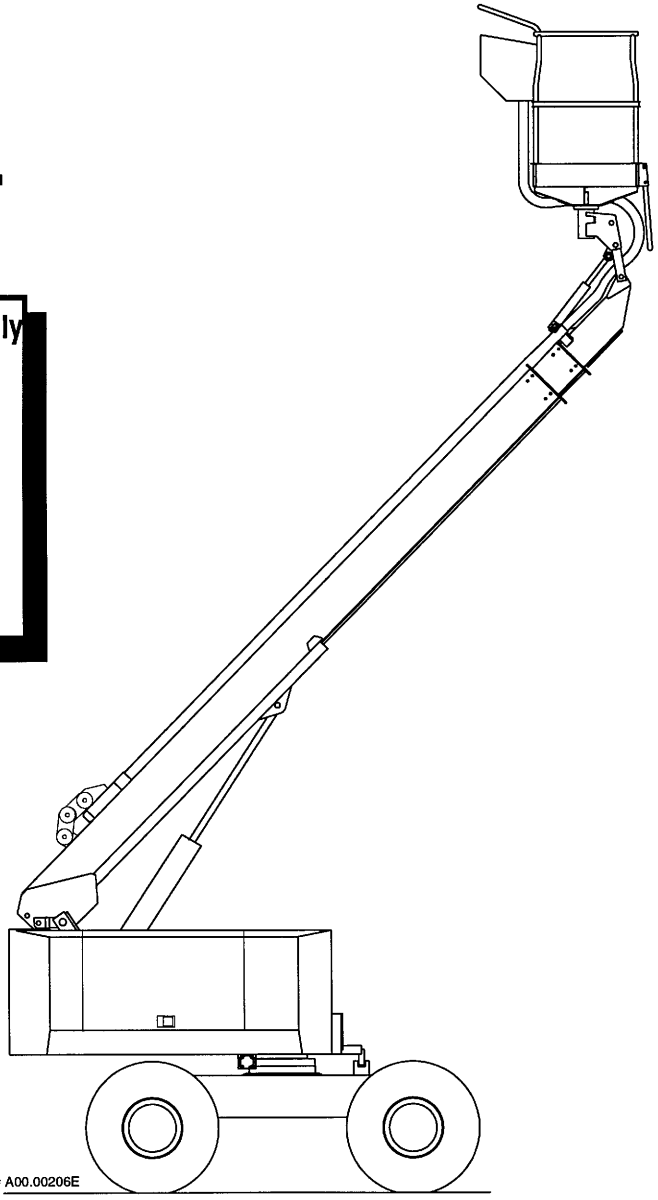
TRAILBLAZER T-60

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



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Table of Contents

Introduction vi
Machine Specifications viii
Machine Component Locator ix
Undercarriage Component Locator x
Superstructure Component Locator xi
Boom Component Locator xii
Platform Component Locator xiii
Lubrication Chart xiv
Lubrication Diagram xv

Section 1: Transportation and Emergency Procedures

Transporting the Unit 1-3
Unloading Procedures 1-4
Emergency System and Procedures 1-5
Emergency Pump 1-5
Unpowered Emergency Movement 1-5
Emergency Lowering 1-6

Section 2: Hydraulic System

Hydraulic Fluid 2-5
Handling Precautions 2-5
Fluid Recommendations 2-5
Hydraulic Fluid Analysis 2-5
System Flushing Procedure 2-6
Hydraulic System Components 2-9
Hydraulic Pump 2-9
Main Hydraulic Pump 2-9
Main Hydraulic Pump Adjustment 2-10
Emergency Pump 2-11
Emergency Pump Adjustment 2-11
Drive/ Steer/ Selector Manifold Assembly 2-11
Directional Control Valves 2-11
Drive/ Brake Valve Assembly 2-12
Motion Control Valve 2-12
Brake Needle Valve 2-12
Brake Shuttle Valve 2-12
Pressure Reducing Valve 2-13
Double Relief Manifold 2-13
Drive Cushion Solenoid Valve 2-13
High Pressure Filter 2-13
High Pressure Filter Element 2-13
Hydraulic Fluid Reservoir 2-13
Hydraulic Fluid Reservoir Maintenance 2-13

Table of Contents (Continued)

Section 2: Hydraulic System (Continued)

Maxi-Reach System 2-14
Maxi-Reach Tests 2-16
Test Set-Up 2-16
Maxi-Reach Set Up 2-16
Boom Lift System 2-18
Directional Control Valves 2-18
Platform 2-18
Ground 2-18
Shuttle Valve Assembly 2-19
Two Speed Valve 2-19
Accumulator 2-19
Lift Cylinder 2-19
Boom Telescope (Extend) System 2-20
Directional Control Valves 2-21
Platform 2-21
Ground 2-21
Shuttle Valve Assembly 2-21
Shuttle Valve 2-21
Flow Control Pressure Compensated Valve 2-21
Sequence Valves 2-22
Regeneration Valve 2-22
Telescope (Extend) Cylinders 2-22
Superstructure Swing System 2-23
Directional Control Valve 2-23
Platform 2-23
Ground 2-23
Shuttle Valve Assembly 2-24
Flow Control Valve 2-24
Double Counterbalance Valve (Swing) 2-24
Swing Drive Motor/ Reducer Assembly 2-24
Platform Rotate System 2-25
Rotate Control Valve 2-25
Rotary Actuator 2-25
Rotary Actuator Maintenance 2-25
Platform Rotator Manifold 2-26
Platform Leveling System 2-27
Level Control Valve 2-27
Double Pilot Operated Check Valve 2-27
Master Level Cylinder 2-28
Relief Valves 2-28
Slave Level Cylinder 2-28
Steer System 2-29
Drive/ Steer Manifold Assembly 2-29
Steer Cylinder 2-29
Steer System Maintenance 2-29
Hydraulic Swivel (Optional) 2-29

Table of Contents (Continued)

Section 3: Drive System

Drive System Components 3-3
- Front Wheel Motor 3-3
- Hydraulic Drive Motor 3-3
- Rear Axle Assembly 3-4
- Hydraulic Manifold Valve Assembly 3-4
- Motion Control Valve Assembly 3-4
  - Motion Control Valve 3-4
  - Brake Needle Valve 3-4
  - Shuttle Valve 3-5
  - Pressure Reducing Valve 3-5
  - Double Relief Valve 3-5
  - Solenoid Valve 3-5
- Drive Enable Valve 3-5
- Platform Drive Control Handle 3-5
- Drive/ Steer/ Selector Assembly 3-6
- Directional Control Valves 3-6

Section 4: Electrical System

Electrical System 4-3
- Battery 4-3
  - Battery Maintenance (In Storage) 4-3
  - Battery Maintenance (In Use) 4-3
  - Battery Troubleshooting 4-4
  - Battery Replacement 4-4
- Platform Control Box 4-5
  - Emergency Stop Button 4-5
  - Ignition Switch 4-5
  - Toggle Switch 4-5
  - Push Button 4-5
  - Light Emitting Diode 4-5
- Ground Control Box 4-6
  - Circuit Breaker 4-6
  - Toggle Switch 4-6
  - Push Button 4-6
  - Key Switch 4-6
  - Volt Meter 4-6
  - Hour Meter 4-6
  - Engine Oil Pressure Gauge 4-7
- Pendant Control 4-7
  - Toggle Switch 4-7
- Foot Pedal Switch 4-7
- Movement Alarm 4-7
- Tilt Alarm 4-8
  - Tilt Alarm Test 4-8
  - Tilt Alarm Sensor Adjustment 4-8
- Tilt Alarm Horn 4-9
- Horn 4-9
- Relays 4-9
- Limit Switches 4-9

Table of Contents (Continued)

Section 5: Mechanical Components

Mechanical Components 5-3
- Tires 5-3
  - Changing Tires 5-3
- Wheels and Lug Nuts 5-3
- Wheel Motor Assembly 5-4
- Steer Cylinder 5-5
  - Steer Cylinder Pins 5-5
  - Base End Cylinder Pin Replacement 5-5
  - Steer Cylinder Seal Replacement 5-5
- Tie Rod Assembly 5-6
  - Tie Rod Assembly Replacement 5-6
- Rear Axle Drive Motor 5-7
  - Rear Axle Drive Motor Replacement 5-7
- Rear Axle Assembly 5-8
  - Rear Axle Assembly Replacement 5-8
  - Rear Axle Brake Adjustment 5-9
  - Axle Disconnect Cylinder 5-9
- Superstructure 5-10
- Platform 5-11
- Hoses and Cables 5-11
- Miscellaneous Equipment 5-11
- Boom 5-12
  - Boom Pivot Pin and Bushing Replacement 5-12
  - Wear Pads 5-13
    - Base Boom Wear Pads Replacement 5-13
    - Mid Boom Top Front Wear Pad Replacement 5-14
    - Mid Boom Rear Wear Pads Replacement 5-14
    - Tip Boom Top Front Wear Pad Replacement 5-15
    - Moving Anchor Wear Pad Replacement 5-15
  - Boom Lift Cylinder 5-16
    - Lift Cylinder Base End Pin Replacement 5-16
    - Lift Cylinder Rod End Pin Replacement 5-17
    - Lift Cylinder Seal Replacement (On Machine) 5-18
    - Bench Replacement Of Lift Cylinder Seals 5-19
    - Counterbalance Valve Inspection 5-20
- Boom Telescope Cylinder 5-21
  - Telescope Boom Cylinder Pins Replacement 5-21
  - Telescope Cylinder Removal 5-22
  - Telescope Cylinder Separation 5-23
  - Telescope Cylinder Seal Replacement 5-23
  - Telescope Cylinder Installation 5-24
  - Counterbalance Valve Inspection 5-25
- Platform Level Cylinders 5-26
  - Platform Level Cylinder Pin Replacement 5-26
  - Level Cylinder Seal Replacement 5-27
  - Bleeding the Platform Leveling Circuit 5-28
- Maxi-Reach System 5-28
  - Boom Telescope Diverter Valve Replacement 5-28
  - Boom Lift Diverter Valve Replacement 5-29
  - Arm Pin and Needle Bearing Replacement 5-29

Table of Contents (Continued)

Section 6: Maintenance Schedule

Maintenance Schedule 6-3
General Maintenance Tips 6-3
First Three Months of Operation 6-3
Routine Servicing 6-3
Daily Operational Checklist 6-6
Monthly Operational Checklist 6-9
Semi-Annual Operational Checklist 6-11

Section 7: Troubleshooting

General Troubleshooting Tips 7-3
Troubleshooting Chart 7-4

Index

Appendix

Hydraulic Schematics A-3
Electrical Schematics A-7

INTRODUCTION

This Service Manual is designed to provide you with the instructions needed to properly maintain the SIMON AERIALS INC. Trailblazer (T-60) 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 Aerial Mobile Work Platforms are designed and built to provide many years of safe, dependable service. To obtain full benefits from your Trailblazer, always follow the proper operating and maintenance procedures. Only trained, authorized personnel should be allowed to operate or service this machine. Service personnel should read and study the Operators, Service, Parts and Component Repair Manuals in order to gain a thorough understanding of the unit prior to making any repairs. Exercise all necessary safety precautions when performing maintenance not covered in this manual.

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

⚠ DANGER

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

⚠WARNING

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

⚠ CAUTION

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

One final note: The best method to protect yourself and others from injury or death is to use common sense. If you are unsure of any operation, don't start until you are satisfied that it is safe to proceed.

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

⚠ DANGER

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

Simon 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 (Max.)	**66 Ft**/ 20.12 M
Platform Height (Max.)	**60 Ft**/ 18.29 M
Horizontal Reach (Max.)	**29 Ft**/ 8.83 M
Platform Capacity (Unrestricted) (Max.)	**500 Lbs.**/ 225 Kg
Platform Size	**30 In. x 60 In. x 43.50 In.**/ .76 M x 1.52 M x 1.10 M
Stowed Length	**24 Ft 1 In.**/ 7.34 M
Stowed Height	**93.4 In.**/ 2.37 M
Machine Width	**94 In.**/ 2.39 M
Superstructure Width	**84 In.**/ 2.13 M
Wheelbase	**75 In.**/ 1.91 M
Tailswing Radius (Max.)	**33 In.**/ .84 M
Outside Curb Clearance Radius	**14 Ft 4 In.**/ 4.37 M
Maximum Travel Speed:	
Boom Stowed	**2.8 MPH**/ 4.5 KPH
Boom Extended	**0.5 MPH**/ 0.8 KPH
Ground Clearance (Rear Axle)	**12.5 In.**/ 33 cm
Gross Weight (Approx.)	**19,000 Lbs.**/ 8,618. Kg
Gradeability (Max.)	**15°**/ 27% (On Hard Surface)
Platform Rotation	**180°**
Superstructure Rotation	**360° Non-continuous**
Tire Size	**390/70 x 16.5-12 Ply (Liquid Ballasted)**
Tire Pressure	**90 PSI**/ 6.21 Bar/ 6.33 Kg-cm^2
Wheel Lug Nut Torque (Rear - Lubricated)	**220 Ft Lbs.**/ 298 Nm/ 30.4 Kg-m
Wheel Lug Nut Torque (Front - Lubricated)	**130 Ft Lbs.**/ 176 Nm/ 18.0 Kg-m
Swing Bearing Bolt Torque (Lubricated)	**170 Ft Lbs.**/ 231 Nm/ 23.5 Kg-m
Drive Motor Bolt Torque (Front Wheels) (Lubricated)	**65 Ft Lbs.**/ 88.4 Nm/ 9.0 Kg-m
Maximum Hydraulic Pressure	**3000 PSI**/ 207 Bar/ 211 Kg-cm^2
Hydraulic Tank Capacity	**40 Gal.**/ 151.4 Liters
Fuel Tank Capacity	**40 Gal.**/ 151.4 Liters
Electrical System	**Two 12 Volt DC, Negative Ground, 95 Amp. Hr., Batteries in Parallel**

Engine Availability (Dual speed, 2200 RPM for boom functions and 3000 RPM for drive):

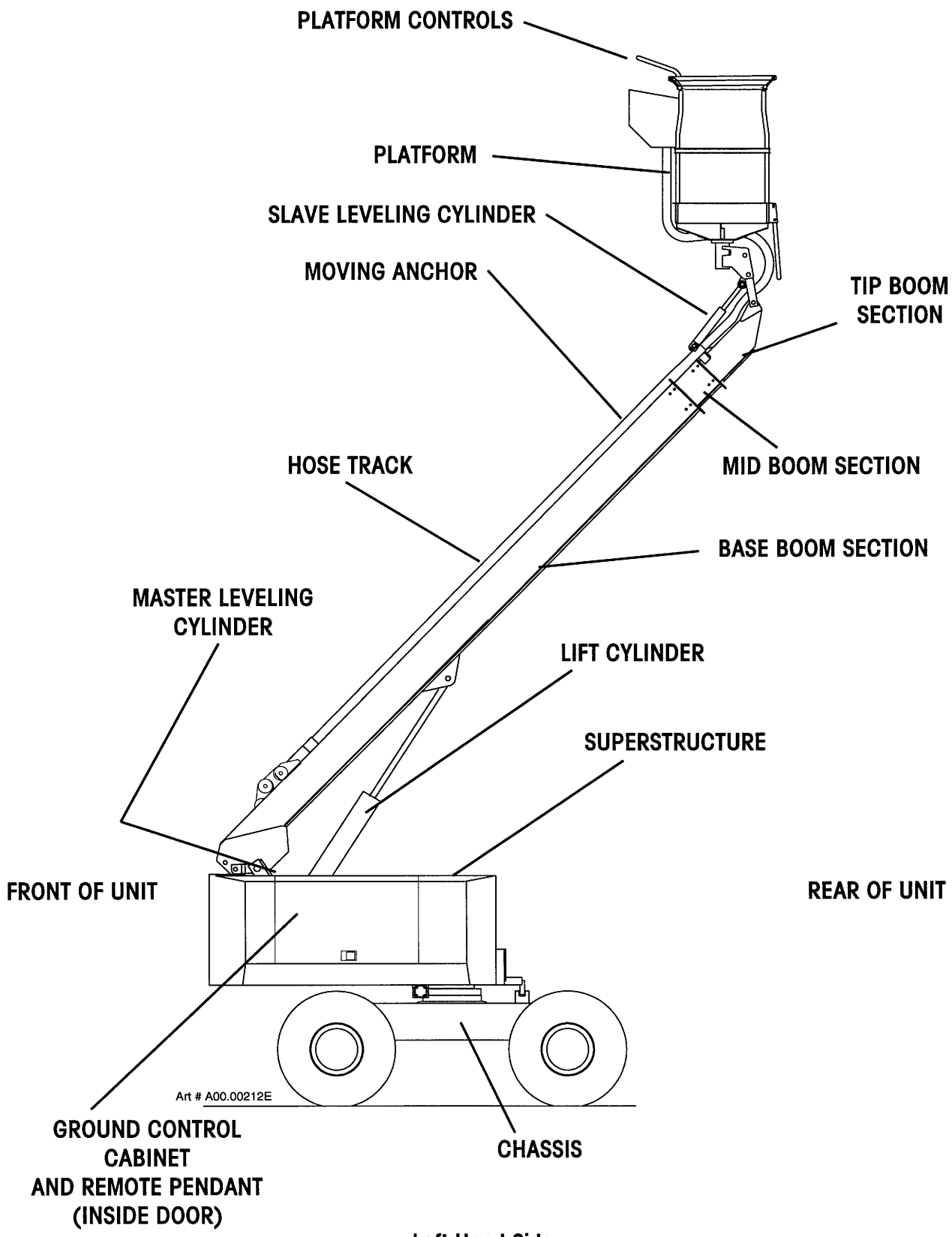
Standard . . . **Ford LSG 423, 63 HP** (47.0 Kw), **Liquid Cooled, Gas (Dual Fuel Option)**

Optional . . . **Wisconsin V-465, 65 HP** (48.5 Kw), **Air Cooled, Dual Fuel**

Deutz F4L 1011, 54 HP (40.3 Kw), **Air Cooled, Diesel**

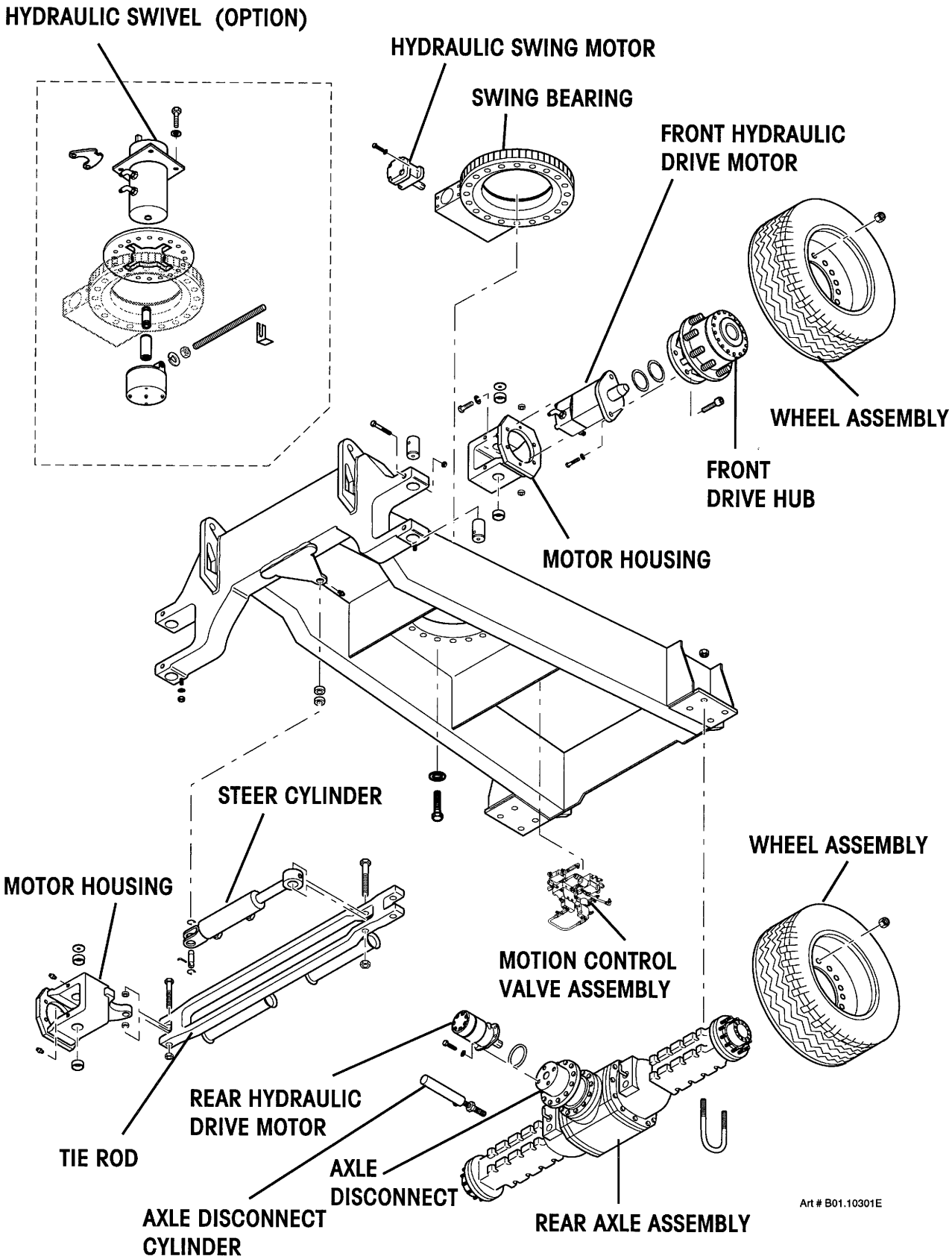
Hatz Silent Pack, 3L40C, 52 HP (38.8 Kw), **Air Cooled, Diesel**

MACHINE COMPONENT LOCATOR

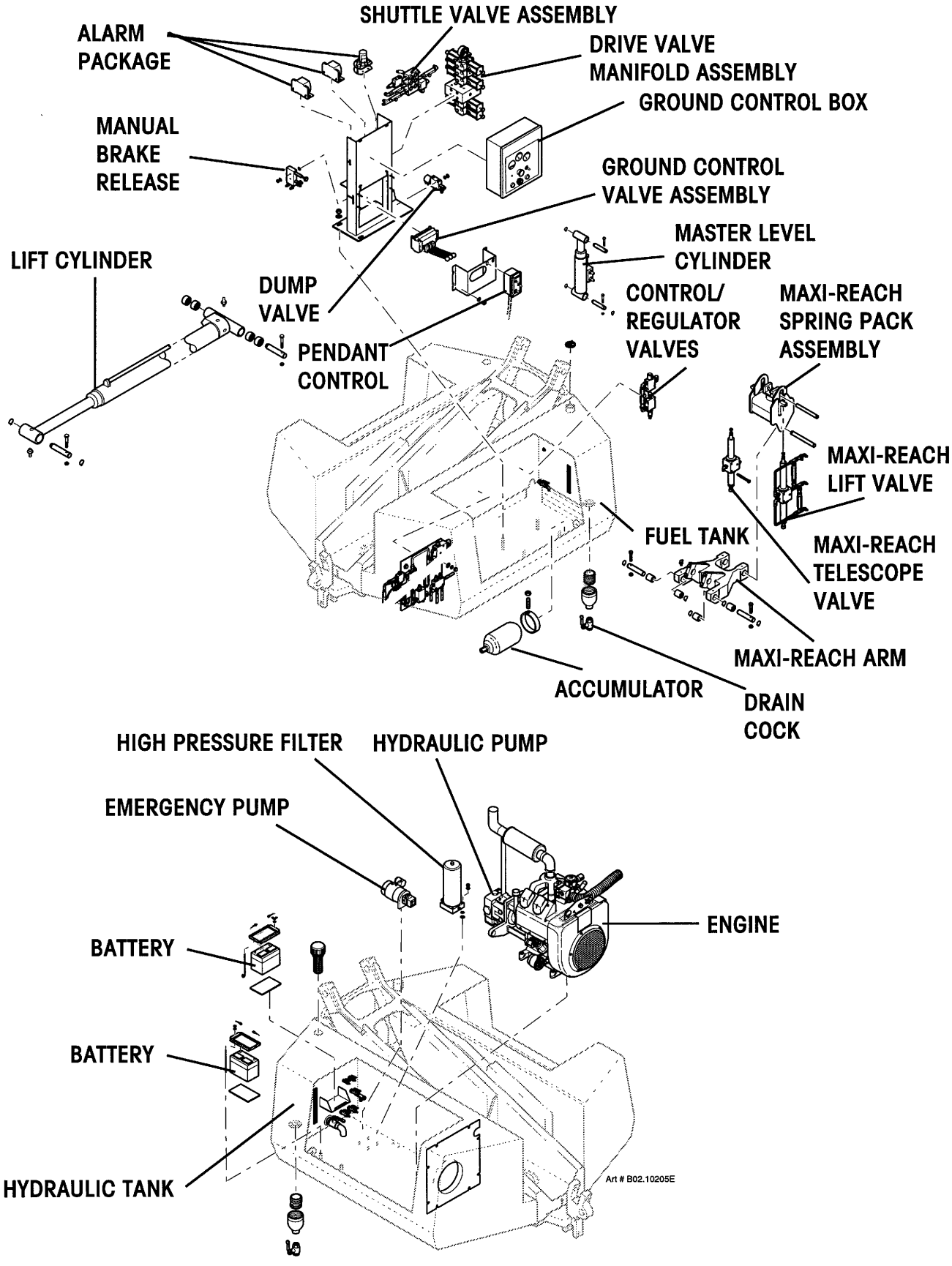


Left Hand Side.

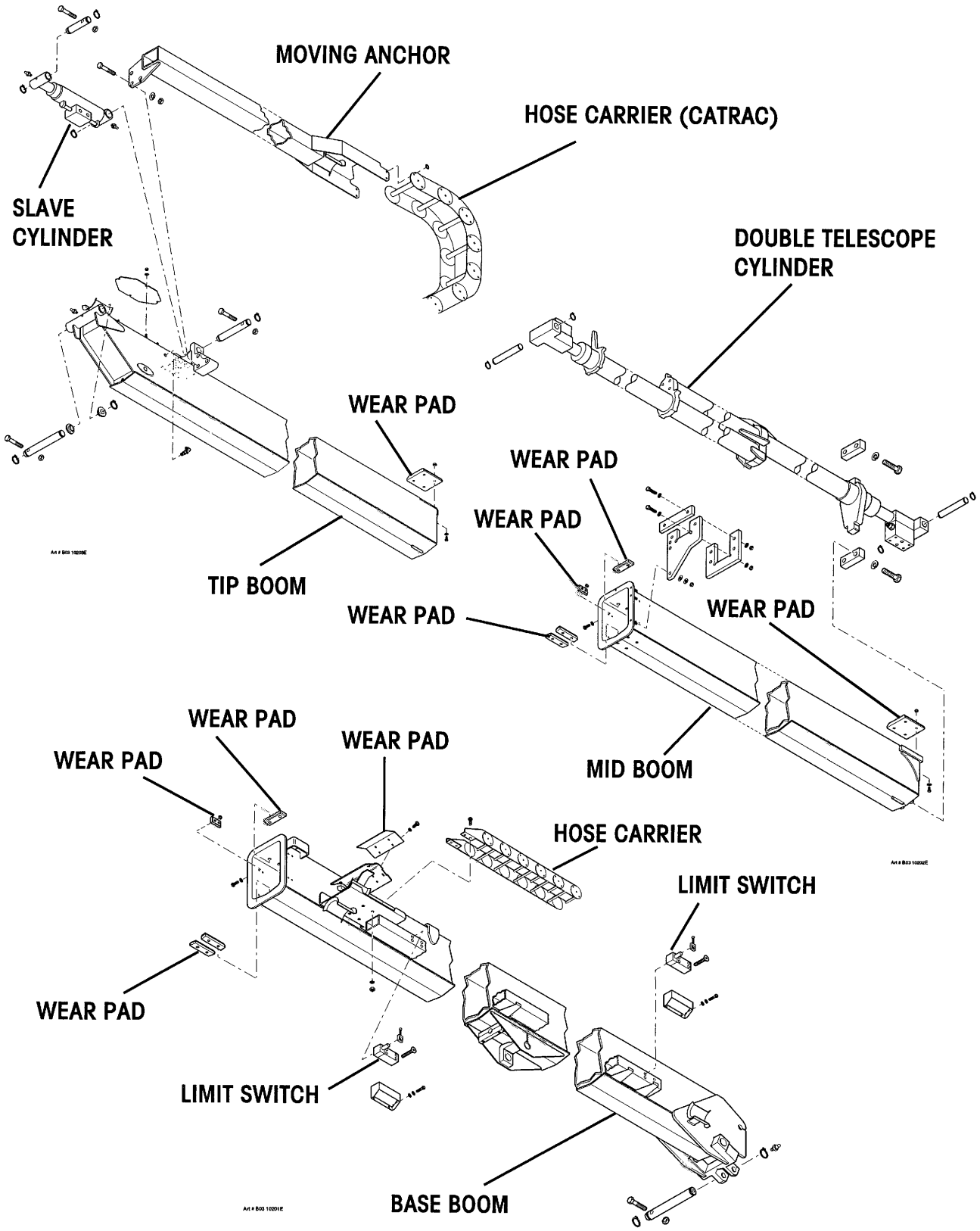
UNDERCARRIAGE COMPONENT LOCATOR



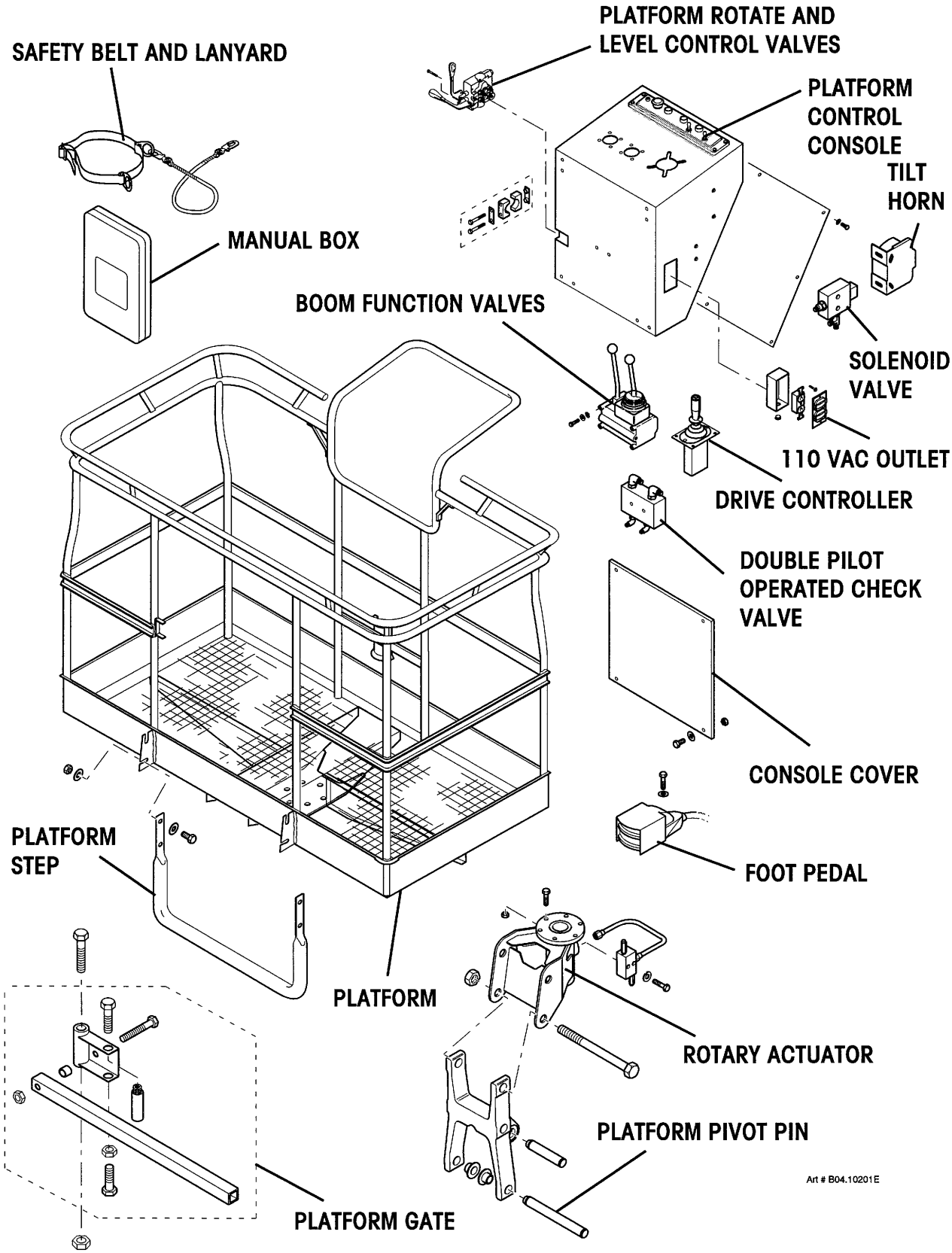
SUPERSTRUCTURE COMPONENT LOCATOR



BOOM COMPONENT LOCATOR



PLATFORM COMPONENT LOCATOR



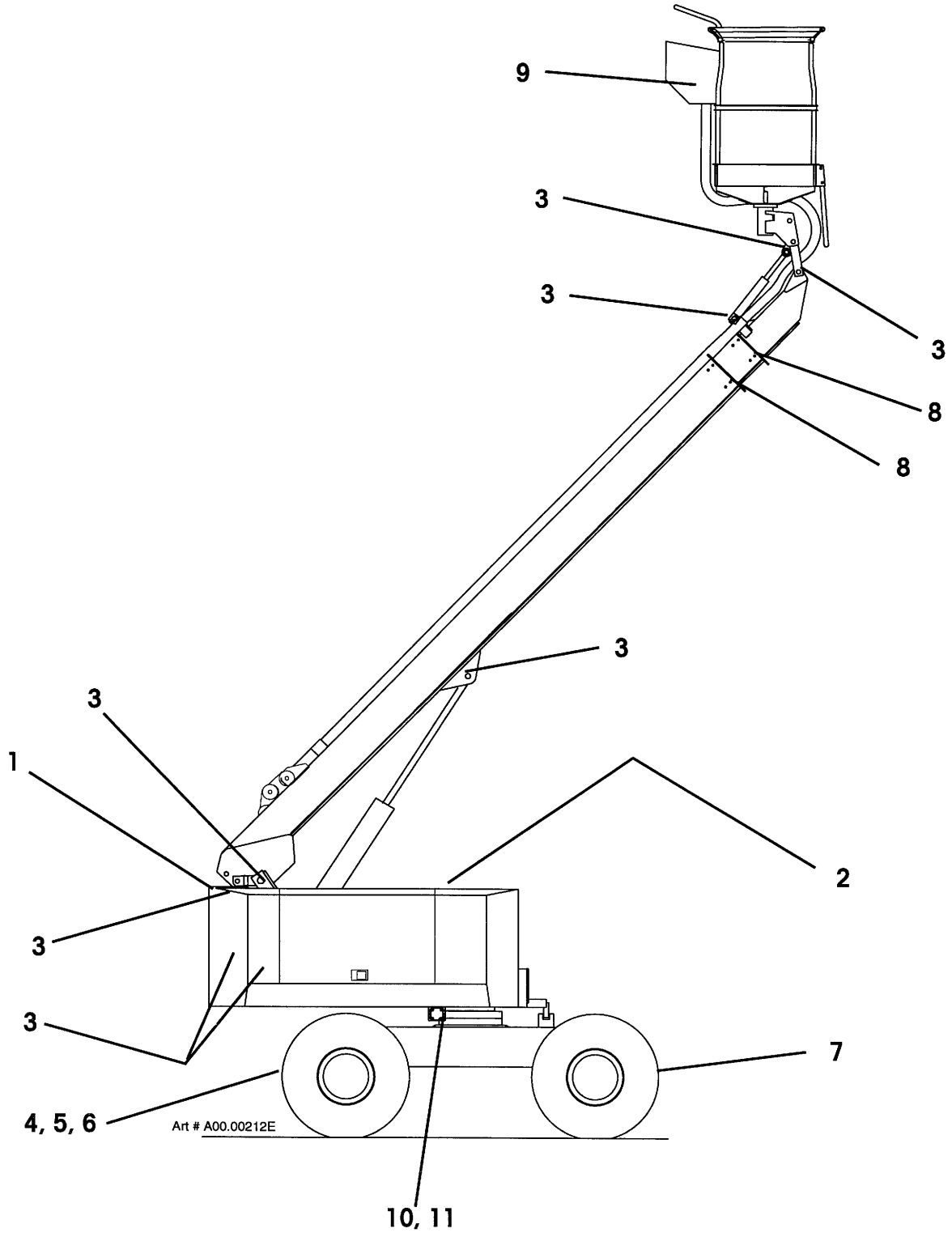
LUBRICATION CHART

NO.	ITEM	SPECIFICATION AND QUANTITY	FREQUENCY OF LUBRICATION
1.	Hydraulic reservoir	Mobil DTE-13 M to "Full" mark with all cylinders retracted.	Check daily, Analyze every 6 months or 500 hours.*†, Change yearly or every 1,000 hours.*†
2.	3 micron high pressure filter and 10 micron emergency pump filter	Filter elements.	Change every 6 months or 500 hours.*†
3.	Boom, cylinder pivot pins, Maxi-Reach arm	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
4.	Steering spindles (king pin bearings)	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
5.	Steering cylinder bearings	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
6.	Tie rod bearings	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
7.	Axle and planetary ends	SAE 80/ 90 APIGL5.	Check monthly.*† Change yearly or every 1,000 hours.*†
8.	Boom wear pads	Silicone spray.	Monthly or every 100 hours.*†
9.	Platform level and rotate valve lever pins; Boom function controls	WD 40 Spray or equivalent penetrating oil.	Monthly or every 100 hours.*
10.	Swing bearing	Lithium N.L.G.I. #2 EP. Purge old grease.	Monthly or every 100 hours.*†
11.	Swing bearing teeth	"Keystone -Moly 29 Open Gear Compound" Coat gear faces.	Monthly or every 100 hours.*†

* Whichever occurs first.

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

LUBRICATION DIAGRAM



SECTION 1: TRANSPORTATION AND EMERGENCY PROCEDURES

Table of Contents, Section 1

Transporting the Unit 1-3
Unloading Procedures 1-4
Emergency System and Procedures 1-5
Emergency Pump 1-5
Unpowered Emergency Movement 1-5
Emergency Lowering 1-6

TRANSPORTING THE UNIT

⚠WARNING

ALWAYS ATTACH THE UNIT TO A WINCH WHEN LOADING OR UNLOADING FROM A TRUCK OR TRAILER. UNASSISTED LOADING OR UNLOADING OF ANY MOBILE PLATFORM IS NOT RECOMMENDED.

THE WINCH OPERATOR AND UNIT OPERATOR MUST COORDINATE MOVEMENT WHILE LOADING THE UNIT.

1. **Unpin the boom.** If boom is raised with boom lock pin in place, do not drive lock pin out. Loosen bolts on boom lock pin bracket for transport, then remove pin.

2. Enter the platform, and start the engine using the platform controls. Select the "HI" engine speed.

3. Raise the boom so that the platform will clear any obstacles as the machine is driven up the loading ramp. It may be necessary to raise the boom to allow greater ground clearance.

4. Carefully manuever the unit onto the truck or trailer with the aid of a winch.

5. Lock the superstructure to the undercarriage and lock the boom in place by installing the lock pins provided.

6. Confirm that the boom is fully retracted, and that the platform will not contact any other item, including the bed of the truck or trailer.

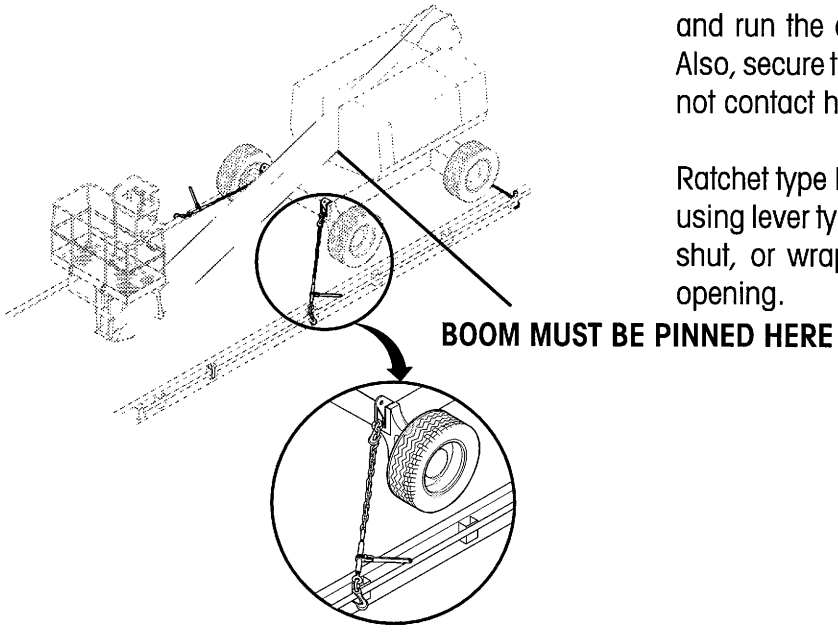
⚠ CAUTION

The platform or boom must not be tied down to the truck or trailer bed in any way.

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

8. Tie down locations are located on all four corners of the undercarriage. 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. Also, secure the boom with a strap so that it does not contact hoses or the boom slave cylinder.

   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.



Transportation Tie Down (Recommended).

UNLOADING PROCEDURES

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

- **Remove lockpin from boom.**

  If boom is raised with boom lock pin in place, do not drive lock pin out. Loosen bolts on boom lock pin bracket for transport, then remove pin.

