SERVICE MANUAL

LOADER BACKHOE

580M
580 Super M
590M
590 Super M

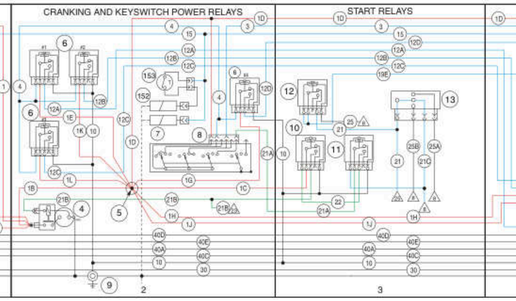
Series 2

6-74442

Issued July 05

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CHARGING



1

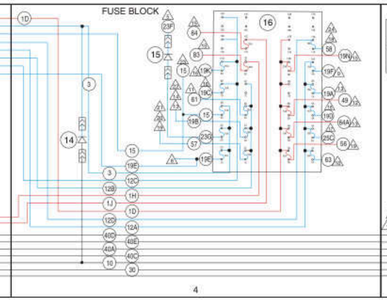
CRANKING AND KEYSWITCH POWER RELAYS

2

START RELAYS

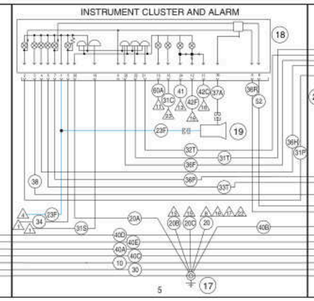
3

FUSE BLOCK



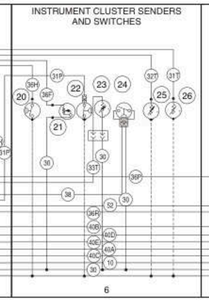
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INSTRUMENT CLUSTER AND ALARM



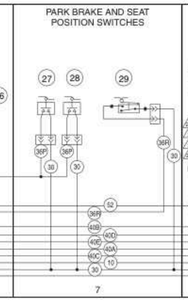
5

INSTRUMENT CLUSTER SENDERS AND SWITCHES



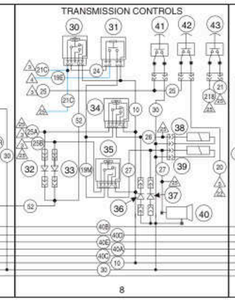
6

PARK BRAKE AND SEAT POSITION SWITCHES



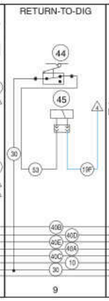
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TRANSMISSION CONTROLS



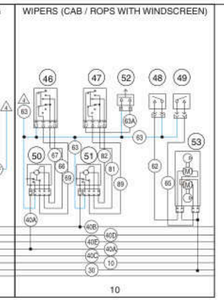
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RETURN-TO-DIG



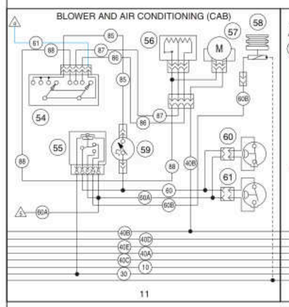
9

WIPERS (CAB / ROPS WITH WINDSCREEN)



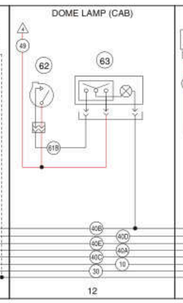
10

BLOWER AND AIR CONDITIONING (CAB)



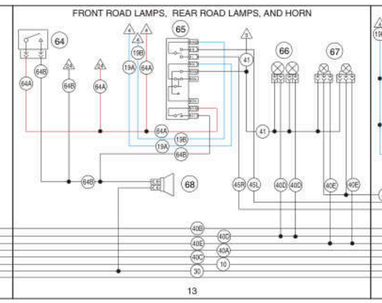
11

DOME LAMP (CAB)



