Service and Maintenance Manual

Model
10VP
15VP
20VP

3120728
June 14 2001

ANSI

MidWestTech | JLG 10VP, 15VP, 20VP Vertical Mast Service Manual | Publication 3120728
Order the manual at mid-west-tech.com >

SUBJECT - SECTION, PARAGRAPH — PAGE NO.

SECTION INTRODUCTION - - MAINTENANCE SAFETY PRECAUTIONS

A General ..... a
B Hydraulic System Safety ..... a
C Maintenance ..... a
Effectivity Changes c

SECTION 1 - SPECIFICATIONS

1.1 Capacities 1-1
1.2 Component Data 1-1
1.3 Performance Data 1-1
1.4 Torque Requirements 1-2
1.5 Lubrication 1-2
1.6 Hydraulic Pressure Adjustment 1-3
1.7 Cylinder Specifications 1-3
1.8 Serial Number Location 1-3

SECTION 2 - SERVICE PROCEDURES

2.1 General 2-1
2.2 Servicing And Maintenance Guidelines 2-1
2.3 Lubrication Information 2-3
2.4 Positioning Lift For Access To Components Located Under The Base Frame 2-4
2.5 Drive Motor Component Service Procedures 2-5
2.6 Platform Control Box Service Procedures 2-15
2.7 Battery Charger Assembly And Disassembly 2-20
2.8 Hydraulic Lift Cylinder - Removal, Inspection And Rebuild 2-23
2.9 Mast Assembly And Disassembly Procedures 2-26
2.10 Mast To Base Frame Installation 2-35
2.11 Mast Chains/cables And Sequencing Cables Adjustment 2-36
2.12 Sequence Cable Replacement Kit 2-38
2.13 Preventive Maintenance And Inspection Schedule 2-40

SECTION 3 - TROUBLESHOOTING

3.1 General 3-1
3.2 Troubleshooting Information 3-1
3.3 Hydraulic Circuit Checks 3-1
3.4 Electrical Circuit Checks 3-1
3.5 Troubleshooting Section - Table Of Contents 3-15
3.6 Ohm Ratings For Various Components 3-16
3.7 Main Power Circuit Troubleshooting 3-17
3.8 Drive Train Troubleshooting 3-20
3.9 Mast Troubleshooting 3-30
3.10 Hydraulic Leak Troubleshooting 3-41
3.11 Base Frame Components Troubleshooting 3-42

MidWestTech | JLG 10VP, 15VP, 20VP Vertical Mast Service Manual | Publication 3120728 Order the manual at mid-west-tech.com >

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE NO.
1-1.	Hydraulic Pressure Setting - Adjustment Screw Located at Base of Pump Motor	1-3
1-2.	Hydraulic Pressure Gauge Installation	1-3
1-3.	Torque Chart	1-4
1-4.	Lubrication Chart	1-5
2-1.	Accessing Machine Underside Components by Lifting with a Fork Truck	2-4
2-2.	Check Torque Limit Clutch - Torque Setting	2-5
2-3.	Torque Limit Clutch - Adjustment Components	2-6
2-4.	Brake Assembly Components	2-6
2-5.	Brake Armature Plate & Brake Disk Adjustment	2-7
2-6.	Manual Release Brake Cable Adjustment	2-8
2-7.	Drive Motor Assembly Removal	2-9
2-8.	Drive Motor Gear Box Assembly	2-10
2-9.	Gear/Pinion Shaft Assembly	2-11
2-10.	Drive Shaft Assembly	2-12
2-11.	Drive Motor Brush Location	2-13
2-12.	Drive Motor Brush Installation	2-13
2-13.	Correct/Incorrect Brush Spring Bracket Positions	2-14
2-14.	Platform Control Box Assembly (Exploded View)	2-15
2-15.	Platform Control - Circuit Board Component Wiring Connections	2-17
2-16.	Machine Positioned for Cylinder Removal	2-23
2-17.	Lift Cylinder Internal Component Assembly Cross-Section	2-25
2-18.	Mast Section - Assembly Reference	2-26
2-19.	10VP Mast Assembly	2-28
2-20.	15VP Mast Assembly	2-29
2-21.	20VP Mast Assembly	2-30
2-22.	Mast Chain/Cable/Sequence Cable Adjustment Components	2-37
3-1.	LED Battery/Fault Code Indicator Strip on Platform Controller Box	3-2
3-2.	Overview of Standard Electrical System	3-6
3-3.	VP Electrical Diagram. (VP Series - Standard)	3-8
3-4.	Overview of VP UL-EE Approved Optional Electrical System	3-10
3-5.	VP Electrical Diagram. (with UL-EE Approved Option)	3-12
3-6.	Hydraulic Diagram. (VP Series)	3-14

