linkage and steer cylinder for excessive play, and ensure that all retaining rings are in place and secure.

Lubricate linkage as required (see Lubrication Chart).

Check cylinder and hoses for hydraulic fluid leakage and security.

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.



Hydraulic Swivel.

AXLE EXTEND SYSTEM

The axle extend system consists of a deadman button, two jack and two extend valves, two hydraulic jacks (front and rear), two axle extend cylinders, and axle stops.

The axle extend system utilizes a front and rear hydraulic jack to lift each end of the machine. (One end of the machine should be lifted at a time.) The hydraulic jacks are controlled by the jack valves. An extend cylinder located inside each of the front and rear axles is controlled by the extend valves.

JACK AND EXTEND VALVES

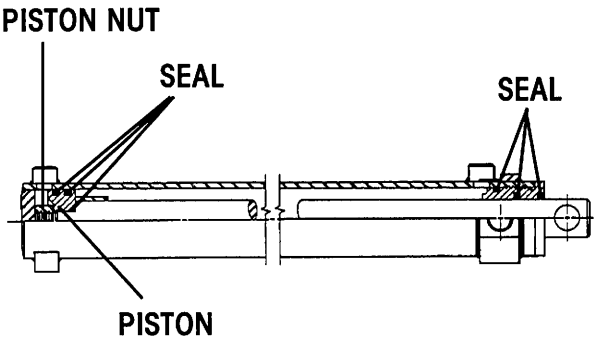
The jack and extend valves are all 3 way, 2 position, closed centered, manually operated valves. The jack valves are used to raise and lower the hydraulic jacks, and the extend valves are used to extend and retract the axles. The axles extend deadman button must be pressed to operate the valves.

HYDRAULIC JACK

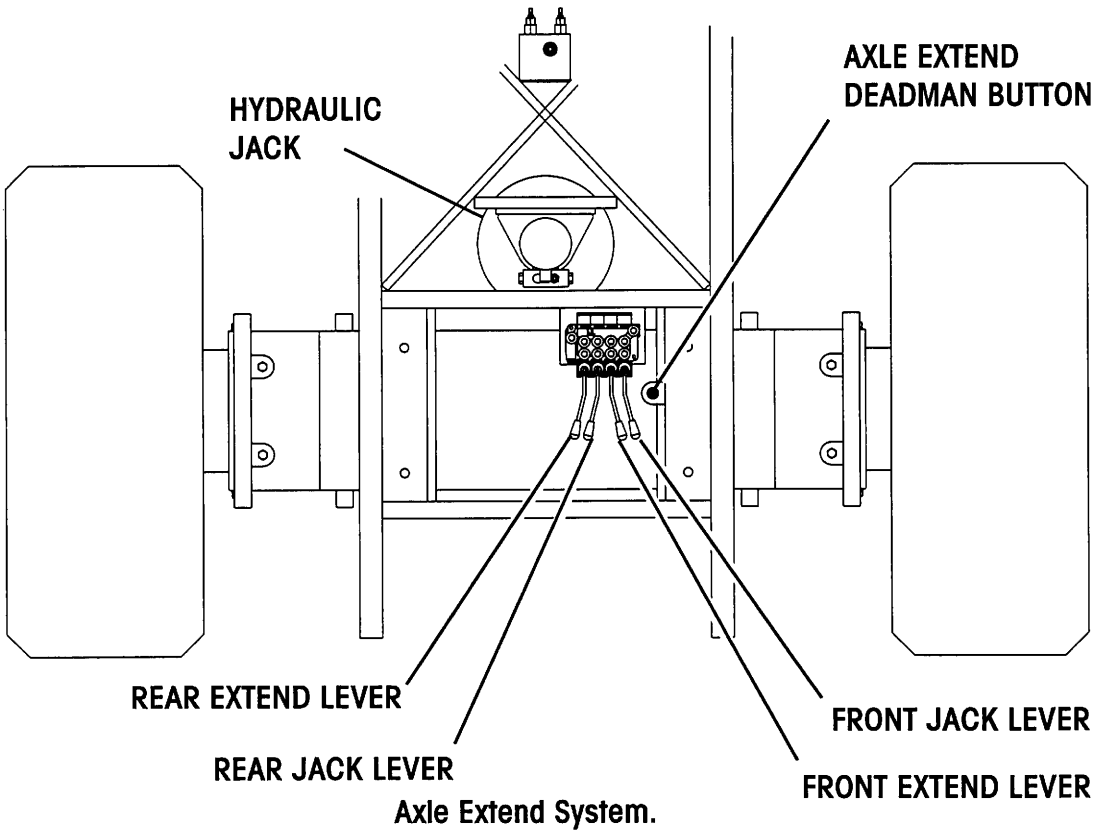
The hydraulic jacks, located at the front and rear of the machine raise and lower each end of the machine in order to extend the axles. The extend valves control their operation.

AXLE EXTEND CYLINDER

The two extend cylinders are double acting and are directly connected to telescoping axles. These



Axle Extend Cylinder.



Axle Extend System.

SECTION 3:
DRIVE SYSTEM

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DRIVE SYSTEM COMPONENTS

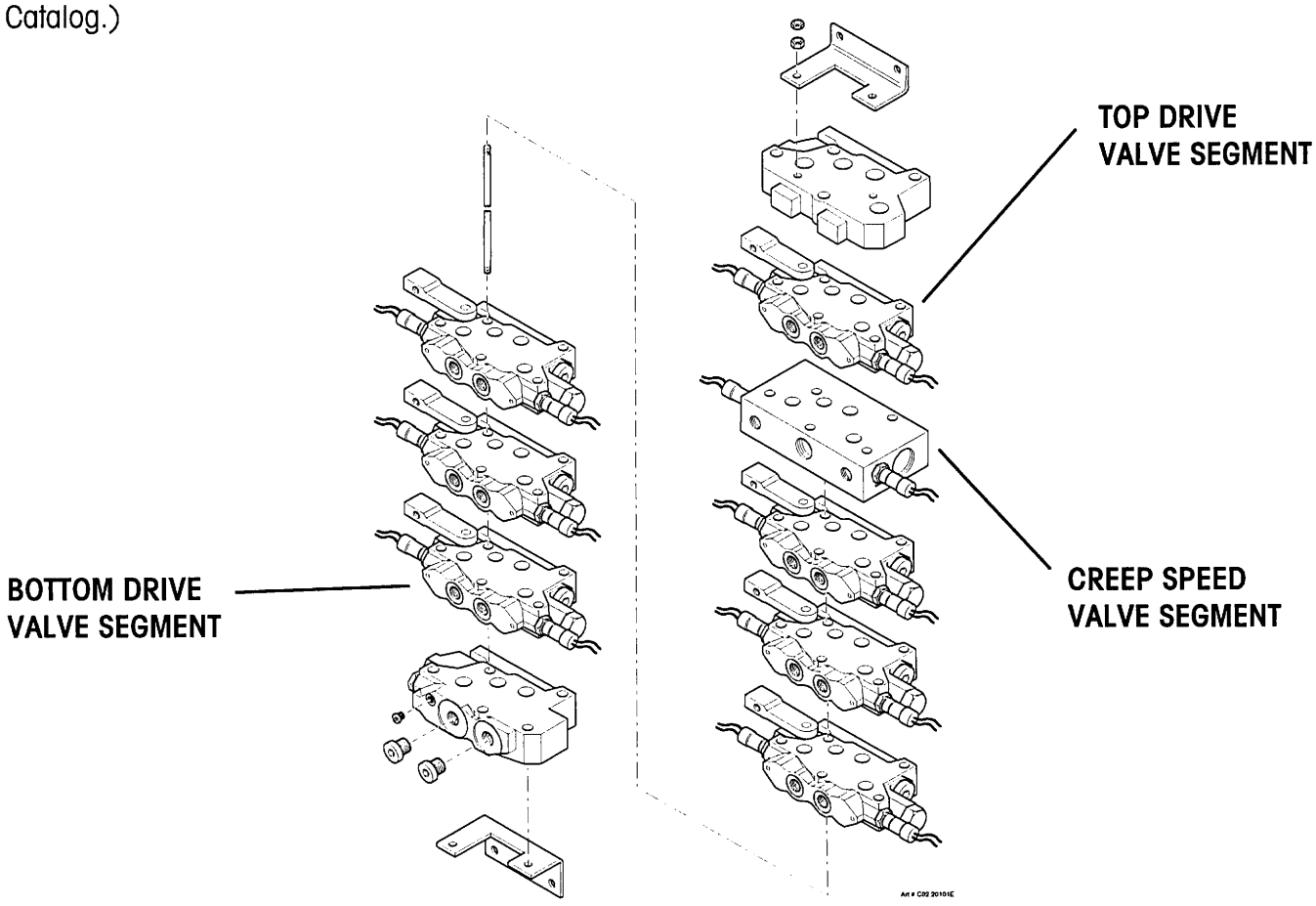
The standard RP is propelled by two hydraulic drive motors with brake assemblies. The optional 4 wheel drive RP is propelled by four hydraulic drive motors with brake assemblies at the rear wheels only. The drive circuit consists of the hydraulic drive motors, the drive valve segment, the drive valve manifold, a toggle switch on the pendant control and a platform drive control lever (joystick).

DRIVE MOTOR

For two wheel drive systems, there are two drive motors on the rear wheels, and for four wheel drive systems there are four drive motors (front and rear wheels). The drive motor connects to the gear reducer if it has an internal brake, or to a separate brake if needed. For four wheel drive machines, only the rear wheels have brakes. (See Illustrated Parts Catalog.)

DRIVE VALVE SEGMENT

When the drive control lever on the platform control or the propel control toggle switch on the control pendant is activated, an electrical signal is transmitted to the valve cartridges in the top and bottom drive valve segments. This allows hydraulic fluid at the correct pressure to be sent to the drive circuit. For creep speed, the top and bottom drive valve segments are closed, and the creep speed valve segment is energized, permitting flow at the rate of 6 GPM to go through the drive circuit. The drive valve segment is part of the ground valve bank and is located on the superstructure.



Ground Valve Bank.

DRIVE VALVE MANIFOLD - TWO WHEEL DRIVE

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

HI SPEED DRIVE ENABLE VALVE

The hi speed drive enable valves are 2 position, 2 way solenoid valves that bypass the flow divider valve and are used to control the fluid flow for travel speed. The valves require no adjustment and seal kits are available (see Illustrated Parts Catalog).

FLOW DIVIDER/ COMBINER VALVE

In the forward direction, this valve divides flow, and in the reverse direction it combines the flow. The single flow divider directs the flow so that 50% goes to the left and 50% goes to the right. The valve requires no adjustment and a seal kit is available (see Illustrated Parts Catalog).

There is a non-serviceable, fixed orifice that allows hydraulic fluid to transfer from one drive motor to the other. When making turns, the outside tire turns faster and requires more hydraulic fluid flow. Since the flow divider gives each motor equal flow, this orifice will allow the transfer of hydraulic fluid from the inside wheel to the outside wheel and prevent tire scrubbing on hard surfaces.

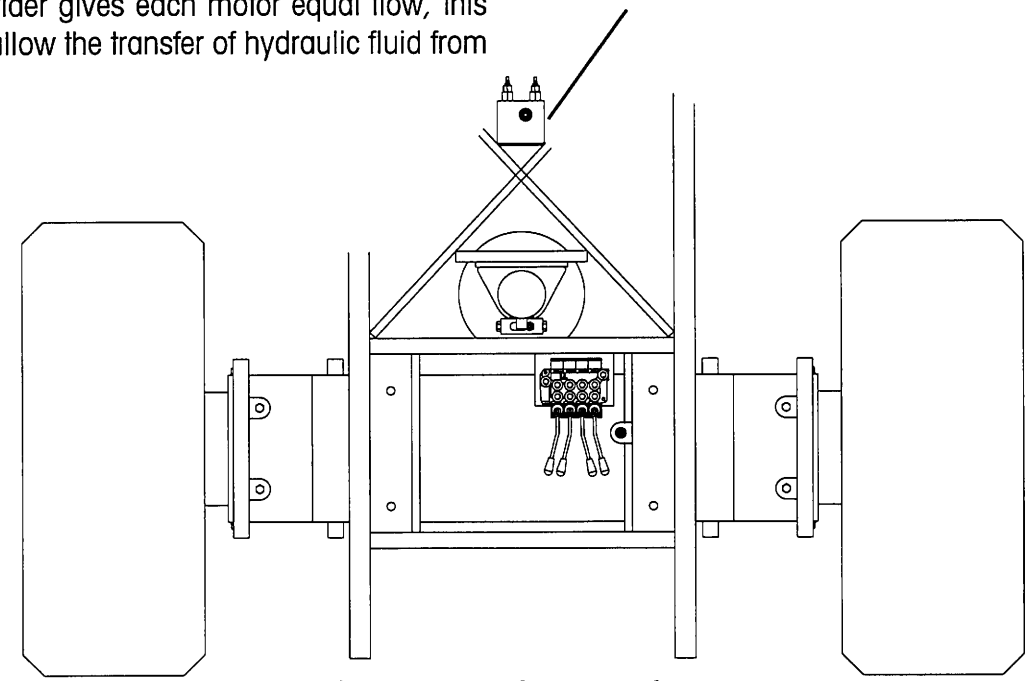
COUNTERBALANCE VALVE

The counterbalance valves are used as a secondary brake circuit that controls the machines movement unless enough drive pressure is supplied to open the valve. It prevents runaway and cavitation when coasting down a slope. The valves require no adjustment and seal kits are available (see Illustrated Parts Catalog).

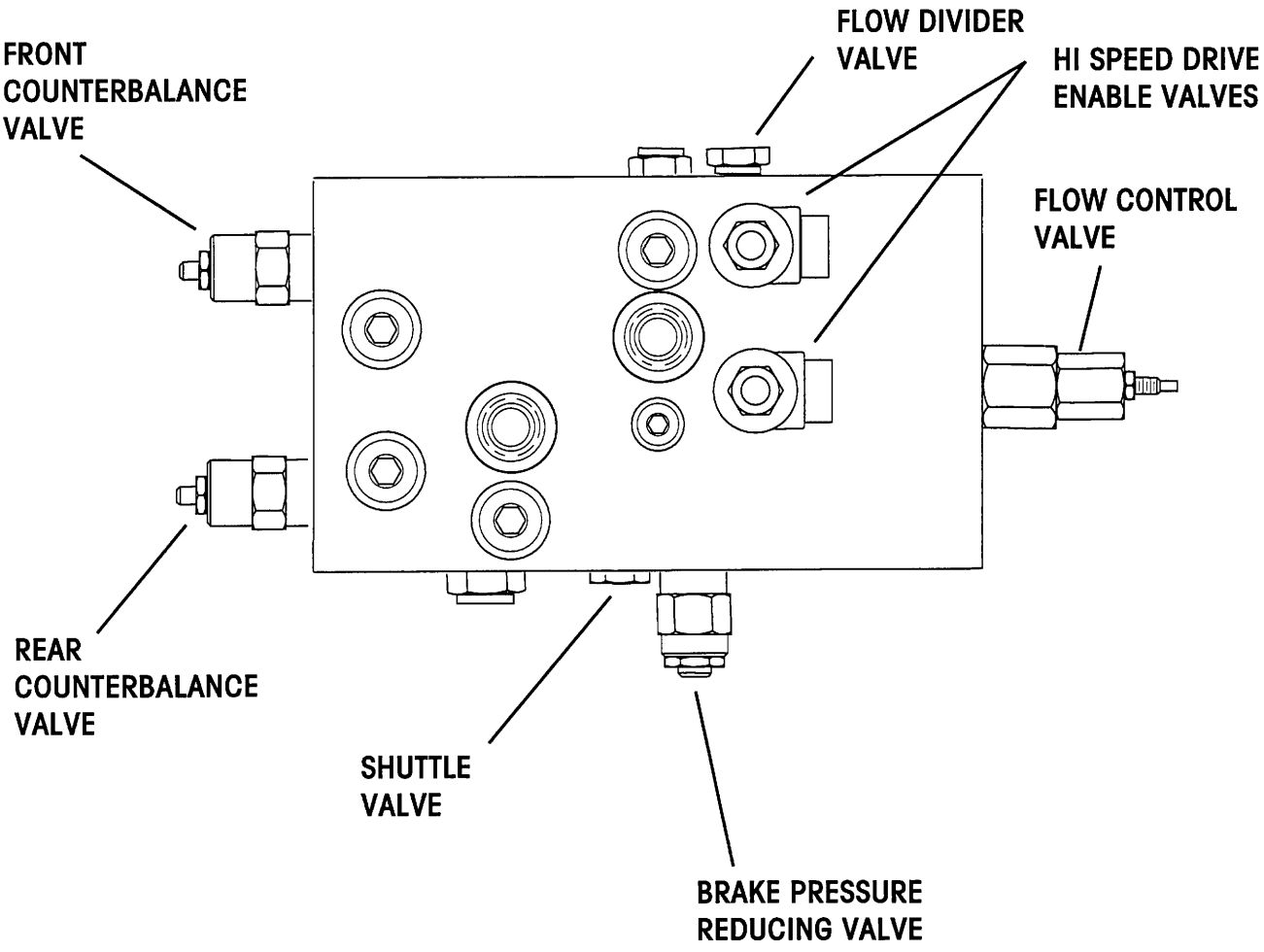
BRAKE VALVE CIRCUIT

The brake valve circuit consists of a shuttle valve, a pressure reducing valve and a flow control valve. The shuttle valve diverts maximum pressure from either the forward or reverse supply ports and sends it to the pressure reducing valve which reduces it to 500 PSI maximum. The flow control valve delays the application of the spring applied hydraulically released brake when releasing the drive handle. This delay allows for a smooth stop by restricting the return flow of oil. The valves require no adjustment and seal kits are available (see Illustrated Parts Catalog).