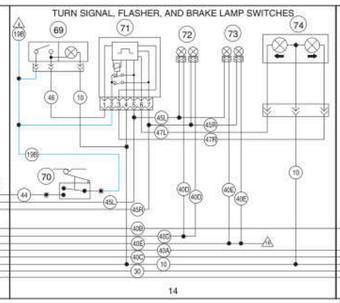
12

FRONT ROAD LAMPS, REAR ROAD LAMPS, AND HORN



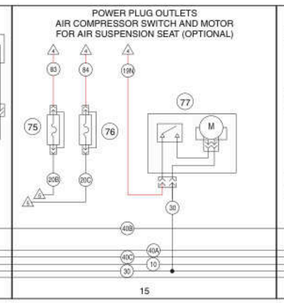
13

TURN SIGNAL, FLASHER, AND BRAKE LAMP SWITCHES



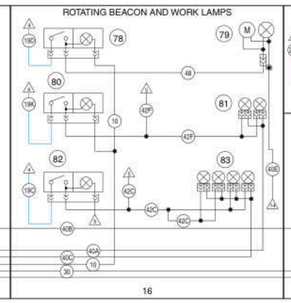
14

POWER PLUG OUTLETS
AIR COMPRESSOR SWITCH AND MOTOR FOR AIR SUSPENSION SEAT (OPTIONAL)



15

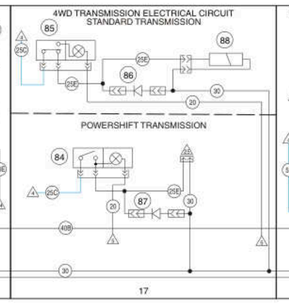
ROTATING BEACON AND WORK LAMPS



16

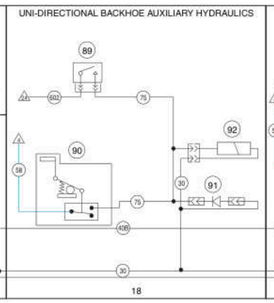
4WD TRANSMISSION ELECTRICAL CIRCUIT
STANDARD TRANSMISSION

POWERSHIFT TRANSMISSION



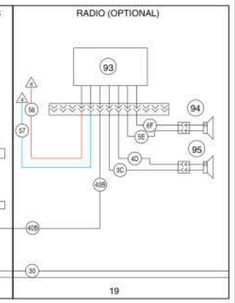
17

UNI-DIRECTIONAL BACKHOE AUXILIARY HYDRAULICS



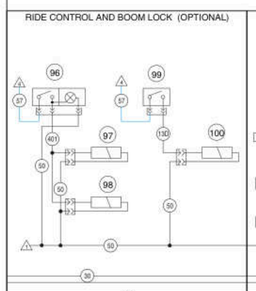
18

RADIO (OPTIONAL)



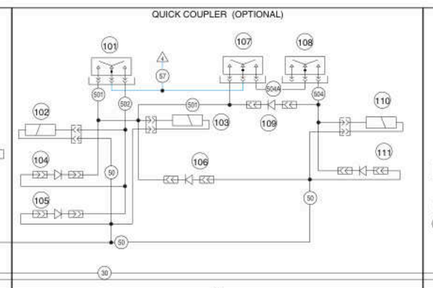
19

RIDE CONTROL AND BOOM LOCK (OPTIONAL)



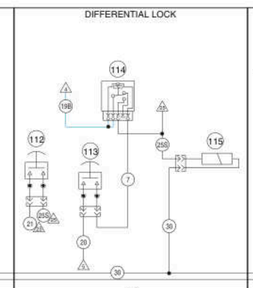
20

QUICK COUPLER (OPTIONAL)



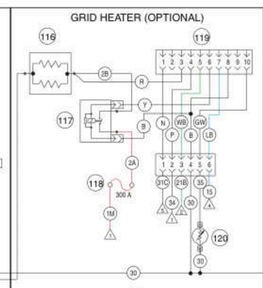
21

DIFFERENTIAL LOCK



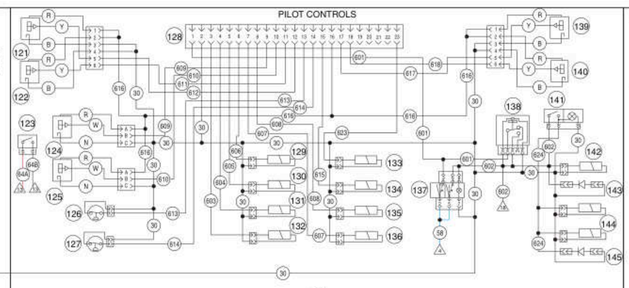
22

GRID HEATER (OPTIONAL)