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

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

- Connect battery cables to battery, if required. Check electrolyte level.

- Open the fuel tank valve.

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

- 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 covers.

- Attach a winch line to the unit to assist with unloading.

⚠WARNING

ALWAYS USE A WINCH TO ASSIST LOADING OR UNLOADING THE UNIT FROM A TRUCK OR TRAILER. WE DO NOT RECOMMEND UNASSISTED LOADING OR UNLOADING OF ANY MOBILE PLATFORM.

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

- Perform Machine Startup procedures found in the Operator's Manual. Refer to Operator Controls Descriptions, as necessary. Turn off engine.

- Remove all machine tie downs. Remove wheel chocks, if used. Switch the Ground/ Platform toggle to "PLATFORM CONTROLS".

- Enter the platform, and restart the engine using the platform controls. Test all platform functions.

- Raise the boom so that the platform will clear any obstacles as the machine is driven down the loading ramp. Boom must not be above horizontal on flat surface or extended. It may be necessary to swing the superstructure to the side to allow greater ground clearance.

- Carefully drive the unit off the truck or trailer.

⚠ CAUTION

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

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

- Before placing the unit into service, all operators must read and understand the contents of the 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 Trailblazer has an emergency pump which can be operated from the operator's platform or ground control station to safely return the platform to the ground position when the unit has lost primary (engine/ pump) power.

- Press and hold the "EMERGENCY PUMP" button on the remote control pendant, **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.

IMPORTANT: For best results, retract boom first, then lower.

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 primary 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.).

- Secure the unit with chains or ropes.

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

- Block wheels.
- Release brakes and disconnect rear drive motor.

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

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

- After primary power has been restored to the vehicle, fully open the needle valve on the hand pump to connect rear drive motor and restore wheel brakes.
- 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 pendant 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. Have someone summon first aid or rescue squad.
2. Attempt to talk to operator before taking any rescue measures.
3. **Check to see if the operator is in a pinned position, or would be endangered if platform is moved, before attempting emergency lowering procedure.**
4. After establishing that the machine is not in contact with live power lines, lower the platform using the emergency lowering procedure (see "Emergency Pump", earlier in this section).
5. Render first aid to the operator.
6. **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

Table of Contents, Section 2:

Hydraulic Fluid 2-5
Handling Precautions 2-5
Fluid Recommendations 2-5
Hydraulic Fluid Analysis 2-5
System Flushing Procedure 2-6
Hydraulic System Components 2-9
Hydraulic Pump 2-9
Main Hydraulic Pump 2-9
Main Hydraulic Pump Adjustment 2-10
Emergency Pump 2-11
Emergency Pump Adjustment 2-11
Drive/ Steer/ Selector Manifold Assembly 2-11
Directional Control Valves 2-11
Drive/ Brake Valve Assembly 2-12
Motion Control Valve 2-12
Brake Needle Valve 2-12
Brake Shuttle Valve 2-12
Pressure Reducing Valve 2-13
Double Relief Manifold 2-13
Drive Cushion Solenoid Valve 2-13
High Pressure Filter 2-13
High Pressure Filter Element 2-13
Hydraulic Fluid Reservoir 2-13
Hydraulic Fluid Reservoir Maintenance 2-13
Maxi-Reach System 2-14
Maxi-Reach Tests 2-16
Test Set-Up 2-16
Maxi-Reach Set Up 2-16
Boom Lift System 2-18
Directional Control Valves 2-18
Platform 2-18
Ground 2-18
Shuttle Valve Assembly 2-19
Two Speed Valve 2-19
Accumulator 2-19
Lift Cylinder 2-19
Boom Telescope (Extend) System 2-20
Directional Control Valves 2-21
Platform 2-21
Ground 2-21
Shuttle Valve Assembly 2-21
Shuttle Valve 2-21
Flow Control Pressure Compensated Valve 2-21
Sequence Valves 2-22
Regeneration Valve 2-22
Telescope (Extend) Cylinders 2-22

Table of Contents, Section 2 (Continued):

Superstructure Swing System 2-23
Directional Control Valve 2-23
Platform 2-23
Ground 2-23
Shuttle Valve Assembly 2-24
Flow Control Valve 2-24
Double Counterbalance Valve (Swing) 2-24
Swing Drive Motor/ Reducer Assembly 2-24
Platform Rotate System 2-25
Rotate Control Valve 2-25
Rotary Actuator 2-25
Rotary Actuator Maintenance 2-25
Platform Rotator Manifold 2-26
Platform Leveling System 2-27
Level Control Valve 2-27
Double Pilot Operated Check Valve 2-27
Master Level Cylinder 2-28
Relief Valves 2-28
Slave Level Cylinder 2-28
Steer System 2-29
Drive/ Steer Manifold Assembly 2-29
Steer Cylinder 2-29
Steer System Maintenance 2-29
Hydraulic Swivel (Optional) 2-29

HYDRAULIC FLUID

HANDLING PRECAUTIONS

⚠WARNING

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

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

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

⚠WARNING

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

FLUID LEAKS UNDER PRESSURE MAY NOT ALWAYS BE VISIBLE.

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

FLUID RECOMMENDATIONS

We strongly recommend the use of MOBIL 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.

HYDRAULIC FLUID ANALYSIS

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

- Any time the hydraulic pump is replaced.
- If fluid discoloration is noticed in the hydraulic reservoir sight tube.
- If, after the first 50 hours of operation, the hydraulic filter elements are plugged.
- Any time the hydraulic filter elements show signs of metal contamination.
- If valve spools at either operator's station have continuous sticking problems which are not corrected by lubrication.
- 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; also, comparison to new fluid and recommendations.

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

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

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

SYSTEM FLUSHING PROCEDURE

⚠WARNING

BLOCK THE WHEELS OF THE MACHINE TO PREVENT UNEXPECTED MOVEMENT OF THE MACHINE.

1. With BOOM DOWN AND FULLY RETRACTED (in stowed position), drain hydraulic fluid from hydraulic tank into a clean, empty container. Use an oil filter cart so the fluid may be reused if analysis is good.
2. When the hydraulic tank is empty, remove suction hose to pump, emergency pump hose, telescope retract return hose, vent (return) hose for telescope cylinder, manifold return hose, drive hose from pump with the tee for motor drain.
3. Remove all hoses between pump and high pressure filter.
4. Flush the hoses.
5. Remove hydraulic fluid filter, and flush the filter body and attaching hoses. Discard old filter element and replace.
6. With hoses removed from the hydraulic tank, flush out the tank.
7. Reinstall all the hoses removed in the previous steps EXCEPT the return lines to tank. Temporarily tie hoses together and position these hoses so that they will drain into a clean container.
8. If the hydraulic fluid removed from the reservoir is good, pump it (through a filter cart) back into the tank. If fluid is not usable, dispose of it and fill the hydraulic tank with filtered, fresh hydraulic fluid (refer to Lubrication Chart).
9. Open the suction line valve to allow fluid to flow to the hydraulic pump.
10. Loosen hose fittings at pump to allow pump to flood with hydraulic fluid. Tighten pump fittings.
11. Turn main power key switch to the "Ground" position.
12. Press "Engine Start" button to start engine.
13. Activate pump selector toggle switch on remote control pendant and hold at "Main" to activate engine powered pump.

⚠ CAUTION

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

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

⚠ CAUTION

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

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

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

⚠ CAUTION

ALWAYS BLOCK THE WHEELS before you raise the machine.

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

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

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

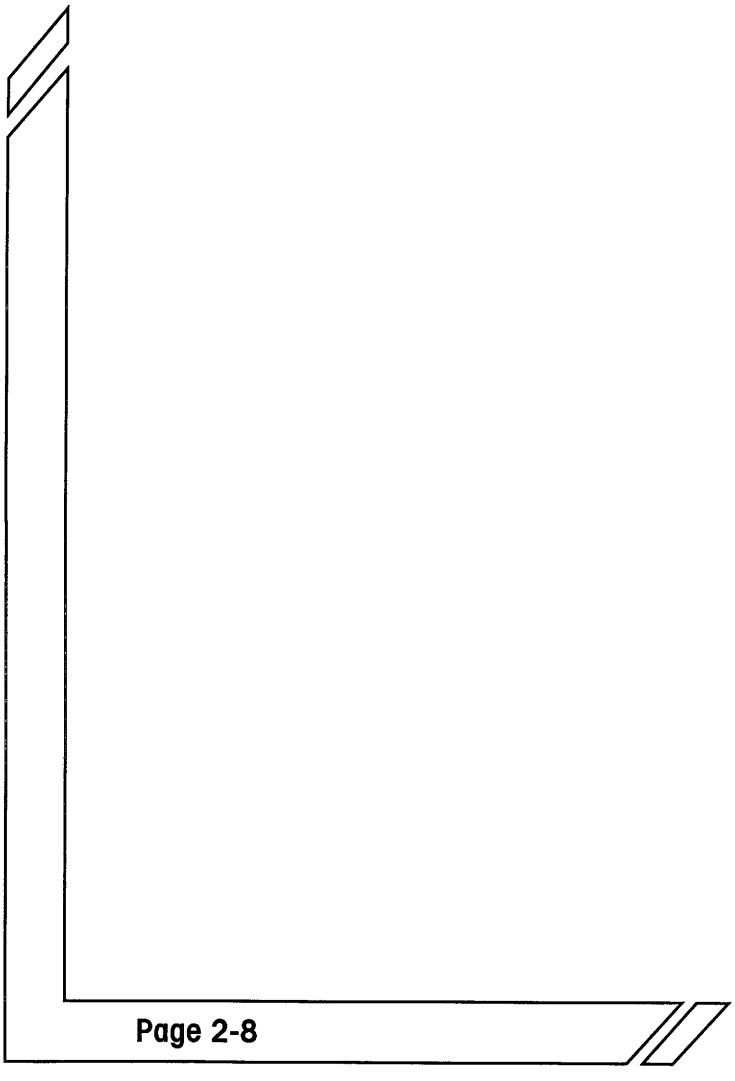
19. Activate the steer toggle switch on remote control pendant to flush the steer cylinder of the hydraulic fluid.

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

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

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

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

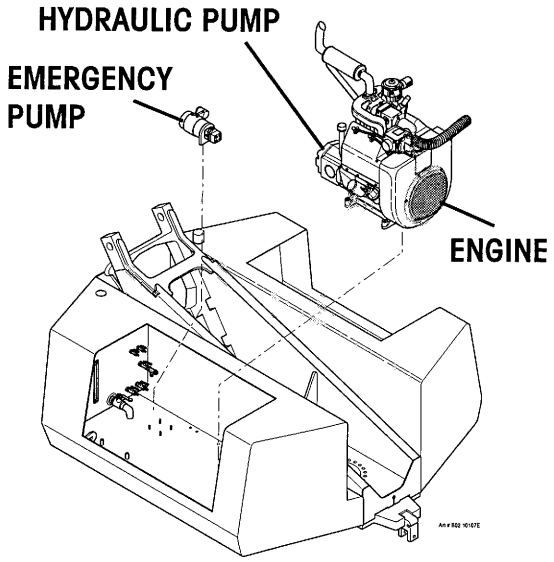


HYDRAULIC SYSTEM COMPONENTS

Following is a description of the major components of the Trailblazer T-60 hydraulic system.

HYDRAULIC PUMP

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



Hydraulic Pumps Location.

MAIN HYDRAULIC PUMP

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

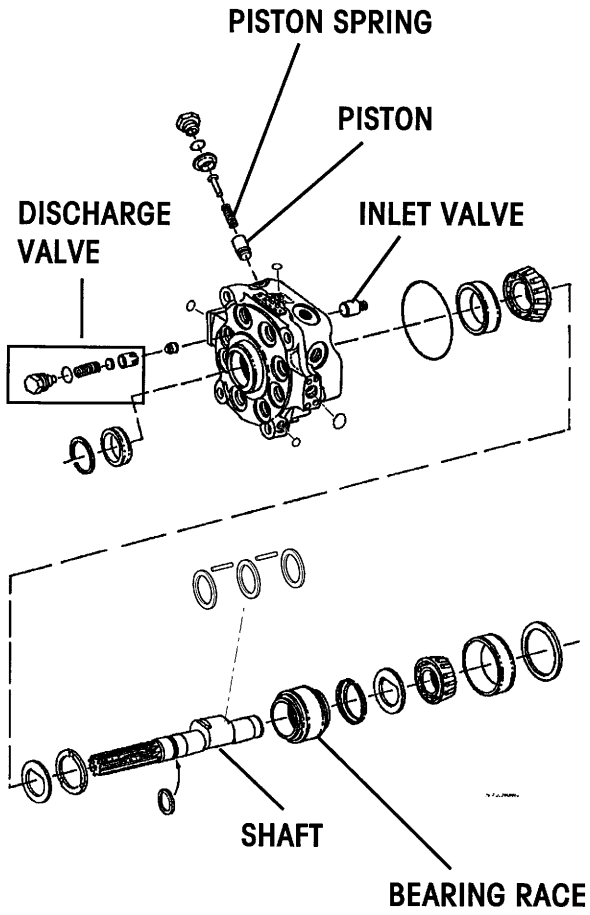
Hydraulic fluid enters through the inlet ports. A common inlet gallery provides fluid to all eight inlet valves in the housing. Pistons radially surround an eccentric cam. The cam moves a bearing race upon which the pistons ride. Behind each piston is a spring which holds the pistons against the bearing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

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

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

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

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



Main Hydraulic Pump.

Pressure compensated pumps are designed to provide "on demand" high pressure fluid regardless of flow requirements up to the maximum pump output. The pressure compensator valve regulates fluid pressure into the pump crankcase. Increased pressure in the crankcase overcomes the piston spring pressure and hold the pistons away from the race, thereby destroking the pump.

MAIN HYDRAULIC PUMP ADJUSTMENT

⚠WARNING

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

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

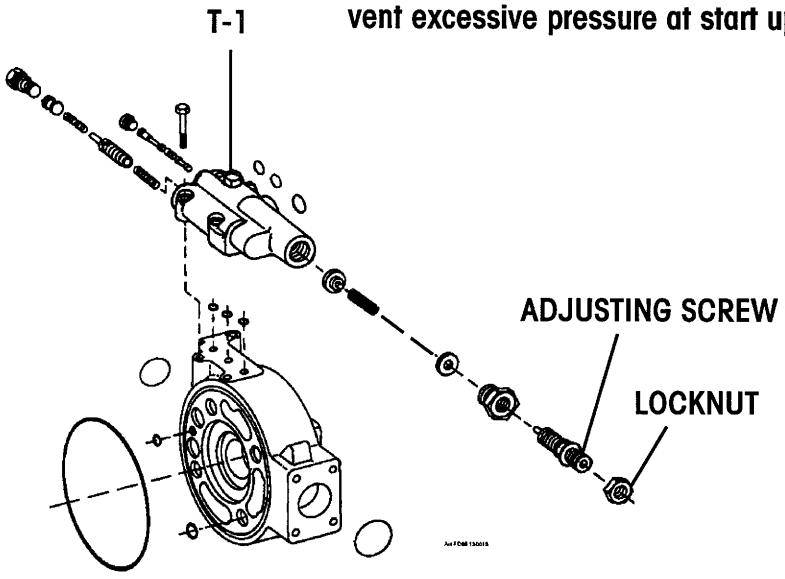
NOTE: Refer to "Machine Specifications" to determine maximum system pressure for your unit.

To adjust the system pressure:

- Install a 14 mm adapter to the high pressure test port (T-1) and connect a 5000 psi (345 Bar/ 352 Kg/cm^2) gauge.
- Locate the adjusting screw on the side of the main pump adapter plate.
- Loosen the locknut and while viewing the pressure gauge, set system pressure to value specified in the "Machine Specifications".
    - Turn the adjusting screw out to decrease pressure, in to increase pressure.
- After system pressure has been set, tighten the lock nut.

⚠ CAUTION

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

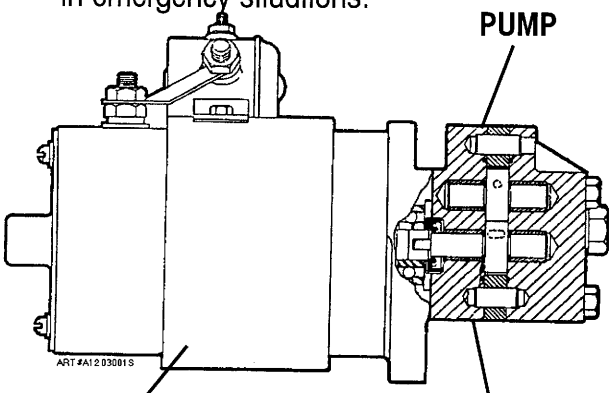


Main Hydraulic Pump Control Adjustment.

EMERGENCY PUMP

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

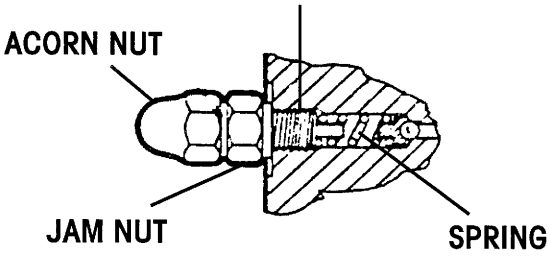
NOTE: This pump should only be used in emergency situations.



Emergency Pump.

EMERGENCY PUMP ADJUSTMENT

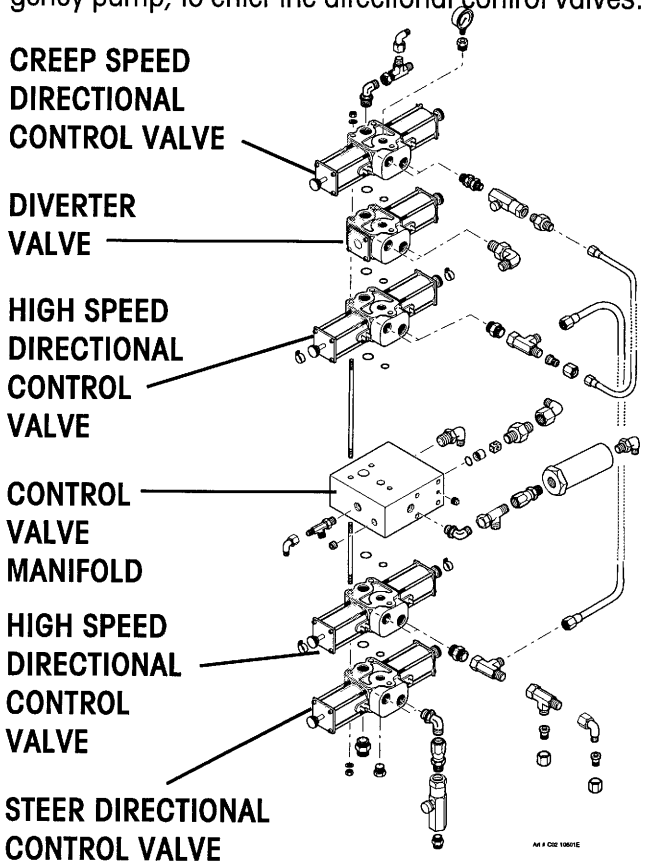
The emergency pump pressure setting screw is located on the side of the adapter plate. To adjust the relief pressure on the pump, remove the acorn nut, loosen the jam nut and turn the adjusting screw in to increase pressure. To decrease pressure, turn the adjusting screw out. (See "Machine Specification"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



Emergency Pump Adjustment.

DRIVE/ STEER/ SELECTOR VALVE ASSEMBLY

The control valve manifold is located in the center of the drive/ steer/ selector valve assembly (main valve stack). This control valve manifold allows hydraulic fluid, from either the main hydraulic pump or emergency pump, to enter the directional control valves.



Manifold Assembly.

DIRECTIONAL CONTROL VALVES

The directional control valves directs hydraulic fluid to the steer and drive functions when energized; thereby, allowing steering, driving at high or low speed. Four of these valves are 4-way, three position valves. The diverter valve is a 4-way, two position directional control valve and delivers fluid to either the ground or platform station. All directional control valves are solenoid operated with manual overrides. The manual override is locked out on the high speed drive valves for safety reasons.

REAR AXLE ASSEMBLY

The rear axle assembly includes a spring applied/ hydraulically released brake. Check the oil monthly and change the oil yearly. For brake adjustment see "Mechanical Components" section in this manual.

DRIVE/ BRAKE VALVE ASSEMBLY

MOTION CONTROL VALVE (DRIVE)

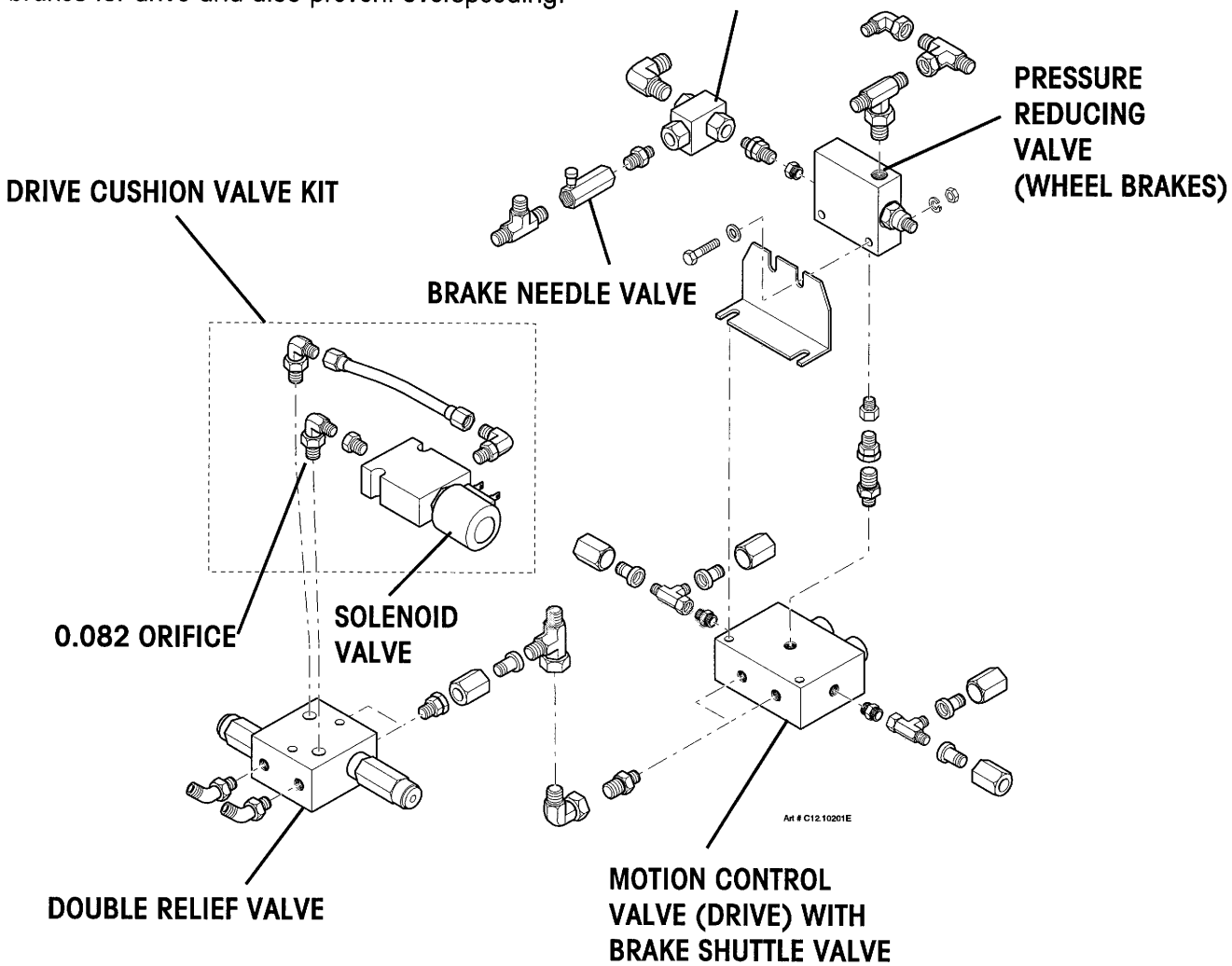
This valveconsists of three screw in cartridges. The shuttle valve is used to drive pressure to the wheel brakes in order to release the brakes. The other two cartridges are counterbalance valves dedicated for reverse and for forward drive. They serve as hydraulic brakes for drive and also prevent overspeeding.

BRAKE NEEDLE VALVE

This flow control valve meters hydraulic fluid flow released from the spring applied wheel brake assemblies to allow brakes to engage slowly. Hydraulic fluid is allowed to flow into the brakes as free flow, while fluid is allowed to flow out of the brakes as controled by the needle valve. The proper valve setting is one (1) turn from the fully closed position.

BRAKE SHUTTLE VALVE

The shuttle valve directs hydraulic fluid from two sources: either the main drive circuit or the manual brake release hand pump to the hydraulic brake assemblies.



Drive/ Brake Control Valve Assembly.

Pressure Reducing Valve

Limits drive pressure to a maximum of 435 psi (30 Bar/ 30.6 Kg/cm^2) for the brake assemblies.

DOUBLE RELIEF VALVE

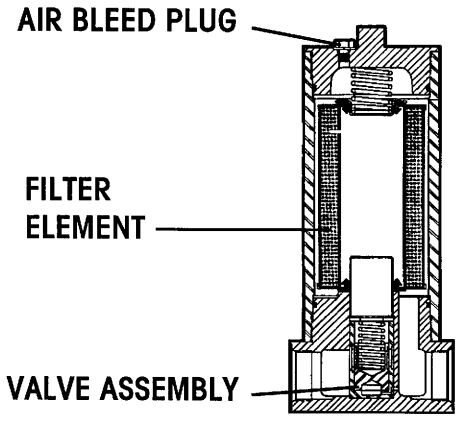
The cross port relief valve limits maximum pressure to all wheel drive motors. Valves are set at 3000 psi (207 Bar/ 211 Kg/cm^2).

DRIVE CUSHION SOLENOID VALVE

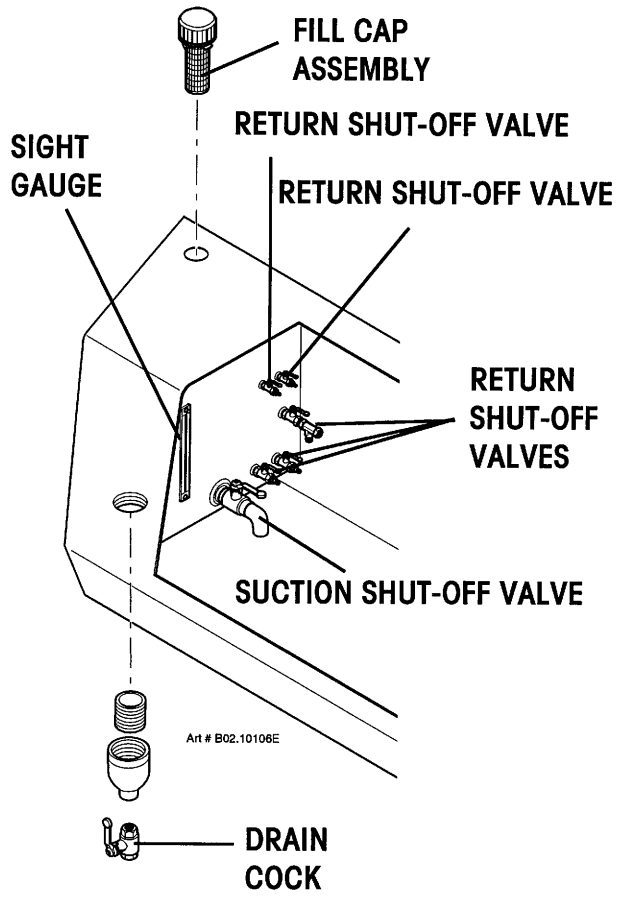
This is a solenoid valve which when open there is a cushioning effect because it bypasses the drive motors with a restricted orifice. When the valve is closed there is no cushioning effect. The valve is closed during creep speed or on slopes of 5° or more. At all other times the valve is open

HIGH PRESSURE FILTER

The high pressure hydraulic filter (3 micron element, only) is a non-bypassing filter. This filter allows maximum fluid flow as long as the filter element is free of contaminants. When the filter is dirty, a valve senses a pressure drop and closes to prevent the filter element from crushing. The build-up of pressure across the filter will also reduce pump flow and function speeds which is usually an indication of a dirty filteraffect high speed drive performance and act as an indication of a dirty filter.



High Pressure Filter.



Hydraulic Fluid Reservoir.

HIGH PRESSURE FILTER ELEMENT

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

HYDRAULIC FLUID RESERVOIR

The hydraulic fluid reservoir is a part of the superstructure weldment and consists of the tank, a fill cap assembly (breather and strainer), a drain plug, one shut-off valve for the suction line, five shut-off valves for return lines and a sight gauge.

HYDRAULIC RESERVOIR MAINTENANCE

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

MAXI-REACH SYSTEM

The Maxi-Reach System is a mechanical and hydraulic device that automatically controls maximum outreach by limiting the boom extend and boom lower functions. The boom extend and lower functions will operate normally until the Maxi-Reach System has been automatically activated. The mechanical portion consists of a load cell mechanism and the hydraulic portion consists of the Maxi-Reach valves for controlling the boom extend and boom lower functions.

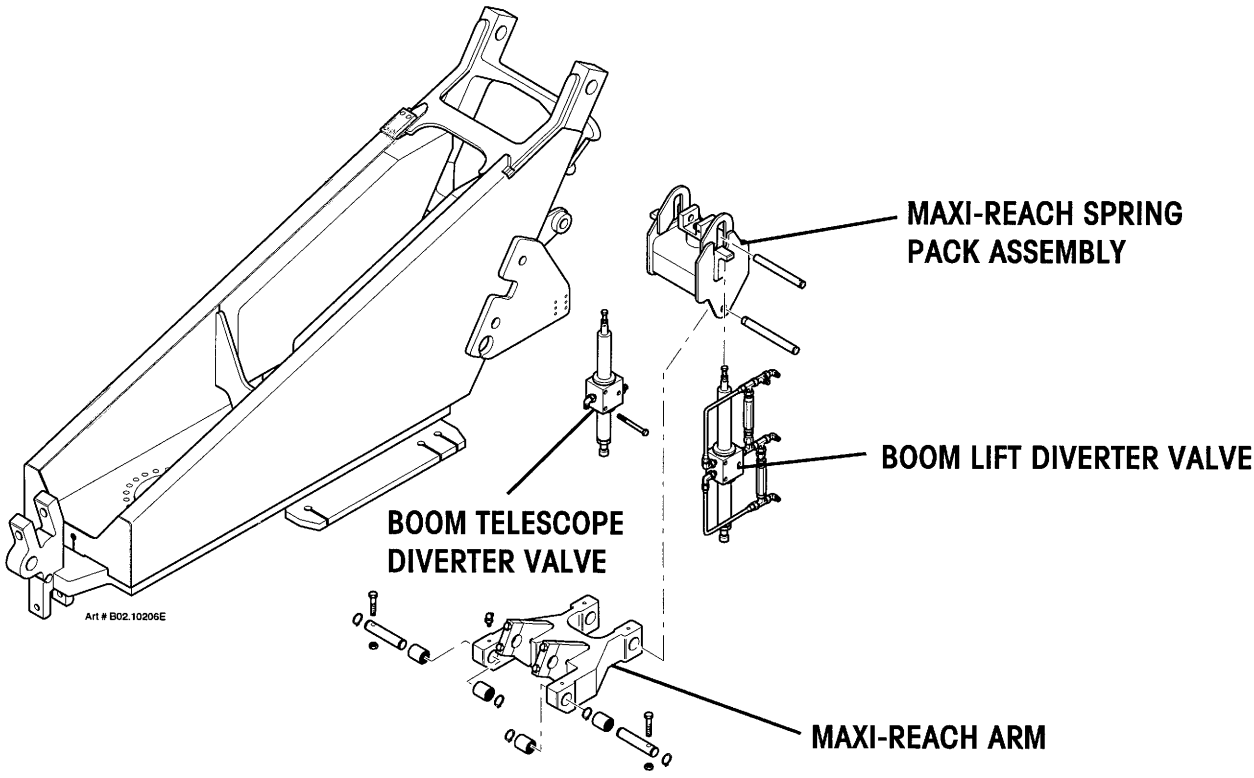
The Maxi-Reach System is activated when the pressure on the spring lowers the arm to hit the diverter valves. The hydraulic fluid flow is then diverted away from the lift cylinder to the telescope cylinder.

Hydraulic fluid flow, under normal operation, is from the shuttle valve manifold through the flow regulator valve to the boom lift diverter valve, to the lift cylinder. When Maxi-Reach is activated, hydraulic fluid flow is to the shuttle valve on the telescope port of the shuttle valve assembly, to the sequence valves and to the telescope cylinder for retract.

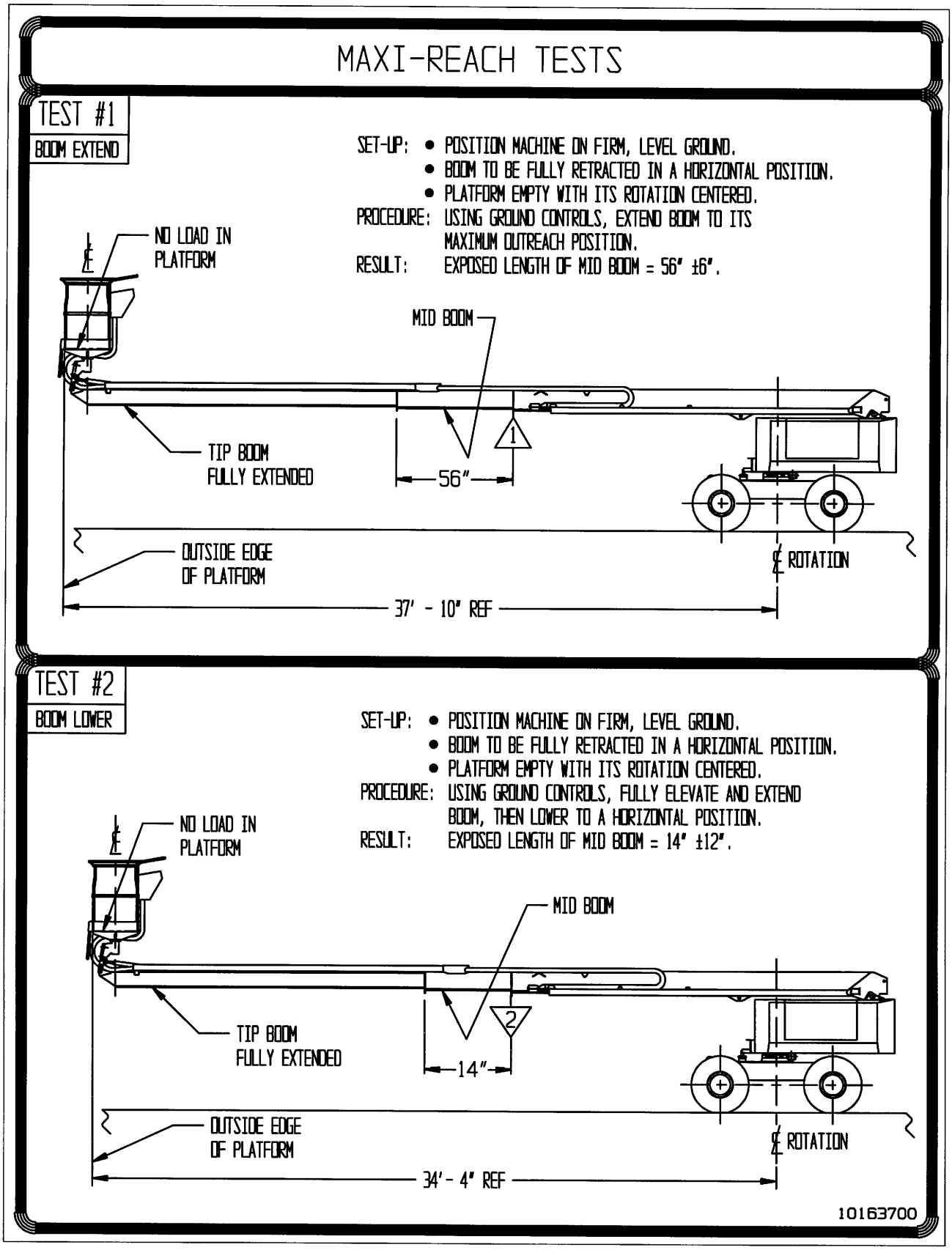
MAXI-REACH TESTS

Since the Maxi-Reach System is a mechanical and hydraulic device, these tests verify the operation of both portions of the system. The load cell mechanism (Spring Pack Assembly and Arm) accurately measures boom loading, and subsequently activates the Maxi-Reach valves to control and limit maximum outreach. These tests check the ability and accuracy of the load cell mechanism to measure boom loads. The two tests are required to check both the boom lower and extend functions.

For ease-of-test verification, there are two triangles painted on the boom. The center of each triangle indicates the actual boom length which corresponds to the maximum outreach for each test. The width of each triangle indicates the maximum allowable variation (tolerance) in boom length for each test. Test one uses the 12 inch wide triangle, which represents 56 ± 6 inches of mid boom extension after completion of the test. Test two uses the inverted 24 inch triangle, which represents 14 ± 12 inches of mid boom extension after completion of the test.



Maxi-Reach Major Components.



Maxi-Reach Tests Decal.

Test Set-Up

The set-up for both tests is identical. The machine should be on firm, level ground with the boom fully retracted and in horizontal position. Also, the platform rotation must be centered. For accurate test results, these tests must be performed with **NO** load and exercised from the ground controls.

Test One - Checks the Maxi-Reach boom extend function.

1. Position machine on firm, level ground with the boom fully retracted and in the horizontal position. Also, the platform rotation must be centered.

2. Extend the boom as far as it will go, using the ground controls.

3. If any portion of the 12 inch wide triangle is covered by the outer edge of the base boom, the machine passes this test. If the unit does not pass this test, have it serviced.

Test Two - Checks the Maxi-Reach boom lower function.

1. Position machine on firm, level ground with the boom fully retracted and in the horizontal position. Also, the platform rotation must be centered.

2. Raise the boom to maximum elevation, using the ground controls.

3. Extend the boom to maximum length, using the ground controls.

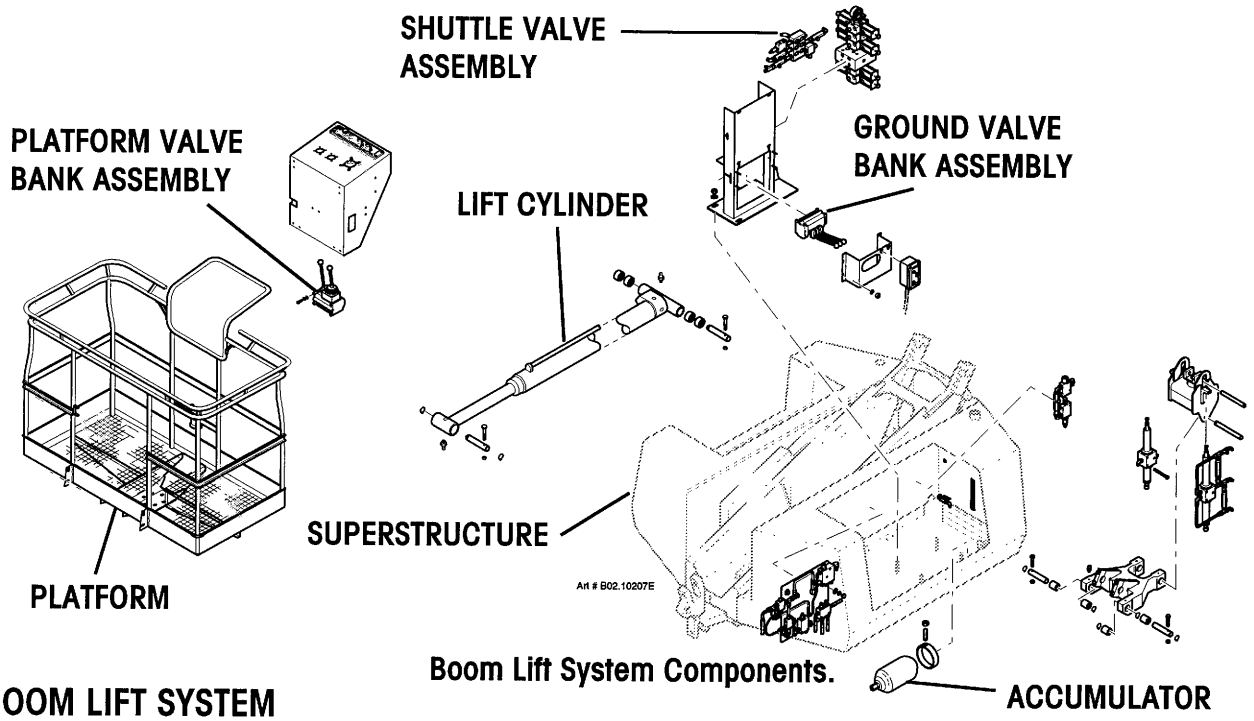
4. Lower the boom to the horizontal position, using the ground controls.

5. If any portion of the inverted 24 inch wide triangle is covered by the outer edge of the base boom, the machine passes this test. If the unit does not pass this test, have it serviced.

MAXI-REACH SET UP

There should be zero gap between the boom lift diverter valve (left valve) and the arm. Spring pack can be adjusted so the boom check is accurate. To increase tension turn capscrew in; to decrease tension turn capscrew out. There is zero to 1/8 inch gap between the boom telescope diverter valve (right valve) and the arm.

> **IMPORTANT:** If you must adjust the Maxi-Reach System, you must notify Simon Aerials Inc. Technical Support Department.