DRIVE VALVE MANIFOLD



Drive Valve Manifold Location.



Two Wheel Drive Valve Manifold.

DRIVE VALVE MANIFOLD - FOUR WHEEL DRIVE

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

FLOW DIVIDER/ COMBINER VALVE

In the forward direction, these valves divide flow, and in the reverse direction they combine the flow. The single flow divider directs the flow so that 50% goes to the left and 50% goes to the right. The remaining two flow dividers direct the flow for each side so that 50% goes to the front and 50% goes to the rear. These two valves guarantee flow to all wheels (4 wheel positraction) and are only active while the function speed switch at the platform console is in low. The valves require no adjustment and seal kits are available (see Illustrated Parts Catalog).

There is a non-serviceable, fixed orifice that allows hydraulic fluid to transfer from one drive motor to the other. When making turns, the outside tire turns faster and requires more hydraulic fluid flow. Since the flow divider gives each motor equal flow, this orifice will allow the transfer of hydraulic fluid from the inside wheel to the outside wheel and prevent tire scrubbing on hard surfaces.

HI SPEED DRIVE ENABLE VALVE

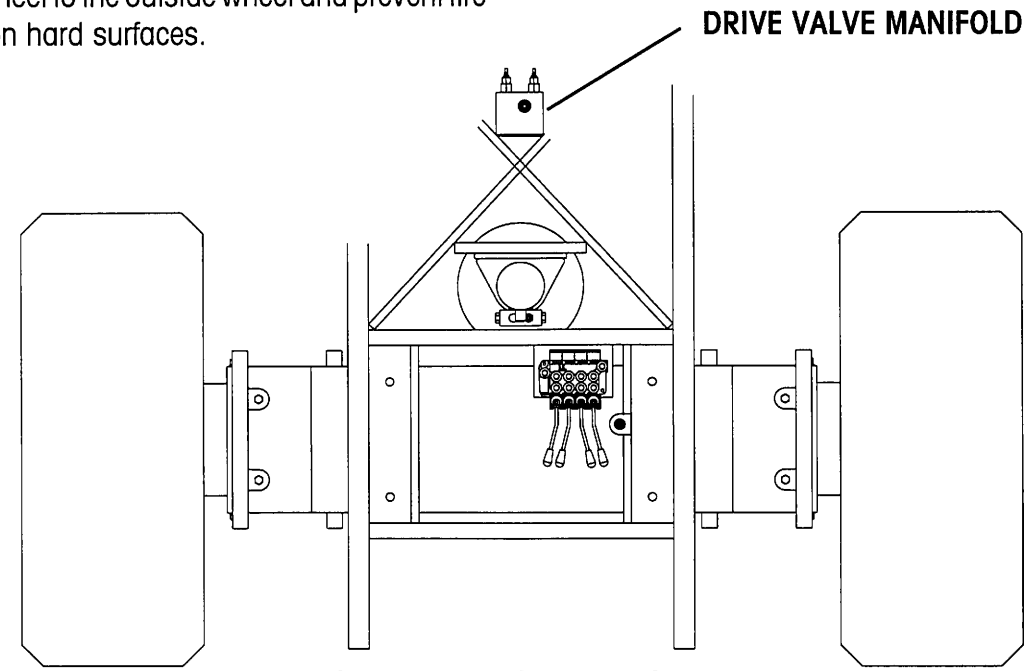
The hi speed drive enable valves are 2 position, 2 way solenoid valves that bypass the flow divider valve and are used to control the fluid flow for travel speed. The valves require no adjustment and seal kits are available (see Illustrated Parts Catalog).

COUNTERBALANCE VALVE

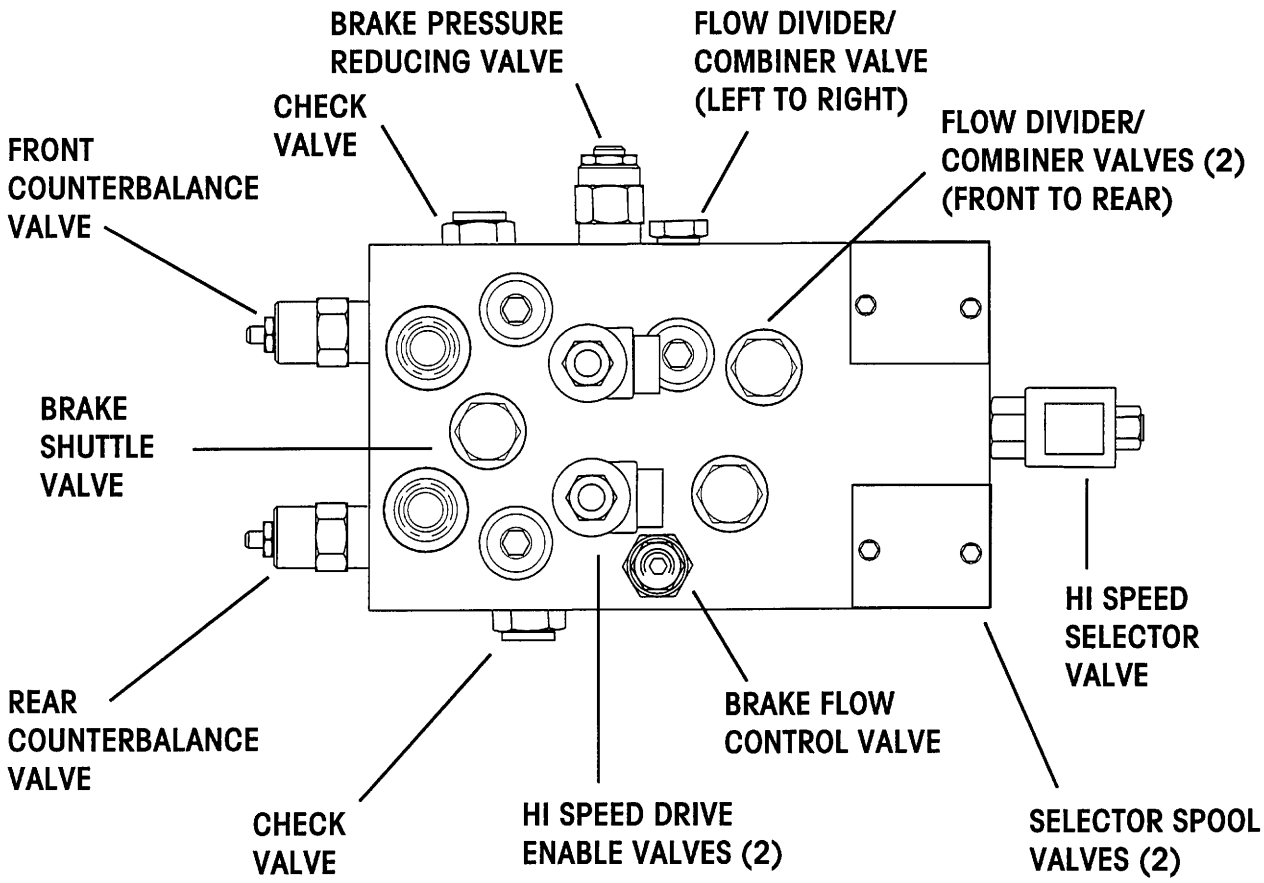
The counterbalance valves are used as a secondary brake circuit that controls the machines movement unless enough drive pressure is supplied to open the valve. It prevents runaway and cavitation when coasting down a slope. The valves require no adjustment and seal kits are available (see Illustrated Parts Catalog).

BRAKE VALVE CIRCUIT

The brake valve circuit consists of a shuttle valve, a pressure reducing valve and a flow control valve. The shuttle valve diverts maximum pressure from either the forward or reverse supply ports and sends it to the pressure reducing valve which reduces it to 500 PSI maximum. The flow control valve delays



Drive Valve Manifold Location.



Four Wheel Drive Valve Manifold.

the application of the spring applied hydraulically released brake when releasing the drive handle. This delay allows for a smooth stop by restricting the return flow of oil. The valves require no adjustment and seal kits are available (see Illustrated Parts Catalog).

SELECTOR SPOOL VALVE CIRCUIT

The hi speed selector valve is a 2 position, 4 way solenoid valve that pilots the two selector spools open when energized in high speed. This results in a series - parallel flow operation. When the hi speed selector valve is not energized, the system diverts 25% of the flow to each wheel motor. The selector spool flow valves divert flow from the flow dividers and reduce heat generation.

TOGGLE SWITCH ON THE PENDANT CONTROL

To operate the drive function from the ground, use the "Drive" toggle switch on the pendant control. See "Section 4: Electrical System" for switch replacement.

PLATFORM CONTROL HANDLE (JOYSTICK)

To operate the drive function from the platform, use the platform control handle. See "Section 3: Electrical System" for control handle adjustment or replacement.

SECTION 4:
ELECTRICAL SYSTEM

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ELECTRICAL SYSTEM

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

BATTERY

Two 12 volt batteries supply the electrical power required to operate the machine.

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 in the front of the superstructure near the boom pivot. To replace it, remove the movement alarm and disconnect the wires.

TILT ALARM

The tilt alarm gives an audible warning when the machine is 4-1/2° or more out of level. It is located on under the platform control console. To replace the tilt alarm, open the platform control console, disconnect the wires and remove it from the platform control console.

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.

Select "PLATFORM" at the ground key (selector) switch. With the axles extended and the boom raised above horizontal, individually push down on each of the three fastened corners of the tilt alarm.

On the tilt alarm, there are three LED's. The green LED indicates the unit has power. The red LED

indicates the sensor is tilted beyond 4-1/2°. The yellow LED indicates the sensor is tilted beyond 4-1/2° and the 3 second delay has expired (tilt alarm should sound at the platform). On these units, there is an in-line 2 amp fuse. Check the fuse first, if the alarm sounds continuously when the sensor is level. Then, check the flange nuts.

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 adjusting each of the three flange nuts until the level bubble is centered.

RELAY

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 BREAKER

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

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 SWITCH

There are limit switches for the boom telescope, boom lift and axle extend functions. The boom telescope limit switch is located on the lower left side of the base boom. The boom lift limit switch is located on the center post of the superstructure. The axle extend limitswitches are located on each axle. Unless the boom lift and telescope limit switches are closed as shown on the machine electrical schematic at the end of this manual, the machine will only be able to travel at creep speed from platform. If the axle extend limit switches are not closed, the boom cannot be raised above horizontal or extended more than 4 FT (0.9M).

EMERGENCY PUMP

There is an emergency pump mounted near the ground control box. It is activated when the Emergency Pump push button on the platform control console or on the remote control pendant is pressed. When either push button is pressed and held, the emergency pump circuit is energized, allowing all hydraulic functions to operat should the main motor powered hydraulic pump be disabled.

When either of the emergency pump pushbuttons is energized, main pump, high speed and low speed throttle solenoids are turned off automatically.

EMERGENCY STOP BUTTON

There is an emergency stop button on the remote control pendant and on the platform control 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 remote control pendant or platform control console to gain access for button removal. Remove the appropriate button mounting screws and wires.

REMOTE CONTROL PENDANT SWITCH REMOVAL

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

GROUND CONTROL BOX 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 CONTROL CONSOLE SWITCH REMOVAL

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

PLATFORM CONTROL BOARD

The platform control board contains the microprocessor and related electronics for the control of platform lights and sending data to the electronics control module.

To replace the platform control board remove the six platform console screws and swing the console up on its hinges, to gain access for removal. Unlatch the individual connectors by pressing on top of the connector locks and remove connectors. Remove tfour bolts holding the board in place.

ELECTRONICS CONTROL MODULE

The electronics control module, located in the ground control box, contains the microprocessor and related electronics for the control of all of the machine functions. It is a non-serviceable unit. If the module is suspected of being faulty, remove the four bolts that secure it in place inside the ground control box. Also, unplug the two connectors. Return the module to Simon Aerials, Inc.

Opening the sealed screws of the ground control module cover, will void any warranty claims.

When installing the electronics control module, secure it in place with the four bolts, and plug in the two cable connectors. The connectors are keyed so they cannot be interchanged.

Refer to the Troubleshooting section for electronics control module fault code identifications and diagnostic procedures.

SECTION 5:
MECHANICAL COMPONENTS

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MECHANICAL COMPONENTS

Following is a description of the major mechanical components.

TIRES

Tires used are pneumatic or the 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 BLOCK THE WHEELS before you raise the machine.

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

DRIVE HUB ASSEMBLY

Drive hub assembly consists of a hydraulic motor, brake and torque hub.

- To remove drive hub assembly:

1. Block the steer wheels and raise the machine at the drive end.

⚠WARNING

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

2. Remove tire and wheel assembly:
   a. Loosen and remove the lug nuts.
   b. Pull off the tire and wheel assembly.

⚠ CAUTION

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

3. Disconnect hoses to the drive hub assembly.

4. Loosen and remove eight capscrews and flat washers on the drive hub assembly.

5. Slide off hydraulic motor and toque hub as one unit.

- Install drive hub assembly:

1. Align the drive hub assembly (hydraulic motor, brake and torque hub) with the axle tube assembly.

2. Install and torque the eight capscrews with flat washers.

3. Connect hydraulic hoses to the drive hub assembly.

⚠WARNING

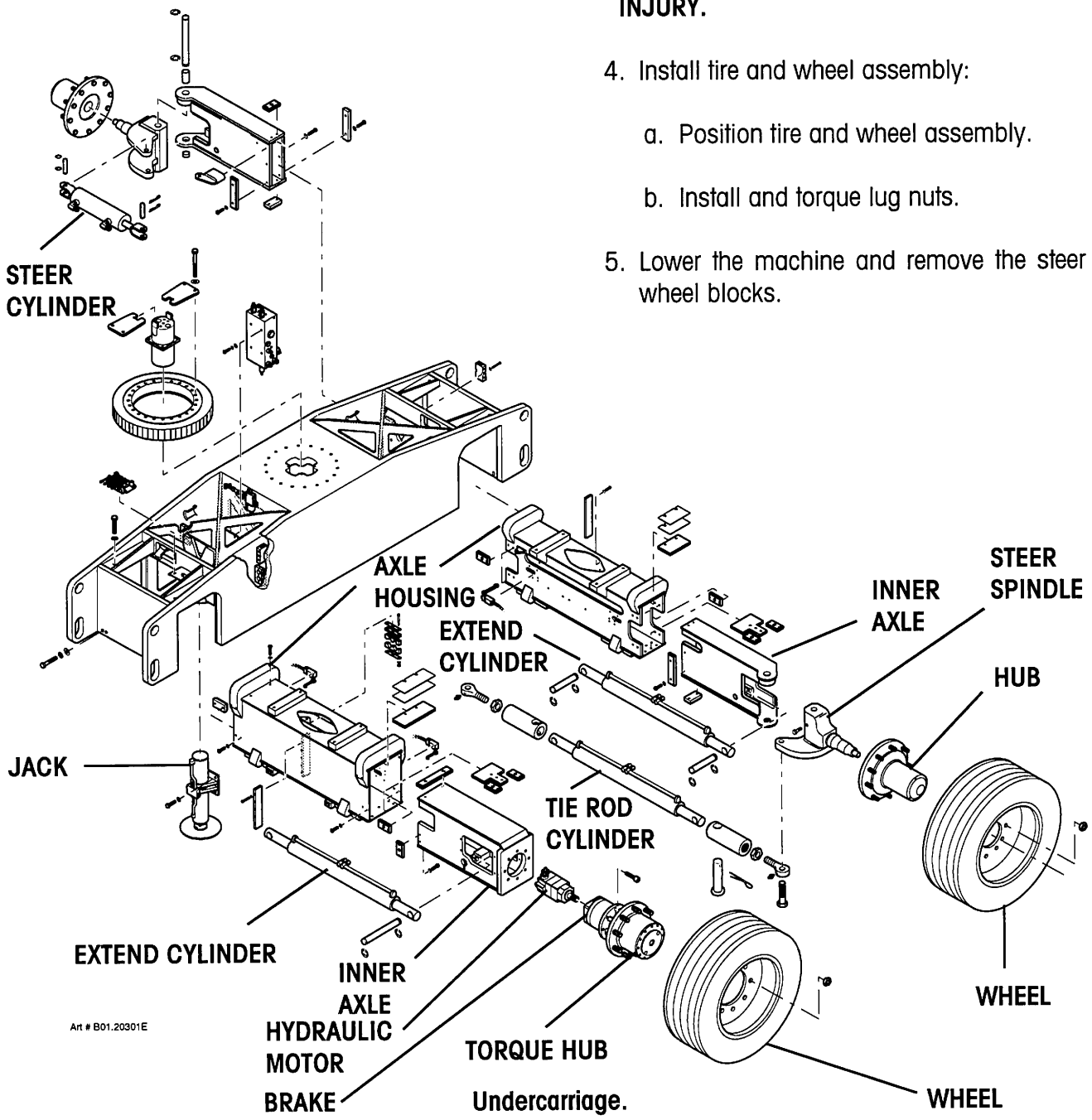
CALCIUM FILLED AND/OR FOAM FILLED TIRES ARE EXTREMELY HEAVY. CARE MUST BE TAKEN TO AVOID PERSONAL INJURY.

