# Service and Maintenance Manual

# Model
# 450A
# 450AJ

*3120869*
**February 16, 2000**

MidWestTech | JLG 450A, 450AJ Boom Lift Service Manual | Publication 3120869

Order the manual at mid-west-tech.com >

# TABLE OF CONTENTS


**SUBJECT - SECTION, PARAGRAPH** **PAGE NO.**

**SECTION A - INTRODUCTION - MAINTENANCE SAFETY PRECAUTIONS**

A General ..... A-1
B Hydraulic System Safety ..... A-1
C Maintenance ..... A-1

**SECTION 1 - SPECIFICATIONS**

1.1 Capacities ..... 1-1
1.2 Component Data ..... 1-1
1.3 Tires ..... 1-1
1.4 Specifications and Performance Data ..... 1-1
1.5 Torque Requirements ..... 1-2
1.6 Lubrication ..... 1-2
1.7 Pressure Settings - PSI (Bar) ..... 1-3
1.8 Major Component Weights ..... 1-3
1.9 Critical Stability Weights ..... 1-3
1.10 Cylinder Specifications ..... 1-3
1.11 Function Speeds (in Seconds) ..... 1-7
1.12 Serial Number Location ..... 1-7

**SECTION 2 - PROCEDURES**

2.1 General ..... 2-1
2.2 Service and Guidelines ..... 2-1
2.3 Lubrication and Information ..... 2-2
2.4 Cylinders - Theory of Operation ..... 2-3
2.5 Valves - Theory of Operation ..... 2-4
2.6 Boom Maintenance ..... 2-4
2.7 Drift Test ..... 2-7
2.8 Cylinder Checking Procedure ..... 2-8
2.9 Cylinder Repair ..... 2-9
2.10 Mid and Lower Lift Cylinder Bleeding Procedure ..... 2-16
2.11 Hydraulic Pump (gear) ..... 2-16
2.12 Swing Bearing ..... 2-23
2.13 Worm gear ..... 2-27
2.14 Boom Synchronizing Procedure ..... 2-27
2.15 Extend-A-Reach ..... 2-28
2.16 Adjustment Procedure For Lockout Valve ..... 2-28
2.17 Torque Hub (Prior to S/N 39594) ..... 2-29
2.18 Torque Hub (S/N 39594 to Present) ..... 2-34
2.19 Drive Brake (Ausco) ..... 2-45
2.20 Boom Limit Switches ..... 2-48
2.21 Lift Up and Platform Level Down Disable Switch ..... 2-48
2.22 Throttle Checks and Adjustments - Deutz Engine ..... 2-49
2.23 Drive and Steer Controller ..... 2-51
2.24 Lift and Swing Controller ..... 2-53
2.25 Function Control ..... 2-53
2.26 Tilt Alarm Switch ..... 2-55
2.27 Pressure Setting Procedures ..... 2-55
2.28 Hydraulic Component Start-Up Procedures and Recommendations ..... 2-59
2.29 Semi-Track ..... 2-61
2.30 Preventive Maintenance and Inspection Schedule ..... 2-63




MidWestTech | JLG 450A, 450AJ Boom Lift Service Manual | Publication 3120869 Order the manual at mid-west-tech.com >