Boom Lift System Components.

BOOM LIFT SYSTEM

The boom lift system consists of a hydraulic directional control valve in the platform valve bank assembly, another directional control valve in the ground valve bank assembly, a shuttle valve assembly, accumulator and a lift cylinder with a counterbalance (holding) valve.

The boom lift circuit under normal operation is manually controled but when in the activating zone, it is controled by the Maxi-Reach System. The Maxi-Reach System automatically controls maximum outreach by limiting the boom extend and boom lower functions. Only when extending or lowering the boom close to the point of maximum outreach does the Maxi-Reach System activate. When operating within this activating zone, it is not possible to manually extend or lower the boom using either the platform or ground controls. The operator must exit this zone by either raising or retracting the boom to restore the normal manual operation of these two functions.

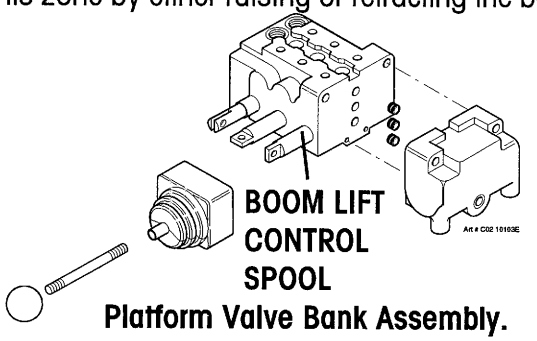
DIRECTIONAL CONTROL VALVES

Platform

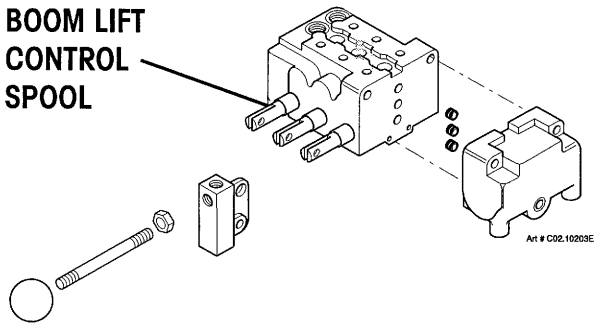
The platform directional control valve directs fluid to the extend or retract port of the lift cylinder, thus raising or lowering the boom. This valve is a 3 position, 4 way manually operated valve.

Ground

The boom lift control valve is located in the ground valve bank assembly with the telescope and swing functions. This valve directs fluid to the extend or



Platform Valve Bank Assembly.

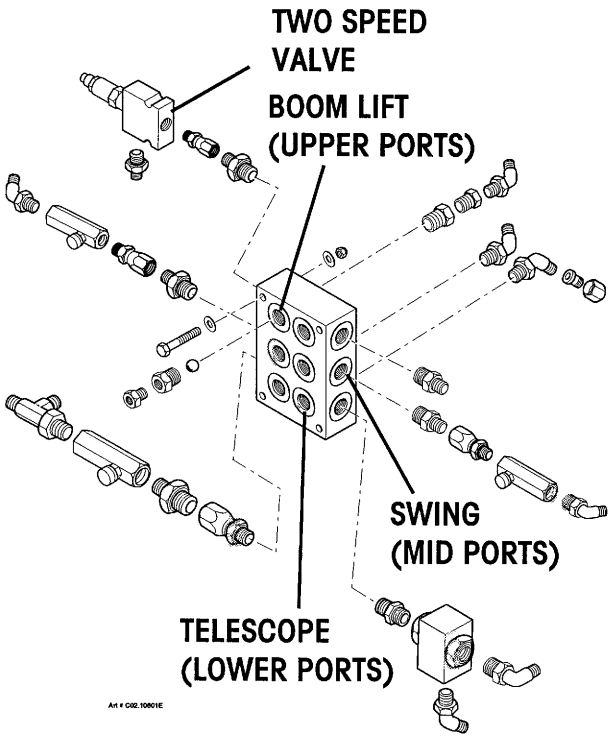


Ground Valve Bank Assembly.

retract port of the lift cylinder, thus raising or lowering the boom. This valve is a 3 position, 4 way manually operated valve.

SHUTTLE VALVE ASSEMBLY

The shuttle valve assembly consists of a manifold block with six integral shuttle valve cartridges. The five valves attached to the manifolde are a shuttle valve, two flow control valves, a flow control pressure compensated valve and a flow regulator valve. The boom lift system uses the flow two speed valve. **Do not adjust the flow control valves on extend or hoist.**



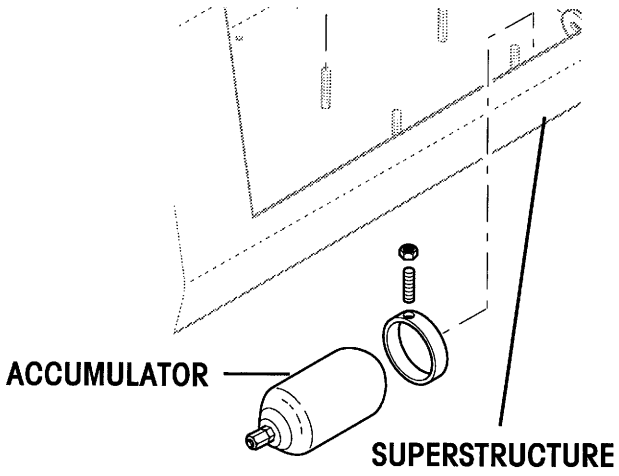
Shuttle Valve Assembly.

Two Speed Valve

This is a two speed valve for boom lift. No adjustment is required.

ACCUMULATOR

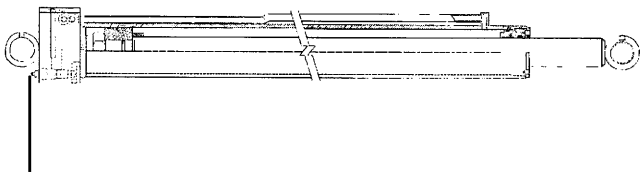
The accumulator in this application acts as a cushioning device when lowering the boom and the lever is brought back to neutral or when booming down and entering the Maxi-Reach activating zone.



Accumulator Location.

LIFT CYLINDER

The boom lift function is performed by a double acting cylinder. This cylinder contains a counterbalance (holding) valve, which prevents drifting and provides over-running protection. When the boom is lowered, directs fluid to the retract port on the lift cylinder which pilots open the counter balance valve, allowing the lift cylinder to retract at a controled rate.

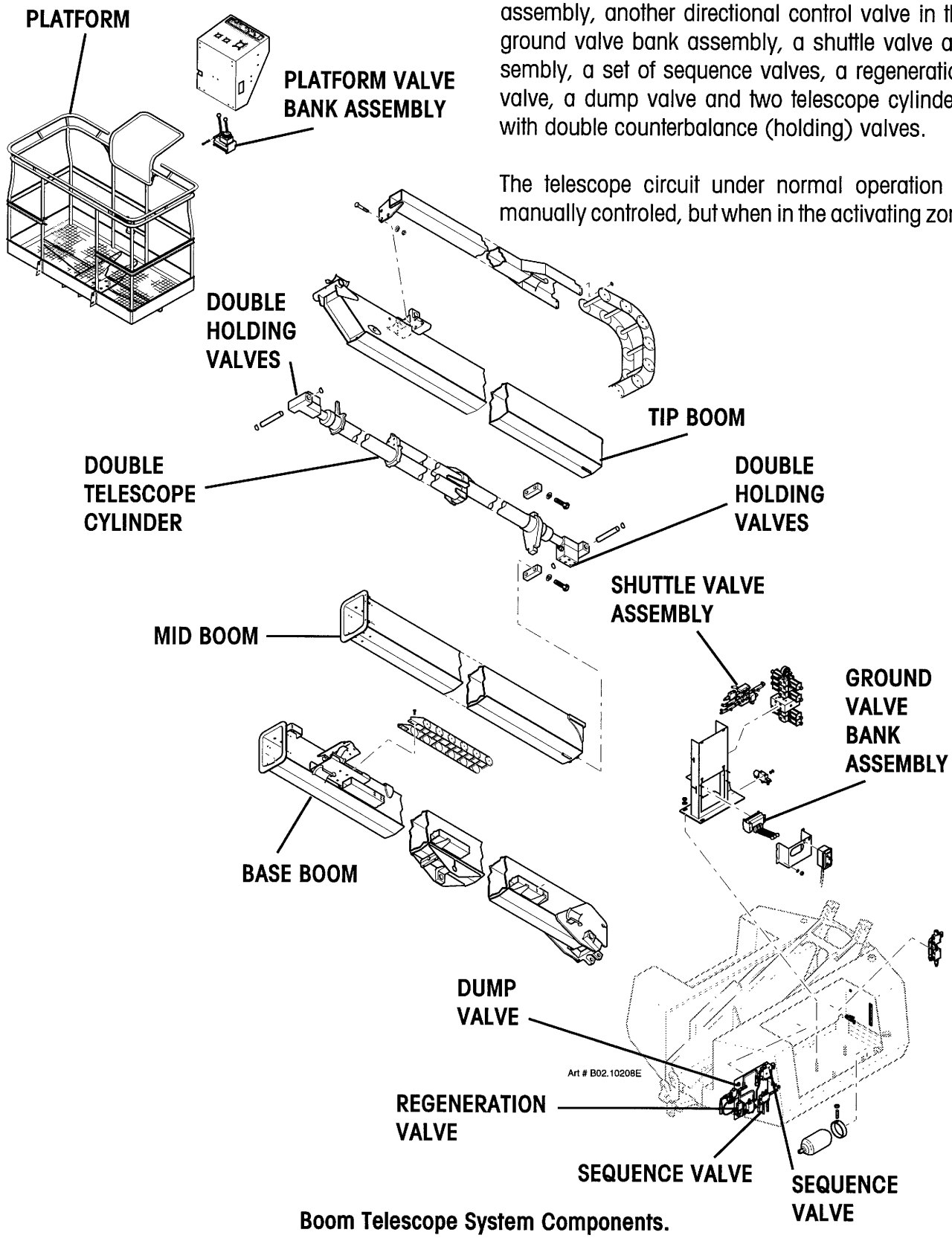


Lift Cylinder.

BOOM TELESCOPE (EXTEND) SYSTEM

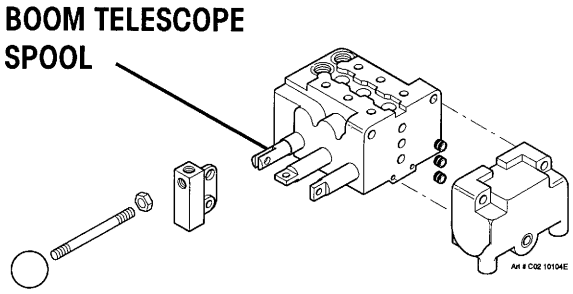
The boom telescope system consists of a hydraulic directional control valve in the platform valve bank assembly, another directional control valve in the ground valve bank assembly, a shuttle valve assembly, a set of sequence valves, a regeneration valve, a dump valve and two telescope cylinders with double counterbalance (holding) valves.

The telescope circuit under normal operation is manually controled, but when in the activating zone



Boom Telescope System Components.

it is controled by the Maxi-Reach System. The Maxi-Reach System automatically controls maximum outreach by limiting the boom telescope and boom lower functions. Only when extending or lowering the boom close to the point of maximum outreach does the Maxi-Reach System activate. When operating within this activating zone, it is not possible to manually extend or lower the boom using either the platform or ground controls. The operator must exit this zone by either raising or retracting the boom to restore the normal manual operation of these two functions.



Platform Valve Bank Assembly.

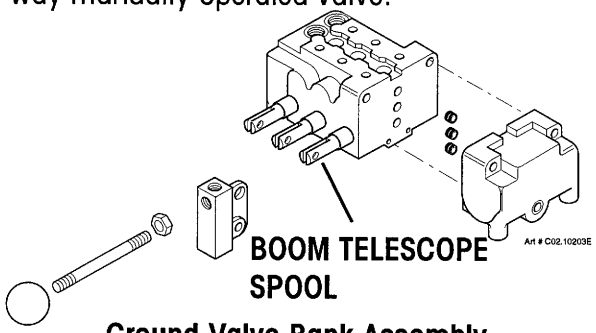
DIRECTIONAL CONTROL VALVES

Platform

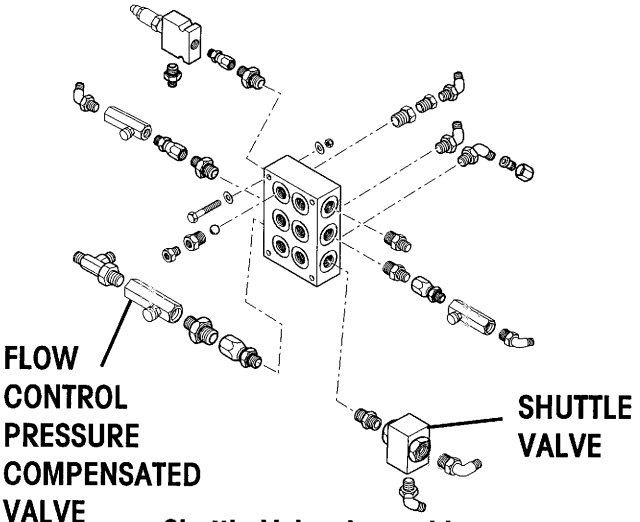
The platform directional control valve directs fluid to the extend or retract port of the telescope cylinder, thus extending or retracting the boom. This valve is a 3 position, 4 way manually operated valve.

Ground

The ground directional control valve is located in the ground valve bank assembly with the lift and swing valves. This valve directs directs fluid to the extend or retract port of the telescope cylinder, thus extending or retracting the boom. This valve is a 3 position, 4 way manually operated valve.



Ground Valve Bank Assembly.



Shuttle Valve Assembly.

SHUTTLE VALVE ASSEMBLY

The main purpose of the shuttle valves is to permit parallel operation of the ground and platform valve banks. The shuttle valve assembly consists of a manifold block with integral shuttle valve cartridge. The shuttle valve allows operation of the telescope cylinder to retract from two different sources. Firts of all from the upper or lower valve bank. Secondly, fluid flows from the Maxi-Reach (boom lift) diverter valve.

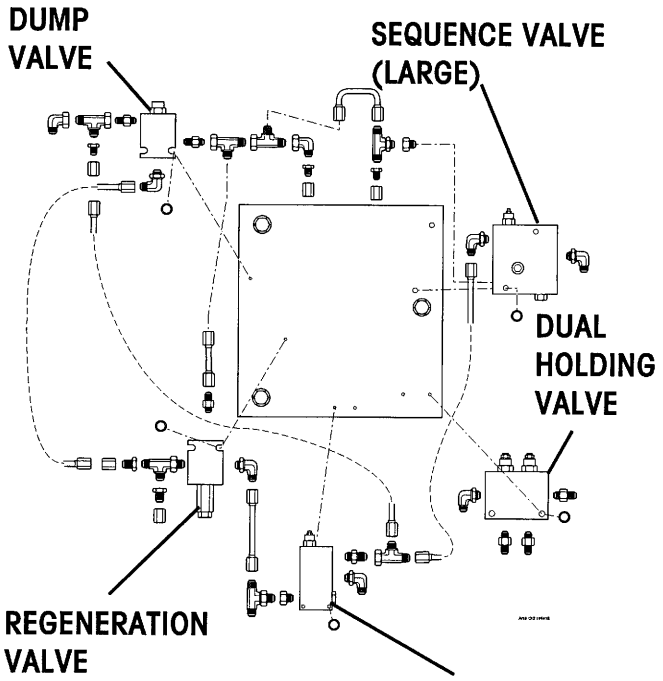
Shuttle Valve

For normal operation the shuttle valve is open to allow fluid flow to retract the telescope cylinders by way of the sequence valves. When Maxi-Reach is activated, the shuttle valve allows hydraulic fluid from the lift function maxi-reach valve to flow to the telescope cylinders to retract the boom by way of the sequence valves. No adjustment is required.

Flow Control Pressure Compensated Valve

The flow control pressure compensated valve is factory set to provide 10 G.P.M. to allow hydraulic fluid flow to extend the telescope cylinders by way of the sequence valves.

> **IMPORTANT:** If you must adjust this valve, notify Simon Aerials Inc. Technical Support Departmentp; adjustment may affect the Maxi-Reach System.



Sequence and Regeneration Valves.

SEQUENCE VALVES

The large sequence valve allows the tip boom to be extended before the mid boom. Once the tip boom is fully extended out the mid boom is allowed to extend.

The small sequence valve allows the mid boom to be retracted first, and then the tip boom is allowed to retract.

Turn the needle valve clockwise to increasesequence pressure and counter-clockwise to decrease sequence pressure.

> **IMPORTANT:** If you must adjust these valve, you must notify Simon Aerials Inc. Technical Support Department as any adjustment may affect the Maxi-Reach System.

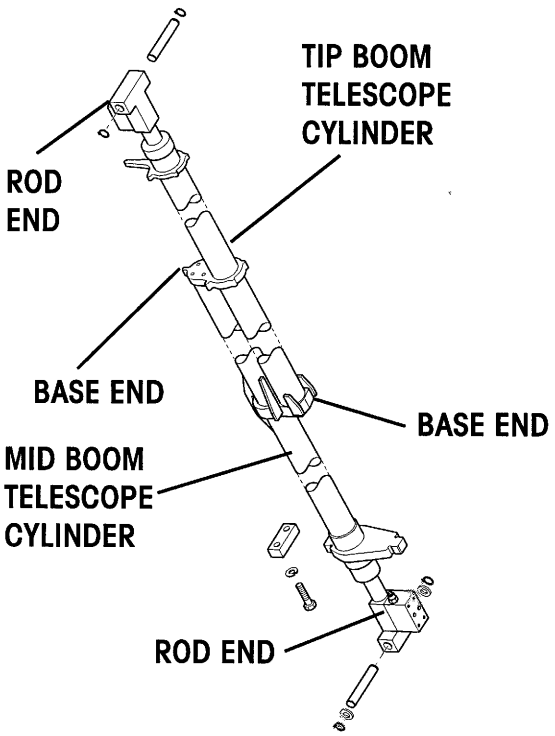
REGENERATION VALVE

Regeneration valve simultaneously connects the extend and retract ports together to allow the cylinder to extend more rapidly. No adjustment is required.

TELESCOPE (EXTEND) CYLINDERS

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

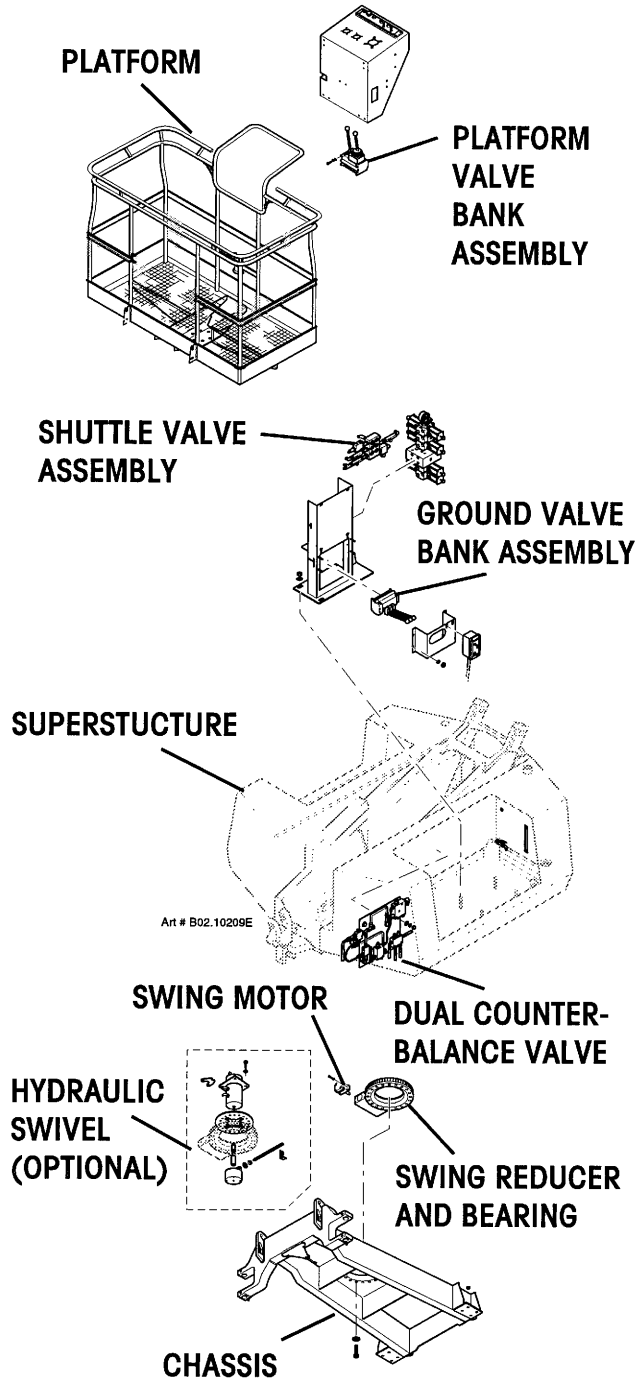
The mid boom telescope cylinder rod end is attached to the base boom. The mid cylinder housing is attached to the mid boom. The tip boom telescope cylinder rod end is attached to the tip boom.



Telescope Cylinder.

SUPERSTRUCTURE SWING SYSTEM

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

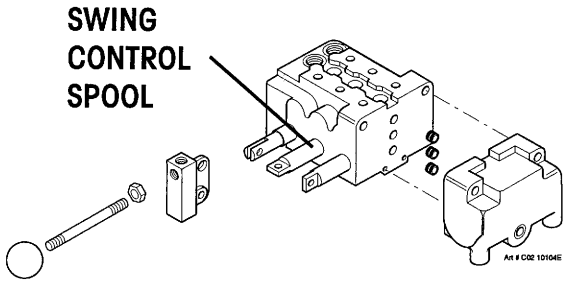


Superstructure Swing System Components.

DIRECTIONAL CONTROL VALVE

Platform

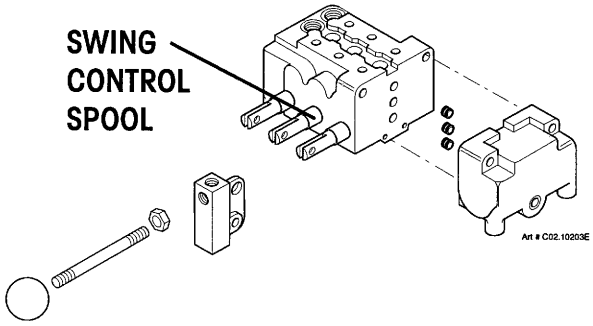
The platform directional control valve directs hydraulic fluid to the swing motor to provide clockwise or counter-clockwise superstructure rotation. This valve is a 3 position, 4 way manually operated valve.



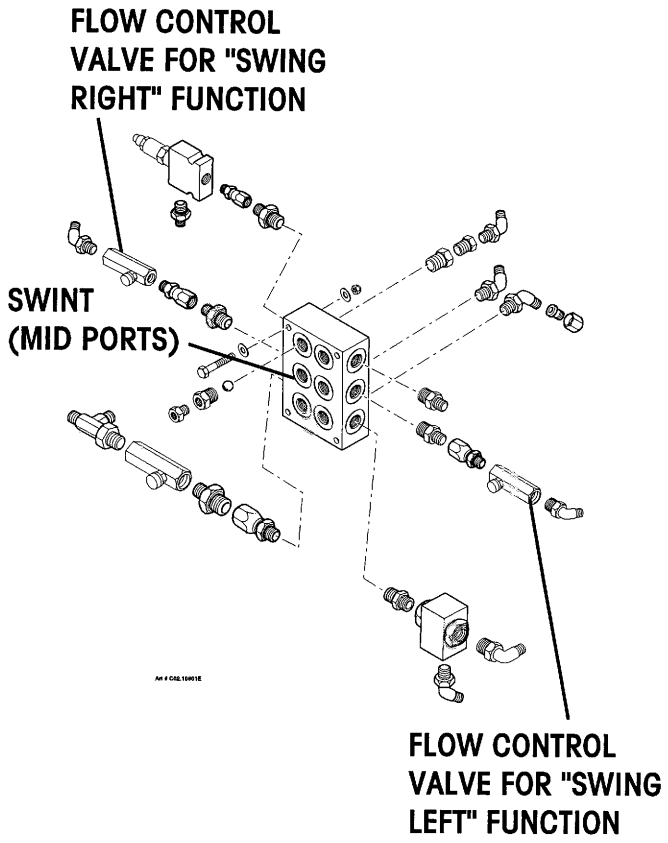
Platform Directional Control Valve.

Ground

The ground directional control valve is located in the valve bank assembly along with the telescope and lift functions. This valve directs hydraulic fluid to the swing motor to provide clockwise or counter-clockwise superstructure rotation. This is a 3 position, 4 way manually operated valve.



Ground Valve Bank Assembly.



Shuttle Valve Assembly.

SHUTTLE VALVE ASSEMBLY

The shuttle valve assembly is located on the superstructure to the right of the ground controls. Two shuttle valves allow the return fluid from the swing motor to go directly back to the reservoir at the ground instead of traveling the longer route through the valve in the platform.

Flow Control Valve

The middle two flow control valves limit the swing function speeds. Turn the needle valves counterclockwise to increase fluid flow and clockwise to decrease fluid flow (speed).

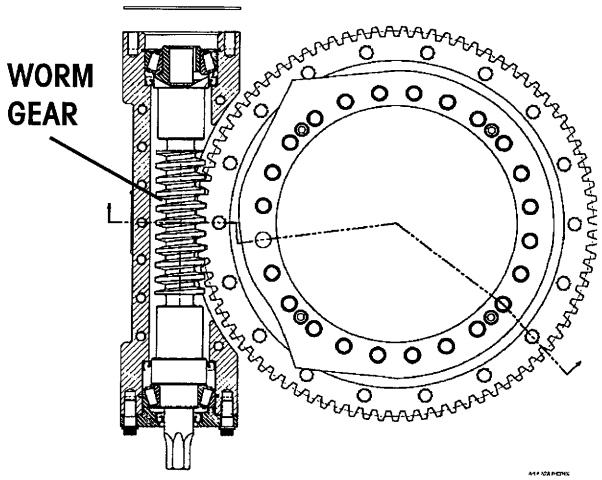
DOUBLE COUNTERBALANCE VALVE (SWING)

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

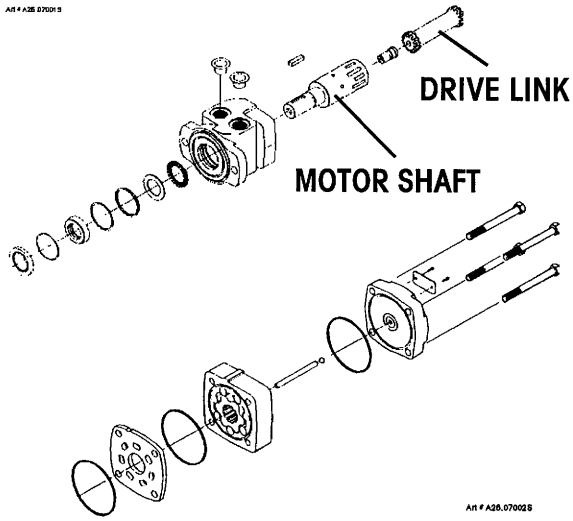
SWING DRIVE MOTOR/ REDUCER ASSEMBLY

The worm gear swing reducer used allows the motor output to be reduced to a fractional speed and proportionally increases swing drive torque. This allows the superstructure to rotate at a slower speed than the hydraulic motor.

The swing reducer has self-locking worm gears to prevent superstructure rotation when the swing function is not being used.



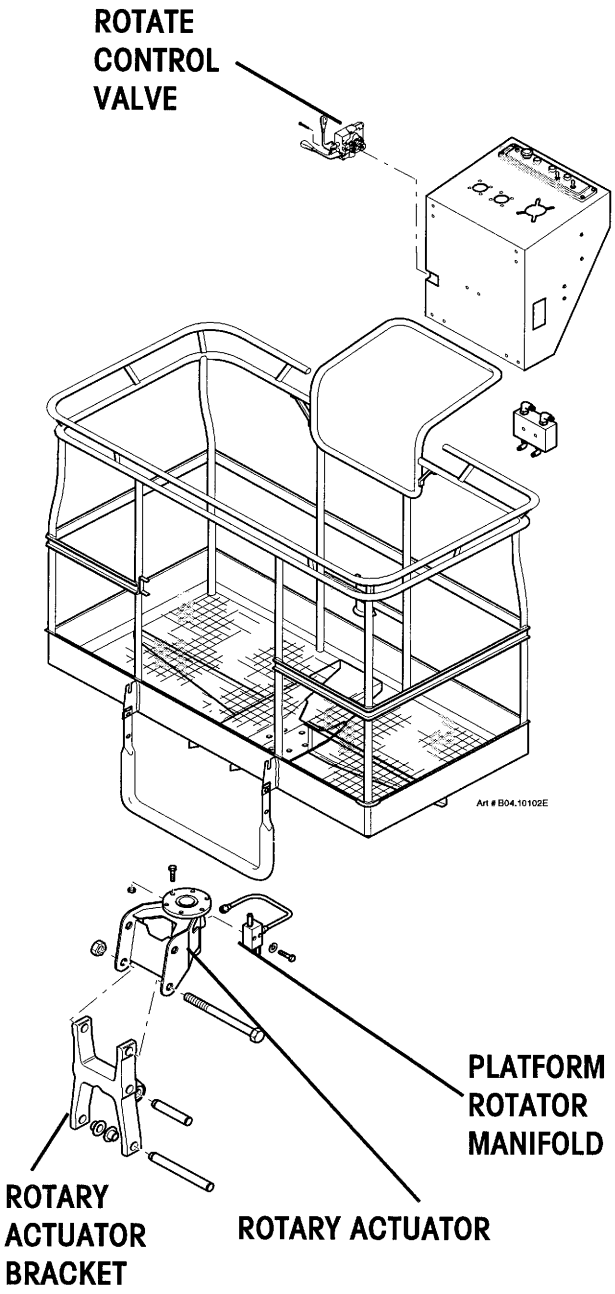
Worm Gear Swing Reducer.



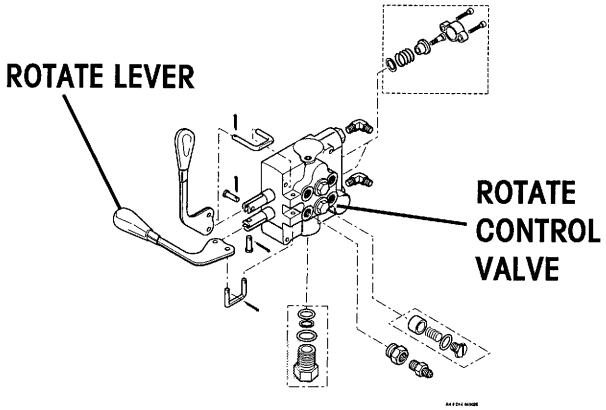
Swing Motor.

PLATFORM ROTATE SYSTEM

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



Components of Platform Rotate System.



Rotate Control Valve.

ROTATE CONTROL VALVE

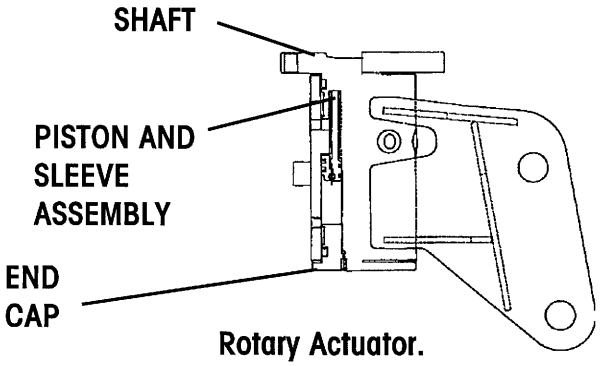
The platform rotate control valve is combined with the platform level control valve and is mounted on the left side of the control console. This valve is a three position, four way valve which is manually operated. This control valve directs fluid flow to the rotate function.

ROTARY ACTUATOR

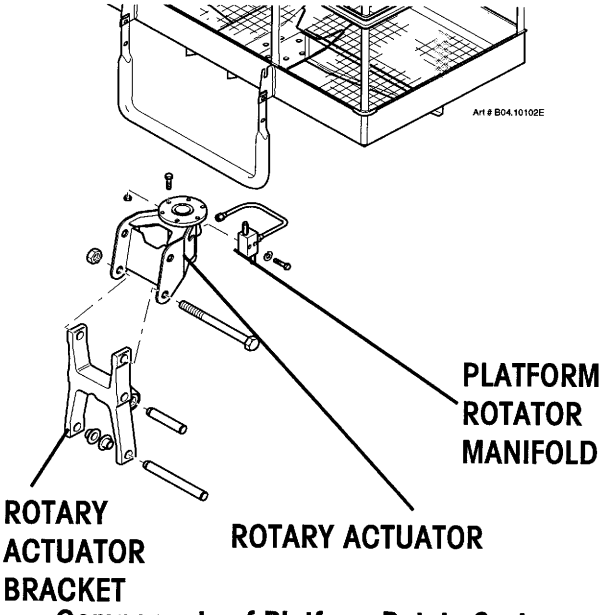
The rotary actuator is a helical gear type. Hydraulic fluid enters the actuator from one of two ports depending on direction of rotation. Fluid under pressure will act on the piston and force the piston sleeve up or down. The helical gears on the piston sleeve transmit the axial motion of the piston into rotary motion of the output shaft.

Rotary Actuator Maintenance

Check end cap torque every 800 hours or once a year.



Rotary Actuator.



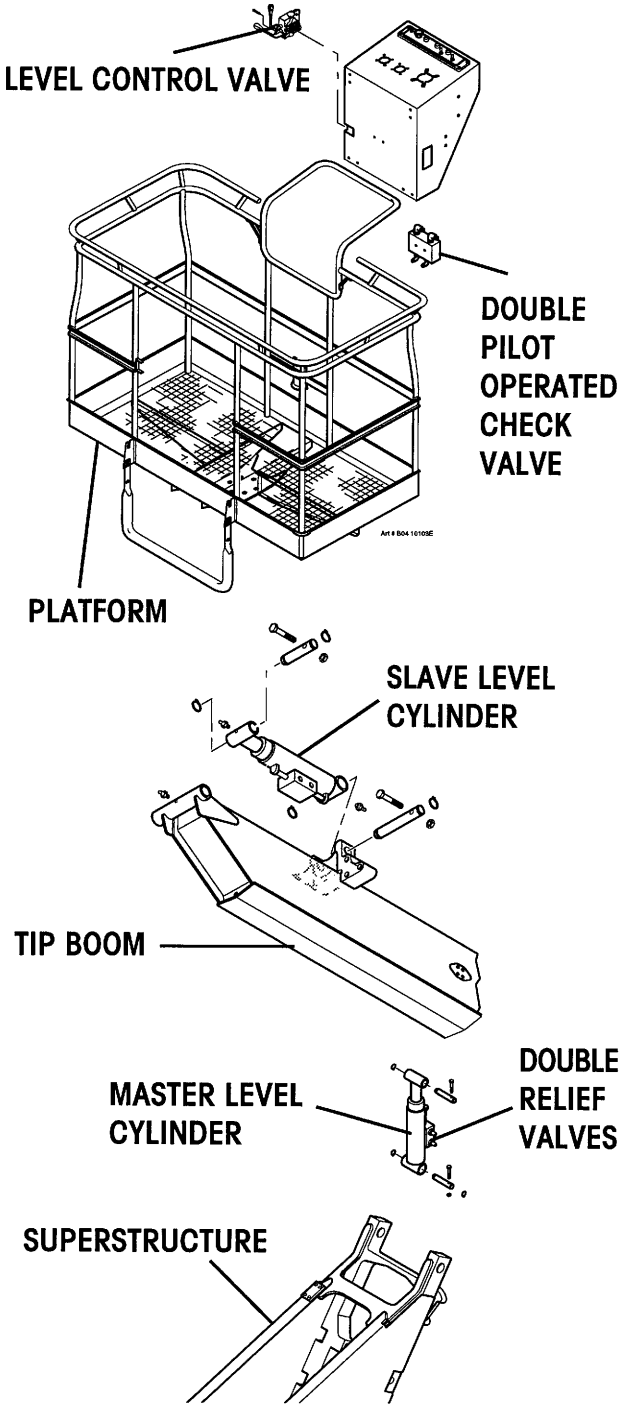
Components of Platform Rotate System.

PLATFORM ROTATOR MANIFOLD

The platform rotator manifold is mounted as an integral part of the rotary actuator. The platform rotator manifold acts as a cross port relief valve and double pilot check valve. The relief valves prevent damage to the rotary actuator. The doublle pilot check valve prevents drift.

PLATFORM LEVELING SYSTEM

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

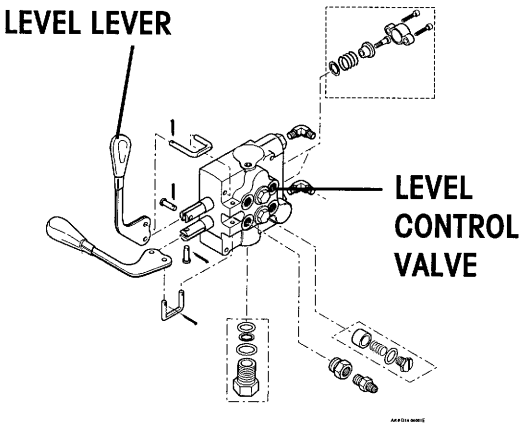


Platform LevelSystem Components.

The platform level system is manually controlled only from the platform.

LEVEL CONTROL VALVE

The platform level control valve is combined with the platform rotate control valve and is mounted on the left side of the control console. This valve is a manually operated three position, four way valve. This control valve directs fluid flow to the level cylindersin order to adjust the platform angle.



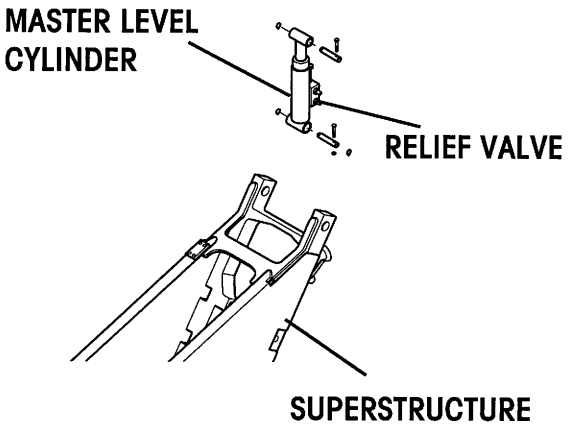
Level Control Valve.

DOUBLE PILOT OPERATED CHECK VALVE

The double pilot operated check valve acts to isolate the manual control valve from the closed loop leveling circuit. It prevents oil in the closed loop from escaping through the manual valve during leveling.

MASTER LEVEL CYLINDER

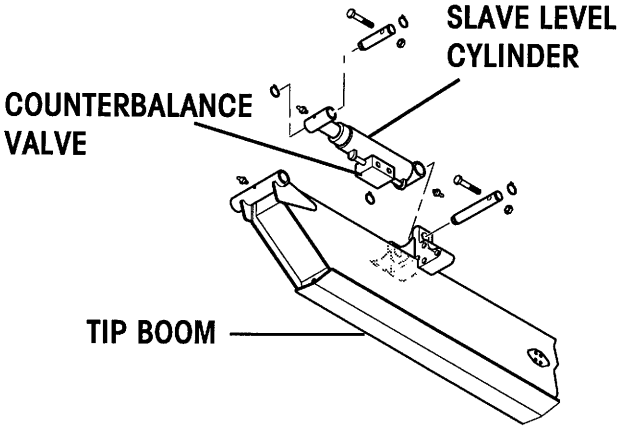
The master leveling cylinder is a double acting cylinder which acts as a pump and is located between superstructure and base boom. Whenever the boom is raised or lowered, the master cylinder pumps oil into the slave cylinder. This forces the slave level cylinder to move the same distance as the master level cylinder. Therefore, any change in boom angle automatically results in the same change in the platform angle, relative to the boom.



Master Leveling Cylinder and Relief Valve.

RELIEF VALVES

The relief valves are factory set at 3000 PSI (207 Bar/ 211 Kg/cm^2) and prevent high pressure in the leveling circuit that could result in component damage. High pressure can occur if the platform has been manually levelled, which could cause the slave level cylinder to "bottom out" before the master level cylinder reaches the end of its stroke (either extending or retracting).



Slave Level Cylinder.

