W110, W130
Wheel Loader

Service Manual

Bur 6-81170

CASE CONSTRUCTION

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W110 and W130 Wheel Loader
Service Manual
6-81160

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NOTE: CNH America LLC reserves the right to make improvements in design or changes in specifications at any time without incurring any obligation to install them on units previously sold.

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106 – Right Speaker (Option)

Check Points	Reading	Possible Cause of Bad Reading
NOTE: *Disconnect connector from right speaker. Put master disconnect switch and ignition switch in ON position. Turn radio on. Put balance control for RH and LH speakers to center position.*		
Terminal for wire MRP to ground	Voltage	Bad circuit between the right speaker and the radio or a bad radio.
Terminal for wire MP to ground	Continuity	Bad circuit between the right speaker and the radio.
NOTE: *If the readings are good, replace the right speaker.*		

107 – Beacon Switch

Check Points	Reading	Possible Cause of Bad Reading
NOTE: *Put master disconnect switch in ON position.*		
Terminal for wire 110_B to ground	24 volts	Check fuse F2A.
NOTE: *Put the beacon switch in the ON position.*		
Terminal for wire 121_B to ground	24 volts	Bad beacon switch.

108 – Rotating Beacon

Check Points	Reading	Possible Cause of Bad Reading
Bulb	Continuity	Bad bulb.
Terminal for wire N_FCG or N_RCK to ground	Continuity	Bad ground circuit.
NOTE: *Put master disconnect switch and beacon switch in ON position.*		
Terminal for wire 121_C or 121_F to ground	24 volts	Bad circuit between the beacon and the beacon switch. Also check the beacon switch (107).
NOTE: *If readings are good replace the rotating beacon (100).*		

109 – Brake Lamp Pressure Switch

Check Points	Reading	Possible Cause of Bad Reading
NOTE: *Put master disconnect switch in ON position.*		
Terminal for wire 117_B to ground	24 volts	Check fuse EF1, also check wires 117_A and 117_B.
Terminal for wire 175_A to ground	0 volt	Bad brake lamp pressure switch.
NOTE: *Put ignition switch in ON position. Have another person press and hold down brake pedal.*		
Terminal for wire 175_A to ground	24 volts	Bad brake lamp pressure switch.

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SPECIAL TOOLS



B785789

OEM1239 (CAS10280) FLOWMETER



B003638

CAS1804 PRESSURE TEST FITTING KIT



B797157

CAS1808 FLOWMETER FITTING KIT

TROUBLESHOOTING THE STEERING SYSTEM

NOTE: *The steering hydraulic schematic is included in the hydraulic schematic. Refer to the rear pocket of this manual.*

1. Make sure the oil level in the hydraulic reservoir is correct. Visually inspect the steering system for leakage and damage.
2. Do the steering relief valve pressure test. Refer to page 7. If the pressure is above or below specifications, adjust the steering relief valve in the loader control valve.
3. Do the main hydraulic pump test. See Section 8002. If the main pump is bad, repair or replace the main hydraulic pump.
4. Test the steering cylinders for leakage, refer to instructions on page 10. If a steering cylinder is leaking, repair or replace the steering cylinder.

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TESTING THE HYDRAULIC PUMP PERFORMANCE AND TORQUE LIMITER

NOTE: *The pump differential pressure must be set before attempting any other tests. Refer to page 7 of this section.*

STEP 1

Connect the flowmeter (5) by disconnecting the inlet hose (4) to the loader valve (2), installing a cap (1) on the fitting at the loader control valve (2). Refer to illustration on page 10.

STEP 2



BD02N020

Disconnect the load sense hose (11) and cap (12) the fitting at the loader valve.

NOTE: *This is the line that returns to the pump compensator valve.*

STEP 3

Connect a "T" fitting (10) into the loader control valve inlet hose (4) and to the flowmeter inlet hose (3).

STEP 4

Use a union (9) and connect an in line needle valve (8) to the open port in the "T" fitting (10), connect the load sense hose (11) to the needle valve (8).

STEP 5

Make sure that the flowmeter valve and the installed needle valve are in the open position. Start and run the engine at high idle, slowly close the flowmeter valve until a pressure reading of 103 bar (1500 psi) is obtained.

