CASE
CONSTRUCTION

SERVICE MANUAL

WHEEL LOADER

521E
TIER 3

84243970
(Replaces 87728450)

Revised June 2009
Issued February 2008

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133 – Electronic Water Valve

Check Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *Put the master disconnect switch and the ignition switch in the ON position. Disconnect connector in the harness not at the valve.*		
Terminal for pin 1 to ground	24 volt	Bad fuse ECA-F11, check circuit 18N.
Terminal for pins 3 and 4 to ground	0.5 volt	Bad driver (132)
NOTE: *Change position of heater control knob from maximum heat to maximum cooling.*		
Terminal for pins 5 and 6 to ground	0.2 to 0.5 volt for approximately 30 seconds	Bad driver (132)
NOTE: *Change position of heater control knob from maximum cooling to maximum heat.*		
Terminal for pins 5 and 6 to ground	0.2 to 0.5 volt for approximately 30 seconds	Bad driver (132)
NOTE: *If all readings are good, replace the valve.*		

134 – Blower Motor Speed Resistors with Thermal Fuse

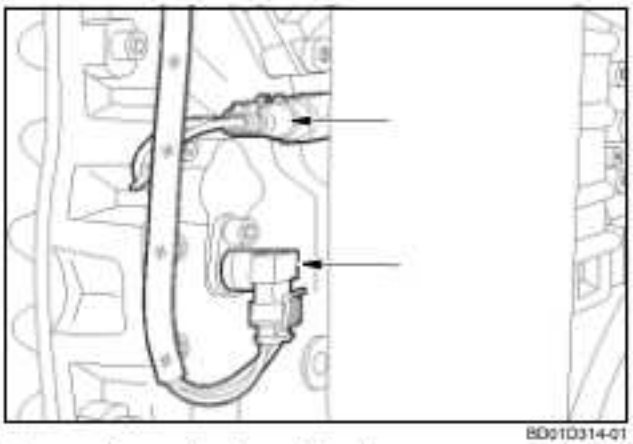
Check Points	Correct Reading	Possible Cause of Bad Reading
NOTE: *Disconnect the wiring harness connector DNS RESISTOR from the resistor.*		
Between terminals 1 and 4 of resistor	Approximately 7.0 ohm	Bad blower motor resistor.
Between terminals 1 and 3 of resistor	Approximately 5.5 ohm	Bad blower motor resistor.
Between terminals 1 and 2 of resistor	Approximately 3.5 ohm	Bad blower motor resistor.

135 – Blower Motor

Check Points	Correct Reading	Possible Cause of Bad Reading
Terminals for wire DNS66 to ground	Continuity	Bad ground circuit.
NOTE: *Put the master disconnect switch and the ignition switch in the ON position. Turn the blower switch (137) to position 4.*		
Terminal for wire DNS65 to ground	24 volts	Check the blower switch (137).
NOTE: *If the readings are correct and the blower motor does not run, replace the blower motor. Turn the blower switch (137) to position 1. If the blower motor ran in position 4 but not in position 1, 2,or 3, check the blower motor resistor (134).*		

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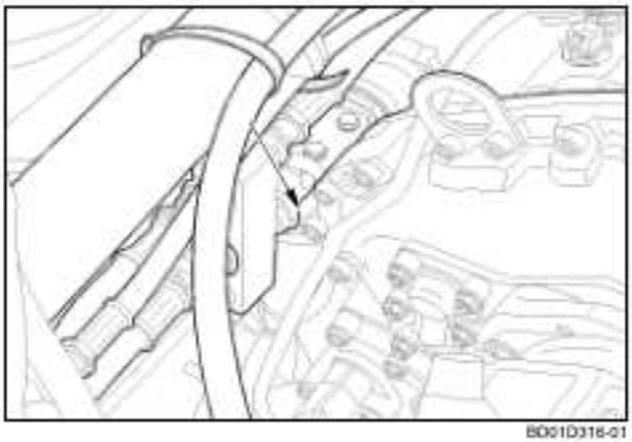
STEP 38



BD01D314-01

Connect transmission wiring harness connectors to output speed sensor and filter maintenance switch following tags installed during removal. Remove and discard tags.