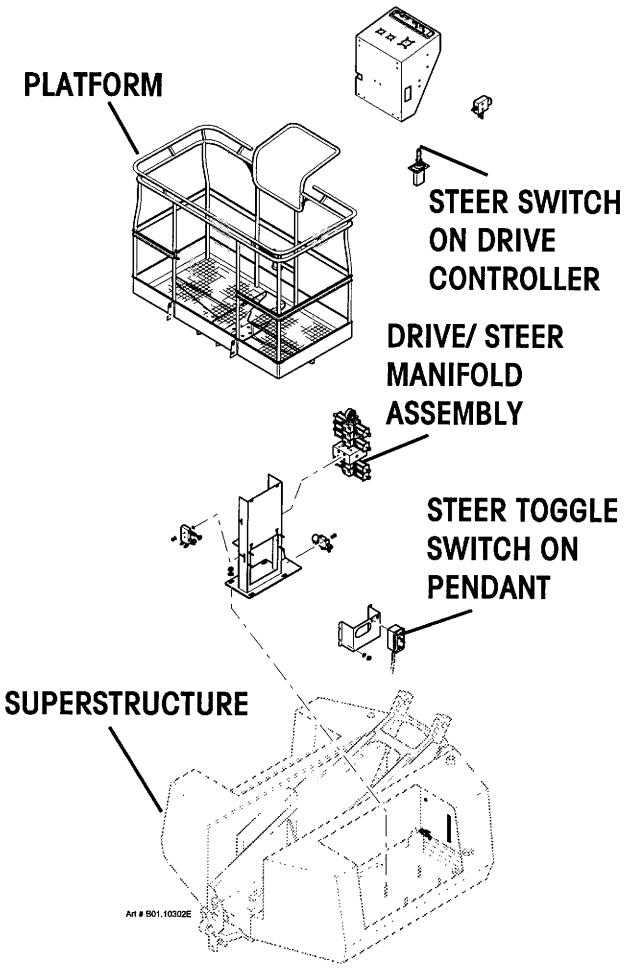
SLAVE LEVEL CYLINDER

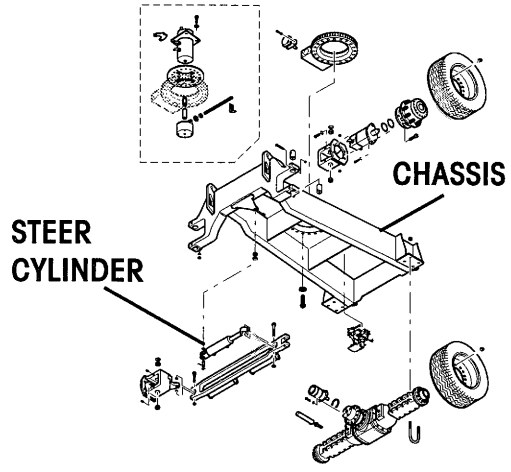
The slave leveling cylinder is a double acting cylinder connected between the tip boom and the platform. This cylinder controls the angle of the platform relative to the boom.

The slave leveling cylinder contains two counterbalance valves. The counterbalance valves prevent cylinder movement in any direction.

STEER SYSTEM

The steer system consists of the steer cylinder, a valve on the drive/ steer manifold assembly and control switches at both platform and ground.





Steer System Components.

DRIVE/ STEER MANIFOLD ASSEMBLY

The steer system is controlled by the bottom valve on the drive/ steer manifold assembly. This valve is activated from the platform by a thumb button on top of the drive control lever. When the thumb button is pressed to steer "LEFT" or "RIGHT", the steer valve spool shifts to allow hydraulic fluid to either the rod end or the base end of the steer cylinder.

The steer valve is activated from the ground by a toggle switch on the pendant control on the superstructure. When the toggle switch is moved to steer "LEFT" or "RIGHT", the solenoid activated valve spool shifts to allow fluid flow to either the rod end or the base end of the steer cylinder.

STEER CYLINDER

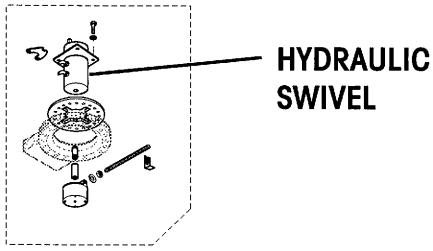
The front wheels are steered hydraulically by a double acting cylinder. The base end of the steer cylinder is attached to the chassis, while the rod end is connected to the tie rod.

STEER SYSTEM MAINTENANCE

Check all pins on steering cylinder and linkage for excessive play, and ensure that all clips are in place and secure. Lubricate linkage as necessary. Check cylinder and hoses for hydraulic fluid leakage and security.

HYDRAULIC SWIVEL (OPTIONAL)

The optional hydraulic swivel allows passage of hydraulic fluid between the superstructure and the undercarriage. The swivel allows for 360° of continuous superstructure rotation in either direction.



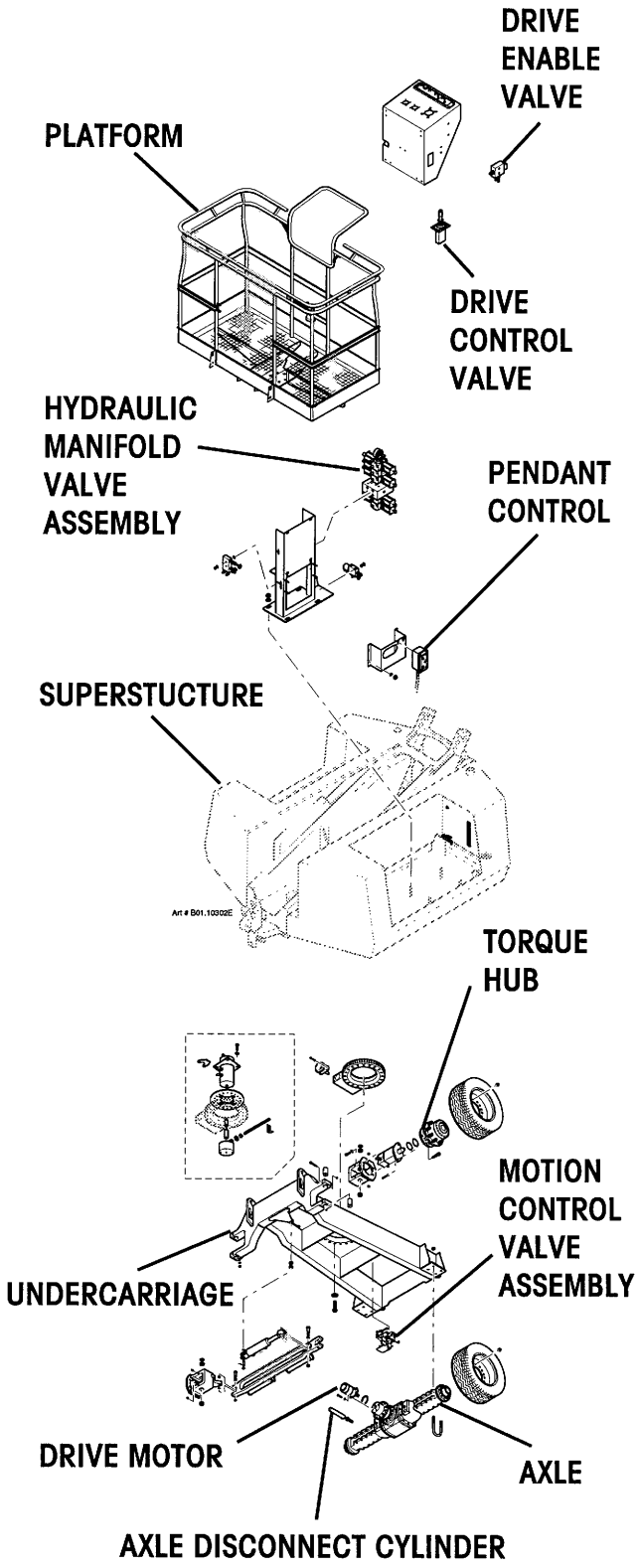
Hydraulic Swivel Option.

SECTION 3:
DRIVE SYSTEM

Table of Contents, Section 3

Drive System Components 3-3
Front Wheel Motor 3-3
Hydraulic Drive Motor 3-3
Rear Axle Assembly 3-4
Hydraulic Manifold Valve Assembly 3-4
Motion Control Valve Assembly 3-4
Motion Control Valve 3-4
Brake Needle Valve 3-4
Shuttle Valve 3-5
Pressure Reducing Valve 3-5
Double Relief Valve 3-5
Solenoid Valve 3-5
Drive Enable Valve 3-5
Platform Drive Control Handle 3-5
Drive/ Steer/ Selector Assembly 3-6
Directional Control Valves 3-6

DRIVE SYSTEM COMPONENTS



Drive System Components.

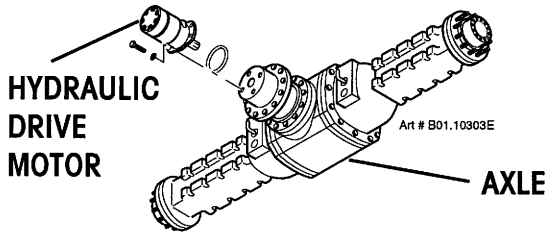
The drive circuit consists of a wheel drive motor to power each front wheel and a hydraulic drive motor to power the rear axle, a motion control valve assembly, a hydraulic manifold valve assembly, a pendant control, a drive enable valve and a platform drive control valve.

FRONT WHEEL MOTOR

Two hydraulic motors with torque hubs drive the front wheels. If a motor is damaged, replace the motor. See "Mechanical Components" section in this manual.

HYDRAULIC DRIVE MOTOR

A third hydraulic motor is mounted on the rear axle assembly and drives the rear wheels. If motor is damaged, replace the motor. See "Mechanical Components" section in this manual.



Rear Hydraulic Drive Motor.

REAR AXLE ASSEMBLY

The rear axle assembly includes a spring applied/ hydraulically released brake. Check the oil monthly and change the oil yearly. For brake adjustment see "Mechanical Components" section in this manual.

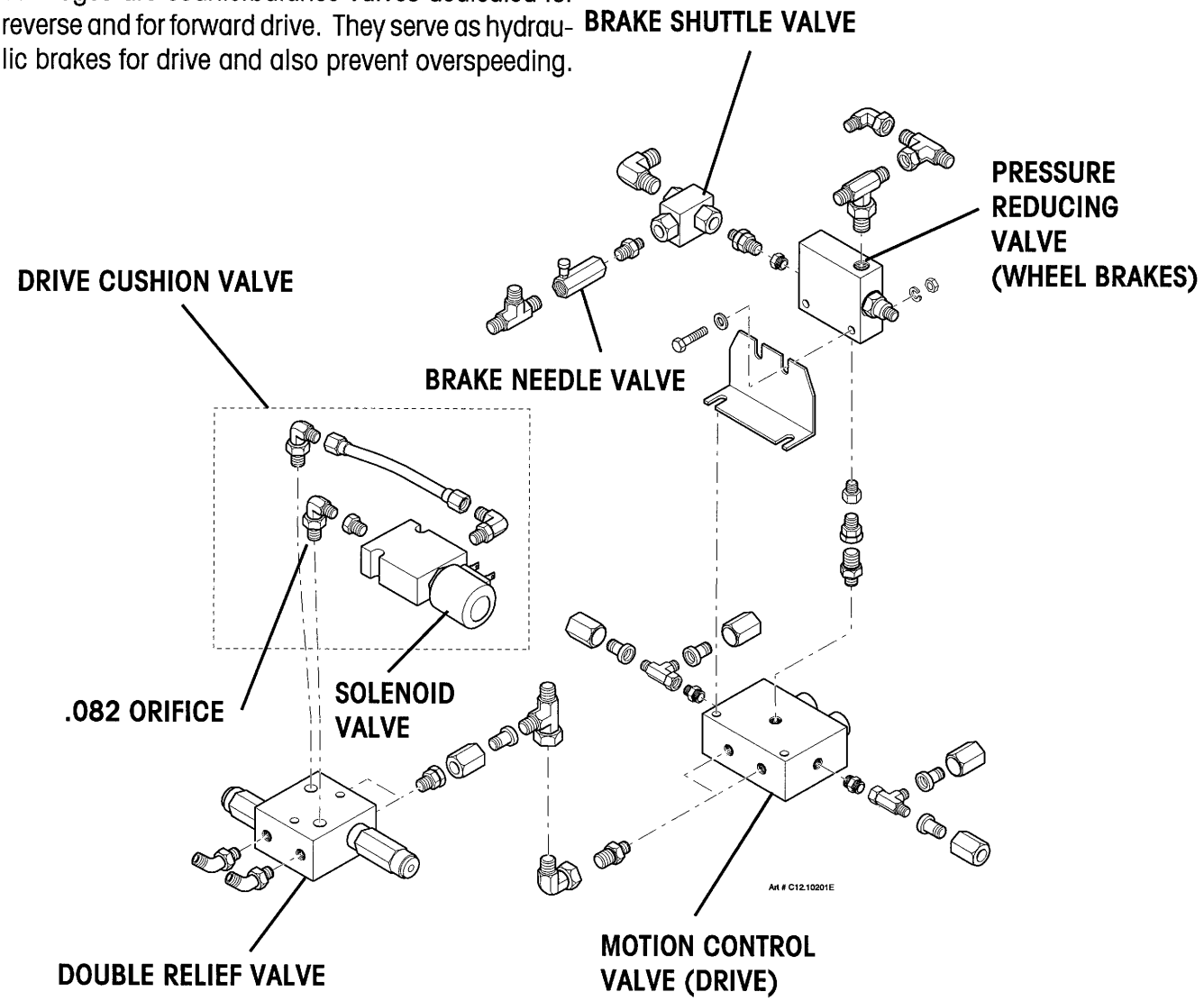
DRIVE/ BRAKE VALVE ASSEMBLY

MOTION CONTROL VALVE (DRIVE)

This valveconsists of three screw in cartridges. The shuttle valve is used to drive pressure to the wheel brakes in order to release the brakes. The other two cartridges are counterbalance valves dedicated for reverse and for forward drive. They serve as hydraulic brakes for drive and also prevent overspeeding.

BRAKE NEEDLE VALVE

This flow control valve meters hydraulic fluid flow released from the spring applied wheel brake assemblies to allow brakes to engage slowly. Hydraulic fluid is allowed to flow into the brakes as free flow, while fluid is allowed to flow out of the brakes as controled by the needle valve. The proper valve setting is one (1) turn from the fully closed position.



Drive/ Brake Control Valve Assembly.

BRAKE SHUTTLE VALVE

The shuttle valve directs hydraulic fluid from two sources: either the main drive circuit or the manual brake release hand pump to the hydraulic brake assemblies.

Pressure Reducing Valve

Limits drive pressure to a maximum of 435 psi (30 Bar/ 30.6 Kg/cm^2) for the brake assemblies.

DOUBLE RELIEF VALVE

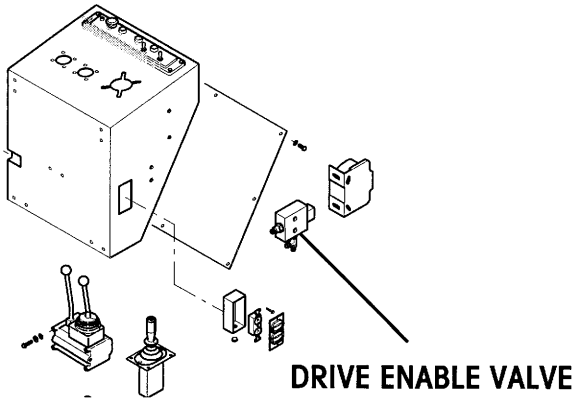
The cross port relief valve limits maximum pressure to all wheel drive motors. Valves are set at 3000 psi (207 Bar/ 211 Kg/cm^2).

DRIVE CUSHION SOLENOID VALVE

This is a solenoid valve which when open there is a cushioning effect because it bypasses the drive motors with a restricted orifice. When the valve is closed there is no cushioning effect. The valve is closed during creep speed or on slopes of 5° or more. At all other times the valve is open

DRIVE ENABLE SOLENOID VALVE

The drive enable valve is a two-way, two position valve which when actuated directs fluid to the drive control valve to control the pump output flow. This valve is normally closed.

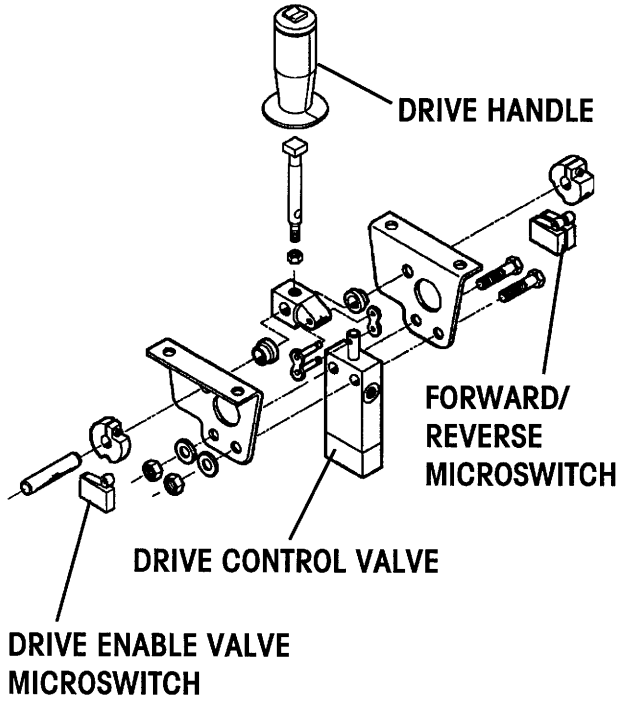


Drive Enable Valve.

PLATFORM DRIVE CONTROL VALVE ASM.

The platform drive control valve assembly is a proportional control valve which controls the displacement of the main hydraulic pump and, therefore; proportionally controls drive speed.

The drive control valve is normally open and manually closed to stroke the pump. It controls drive speed proportionally. As the handle is moved, either the forward or reverse microswitch is closed, sending a signal to the drive valve coils. Whenever the drive control handle is slightly moved off the center position the drive enable microswitch closes, which energizes the drive enable valve coil.



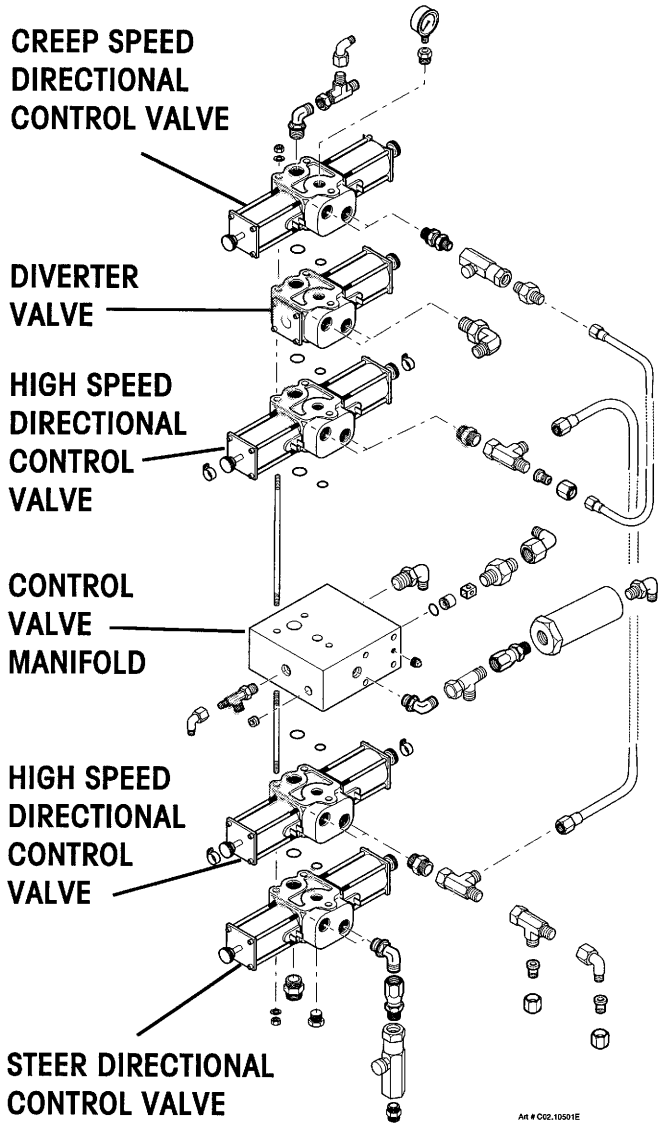
Platform Drive Control Valve Assembly.

DRIVE/ STEER/ SELECTOR VALVE ASSEMBLY

The control valve manifold is located in the center of the drive/ steer/ selector valve assembly (main valve stack). This control valve manifold allows hydraulic fluid, from either the main hydraulic pump or emergency pump, to enter the directional control valves.

DIRECTIONAL CONTROL VALVES

The directional control valves direct hydraulic fluid to the steer and drive functions when energized; thereby, allowing steering, driving at high or low speed. Four of these valves are 4-way, three position valves. The diverter valve is a 4-way, two position directional control valve and delivers fluid to either the ground or platform station. All directional control valves are solenoid operated with manual overrides. The manual override is locked out on the high speed drive valves for safety reasons.



Drive/ Steer/ Selector Valve Assembly.

SECTION 4:
ELECTRICAL SYSTEM

Table of Contents, Section 4

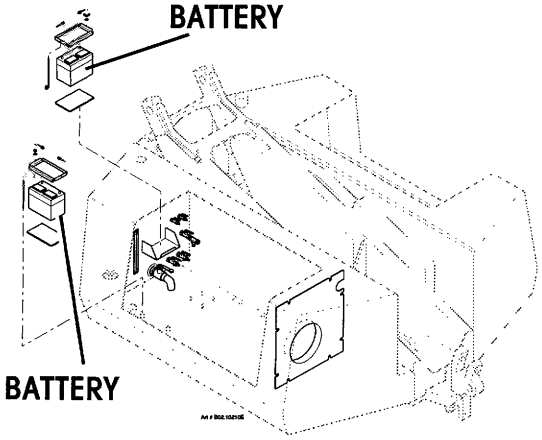
Electrical System 4-3
- Battery 4-3
  - Battery Maintenance (In Storage) 4-3
  - Battery Maintenance (In Use) 4-3
  - Battery Troubleshooting 4-4
  - Battery Replacement 4-4
- Platform Control Box 4-5
  - Emergency Stop Button 4-5
  - Ignition Switch 4-5
  - Toggle Switch 4-5
  - Push Button 4-5
  - Light Emitting Diode 4-5
- Ground Control Box 4-6
  - Circuit Breaker 4-6
  - Toggle Switch 4-6
  - Push Button 4-6
  - Key Switch 4-6
  - Volt Meter 4-6
  - Hour Meter 4-6
  - Engine Oil Pressure Gauge 4-7
- Pendant Control 4-7
  - Toggle Switch 4-7
- Foot Pedal Switch 4-7
- Movement Alarm 4-7
- Tilt Alarm 4-8
  - Tilt Alarm Test 4-8
  - Tilt Alarm Sensor Adjustment 4-8
- Tilt Alarm Horn 4-9
- Horn 4-9
- Relays 4-9
- Limit Switches 4-9

ELECTRICAL SYSTEM

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

BATTERY

Two 12 volt, 95 amp batteries supply the electrical current required to start the engine and supply emergency power. The batteries are located in the engine side compartment of the superstructure.



12 Volt Battery Locations.

BATTERY MAINTENANCE (IN STORAGE)

Follow these procedures for maintenance of stored batteries:

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

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

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

BATTERY MAINTENANCE (IN USE)

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

Check battery terminals for:

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

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

⚠WARNING

NEVER ADD ADDITIONAL ACID TO THE BATTERY.

Remove vent caps before filling, and USE ONLY DISTILLED WATER. Fill all cells to the proper level. Do not overfill. Fill to level indicator (or 1/2 inch over the top of the separators if there is no level indicator). Do not use a hose to add water to battery.

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, subjected to excessively high temperatures, or is nearing the end of its service life.

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

BATTERY TROUBLESHOOTING

Once a month:

- Check all cells with a hydrometer for variation in specific gravity. A fully charged battery should indicate between 1.25 and 1.28 specific gravity. A variation of 0.03 points or more between cells is an indication that the battery should be replaced. Mark the low cells.

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.

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

⚠ CAUTION

Always disconnect the negative battery cable first.

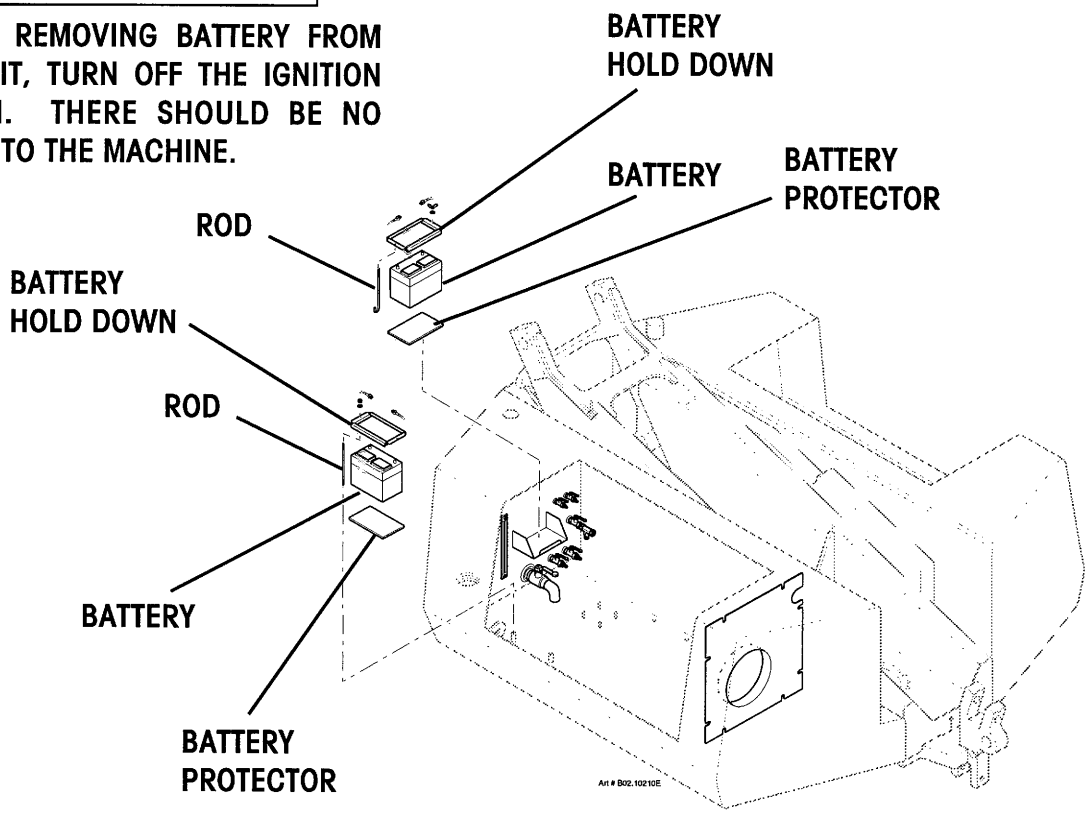
Remove the nut, washer, rod and hold down bracket holding the battery to the superstructure.

Carefully lift the battery from the superstructure. Set aside and dispose of properly.

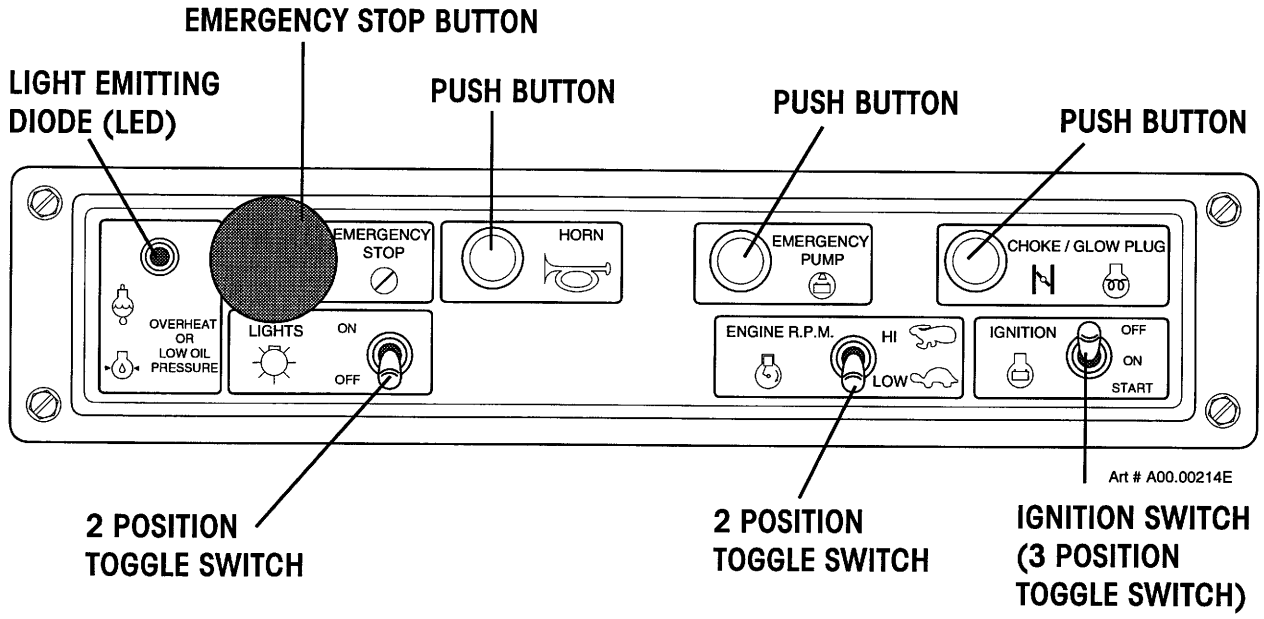
To install the battery, place the battery in its proper location. Positionthe battery hold down bracket and install rod, washer and nut. Connect the battery cables.

⚠ CAUTION

Always connect the positive battery cable first.



12 Volt Battery.



Platform Control Box.

PLATFORM CONTROL BOX

EMERGENCY STOP BUTTON

There is an emergency stop button on the ground control box and in the platform console. When an emergency stop button is pressed, all functions stop immediately including the engine and the wheel brakes are automatically applied. The emergency stop in the platform can be overridden from the ground controls.

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

Refer to electrical schematic in the Appendix for troubleshooting this control.

IGNITION SWITCH

The ignition switch ("START/ ON/ OFF") on the platform control panel acts as a power "ON/ OFF" switch. The switch must be "ON" to operate the machine from the platform. When the ignition switch is flipped to "OFF", all functions stop immediately and the wheel brakes are automatically applied.

If there is a problem with the ignition switch, check the continuity of the wiring and switch in each position.

TOGGLE SWITCH

There are two two-position toggle switches on the platform control box. If there is a problem with a toggle switch, check tcontinuity of the wiring and switch in each position.

PUSH BUTTON

There are three push buttons on the platform control box. If there is a problem with a push button, check the continuity of the wiring and switch in each position.

LIGHT EMITTING DIODE

There is one light emitting diode (LED) on the platform control box. If there is a problem with the diode, check the wiring. If the wiring is correct, replace the diode.

GROUND CONTROL CONSOLE

CIRCUIT BREAKER

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

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

TOGGLE SWITCH

There is one two-position toggle switch on early models and one optional three-position toggle switch on the ground control box. If there is a problem with a toggle switch, check the wiring. If the wiring is correct, replace the toggle switch.

PUSH BUTTON

There are two push buttons on the ground control box. If there is a problem with a push button, check the wiring. If the wiring is correct, replace the push button.

KEY SWITCH

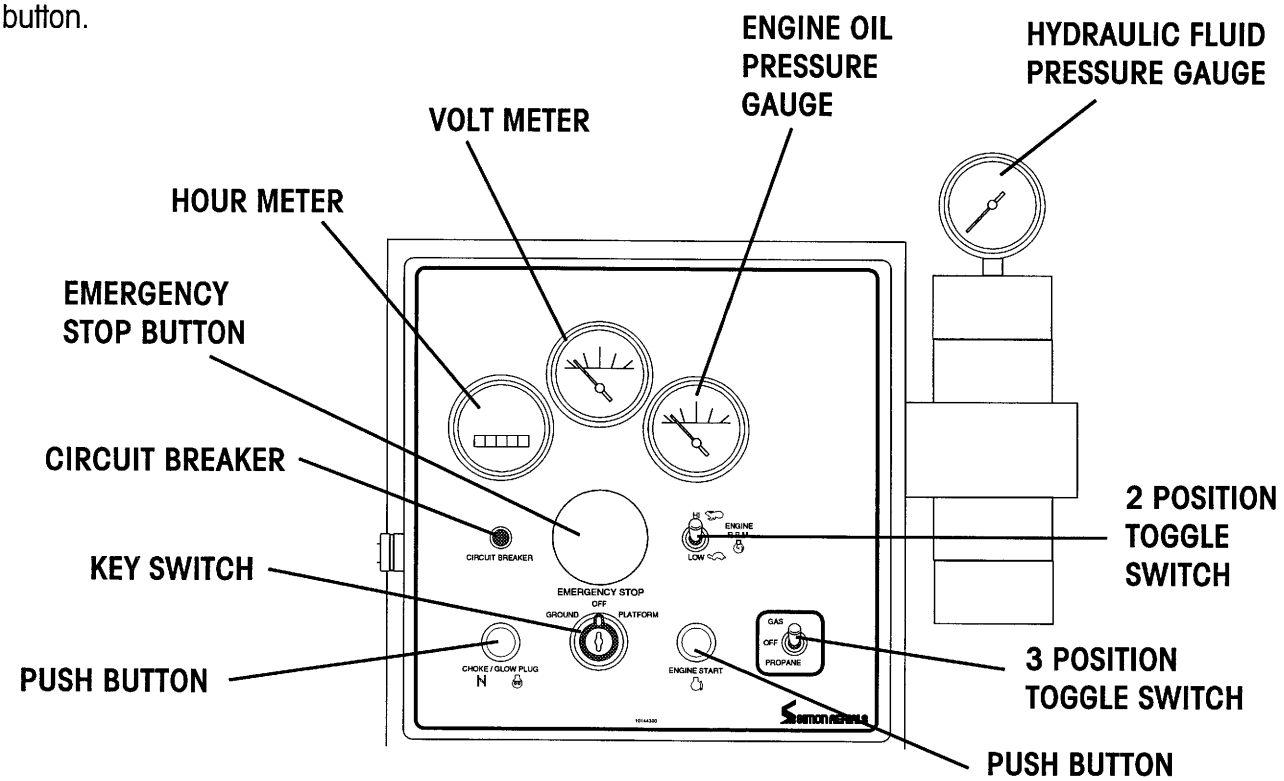
There is a three-position key switch (GROUND/ OFF/ PLATFORM) on the ground control box that acts as a power "ON-OFF"switch. The switch must be in the "GROUND" or "PLATFORM" position to operate the machine. When troubleshooting the electrical circuit, make sure the key switch is in the correct position. If there is a problem with the key switch, check the wiring. If the wiring is correct, replace the key switch.

VOLT METER

The volt meter indicates the battery charge. If there is a problem with the volt meter, check the wiring. If the wiring is correct, replace the meter.

HOUR METER

The hour meter indicates total elapsed time the engine has been running in hours and tenths. If there is a problem with the hour meter, check the wiring. If the wiring is correct, replace the meter.



Ground Control Console.

ENGINE OIL PRESSURE GAUGE

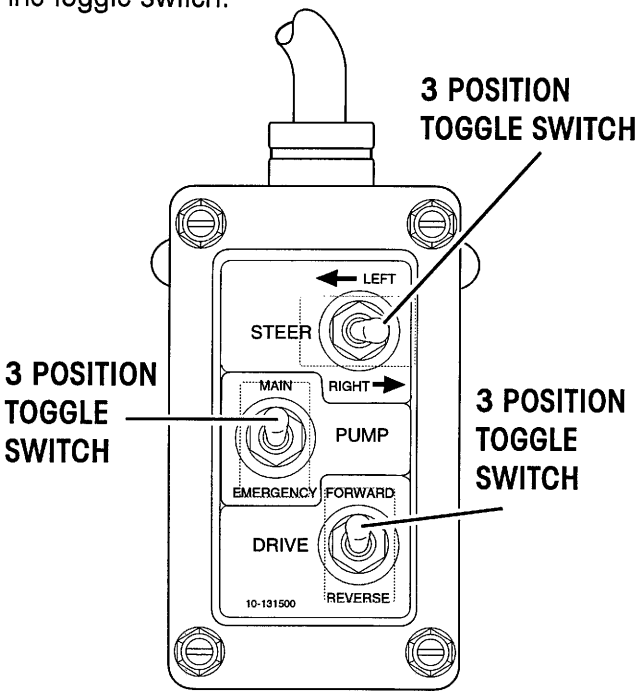
The engine oil pressure gauge indicates the engine oil pressure. If there is a problem with the engine oil pressure gauge, check continuity of the sender and the wiring. If the wiring and sender are operational, replace the gauge.

PENDANT CONTROL BOX

The pendant control box is located on the ground control bracket next to the ground control console.

TOGGLE SWITCH

There are three 3-position toggle switches. If there is a problem with a toggle switch, check the wiring. If the wiring and solenoids are operational, replace the toggle switch.



Pendant Control Box. ART # C06.06001E

FOOT PEDAL SWITCH

The foot pedal is located on the platform floor. The foot pedal is a double pole, double throw electrical switch which must be fully depressed before any machine function can be operated from the platform. When the foot pedal switch is released, all machine functions stop, except the engine which continues to run.

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

MOVEMENT ALARM

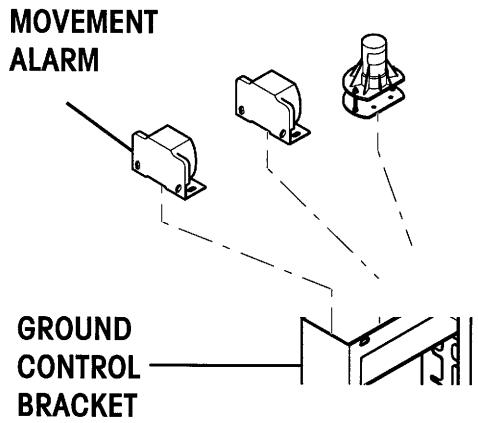
The movement alarm is located on top of the ground control bracket. It is activated as soon as the drive controller on the platform control console or the forward/ reverse toggle switch on the pendant control is moved off the center "Neutral" position.

⚠WARNING

THE MOVEMENT ALARM IS PROVIDED FOR YOUR PROTECTION, AND THE PROTECTION OF PERSONS WORKING IN THE IMMEDIATE AREA.

DISABLING THIS IMPORTANT SAFETY DEVICE MAY RESULT IN DEATH OR SERIOUS INJURY.

If the movement alarm does not function, check the



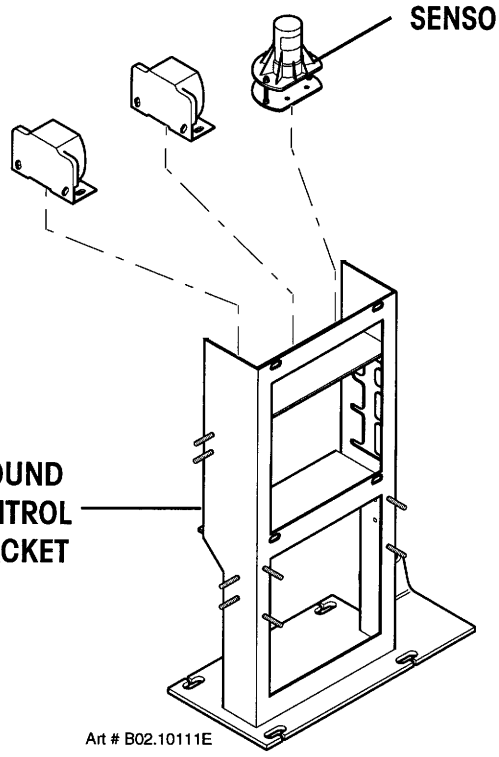
Movement Alarm.

wiring. If wiring is correct, replace the alarm.

TILT ALARM

The tilt alarm gives an audible warning when the chassis is five degrees or more out of level. The alarm can be tested by manually tipping the alarm sensor (see "Tilt Alarm Test" procedure). If the tilt alarm does not function, check the horn, then check the output relay in the ground control box.

Check the wiring. If there is continuity through the wiring, replace the alarm.



Tilt Alarm.

TILT ALARM TEST

Check the tilt alarm daily with the boom extended. Individually push down and hold for 10 seconds each of the three fastened corners of the tilt alarm sensor. There should be enough travel to cause the alarm to sound as each corner is pressed. If not, the flange nuts have been tightened too far. Loosen the nut on the 90° corner and perform the adjustment procedure. This "Push-to-Test" feature enables the tilt alarm to be tested without losing its adjustment.

TILT ALARM SENSOR ADJUSTMENT

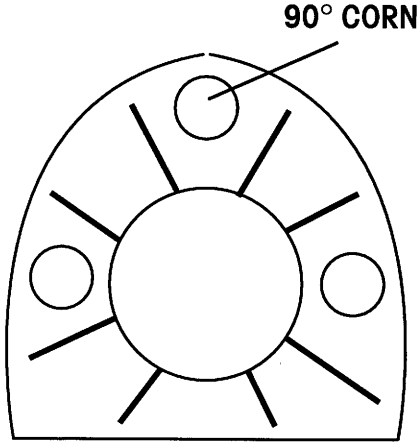
The tilt alarm sensor can be adjusted. Before attempting to adjust the sensor, park the machine on a flat, level surface.

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

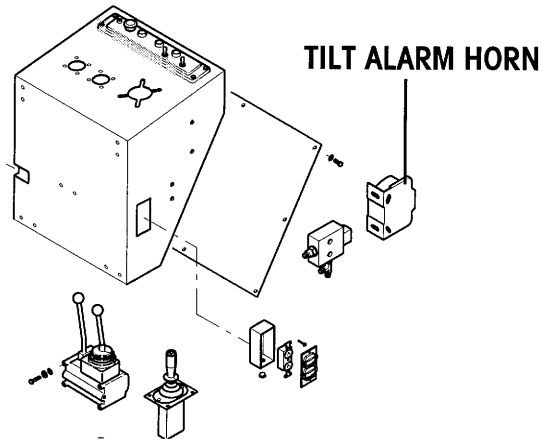
Check to be sure the electrical connections are correct. Slowly tighten the nut on one of the two corners ADJACENT to the 90° corner until the light-emitting diode (LED) just turns on, indicating that the circuit is closed. Note the position of the nut.

