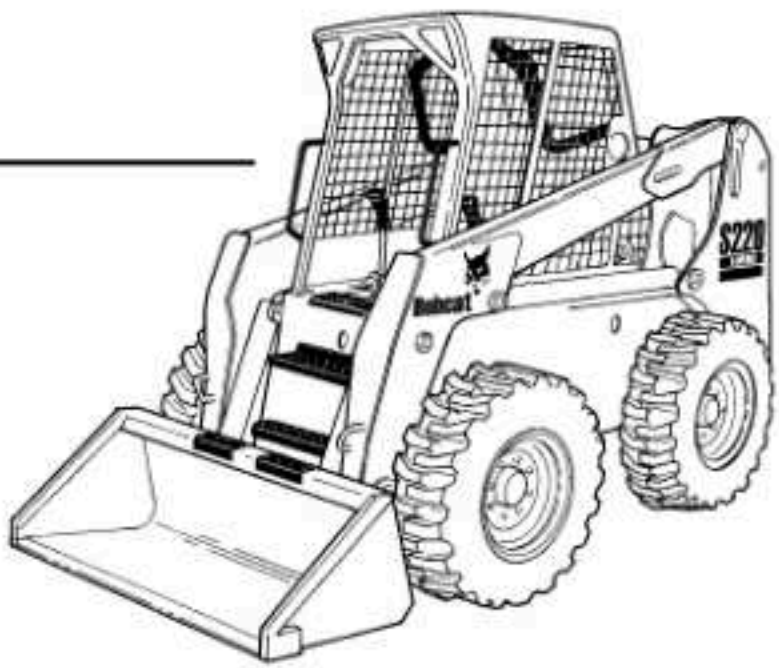
S220 TURBO

S220 TURBO HIGH FLOW

Bobcat®

Service Manual

S/N 526211001 & Above
S/N 526311001 & Above



EQUIPPED WITH BOBCAT INTERLOCK CONTROL SYSTEM (BICS™)

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Ingersoll Rand
Compact Vehicle Technologies
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HYDRAULIC/HYDROSTATIC SCHEMATIC
WITH TWO SPEED VALVE AND HIGH FLOW OPTION
S220 (S/N 526214000 AND ABOVE)
(S/N 526312000 AND ABOVE)

(PRINTED MARCH 2005)
V-0647legend

LEGEND

1. RESERVOIR:
   Capacity . . . . . 21 Qts. (19.9 L)
2. FILTER - CASE DRAIN (90 Micron)
3. FILTER - HYDRAULIC (CANISTER)
4. SPRING LOADED FILTER BYPASS VALVE: 45-55 PSI (3,1-3,8 Bar)
5. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE WITH 30PSI SPRING - HYDRAULIC POWERED BOB-TACH
6. DIFFERENTIAL PRESSURE SWITCH: 36-44 PSI (2,5-3,0 Bar)
7. FLOW DIVIDER ADJUSTMENT VALVE
8. CHECK VALVE - BUCKET POSITION VALVE
9. FIXED CAPACITY DISPLACEMENT BIDIRECTIONAL HYDROSTATIC MOTOR
10. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - FLOW CONTROL SPOOL
11. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - UNLOADING SPOOL
12. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - TILT CONTROL
13. PILOTED ACTIVATED DIRECTIONAL CONTROL VALVE - LIFT CONTROL
14. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BICS CONTROL
15. PULL BUTTON ACTIVATED DIRECTIONAL CONTROL VALVE - LIFT ARM BY PASS
16. FILTER - BICS CONTROL VALVE (SCREEN)
17. RELIEF/ANTICAVITATION VALVE - PORT (TILT ROD END)
    4000 PSI (275 Bar)
18. LOAD CHECK VALVE
19. RELIEF VALVE - MAIN:
    3250-3350 PSI (224-231 Bar)
    at Front Quick Couplers
20. RELIEF/ANTICAVITATION VALVE - PORT (TILT BASE END)
    4000 PSI (275 Bar)
21. ANTICAVITATION VALVE
22. RELIEF/ANTICAVITATION VALVE - PORT (LIFT BASE END)
    4000 PSI (275 Bar)
23. RELIEF VALVE - 3300 PSI (227,6 Bar)
24. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - AUXILIARY
25. RELIEF/ANTICAVITATION VALVE - PORT (OPTIONAL)
    3100 PSI (214 Bar)
26. RELIEF/REPLENISHING VALVE - HIGH PRESSURE: 5000 PSI (345 Bar)
27. PRESSURE SWITCH
28. RELIEF VALVE - CHARGE:
    120 degrees F. (53 degrees C.)Fluid
    at High Engine Idle
    400 - 460 PSI (27,5 - 31,7 Bar)
29. CHARGE PUMP
    13.6 GPM (51,5 L/min.) at High Engine Idle
30. HYDRAULIC PUMP . . . . . Gear Type
    20.7 GPM (78.35 L/min.) at High Engine Idle
31. DRIVE MOTOR SHUTTLE VALVE
32. SHUTTLE RELIEF VALVE:
    200 PSI (13,8 Bar)
33. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BASE
34. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - ROD
35. LOAD SHUTTLE VALVE - BLEED OFF
36. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE (TWO COIL)
37. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - REAR AUX
38. ORIFICE WITH 0.140 (3,6 mm) RESTRICTION
39. CHECK VALVE
40. FILTER (BRAKE)
41. CHECK VALVE - BICS CONTROL VALVE
42. RESTRICTION
43. AUXILIARY HYDRAULIC PUMP