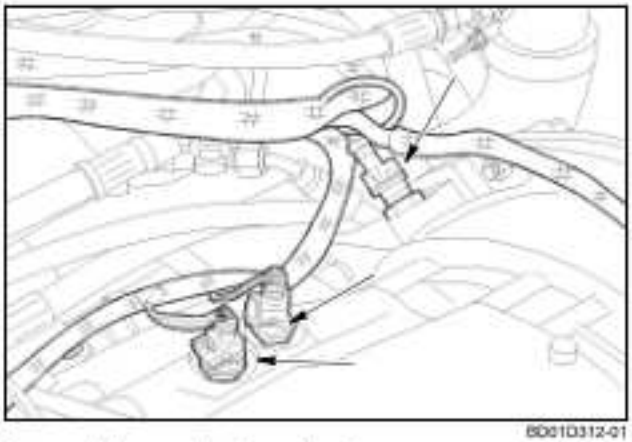
STEP 39



BD01D316-01

Install socket head bolt to secure wiring harness clamp.

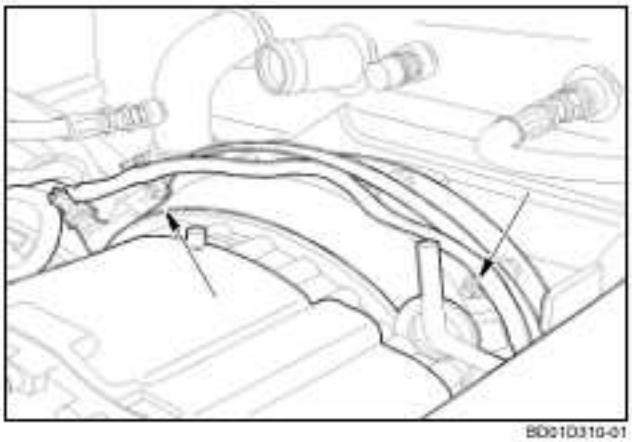
STEP 40



BD01D312-01

Connect transmission wiring harness connectors to turbine speed sensor, intermediate speed sensor, and engine speed sensor following tags installed during removal. Remove and discard tags.

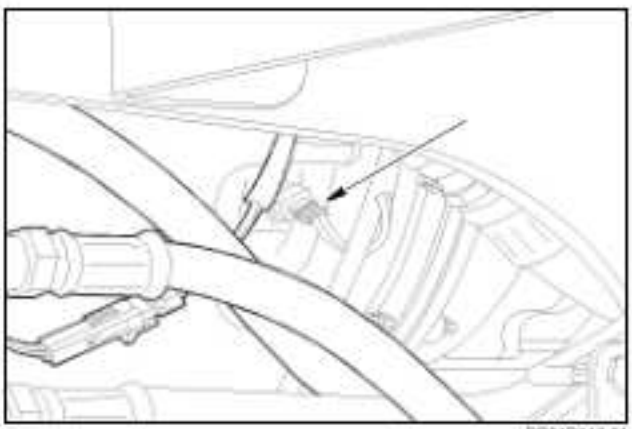
STEP 41



BD01D310-01

Install two socket head bolts to secure transmission wiring harness clamps.

STEP 42



BD01D317-01

Connect transmission wiring harness connector to temperature sensor following tag installed during removal. Remove and discard tag.

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STEP 5

Make sure that the temperature of the hydraulic oil is at least 52°C to 60°C (125°F to 140°F). The following is the procedure for heating the hydraulic oil.

A. Apply the parking brake.

B. Start the engine.

C. To measure the oil temperature with the instrument cluster:

- Press the up or down arrow key.
- Stop at the info screen with the temperatures that need to be monitored are on.

D. Run engine at full throttle.

E. Hold the bucket control lever in the ROLLBACK position while raising and lowering the lift arms from ground level to full height.

F. Continue this procedure until the temperature of the hydraulic oil is 54° to 57°C (129° to 134°F).

STEP 6

Start the engine and remove the safety link (refer to step 2) and lower the loader arms to the ground.

STEP 7

Operate the machine at full throttle. Tilt the bucket to a full rollback position and hold while observing the pressure gauge.