## TABLE OF CONTENTS (continued)

**SUBJECT - SECTION, PARAGRAPH** **PAGE NO.**

**SECTION 3 - TROUBLESHOOTING**


3.1 General ..... 3-1
3.2 Troubleshooting ..... 3-1
3.3 Hydraulic Circuit Checks ..... 3-1


## LIST OF FIGURES

**FIGURE NO. TITLE** **PAGE NO.**


1-1. Lubrication Diagram ..... 1-4
1-2. Serial Number Locations ..... 1-7
1-3. Torque Chart ..... 1-8
2-1. Location of Components - Boom Removal ..... 2-4
2-2. Location of Components - Removal of Telescope Cylinder ..... 2-5
2-3. Location of Components - Front Wear Pads ..... 2-6
2-4. Boom Prop Configuration ..... 2-10
2-5. Cylinder Barrel Support ..... 2-11
2-6. Capscrew Removal ..... 2-11
2-7. Cylinder Rod Support ..... 2-11
2-8. Tapered Bushing Removal ..... 2-12
2-9. Gar-Max Bearing Installation ..... 2-12
2-10. Rod Seal Installation ..... 2-13
2-11. Wiper Seal Installation ..... 2-13
2-12. Installation of Head Seal Kit ..... 2-13
2-13. Piston Seal Kit Installation ..... 2-14
2-14. Tapered Bushing Installation ..... 2-14
2-15. Seating the Tapered Bearing ..... 2-15
2-16. Poly-Pak Piston Seal Installation ..... 2-15
2-17. Rod Assembly Installation ..... 2-15
2-19. Swing Bearing Feeler Gauge Check ..... 2-23
2-18. Swing Bearing Installation ..... 2-24
2-20. Swing Bearing Tolerance Measuring Point ..... 2-25
2-21. Swing Bearing Torquing Sequence ..... 2-26
2-22. Synchronizing Valve ..... 2-27
2-23. Extend-A-Reach ..... 2-28
2-24. Front Axle ..... 2-29
2-25. Ring Gear/Cover ..... 2-29
2-26. Carrier ..... 2-30
2-27. Torque Hub (Prior to S/N 39594) - Exploded View ..... 2-31
2-28. Torque Hub (Prior to S/N 39594) - Cutaway View ..... 2-32
2-29. Torque Hub (S/N 39594 to Present) - Cutaway View ..... 2-35
2-30. Cluster Gear Punch Marks ..... 2-43
2-31. Drive Brake (Ausco) ..... 2-46
2-32. Switch Adjustment ..... 2-48
2-33. Functional Check ..... 2-48
2-34. Addco Adjustments - Deutz ..... 2-49
2-35. Drive and Steer Adjustment ..... 2-52
2-36. Lift and Swing Adjustment ..... 2-53
2-37. Function Control Card Adjustment ..... 2-54
2-38. Tilt Switch Adjustment ..... 2-55
2-39. Main Valve (Proportional Controls) - Sheet 1 ..... 2-56
2-40. Main Valve (Proportional Controls) - Sheet 2 ..... 2-57
2-41. Valve Location - Chassis ..... 2-58




MidWestTech | JLG 450A, 450AJ Boom Lift Service Manual | Publication 3120869 Order the manual at mid-west-tech.com >

## LIST OF FIGURES (continued)


| FIGURE NO. | TITLE | PAGE NO. |
|---|---|---|
| 3-1. | Electrical Components Installation - Sheet 1 | 3-20 |
| 3-2. | Electrical Components Installation - Sheet 2 | 3-21 |
| 3-3. | Electrical Schematic - Boom, Turntable, Chassis - Deutz - Sheet 1 | 3-22 |
| 3-4. | Electrical Schematic - Boom, Turntable, Chassis - Deutz - Sheet 2 | 3-23 |
| 3-5. | Electrical Schematic - Platform -Deutz - Sheet 1 | 3-24 |
| 3-6. | Electrical Schematic - Platform -Deutz - Sheet 2 | 3-25 |
| 3-7. | Hydraulic Schematic - Proportional Controls | 3-26 |


## LIST OF TABLES


| TABLE NO. | TITLE | PAGE NO. |
|---|---|---|
| 1-1 | Torque Requirements | 1-2 |
| 1-2 | Hydraulic Oil | 1-2 |
| 1-3 | Lubrication Specifications | 1-2 |
| 1-4 | Mobil EAL Envirosyn H 46 Specs | 1-2 |
| 1-5 | Major Component Weights | 1-3 |
| 1-6 | Critical Stability Weights | 1-3 |
| 1-7 | Cylinder Specifications | 1-3 |
| 1-8 | Lubrication Chart | 1-5 |
| 2-1 | Cylinder Head and Tapered Bushing Torque Specifications | 2-16 |
| 2-2 | Holding Valve Torque Specification | 2-16 |
| 2-3 | Hydraulic Pump Bolt Torque Chart | 2-22 |
| 2-4 | Position Controller Truth Table | 2-49 |
| 2-5 | Adjustment Chart | 2-62 |
| 2-6 | Preventive Maintenance and Inspection Schedule | 2-64 |
| 3-1 | Platform Assembly - Troubleshooting | 3-2 |
| 3-2 | Boom Assembly - Troubleshooting | 3-3 |
| 3-3 | Turntable Assembly - Troubleshooting | 3-8 |
| 3-4 | Chassis Assembly - Troubleshooting | 3-9 |
| 3-5 | Hydraulic System - Troubleshooting | 3-15 |
| 3-6 | Electrical System - Troubleshooting | 3-18 |




MidWestTech | JLG 450A, 450AJ Boom Lift Service Manual | Publication 3120869 Order the manual at mid-west-tech.com >