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

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



Tilt Alarm 90° Corner.

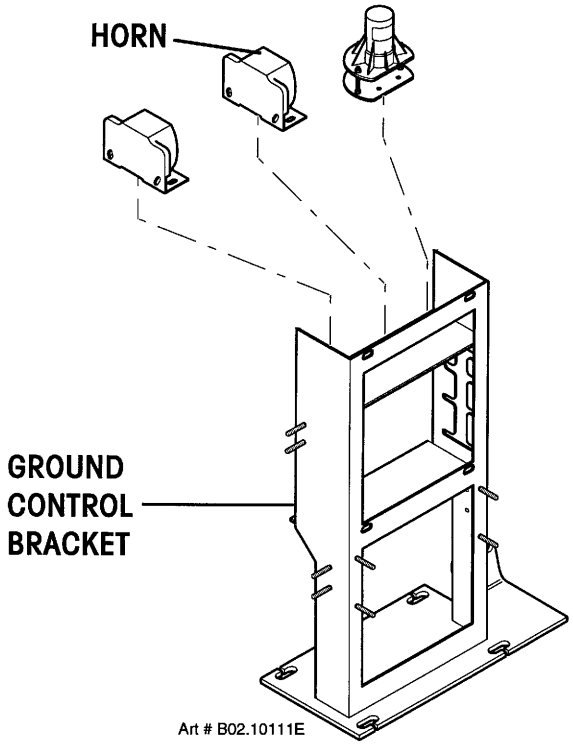


Tilt Alarm Horn.

is sitting. Test the tilt alarm for proper function.

TILT ALARM HORN

The horn gives an audible warning. If the horn does not function, check the wiring. If wiring is correct, replace the horn.



Horn.

HORN

The horn gives an audible warning. If the horn does not function, check the wiring. If wiring is correct, replace the horn.

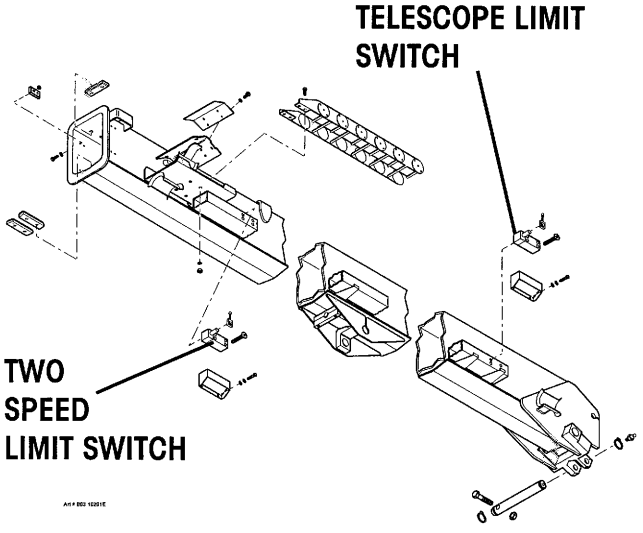
RELAYS

There are a number of relays associated with machine functions that are located in the ground control box (refer to Electrical Schematic at the back of this manual). If faulty replace.

LIMIT SWITCHES

There are a number of limit switches located on the unit as safety devices for boom lift and boom telescope functions. The boom telescope limit switch is located on the lower right side of the base boom. The boom hoist limit switch is located on the right side of the pylon weldment of the superstructure.

Unless the boom lift and telescope limit switches are closed as shown on the unit electrical schematic at the end of this manual, the unit will only be able to travel at creep speed. Replace any faulty limit switches.



Limit Switch Locations.

SECTION 5:
MECHANICAL COMPONENTS

Table of Contents, Section 5

Mechanical Components 5-3
Tires 5-3
Changing Tires 5-3
Wheels and Lug Nuts 5-3
Wheel Motor Assembly 5-4
Steer Cylinder 5-5
Steer Cylinder Pins 5-5
Base End Cylinder Pin Replacement 5-5
Steer Cylinder Seal Replacement 5-5
Tie Rod Assembly 5-6
Tie Rod Assembly Replacement 5-6
Rear Axle Drive Motor 5-7
Rear Axle Drive Motor Replacement 5-7
Rear Axle Assembly 5-8
Rear Axle Assembly Replacement 5-8
Rear Axle Brake Adjustment 5-9
Axle Disconnect Cylinder 5-9
Superstructure 5-10
Platform 5-11
Hoses and Cables 5-11
Miscellaneous Equipment 5-11
Boom 5-12
Boom Pivot Pin and Bushing Replacement 5-12
Wear Pads 5-13
Base Boom Wear Pads Replacement 5-13
Mid Boom Top Front Wear Pad Replacement 5-14
Mid Boom Rear Wear Pads Replacement 5-14
Tip Boom Top Front Wear Pad Replacement 5-15
Moving Anchor Wear Pad Replacement 5-15
Boom Lift Cylinder 5-16
Lift Cylinder Base End Pin Replacement 5-16
Lift Cylinder Rod End Pin Replacement 5-17
Lift Cylinder Seal Replacement (On Machine) 5-18
Bench Replacement Of Lift Cylinder Seals 5-19
Counterbalance Valve Inspection 5-20
Boom Telescope Cylinder 5-21
Telescope Boom Cylinder Pins Replacement 5-21
Telescope Cylinder Removal 5-22
Telescope Cylinder Separation 5-23
Telescope Cylinder Seal Replacement 5-23
Telescope Cylinder Installation 5-24
Counterbalance Valve Inspection 5-25
Platform Level Cylinders 5-26
Platform Level Cylinder Pin Replacement 5-26
Level Cylinder Seal Replacement 5-27
Bleeding the Platform Leveling Circuit 5-28
Maxi-Reach System 5-28
Boom Telescope Diverter Valve Replacement 5-28
Boom Lift Diverter Valve Replacement 5-29
Arm Pin and Needle Bearing Replacement 5-29

MECHANICAL COMPONENTS

Following is a description of the major mechanical components of the Trailblazer 60.

TIRES

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

CHANGING TIRES

⚠WARNING

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

When a tire change is necessary, follow these steps:

⚠ CAUTION

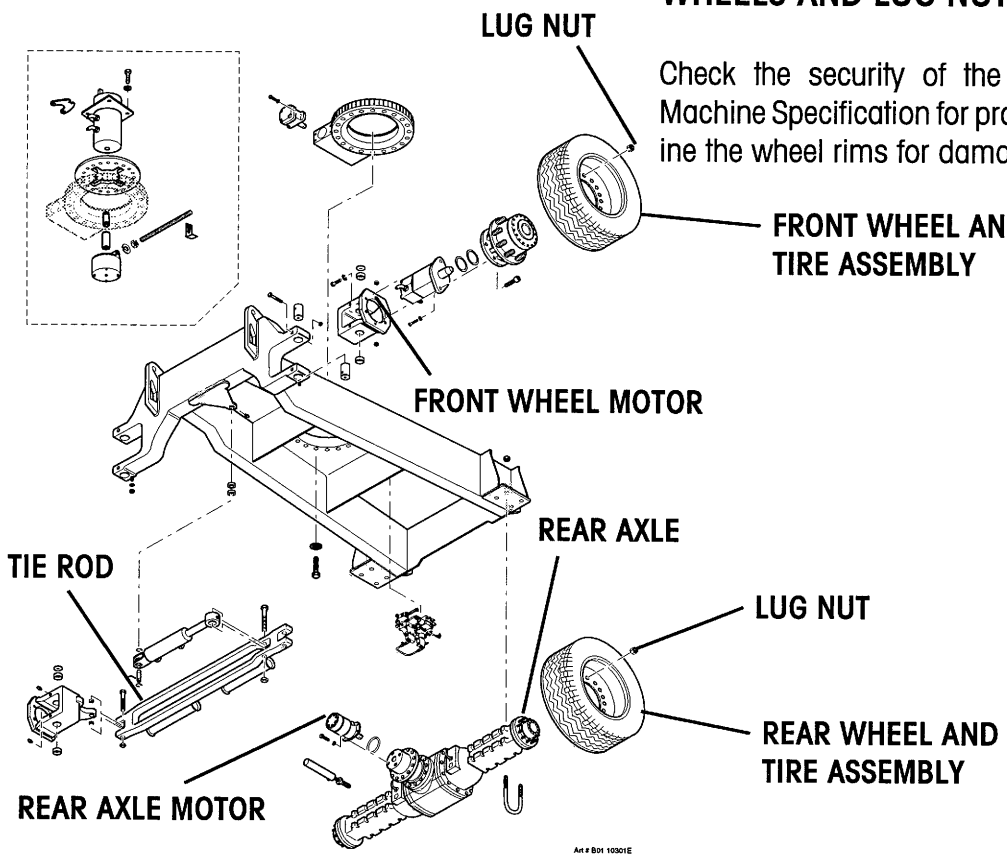
ALWAYS BLOCK THE WHEELS before you raise the machine.

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

  NOTE: Tire should have the correct amount of calcium.
- Fasten lug nuts and tighten to proper torque (see Machine Specifications).
- Lower the machine and remove the blocks.

WHEELS AND LUG NUTS

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



Chassis Mechanical Components.

WHEEL MOTOR ASSEMBLY

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

- To remove front wheel motor:

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

⚠WARNING

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

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

⚠ CAUTION

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

3. Disconnect hoses and fittings to the wheel motor.

4. Loosen and remove four capscrews and lockwashers holding the motor housing to the drive hub. Also remove the two capscrews holding drive hub to motor housing.

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

6. Remove two capscrews and washers holding wheel motor to drive hub. Separate motor from hub.

7. Replace the two seals located between the wheel motor and drive hub.

- Install front wheel motor:

1. Attach the wheel motor to the drive hub. Torque the two capscrews. See "Machine Specification".

2. Slide the wheel motor and drive hub into the motor housing. Install and torque the four capscrews with washers. Also install and torque the two capscrews. See "Machine Specification".

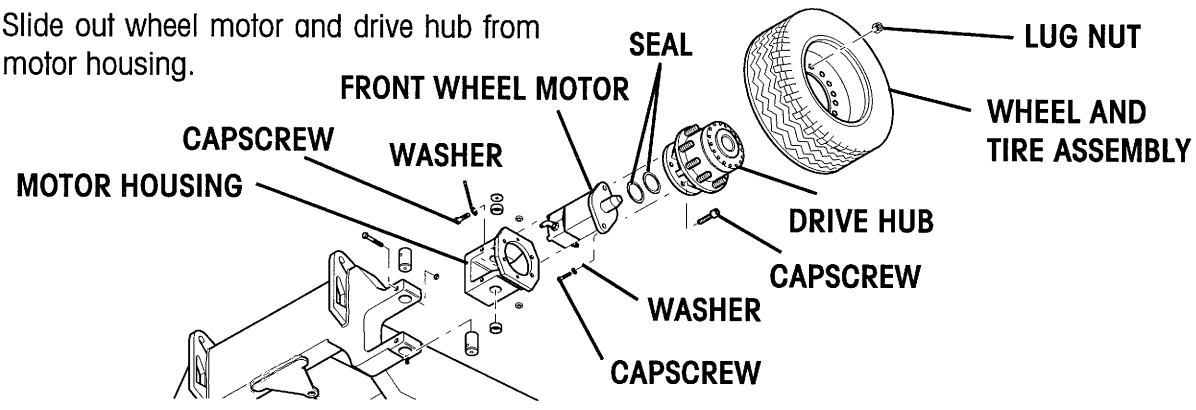
3. Install all fittings and hoses.

⚠WARNING

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

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

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



Front Tire and Wheel Assembly, and Wheel Motor.

STEER CYLINDER

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

STEER CYLINDER PINS

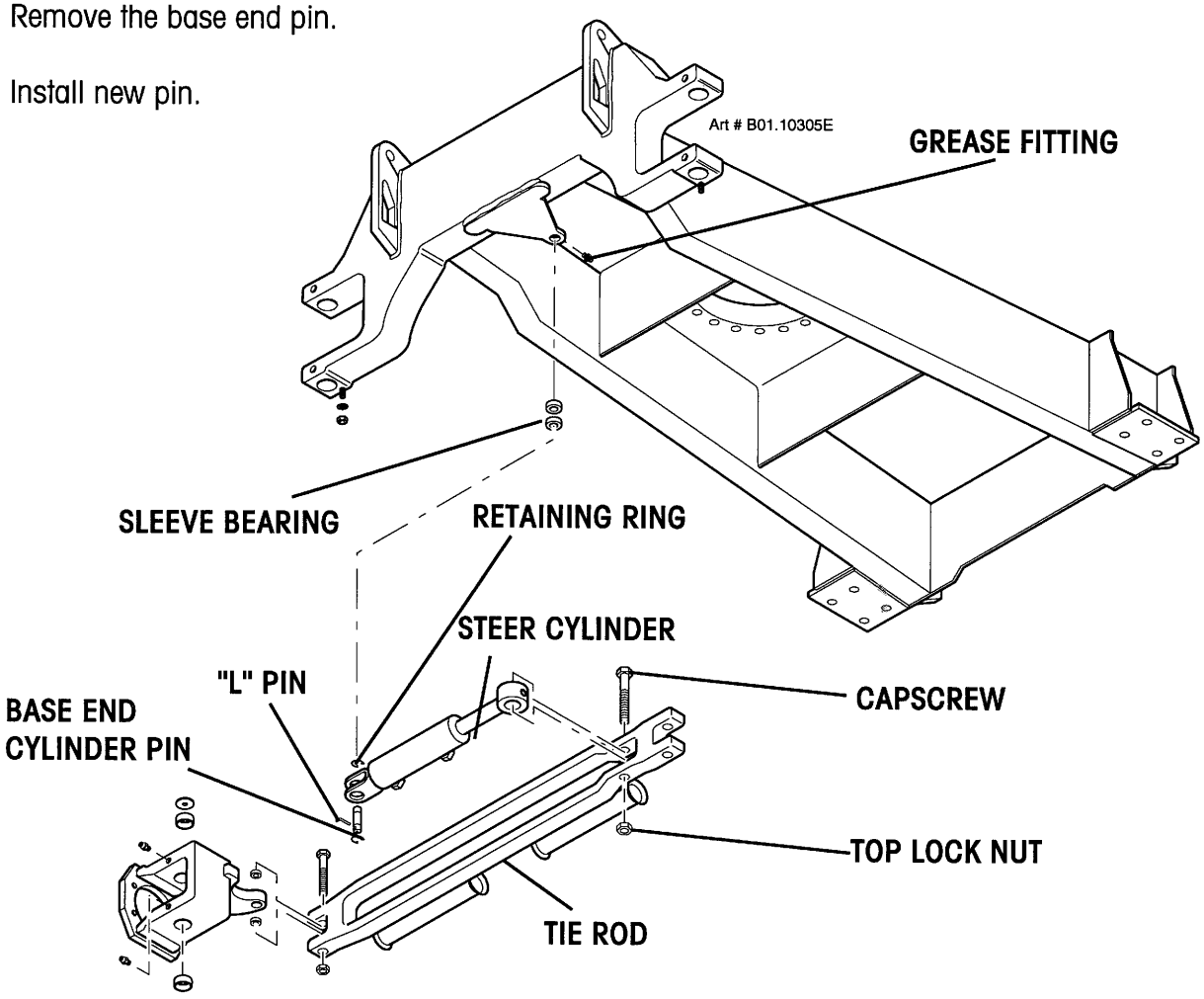
Check all pins for wear. If base end pin rotates, check for a missing retaining ring or "L" pin. If wear is detected, the pin must be replaced.

Base End Cylinder Pin Replacement

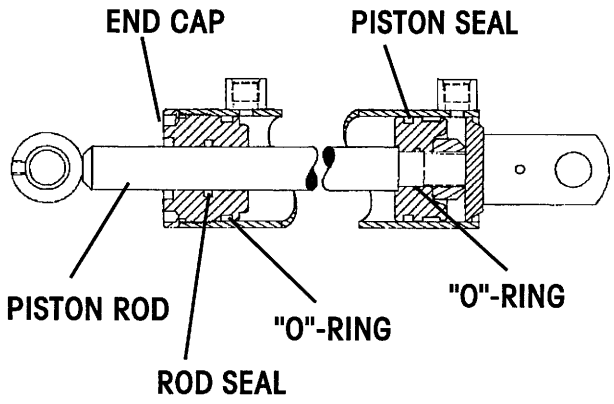
1. Remove retaining ring.
2. Remove the "L" pin.
3. Remove the base end pin.
4. Install new pin.
5. Install "L" pin and retaining ring.
6. Apply grease to sleeve bearing.

STEER CYLINDER SEAL REPLACEMENT

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



Steer Cylinder and Tie Rod Assembly.



Steer Cylinder.

5. Clean the cylinder.

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

⚠ CAUTION

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

7. Remove the rod and piston assembly.

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

9. Install the rod and piston assembly.

10. Install and tighten the end cap.

11. Install cylinder.

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

12. Connect the hydraulic hoses.

TIE ROD ASSEMBLY

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

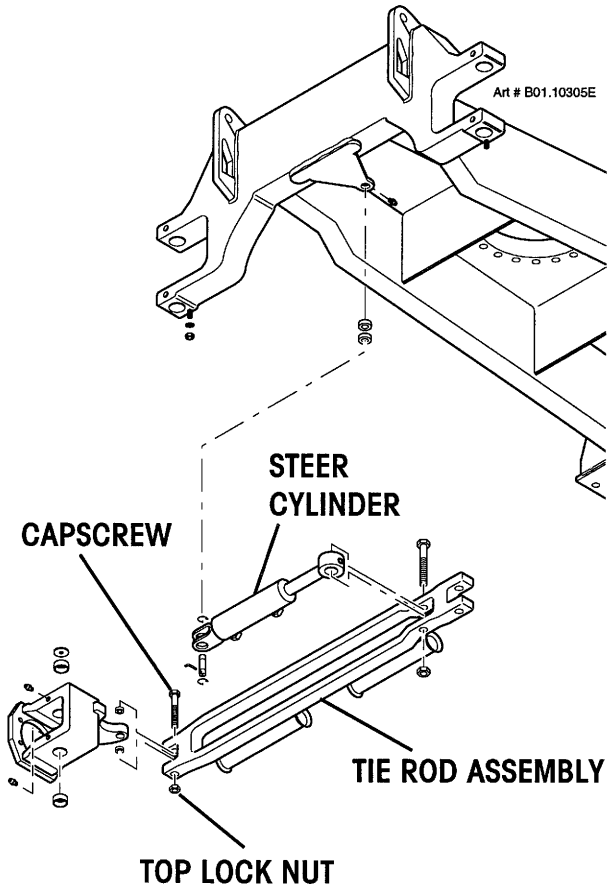
TIE ROD ASSEMBLY REPLACEMENT

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

2. Remove tie rod assembly.

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

4. Install rod end of steer cylinder.



Steer Cylinder and Tie Rod Assembly.

REAR AXLE DRIVE MOTOR

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

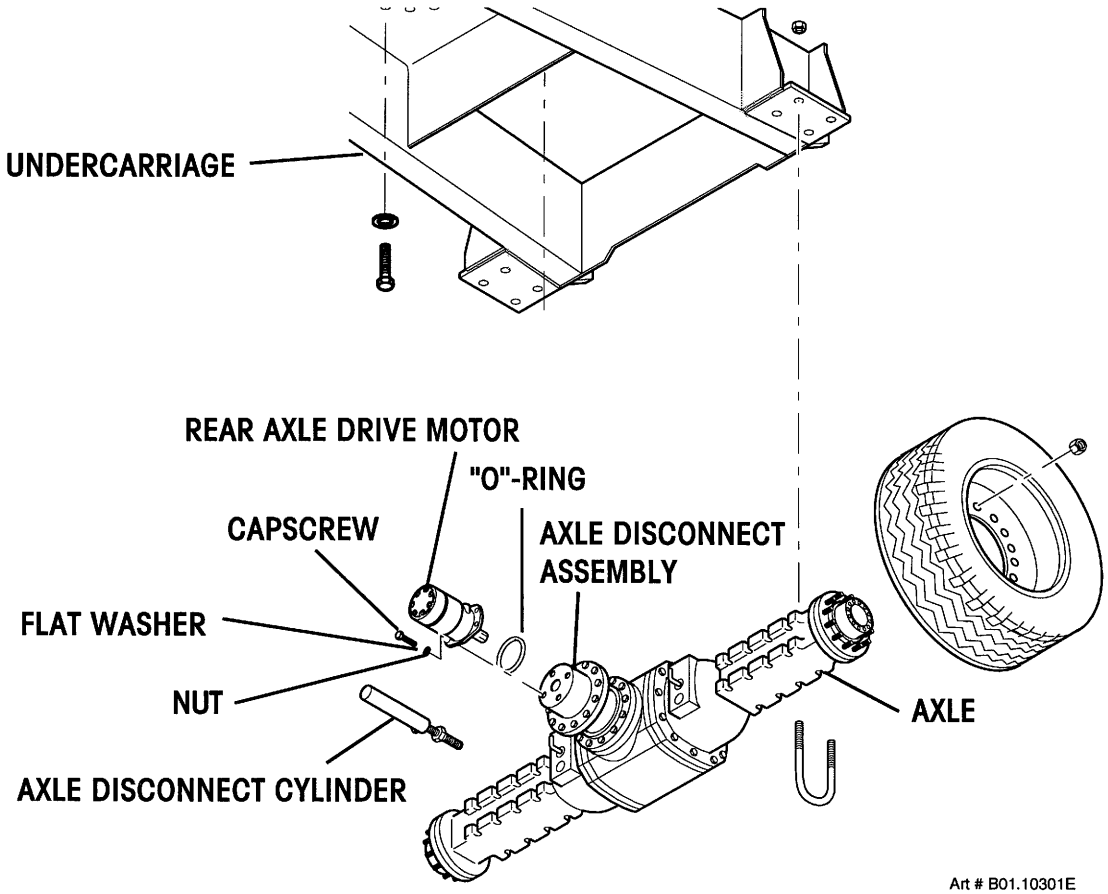
REAR AXLE DRIVE MOTOR REPLACEMENT

1. Block the front wheels and raise the rear of the machine.

⚠ CAUTION

ALWAYS BLOCK THE WHEELS before you raise the machine.

2. Remove the capscrews, flat washers and nuts (only on some early axles) holding the motor to the axle.
3. Remove the rear axle drive motor.
4. Remove the "O"-ring.
5. Install a new "O"-ring.
6. Install the rear axle drive motor.
7. Install capscrews, flat washers and nuts (only on some early axles).
8. Torque the capscrews. See "Machine Specifications".



Rear Axle Drive Motor.

REAR AXLE ASSEMBLY

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

REAR AXLE ASSEMBLY REPLACEMENT

To remove the rear axle assembly:

⚠ CAUTION

ALWAYS BLOCK THE WHEELS before you raise the machine.

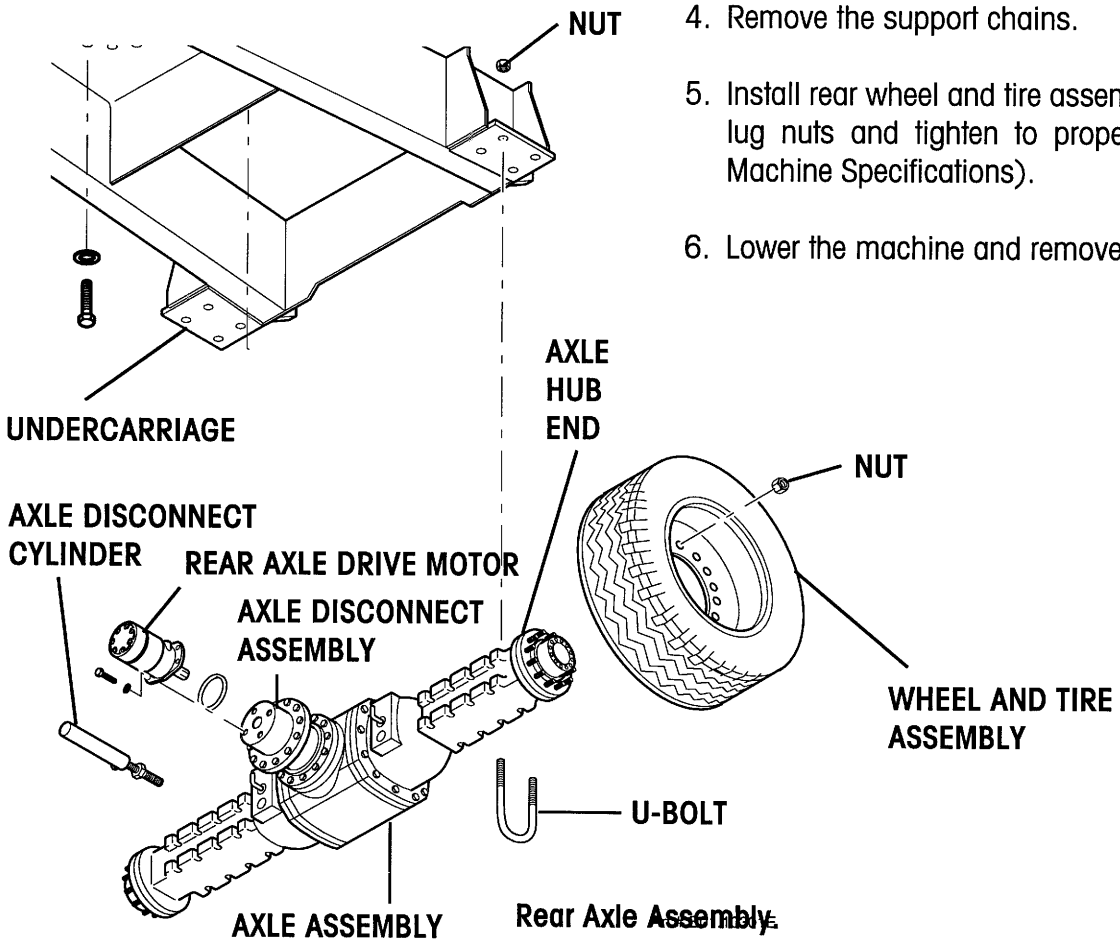
1. Block the front wheels.
2. Raise the rear of the machine and support the undercarriage structure.
3. Remove both rear wheel and tire assemblies.
4. Support both axle hub ends with a crane and chains.
5. Remove the "U"- bolts and nuts from the undercarriage. This releases the axle assembly. Carefully lower the axle to the ground.

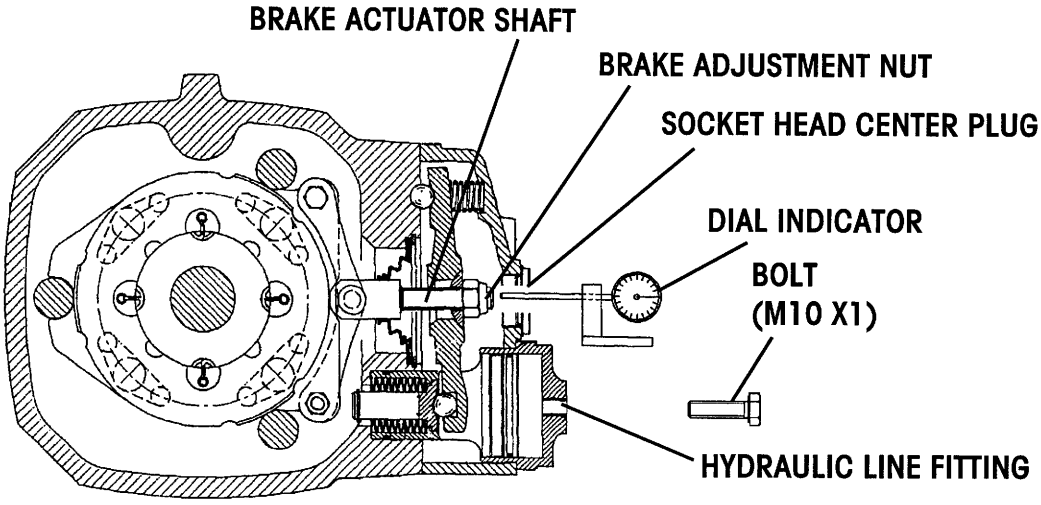
⚠ CAUTION

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

To install the rear axle assembly:

1. Support both axle hub ends with a crane and chains.
2. Position the rear axle assembly to align with the undercarriage mounting holes.
3. Install "U" - bolts and nuts.
4. Remove the support chains.
5. Install rear wheel and tire assemblies. Fasten lug nuts and tighten to proper torque (see Machine Specifications).
6. Lower the machine and remove the blocks.





Spring Applied Hydraulic Release Brake.

REAR AXLE BRAKE ADJUSTMENT

1. Remove the socket head center plug on the brake cover. Install a dial indicator shaft to the end of the brake actuator shaft to measure the travel of the shaft. Indicator shaft must be in the same plane as the actuator shaft.

2. Set the dial indicator at "0" setting. Remove the hydraulic line fitting just below the actuator shaft. Install bolt (M10 x 1)where the hydraulic line fitting was removed and screw to maximum depth to disengage the failsafe brake.

3. Read the indicator setting. The proper setting range is 0.059 - 0.079 inch (1.5 - 2.0 mm). If the indicator setting is out of this range, the indicator should be removed so the brake adjustment nut can be adjusted to the proper shaft travel.

4. Adjust the brake adjustment nut.

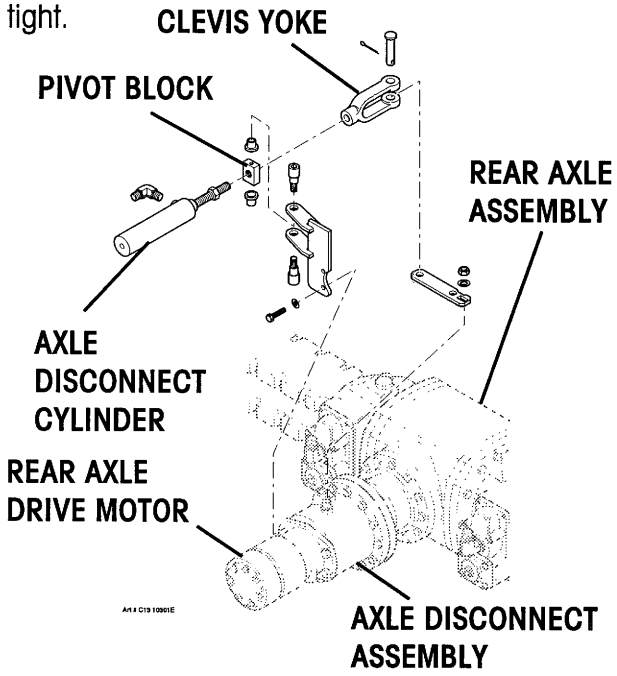
5. Install the dial indicator shaft to the end of the actuator shaft and adjust the dial setting to "0".

6. Back out the bolt (M10 x 1) until the brake engages, bolt will turn free.

7. Read gauge setting. If setting is not in the proper range 0.059 - 0.079 inch (1.5 - 2.0 mm), repeat steps 4, 5 and 6 until the proper setting is obtained.

AXLE DISCONNECT CYLINDER

When the axle disconnect cylinder leaks or is damaged, replace the cylinder. Unscrew the rear axle drive motor disconnect cylinder from the clevis yoke and pivot block. To install the cylinder, screw the cylinder into the pivot block and clevis yoke until tight.

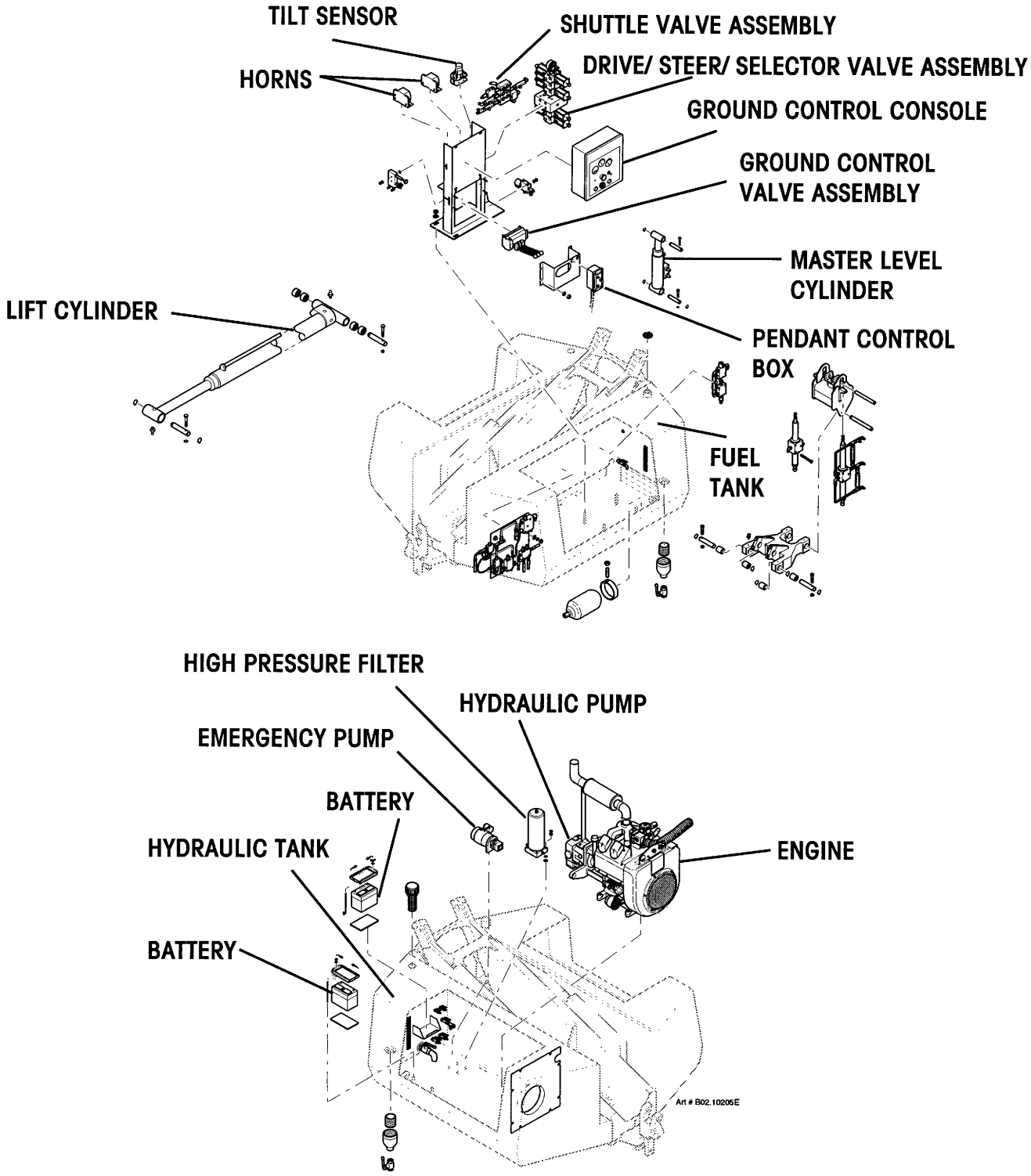


Rear Axle Drive Motor Disconnect Cylinder.

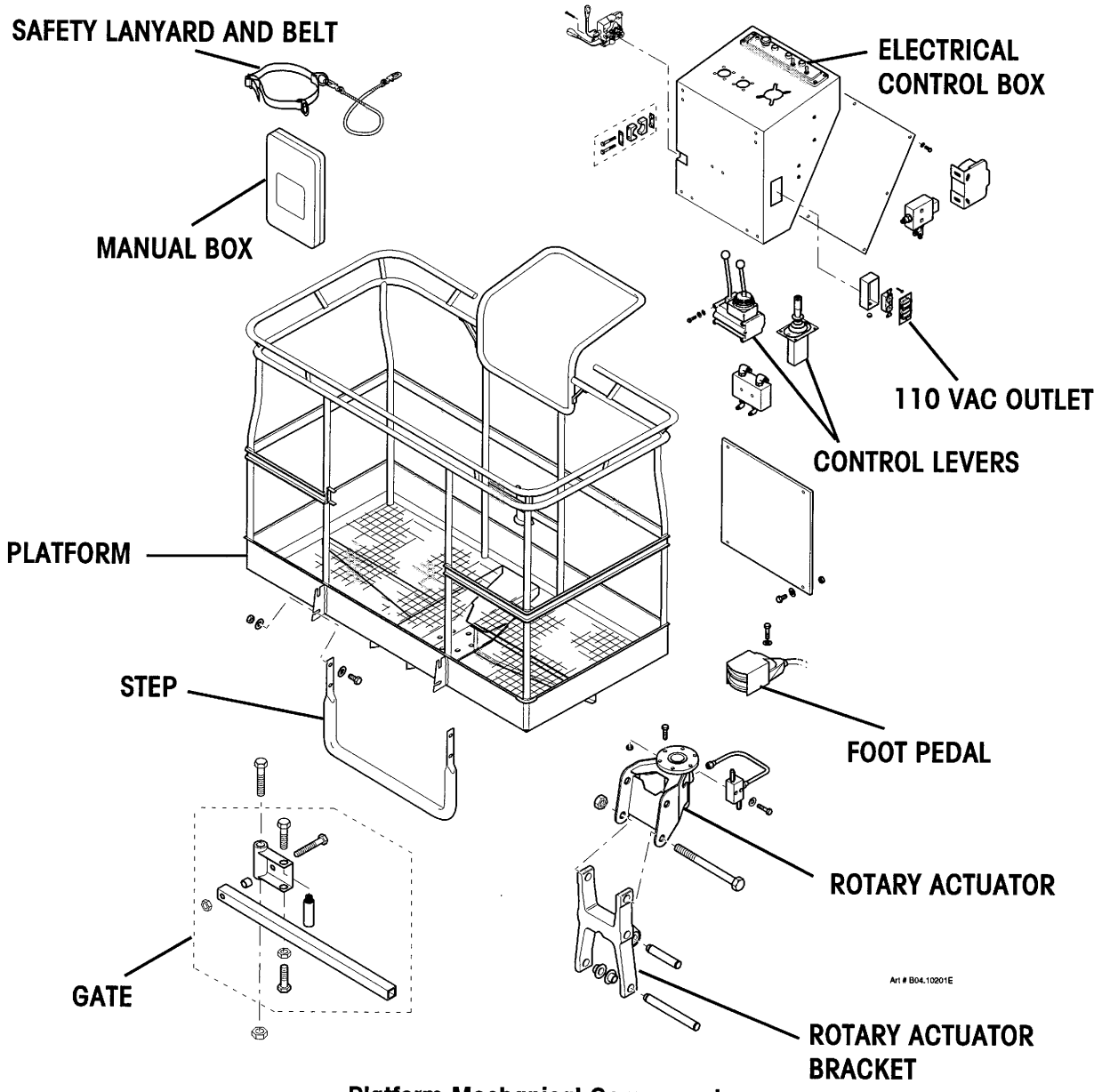
SUPERSTRUCTURE

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

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



Components Found on the Superstructure.



Platform Mechanical Components.

PLATFORM

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

HOSES AND CABLES

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

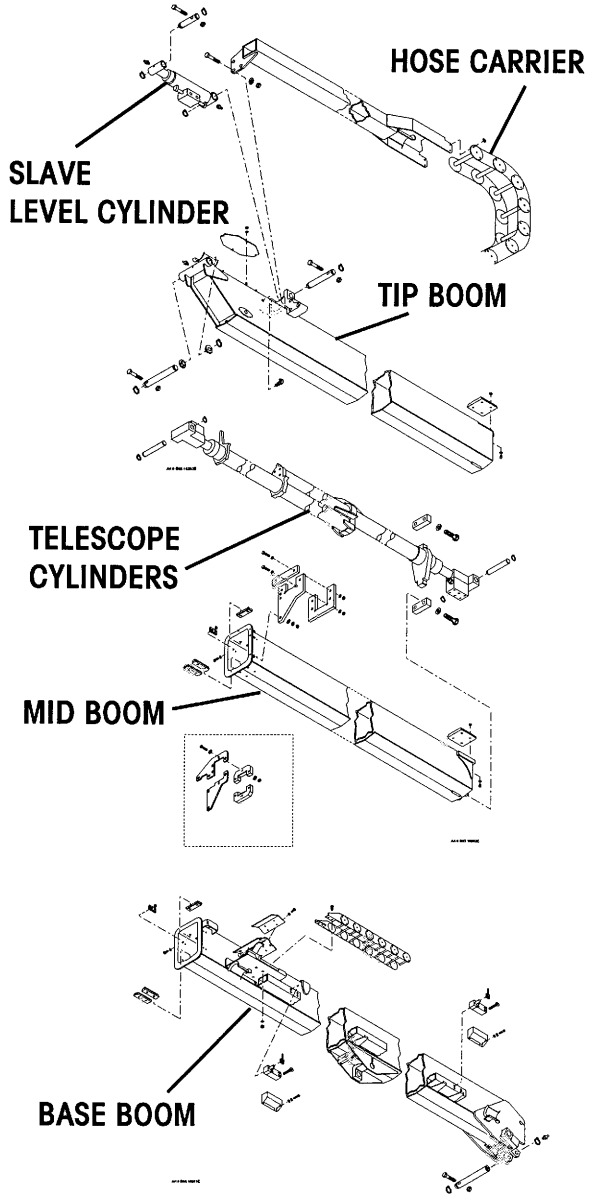
Cables and hoses should be examined for rubbing and chafing, especially in the swing bearing area and the hose track area.

MISCELLANEOUS EQUIPMENT

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

BOOM

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



Boom Components.