STEP 8

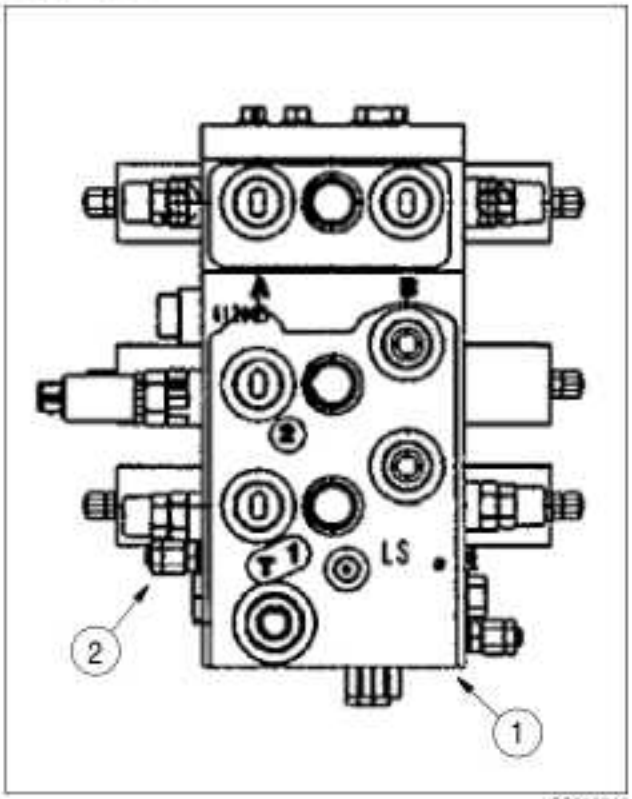
The pressure should read between 248 and 255 bar (3596 to 3700 psi).

STEP 9

If the pressure is not within the specifications, it will be necessary to adjust the main relief valve.

Adjustment

STEP 10



BS01A046

1. LOADER CONTROL VALVE
2. RELIEF VALVE ADJUSTMENT

With the engine running and the loader on the ground, loosen the jam nut and turn the adjustment screw (2) clockwise for higher pressure or counterclockwise for lower pressure.

NOTE: *1/4 turn of the adjusting screw changes the pressure setting approximately 35 bar (500 psi).*

STEP 11

Repeat the Pressure Check Procedure.

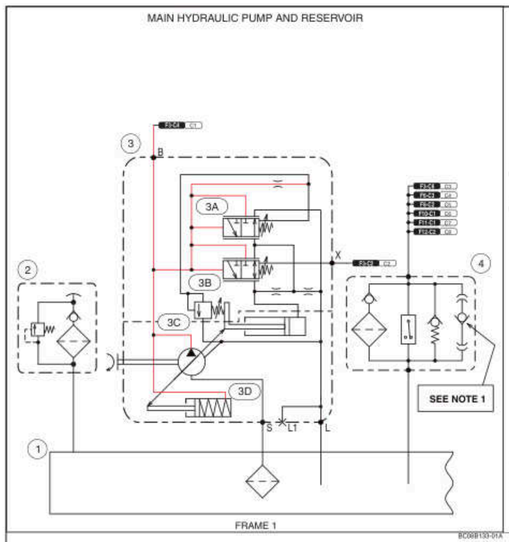
STEP 12

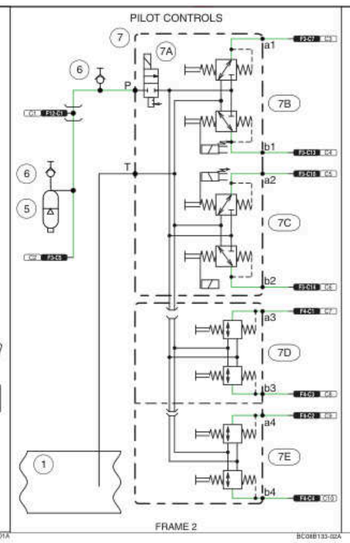
If the pressure is not within the specifications, repeat steps 10 and 11 until pressure is within the required range.