# SECTION 1. SPECIFICATIONS

## 1.1 CAPACITIES

Fuel Tank - 62.5 liters

Hydraulic Oil Tank - 106 liters

Torque Hub - 0.5 liters

***NOTE:*** *Torque hubs should be one half full of lubricant.*

Engine Crankcase (Ford LRG425) - 4.5 L

Engine Crankcase (Deutz F3M1011F) - 6 L

## 1.2 COMPONENT DATA

### Engine - Deutz F3M1011F

Fuel - Diesel

No. of Cylinders - 3

BHP at Max. RPM - 48

RPM Setting (No Load) - Mid - 1500

## 1.3 TIRES

12x16.5

- Pneumatic - 6 Bar
- Weight: 58 kg

12x16.5

- Foam-Filled
- Weight: 149 kg

33/1550x16.5

- Pneumatic - 6 Bar
- Weight: 61 kg

33/1550x16.5

- Foam-Filled
- Weight: 179 kg

33/16LL x 16.1

- Pneumatic - 3 bar
- Weight: 41.5 kg

33/16LL x 16.1

- Foam-Filled
- Weight: 193 kg

## 1.4 SPECIFICATIONS AND PERFORMANCE DATA

Max. Platform Height - 13.8 M

Max. Horizontal Reach - 7.3 M

Unrestricted Rated Capacity - 230kg

Maximum Capacity - 230 kg

Maximum Tire Load (450A) - 3230 kg

Maximum Tire Load (450AJ) - 3357 kg

Overall Width - 1.98 m

Tailswing - Zero

Stowed Height - 2.24 m

Stowed Length - 6.15 m

Wheelbase - 1.98 m

Ground Clearance - 28 cm

Platforms - 0.76m x 1.22M
0.76m x 1.52M
0.76m x 1.83M

Rated Gradeability - 2WD -30%
4WD - 40%

System Voltage - 12 Volts

Max. Hydraulic System Operating Pressure - 207 bar

Travel Speed (2WD) - 7.2 kph

Travel Speed (4WD) - 3.6 mph

Ground Bearing Pressure (450A)

12x16.5 pneu. - 3.23 kg/cm$^2$
12x16.5 FF - 3.93 kg/cm$^2$
33/1550x16.5 pneu. - 2.46 kg/cm$^2$
33/1550x16.5 FF - 3.51 kg/cm$^2$

Ground Bearing Pressure (450AJ)

12x16.5 pneu. - 3.37 kg/cm$^2$
12x16.5 FF - 4.07 kg/cm$^2$
33/1550x16.5 pneu. - 2.53 kg/cm$^2$
33/1550x16.5 FF - 3.65 kg/cm$^2$



MidWestTech | JLG 450A, 450AJ Boom Lift Service Manual | Publication 3120869 Order the manual at mid-west-tech.com >

# SECTION 3. TROUBLESHOOTING

## 3.1 GENERAL

This section contains troubleshooting information to be used for locating and correcting most of the operating problems which may develop. If a problem should develop which is not presented in this section or which is not corrected by listed corrective actions, technically qualified guidance should be obtained before proceeding with any maintenance.

## 3.2 TROUBLESHOOTING

The troubleshooting procedures applicable to the aerial platform are listed and defined in Tables 3-1 through 3-6. As an aid to table use, the aerial platform is divided into four major groups, each covered separately within this section. These groups are as follows: elevation system, chassis assembly, hydraulic system and electrical system.

Each malfunction within an individual group or system is followed by a listing of probable causes which will enable determination of the applicable remedial action. The probable causes and the remedial action should, where possible, be checked in the order listed in the tables.

It should be noted that there is no substitute for a thorough knowledge of the equipment and related systems.

It should be recognized that the majority of the problems arising in the machine will be centered in the hydraulic and electrical systems. For this reason, every effort has been made to ensure that all likely problems in these areas are given the fullest possible treatment. In the remaining machine groups, only those problems which are symptomatic of greater problems which have more that one probable cause and remedy are included. This means that problems for which the probable cause and remedy may be immediately obvious are not listed in this section.

The first rule for troubleshooting any circuit that is hydraulically operated and electrically controlled is to determine if the circuit is lacking hydraulic oil and electrical control power. This can be ascertained by overriding the bypass valve (mechanically or electrically) so that oil is available to the function valve, then overriding the function valve mechanically. If the function performs satisfactorily, the problem exists with the control circuit.