4. Install tire and wheel assembly:

   a. Position tire and wheel assembly.

   b. Install and torque lug nuts.

5. Lower the machine and remove the steer wheel blocks.



Undercarriage.

STEER CYLINDER PINS

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

CYLINDER PIN REPLACEMENT

1. Remove retaining rings (rod end) or hair pin clips (base end).
2. Remove the pin.
3. Grease and install new pin and retaining rings or hair pin clips.

STEER CYLINDER

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

STEER CYLINDER SEAL REPLACEMENT

1. Disconnect the hydraulic hoses.
2. Remove the steer cylinder pin.
3. Remove the cylinder.
4. Clean the end of the cylinder.
5. Loosen the end cap and withdraw it over the piston rod.

⚠ CAUTION

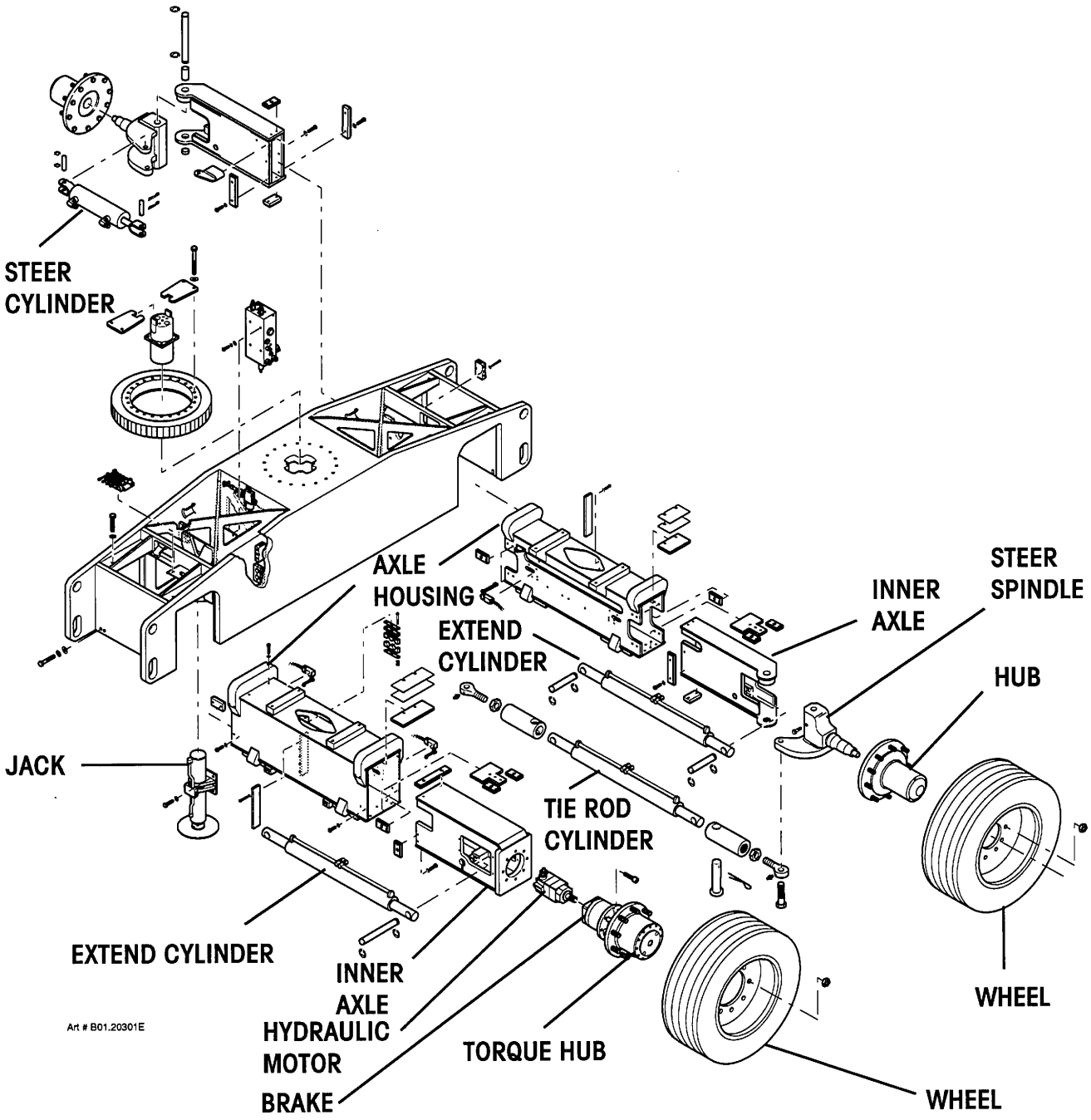
Take care not to damage the rod surface and guard against dirt entering the system.

6. Remove the rod and piston assembly.
7. Replace the seals and "o"-rings.
8. Install the rod and piston assembly.
9. Install and tighten the end cap.
10. Install cylinder.
11. Connect the hydraulic hoses.

STEER AXLE DISASSEMBLY

1. With axles extended, remove tie rod cylinder.
   a. Disconnect hoses to tie rod cylinder and plug hose ends.
   b. Remove hair pin clips and remove tie rod pins.
2. Remove steer cylinder.
   a. Disconnect hoses to steer cylinder and plug hose ends.
   b. Remove rod end retaining rings and pin.
   c. Remove base end hair pin clips and remove pin.
3. Disconnect extend cylinder.
   a. Remove retaining rings and remove pins at both ends of the extend cylinder.
   b. Disconnect hoses to extend cylinder and plug hose ends.
4. Remove axle housing wear pads (2 each side, 2 on bottom).
5. Remove outer axle stops from top and bottom of outer axle weldment.
6. Slide out inner extend axle.
7. Slide out extend cylinder.

NOTE: All wear pads should be inspected and replaced as required.



Undercarriage.

STEER AXLE ASSEMBLY

1. Slide in extend cylinder when fully extended.
2. Slide in inner extend axle.
3. Install axle housing wear pads (2 each side, 2 on bottom).
4. Install outer axle stops with shims on top only.
5. Connect extend cylinder.
   a. Install pins and retaining rings on cylinder.
   b. Connect extend cylinder hoses.
6. Install steer cylinder.
   a. Install rod end retaining rings and install pin.
   b. Install base end hair pin clips and install pin.
   c. Connect hoses to steer cylinder.
7. Install tie rod cylinder.
   a. Install hair pin clips and install tie rod pins.
   b. Connect hoses to tie rod cylinder.

DRIVE AXLE DISASSEMBLY

1. With drive end raised and axles extended, disconnect extend cylinder.
   a. Remove retaining rings and remove pins at both ends of the extend cylinder.
   b. Remove axle housing cover, disconnect hoses to extend cylinder. Plug hose ends.
2. Remove axle housing wear pads (2 each side, 2 on bottom).
3. Remove outer axle stops from top and bottom of outer axle weldment.
4. Slide out inner extend axle.
5. Slide out extend cylinder.

NOTE: All wear pads should be inspected and replaced as required.

DRIVE AXLE ASSEMBLY

1. Slide in extend cylinder fully extended.
2. Slide in inner extend axle.
3. Install axle housing wear pads (2 each side, 2 on bottom).
4. Install outer axle stops with shims on top only.
5. Connect extend cylinder.
   a. Install pins and install retaining rings at both ends of the extend cylinder.
   b. Connect hoses to extend cylinder and install axle housing cover.

HYDRAULIC JACK REPLACEMENT

Disconnect jack hoses and plug them. Remove bolts that secure jack to undercarriage. Remove jack. To install jack, secure it to undercarriage and connect jack hoses. The seals in the hydraulic jack can be replaced by removing the head gland, sliding out the rod and piston, and replacing "o"-rings and seals. See Illustrated Parts Catalog. **KEEP INTERNAL CYLINDER COMPONENTS CLEAN!**

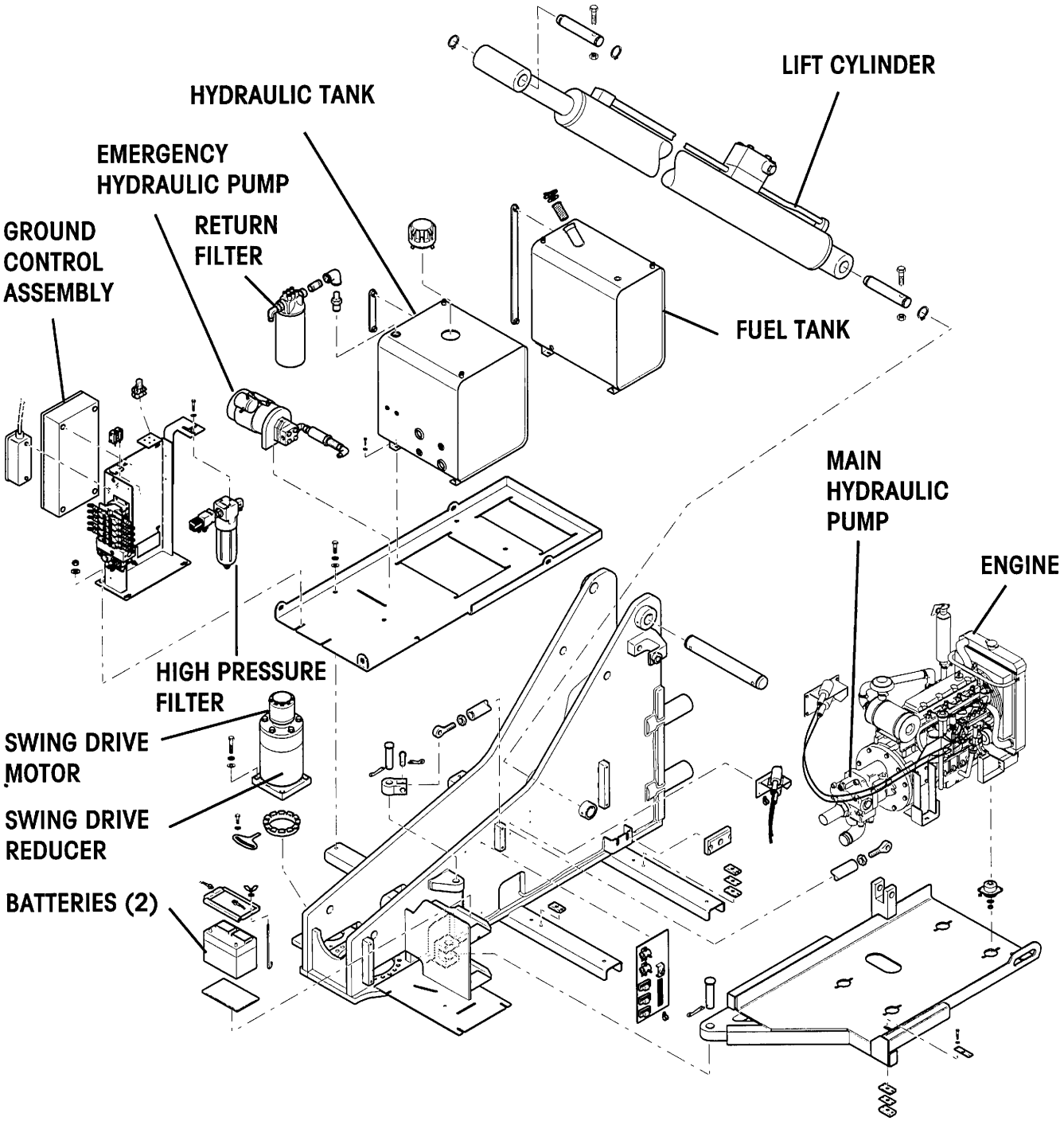
DRIVE MOTOR REPLACEMENT

With axles extended, remove drive motor covers. Disconnect hoses and remove bolts that secure drive motor to drive assembly. Then slide motor out. To install drive motor, slide it into the inner axle and secure it to the drive assembly with bolts. Connect hoses to drive motor and replace drive motor covers.

SUPERSTRUCTURE

The superstructure 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

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

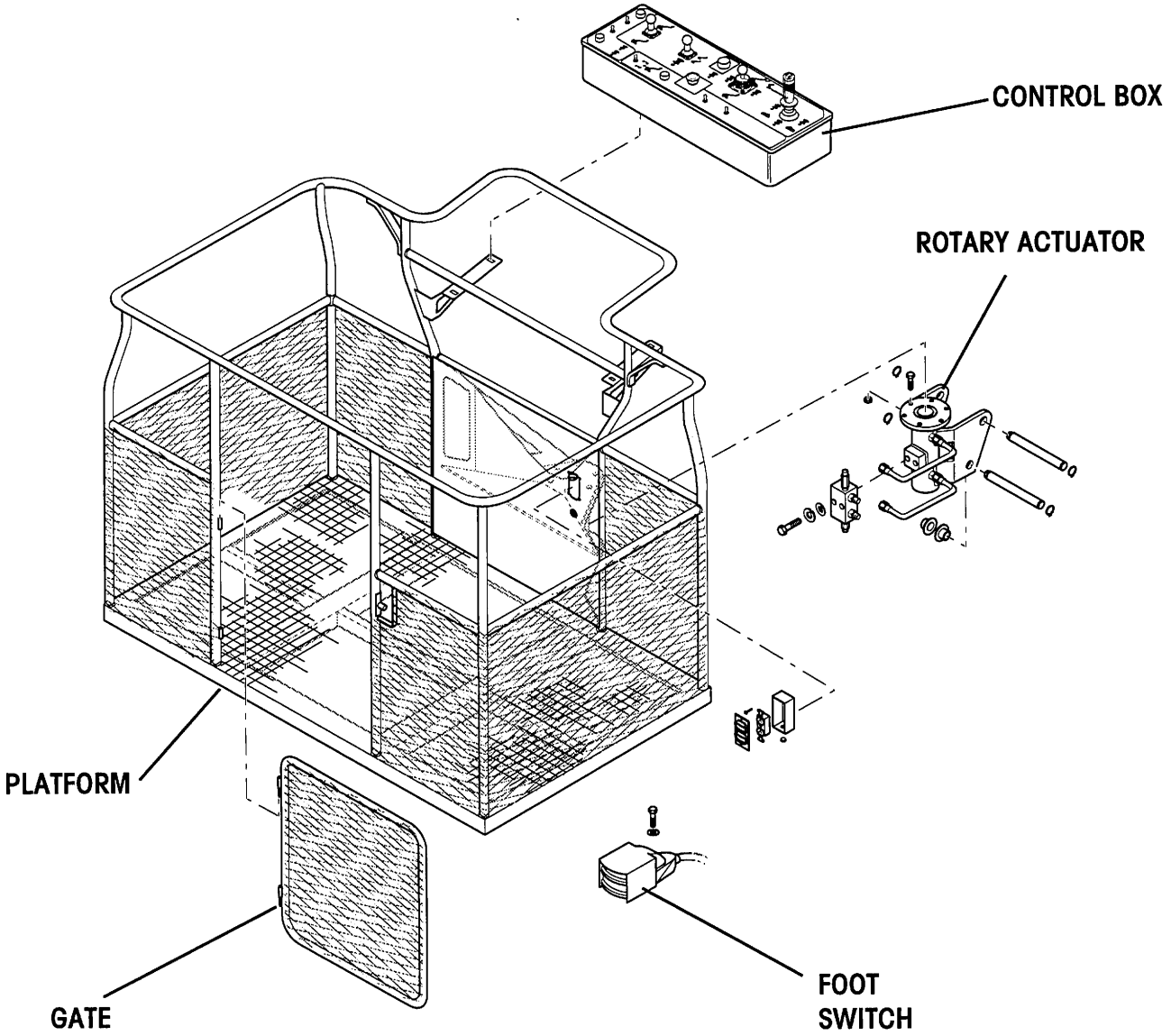
HOSES AND CABLES

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.



Platform Components.

BOOM

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

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.