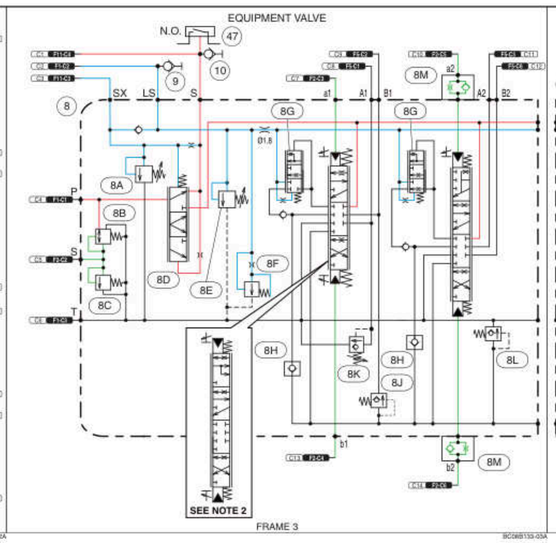
STEP 13

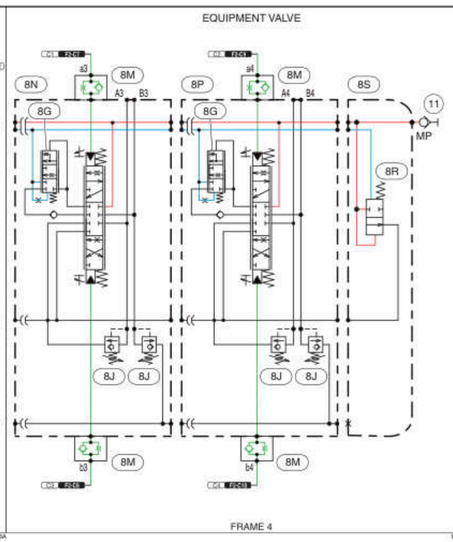
Stop the engine before removing the pressure gauge.

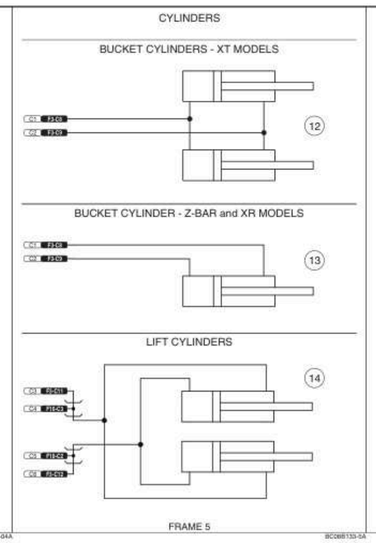
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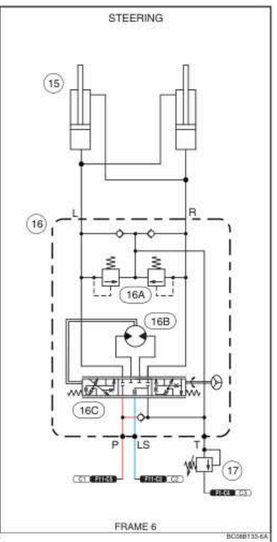