STEP 6

Using the temperature gauge on the flow meter, continue to run the engine at high idle until the temperature of the hydraulic oil is at least 52°C to 60°C (125°F to 140°F).

STEP 7

Run the engine at low idle, fully open the flowmeter valve.

STEP 8

Open the needle valve (8) and operate the engine at 2000 rpm, close the flowmeter valve until the pump pressure is 500 psi. The flow at this point should be 36.5 to 37.5 gpm.

STEP 9

Close the flowmeter valve slowly and read the flow at 2000 psi @ 2000 rpm. The flow should read 35.5 to 36.5 gpm.

STEP 10

NOTE: *The reading in this step will only apply to the W110 machine.*

Continue slowly closing the flowmeter valve, monitoring the flow with the engine speed at 2000 rpm. At a point between 2200 and 2400 psi, the flow should noticeably start decreasing. This is the torque limit setting of the pump. Record this pressure.

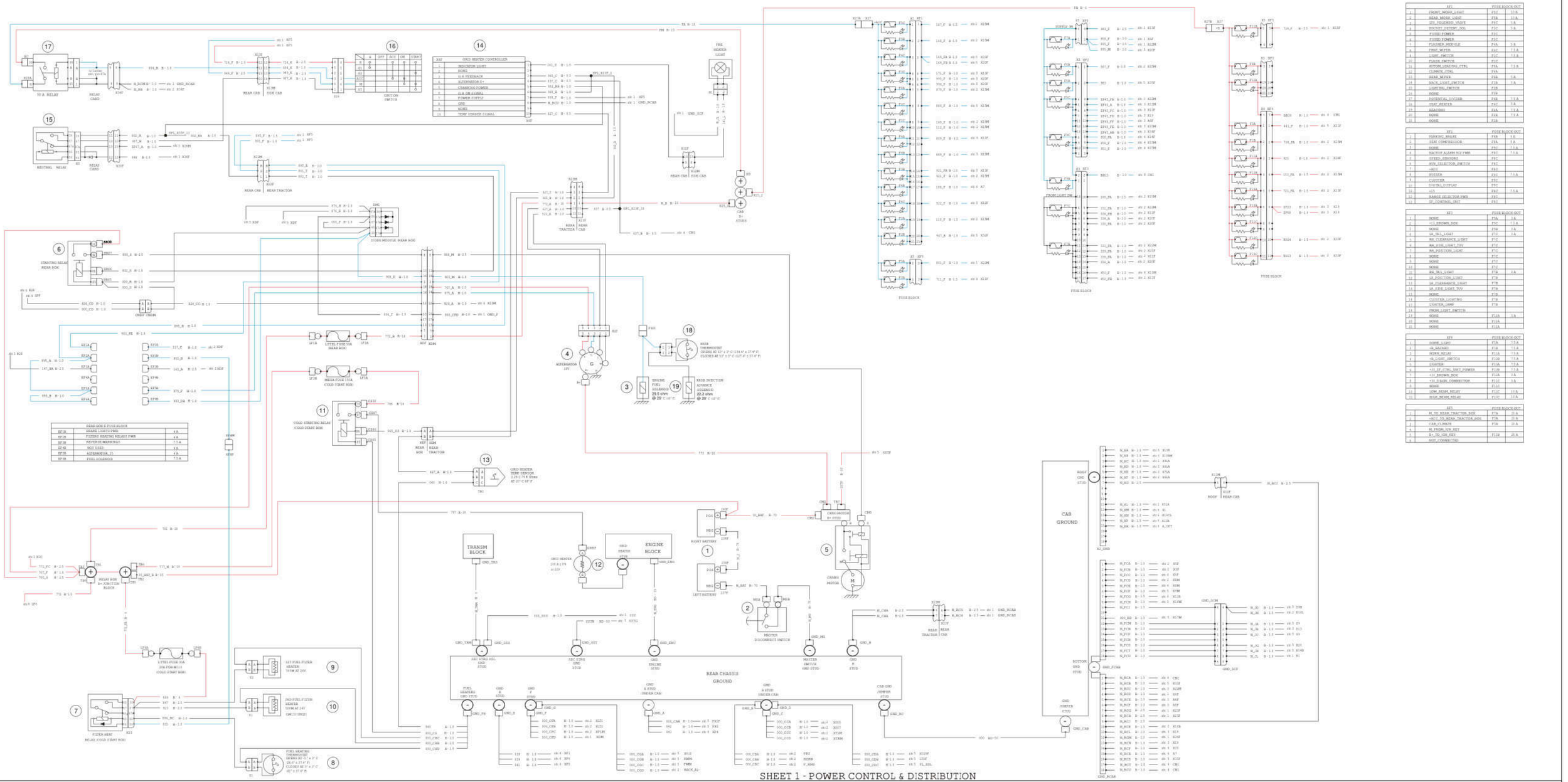
STEP 11

Continue slowly closing the flowmeter valve until 3300 psi is reached. The flow should read between 23.5 and 26.0 gpm.

STEP 12

If any of the pump flow readings are not within specifications, the pump may be out of calibration and Technical Services Group should be contacted.

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REAR BOX E FUSE BLOCK		
EF1E	BRAKE LIGHTS PWR	4 A