    S/N 526214000 - 526214399
    S/N 526312000 - 526212099
    10.2 GPM (37.85 L/min.) at High Engine Idle

    S/N 526214400 & Above
    S/N 526212100 & Above
    20.7 GPM (76.8 L/min.) at High Engine Idle

44. PILOT ACTIVATED DIRECTIONAL CONTROL VALVE - TWO SPEED DRIVE MOTOR
45. VARIABLE CAPACITY DISPLACEMENT BIDIRECTIONAL HYDROSTATIC PUMP
46. RELIEF VALVE 2000 PSI (138 Bar)
47. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE (TWO COIL)
48. RELIEF VALVE - 1200 PSI (82,8 Bar)
49. CHECK VALVE WITH 80 PSI (5,5 Bar) SPRING
50. CHECK VALVE WITH 300 PSI (20,7 Bar) SPRING WITH 0.016 (0.40 mm) ORIFICE
51. FILTER - BOB-TACH
52. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BUCKET POSITION VALVE (ON/OFF)
53. FIXED CAPACITY DISPLACEMENT BIDIRECTIONAL HYDROSTATIC MOTOR
54. HYDRAULIC BRAKE - SPRING APPLIED - PRESSURE TO RELEASE
55. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - BRAKE
56. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - MAKE-UP
57. SOLENOID ACTIVATED DIRECTIONAL CONTROL VALVE - TWO SPEED
58. FRONT AUXILIARY MANUAL PRESSURE BLEED-OFF VALVE
59. FILTER - CASE DRAIN (ATTACHMENT)
60. RELIEF VALVE - 3300 PSI (227,6 Bar)
61. DUMP VALVE (ON/OFF)
62. CHECK VALVE
63. ORIFICE WITH 0.031 (0.76 mm) RESTRICTION
64. ORIFICE WITH 0.089 (2.26 mm) RESTRICTION
65. ORIFICE WITH 0.025 (0.64 mm) RESTRICTION

NOTE: Unless otherwise specified springs have NO significant pressure value.

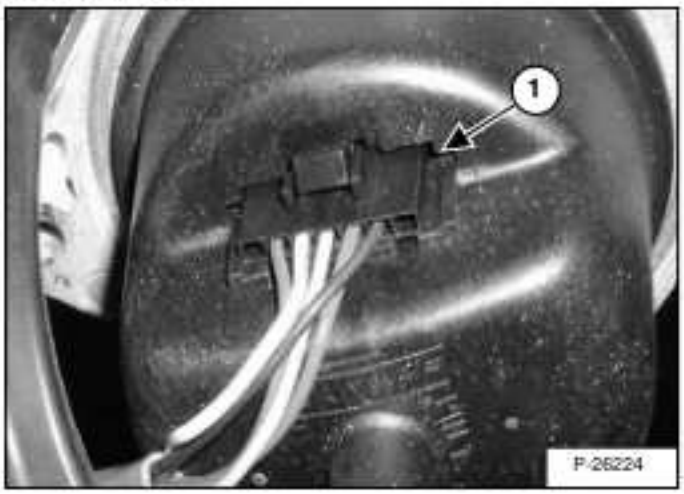
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CONTROL HANDLE (SELECTABLE JOYSTICK CONTROL) (SJC) (CONT'D)

Joystick Removal (Right & Left) (Cont'd)

Figure 50-112-9



Disconnect the electrical harness (Item 1) **[Figure 50-112-9]** from the joystick.

Remove the joystick from the loader.

Joystick Boot Removal (Right & Left)

Figure 50-112-10



Raise the lift arms and install an approved lift arm support device. (See Engaging The Lift Arm Support Device on Page 10-20-1.)