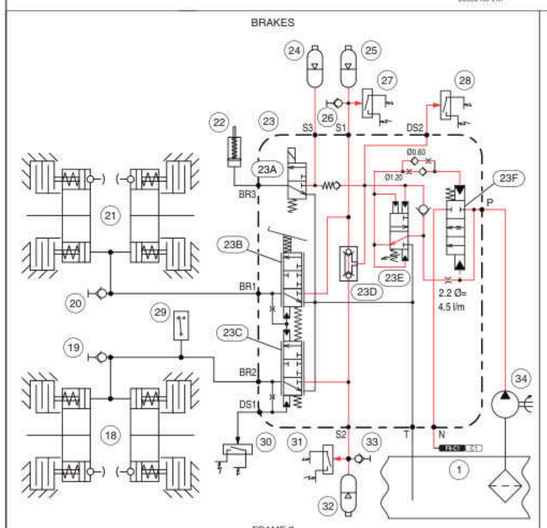


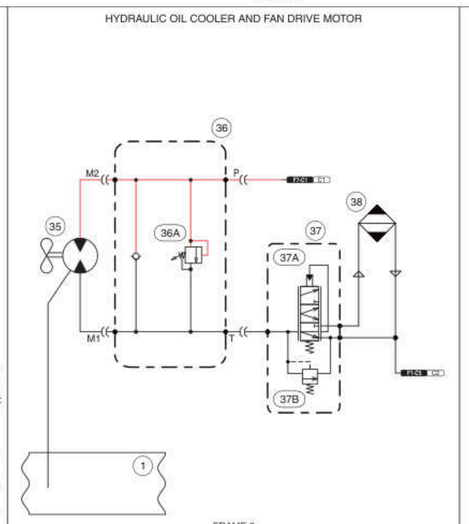


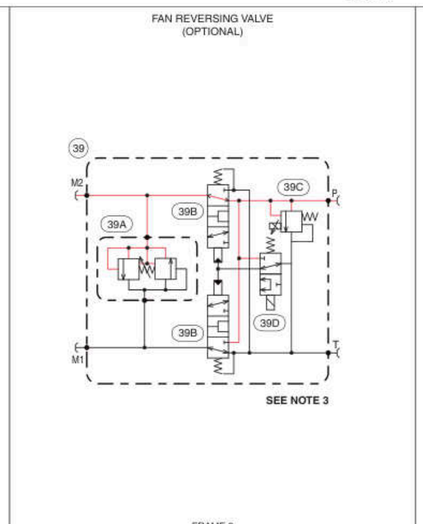


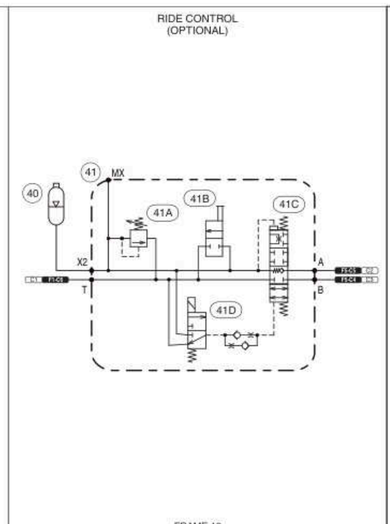


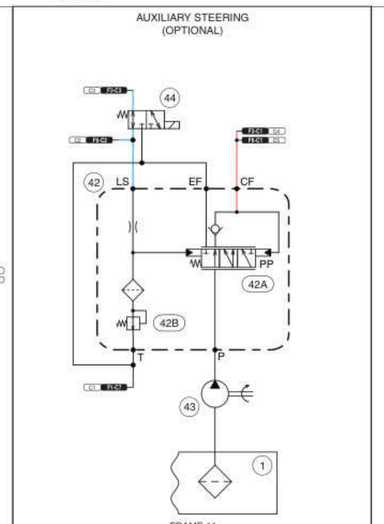


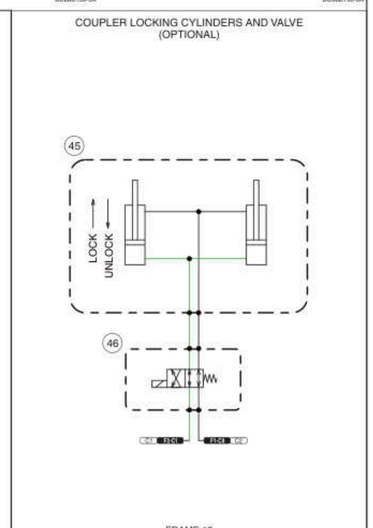












COMPONENTS

FRAME 1 COMPONENTS
- 1 - 1. Hydraulic Reservoir
- 1 - 2. Breather - Hydraulic Reservoir
  Check Valve (0.03 Bar/0.43 PSI)
  Relief Valve (0.35 Bar/5.07 PSI)
- 1 - 3. Implement Hydraulic Pump
  Displacement (71 cc rev/4.3 cu in rev)
  Cutoff (280 Bar/4061 psi)
  Delta (21 Bar/304 psi)
- 1 - 3A. Compensator Differential Spool
- 1 - 3B. Compensator High Pressure Cutoff Spool
- 1 - 3C. Torque Limiter (Disabled)
- 1. 3D Control Piston with Spring
- 1 - 4. Hydraulic Filter Assembly
  Bypass (3.4 Bar/50 psi)
  Warning Switch (2.7 Bar/40psi)

FRAME 2 COMPONENTS
- 2 - 1. Hydraulic Reservoir
- 2 - 5. Pilot Pressure Accumulator
  Pre-charge (13.8 Bar /200 psi)
  Capacity (0.95 liter/57.9 cu in)
- 2 - 6. Pilot Pressure Test Port
- 2 - 7. Controller (4-Spool Valve)
- 2 - 7A. Pilot ON/OFF Solenoid
- 2 - 7B. Bucket Control
- 2 - 7C. Lift Control
- 2 - 7D. Auxiliary Control #1
- 2 - 7E. Auxiliary Control #2