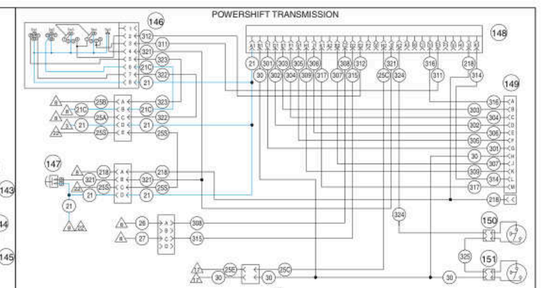
23

PILOT CONTROLS



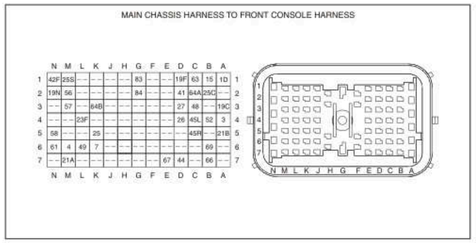
24

POWERSHIFT TRANSMISSION

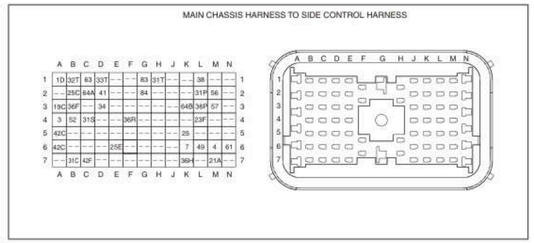


25

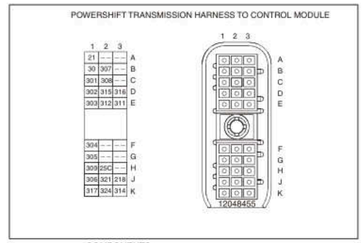
MAIN CHASSIS HARNESS TO FRONT CONSOLE HARNESS



MAIN CHASSIS HARNESS TO SIDE CONTROL HARNESS

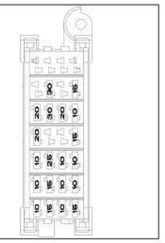


POWERSHIFT TRANSMISSION HARNESS TO CONTROL MODULE

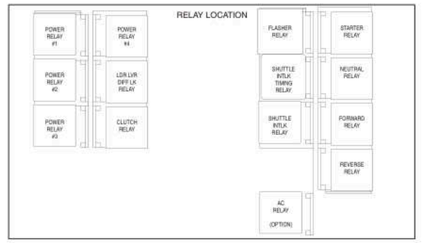


FUSE LOCATION

SPARE	NOT USED	NOT USED	NOT USED
SPARE	POWER OUTLET	SPARE	PILOT CONTROLS RH AUX (OPTION)
FRONT WORK LIGHTS	POWER OUTLET	AIR SUSP SEAT AIR COMP (OPTION)	RETURN TO DIG
REAR WORK LIGHTS	SPARE	SPARE	DRIVING LIGHTS
FUEL SHUTOFF	BLOWER (OPTION)	DOME LIGHT	ROTATING BEACON (OPTION)
INSTRUMENTS ALARM SYS	SIGNAL LIGHTS	HORN	4WD (OPTION)
STARTING TRANSMISSION CONTROL	RADIO, RIDE CNTRL, QUICK COUPLER (OPTION)	RADIO (BATT) (OPTION)	WIPERS (OPTION)