WEAR PADS

Wear to boom sections is prevented by the installation of wear pads at several points along the boom length. The 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 front of the mid boom, and at the top, bottom and side rear of the mid 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

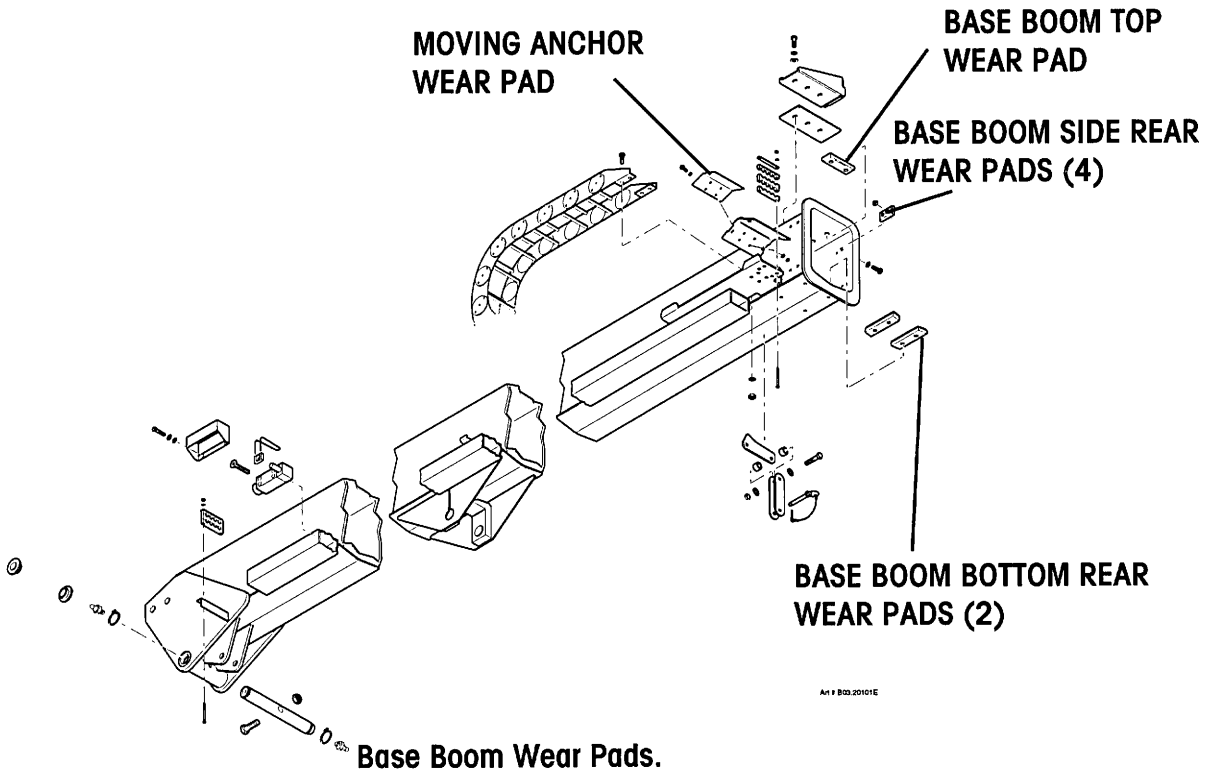
If a pad wears to approximately 3/8" (9.5 mm) thick, it should be replaced or shimmed. Generally, only the bottom pad at the upper end and the top pad at the lower end of the boom will show wear.

Base Boom 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 mid and 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 mid and 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.

Moving Anchor Wear Pad Replacement

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



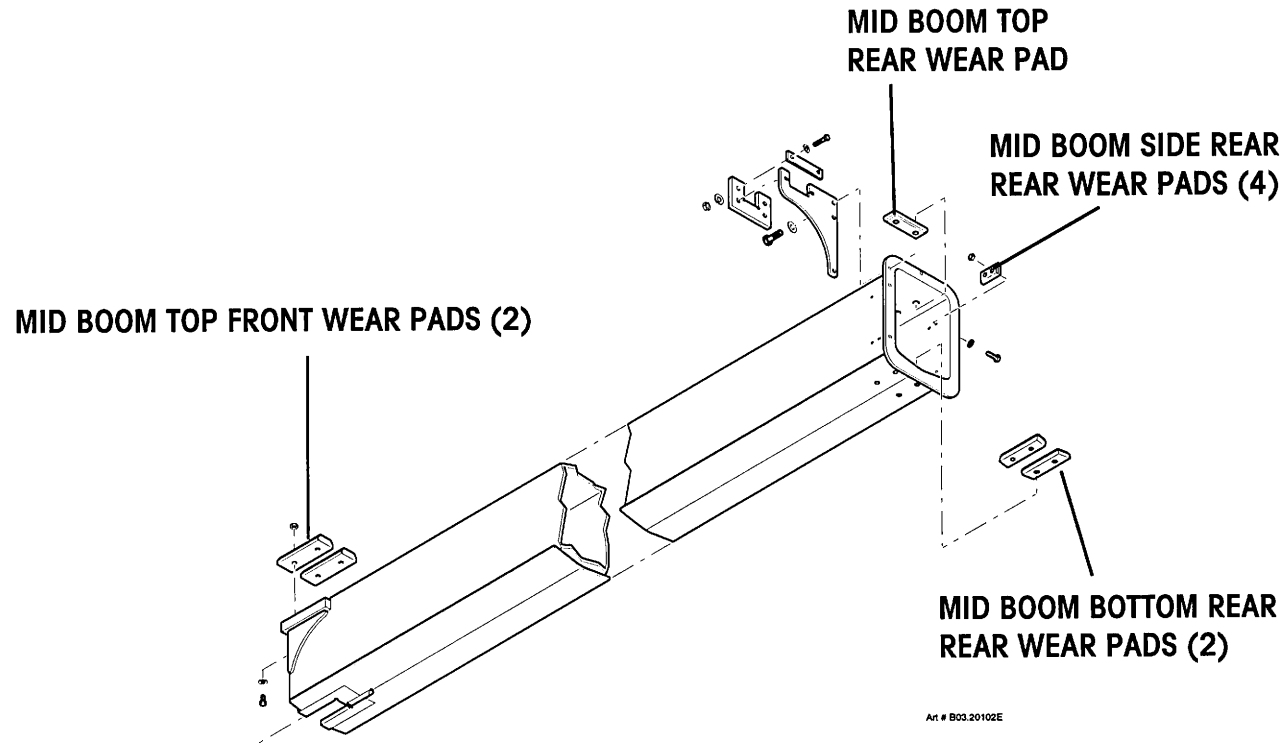
Base Boom Wear Pads.

Mid 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 mid boom top front wear pad retaining bolts, lockwashers and nuts.
5. Remove bolts, washers and nuts; wear pad will easily fall out.
6. Install new wear pad with bolts, lockwashers and nuts.
7. Raise cylinder and install cylinder pin, retaining rings and flat washers.

Mid Boom Rear Wear Pads 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.



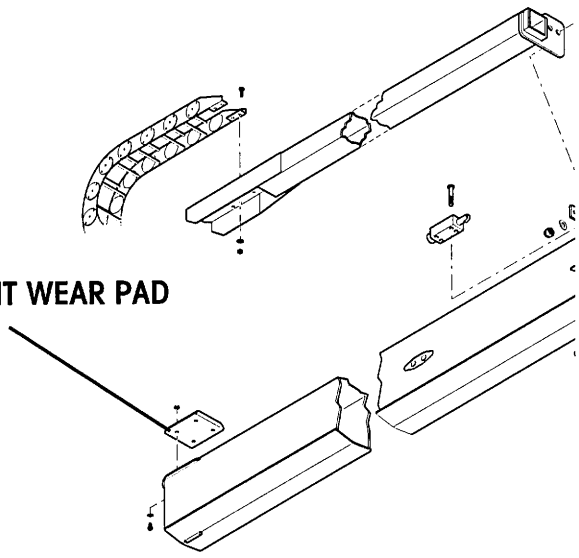
Mid Boom Wear Pad.

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

Tip Boom Top Front Wear Pad Replacement

1. Fully extend the boom and support the boom in the horizontal position.
2. Remove bolts, washers and nuts; wear pad will easily fall out.
3. Install new wear pad with bolts, lockwashers and nuts.

TIP BOOM TOP FRONT WEAR PAD



Tip Boom Wear Pad.

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 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.

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.

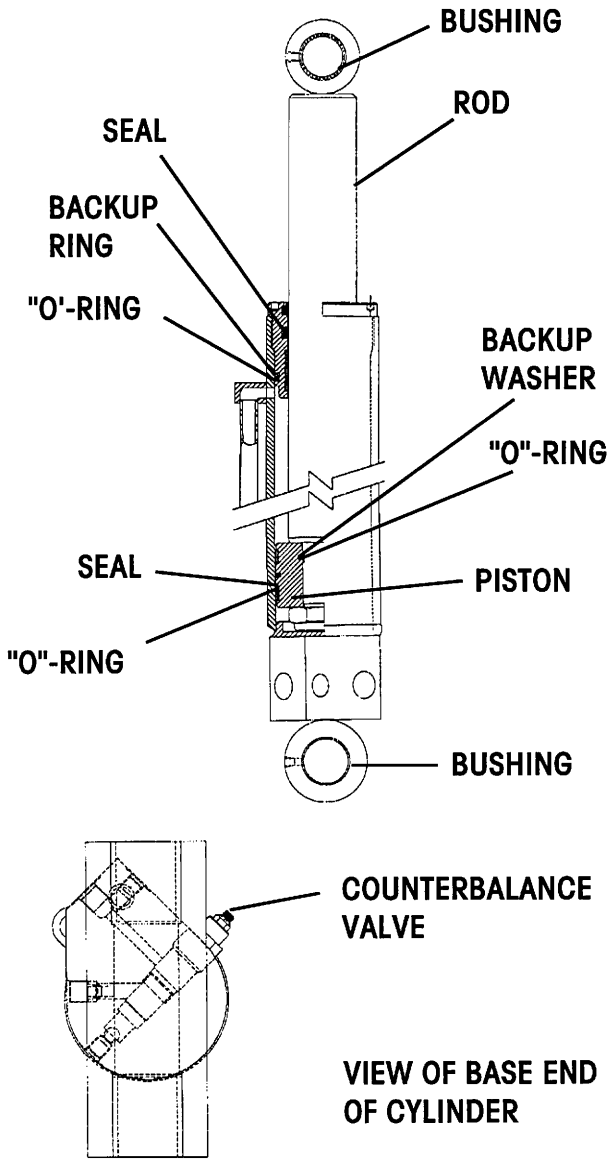
6. With the cylinder supported, remove the base end cylinder pin.

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.

10. Clean the end of the cylinder.



Lift 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.

JIB BOOM REMOVAL

⚠ CAUTION

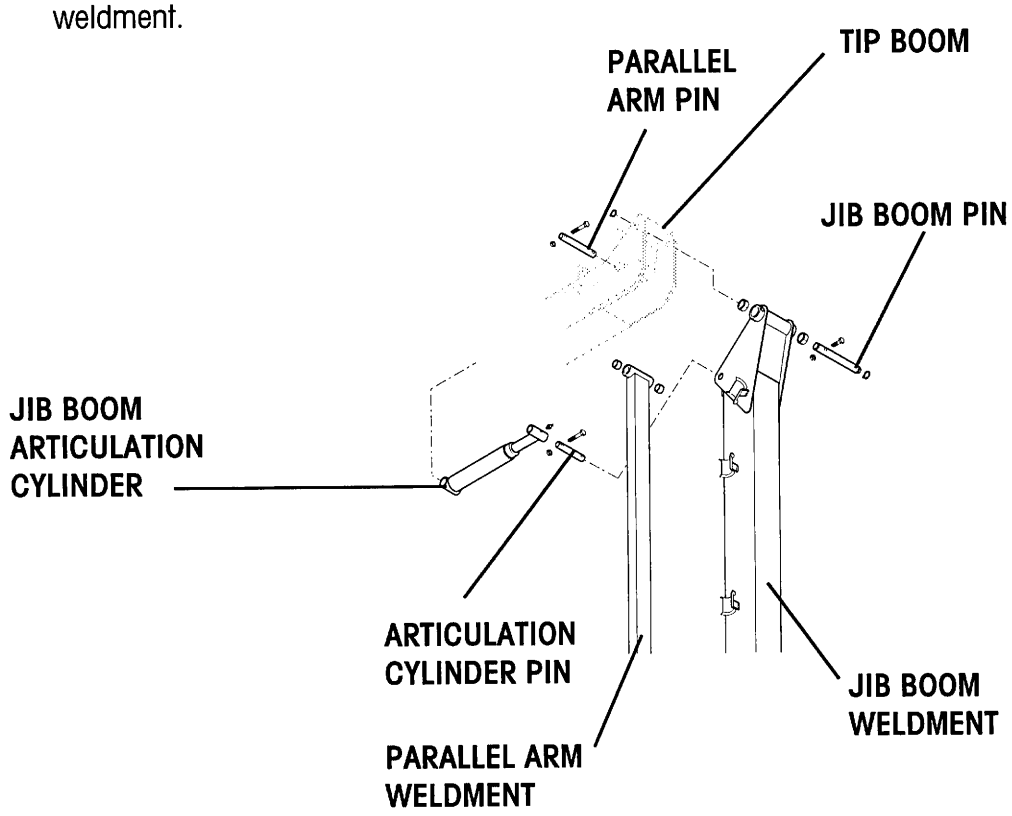
Plug all open hydraulic fittings to prevent contamination by dirt or other foreign objects.

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.**
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. 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 CYLINDER REMOVAL

1. Elevate the boom to the horizontal position.

⚠ CAUTION

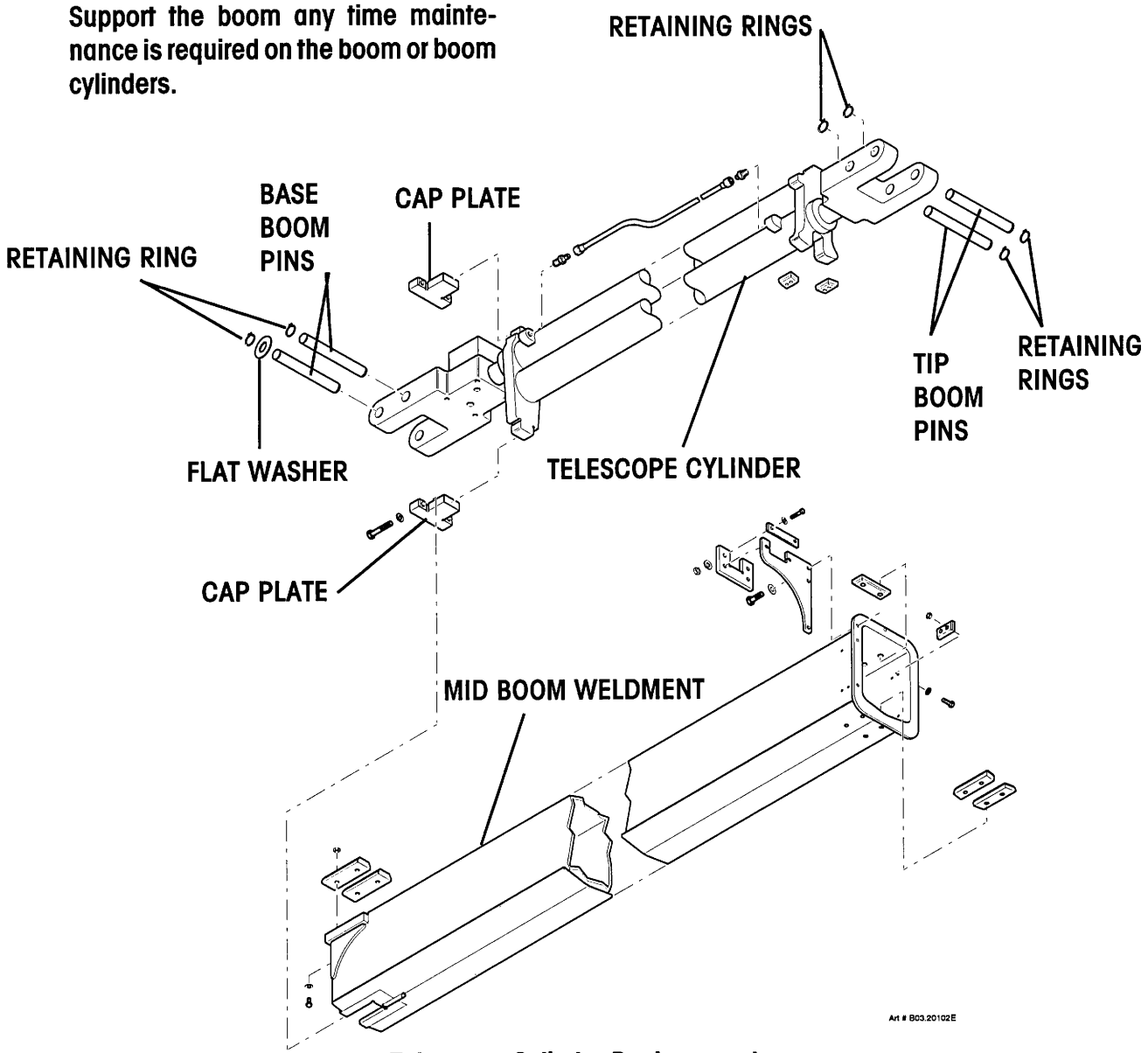
Support the boom any time maintenance is required on the boom or boom cylinders.

2. Extend the boom until the telescope cylinder rod end mounting pins on the tip boom are exposed.

3. SUPPORT THE EXTENDED TIP BOOM (on a boom stand or similar rigid platform).

4. Remove retaining clips and the two pins at the rod end of the telescope cylinder to the tip boom.

5. Close the hydraulic valves and disconnect the hydraulic hoses from the telescope cylinder. Plug hose ends.



Telescope Cylinder Replacement.

6. Remove the retaining rings, flat washers and pins from the boom base end of the cylinder.

7. Remove the two boom cap plates that secure the telescope cylinder to the mid boom.

8. Using a crane, withdraw the cylinder from the back end of 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. Refer to Illustrated Parts Catalog.

7. Install new seals and backup rings. Refer to Illustrated Parts Catalog.

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. Connect the hydraulic hoses to the telescope cylinder and open hydraulic lines.

3. Cycle the telescope cylinder several times to BLEED THE SYSTEM.

4. Measure the distance from base boom pin holes to tip boom pin holes, and extend the telescope cylinder that distance.

5. Using a crane, slide the telescope cylinder into the boom and align the rod end mounting holes with the holes in the tip boom.

6. Install the two pins and retaining rings holding the rod end of the telescope cylinder to the tip boom.

7. Install the pin, flatwashers and retaining rings in the base end of the cylinder.

8. Install the two boom cap plates that secure the telescope cylinder to the mid boom.

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.