FRAME 3 COMPONENTS
- 3 - 8. Equipment Valve: 2-spool
- 3 - 8A. Steering Pressure Relief
  (217 Bar/3147 psi)
- 3 - 8B. Pilot Pressure Reducing Valve
  (30 Bar/435 psi)
- 3 - 8C. Pilot Pressure Relief
  (45 Bar/653 psi)
- 3 - 8D. Steering Priority Spool
- 3 - 8E. Loader Main Relief
  (227 Bar/3292 psi)
- 3 - 8F. Load Sense Bleed Down Orifice
  (0.7 L/min)
- 3 - 8G. Flow Compensator Spool
- 3 - 8H. Regeneration Check Valve
- 3 - 8J. Circuit Relief Valve with Anti-Cavitation
  (290 Bar/4206 psi)
- 3 - 8K. Circuit Relief Valve with Anti-Cavitation
  (XT Models: 183 Bar/2654 psi)
  (Z-Bar Models: 290 Bar/4206 psi)
- 3 - 8L. Regeneration Relief Valve
  (6.7 Bar/97 psi)
- 3 - 8M. Shuttle Check Valve
- 3 - 9. Load Sense Pressure Test Port
- 3 - 10. Steering Pressure Test Port
- 3 - 47. Auxiliary Steering Pressure Switch
  Closes At: 2.0 to 2.75 Bar (30-47 psi)

FRAME 4 COMPONENTS
- 3 - 8G. Flow Compensator Spool
- 3 - 8J. Circuit Relief Valve with Anti-Cavitation
  (290 Bar/4206 psi)
- 4 - 8M. Shuttle Check Valve
- 4 - 8N. Auxiliary Valve #1
- 4 - 8P. Auxiliary Valve #2
- 4 - 8R. Pressure Differential Valve
  (40 Bar/580 psi)
- 4 - 8S. End Cover
- 4 - 11. Pump Pressure Test Port

FRAME 5 COMPONENTS
- 5 - 12. Bucket Cylinders
  Bore: 101.6 mm (4.00 in)
  Rod: 57.2 mm (2.25 in)
  Stroke: 758.2 mm (29.85 in)
- 5 - 13. Bucket Cylinder
  Bore: 114.3 mm (4.5 in)
  Rod: 63.5 mm (2.5 in)
  Stroke: 529.2 mm (20.84 in)
- 5 - 14. Lift Cylinders
  Bore: 101.6 mm (4.0 in)
  Rod: 57.2 mm (2.25 in)
  Stroke: 783.0 mm (30.8 in)

FRAME 6 COMPONENTS
- 6 - 15. Steering Cylinders
  Bore: 63.5 mm (2.5 in)
  Rod: 34.93 mm (1.375 in)
  Stroke: 489.2 mm (19.25 in)
- 6 - 16. Steering Control Valve
  Displacement:
  460 cc/rev (28.07 cu in/rev)
- 6 - 16A. Circuit Relief Valve
  (290 Bar/4206 psi)
- 6 - 16B. Gerotor Pump
- 6 - 16C. Steering Spool
- 6 - 17. Back Pressure Valve
  (6-10 Bar/115-145 psi)

FRAME 7 COMPONENTS
- 7 - 1. Hydraulic Reservoir
- 7 - 18 Rear Brakes
  Modulation Pressure:
  (59 to 64 Bar/855.5 to 928 psi)
- 7 - 19. Rear Brake Pressure Test Port
- 7 - 20. Front Brake Pressure Test Port
- 7 - 21. Front Brake
  Modulation Pressure:
  (62 to 68 Bar/899 to 986 psi)
- 7 - 22. Parking Brake Cylinder
- 7 - 23. Brake Valve and Accumulator Charging Valve
  Cut-in Pressure:
  (157 to 167 Bar/2277 to 2422 psi)
  Cut-out Pressure:
  (190 to 196 Bar/2755 to 2843 psi)
- 7 - 23A. Park Brake Solenoid
- 7 - 23B. Front Brake Valve
- 7 - 23C. Rear Brake Valve
- 7 - 23D. Accumulator Isolation Check Valve
- 7 - 23E. Accumulator Charging Spool
- 7 - 23F. Priority Spool
- 7 - 24. Parking Brake Accumulator
  Pre-charge (97 Bar/1405 psi)
  Capacity: 0.5 liter/30.5 cu/in)
- 7 - 25. Front Axle Accumulator
  Pre-charge (55 Bar /800 psi)
  Capacity (2.8 liter/170.8 cu/in)
- 7 - 26. Front Accumulator Test Port
- 7 - 27. Redundant Brake Pressure Switch
  (NO, Closes at 62 Bar/900 psi)
- 7 - 28. Low Brake Pressure Switch
  Rising (141 Bar/2045 psi)
  Falling (117 Bar/1697 psi)
- 7 - 29. Brake Declutch Switch
  Adjustable Factory Setting:
  (NC, Opens at 24 Bar/350 psi)
- 7 - 30. Brake Lamp Switch
  (NO, Closes at 4.1 Bar/60 psi)
- 7 - 31. Redundant Brake Pressure Switch
  (NO, Closes at 62 Bar/900 psi)
- 7 - 32. Rear Axle Accumulator
  Pre-charge (55 Bar/800 psi)
  Capacity (2.8 liter/170.8 cu/in)
- 7 - 33. Rear Accumulator Test Port
- 7 - 34. Brake and Cooling Fan Pump
  14cc/rev (0.85 cu/in)