EF2E	FILTER HEATING RELAYS PWR	4 A
EF3E	REVERSE WARNINGS	7.5 A
EF4E	NOT USED	5 A
EF5E	ALTERNATOR_15	4 A
EF6E	FUEL SOLENOID	7.5 A

1	FRONT_WORK_LIGHT	F1C 10 A
2	HEAD_BEAM_LIGHT	F2C 10 A
3	EPL_VOLVOBOL_VALVE	F3C 5 A
4	BUCKET_DETENT_SOL	F4C 5 A
5	FUSED POWER	F5C
6	FUSED POWER	F6C
7	FLASHER_MODULE	F7A 5 A
8	FRONT_WIPER	F8A 7.5 A
9	LIGHT_SWITCH	F9C 7.5 A
10	FUSED_SWITCH	F10
11	AUTOMA_LOADING_CTRL	F11A 7.5 A
12	CLIMATE_CTRL	F12A
13	REAR_WIPER	F13A 5 A
14	HEAD_LIGHT_SWITCH	F14A 5 A
15	LIGHTING_SWITCH	F15A
16	HORN	F16A
17	POTENTIAL-DIODE	F4B 7.5 A
18	SEAT_HEATER	F5C 5 A
19	BEACONS	F6A 7.5 A
20	HORN	F7B 7.5 A
21	HORN	F8B

1	PARKING_BRAKE	F9B 5 A
2	REM_COMPRESSOR	F9A 5 A
3	HORN	F9C 7.5 A
4	BACKUP ALARM RCP PWR	F9D 5 A
5	SPEED_SENSORS	F9C
6	ASR_SELECTOR_SWITCH	F9D
7	+ECU	F9D
8	SYSTEM	F9C 7.5 A
9	CLUSTER	F9D
10	CONTROL_DISPLAY	F9C
11	+15	F9C 7.5 A
12	RANGE SELECTOR KNOB	F9D
13	SF_CONTROL UNIT	F9C

1	HORN	F9A 5 A
2	+15_BROWN_BOX	F9C 7.5 A
3	HORN	F9B 5 A
4	SW_IN/L_LIGHT	F1C 5 A
5	RH_CLEARANCE_LIGHT	F1C
6	RH_SIDE_LIGHT_TUV	F1C
7	RH_POSITION_LIGHT	F1C
8	HORN	F1C
9	HORN	F1C
10	HORN	F1C
11	RH_IN/L_LIGHT	F7B 5 A
12	LH_POSITION_LIGHT	F7B
13	LH_CLEARANCE_LIGHT	F7B
14	LH_SIDE_LIGHT_TUV	F7B
15	HORN	F7B
16	COUNTER_LIGHTING	F7B
17	STARTER_LAMP	F7B
18	FROM_LIGHT_SWITCH	F7B
19	HORN	F12A 5 A
20	HORN	F12A
21	HORN	F12A