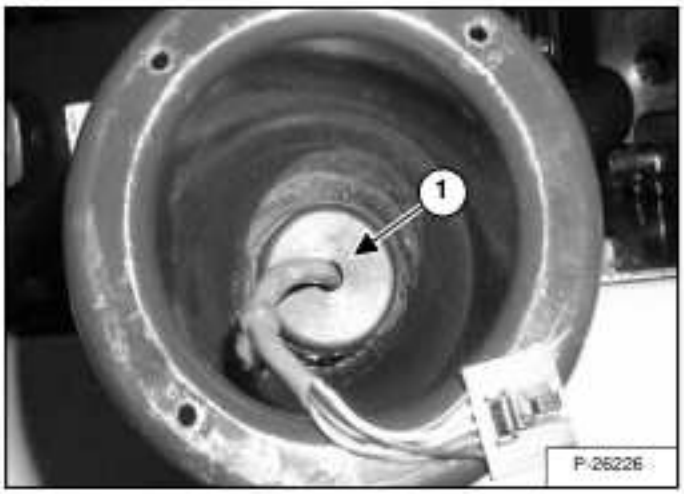
Raise the operator cab. (See Raising The Operator Cab on Page 10-30-1.)

Remove the joystick. (See Joystick Removal (Right & Left) on Page 50-112-2.)

Remove the joystick boot from the control lever assembly **[Figure 50-112-10]**.

Lever Assembly Removal (Right & Left)

Figure 50-112-11



Raise the lift arms and install an approved lift arm support device. (See Engaging The Lift Arm Support Device on Page 10-20-1.)

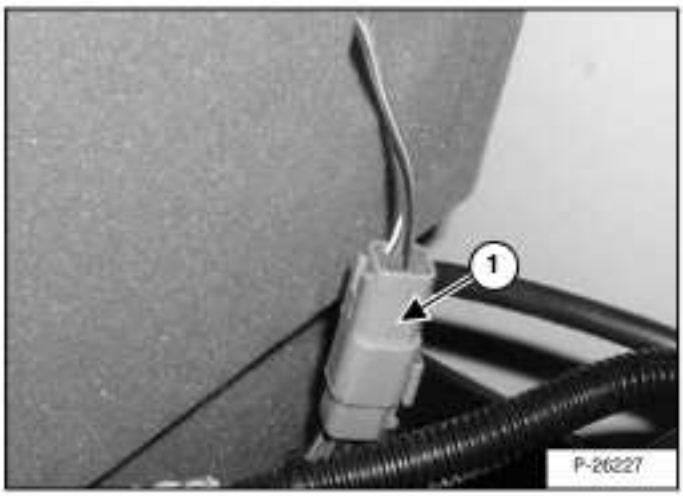
Raise the operator cab. (See Raising The Operator Cab on Page 10-30-1.)

Remove the joystick. (See Joystick Removal (Right & Left) on Page 50-112-2.)

Remove the joystick boot. (See Joystick Boot Removal (Right & Left) on Page 50-112-3.)

Remove the joystick wiring grommet (Item 1) **[Figure 50-112-11]**

Figure 50-112-12



Disconnect the joystick wiring harness connector (Item 1) **[Figure 50-112-12]**.

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SYSTEM TROUBLESHOOTING CHART

Blower motor does not operate

Possible Cause	Inspection	Solution
1. Blown fuse.	Inspect the fuse/wiring.	Replace fuse/repair wiring.
2. Broken wiring or bad connection.	Check the fan motor ground and connectors.	Repair the wiring or connector.
3. Fan motor malfunction.	Check the lead wires form the motor with a circuit tester.	Replace Motor.
4. Resistor malfunction.	Check resistor using a circuit tester.	Replace Resistor.
5. Fan motor switch malfunction.	Check power into and out of the fan switch.	Replace Fan Switch.

Blower motor operates normally, but air flow is insufficient

Possible Cause	Inspection	Solution
1. Evaporator inlet obstruction.	Check evaporator for plugging.	Remove obstruction and clean evaporator fins with air or water.
2. Air leak.	Check to make sure air hoses are properly hooked to Louvers, and air ducts.	Repair of adjust.
3. Defective thermo. switch (frozen evaporator).	Check thermostat using a circuit tester.	Replace thermostat.
4. Plugged cab filters	Check cab filter condition.	Clean or replace filters.

Insufficient cooling although air flow and compressor operation are normal

Possible Cause	Inspection	Solution
1. System low on refrigerant.	The high side pressure will be low and bubbles may be present in sight glass on receive drier.	Repair any leaks and recharge the refrigerant to the correct level.
2. Excessive refrigerant.	The high pressure side pressure will be high.	Use refrigerant recovery equipment to capture excess refrigerant. Charge to the correct refrigerant level.