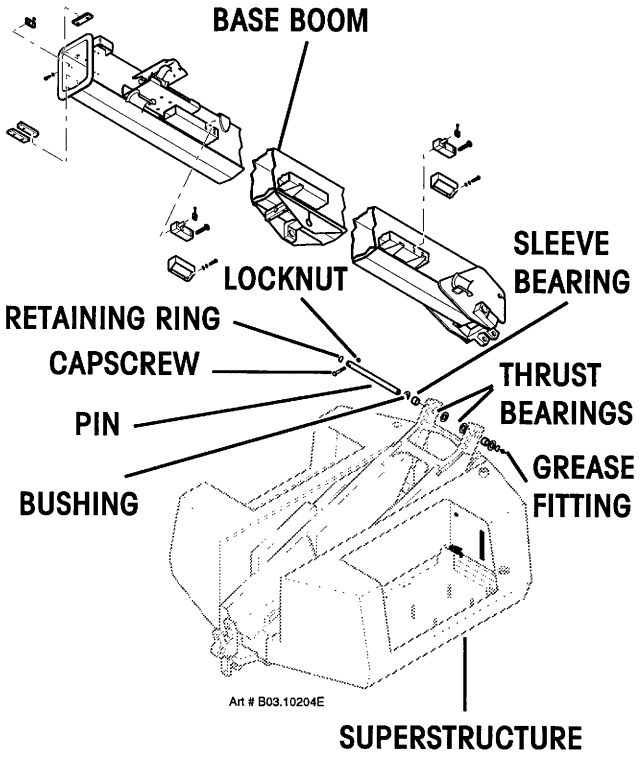
BOOM PIVOT PIN AND BUSHING REPLACEMENT

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

⚠WARNING

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

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



Boom Pin and Bushing.

WEAR PADS

Wear to boom sections 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.

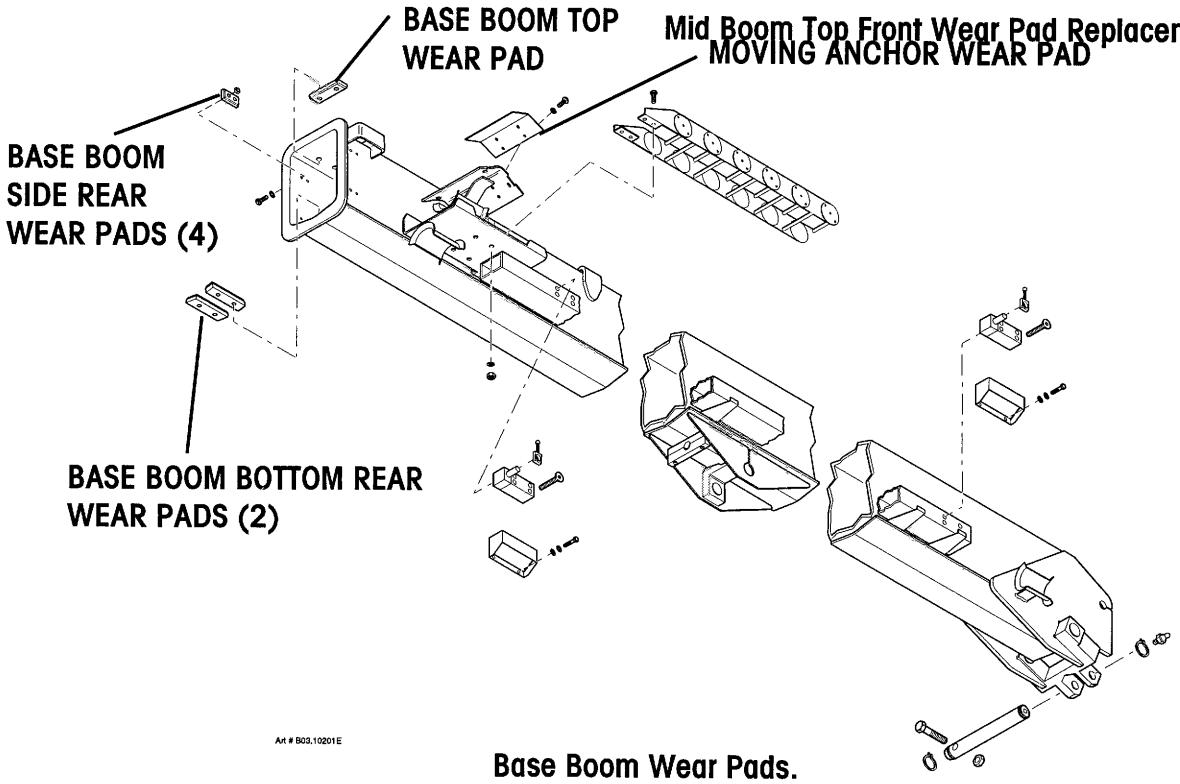
Wear pads are located at the top front of the tip boom and at the top front of the mid boom, and at the top, bottom and side rear of the mid boom, and at the top, bottom and side rear of the base boom. There is also a moving anchor wear pad mounted on a weldment located on the side of the base boom.

⚠ 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.

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.

Base Boom Wear Pads Replacement



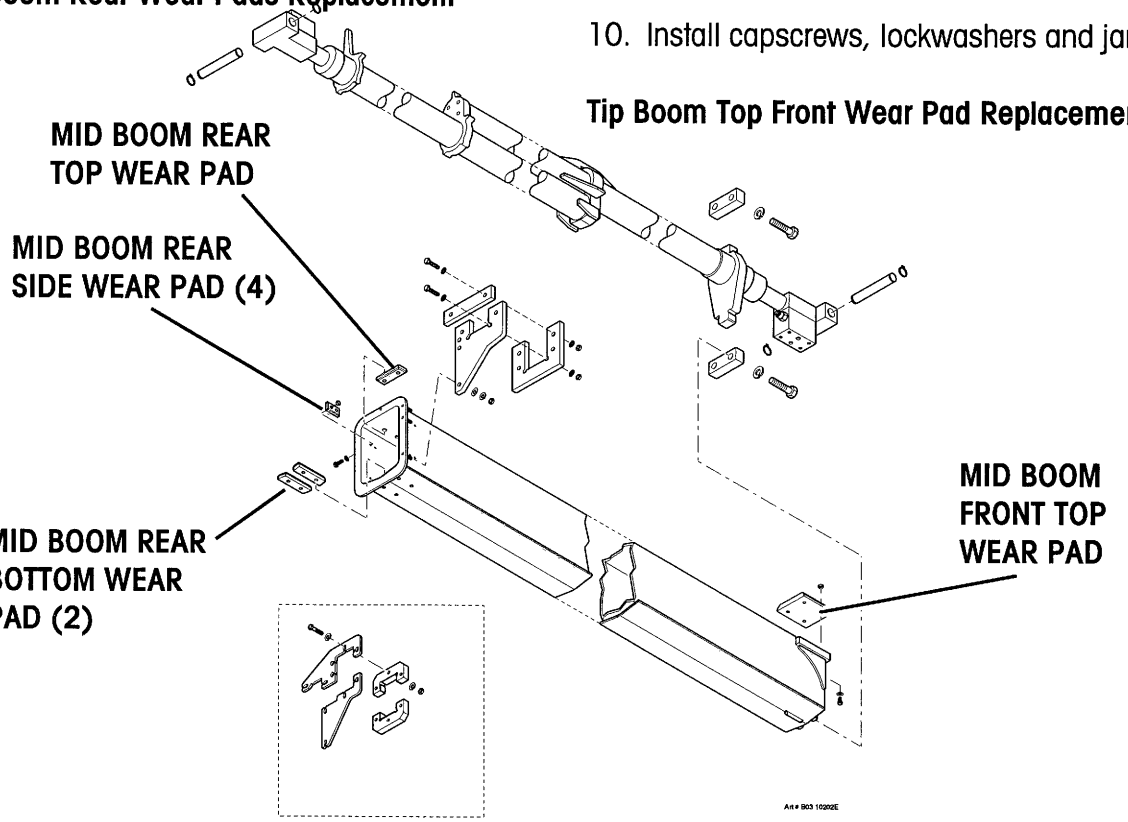
Base Boom Wear Pads.

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.
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.

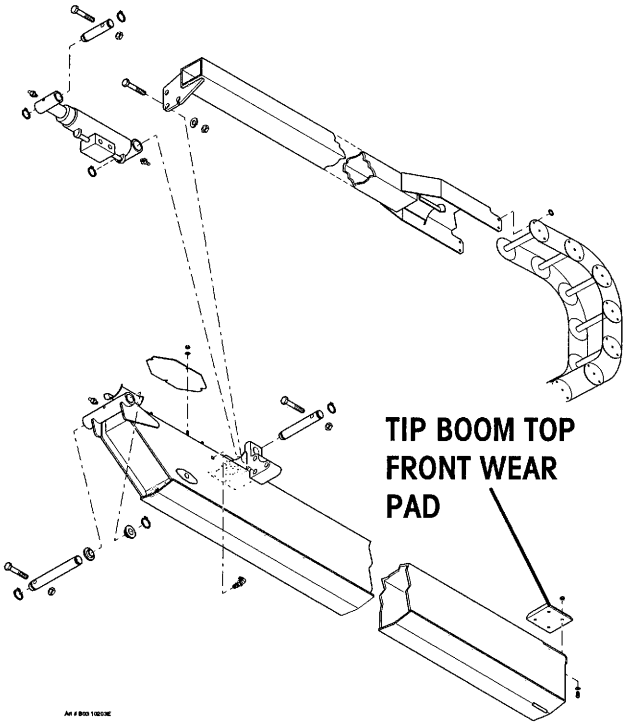
Tip Boom Top Front Wear Pad Replacement



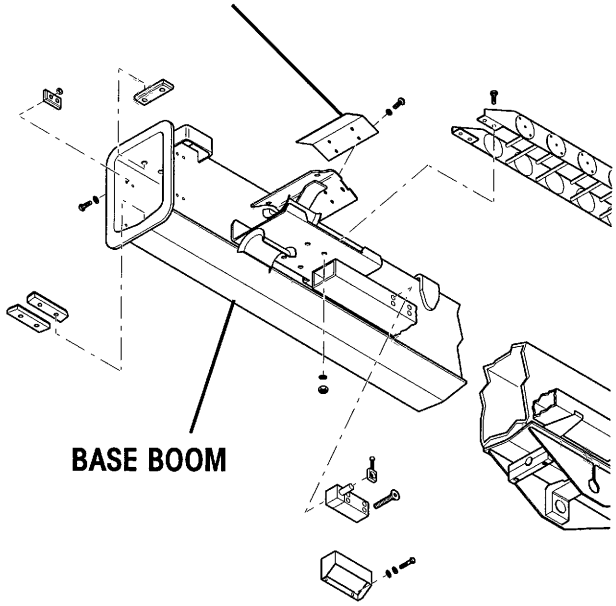
Tip Boom Wear Pads.

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.

Moving Anchor Wear Pad Replacement



Tip Boom Wear Pads.



Moving Anchor Wear Pad.

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

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. If the base end cylinder pin is damaged, the needle bearings are also damaged and should be replaced. Check the pin capscrew for tightness. The cylinder and holding valve should be inspected for fluid leakage, damage and security.

LIFT CYLINDER BASE END PIN REPLACEMENT

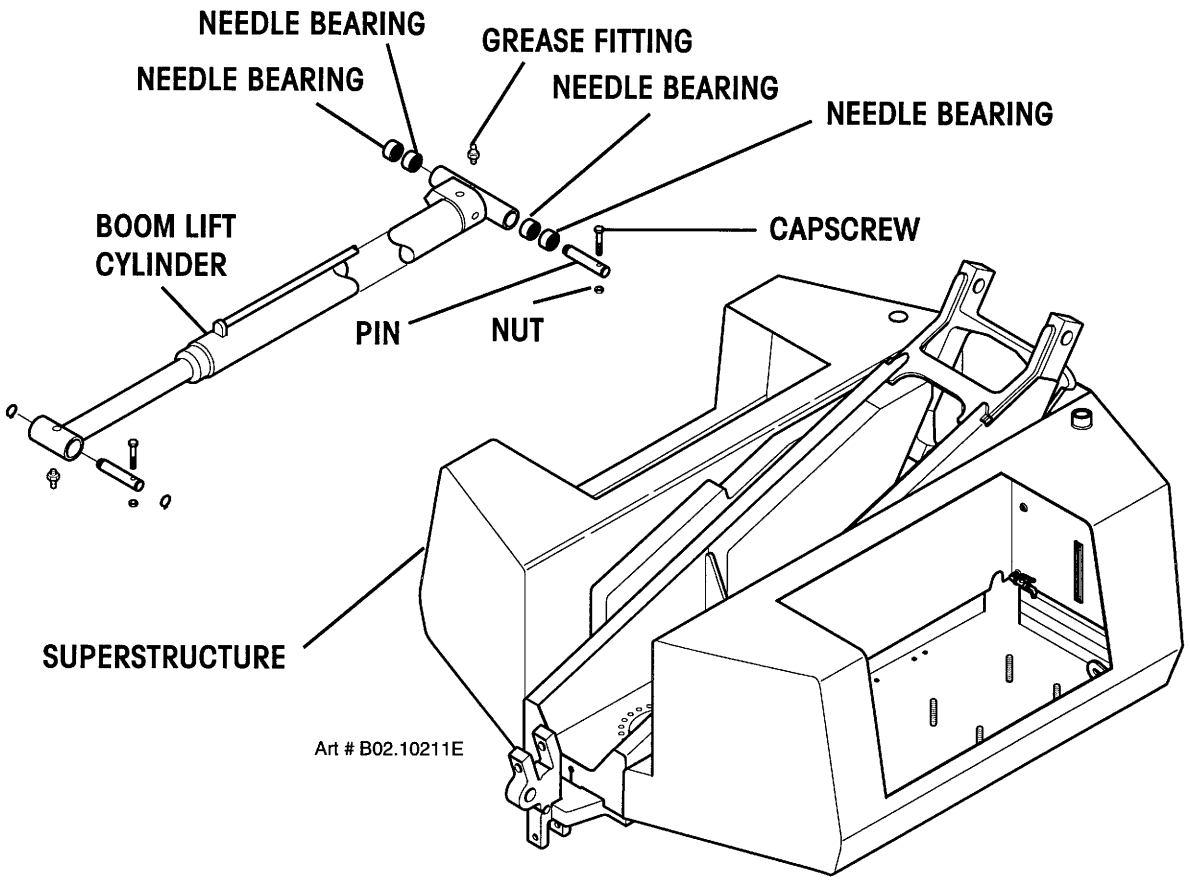
⚠ CAUTION

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

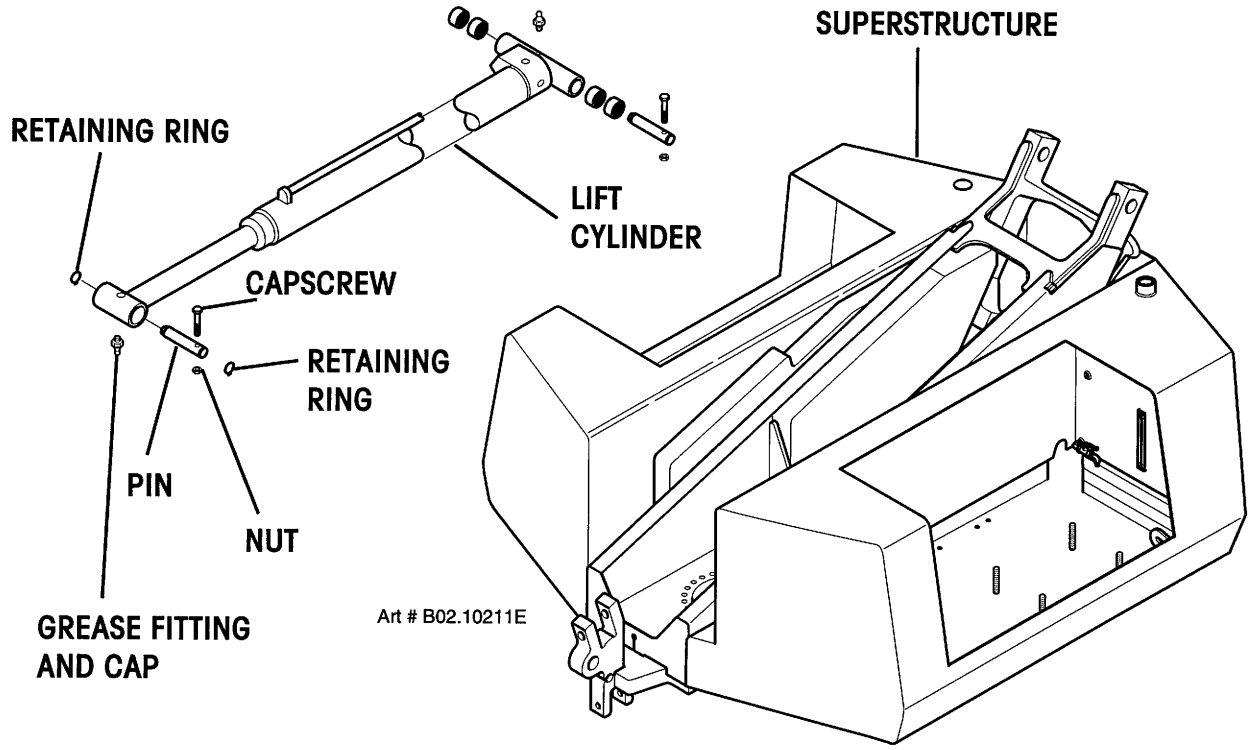
1. Support the boom securely (on a boom stand or similar rigid platform).
2. Operate the boom lift control to release hydraulic pressure and remove any load on the lift cylinder.
3. Remove the capscrew and nut.

⚠ CAUTION

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



Lift Cylinder Base End Pin.



Lift Cylinder Rod End Pin.

4. SUPPORT THE BOOM LIFT CYLINDER and remove the pin.
5. Remove the four (4) needle bearings.
6. Install four (4) new needle bearings.
7. Install new pin, capscrew and nut.
8. Apply grease to pin through grease fitting.

BOOM LIFT CYLINDER ROD END PIN REPLACEMENT

⚠ CAUTION

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

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 capscrew and nut.

⚠ CAUTION

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

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

BOOM LIFT CYLINDER SEAL REPLACEMENT (ON MACHINE)

⚠ CAUTION

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

1. Support the boom securely in the horizontal position (on a boom stand or similar rigid platform).

2. Operate the boom lift control to release hydraulic pressure and remove any load in the lift cylinder circuit.

3. Clean the cylinder, and loosen the cylinder end cap by several turns.

⚠ CAUTION

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

4. Remove the rod end pivot pin, and support the cylinder barrel.

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

⚠ CAUTION

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

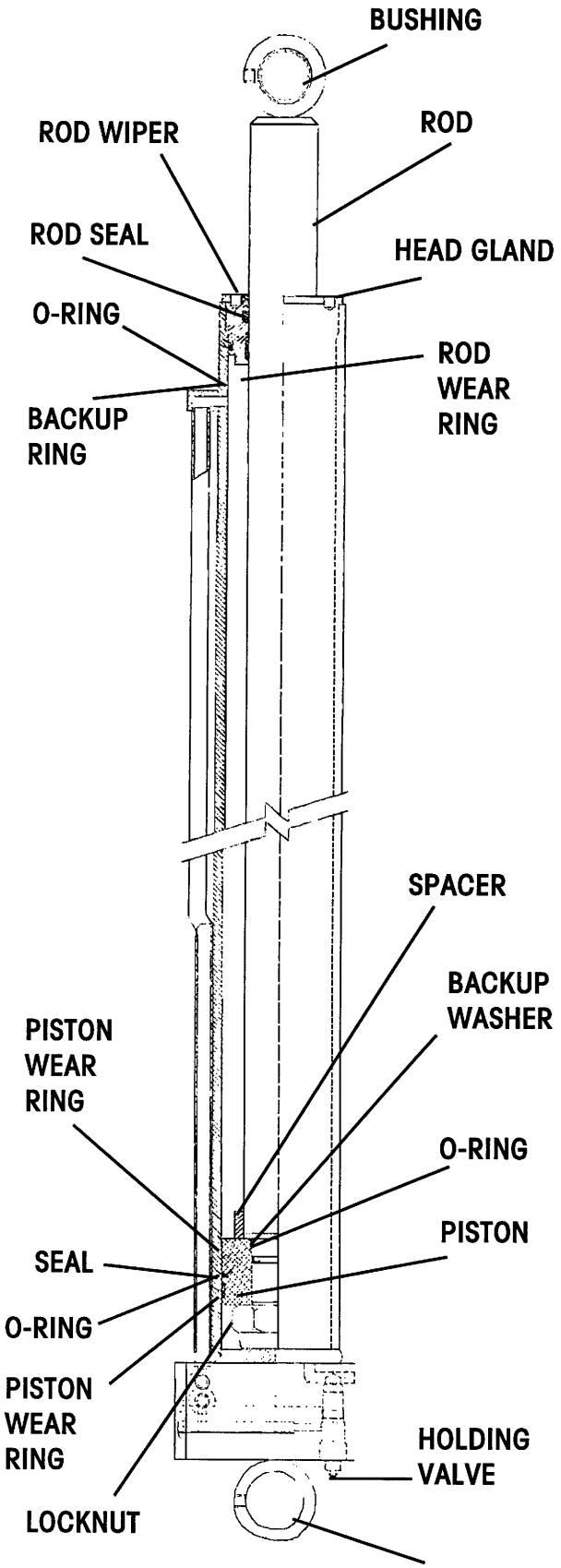
6. Remove the rod and piston assembly.

7. Replace the "O"-rings, seals and backup rings.

8. Reassemble the lift cylinder, again AVOIDING DIRT AND ROD DAMAGE.

9. Tighten the end cap.

10. Install rod end pin.



Lift Cylinder.

BENCH REPLACEMENT OF LIFT CYLINDER SEALS

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

1. Operate boom lift to horizontal position.

⚠ CAUTION

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

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 either of the end pins are removed.

4. Support the cylinder with a crane.

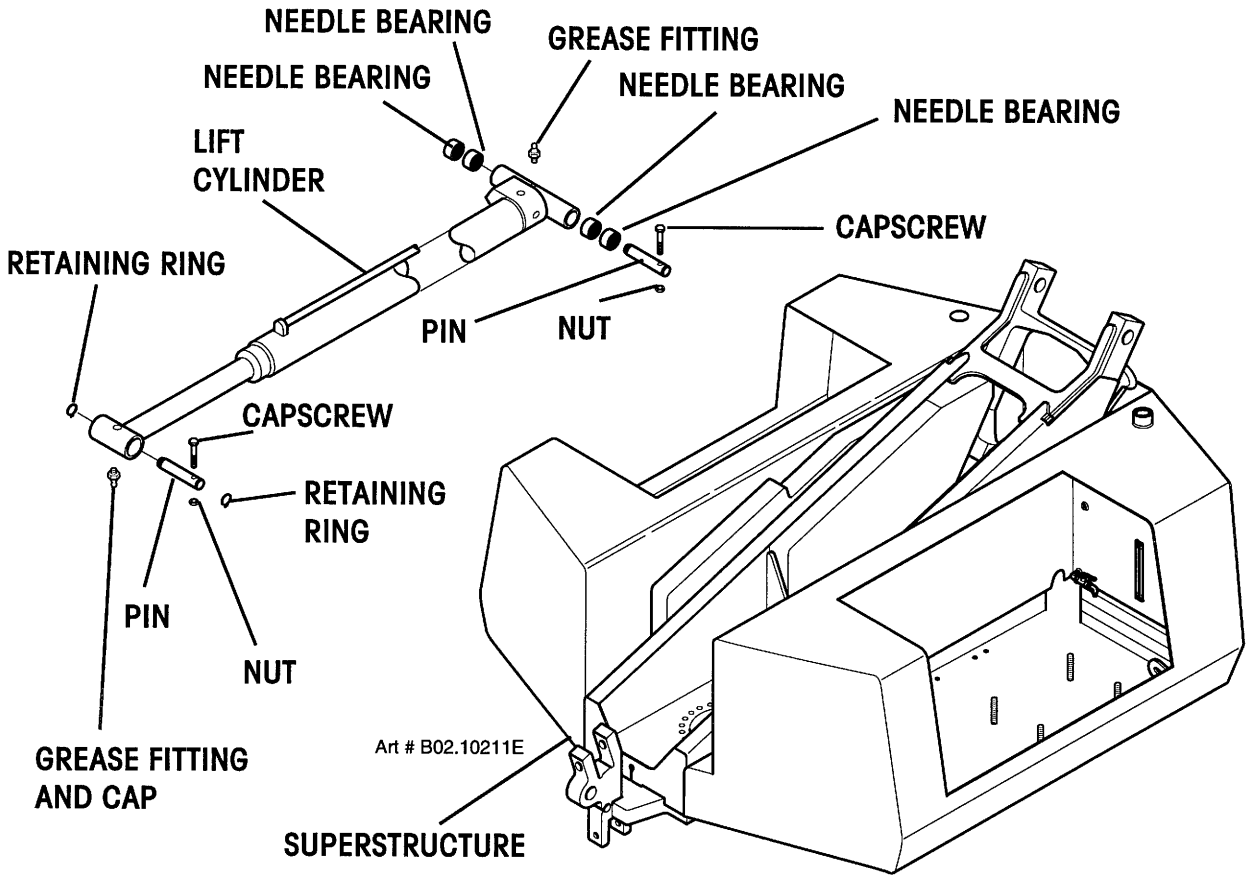
5. Remove the rod end cylinder pin.

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

7. Move the cylinder to a bench for examination.

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

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



Lift Cylinder Rod and Base Pins.

10. Clean the end of the cylinder.

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

⚠ CAUTION

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

12. Remove the rod and piston assembly.

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

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

14. Tighten the end cap.

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

16. Connect all the hydraulic hoses.

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

18. Remove cylinder support.

19. Remove boom support.

20. BLEED THE SYSTEM after reinstalling the cylinder.

COUNTERBALANCE VALVE INSPECTION

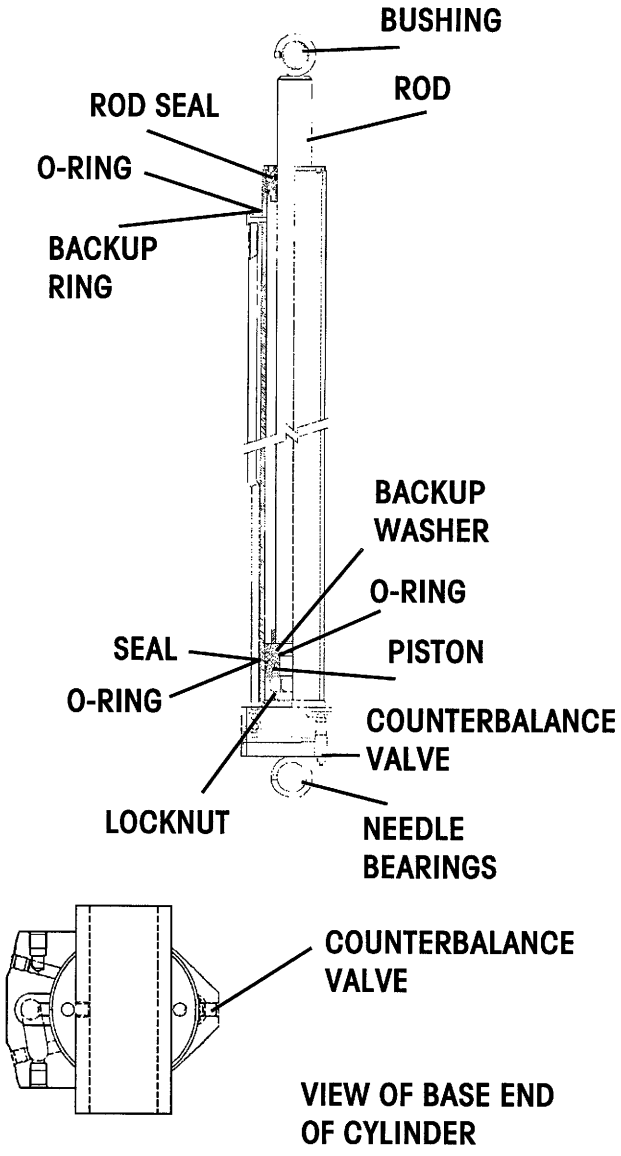
1. Place rated load in platform, raise the boom to the horizontal position, extend the boom to full side reach and stop the engine.

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

⚠ DANGER

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

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



Lift Cylinder.

BOOM TELESCOPE CYLINDER

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

TELESCOPE BOOM CYLINDER PINS REPLACEMENT

1. Operate boom lift to horizontal position.

⚠ CAUTION

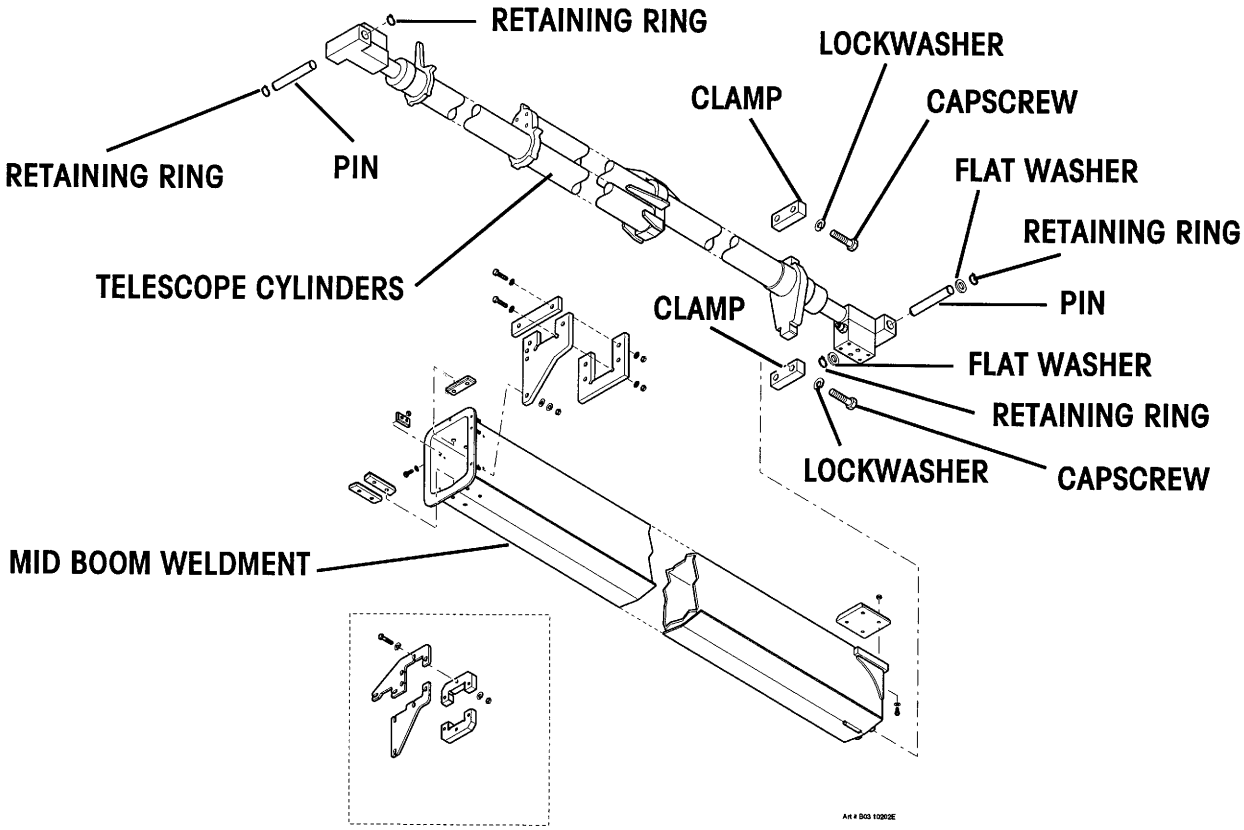
Support the boom any time maintenance is required on the boom or boom cylinders.

2. SUPPORT THE BOOM (on a boom stand or similar rigid platform) at the horizontal position.
3. Remove the retaining rings and flat washers at the base boom.

⚠ CAUTION

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

4. SUPPORT THE CYLINDER and remove the base end pin.
5. Install new pin, retaining rings and flat washers. Cylinder must be lined up for ease of installation.
6. Remove retaining rings at the tip boom.
7. SUPPORT THE CYLINDER and remove the tip end pin.
8. Install new pin and retaining rings. Cylinder must be lined up for ease of installation.



Telescope Cylinder Replacement.

TELESCOPE CYLINDER REMOVAL

1. Elevate the boom to the horizontal position.

⚠ CAUTION

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

2. SUPPORT THE BOOM (on a boom stand or similar rigid platform).

3. Remove the four (4) locknuts and flatwashers attaching the tip boom cover.

4. Remove the tip boom cover, exposing the hoses attached to the telescope cylinders.

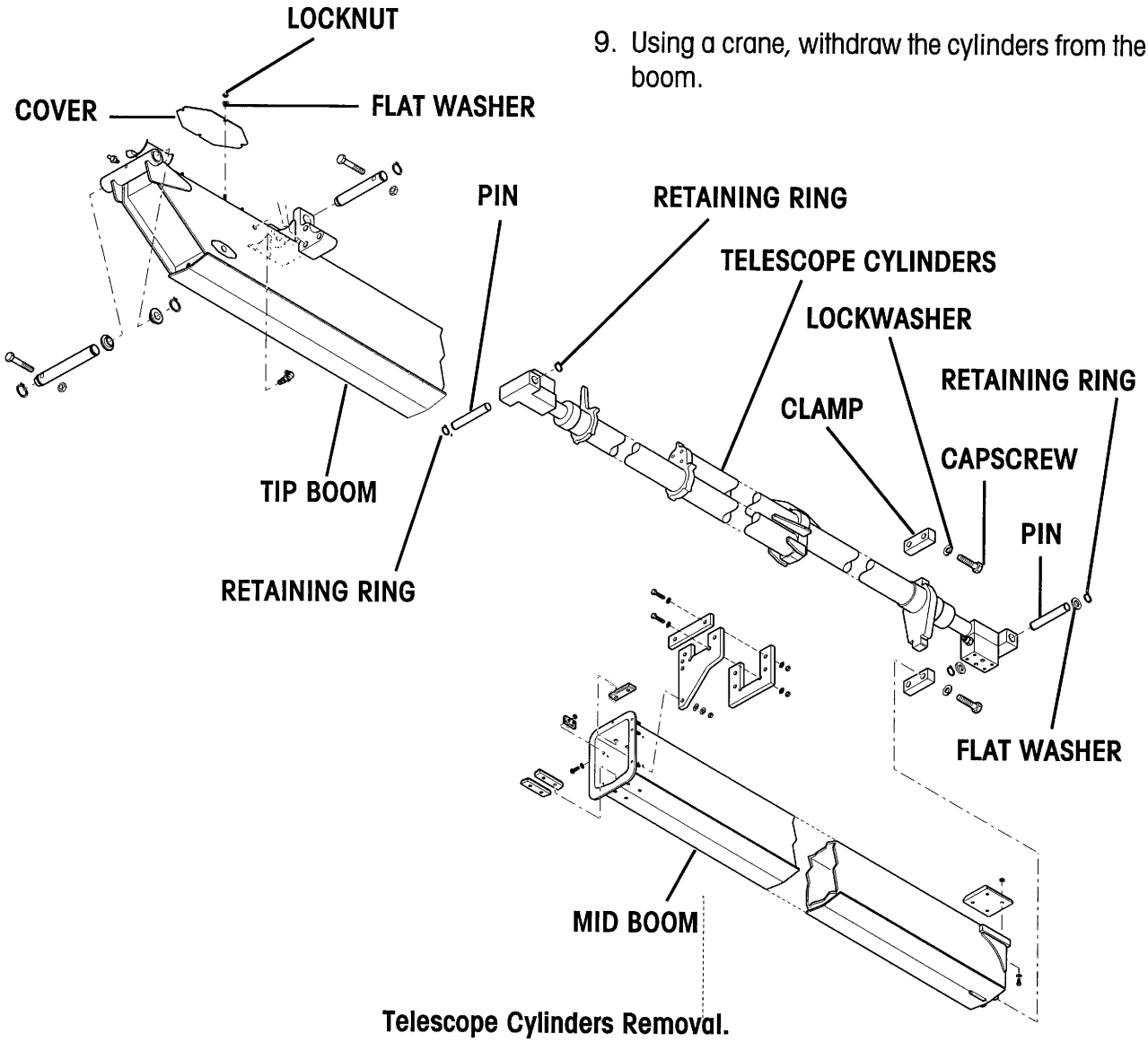
5. Disconnect the hydraulic hoses from the telescope cylinder.

6. Remove the retaining rings, flat washers and pin from the base end of the cylinders.

7. Remove the retaining rings and pin holding the rod end of the telescope cylinders to the tip boom.

8. Remove the capscrews, lockwashers and clamps holding the telescope cylinders to the mid boom.

9. Using a crane, withdraw the cylinders from the boom.



Telescope Cylinders Removal.

TELESCOPE CYLINDER SEPARATION

Lay the cylinders on a work bench. Remove the capscrews from the cylinder mounting ears. Separate the two cylinders.

To mount the two cylinders, install the capscrews into the cylinder mounting ears.

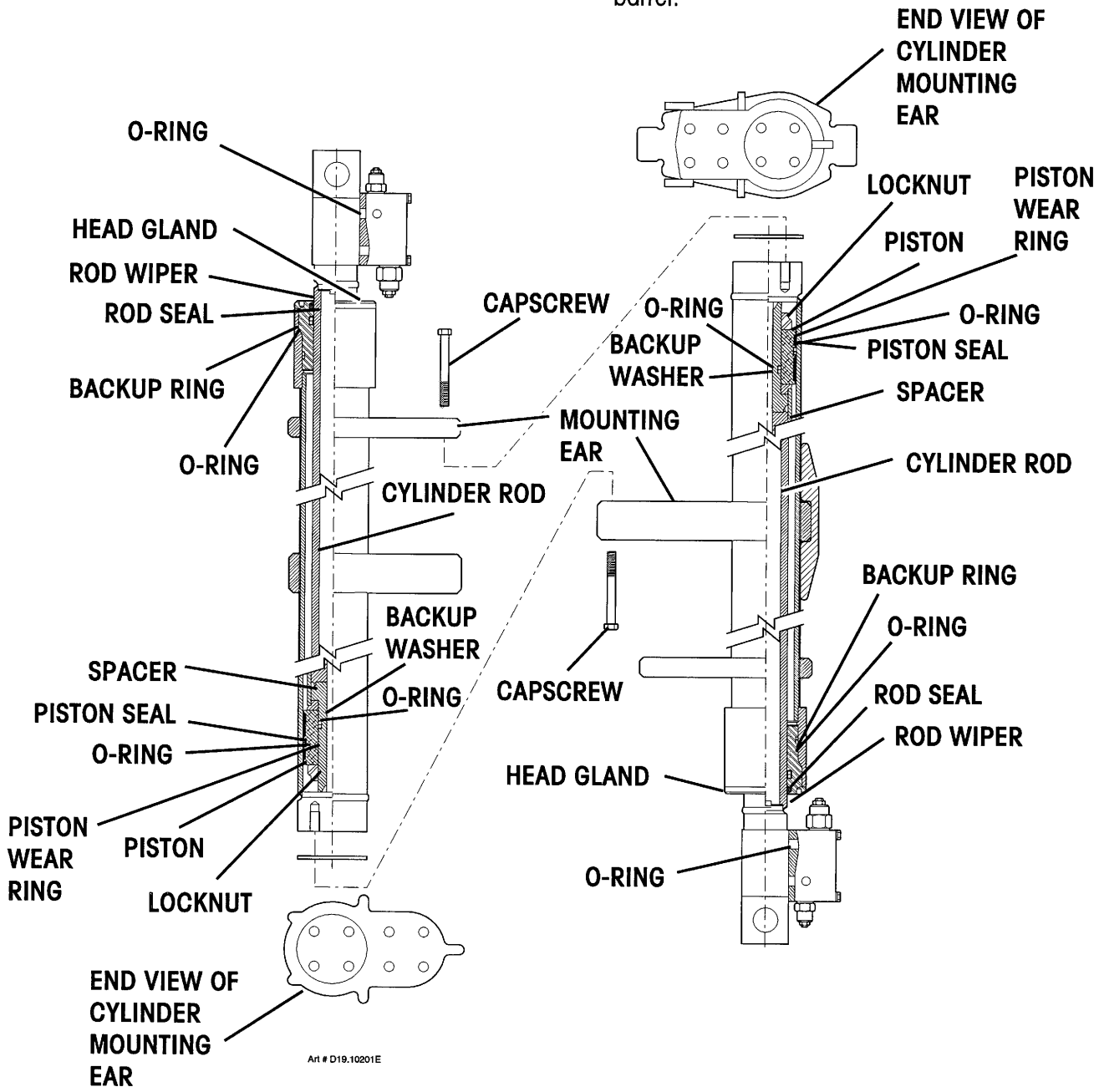
TELESCOPE CYLINDER SEAL REPLACEMENT

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.



Telescope Cylinders.