## 3.3 HYDRAULIC CIRCUIT CHECKS

The reference for improper function of a hydraulic system, where the cause is not immediately apparent, should be the Troubleshooting Chart. The best place to begin the problem analysis is at the power source (pump). Once it is determined that the pump is serviceable, then a systematic check of the circuit components, beginning with the control, would follow. For aid in troubleshooting, refer to the Illustrated Parts Manual for hydraulic diagrams of the various circuits



MidWestTech | JLG 450A, 450AJ Boom Lift Service Manual | Publication 3120869 Order the manual at mid-west-tech.com >

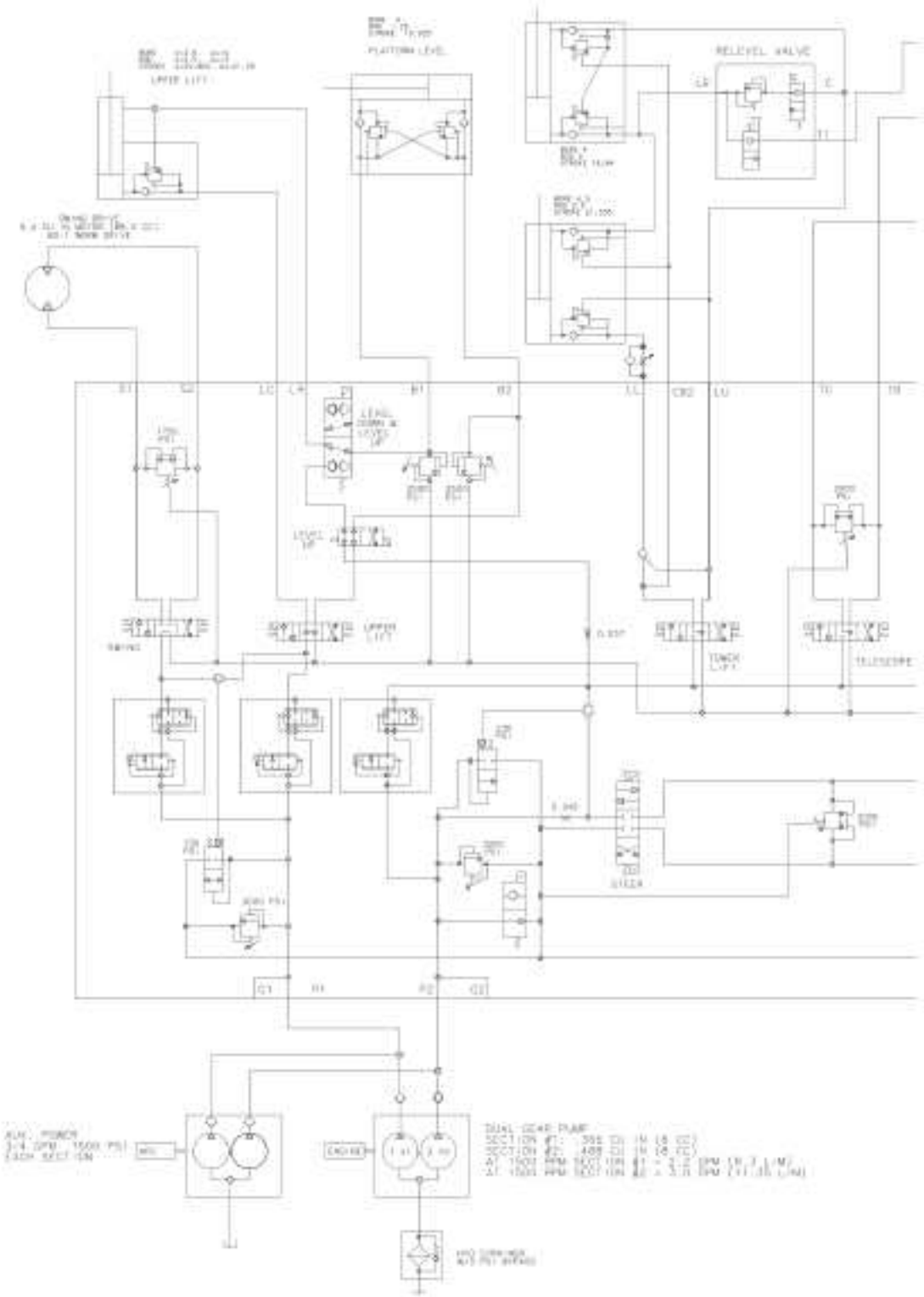


**Figure 3-7. Hydraulic Schematic - Proportional Controls (Sheet 1 of 6)**



MidWestTech | JLG 450A, 450AJ Boom Lift Service Manual | Publication 3120869 Order the manual at mid-west-tech.com >