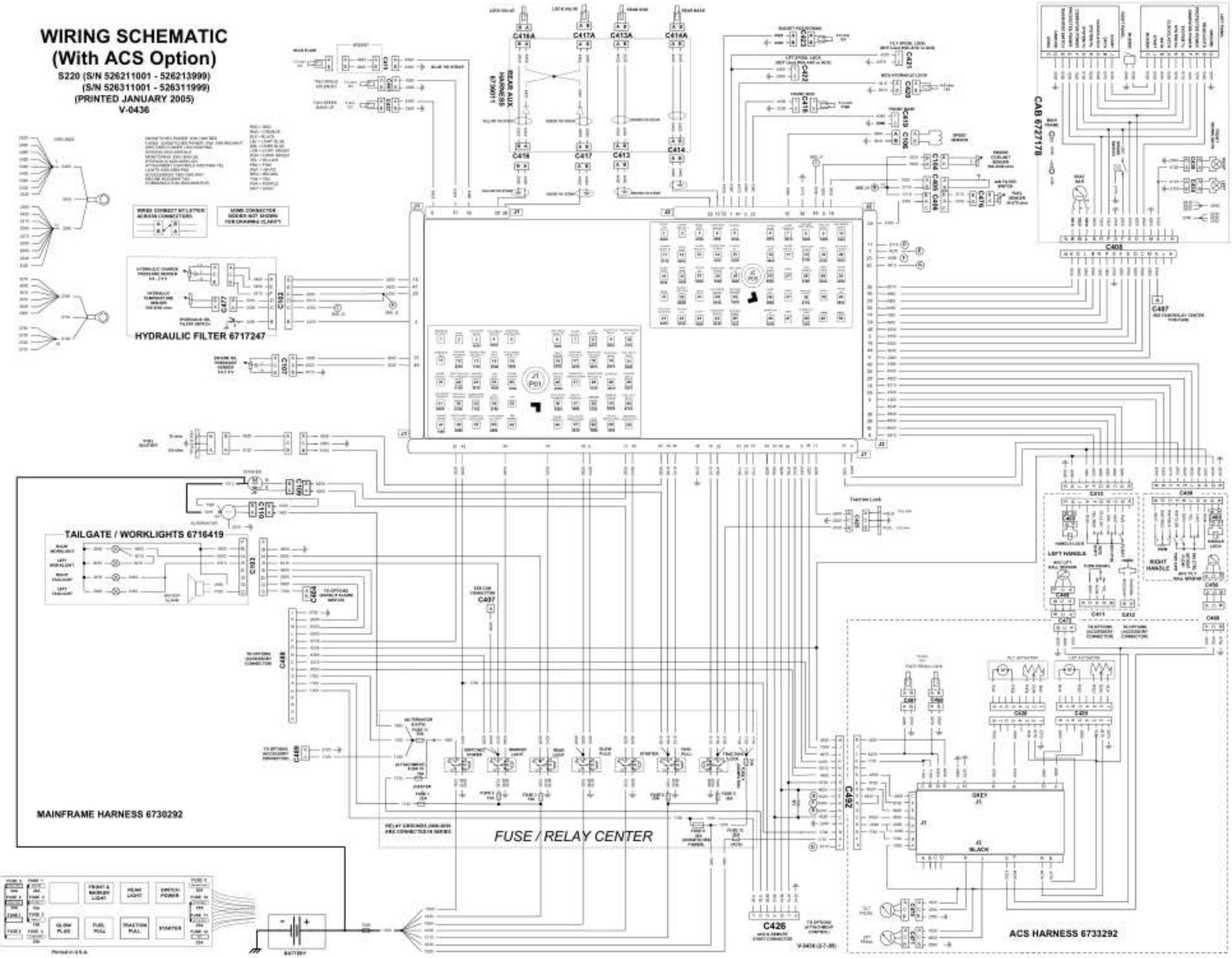
The compressor does not operate at all, or operates improperly

Possible Cause	Inspection	Solution
1. Loose drive belt.	The belt is vibrating or oscillating.	Adjust tension.
2. Internal compressor malfunction.	The compressor is locked up and the belt slips.	Replace compressor.
	Magnetic clutch related	
3. Low battery voltage.	Clutch slips.	Recharge the battery.
4. Faulty coil.	Clutch slips.	Replace the magnetic clutch.
5. Oil on the clutch surface.	Clutch slips.	Replace or clean the clutch surface.
6. Open oil.	Clutch does not engage and there is no reading when a circuit tester is connected between the coil and terminals.	Replace clutch.
7. Broken wiring or poor ground.	Clutch will not engage. Inspect the ground and connections.	Repair.
8. Wiring harness components.	Test the conductance of the pressure switch, thermostat, Relay, etc.	Check operation.

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WIRING SCHEMATIC
(With ACS Option)

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(S/N 526311001 - 526311999)
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