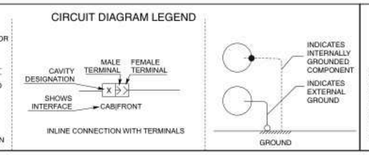
RELAY LOCATION



COMPONENTS

1. BATTERY
2. ALTERNATOR
3. CHASSIS GROUND
4. STARTER AND STARTER SOLENOID
5. POWER JUNCTION
6. POWER RELAYS
7. FUEL SHUTOFF SOLENOID
8. KEY SWITCH
9. FRONT CONSOLE GROUND
10. STARTER RELAY
11. NEUTRAL START RELAY
12. CLUTCH CUTOUT RELAY
13. FNR SWITCH
14. DIODE
15. DIODE
16. FUSE BLOCK
17. SIDE CONSOLE GROUND
18. INSTRUMENT CLUSTER
19. WARNING ALARM
20. HYDRAULIC FILTER RESTRICTION SWITCH
21. FUEL LEVEL SENDER
22. ENGINE OIL PRESSURE SWITCH
23. REAR AXLE TEMPERATURE SENDER
24. AIR FILTER RESTRICTION SWITCH
25. TRANSMISSION TEMPERATURE SENDER
26. ENGINE TEMPERATURE SENDER
27. PARKING BRAKE SWITCH #1
28. PARKING BRAKE SWITCH #2
29. SEAT POSITION SWITCH
30. SHUTTLE INTERLOCK RELAY
31. SHUTTLE INTERLOCK TIMING RELAY
32. DIODE
33. DIODE
34. FORWARD RELAY
35. REVERSE RELAY
36. DIODE
37. DIODE
38. FORWARD SOLENOID
39. REVERSE SOLENOID
40. BACKUP ALARM
41. CLUTCH CUTOUT SWITCH (SHIFT HANDLE)
42. CLUTCH CUTOUT SWITCH LOADER HANDLE STANDARD TRANSMISSION
43. CLUTCH CUTOUT SWITCH LOADER HANDLE POWERSHIFT TRANSMISSION
44. RETURN-TO-DIG LIMIT SWITCH
45. LOADER VALVE SOLENOID
46. FRONT WIPER SWITCH
47. REAR WIPER SWITCH
48. FRONT WINDSHIELD WASHER SWITCH (CAB/ROPS WINDSCREEN)
49. REAR WINDSHIELD WASHER SWITCH (CAB/ROPS WINDSCREEN)
50. FRONT WIPER MOTOR (CAB)
51. REAR WIPER MOTOR (CAB)
52. REAR WIPER CUT OFF SWITCH
53. WINDSHIELD WASHER MOTOR
54. BLOWER SWITCH
55. AIR CONDITIONING PRESSURE RELAY
56. BLOWER MOTOR RESISTOR BOARD AND THERMAL FUSE
57. BLOWER MOTOR
58. AIR CONDITIONER COMPRESSOR CLUTCH
59. AIR CONDITIONER TEMPERATURE SWITCH
60. AIR CONDITIONER LOW PRESSURE SWITCH
61. AIR CONDITIONER HIGH PRESSURE SWITCH
62. DOME LAMP SWITCH (DOOR SWITCH)
63. DOME LAMP WITH SWITCH
64. REAR HORN BUTTON
65. TURN SIGNAL, DRIVING LAMP, AND HORN SWITCH
66. DRIVING LAMPS
67. REAR STOP AND TAIL LAMPS
68. HORN
69. HAZARD FLASHER SWITCH
70. BRAKE LAMP SWITCH
71. FLASHER RELAY
72. FRONT TURN SIGNAL LAMPS
73. REAR TURN SIGNAL LAMPS
74. TURN SIGNAL INDICATOR LAMPS
75. POWER PLUG #1
76. POWER PLUG #2
77. AIR SUSPENSION SEAT - AIR COMPRESSOR SWITCH AND MOTOR
78. ROTATION BEACON SWITCH
79. ROTATING BEACON
80. FRONT WORK LAMP SWITCH