PLATFORM LEVELLING CYLINDERS

The platform levelling 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 levelling 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.

LEVELLING CYLINDER PIN REPLACEMENT

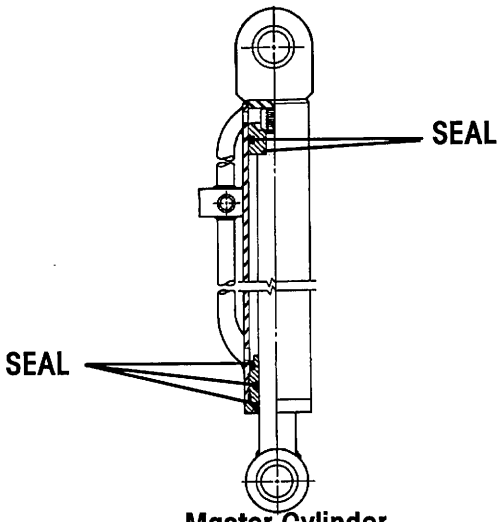
SUPPORT THE PLATFORM to remove the load on both master and slave cylinders. Remove the retaining ring, the pin locking bolts and nuts, and remove the pin.

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

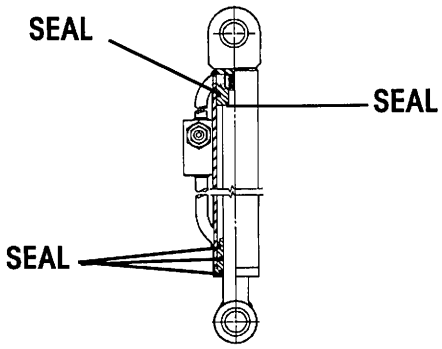
LEVELLING CYLINDER SEAL REPLACEMENT

Lower the main boom. SUPPORT THE PLATFORM to remove the load on both master and slave 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.



Master Cylinder.



Slave Cylinder.

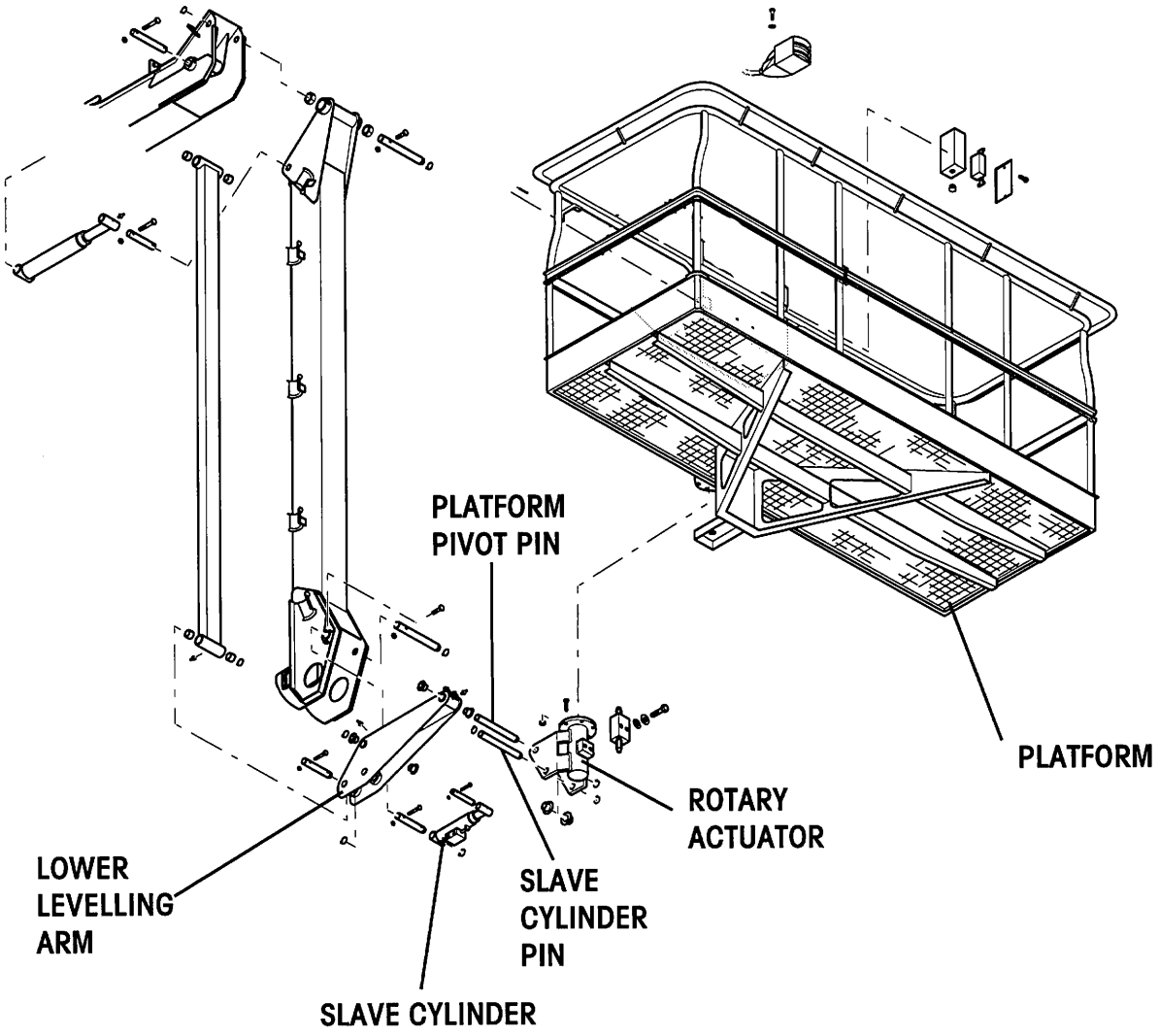
PLATFORM LEVELLING PROCEDURE

After a platform levelling cylinder has been repaired or replaced, or if the platform does not remain level with the raising and lowering of the boom, the platform levelling 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.



Platform/ Jib Components.

BLEEDING THE PLATFORM LEVELLING CIRCUIT

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

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

1. With boom retracted, check the hydraulic fluid level in the tank.

⚠WARNING

HYDRAULIC FLUID WILL BE FORCIBLY EJECTED FROM B AND C FITTINGS (LABELED). LOOSEN NIPPLE SLOWLY.

2. Slightly loosen the B and C hose fittings (labeled) at the base of the master leveling cylinder.

3. 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.

⚠WARNING

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

4. Tighten the B and C hose fittings (labeled) and top off the hydraulic tank.

5. Repeat the procedure as required until all air is expelled.

6. After bleeding the leveling circuit, raise boom to full elevation and then fully lower boom to ensure that platform remains level.

7. Check platform level control lever for proper operation.

SECTION 6:
MAINTENANCE

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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 unit is inspected per the operational checklists at the end of this section.

SHIFT SERVICE

Hydraulic System

Before checking the hydraulic fluid level, ensure that the 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 not damaged.

Platform Rails and Safety Gate

Check security of platform and safety gate.

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.

WEEKLY SERVICE

Hinge Boom

Lubricate the hinge boom and lock pins. Check electrical connections at hinge boom for tightness and corrosion.

Swing Bearing and Drive Pinion Gear

Lubricate standard open swing bearing and drive pinion gear, and check optional oil bath swing bearing case.

Checklist

Perform all items on the Weekly 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.

Hydraulic Filter

Change the high pressure and return filter elements.

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 with 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 unit.

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. ALWAYS REMEMBER, A LITTLE PREVENTIVE MAINTENANCE CAN SAVE MUCH MORE THAN IT COSTS.

INITIAL	DESCRIPTION
_____	1. Check unit for any prior-shift or transportation damage, i.e. missing parts, torn or loose hoses, hydraulic fluid leaks, torn or disconnected wires, flat or damaged tires etc. The compartment doors on both sides can be opened to inspect components inside.
_____	2. Check for machine damage, broken welds, improper or makeshift repairs.
_____	3. Check hydraulic system for leaks, examine hoses for signs of excessive wear, chafing or twisting.
_____	4. Check engine oil and fuel levels.
_____	5. Check engine coolant level (liquid cooled engine only).

Continued on following page . . .

SHIFT OPERATIONAL CHECKLIST (CONTINUED)

INITIAL	DESCRIPTION
_____	6. Check battery electrolyte level. Check battery terminals for tight connections and cleanliness.
_____	7. Check hydraulic fluid level. The level should be at the line marked on the sight gauge with the unit in stowed position. Inspect condition of hydraulic fluid in the reservoir. Fluid should be a clear amber color.
_____	8. Check that all shutoff valves on hydraulic tank are open (parallel to flow).
_____	9. Check tires for proper inflation pressure (see Machine Specifications).
_____	10. Check if wheel lug nuts are tight.
_____	11. Ensure that the four axle extend interlocks located at the axles are functioning properly.
_____	12. Check hose carrier to verify that it is not bent or sagging.
_____	13. Inspect safety equipment as required by OSHA, government and local rules.
_____	14. Inspect the work platform and boom structure for signs of damage and broken welds. Check platform gate latch for damage.
_____	15. Check pivot pins for security.
_____	16. Check that no attempt had been made to override the drive interlock system by a previous operator.
_____	17. Check that all warning and instructional decals are legible and secure.
_____	18. Start engine. Check hydraulic pressure (see Machine Specifications).
_____	19. Check that the tilt alarm is working properly.
_____	20. When all pre-inspection checks have been completed, test the ground controls for proper operation.

Continued on following page . . .

SHIFT OPERATIONAL CHECKLIST (CONTINUED)

INITIAL	DESCRIPTION
_____	21. Check emergency pumps for operation and pressure (see Machine Specifications).
_____	22. Check platform controls for proper operation.
_____	23. With the main boom raised, check for the smooth operation of drive, creep speed.
_____	24. Follow instructions for servicing engine daily. Refer to the Engine Maintenance Manual supplied with your machine.

ADDITIONAL MAINTENANCE REQUIREMENTS FOR HARSH ENVIRONMENTS

NOTE: Do not lubricate wear pads or boom cables in dusty or sandblast environments. There are boots and guards available to extend unit's life in these applications. Consult Simon Aerials Service Department.

INITIAL	DESCRIPTION
_____	• Inspect cylinder boots, valve spool boots, etc., for cuts or other damage after every eight (8) hours of service. Repair or replace if necessary.
_____	• Check hydraulic system for leakage after every eight (8) hours of operation.
_____	• Follow instructions for servicing engine when used severely. Refer to the Engine Maintenance Manual supplied with your machine.

WEEKLY OPERATIONAL CHECKLIST

DATE: _____ **INSPECTED BY:** _____

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

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 WEEKLY INTERVALS OR EVERY 25 HOURS, WHICHEVER OCCURS FIRST. FAILURE TO DO SO COULD ENDANGER THE LIFE OF THE OPERATOR. ALWAYS REMEMBER, A LITTLE PREVENTIVE MAINTENANCE CAN SAVE MUCH MORE THAN IT COSTS.

INITIAL	DESCRIPTION
_____	1. Perform all checks listed on Shift Operational Checklist.
_____	2. Check wheel lug nut torque (see Machine Specifications).
_____	3. Check hydraulic connections for leaks, corrosion and wear.
_____	4. Lubricate swing bearing and drive pinion gear.
_____	5. Apply lubricant to exposed swing bearing and drive pinion gear (see Lubrication Chart). Check lubricant in optional oil bath swing bearing case, if so equipped, for proper level, and check for dirt or metal contamination (see Lubrication Chart).

Continued on following page . . .

WEEKLY OPERATIONAL CHECKLIST (CONTINUED)

ADDITIONAL MAINTENANCE REQUIREMENTS FOR HARSH ENVIRONMENTS

NOTE: Do not lubricate wear pads or boom cables in dusty or sandblast environments. There are boots and guards available to extend unit's life in these applications. Consult Simon Aerials Service Department.

INITIAL	DESCRIPTION
_____	• Lubricate all grease fittings (see Lubrication Chart).
_____	• Check oil level in swing drive motor assembly (see Lubrication Chart).
_____	• Check oil level in power hubs (see Lubrication Chart).
_____	• Follow instructions for servicing engine when used severely. Refer to the Engine Maintenance Manual supplied with your machine.

MONTHLY OPERATIONAL CHECKLIST

DATE: _____ **INSPECTED BY:** _____

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

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, WHICHEVER OCCURS FIRST. FAILURE TO DO SO COULD ENDANGER THE LIFE OF THE OPERATOR. ALWAYS REMEMBER, A LITTLE PREVENTIVE MAINTENANCE CAN SAVE MUCH MORE THAN IT COSTS.

INITIAL	DESCRIPTION
_____	1. Perform all checks listed on Shift and Weekly Operational Checklists.
_____	2. Lubricate all grease fittings (see Lubrication Chart).
_____	3. Lubricate all hydraulic valve spool linkages.
_____	4. Check hose and electrical wire routed from the main boom, through the jib boom and to the platform for any damage.
_____	5. Check protective rubber cover around hoses at moving anchor, tip boom, boom hose passages, and at swing bearing.
_____	6. Check boom hose carrier for sag and damage. If damaged, have them repaired.
_____	7. Check torque of swing bearing bolts (see Machine Specifications).

Continued on following page . . .

MONTHLY OPERATIONAL CHECKLIST (CONTINUED)

INITIAL	DESCRIPTION
_____	8. Check adjustment and security of swing drive motor assembly. There should be a slight amount of backlash between the superstructure and undercarriage when properly adjusted. Check torque of mounting bolts (see Machine Specifications).
_____	9. Check oil level in swing drive gear box (see Lubrication Chart).
_____	10. Check oil level in power hubs (see Lubrication Chart).
_____	11. Check that tires are not leaning in or out.
_____	12. Check that wheel spindles turn freely, with no end play.
_____	13. Check drive wheel power hub mounting bolt torque (see Machine Specifications).
_____	15. Check that neither the main boom nor jib boom drift with a full load, when there is no hydraulic pressure (engine off) and the controls are in the "BOOM DOWN" position.
_____	16. Inspect boom cables.
_____	17. Check to make sure boom sections are not dented or bent.
_____	18. Check that all adjustable flow valves are locked. Check settings if any are not locked.
_____	19. Check fuel shutoff rack for proper operation. Loosen lever arm and lubricate with WD-40 or equivalent.
_____	20. Follow instructions for servicing engine monthly. Refer to the Engine Maintenance Manual supplied with your machine.

ADDITIONAL MAINTENANCE REQUIREMENTS FOR HARSH ENVIRONMENTS

EVERY 90 DAYS

INITIAL	DESCRIPTION
_____	• Replace high pressure filter element.
_____	• Follow instructions for servicing engine when used severely. Refer to the Engine Maintenance Manual supplied with your machine.

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, WHICHEVER IS SOONER. FAILURE TO DO SO COULD ENDANGER THE LIFE OF THE OPERATOR. ALWAYS REMEMBER, A LITTLE PREVENTIVE MAINTENANCE CAN SAVE MUCH MORE THAN IT COSTS.

INITIAL	DESCRIPTION
_____	1. Perform all checks listed on Shift, Weekly and Monthly operational checklists.
_____	2. Have hydraulic fluid sample analyzed at a test laboratory. Comply with test results and recommendations to ensure long, trouble free operation. **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. Inspect the entire machine for signs of structural damage and broken welds, and worn or damaged components. Replace as necessary.
_____	4. Clean and lubricate all electrical switches with an electrical contact cleaner and ensure that the switches operate freely in all positions.
_____	5. Check the electrical mounting and hardware connections for security.

Continued on following page . . .

SEMI-ANNUAL OPERATIONAL CHECKLIST (CONTINUED)

INITIAL	DESCRIPTION
_____	6. Replace high pressure and return filter elements.
_____	7. Clean and lubricate the exposed swing bearing gear teeth with dry moly lube spray (not required for oil bath swing bearing option).
_____	8. Repack front wheel bearings.
_____	9. Follow instructions for servicing engine semi-annually. Refer to the Engine Maintenance Manual supplied with your machine.

EVERY YEAR

_____	10. Drain and replace fluid from hydraulic reservoir. Drain and replace fluid from drive wheel power hubs. If badly contaminated, it may be necessary to disassemble and inspect components.

EVERY TWO YEARS

_____	11. Drain and replace fluid from swing drive motor assembly. If badly contaminated, it may be necessary to disassemble and inspect components.

ADDITIONAL MAINTENANCE REQUIREMENTS FOR HARSH ENVIRONMENTS

EVERY SIX MONTHS

_____	• Drain and replace fluid from swing drive motor assembly and drive wheel power hubs.
_____	• Follow instructions for servicing engine when used severely. Refer to the Engine Maintenance Manual supplied with your machine.

SECTION 7:
TROUBLESHOOTING

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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 Switch is pressed and held for platform console operation.
- The Deadman button 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 hydraulic reservoir 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.

ERROR CODE IDENTIFICATIONS

(Check error code while function is activated.)