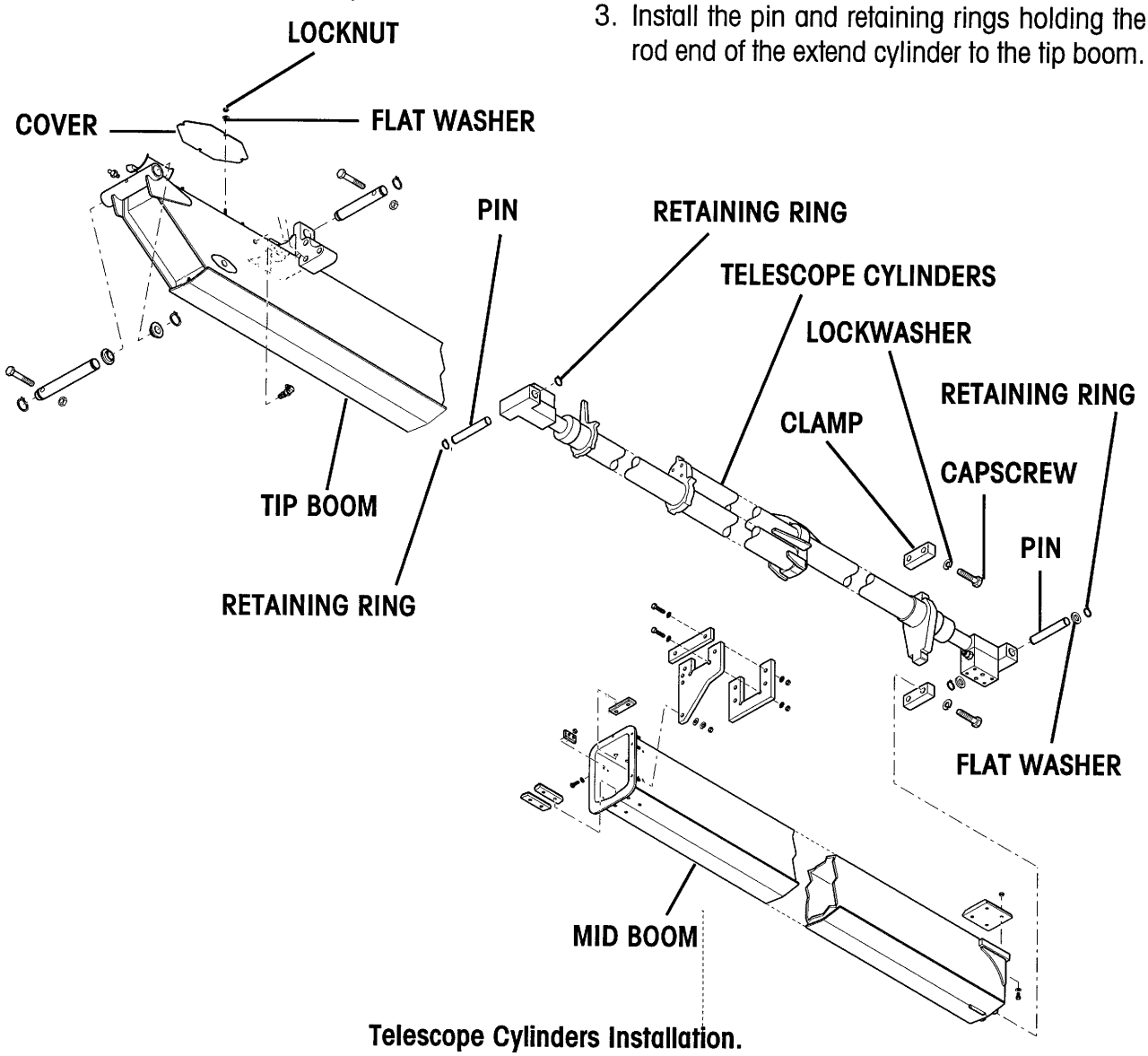
3. Remove the nut from the end of the rod.
4. Slip off the piston.
5. Examine the rod and seals for signs of damage or wear.
6. Remove the old seals and backup rings.
7. Install new seals and backup rings.
8. Install piston.
9. Install nut on the end of the rod.
10. Install rod and cap on the cylinder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

TELESCOPE CYLINDER INSTALLATION

⚠ CAUTION

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

1. SUPPORT THE BOOM (on a boom stand or similar rigid platform) IN THE HORIZONTAL POSITION.
2. Using a crane, slide the extend cylinders into the boom until the rod end mounting holes align with the holes in the tip boom.
3. Install the pin and retaining rings holding the rod end of the extend cylinder to the tip boom.



Telescope Cylinders Installation.

4. Install the capscrews, lockwashers and clamps holding the telescope cylinders to the mid boom.

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

6. Connect the hydraulic hoses to the extend cylinder.

7. Install the tip boom cover with the locknuts and flatwashers.

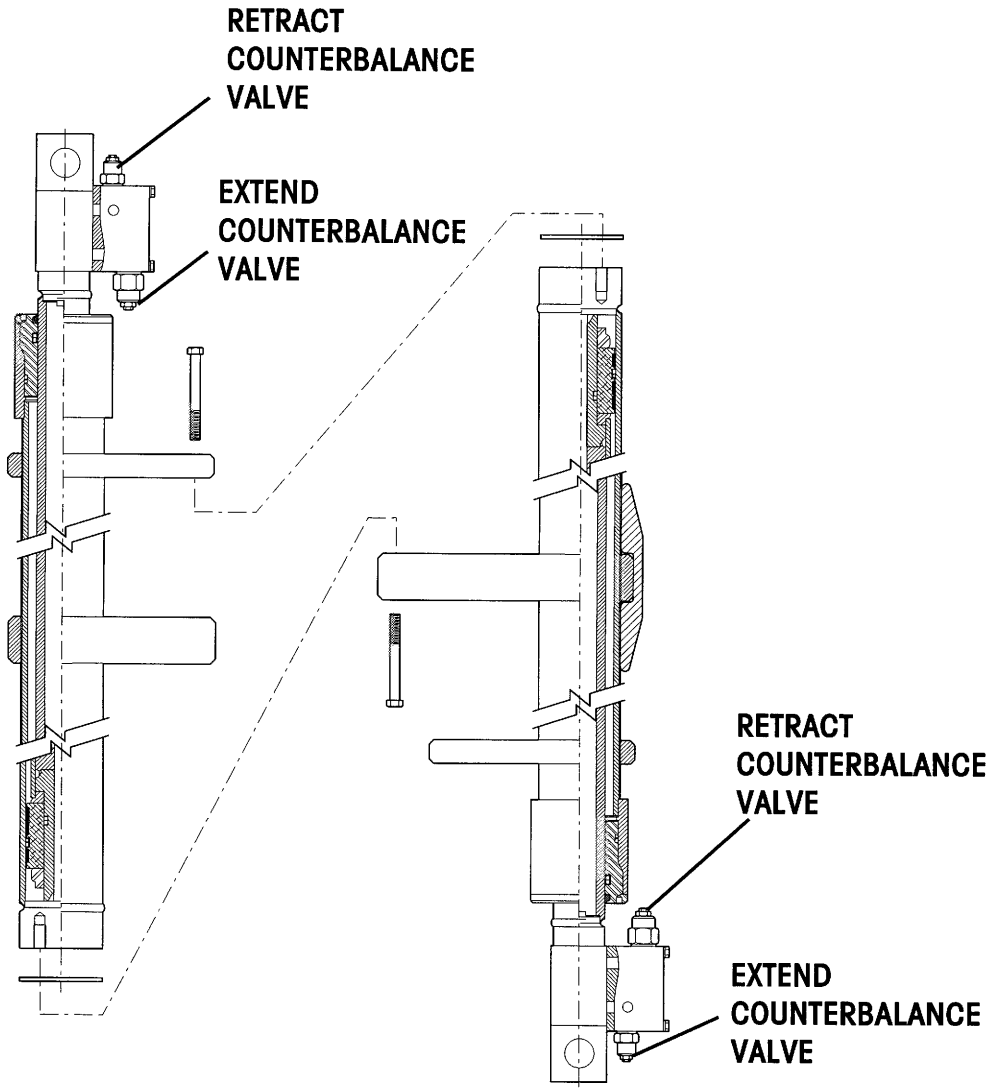
8. Cycle the extend cylinder assembly several times to BLEED THE SYSTEM.

COUNTERBALANCE VALVE INSPECTION

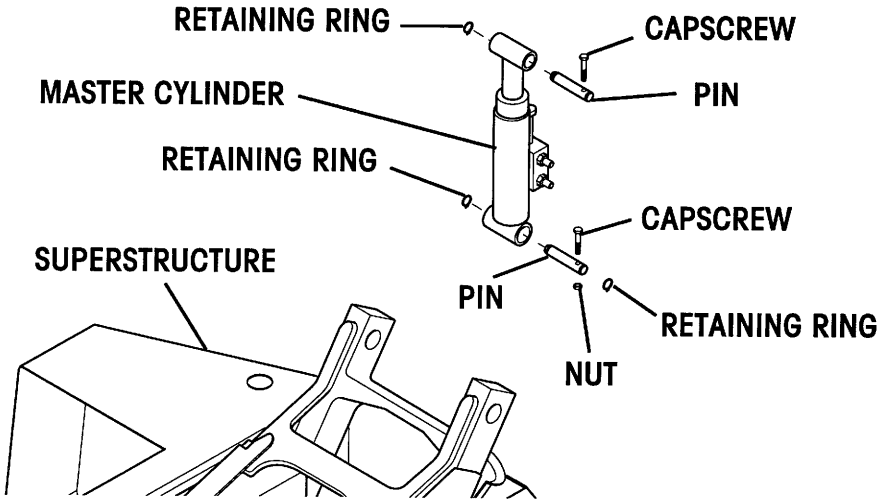
1. Place rated load in the platform, hoist the boom to full elevation and extend the telescope cylinder, then stop the engine.

2. If the extend 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.



Counterbalance Valve Locations.



Master Cylinder Pin Replacement.

PLATFORM LEVEL CYLINDERS

The platform level 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. The platform level cylinders (master and slave) are of the double acting type.

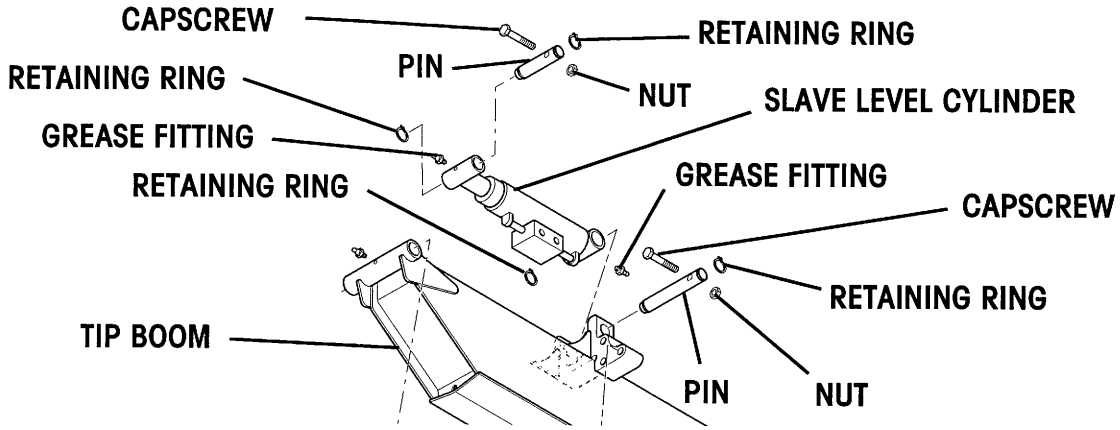
1. Check pivot pins for wear.
2. Check the pivot pin locking bolts for tightness.
3. Inspect the cylinders for fluid leakage, damage and security.
4. Replace the seals when the cylinder is serviced.

PLATFORM LEVEL CYLINDER PIN REPLACEMENT

⚠ CAUTION

Support the platform any time maintenance is required on the level cylinders.

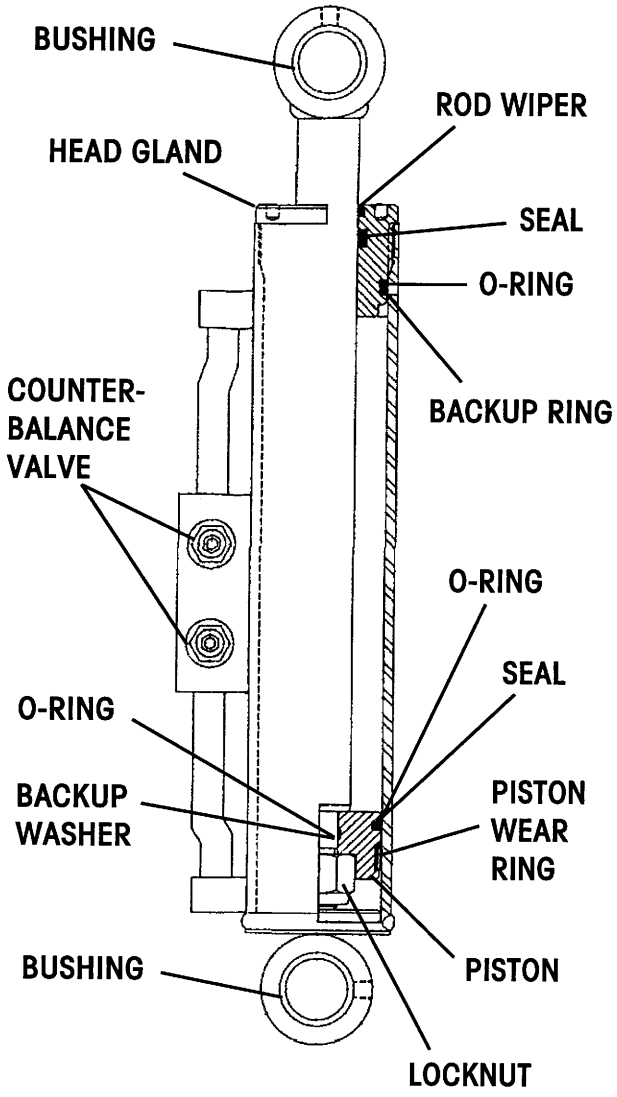
1. SUPPORT THE PLATFORM to remove the load on both master and slave level cylinders.
3. Remove the retaining rings, the pin locking capscrew and nut, and remove the pin.
4. Install new pin, locking capscrew, nut and retaining rings.
5. Apply grease to pin through the grease fitting.



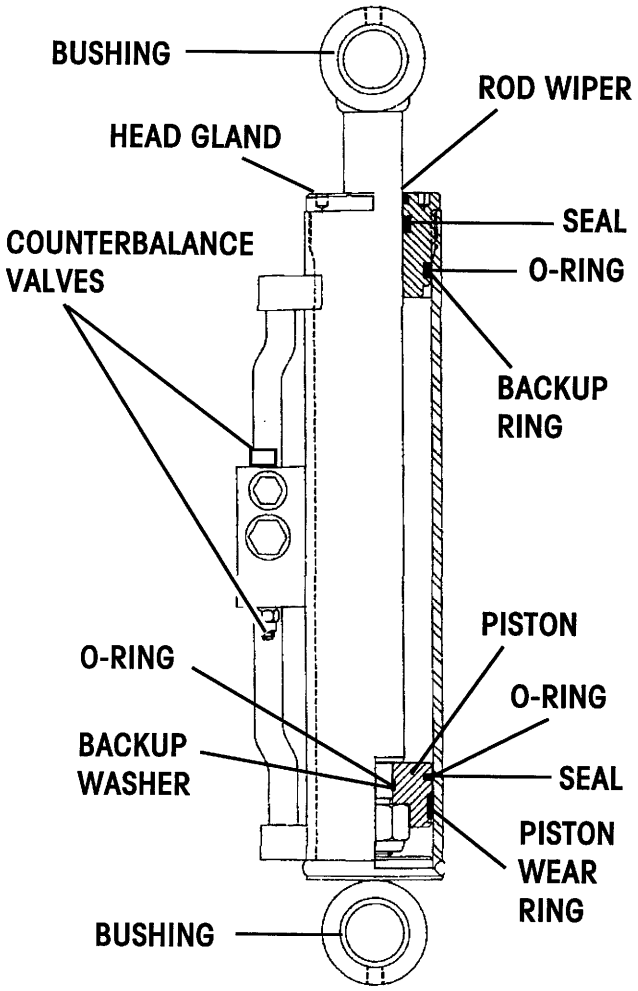
Slave Level Cylinder Pin Replacement.

LEVEL CYLINDER SEAL REPLACEMENT

1. Lower the boom all the way.
2. SUPPORT THE PLATFORM to remove the load on the slave leveling cylinder.
3. Remove the capscrew, nut, retaining rings and pin. Slave cylinder seals can be replaced on the machine. Master cylinder must be removed for seal replacement.
4. Clean the cylinder.
5. Unscrew the end cap and pull the cap and rod straight out of the cylinder barrel.



Master Level Cylinder.



Slave Level Cylinder.

⚠ CAUTION

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

6. Remove the split pin and nut from the end of the rod.
7. Slip off the piston.
8. Examine the rod and seals for signs of damage or wear.
9. Remove the old seals and install a new seal kit.

BLEEDING THE PLATFORM LEVELING 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. LOOSEN NIPPLE SLOWLY.

NOTE: The "B" and "C" are marked on the hoses and the fittings are for the hoses marked "B" and "C".

2. Slightly loosen the "B" and "C" hose fittings at the base of the master level 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 ERRATIC OR JERKY PLATFORM MOTION.

4. Tighten the "B" and "C" hose fittings and replenish 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.

MAXI-REACH SYSTEM

The Maxi-Reach System consists of a spring pack assembly, arm, boom telescope diverter valve and boom lift diverter valve.

IMPORTANT: Before you adjust the Maxi-Reach System, you must notify Simon Aerials Inc. Technical Support Department.

BOOM TELESCOPE DIVERTER VALVE REPLACEMENT

1. Disconnect the hydraulic lines from the valve.

2. Remove the capscrews holding the valve.

3. Lift out the diverter valve.

4. Position the diverter valve.

5. Install the capscrews and tighten.

6. Connect the hydraulic lines.

7. Check the gap between the boom telescope diverter valve and the arm (see Maxi-Reach Set Up).

8. Perform the Maxi-Reach tests (see Hydraulic System Components for test procedures).

BOOM LIFT DIVERTER VALVE REPLACEMENT

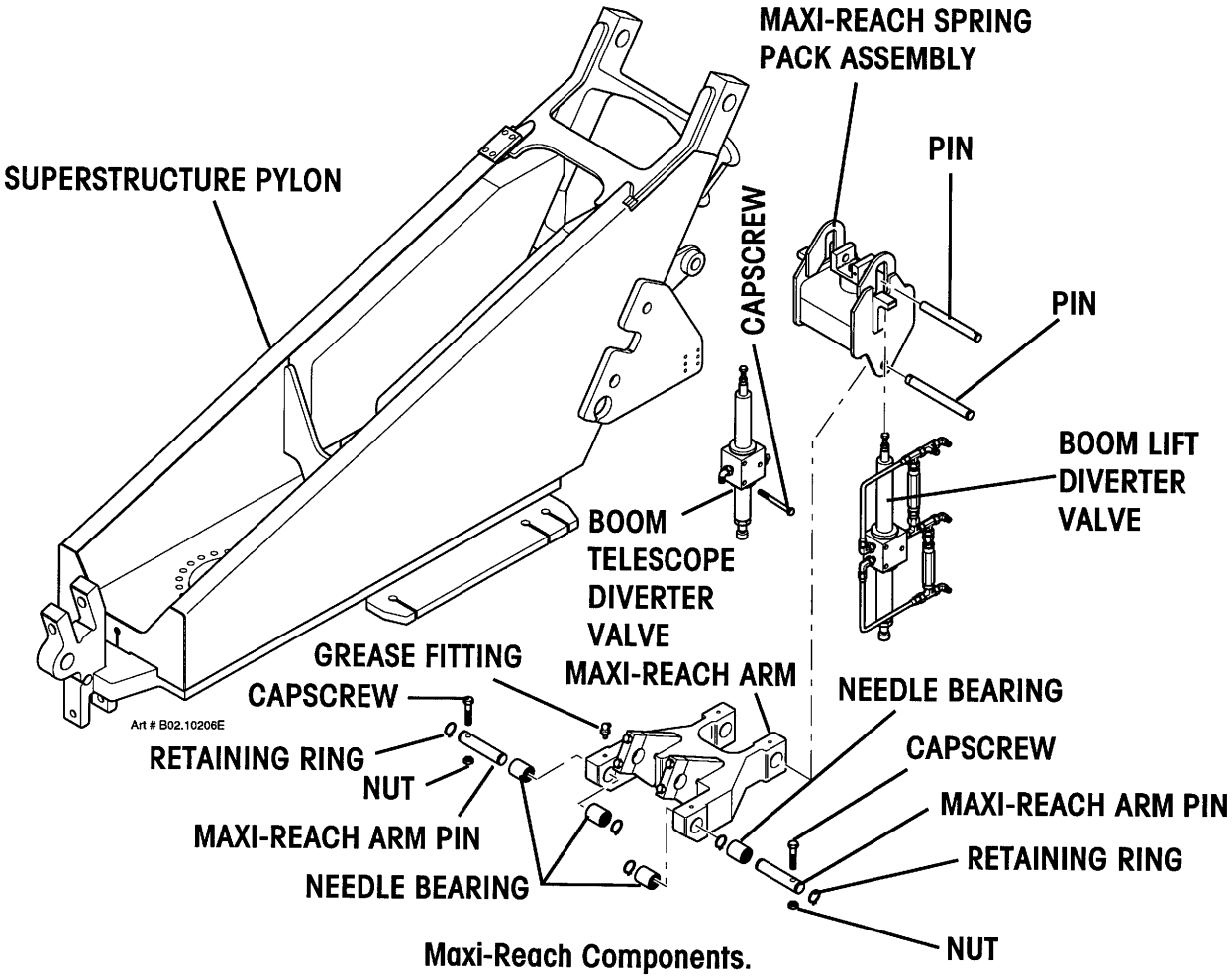
1. Disconnect the hydraulic lines from the valve.
2. Remove the capscrews holding the valve.
3. Lift out the diverter valve.
4. Position the diverter valve.
5. Install the capscrews and tighten.
6. Connect the hydraulic lines.
7. Check the gap between the boom lift diverter valve and the arm. There should be zero gap (see Maxi-Reach Set Up).
8. Perform the Maxi-Reach tests (see Hydraulic System Components for test procedures).

ARM PIN AND NEEDLE BEARING REPLACEMENT

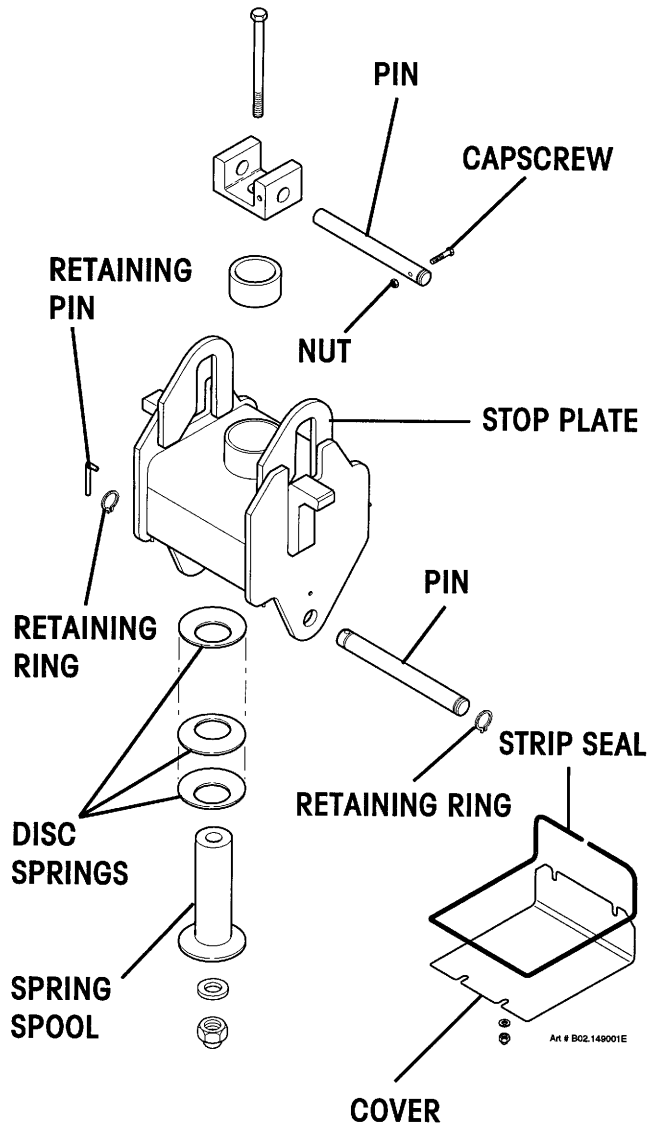
⚠ CAUTION

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

1. Remove base end of lift cylinder and support it with a crane (see Lift Cylinder Base End Pin Replacement) or remove the lift cylinder. This gives you easier access to the Maxi-Reach arm.
2. Remove Maxi-Reach spring pack assembly:
   a. Support the Maxi-Reach spring pack assembly with a crane and sling.



Maxi-Reach Components.



Maxi-Reach Spring Pack Assembly.

b. Remove capscrew and locknut from upper pin in the Maxi-Reach spring pack assembly.

c. Remove the upper pin in Maxi-Reach spring pack assembly.

d. Remove retaining pin and retaining rings on the lower pin in the Maxi-Reach spring pack assembly.

e. Remove the lower pin in the Maxi-Reach spring pack assembly.

f. Remove the Maxi-Reach spring pack assembly.

3. Remove capscrews and nuts from the Maxi-Reach arm pins.

4. Remove retaining rings on both arm pins.

5. Pull out the Maxi-Reach arm pins.

6. Remove the Maxi-Reach arm.

7. Press out the needle bearingings from the arm.

8. Press in the new needle bearings.

9. Position the Maxi-Reach arm.

10. Install the Maxi-Reach arm pins.

11. Install retaining rings on both arm pins.

12. Install capscrews and nuts and tighten.

13. Install Maxi-Reach spring pack assembly:

a. Position the Maxi-Reach spring pack assembly.

b. Install the lower pin in the Maxi-Reach spring pack assembly.

c. Install retaining rings and retaining pin on the lower pin in the Maxi-Reach spring pack assembly.

d. Install the upper pin in the Maxi-Reach spring pack assembly.

e. Install capscrew and locknut in the upper pin.

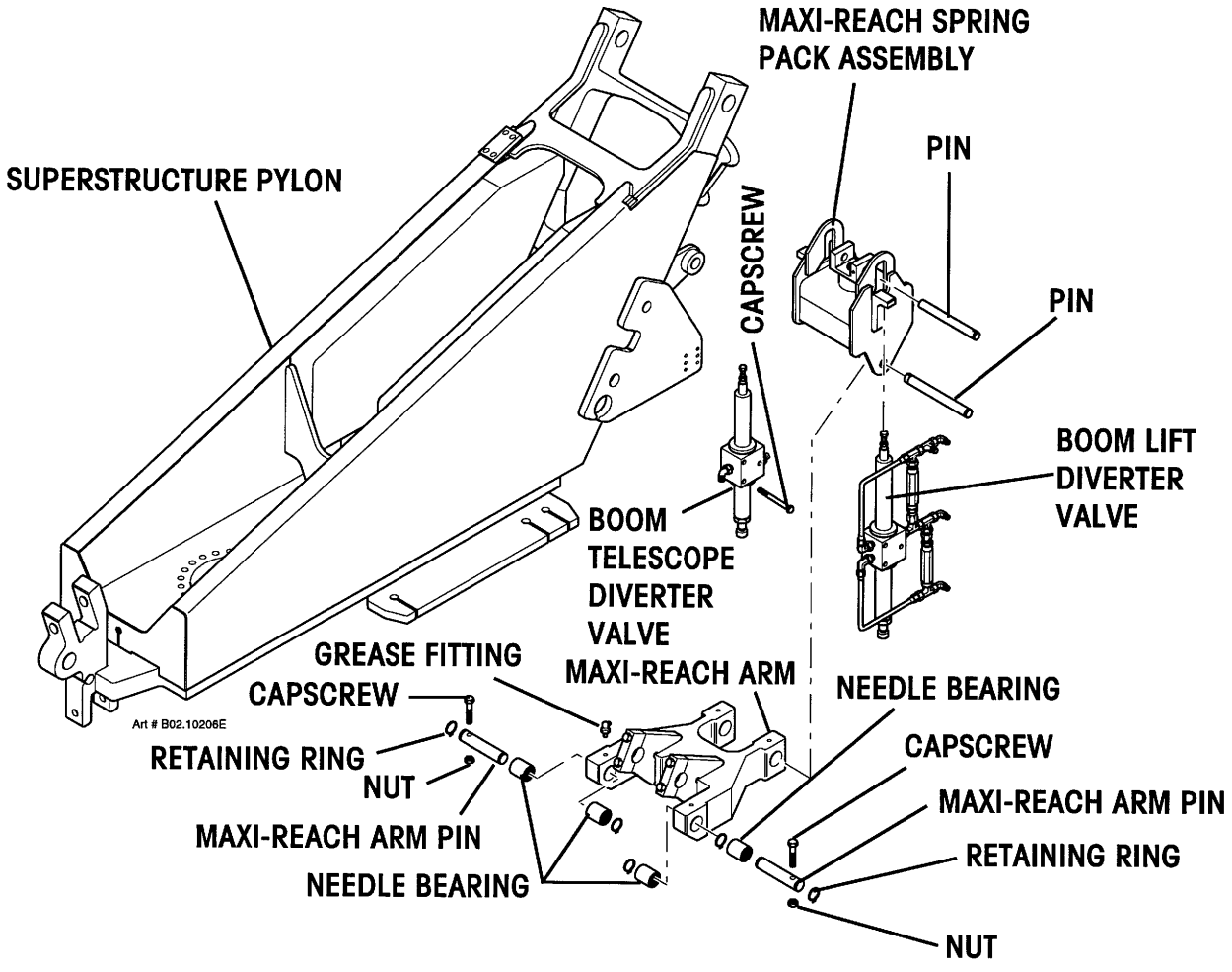
f. Remove sling from Maxi-Reach spring pack assembly.

14. Install base end of lift cylinder (see Lift Cylinder Base End Pin Replacement).

15. Apply grease to pin through the grease fitting.

16. Check the gap between the boom lift diverter valve and the arm. There should be zero gap (see Maxi-Reach Set Up).

17. Perform the Maxi-Reach tests (see Hydraulic System Components for test procedures).



Maxi-Reach Components.

SECTION 6:
MAINTENANCE SCHEDULE

Table of Contents, Section 6

Maintenance Schedule 6-3
General Maintenance Tips 6-3
First Three Months of Operation 6-3
Routine Servicing 6-3
Daily Operational Checklist 6-6
Monthly Operational Checklist 6-9
Semi-Annual Operational Checklist 6-11

MAINTENANCE SCHEDULE

The Simon Trailblazer 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.

DAILY SERVICE

Hydraulic System

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

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

Tire Condition

Check that the tires are in good condition.

Platform Rails and Safety Gate

Check security of platform and safety gate.

Control Valves

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

Steering

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

Batteries

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

Pivot Pins

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

Test All Machine Systems

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

Test the operation of all machine boom functions.

Checklist

Perform all items on the Daily 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.

High Pressure Filter

Change the high pressure filter element.

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

Checklist

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

ANNUAL SERVICE

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

Flexible Hoses

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

Hydraulic Fluid

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

Hydraulic Fluid Tank

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

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

Open the drain tap, and completely drain the fluid from the tank.

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

Structural Examination

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

FOUR YEAR INTERVAL SERVICE

Pivot Pins and Bearings

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

DAILY 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 Trailblazer clean!!

⚠WARNING

THIS CHECKLIST MUST BE USED AT DAILY INTERVALS OR AFTER EVERY 6 TO 8 HOURS OF USE, WHICHEVER IS SOONER. FAILURE TO DO SO COULD ENDANGER THE LIFE OF THE OPERATOR. REMEMBER, A LITTLE PREVENTIVE MAINTENANCE CAN SAVE MUCH MORE THAN IT COSTS.

INITIAL	DESCRIPTION
_____	1. Perform a visual inspection of all machine components, i.e. missing parts, torn or loose hoses, hydraulic fluid leaks, torn or disconnected wires, or damaged tires etc. Open both compartment doors to inspect components inside.
_____	2. Check battery electrolyte level and connections. Check fuel, engine oil and coolant levels.
_____	3. Check hydraulic fluid level. The level should be at the line marked on the sight gauge with the unit in stowed position.
_____	4. Check that all shutoff valves on hydraulic tank are open (parallel to flow).

Continued on following page . . .

DAILY OPERATIONAL CHECKLIST (CONTINUED)

INITIAL	DESCRIPTION
_____	5. Check tires for damage.
_____	6. Check tire pressure (see "Machine Specifications").
_____	7. Check wheel lug nuts for tightness.
_____	8. Check hoses for worn areas.
_____	9. Check hose carrier to verify that it is not bent or sagging.
_____	10. Inspect safety belt connections, and check for worn areas on the belts.
_____	11. Check platform rails and gate latch for damage.
_____	12. Check pivot pins for security.
_____	13. Check that all warning and instructional labels are legible and secure.
_____	14. Start engine. Check that hydraulic pressure is as stated in machine specifications.
_____	15. Check that the tilt alarm is working properly.
_____	16. Check that no attempt has been made to override the drive interlock system by a previous operator.
_____	17. When all pre-inspection checks have been completed, the operator is ready to test the ground controls for proper operation.
_____	18. Perform Maxi-Reach test (see Operator's Manual).
_____	19. Check platform controls for proper operation.
_____	20. With the platform raised, check for the smooth operation of low speed drive.
_____	21. Follow engine daily service requirements. Refer to the Engine Maintenance Manual supplied with your Trailblazer.

Continued on following page . . .

DAILY OPERATIONAL CHECKLIST (CONTINUED)

ADDITIONAL MAINTENANCE REQUIREMENTS FOR HARSH ENVIRONMENTS

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

DAILY

INITIAL	DESCRIPTION
_____	22. Inspect cylinder boots, valve spool boots, etc., for cuts or other damage after every eight (8) hours of service. Repair or replace if necessary.
_____	23. Check hydraulic system for leakage after every eight (8) hours of operation.
_____	24. Follow engine severe usage service requirements. Refer to the Engine Maintenance Manual supplied with your Trailblazer.

WEEKLY

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

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 Trailblazer clean!!

⚠WARNING

THIS CHECKLIST MUST BE USED AT MONTHLY INTERVALS OR EVERY 100 HOURS OF OPERATION, WHICHEVER OCCURS FIRST. FAILURE TO DO SO COULD ENDANGER THE LIFE OF THE OPERATOR. ALWAYS REMEMBER, A LITTLE PREVENTIVE MAINTENANCE CAN SAVE MUCH MORE THAN IT COSTS.

INITIAL	DESCRIPTION
_____	1. Perform all checks listed on Daily Operational Checklist.
_____	2. Lubricate all grease fittings (see Lubrication Chart).
_____	3. Inspect condition of hydraulic fluid in the reservoir. Fluid should have a clear amber color.
_____	4. Check hydraulic system for leaks, examine hoses for signs of excessive wear, chafing or twisting. Adjust the hoses and/ or replace them if necessary.
_____	5. Inspect the work platform and boom structure for signs of damage and broken welds. Check all bolts (including cab rotate bolts) for tightness.
_____	6. Check for unit damage, broken welds, loose bolts, improper or make-shift repairs.
_____	7. Check protective rubber cover around hoses at moving anchor, tip boom, boom hose passages, and at swing bearing.

Continued on following page . . .

MONTHLY OPERATIONAL CHECKLIST

INITIAL	DESCRIPTION
_____	8. Check torque of swing bearing bolts (see "Machine Specifications").
_____	9. Check torque of swing drive mounting bolts (see "Machine Specifications").
_____	10. Check that wheels are not leaning in or out.
_____	11. Check that steer wheel spindles turn freely, with no end play.
_____	12. Check torque of axle mounting bolts (see "Machine Specifications").
_____	13. Check wheel lug nut torque (see "Machine Specifications").
_____	14. Check that the boom does not drift down with a full load, no hydraulic pressure (engine off) and the control valve in the "BOOM DOWN" position.
_____	15. Check to make sure boom sections are not dented or bent.
_____	16. Check that all jam nuts on adjustable flow valves are locked. Check settings if any are not locked.
_____	17. Check fuel shutoff rack for proper operation. Loosen lever arm and lubricate with WD-40 or equivalent.
_____	18. Follow engine monthly service requirements. Refer to the Engine Maintenance Manual supplied with your Trailblazer.
_____	19. Check axle and planetary ends. Refer to Lubrication Chart.
_____	20. Check swing bearing and swing bearing teeth. Refer to Lubrication Chart.

ADDITIONAL MAINTENANCE REQUIREMENTS FOR SEVERE USAGE APPLICATIONS

EVERY 90 DAYS

INITIAL	DESCRIPTION
_____	21. Replace high pressure filter element.

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 Trailblazer clean!!

⚠WARNING

THIS CHECKLIST MUST BE USED AT SIX MONTH INTERVALS OR EVERY 500 HOURS OF OPERATION, WHICHEVER OCCURS FIRST. FAILURE TO DO SO COULD ENDANGER THE LIFE OF THE OPERATOR. ALWAYS REMEMBER, A LITTLE PREVENTIVE MAINTENANCE CAN SAVE MUCH MORE THAN IT COSTS.

INITIAL	DESCRIPTION
_____	1. Perform all checks listed on Daily and Monthly Operational Checklists.
_____	2. Have hydraulic fluid sample analyzed at a test laboratory. Comply with test results and recommendations to ensure long, trouble free operation. **NOTE:** If hydraulic fluid has been regularly maintained, it should only require changing once every year, depending on maintenance, temperature, application, duty cycle, and atmospheric conditions.
_____	3. Clean and lubricate all electrical switches with an electrical contact cleaner and ensure that the switches operate freely in all positions.
_____	4. Check the electrical mounting and hardware connections for security.
_____	5. Replace high pressure filter elements.

Continued on following page . . .

SEMI-ANNUAL OPERATIONAL CHECKLIST (CONTINUED)

INITIAL	DESCRIPTION
_____	6. Spray all hydraulic valve spool linkages with WD-40.
_____	7. Follow engine semi-annual service requirements. Refer to the Engine Maintenance Manual supplied with your Trailblazer.

SECTION 7:
TROUBLESHOOTING

Table of Contents, Section 7

General Troubleshooting Tips 7-3
Troubleshooting Chart 7-4
Index to Troubleshooting Chart
All hydraulic functions inoperable. 7-10
Boom drifts down without lever activation 7-11
Boom drifts down without lever actuated with power .. 7-10
Boom track cross braces breaking 7-5
Boom track sagging 7-6
Cavitation, a gaseous condition within the fluid 7-5
Drive function does not operate from ground 7-11
Engine won't crank 7-6
Excessive hydraulic pump pressure 7-8
Execssive heat 7-4
Function chatter 7-9
Hydraulic functions slow 7-8
Hydraulic pump and fluid line vibration 7-9
Hydraulic pump noise or squeal 7-10
Hydraulic pump shaft seal failure 7-9
Lift cylinder drifts 7-7
Low hydraulic pump output 7-8
Low speed drive 7-17
Maxi-Reach test failure 7-17
Movement alarm will not sound 7-7
No drive function from platform 7-11
No extend or retract function from platform 7-13
No hydraulic pump output 7-7
No lift function from platform 7-12
No lift or extend function 7-12
No steer function from ground 7-11
No swing function from platform 7-13
Platform does not level properly (platform drifting) 7-15
Platform level selector valve body cracked or blown .. 7-15
Platform rotate selector valve body cracked or blown . 7-14
Platform will not react to platform rotate control 7-14
Poor lubrication, parts break through lubricant 7-4
Slow hydraulic pump response 7-8
Steer selector valve body cracked or blown 7-16
Swing gear pinion shaft, tooth and/ or ring bearing 7-14
Swing motor will not run in either direction 7-13
Telescope, swing, or hoist functions 7-10
Throttle actuator 7-6
Unit will not go into high speed drive 7-17
Unit will not steer; all other functions operate 7-15
Varnish 7-4
Water in hydraulic fluid 7-4
Wheel drive motor failure 7-16
When extending, boom retracts 7-12

GENERAL TROUBLESHOOTING TIPS

Before investigating a malfunction, check the following items:

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

Common Causes of Hydraulic System Malfunctions:

- Mixing incompatible hydraulic fluids, destroying the additives and causing varnish build up resulting in sticking valves.
- Water or condensation in the hydraulic fluid due to a damp climate.
- 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. Refer to Fluid Recommendations in Section 2.