1	DOME_LIGHT	F1A 7.5 A
2	+B_HAZARD	F1B 7.5 A
3	HORN_RELAY	F11B 7.5 A
4	+B_LIGHT_SWITCH	F10B 7.5 A
5	CLUSTER	F10A 7.5 A
6	+15_SF_CTRL_UNIT_POWER	F10B 7.5 A
7	+15_BROWN_BOX	F10A 5 A
8	+15_FUSION_CONNECTOR	F11C 5 A
9	HORN	F11C
10	LOW_BEAM_RELAY	F11C 10 A
11	HIGH_BEAM_RELAY	F10C 10 A

1	M_TO_REAR_TRACTION_BOX	F7A 15 A
2	+ACC_TO_REAR_TRACTION_BOX	F5A 15 A
3	CAB_CLIMATE	F5A 10 A
4	M_FROM_IGN_KEY	
5	B+_TO_IGN_KEY	F11B 25 A
6	NOT_CONNECTED	

SHEET 1 - POWER CONTROL & DISTRIBUTION

COMPONENTS

1. Batteries
2. Master Disconnect Switch
3. Fuel Solenoid
4. Alternator
5. Starter Motor
6. Starting Relay
7. Filter Heater Relay
8. Fuel Filter Heater Thermostat
9. 1st Filter Heater
10. 2nd Fuel Filter Heater (LW130)
11. Cold Start Relay
12. Grid Heater
13. Grid Heater Temperature Sensor
14. Grid Heater Controller
15. Neutral Start Relay
16. Ignition Switch
17. Accessory Relay
18. KKSB Thermostat
19. KKSB Solenoid
20. Output Speed Sensor
21. Engine Speed Sensor
22. Intermediate Speed Sensor
23. Turbine Speed Sensor
24. Filter Maintenance Switch
25. Torque Converter Output Temperature Sender
26. Transmission Solenoid Valve and Temperature Sensors
27. Transmission Electronic Control Module
28. Transmission Shifter
29. Diagnostic Connector
30. Transmission Kick-down Switch
31. Transmission Automatic Switch
32. Declutch Switch
33. Declutch Pressure Switch
34. Transmission Enable Switch
35. FNR Switch
36. Backup Alarm Relay
37. Backup Alarm
38. Brake Warning Pressure Switch
39. Brown Box
40. Fuel Level Sender
41. Engine Coolant Temperature Sender
42. Air Filter Restriction Switch
43. Parking Brake Switch
44. Instrument Cluster
45. Digital Display Panel
46. Engine Oil Pressure Switch
47. Parking Brake Pressure Switch
48. Parking Brake Relay
49. Parking Brake Solenoid
50. Fan Reversing Switch (Option)
51. Fan Reversing Solenoid (Option)
52. Detent Switch
53. Bucket Control Valve Electromagnetic Detents
54. Boom Control
55. Bucket Control
56. Float Solenoid
57. Secondary Steering Pressure Switch (Option)
58. Secondary Steering Motor (Option)
59. Secondary Steering Solenoid (Option)
60. Secondary Steering Relay (Option)
61. Pin Engage Switch (Option)
62. Pin Engage Solenoid (Option)
63. LTS Control Switch
64. LTS Control Relay Number 1
65. LTS Control Relay Number 2
66. LTS Control Solenoid
67. Front Wiper Motor
68. Front Wiper and Washer Switch
69. Front Wiper Timer
70. Front Washer Motor
71. Rear Wiper Switch
72. Rear Washer Switch
73. Rear Washer Pump Motor
74. Rear Wiper Motor
75. Rear Wiper Timer
76. Horn Relay - Number 1
77. Horn Relay - Number 2
78. Horn
79. Central Grease Lubrication Switch (Option)
80. Seat Compressor and Switch (Option)
81. Seat Heater Switch (Option)
82. Blower Switch
83. Blower Motor Speed Resistors
84. Blower Motor
85. Air Conditioning Pressure Switch
86. Thermostat Switch
87. Compressor Clutch Relay
88. Compressor Clutch
89. Conditioner Switch
90. Heater Control Unit
91. Circuit Control Switch
92. Circuit Control Motor
93. Warm Cold Stop Cock Knob
94. Warm Cold Stop Cock Motor
95. Climate Control Unit (Option)
96. Temperature Senors (Option)
97. Climate Control Relays (Option)
98. Recycling Motor (Option)
99. Power Converter, Recycling Motor (Option)
100. Water Valve Motor (Option)
101. Cigar Lighter
102. Power Converter - 24 volts to 12 volts (Option)
103. Power Outlet (Option)
104. 12 Volt Radio (Option)
105. Left Speaker (Option)
106. Right Speaker (Option)
107. Beacon Switch (Option)
108. Rotating Beacon (Option)
109. Brake Lamp Pressure Switch
110. Hazard Switch
111. Turn Signal, Hi/Low Beam Switch
112. Flasher Module
113. Left-Hand Rear Combination Lamp
114. Right-Hand Rear Combination Lamp
115. Left-Hand Front Combination Lamp
116. Right-Hand Front Combination Lamp
117. Rear Work Light Switch
118. Front Work Light Switch
119. Left-Hand Front Work Lamp
120. Right-Hand Front Work Lamp
121. Lamp Switch
122. High Beam Relay
123. Low Beam Relay
124. License Plate Lamp
125. Dome Lamp
126. TUV Lamps (Option)
127. Italian Road Circulation Lamps (Option)