81. FRONT WORK LAMPS
82. REAR WORK LAMP SWITCH
83. REAR WORK LAMPS
84. 4WD SWITCH POWER SHIFT TRANSMISSION
85. 4WD SWITCH STANDARD TRANSMISSION
86. DIODE
87. DIODE
88. 4WD SOLENOID
89. THUMB OPERATED REAR AUXILIARY HYDRAULIC SWITCH (PILOT CONTROL)
90. FOOT OPERATED REAR AUXILIARY HYDRAULIC SWITCH (MANUAL CONTROL)
91. DIODE
92. AUXILIARY BACKHOE HYDRAULIC SOLENOID
93. RADIO
94. LEFT SPEAKER
95. RIGHT SPEAKER
96. RIDE CONTROL ENGAGE SWITCH
97. RIDE CONTROL SOLENOID (ACCUMULATOR)
98. RIDE CONTROL SOLENOID (TANK)
99. BOOM LOCK SWITCH
100. BOOM LOCK SOLENOID
101. LOADER QUICK COUPLER SWITCH
102. LOADER QUICK COUPLER SOLENOID
103. LOAD SENSING SOLENOID
104. DIODE
105. DIODE
106. DIODE
107. BACKHOE QUICK COUPLER SWITCH #A
108. BACKHOE QUICK COUPLER SWITCH #B
109. DIODE
110. BACKHOE QUICK COUPLER SOLENOID
111. DIODE
112. LOADER LEVER DIFFERENTIAL LOCK ENGAGE SWITCH - POWER SHIFT TRANSMISSION
113. LOADER LEVER DIFFERENTIAL LOCK ENGAGE SWITCH - STANDARD TRANSMISSION
114. DIFFERENTIAL LOCK ENABLE RELAY
115. DIFFERENTIAL LOCK SOLENOID
116. GRID HEATER
117. COLD START RELAY
118. FUSE 300 AMP
119. COLD START CONTROLLER
120. COLD START TEMPERATURE SENDER
121. E'HOE EXTEND PUSH BUTTON
122. E'HOE RETRACT BUTTON
123. HORN SWITCH
124. LH STABILIZER SWITCH
125. RH STABILIZER SWITCH
126. LH STABILIZER PRESSURE SWITCH
127. RH STABILIZER PRESSURE SWITCH
128. ELECTRONIC PILOT CONTROLLER
129. RH STABILIZER DOWN SOLENOID
130. RH STABILIZER UP SOLENOID
131. LH STABILIZER DOWN SOLENOID
132. LH STABILIZER UP SOLENOID
133. AUX REVERSE SOLENOID
134. AUX FORWARD SOLENOID
135. E'HOE RETRACT SOLENOID
136. E'HOE EXTEND SOLENOID
137. PILOT ON/OFF SWITCH
138. PILOT CONTROL RELAY
139. AUX FORWARD PUSH BUTTON
140. AUX REVERSE PUSH BUTTON
141. PATTERN CHANGE SWITCH
142. PRESSURE REDUCING VALVE SOLENOID
143. DIODE
144. PATTERN CHANGE SOLENOIDS
145. DIODE
146. FNR LEVER SWITCH - POWER SHIFT TRANSMISSION
147. LOADER LEVER KICKDOWN SWITCH - POWER SHIFT TRANSMISSION
148. POWER SHIFT TRANSMISSION CONTROL MODULE CONNECTION
149. POWER SHIFT TRANSMISSION CONNECTOR
150. LEFT-HAND BRAKE PRESSURE SWITCH
151. RIGHT-HAND BRAKE PRESSURE SWITCH
152. COLD START TIMING SOLENOID
153. COLD START TIMING TEMPERATURE SWITCH