ERROR CODE	DESCRIPTION	PROBABLE CAUSE
EC1	Data lines	Bad connection on data lines to or from platform.
EC2	Drive	Bad connection at drive joystick.
EC3	Boom up/down	Bad connection at boom up/down joystick.
EC4	Swing	Bad connection at swing Joystick.
EC5	Boom ext./ret.	Bad connection at boom extend/retract joystick.
EC6	Jib	Bad connection at jib joystick.
EC7	Starter	Short or open connection to starter relay.
EC8	Emergency pump	Short or open connection to emergency pump relay.
EC9	Choke/Glow Plug	Short or open connection to choke/glow plug relay.
EC10	Pump Stroker	Short or open connection to pump stroke valve.
EC11	Horn	Short or open connection to horn.
EC12	High speed valve	Short or open connection to high speed drive valve.
EC13	Plat. Rotate Right	Short or open connection to platform rotate right valve.
EC14	Plat. Rotate left	Short or open connection to platform rotate left valve.
EC15	Plat. level up	Short or open connection to platform level up valve.
EC16	Plat. level down	Short or open connection to platform level down valve.
EC17	Steer select	Short or open connection to steer select valve.
EC18	Axle	Short or open connection to axle enable valve.
EC19	Boom axle enable switch	Trying to extend or retract axles while boom up or out.
EC20	Boom/axle switch	Trying to boom up or out while axles are in.
EC21	Engine distress	Oil , temp or fan belt switch(es) on while engine running.

TROUBLESHOOTING CHART

Problem	Probable Cause	Solution
• All hydraulic functions inoperable.	• Check error code at ground control.	• Correct electrical problem.
	• Hydraulic enable valve.	• Check valve wiring and operation.
	• Pump stroker valve.	• Check valve wiring and operation.
	• Low fluid in reservoir.	• Fill to proper level.
	• Hydraulic pump defective.	• Repair or replace.
	• Faulty Deadman button or foot switch.	• Replace or repair.
	• Water in hydraulic fluid.	• Drain and flush hydraulic system.
	• Improper oil viscosity.	• Use correct fluid. See Lubrication Chart.
	• Hydraulic fittings loose or ports open.	• Close ports and tighten fittings. Drain and flush hydraulic system.
	• Faulty compensator valve.	• Check for improper compensator adjustment or replace valve.
	• Fluid leaks.	• Check for circuit leakage and fluid at pump inlet.
	• Faulty pump coupler.	• Replace coupler.
	• Pump intake restricted or plugged.	• Remove, clean or replace filter and/or strainer.
	• Dirt or sludge in pump.	• Drain and flush hydraulic system.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Hydraulic functions slow.	• Low hydraulic pump pressure.	• Check and adjust for correct pressure if necessary.
		• Check for restricted inlet or insufficient inlet fluid.
	• Pump differential pressure control or compensator failed or out of adjustment.	• Check adjustment, and replace if damaged.
	• High pressure filter or return filter.	• Check for plugged hydraulic filters; replace filter elements.
	• Pump component failure.	• Repair or replace pump.
	• Pump horsepower limiter failed, or out of adjustment.	• Check horsepower limiter adjustment and replace if faulty.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Function chatter.	• Hydraulic fluid low.	• Check for sufficient inlet fluid and add fluid.
	• Broken pump components.	• Repair or replace pump.
	• Air in hydraulic system.	• Check for pump suction air leak.
	• Cavitation in hydraulic pump.	• Check return filter. • Check suction 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.
		• Check for air leak at inlet connections.
		• Check for insufficient inlet fluid (cavitation).
	• Aeration of fluid in reservoir.	• Check for low fluid level and add as required.
	• Plugged or restricted suction line, suction strainer or filter.	• Remove, clean or replace suction line, filter or strainer.
	• Fluid viscosity too high.	• Drain and flush system. Fill with recommended fluid. (See Lubrication Chart.)
	• Failure of pump component(s).	• Repair or replace pump.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• 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. • Footswitch blocked or 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). • Unblock footswitch or correct electrical problem.
• Engine does not go into mid or hi speed.	• Throttle relays. • An actuator failure. • Ground/platform throttle switch. • Throttle actuator cable.	• 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). • Adjust linkage cable.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Drive function only does not operate.	• Check error code at ground control.	• Correct electrical problem.
	• Toggle switch (for ground) or joystick (for platform) electrical malfunction.	• Check switch (joystck) and wire continuity.
	• Faulty drive valve coil or electrical connection.	• Check electrical connection and coil for operation.
	• Drive valve spool is stuck.	• Manually engage and check for proper operation. Replace if faulty.
	• Drive brakes not releasing.	• Test brake hydraulic pressure.
	• Wheel drive motor component failure.	• Replace the motors.
• Steer function only does not operate.	• Check error code at ground control.	• Correct electrical problem.
	• 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 valve spools may be stuck. Remove valve and inspect, clean, repair or replace as needed.
	• Faulty steer coils or electrical connections.	• Check steer coils and electrical connections.
	• Faulty steer switch.	• Check steer switch.
	• Faulty cylinder packing.	• Replace packing.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Swing function only inoperable either direction.	• Check error code at ground control.	• Correct electrical problem.
	• Spool valve stuck.	• Manually engage swing spool and check for proper operation. Replace if faulty.
	• Faulty valve coil or electrical connection.	• Check coil or electrical connection for operation.
	• 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
• Extend or retract function from platform - none.	• Check error code at ground control.	• Correct electrical problem.
	• 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.
	• Faulty valve coil or electrical connections.	• Check coil or electrical connection for operation.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Boom track sagging.	• Track pin holes stretched usually caused by a damaged beam support.	• Check 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.
• Boom track cross braces breaking.	• Hoses wearing 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.
• Boom drifts down without footswitch actuated.	• Mechanical failure.	• Check that platform boom control lever returns to neutral position.
	• Faulty counterbalance valve.	• Check counterbalance valve, and replace if necessary.
	• Faulty cylinder packing.	• Check for leaking lift cylinder, and repack as required.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Lift function only does not operate.	• Check error code at ground control.	• Correct electrical problem.
	• Mechanical failure.	• Check that platform boom control lever returns to 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.
	• Faulty valve coil or electrical connections.	• Check coil and electrical connections for operation.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Jib function - none.	• Check error code at ground control.	• Correct electrical problem.
	• Jib spool valve stuck.	• Manually engage jib spool and check for operation.
	• Holding valves not operating properly.	• Remove, clean, inspect, replace and test unit operation.
	• Faulty cylinder.	• Possibly plugged lines, cylinder ports or damaged cylinder packings. Inspect, repair or replace cylinder.
	• Faulty valve coil or electrical connections.	• Check coil and electrical connections for operation.
• Jib cylinder drifts down without footswitch operated.	• Holding valve cartridge dirty or faulty.	• Clean, repair or replace the holding valve.
	• Cylinder packing is damaged.	• Replace cylinder packing.

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.
	• Defective master cylinder relief valve.	• Repair or replace as necessary.
• Platform level function only does not operate.	• Check error code at ground control.	• Correct electrical problem.
	• Hydraulic line blockage.	• Check for blocked or partially blocked return hoses.
	• Faulty valve coil or electrical connections.	• Check coil and electrical connections for operation.
	• Platform level toggle switch.	• Check electrical connections for operation or replace toggle switch.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Platform rotate function only does not operate.	• Check error code at ground control.	• Correct electrical problem.
	• Double pilot operated check valve (relief valve).	• Install valve correctly. Check the valve cartridge and replace if necessary.
	• 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.
	• Hydraulic line blockage.	• Check for blocked or partially blocked return hoses.
	• Faulty valve coil or electrical connections.	• Check coil and electrical connections for operation.
	• Platform level toggle switch.	• Check electrical connections for operation or replace toggle switch.
• Movement alarm will not sound.	• Broken wire or connection in the alarm circuit.	• Trace electrical circuit to alarm.
	• Alarm is faulty.	• Replace the faulty component.
• Tilt alarm sounds continuously.	• Faulty fuse or broken connection at tilt sensor.	• Replace fuse or correct electrical connection.
• Tilt alarm does not sound when machine tilted.	• Alarm is faulty.	• Replace alarm.
	• Tilt sensor or electrical connection faulty,	• Replace tilt sensor or correct electrical connection to sonsor.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Axle extend/retract function - none.	• Check error code at ground control.	• Correct electrical problem.
	• Faulty axle enable button.	• Check axle enable switch continuity.
	• Faulty extend cylinders.	• Possibly plugged lines, cylinder ports or damaged cylinder packings. Inspect, repair or replace cylinder.
	• Faulty steer right or axle enable valve coil or electrical connections.	• Check coil and electrical connections for operation.
• Hydraulic jack function - none.	• Check error code at ground control.	• Correct electrical problem.
	• Faulty axle enable button.	• Repair or replace as required.
	• Faulty jack cylinders.	• Check axle enable switch continuity.
	• Faulty jack selector valve.	• Possibly plugged lines, cylinder ports or damaged cylinder packings. Inspect, repair or replace cylinder.
		• Repair or replace as required.
	• Faulty steer right or axle enable valve coil or electrical connections.	• Check coil and electrical connections for operation.

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APPENDIX

OPTIONAL LOAD SENSE LINE

TO DRAIN OF MASTER LEVEL CYLINDER MANIFOLD

TO #3 PORT ON SWIVEL

HYDRAULIC RESERVOIR

8.6U FILTER

PUMP STROKE

CONTROL DRAIN

"B"

"A"

PRESSURE COMP. 3500PSI

8.6U FILTER

EMERGENCY PUMP

3000 PSI RELIEF SETTING

10U FILTER

M

DRIVE/CREEP

CREEP MANIFOLD

SWING LEFT

SWING RIGHT

BOOM UP

BOOM DOWN

BOOM RETRACT

BOOM EXTEND

JIB UP

JIB DOWN

STEER LEFT

STEER RIGHT

DRIVE

T P LS

T P LS

GAUGE

TO PRESSURE PORT OF LEVEL/ROTATE MANIFOLD

C2 24/3 GPM 3500 PSI

C1 24/3 GPM 3500 PSI

6 GPM

LEVEL/ROTATE 2950 PSI

C2 0.8 GPM 3000 PSI

C1 0.8 GPM 3000 PSI

C2 3000 PSI 6.4 GPM

C1 3000 PSI 4.5 GPM

C2 3000 PSI 10 GPM

C1 1000 PSI 15 GPM

C2 3000 PSI 0.7 GPM

C1 3000PSI 0.7 GPM

C2 2000 PSI 9.5 GPM

C1 1750 PSI 11 GPM

C2 (FWD) 3500PSI 24 GPM

C1 (REV) 3500PSI 24 GPM

PP

TO TANK PORT OF LEVEL/ROTATE MANIFOLD

TO SWING MOTOR

TO LIFT CYLINDER

TO BOOM TELESCOPIC CYLINDER

TO ARTICULATION CYLINDER

TO AXLE ENABLE VALVE

TO REAR PORT OF STEERING CYLINDER

TO #2 PORT ON SWIVEL

TO #1 PORT ON SWIVEL

REFERENCE: REMOVE JIB SECTION FROM VALVE FOR T80

REF: RP86\T80 SHEET 1 OF 3

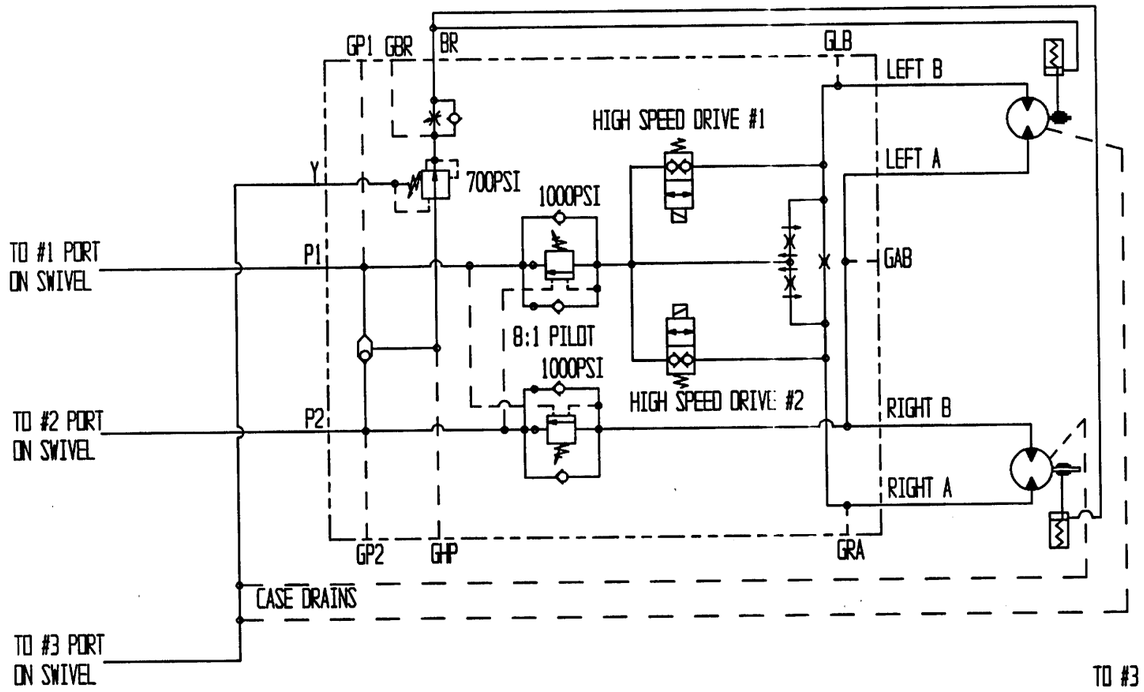
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TITLE: HYDRAULIC SCHEMATIC

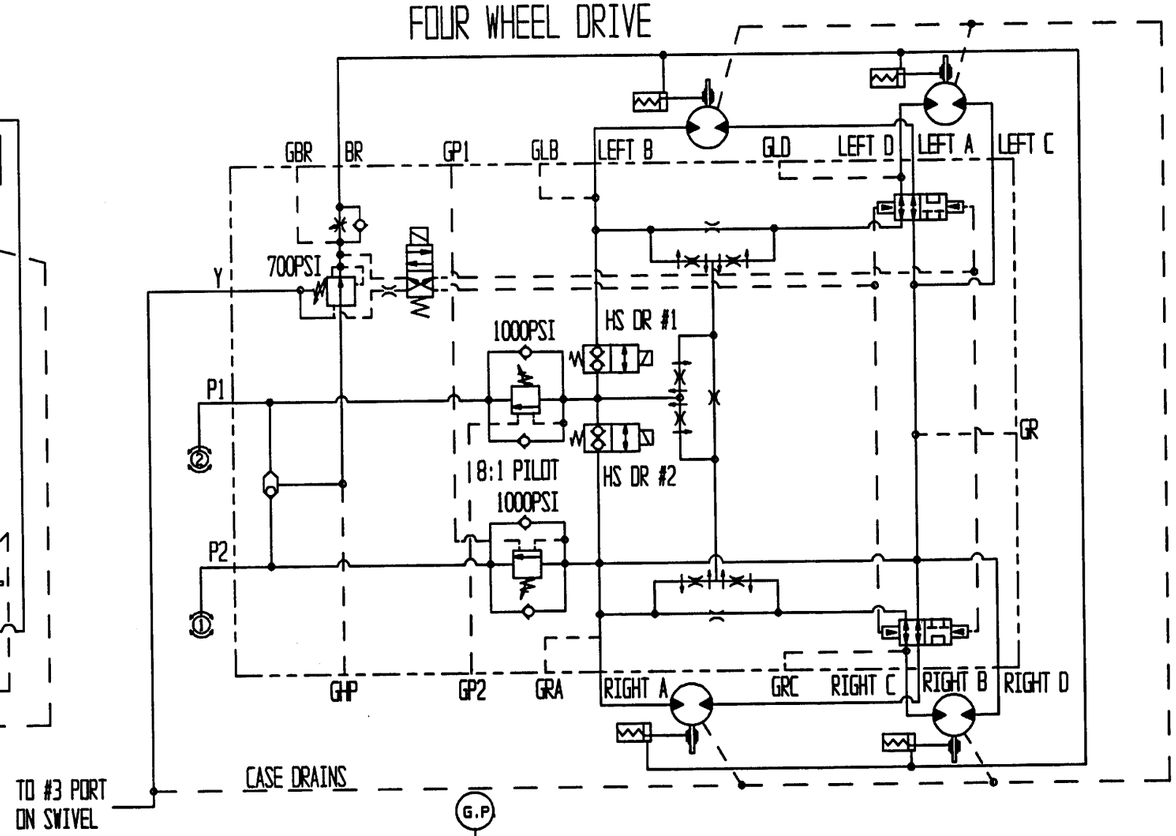
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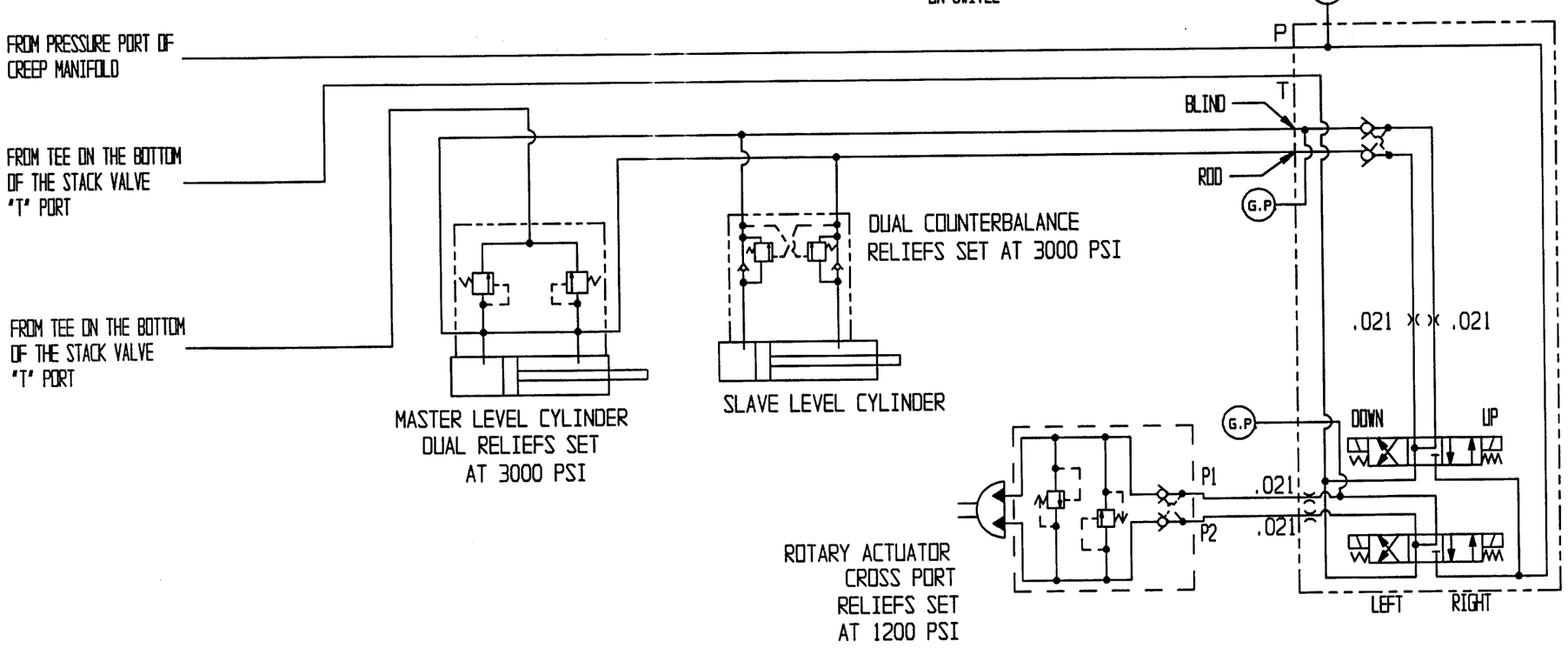
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TWO WHEEL DRIVE