LIST OF TABLES

TABLE NO.	TITLE	PAGE NO.
1-1.	Machine GVW and Wheel Loads	1-1
1-2.	Hydraulic Oil Operating Range	1-2
1-3.	Lubrication Specifications	1-2
1-4	Machine Interlock Switch Operating Conditions	1-2
1-5.	Cylinder Specifications	1-3
1-6	Lubrication Intervals for Various Components	1-5
2-1	Chain Stretch Tolerance	2-2
2-2	VP Series Mast Component Features	2-26
2-3	Preventive Maintenance & Inspection Schedule	2-41
3-1	MC-1 WARNING CODES (Indicated by 3 beeps, then slow flashing LED's)	3-3
3-2	MC-1 ERROR CODES (Indicated by rapid LED flashing and periodic beep)	3-4
3-3	Ohm Ratings for Various Components	3-16
3-4	Unit will not Power Up From Ground Control	3-17
3-5	No Power At Platform Control	3-18
3-6	Won't Drive. (Platform Lowered or Elevated)	3-20
3-7	Elevation Switch Circuit Check	3-20
3-8	Brake Limit Switch Circuit Check	3-21

MidWestTech | JLG 10VP, 15VP, 20VP Vertical Mast Service Manual | Publication 3120728 Order the manual at mid-west-tech.com >

3-9	Drive Motor/Circuit Check	3-21
3-10	Brake Switch/Circuit Check	3-21
3-11	Won't Drive with Platform Elevated	3-22
3-12	Tilt Sensor Circuit Check	3-22
3-13	PHP Limit Switch Circuit	3-23
3-14	Won't Climb Grade	3-24
3-15	Drives In Opposite Direction	3-25
3-16	Only Drives A Short Distance	3-26
3-17	E-Stop and Key Switch Circuit Check	3-27
3-18	Won't Drive Straight	3-28
3-19	Noise from Drive Assembly	3-29
3-20	Platform Will Not Lift Up Using Platform Control	3-30
3-21	Pump Circuit	3-31
3-22	Pump Valves Circuit	3-32
3-23	Platform Will Not Lower Using Platform Control	3-33
3-24	Unit Will Not Lift Up From Ground Control Toggle Switch	3-34
3-25	Unit Will Not Lower From Ground Control Toggle Switch	3-35
3-26	Platform Will Not Lower Manually	3-36
3-27	Platform Lift Up and Down Jerky	3-37
3-28	Mast Noisy when Lifting and Lowering	3-38
3-29	Platform (Mast) Won't Stay Elevated	3-39
3-30	Platform (Mast) Descends Too Slowly	3-40
3-31	Hydraulic Leak Troubleshooting	3-41
3-32	Caster Wheels Not Operating Freely	3-42
3-33	Pot Hole Protection (PHP) Bars Will Not Set	3-42

MidWestTech | JLG 10VP, 15VP, 20VP Vertical Mast Service Manual | Publication 3120728 Order the manual at mid-west-tech.com >

SECTION 1. SPECIFICATIONS

1.1 CAPACITIES

System Voltage

All VP Models –24 Volt DC (2 - 12 volt DC batteries)

Hydraulic Oil Reservoir

All VP Models – 5 qts. U.S. (4.7 ltr.)

1.2 COMPONENT DATA

Hydraulic Pump/Pump Motor Assembly

Pump Motor - 24 Volt DC motor

Pump Displacement –

10 & 15VP – .098 cu. in./rev. (1.6cc/rev.)

20VP – .049 cu. in./rev. (0.8cc/rev)

Pump Output (Max.) –

10 & 15VP - 1.20 gpm @ 2200 psi

20VP – 0.65 gpm @ 2200 psi

Hydraulic System Pressure Setting –

10 & 15VP - 1000 psi (68.95 bar)

20VP - 2500 psi (172.3 bar)

Rear Wheel Drive Motors

DriveMotors -

24 Volt DC w/perm. magnet

Right angle gear

Maintenance free sealed gear

Brake shaft and drive shaft.Integral to Motor

Parking Brake (must be released for pushing)

Batteries/Battery Charger

Batteries (2) – 12 Volt / 80 Amp Hour – Deep CycleMarine - RV

Battery Charger –

U.S.A./CAN. –120 Volt A.C. / 60 Hz input

Brazil - 220 Volt A.C./ 60 Hz input

24 volt, 10 amp output -

with 2 amp finish

Reset Circuit Breaker

Automatic Charge Circuit

Plug Interlock Circuit

1.3 PERFORMANCE DATA

Platform Capacity(All Platforms except Extendible)

10VP –350 lbs. (160 kg)

15VP –350 lbs. (160 kg)

20VP –350 lbs. (160 kg)