CIRCUIT DIAGRAM LEGEND



WIRE IDENTIFICATION

Y (3SR) 1.0
WIRE COLOR
WIRE NUMBER
WIRE SIZE

ABBREV	WIRE COLOR	ABBREV	WIRE COLOR
B	BLACK	O	ORANGE
BR	BROWN	P	PINK
DB	DARK BLUE	R	RED
DG	DARK GREEN	T	TAN
G	GRAY	V	VIOLET (PURPLE)
LB	LIGHT BLUE	W	WHITE
LG	LIGHT GREEN	Y	YELLOW

ACTUATORS

LEVER RELEASED, LEVER ACTUATED, LIQUID LEVEL FLOAT, PRESSURE, HAND, DIODE, VARIABLE RESISTOR, RESISTOR, COIL, LIGHT EMITTING DIODE, TEMP., MOMENTARY, MAINTAINED, CONTACTS

HOUSINGS

V VACUUM SWITCH, P PRESSURE SWITCH, T TEMPERATURE SWITCH, M MOTOR, LAMP

CONTACT CONFIGURATIONS

S.P.S.T., S.P.D.T., D.P.S.T., D.P.D.T.

MISCELLANEOUS SYMBOLS

FUSE, AUTO. RESET CIRCUIT BREAKER, MANUAL RESET CIRCUIT BREAKER

NOTES

1. DIAGRAM SHOWN WITH VEHICLE PARKED, POWER OFF AND CONTROLS IN OFF OR NEUTRAL POSITION.
2. SHEET NUMBERS REFER TO THE NUMBER AT THE BOTTOM CENTER OF EACH BLOCK.

LEGEND

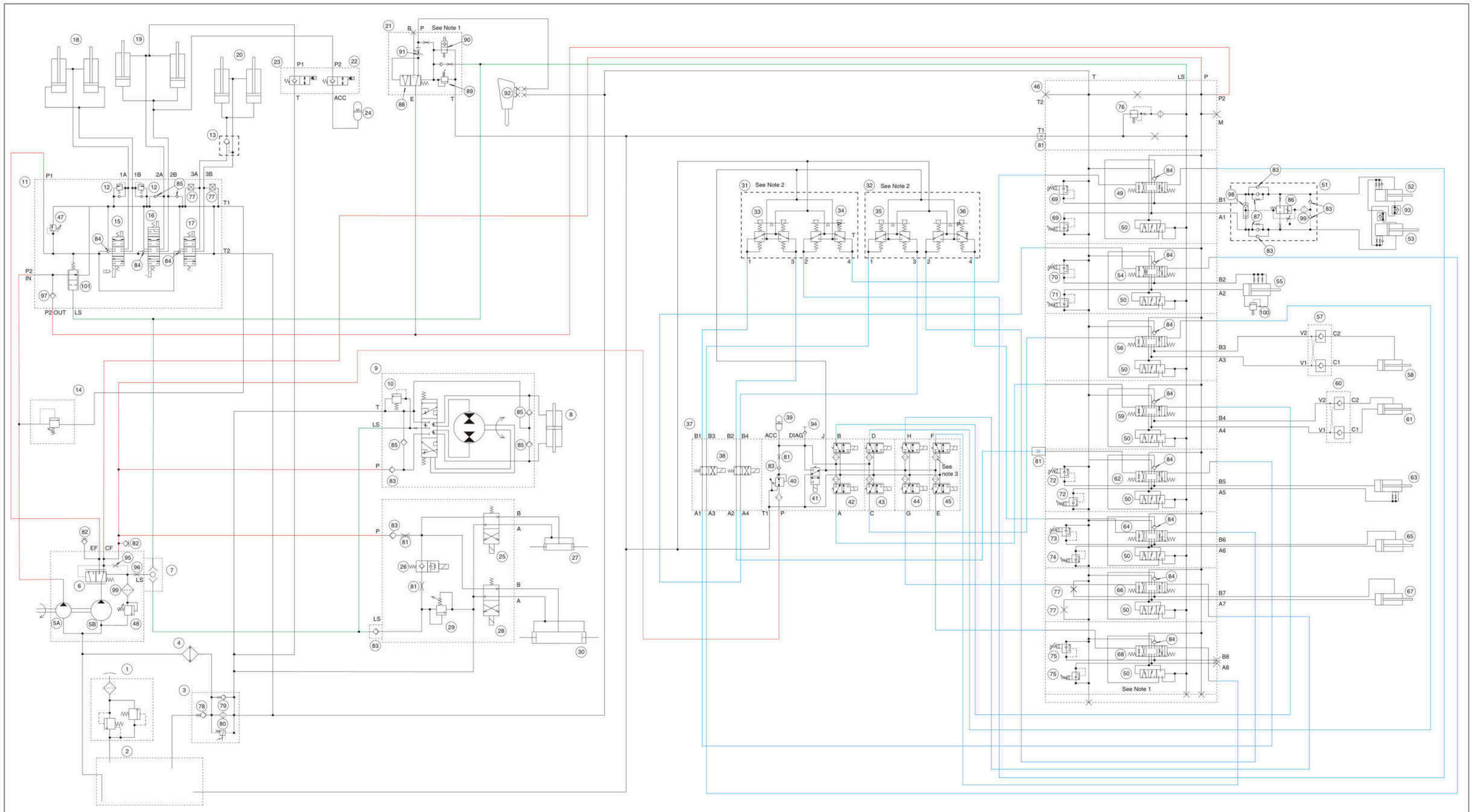
- INDICATES CONSTANT POWER
- INDICATES POWER WHEN KEY SWITCH IS IN ON POSITION
- INDICATES MOMENTARY POWER WHEN KEY SWITCH IS IN START POSITION