FOUR WHEEL DRIVE





REF: RP86/T80 SHEET 2 OF 3

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TITLE: HYDRAULIC SCHEMATIC

REVISION: G

DRG. NO.: E-2349560

FROM #3 PORT
ON SWIVEL

FROM #5 PORT
ON SWIVEL

AXLE ENABLE

FROM #4 PORT
ON SWIVEL

1

2

3

OPTIONAL TOWING PACKAGE
STEERING RELEASE VALVE

FROM #3 PORT
ON SWIVEL

FROM #4 PORT
ON SWIVEL

FROM #5 PORT
ON SWIVEL

AXLE EXTEND
CYLINDER-FRONT

TIE ROD
CYLINDER-FRONT

*FOUR WHEEL STEER ONLY
TIE ROD
CYLINDER-REAR

AXLE EXTEND
CYLINDER-REAR

JACK
CYLINDER-FRONT

JACK
CYLINDER-REAR

C1

V1

C2

V2

C1

V1

C2

V2

1600 PSI

FRONT/REAR STEER SELECT
OPTION FOR REAR STEER

1900 PSI

1600 PSI

STEERING CYLINDER-FRONT

1600 PSI

1900 PSI

OPTIONAL STEERING CYLINDER-REAR

COUNTERBALANCE RELIEFS
SET AT 3000 PSI

C1

FROM BOOM EXTEND SECTION OF
MAIN CONTROL VALVE

C2

R E

BOOM TELESCOPE
CYLINDER

FROM SWING SECTION OF
MAIN CONTROL VALVE

SWING MOTOR

BRAKE

FROM BOOM UP/DOWN SECTION OF
MAIN CONTROL VALVE

REF: MOUNTED ON
MAIN CONTROL VALVE

COUNTERBALANCE RELIEF
SET AT 4900 PSI

LIFT CYLINDER

*NOTE NOT ON T80

FROM ARTICULATION (JIB) SECTION OF
MAIN CONTROL VALVE

DUAL COUNTERBALANCE
RELIEFS SET AT 3000 PSI

JIB CYLINDER
(ARTICULATION)

REF: RP86/T80 SHEET 3 OF 3

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TITLE
HYDRAULIC SCHEMATIC

REVISION G

DRWG. NO. E-2349560

PLATFORM BOX

PLATFORM CONTROLLER BOARD

TILT ALARM JP8-2 — 25A
GROUND JP8-5 — 20A
AXEL LIGHTS JP8-5 — 20
ENGINE LIGHTS JP8-3 — 25 BLACK
SYSTEM GROUND JP8-2 — 10 YELLOW
STEER RIGHT JP1-1 — 11 YELLOW
STEER LEFT JP1-2 — 25B PURPLE
JOYSTICKS GROUND JP3-1 — 14 GREEN
DRIVE JP3-9 — 12 GREEN
BOOM UP/DOWN JP3-8 — 8 GREEN
SWING JP3-7 — 6 GREEN
BOOM EXT/RET JP3-6 — 26 GREEN
JIB J9-5 — 2A ORANGE
JOYSTICKS SUPPLY(+5 VDC) JP3-10 — 44 YELLOW
LIGHTS JP1-3 — 55 YELLOW
PLATFORM LEVEL DN JP1-4 — 54 YELLOW
PLATFORM LEVEL UP JP1-5 — 52 YELLOW
PLATFORM ROTATE LEFT JP1-6 — 53 YELLOW
PLATFORM ROTATE RIGHT JP1-7 — 5 YELLOW
EMERGENCY PUMP JP1-8 — C YELLOW
MACHINE FUNCTION SPEED JP2-1 — 10A YELLOW
STEER SELECT JP2-2 — 3A YELLOW
HORN JP2-3 — 4A YELLOW
ENGINE ON JP2-4 — 4 YELLOW
ENGINE START JP2-5 — 51 YELLOW
CHOKE/GLOW PLUG JP2-8 — 43 YELLOW
ENGINE THROTTLE JP2-7 — 36 RED
SYSTEM POWER (+12 VDC) JP8-1 — DT BROWN
DATA TRANSMIT JP4-5 — DR BLUE
DATA RECEIVE JP4-4 — 17 YELLOW
FOOT SWITCH JP2-8 — 28
+12 VDC JP8-4
+12 VDC JP8-1 — RED

TILT ALARM
25A BLACK
AXLES LIGHT
ENGINE DISTRESS LIGHT
WHITE
20A WHITE
BLACK
19A WHITE

25
STEER RIGHT 10 — B
STEER LEFT 11 — A — C

DRIVE FWD/REV.
2A R
25B L
14 C

BOOM UP/DOWN
SWING LEFT/RIGHT
2A 2 2
25B 1 1
12 3 3
8 3 3

BOOM EXT/RET
2A R
25B L
6 C

JIB UP/DOWN (RP-86 OPTION)
CONNECT 26 TO 6 FOR T-80
2A R
25B L
26 C

36
LIGHTS (OPTION) 44
PLATFORM LEVEL DOWN 31
PLATFORM LEVEL UP 31A
PLATFORM ROTATE CW 32
PLATFORM ROTATE CCW 32A
AUXILIARY PUMP 5
MACHINE FUNCTION SPEED C
STEER SELECT (OPTION) 10A
HORN 3A
ENGINE ON 4A 1 2
ENGINE START 4 4 5
CHOKE/GLOW PLUG 51
THROTTLE 43
36
DT
DR

SENSOR RING OVERRIDE (OPTION)
17 17A
17B
17C

SPARE → P1,J
SPARE → P2,H
SPARE → P2,J

C4, SHIELD (CUT SHIELD AT PLATFROM) 25
P2,G C4, BLACK
P1,H C4, BLUE 25
P1,E C4, BLACK 25
P2,F C8, WHITE 36 25 — PLATFROM LIGHTS (OPTION)
EM. STOP
P1,A C4, RED
35 P1,B C4, ORANGE
36 P1,C C4, GREEN
P1,D C4, BROWN
P2,A C9, RED
48 P2,B C9, WHITE
P1,F C4, WHITE
P1,G C4, YELLOW
P2,C C9, GREEN — FOOT SWITCH
P2,D C10, BLACK
P2,E C10, WHITE — SENSOR RING LIMIT SWITCH (OPTION)

8 CONDUCTOR CABLE TO GROUND BOX

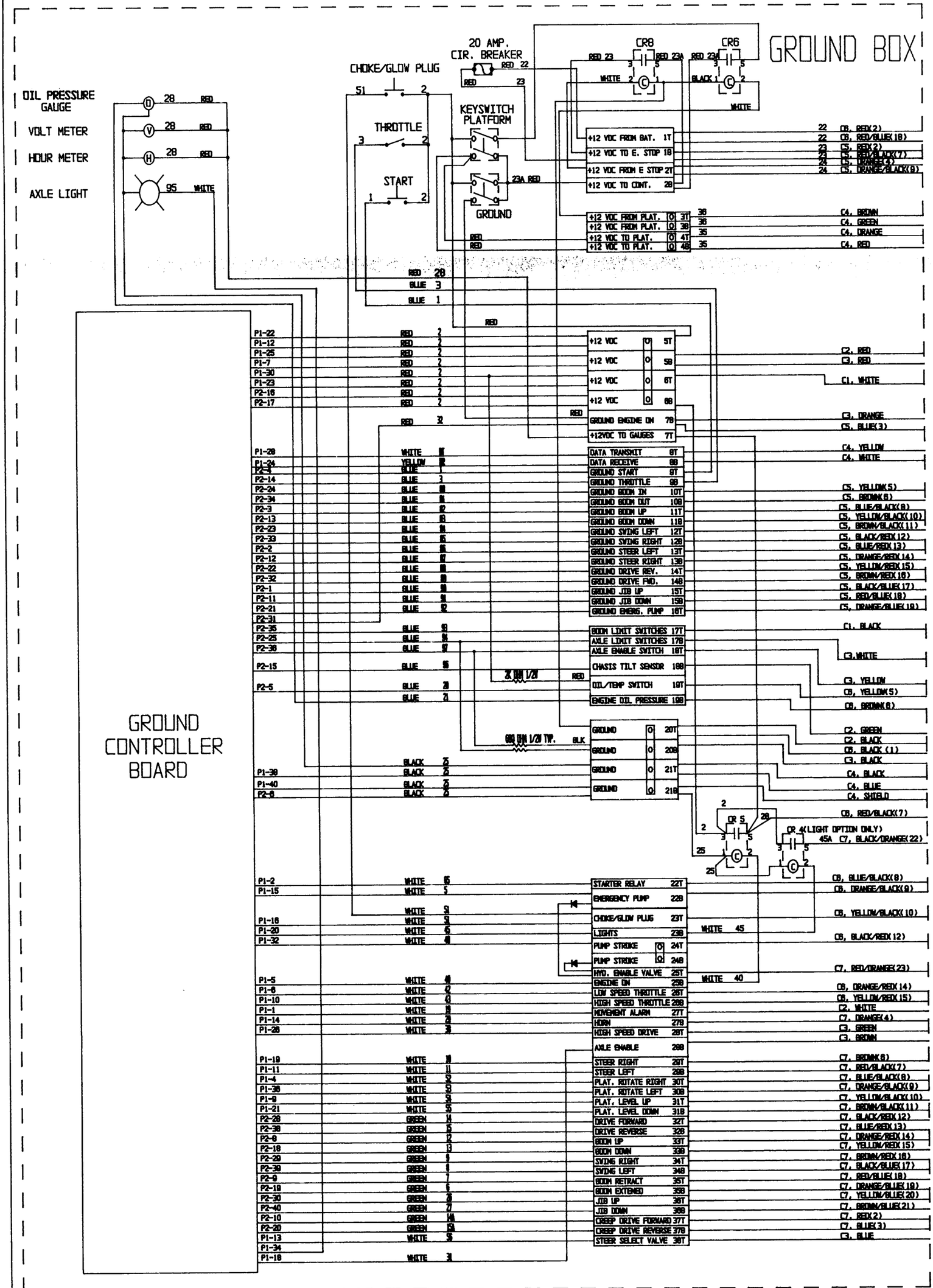
P2 DESIGNATES LEFT 9 PIN CONNECTOR HD10-9-96P
P1 DESIGNATES RIGHTT 9 PIN CONNECTOR HD10-9-16P
C4,GREEN DESIGNATES CABLE #4 GREEN WIRE

REF: T-80/ RP-86

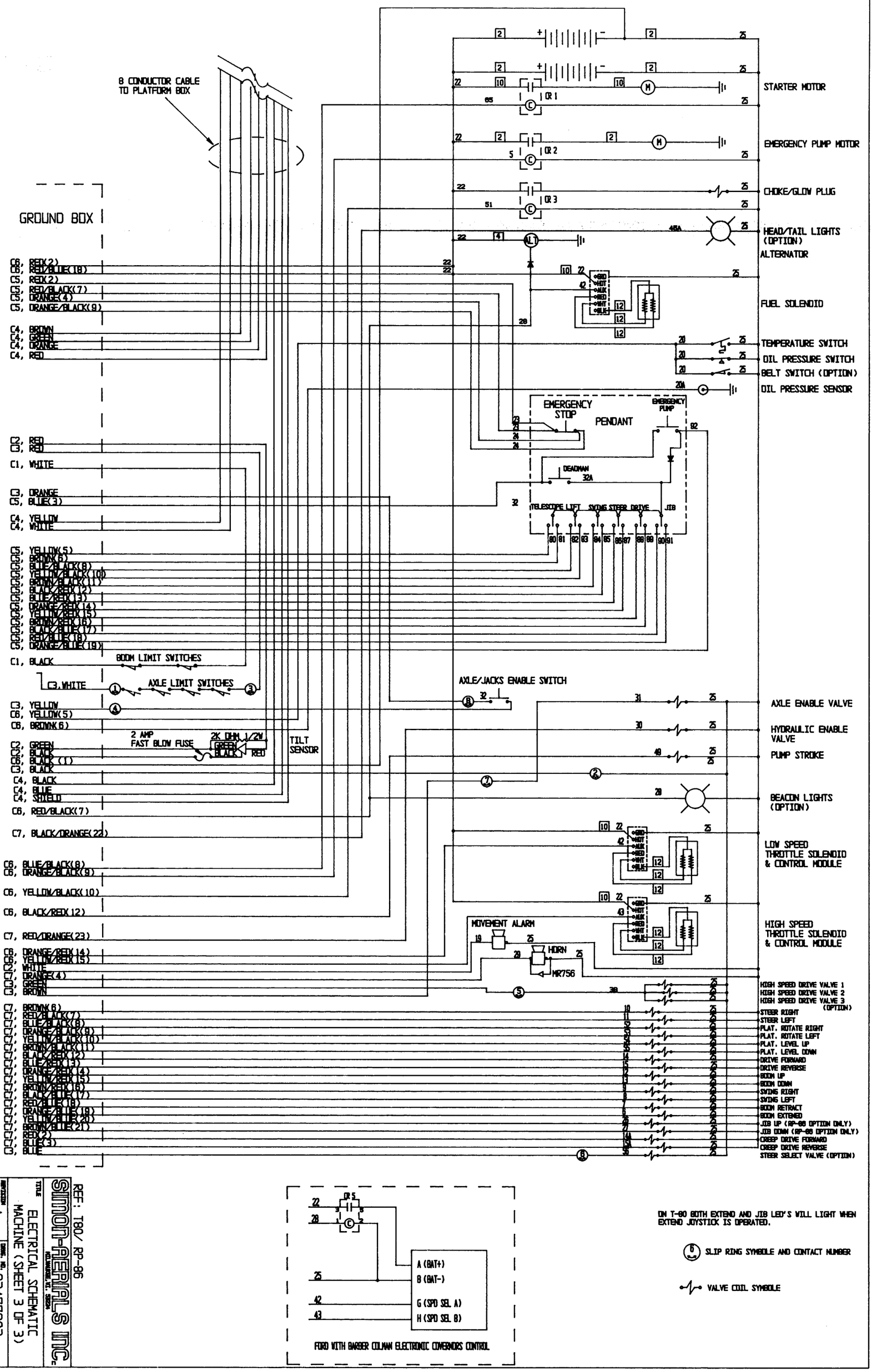
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MILWAUKEE, WI. 53224

TITLE: ELECTRICAL SCHEMATIC PLATFORM (SHEET 1 OF 3)