FRAME 8 COMPONENTS
- 8 - 1. Hydraulic Reservoir
- 8 - 35. Fan Drive Motor
  Displacement: 14 cc/rev (0.85 cu/in)
- 8 - 36. Fan Valve
  Fan Speed: 1650 ± 25 rpm
- 8 - 36A. Fan Relief
  (197 Bar/2857 psi)
- 8 - 37. Cooler Bypass Valve (Optional)
- 8 - 37A. Priority Valve
- 8 - 37B Relief Valve
  3.0 ± 0.6 Bar/ 43.5 ± 8.7 psi
- 8 - 38. Hydraulic Cooler

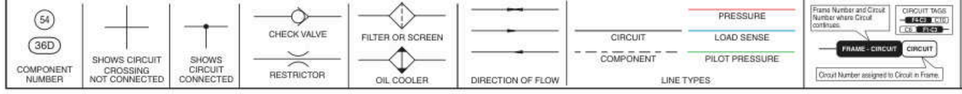
FRAME 9 COMPONENTS
- 9 - 39. Fan Reversing Valve
  Fan Speed: 1650 ± 25 rpm
- 9 - 39A. Fan Crossover Relief
  (234 BAR/3394 psi)
- 9 - 39B. Reversing Spools
- 9 - 39C. Pulse Width Modulator (PWM) Relief Solenoid
- 9 - 39D. ON/OFF Reverse Solenoid

FRAME 10 COMPONENTS
- 10 - 40. Ride Control Accumulator
  Pre-charge (14.5 Bar/210.3 psi)
  Capacity (3.78 liter/231 cu/in)
- 10 - 41. Ride Control Valve
- 10 - 41A. Pressure Relief Valve
  (280 BAR/4061 psi)
- 10 - 41B. Manual Bleed Valve
- 10 - 41C. Ride Control Spool Valve
- 10 - 41D. Ride Control Solenoid

FRAME 11 COMPONENTS
- 11 - 1. Hydraulic Reservoir
- 11 - 42. Auxiliary Steering Priority Valve
  Relief Pressure: (241 Bar/3495 psi)
- 11 - 42A. Priority Spool
- 11 - 42B. Relief Valve (240 BAR/3480 psi)
- 11 - 43. Auxiliary Steering Pump
  Displacement:
  11 cc/rev (0.671 cu/in)
- 11 - 44. Auxiliary Steering Load Sense Valve

FRAME 11 COMPONENTS
- 12 - 45. Coupler Locking Cylinders
- 12 - 46. Coupler Locking Valve

HYDRAULIC SYMBOLS



CIRCUIT CONTINUATION

NOTES

NOTE 1. Reverse Control Check Valve.
Used with Ride Control equipped Models ONLY.
NOTE 2. Used for XT Model Machines ONLY.
NOTE 3. This will replace Item 36 in Frame 8 when this Option is installed on machine.
NOTE 4. See the Repair Manual for the proper Testing and Adjustment for Hydraulic Components.

HYDRAULIC SCHEMATIC
521E WHEEL LOADER

Additional copies of this Hydraulic and Electrical Schematic can be ordered through Technical Publications Distribution System.
The part number is 5-11180

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