ELECTRICAL SCHEMATIC
580M, 580SM, 580SM+ and 590SM LOADER BACKHOE

Additional copies of this Hydraulic and Electrical Schematic can be ordered through Technical Publications Distribution System. The Part Number is 6-75122.

BCD58103

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COMPONENTS

1. HYDRAULIC RESERVOIR BREATHER
2. HYDRAULIC RESERVOIR
3. HYDRAULIC FILTER
4. OIL COOLER
5A. SMALL PUMP SECTION
42 L/min @ 207 BAR
11 GPM @ 3000 PSI
5B. LARGE PUMP SECTION
119 L/min @ 207 BAR
31.5 GPM @ 3000 PSI
6. PRIORITY VALVE
7. LOAD SENSE SHUTTLE VALVE
8. STEERING CYLINDER
9. STEERING CONTROL VALVE
10. STEERING RELIEF VALVE
162 +10 -0 BAR
2350 +150 -0 PSI
11. LOADER CONTROL VALVE
12. LOADER BUCKET CIRCUIT RELIEF VALVE WITH ANTI-CAVITATION CHECK VALVE
210 ± 3 BAR
3050 ± 50 PSI
13. 4-IN-1 BUCKET LOCK VALVE
14. SMALL PUMP RELIEF VALVE
2925-2975 PSI (202-205 BAR)
15. BUCKET SPOOL
16. LIFT SPOOL
17. CLAM SPOOL
18. BUCKET CYLINDERS
19. LIFT CYLINDERS
20. CLAM CYLINDERS
21. UNI-DIRECTIONAL AUXILIARY HYDRAULICS
22. RIDE CONTROL SOLENOID VALVE (ACCUMULATOR)
23. RIDE CONTROL SOLENOID VALVE (TANK)
24. ACCUMULATOR FOR RIDE CONTROL
25. BACKHOE QUICK COUPLER SOLENOID VALVE
26. QUICK COUPLER SOLENOID
27. BACKHOE QUICK COUPLER CYLINDER
28. LOADER QUICK COUPLER SOLENOID VALVE
29. QUICK COUPLER RELIEF VALVE
189.5 ± 3 BAR
2750 ± 50 PSI
30. LOADER QUICK COUPLER CYLINDER
31. LEFT-HAND JOYSTICK CONTROL
32. RIGHT-HAND JOYSTICK CONTROL
33. BOOM CONTROL
34. SWING CONTROL
35. DIPPER CONTROL
36. BUCKET CONTROL
37. REGULATED MANIFOLD
38. PATTERN CHANGE VALVE
39. ACCUMULATOR
40. PILOT PRESSURE REDUCING VALVE
24 to 34.5 BAR
350 to 500 PSI
41. PILOT CONTROL ON OFF SOLENOID
42. RIGHT-HAND STABILIZER CONTROL
43. LEFT-HAND STABILIZER CONTROL
44. EXTEND-A-HOE CONTROL
45. BI-DIRECTIONAL AUXILIARY CONTROL
46. BACKHOE CONTROL VALVE
47. LOADER RELIEF VALVE
210 ± 3 BAR
3050 ± 50 PSI
48. LOAD SENSING RELIEF VALVE
210 ± 3 BAR
3050 ± 50 PSI
49. SWING SPOOL
50. COMPENSATOR
51. SWING DAMPENING VALVE
52. LEFT-HAND SWING CYLINDER
53. RIGHT-HAND SWING CYLINDER
54. BOOM SPOOL
55. BOOM CYLINDER
56. LEFT STABILIZER SPOOL
57. LEFT STABILIZER LOAD CHECK VALVE