Extendible Platform Capacity

ANSI (U.S.) – 300 lbs. (136 kg)

CSA (CAN.) – 250 lbs. (114 kg)

Platform Size

Standard Platform – 26 in. x 26 in. (66cm) x (66cm)

Machine Height (In Stowed Position)

VP Series - 79 in. (201cm) height

Table 1-1.
Machine GVW and Wheel Loads

VP MODEL	CONFIG.	GVW (no load)	DRIVE WHEEL (ea) w/rated load	CASTER (ea) w/rated load	PSI (Drive)	PSI (Caster)
10VP	ANSI (U.S.)	930 lb. (422 kg)	424 lb.	216 lb.	76 psi	102 psi
	CSA (CAN.)	930 lb. (422 kg)	424 lb.	216 lb.	76 psi	102 psi
15VP	ANSI (U.S.)	1,355 lb. (615 kg)	604 lb.	249 lb.	108 psi	117 psi
	CSA (CAN.)	1,425 lb. (647 kg)	630 lb.	257 lb.	113 psi	121 psi
20VP	ANSI (U.S.)	1,910 lb. (867 kg)	750 lb.	400 lb.	134 psi	188 psi
	CSA (CAN.)	2,100 lb. (953 kg)	774 lb.	470 lb.	140 psi	220 psi

MidWestTech | JLG 10VP, 15VP, 20VP Vertical Mast Service Manual | Publication 3120728 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 operating problems on a VP Series Personnel Lift. 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 INFORMATION

Troubleshooting procedures applicable to the VP machine are listed and defined starting with Section 3.5, TROUBLESHOOTING SECTION - TABLE OF CONTENTS in this chapter of the manual.

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 than 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

(See Figure 3-6.)

The first reference for improper function of a hydraulic system, where the cause is not immediately apparent, should be the Hydraulic Diagram Circuit. 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, would follow.

NOTE: *For aid in troubleshooting, refer to Figure 3-6. for HYDRAULIC DIAGRAM circuit.*

3.4 ELECTRICAL CIRCUIT CHECKS

General

The drive system on the VP series machine requires a microprocessor controlled electrical circuit to operate smoothly and accurately. All platform control functions are relayed to various machine components (i.e. platform up/down, drive functions, etc.) through the (MC-1) microprocessor box (mounted under the battery charger support bracket).

To help diagnose any problems with the components associated with the microprocessor, the MC-1 is designed with an internal fault messaging system which is displayed by LED flash sequences on the platform controller. When operating normally the LED panel on the platform controller (center LED strip) indicates the battery voltage status using ten (10) green LEDs. If a malfunction occurs to any of the drive components, the platform controller, or the MC-1 unit itself, these LEDs will flash a fault code (Warning or Error type) to help locate the problem area. The possible causes of fault codes are outlined in the following sub-sections of this chapter, see Table 3-1 and Table 3-2.

NOTE: *For aid in troubleshooting electrical problem, refer to Figure 3-3. for an ELECTRICAL DIAGRAM of the various circuits. Also a pictorial overview of the Section, see Figure 3-2. "Pictorial Overview of VP Electrical System".*

MidWestTech | JLG 10VP, 15VP, 20VP Vertical Mast Service Manual | Publication 3120728 Order the manual at mid-west-tech.com >

3.9 MAST TROUBLESHOOTING

Platform Will Not Lift Up Using Platform Control

Overview Of Procedure

This procedure examines the complete pump motor, ground control and pump valves electrical circuits.

Check For These Obvious Conditions First:

- Battery voltage 24 volts. (Fully charge batteries)
- Platform loaded within maximum allowable capacity.
- Hydraulic oil is within it's specified operating temperature range.

Table 3-20. Platform Will Not Lift Up Using Platform Control.

STEP	ACTION	SPEC	YES	NO
1.	Will platform lift from ground control switch? Note: Key switch must be set to GRND to test this.	—	Go to Step 2	See (Figure 3-24)
2.	Does pump motor run?	—	Go to Step 3	See Pump Circuit Check (Table 3-21)
3.	Are the down and dump valves opening/closing properly? Note: If machine will not lift and hydraulic oil is visible flowing in the hydraulic tank, the dump valve is stuck in the open position.	—	Go to Step 4	See Pump Valves Circuit Check (Table 3-22)
4.	Is the pressure set properly on the pump?	—	Go to Step 5	Set to correct pressure specification per this Service Manual
5.	Is the lift cylinder OK?	—	Go to Step 6	Rebuild or Replace Lift Cyl.
6.	Are the mast sections operating freely?	—	Consult Factory	Check Mast, Rebuild if Necessary

MidWestTech | JLG 10VP, 15VP, 20VP Vertical Mast Service Manual | Publication 3120728 Order the manual at mid-west-tech.com >