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

TROUBLESHOOTING CHART

Problem	Probable Cause	Solution
• Excessive heat causing excessive wear on seals and metal parts due to lowered hydraulic fluid viscosity. Symptoms to watch for are: pump case turns brown, hydraulic fluid darkens and premature pump failure.	• Excessive water in the hydraulic fluid.	• Drain, flush and refill hydraulic system.
	• Improper oil viscosity.	• Drain, flush and refill hydraulic system with the correct fluid.
	• Improper lubrication and hydraulic fluid.	• Drain and flush hydraulic system.
	• Pump cam bearing failure.	• Rebuild pump as required.
	• Foot pedal blocked to the "ON" position.	• Unblock foot pedal.
• Water in hydraulic fluid. Symptoms to watch for are: pitting and etching of pump pistons and pump piston cam wear causing heat build up and premature pump failure.	• Damp climate.	• Drain and flush hydraulic system.
	• Hydraulic fitting or port open to contaminants.	• Drain and flush hydraulic system. Replace worn pump components.
	• Condensation build up.	• Drain condensation.
• Varnish, the dark brownish residue left from oxidation of hydraulic fluids. Symptoms to watch for are: pistons, spools and moving parts with close tolerances tend to stick and hang up.	• Mixing of incompatible fluids or poor quality fluids.	• Drain and flush hydraulic system, then fill with recommended hydraulic fluid.
	• Excessive heating of the fluids.	• Drain and flush hydraulic system, then fill with recommended hydraulic fluid.
• Poor lubrication, parts break through lubricant causing metal to metal contact. Symptoms to watch for are: heads of pump pistons worn and excessive heat build up.	• Hydraulic fluid viscosity low.	• Drain and flush hydraulic system, then fill with recommended hydraulic fluid.
	• Improper or poor grade hydraulic fluid or lubricant without anti-wear additives.	• Drain and flush hydraulic system, then fill with recommended hydraulic fluid.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Cavitation, a gaseous condition within the fluid stream where the pressure is reduced to the vapor pressure of the fluid. The higher the system pressure the more violent the reaction will be. Symptoms to watch for are: pitting and etching of pump pistons.	• Low reservoir fluid level.	• Add hydraulic fluid.
	• Air leaks in suction line.	• Repair any suction hose leaks.
	• Improper hydraulic fluid.	• Have fluid analyzed regularly and drain and flush hydraulic system, then fill with recommended hydraulic fluid.
	• Vaporization of water.	• Have fluid analyzed regularly and drain and flush hydraulic system, then fill with recommended hydraulic fluid.
	• Hydraulic fluid system has not been warmed before using full system pressure.	• Warm up system before using full system pressure.
	• Pump speed too high.	• Ensure reservoir pressurization is operating properly and adjust engine speed.
• Boom track cross braces breaking.	• Hoses skiving in the boom track.	• 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.	• Provide more hose slack.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Boom track sagging.	• Catrac cover is damaged. If the guard is damaged, the track could get caught and could also tear off the moving anchor. • Improper lubrication and cleaning.	• Replace catrac cover and any other items damaged due to a damaged guard. • Follow proper lubrication and cleaning procedures.
• Engine won't crank.	• Starter motor relay. • Starter motor interlock relay. • Low oil pressure/ high water temperature. • Power relay. • Ground/ platform switch. • Ground/ platform ignition switch. • Oil pressure relay. • Engine failure.	• A breakdown in any one of these components will cause the engine not to crank. Trace the available voltage to starter motor relay. Replace the faulty component(s).
• Throttle actuator doesn't work.	• Throttle high speed relay. • Circuit breaker is bad. • An actuator failure.	• A breakdown in any one of these components will cause the actuator not to function. Trace the available voltage to the throttle solenoid. Replace the faulty component(s).

TROUBLESHOOTING CHART (CONTINUED)

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

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Low hydraulic pump output.	• Low pressure.	• Check and adjust for correct pressure if necessary.
	• Component failure.	• Check for compensator valve, seat, spring or packing failure and replace if damaged.
		• Check for worn or scored pistons and bores; replace if damaged.
		• Check for broken discharge valve or spring; replace if damaged.
		• Check for restricted inlet or insufficient inlet fluid.
• Hydraulic functions slow.	• Low hydraulic pump pressure.	• Check and adjust for correct pressure if necessary.
	• Hydraulic high pressure filter.	• Check for plugged hydraulic high pressure filter; replace filter element.
	• Pump component failure.	• Check for compensator valve, seat, spring or packing failure and replace if damaged.
	• Low oil temperature.	• Run machine for a while before putting in use.
• Slow hydraulic pump response.	• High pressure filter.	• Check for plugged high pressure filter.
• Excessive hydraulic pump pressure.	• Improper compensator adjustment.	• Adjust compensator valve and replace if necessary.

TROUBLESHOOTING CHART (CONTINUED)

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

TROUBLESHOOTING CHART (CONTINUED)

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

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Boom drifts down without lever activation but with power on; does not drift down with power off.	• Mechanical failure.	• Check that ground and platform boom control levers return to their neutral position.
• Drive function does not operate from ground.	• No voltage at toggle switch. • Ground drive speed control relay is bad.	• Check voltage available to the toggle switches. • Ensure proper operation of ground drive speed control relay or replace.
• No steer function from ground.	• Steer toggle switch is bad. • Steer valve. • Faulty steer cylinder.	• Check voltage available to the toggle switch. • Steer valve is not fully engaged. • Possibly plugged steer ports or damaged cylinder packing. Inspect, repair or replace steer cylinder.
• No drive function from platform.	• Platform low (creep) speed drive control relay is bad. • No hydraulic fluid flow available to the drive motors. • Diverter valve not fully shifted. • Drive motors are damaged. • Drive valve spool is stuck. • Low speed flow controls are closed.	• Ensure platform drive speed control relay is working properly. Repair or replace. • Test for available fluid flow at the drive motors. • Inspect, repair or replace. • Inspect, repair or replace. • Manually engage and check for proper operation. Replace if faulty. • Adjust for proper speed.

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• No lift or extend function.	• Maxi-Reach system in effect.	• Retract and/or lower boom to reset Maxi-Reach system.
	• Maxi-Reach diverter valve.	• Replace Maxi-Reach diverter valve.
• When extending, boom retracts all the way.	• Maxi-Reach diverter valve is sticking.	• Replace Maxi-Reach diverter valve.
• No lift function from platform.	• Mechanical failure.	• Check that ground and platform boom control levers return to their neutral position.
	• Lift spool valve stuck.	• Manually engage lift (hoist) spool and check for operation.
	• Defective counterbalance valve.	• Check counterbalance valve for foreign material or internal damage; replace if damaged.
	• Faulty cylinder.	• Plugged lines, cylinder ports or damaged cylinder packings. Inspect, repair or replace cylinder.
	• Pump not coming on stroke.	• Check pump stroke circuit.
	• Drive enable valve energized.	• Check drive enable valve for voltage/ open cartridge.

TROUBLESHOOTING CHART (CONTINUED)

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

TROUBLESHOOTING CHART (CONTINUED)

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

TROUBLESHOOTING CHART (CONTINUED)

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

TROUBLESHOOTING CHART (CONTINUED)

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

TROUBLESHOOTING CHART (CONTINUED)

Problem	Probable Cause	Solution
• Low speed drive valve inoperative in low speed drive mode only.	• Valve spool stuck.	• Check for a sticking spool; replace if necessary.
	• High speed drive valve coil.	• Check resistance in the high speed drive valve coil. Each coil should have 4 ohms resistance, if valve has less than 4 ohms resistance, excessive voltage will feed across the coil to the opposite coil of the low speed valve trying to be operated. Thus both coils are trying to actuate. Replace high speed drive coil if necessary.
	• Flow controls closed or plugged.	• Clean or replace flow control valve.
• Unit will not go into high speed drive with boom retracted and lowered.	• High pressure filter dirty.	• Replace filter element.
	• Hi speed drive valve faulty.	• Repair or replace if necessary.
	• Boom limit switches faulty.	• Check wiring or replace switches.
• Maxi-Reach test failure. **First, contact factory!**	• One or both Maxi-Reach diverter valves.	• Replace the Maxi-Reach diverter valve(s).
	• Maxi-Reach spring pack assembly.	• Replace Maxi-Reach spring pack assembly.

ADDENDUM

Addendum

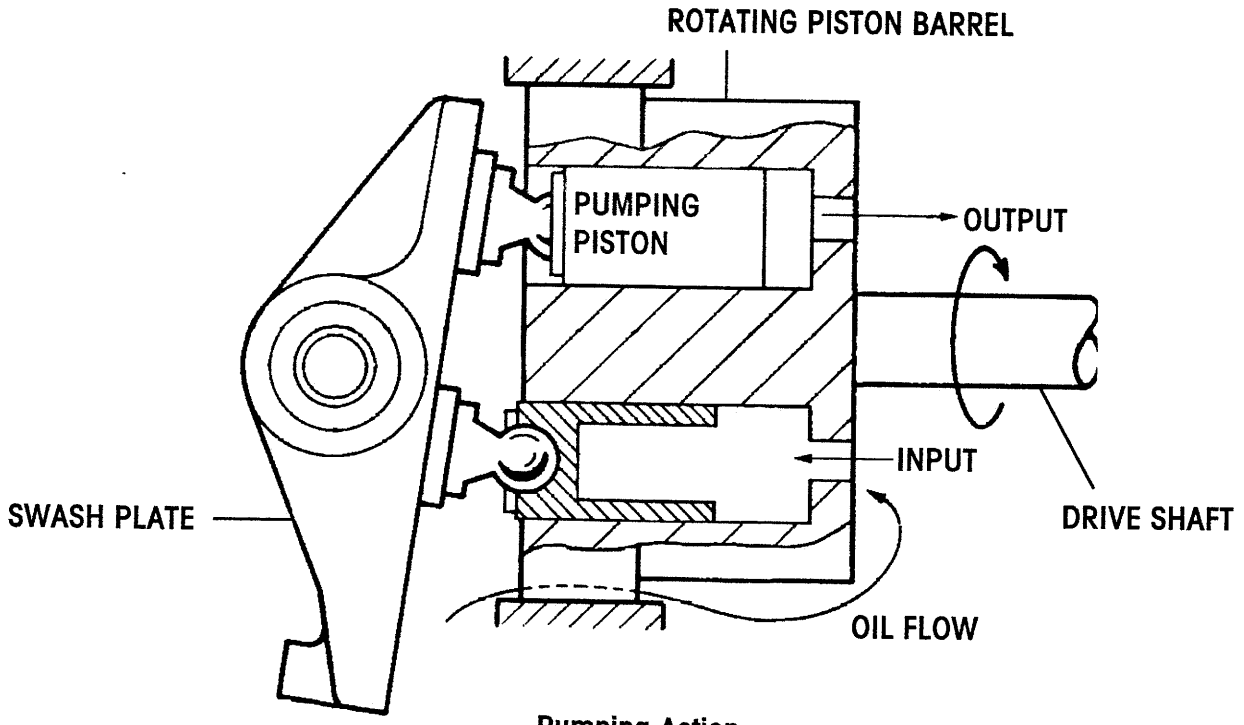
Main Hydraulic Pump AD-3
Hydraulic Pump Adjustment AD-5
Hydraulic Filter AD-5
Return Filter AD-5
High Pressure Filter AD-5

MAIN HYDRAULIC PUMP (CURRENT PRODUCTION)

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

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

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



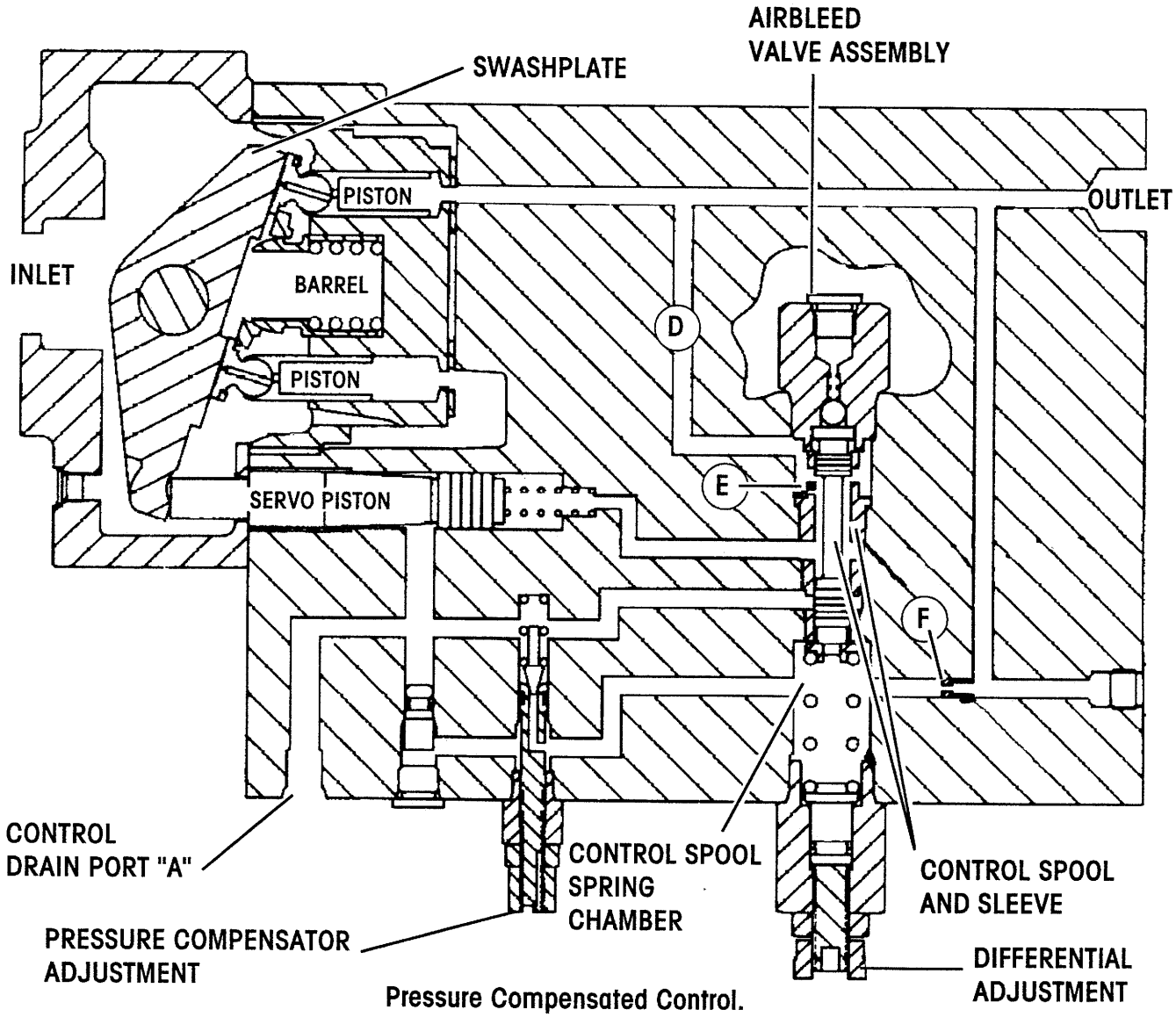
Pumping Action.

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.

HYDRAULIC FILTER

There are two hydraulic filters for machines that use a current production hydraulic pump: a return filter and a high pressure filter. They are both located near the hydraulic tank (see Illustrated Parts Catalog, if necessary).

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.

MAIN PUMP REPLACEMENT (CURRENT PRODUCTION)

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 formaximum 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.

INDEX

Index

A

Accumulator 2-19
Annual Service 6-5
Arm Pin and Needle Bearing Replacement 5-29
Axle Disconnect Cylinder 5-9

B

Base Boom Wear Pads Replacement 5-13
Base End Cylinder Pin Replacement 5-5
Batteries 6-4
Battery 4-3
Battery Maintenance (In Storage) 4-3
Battery Maintenance (In Use) 4-3
Battery Replacement 4-4
Battery Troubleshooting 4-4
Bench Replacement Of Lift Cylinder Seals . 5-19
Bleeding the Platform Leveling Circuit 5-28
Boom 5-12
Boom Component Locator xii
Boom Cylinders 6-5
Boom Lift Cylinder 5-16
Boom Lift Diverter Valve Replacement 5-29
Boom Lift System 2-18
Boom Pivot Pin and Bushing Replacement 5-12
Boom Telescope (Extend) System 2-18
Boom Telescope Cylinder 5-21
Boom Telescope Diverter Valve Replacement 5-28
Brake Needle Valve 2-12

C

Changing Tires 5-3
Chassis Bolts 6-4
Checklist 6-4,-5
Checks the Maxi-Reach Boom Extend Function. 2-16
Circuit Breaker 4-6
Control Valves 6-4
Counterbalance Valve Inspection 5-20,-25
Cylinders 6-4

D

Daily Operational Checklist 6-6
Daily Service 6-4
Directional Control Valve 2-21
Directional Control Valves 2-11,-16,-19
Double Counterbalance Valve 2-24
Double Pilot Operated Check Valve 2-27
Double Relief Manifold 2-13, 3-5
Drive/ Brake Valve Assembly 2-12, 3-4
Drive Cushion Solenoid Valve 2-13
Drive Enable Valve 3-5
Drive Motors 3-3
Drive System Components 3-3
Drive/ Steer/ Selector Manifold Assembly .. 2-11,-29

E

Electrical Schematics: A-2
Electrical System 4-3
Emergency Lowering 1-6
Emergency Pump 1-5, 2-11
Emergency Pump Adjustment 2-11
Emergency Stop Button 4-5
Emergency System and Procedures 1-5
Engine Oil Pressure Gauge 4-7

F

First Three Months of Operation 6-3
Flexible Hoses 6-5
Flow Control Pressure Compensated Valve 2-21
Flow Control Valve 2-24,3-4
Fluid Recommendations 2-5
Foot Pedal Switch 4-7
Four Year Interval Service 6-5
Front Wheel Motor 3-3

G

General Maintenance Tips 6-3
General Troubleshooting Tips 7-3
Ground Control Box 4-6

Index (Continued)

H

Handling Precautions 2-5
High Pressure Filter 2-13, 6-5
High Pressure Filter Element 2-13
Horn 4-9
Hoses and Cables 5-11
Hour Meter 4-6
Hydraulic Drive Motor 3-3
Hydraulic Fluid 2-5, 6-5
Hydraulic Fluid Analysis 2-5
Hydraulic Fluid Reservoir 2-13
Hydraulic Fluid Tank 6-5
Hydraulic Manifold Valve Assembly 3-4
Hydraulic Pump 2-9
Hydraulic Reservoir Maintenance 2-13
Hydraulic Schematics: A-2
Hydraulic Swivel 2-29
Hydraulic System 6-4
Hydraulic System Components 2-9

I

Ignition Switch 4-5
Introduction vi

K

Key Switch 4-6

L

Level Control Valve 2-27
Level Cylinder Seal Replacement 5-27
Lift Cylinder 2-19
Lift Cylinder Base End Pin Replacement ... 5-16
Lift Cylinder Rod End Pin Replacement 5-17
Lift Cylinder Seal Replacement 5-18
Light Emitting Diode 4-5
Limit Switches 4-9
Lubrication Chart xiv
Lubrication Diagram xv

M

Machine Component Locator ix
Machine Specifications viii
Main Hydraulic Pump 2-9
Main Hydraulic Pump Adjustment 2-10
Maintenance Schedule 6-3
Master Level Cylinder 2-28
Maxi-Reach System 5-28
Maxi-Reach Set Up 2-16
Maxi-Reach System 2-14
Maxi-Reach Tests 2-16
Mechanical Components 5-3
Mid Boom Rear Wear Pads Replacement .. 5-14
Mid Boom Top Front Wear Pad Replacement 5-14
Miscellaneous Equipment 5-11
Monthly Operational Checklist 6-9
Monthly Service 6-4
Motion Control Valve 2-12, 3-4
Movement Alarm 4-7
Moving Anchor Wear Pad Replacement 5-15

P

Pendant Control 4-7
Pivot Pins 6-4
Pivot Pins and Bearings 6-5
Pivot Pins and Grease Fittings 6-4
Platform 5-11
Platform Component Locator xiii
Platform Control Box 4-5
Platform Drive Control Handle 3-5
Platform Level Cylinder Pin Replacement .. 5-26
Platform Level Cylinders 5-26
Platform Leveling System 2-25
Platform Mounting 6-5
Platform Rails 6-4
Platform Rotate System 2-25
Platform Rotator Manifold 2-26
Pressure Reducing Valve 2-13, 3-5
Push Button 4-5,-6

Index (Continued)

R

Rear Axle Assembly 3-4, 5-8
Rear Axle Assembly Replacement 5-8
Rear Axle Brake Adjustment 5-9
Rear Axle Drive Motor 5-7
Rear Axle Drive Motor Replacement 5-7
Regeneration Valve 2-22
Relays 4-9
Relief Valves 2-28
Rotary Actuator 2-25
Rotary Actuator Maintenance 2-25
Rotate Control Valve 2-25
Routine Servicing 6-3

S

Safety Gate 6-4
Semi-Annual Operational Checklist 6-11
Semi-Annual Service 6-5
Sequence Valves 2-22
Shuttle Valve 2-12,-21,3-4
Shuttle Valve Assembly 2-19,-21,-22
Slave Level Cylinder 2-28
Solenoid Valve 3-5
Steer Cylinder 5-5, 2-27
Steer Cylinder Pins 5-5
Steer Cylinder Seal Replacement 5-5
Steer System 2-29
Steer System Maintenance 2-29
Steering 6-4
Structural Examination 6-5
Superstructure 5-10
Superstructure Component Locator xi
Superstructure Swing System 2-23
Swing Drive Motor/ Reducer Assembly 2-24
System Flushing Procedure 2-6

T

Telescope (Extend) Cylinders 2-22
Telescope Boom Cylinder Pins Replacement 5-21
Telescope Cylinder Installation 5-24
Telescope Cylinder Removal 5-22
Telescope Cylinder Seal Replacement 5-23
Telescope Cylinder Separation 5-23
Test All Machine Systems 6-4
Test Set-Up 2-16
Tie Rod Assembly 5-6
Tie Rod Assembly Replacement 5-6
Tilt Alarm 4-8
Tilt Alarm Horn 4-9
Tilt Alarm Sensor Adjustment 4-8
Tilt Alarm Test 4-8
Tip Boom Top Front Wear Pad Replacement 5-15
Tire Condition 6-4
Tires 5-3
Toggle Switch 4-5,-6,-7
Transporting the Unit 1-3
Troubleshooting Chart 7-4
Two Speed Valve 2-19

U

Undercarriage Component Locator x
Unloading Procedures 1-4
Unpowered Emergency Movement 1-5

V

Volt Meter 4-6

W

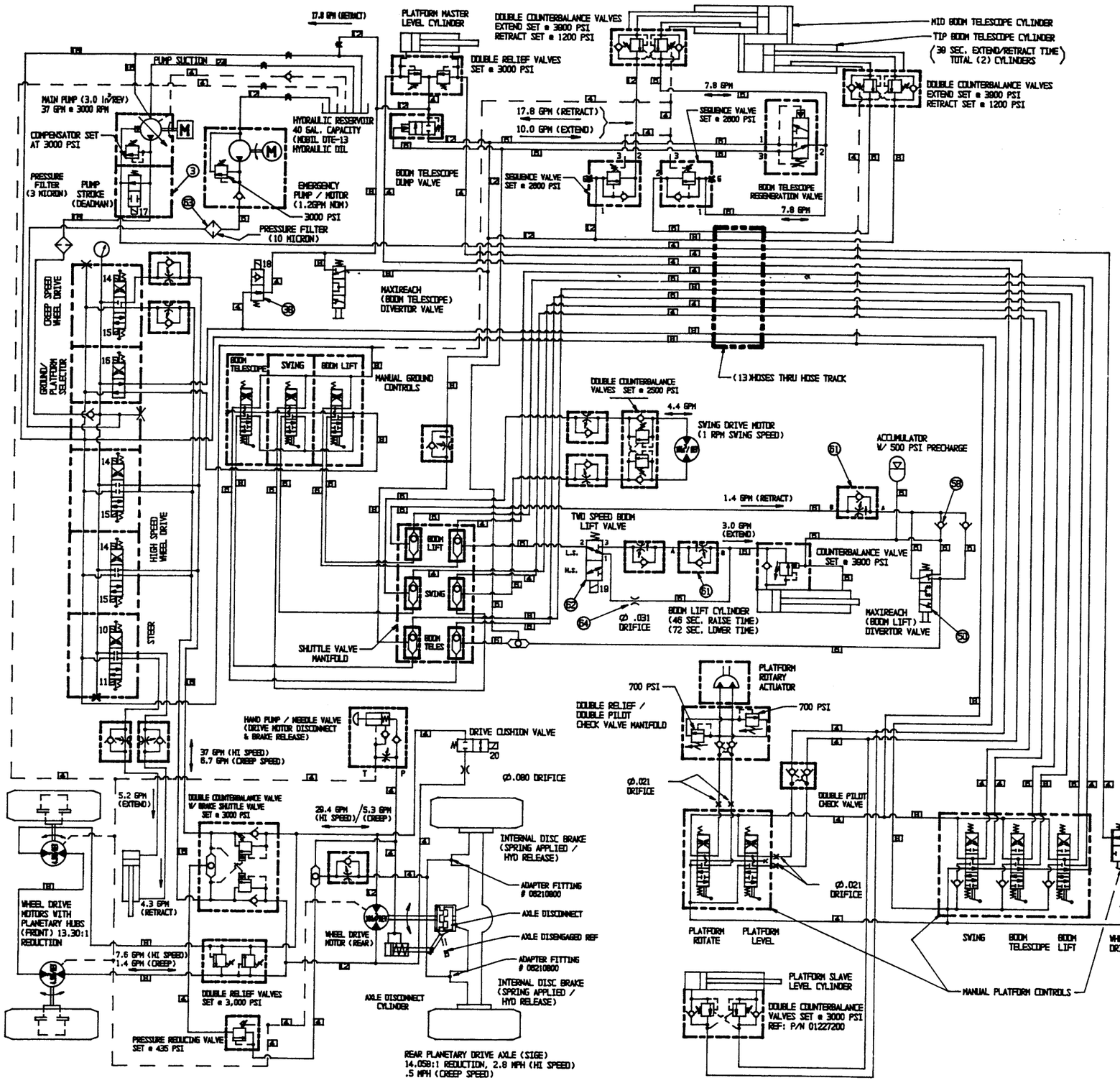
Wear Pads 5-13
Wheel Motor Assembly 5-4
Wheels and Lug Nuts 5-3

APPENDIX

Table of Contents, Appendix

Hydraulic Schematics:
Deutz F4L1011, Ford VSG-423, Isuzu C240, Wisconsin 65 HP... SES-231247-0
Hatz 3L40C SES-231319-0

Electrical Schematics:
Ford VSG-423 ..... SBS-231309-0
Hatz 3L40C SDS-231308-0
Deitz L1011 ..... SDS-230656-0



KEY - LINE SIZES
[4] 1/4 I.D HOSE
[5] 3/8 I.D HOSE
[8] 1/2 I.D HOSE
[12] 3/4 I.D HOSE
[16] 1" I.D HOSE
[20] 1 1/2 I.D HOSE

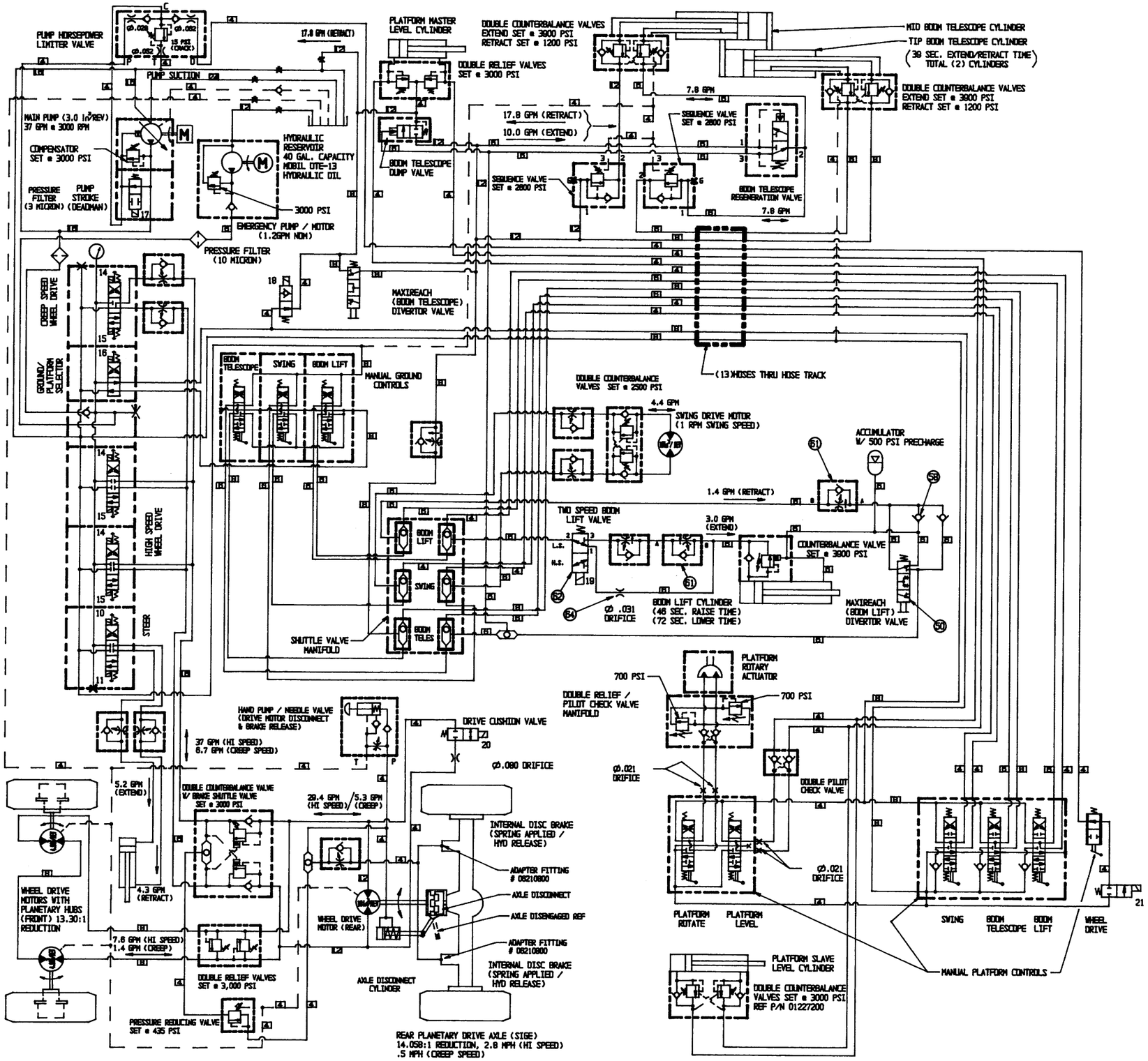
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& FOLLOWING ENGINES: FORD 2.3L
WISC 65 HP
DEUTZ F4L1011
ISUZU C240

SIMON AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: HYDRAULIC SCHEMATIC / T-60

REVISION: D / 8-9-93

DRWG. NO. E-2312470



KEY - LINE SIZES
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[6] 3/8 I.D HOSE
[8] 1/2 I.D HOSE
[12] 3/4 I.D HOSE
[16] 1" I.D HOSE
[24] 1 1/2 I.D HOSE

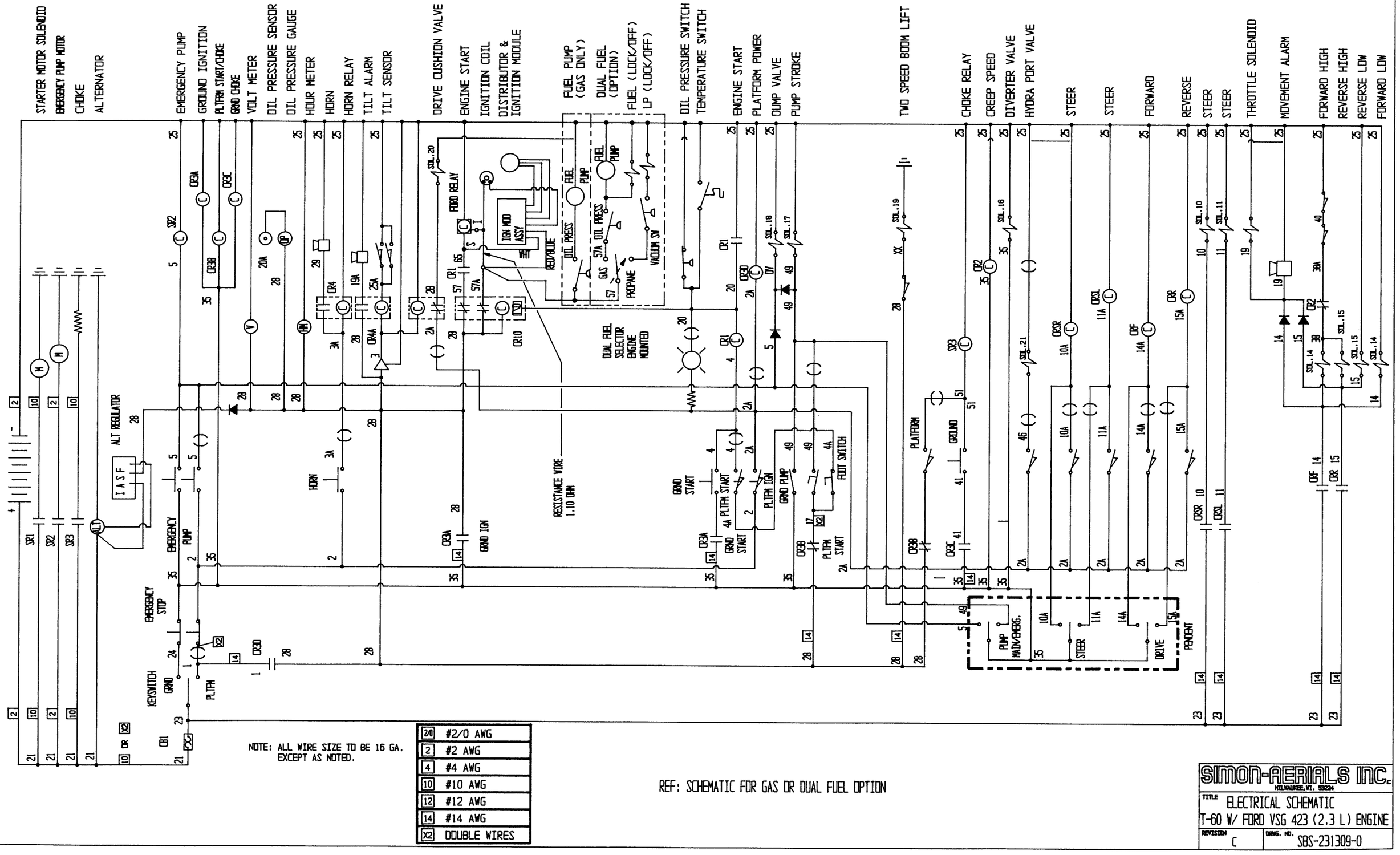
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SIMON AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: HYDRAULIC SCHEMATIC / T-60

REVISION: D / 8-9-93

DRWG. NO. E-2313190



NOTE: ALL WIRE SIZE TO BE 16 GA. EXCEPT AS NOTED.

2/0	#2/0 AWG
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4	#4 AWG
10	#10 AWG
12	#12 AWG
14	#14 AWG
X2	DOUBLE WIRES

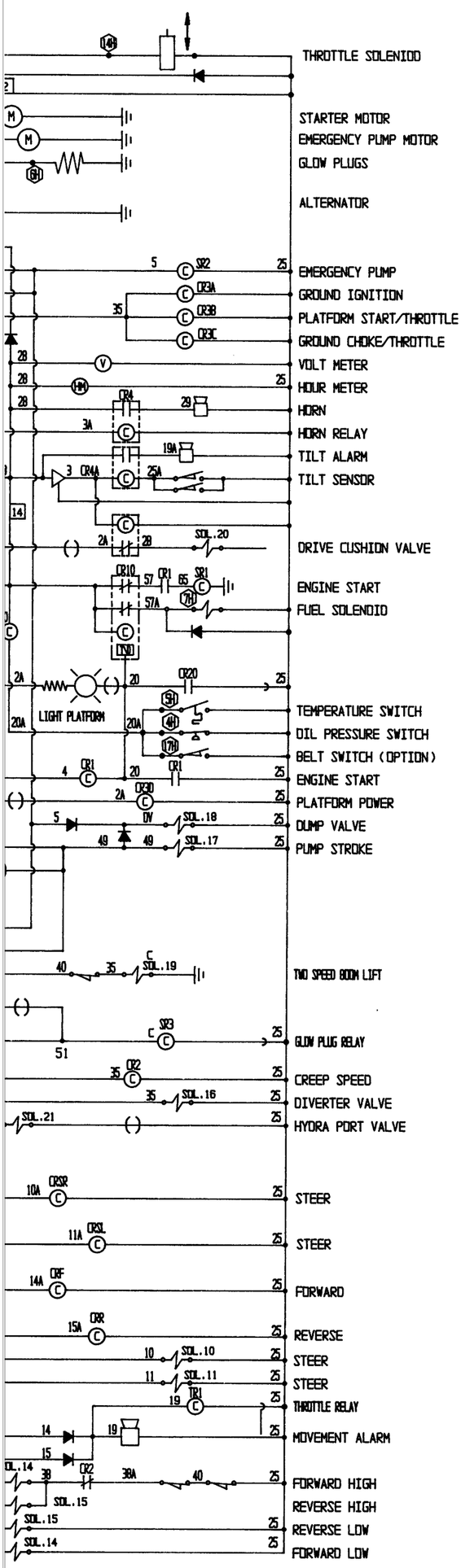
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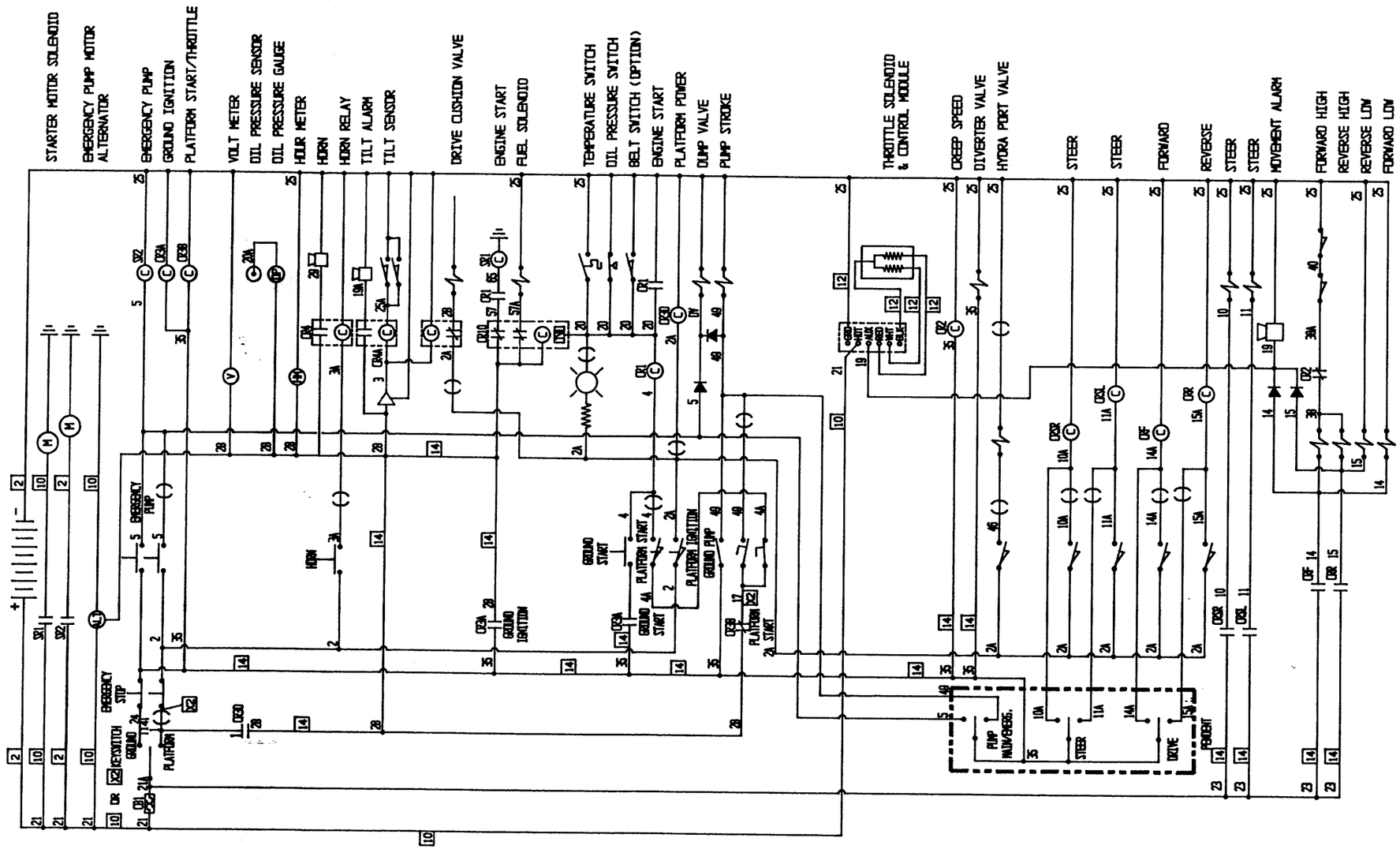
SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: ELECTRICAL SCHEMATIC
T-60 W/ FORD VSG 423 (2.3 L) ENGINE

REVISION: C

DRWG. NO.: SBS-231309-0


THROTTLE SOLENIOD
STARTER MOTOR
EMERGENCY PUMP MOTOR
GLOW PLUGS
ALTERNATOR
EMERGENCY PUMP
GROUND IGNITION
PLATFORM START/THROTTLE
GROUND CHOKE/THROTTLE
VOLT METER
HOUR METER
HORN
HORN RELAY
TILT ALARM
TILT SENSOR
DRIVE CUSHION VALVE
ENGINE START
FUEL SOLENOID
LIGHT PLATFORM
TEMPERATURE SWITCH
OIL PRESSURE SWITCH
BELT SWITCH (OPTION)
ENGINE START
PLATFORM POWER
DUMP VALVE
PUMP STROKE
TWO SPEED BOOM LIFT
GLOW PLUG RELAY
CREEP SPEED
DIVERTER VALVE
HYDRA PORT VALVE
STEER
STEER
FORWARD
REVERSE
STEER
STEER
THROTTLE RELAY
MOVEMENT ALARM
FORWARD HIGH
REVERSE HIGH
REVERSE LOW
FORWARD LOW



NOTE: THIS SCHEMATIC IS APPLICABLE TO THE T-40 MODEL WITH SERIAL NUMBERS ABOVE APA00122 AND ALL T-60

NOTE: ALL WIRE SIZE TO BE 16 GA. EXCEPT AS NOTED.

2/0	#2/0 AWG
2	#2 AWG
4	#4 AWG
10	#10 AWG
12	#12 AWG
14	#14 AWG
X2	DOUBLE WIRES

REF: T-40 & T-60 W/ DEUTZ L1011 ENGINE

SIMON-AERIALS INC.
MILWAUKEE, WI. 53224

TITLE: ELECTRICAL SCHEMATIC

REVISION: C

DRWG. NO.: SDS-2306560