58. LEFT-HAND STABILIZER CYLINDER
59. RIGHT STABILIZER SPOOL
60. RIGHT STABILIZER LOAD CHECK VALVE
61. RIGHT-HAND STABILIZER CYLINDER
62. DIPPER SPOOL
63. DIPPER CYLINDER
64. BUCKET SPOOL
65. BUCKET CYLINDER
66. EXTEND-A-HOE SPOOL
67. EXTEND-A-HOE CYLINDER
68. BI-DIRECTIONAL SPOOL
69. SWING CIRCUIT RELIEFS WITH ANTI-CAVITATION CHECK VALVE
207 ± 3 BAR
3000 ± 50 PSI
70. BOOM B PORT CIRCUIT RELIEF WITH ANTI-CAVITATION CHECK VALVE
331 ± 3 BAR
4800 ± 50 PSI
71. BOOM A PORT CIRCUIT RELIEF WITH ANTI-CAVITATION CHECK VALVE
221 ± 3 BAR
3205 ± 50 PSI
72. DIPPER CIRCUIT RELIEFS WITH ANTI-CAVITATION CHECK VALVE
238 ± 3 BAR
3450 ± 50 PSI
73. BUCKET B PORT CIRCUIT RELIEF WITH ANTI-CAVITATION CHECK VALVE
221 ± 3 BAR
3205 ± 50 PSI
74. BUCKET A PORT CIRCUIT RELIEF WITH ANTI-CAVITATION CHECK VALVE
262 ± 3 BAR
3800 ± 50 PSI
75. AUXILIARY CIRCUIT RELIEFS WITH ANTI-CAVITATION CHECK VALVE
220 +5 -1 BAR
3191 +72.5 -14.5 PSI
76. LOAD SENSE DRAIN ORIFICE
77. PLUG
78. COOLER BYPASS
79. FILTER BYPASS
80. FILTER CONDITION SWITCH
81. ORIFICE
82. PUMP TEST PORT
83. CHECK VALVE
84. LOAD CHECK VALVE
85. ANTI CAVITATION VALVE
86. SWING CUSHION SPOOL
87. BACK PRESSURE VALVE
88. PRIORITY SPOOL
89. UNI-DIRECTIONAL AUXILIARY RELIEF VALVE
90. UNI-DIRECTIONAL AUXILIARY ON/OFF SOLENOID
91. FLOW CONTROL ADJUSTMENT
92. HAMMER ATTACHMENT EXAMPLE
93. FLOATING ORIFICE
94. PILOT MANIFOLD TEST PORT
95. DYNAMIC SENSING ORIFICE
96. LS SIGNAL ORIFICE
97. P2 PORT CHECK VALVE
98. SHUTTLE CHECK VALVE
99. SCREEN
100. BOOM PISTON RELIEF
101. RELOADER VALVE

NOTES

1. Machines will not be equipped with bi-directional and uni-directional auxiliary hydraulics on the same machine. Valves are shown for reference only.
2. Pilot controls are listed with pattern change valves not activated.
3. Early production machines were not equipped with a screen on items 42, 43, 44, and 45.

HYDRAULIC SYMBOLS

PRESSURE
COMPONENT
RETURN
LOAD SENSE
PILOT PRESSURE
CROSSING LINES
CHECK VALVE
FILTER OR SCREEN
LINE CONNECTION
RESTRICTOR
OIL COOLER

HYDRAULIC SCHEMATIC FOR 590SM SERIES 2 WITH PILOT CONTROLS

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