WIRE IDENTIFICATION

1. WIRE NUMBER
2. WIRE COLOR SYMBOL
3. WIRE SIZE (mm²) TYPICAL

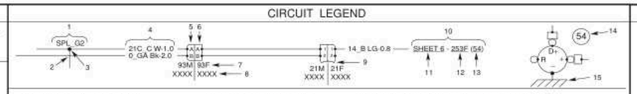
Example: 23F_A W-2.0 — 1 = 23, 2 = F, 3 = A

N = BLACK	RT = RED	H = GREY
L = BLUE	M = BROWN	BL = BLUE
GN = GREEN	SW = BLACK	B = WHITE
GE = YELLOW	V = GREEN	G = YELLOW
RN = RED/BLACK DOTTED	R = RED	

SHOWS POWER - MASTER DISCONNECT SWITCH IN ON POSITION

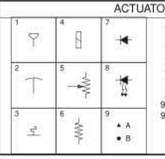
SHOWS POWER - KEY SWITCH IN ON POSITION

CIRCUIT LEGEND



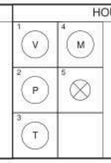
1. SPLICE IDENTIFICATION
2. CIRCUIT CROSSING (NOT CONNECTED)
3. CIRCUIT CONNECTED
4. WIRE IDENTIFICATION
5. MALE CONNECTOR
6. FEMALE CONNECTOR
7. CONNECTOR IDENTIFICATION
8. HARNESS IDENTIFICATION
9. INDICATES PARTIAL CONNECTOR
10. CIRCUIT IDENTIFICATION
11. SCHEMATIC SHEET NUMBER FOR CIRCUIT CONTINUATION
12. CONNECTION POINT ON SCHEMATIC
13. COMPONENT NUMBER (IF ASSIGNED)
14. COMPONENT NUMBER
15. INDICATES INTERNALLY GROUNDED COMPONENT

ACTUATOR SYMBOLS



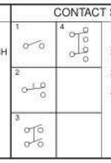
1. PRESSURE
2. HAND OPERATED
3. TEMPERATURE
4. COIL
5. VARIABLE RESISTOR
6. RESISTOR
7. DIODE
8. LIGHT EMITTING DIODE
9A. MOMENTARY CONTACT
9B. MAINTAINED CONTACT

HOUSINGS



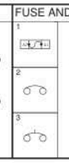
1. VACUUM SWITCH
2. PRESSURE SWITCH
3. TEMPERATURE SWITCH
4. MOTOR
5. LAMP

CONTACT SYMBOLS



1. SINGLE POLE, SINGLE THROW
2. SINGLE POLE, DOUBLE THROW
3. DOUBLE POLE, SINGLE THROW
4. DOUBLE POLE, DOUBLE THROW

FUSE AND CIRCUIT BREAKER



1. FUSE
2. CIRCUIT BREAKER, AUTOMATIC RESET
3. CIRCUIT BREAKER, MANUAL RESET

NOTES

SHEET 1 - POWER CONTROL & DISTRIBUTION
SHEET 2 - LIGHTING

ELECTRICAL SCHEMATIC W110 and W130 Wheel Loaders

Additional copies of this Hydraulic and Electrical Schematic can be ordered through Technical Publications Distribution System.
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