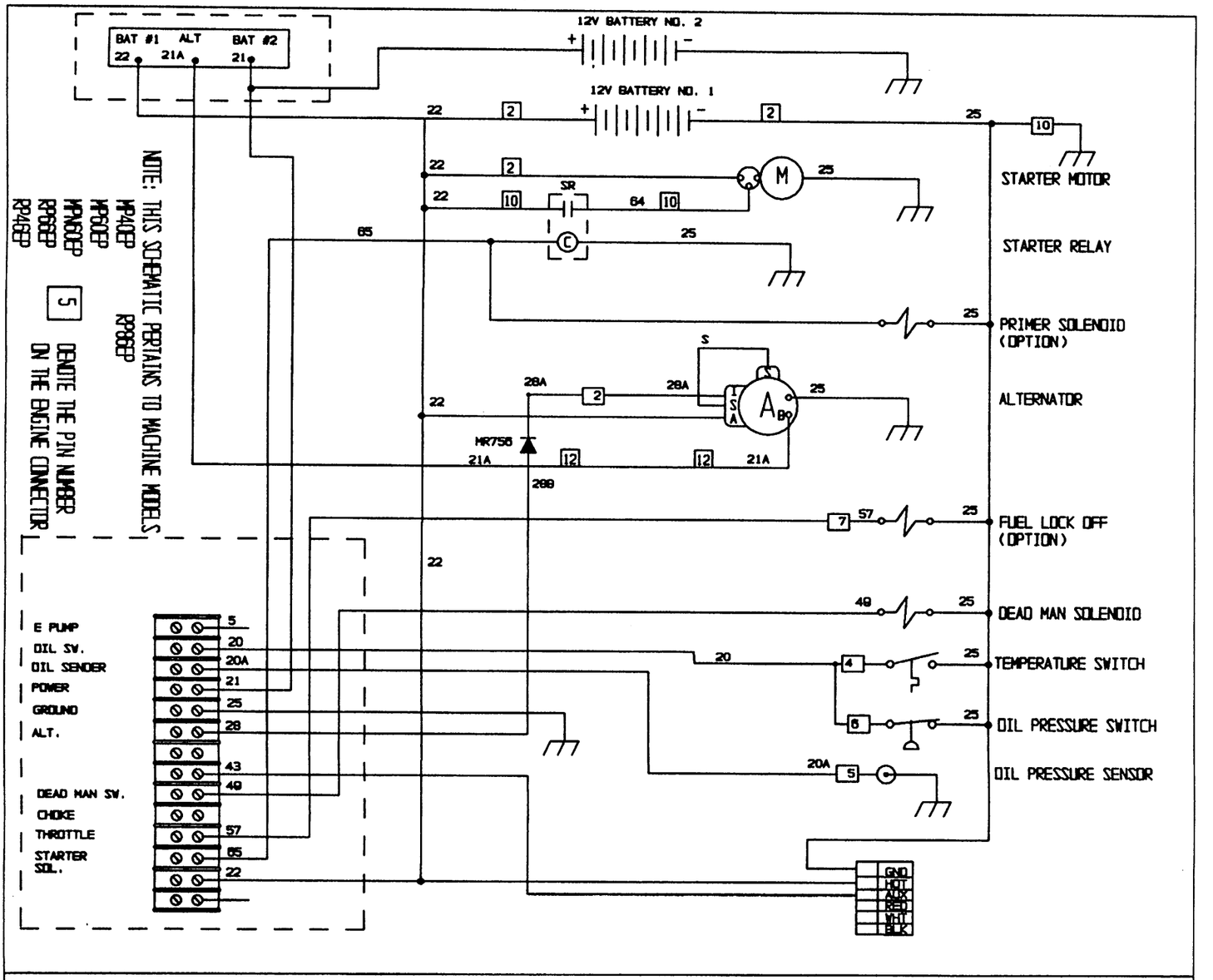
REVISION: A
DRWG. NO.: 23477901

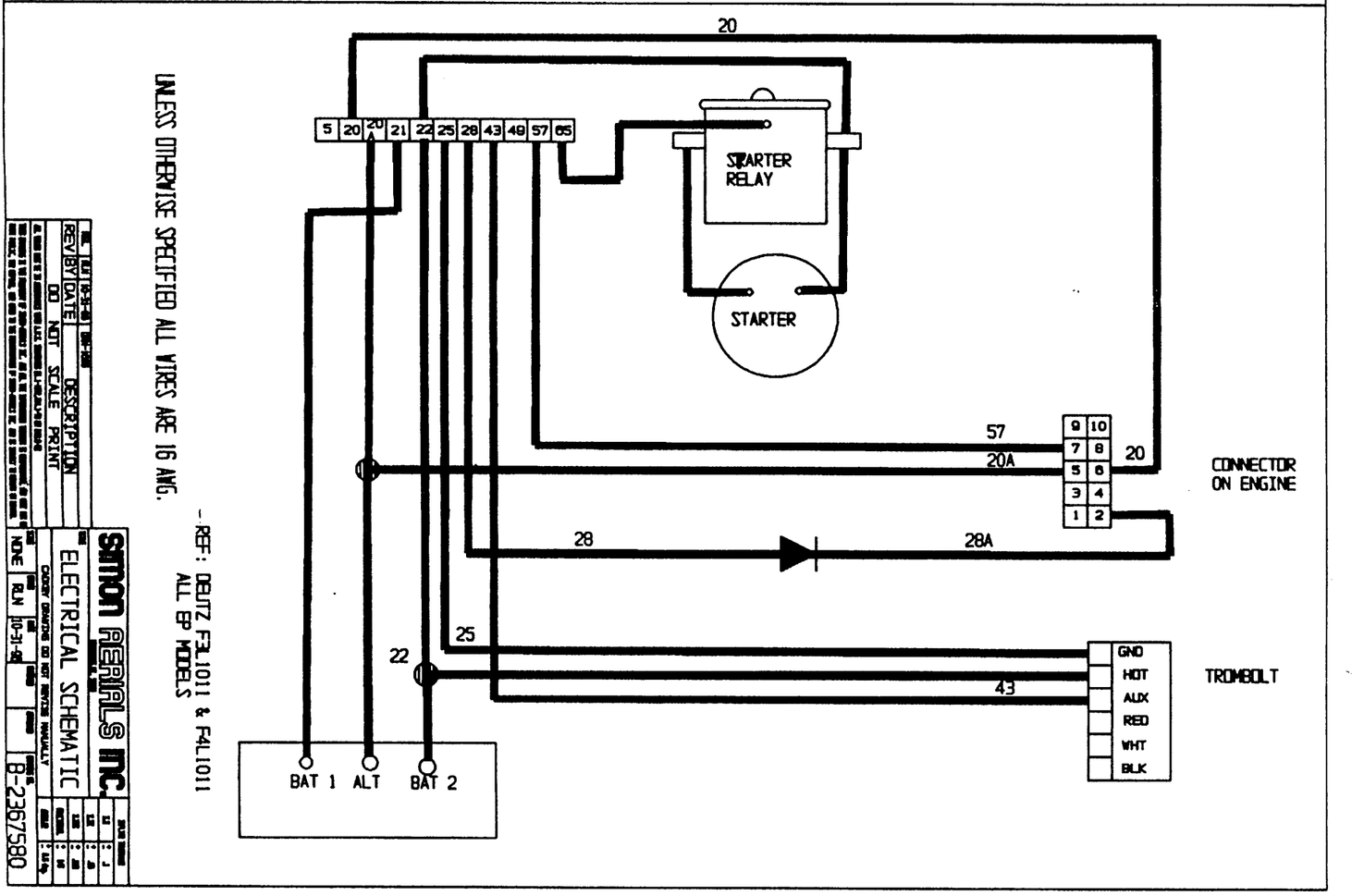


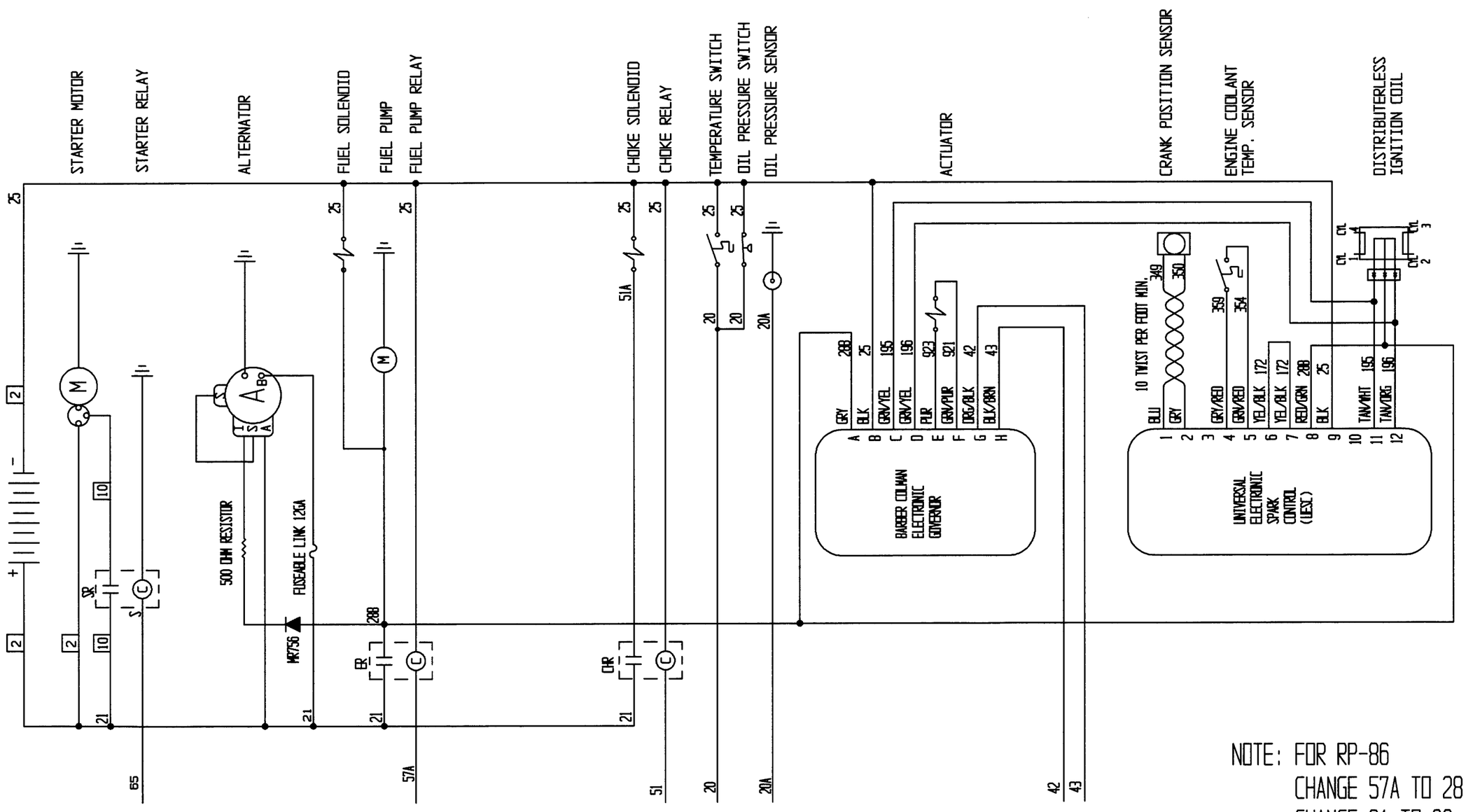
REVISION A	TITLE: ELECTRICAL SCHEMATIC GROUND BOX (SHEET 2 OF 3)	SIMON-AERIALS INC. T-80/ RP-86
DWG. NO. 23477902		



REVISION A	TITLE: ELECTRICAL SCHEMATIC MACHINE (SHEET 3 OF 3)	SIMON-AERIALS INC.
DWG. NO. 23477903		REF: T80/ RP-86


NOTE: THIS SCHEMATIC PERTAINS TO MACHINE MODELS
M40EP
M60EP
M66EP
R66EP
R46EP
R86EP
5 DENOTE THE PIN NUMBER ON THE ENGINE CONNECTOR
BAT #1 ALT BAT #2
22 21A 21
12V BATTERY NO. 2
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
E PUMP
OIL SW.
OIL SENDER
POWER
GROUND
ALT.
DEAD MAN SW.
CHOKE
THROTTLE
STARTER SOL.
GND
HOT
AUX
RED
WHT
BLK


UNLESS OTHERWISE SPECIFIED ALL WIRES ARE 16 AWG.
- REF: DEUTZ F3L1011 & F4L1011 ALL EP MODELS
STARTER RELAY
STARTER
CONNECTOR ON ENGINE
TROMBOLT
GND
HOT
AUX
RED
WHT
BLK
BAT 1 ALT BAT 2
ELECTRICAL SCHEMATIC
SIMON AERIALS INC.
8-2367580



NOTE: FOR RP-86
CHANGE 57A TO 28
CHANGE 21 TO 22

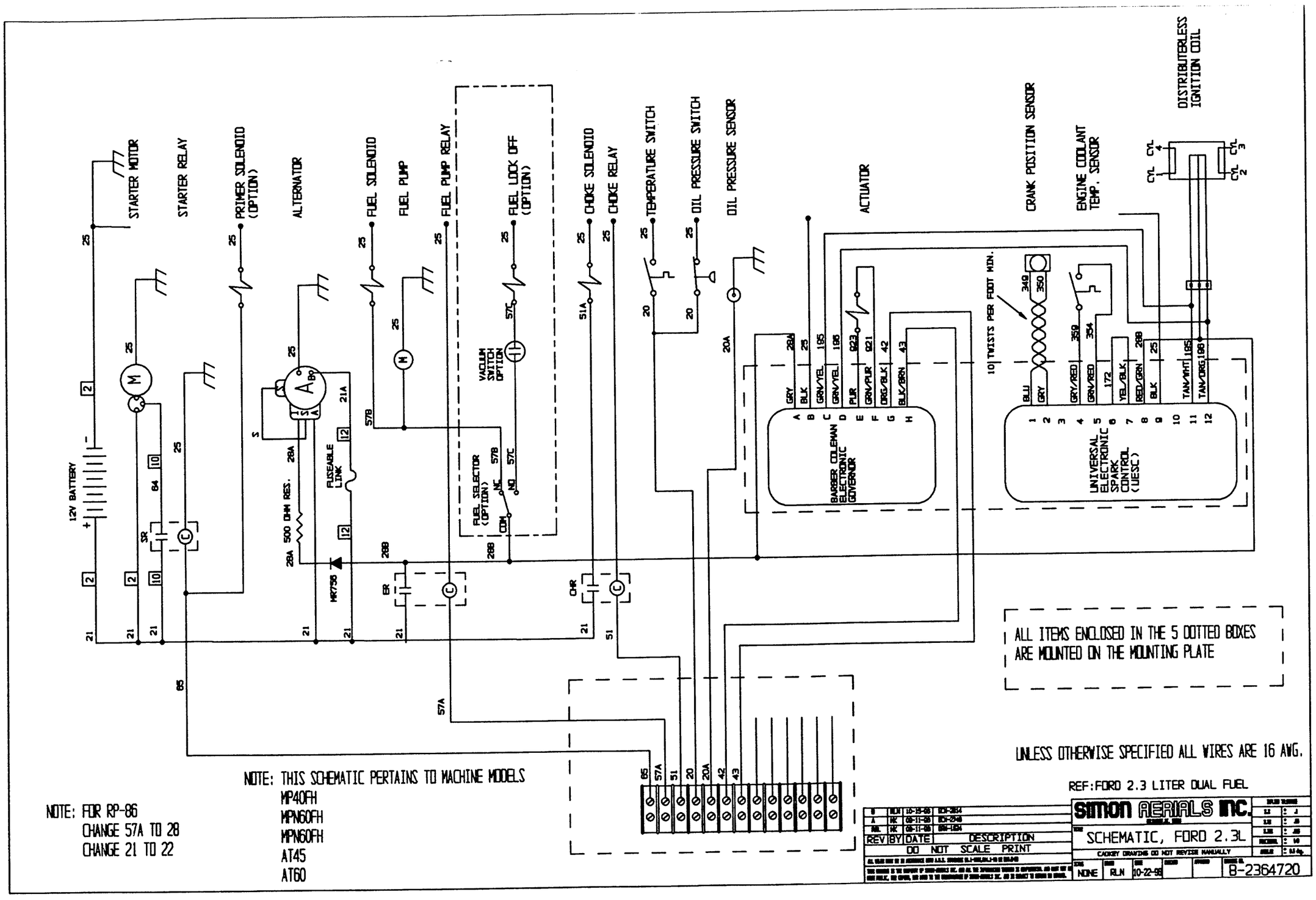
UNLESS OTHERWISE SPECIFIED ALL WIRES ARE 16 AWG.

REF: FORD 2.3 LITER GAS

SIMON AERIALS INC.
MILWAUKEE, WI. 53224

TITLE
ELECTRICAL SCHEMATIC

REVISION REL	DRWG. NO. 2366070	B
REV. DATE 09/11/96		



ALL ITEMS ENCLOSED IN THE 5 DOTTED BOXES ARE MOUNTED ON THE MOUNTING PLATE

UNLESS OTHERWISE SPECIFIED ALL WIRES ARE 16 AWG.

REF:FORD 2.3 LITER DUAL FUEL

NOTE: THIS SCHEMATIC PERTAINS TO MACHINE MODELS
MP40FH
MPN60FH
MPN60FH
AT45
AT60

NOTE: FOR RP-86
CHANGE 57A TO 28
CHANGE 21 TO 22

REV	BY	DATE	DESCRIPTION
B	MDH	10-15-98	ECR-2814
A	MC	08-11-98	ECR-2748
INIT.	MC	08-11-98	ECR-1654

DO NOT SCALE PRINT

SIMON AERIALS INC.

SCHEMATIC, FORD 2.3L

CADKEY DRAWING DO NOT REVISE MANUALLY

SIZE	DRAWN	DATE	CHECKED	APPROVED	DRAWING NO.
NONE	RLN	10-22-98			B-2364720