# 1790 Front-Fold Planter Diagnosis and Tests
(Serial No. 705101- )

## TECHNICAL MANUAL
## 1790 Front-Fold Planter (705101- )

**TM2159 01JUN04 (ENGLISH)**

**For complete service information also see:**

| | |
|---|---|
| COMPUTER TRAK® 350 and 450 Monitors | TM2064 |
| SEEDSTAR Generation 2, Mapped Based Seeding and Variable Rate Fertilizer Diagnosis and Test Manual | TM2099 |
| SEEDSTAR Seed Monitor, Map Based Seeding, and Variable Rate Drive | TM1601 |
| 1790 Front-Fold Planter Repair | TM2058 |

**John Deere Seeding Group**
LITHO IN U.S.A.

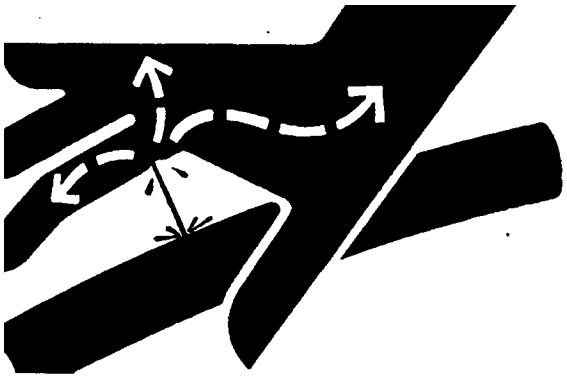
## Avoid High-Pressure Fluids

Escaping fluid under pressure can penetrate the skin causing serious injury.

Avoid the hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.

Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source. Such information is available from Deere & Company Medical Department in Moline, Illinois, U.S.A.



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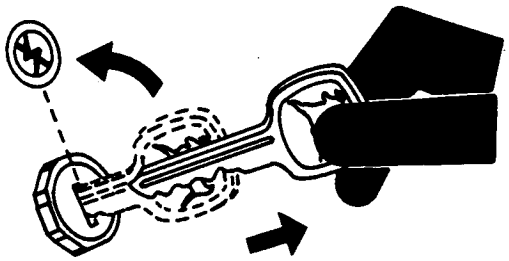
## Park Machine Safely

Before working on the machine:

- Lower all equipment to the ground.
- Stop the engine and remove the key.
- Disconnect the battery ground strap.
- Hang a "DO NOT OPERATE" tag in operator station.



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## Lubricant Storage

Your equipment can operate at top efficiency only when clean lubricants are used.

Use clean containers to handle all lubricants.

Whenever possible, store lubricants and containers in an area protected from dust, moisture, and other contamination. Store containers on their side to avoid water and dirt accumulation.

Make certain that all containers are properly marked to identify their contents.

Properly dispose of all old containers and any residual lubricant they may contain.

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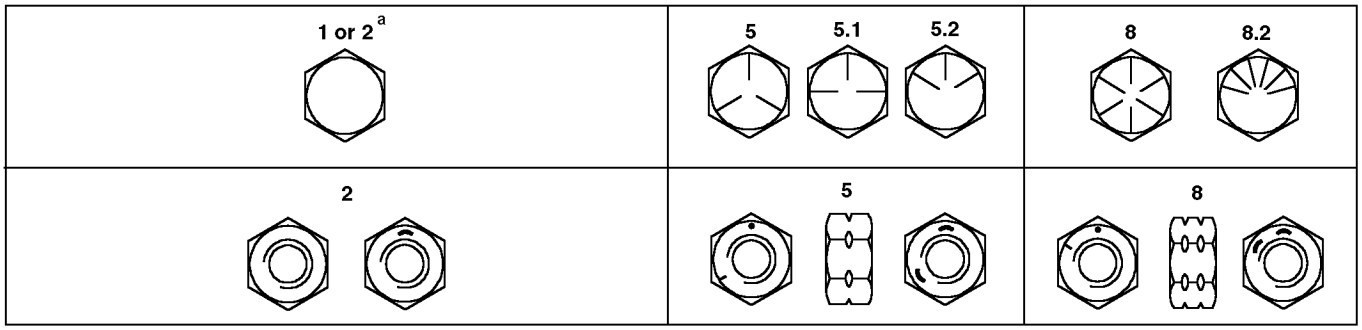
## Unified Inch Bolt and Cap Screw Torque Values




TORQ1A –UN–27SEP99

*Top, SAE Grade and Head Markings; Bottom, SAE Grade and Nut Markings*

| | Grade 1 (No Mark) | | Grade 2[a] (No Mark) | | Grade 5, 5.1 or 5.2 | | Grade 8 or 8.2 | |
|---|---|---|---|---|---|---|---|---|
| **Size** | **Lubricated[b] N•m (lb-ft)** | **Dry[c] N•m (lb-ft)** | **Lubricated[b] N•m (lb-ft)** | **Dry[c] N•m (lb-ft)** | **Lubricated[b] N•m (lb-ft)** | **Dry[c] N•m (lb-ft)** | **Lubricated[b] N•m (lb-ft)** | **Dry[c] N•m (lb-ft)** |
| 1/4 | 3.8 (2.8) | 4.7 (3.5) | 6 (4.4) | 7.5 (5.5) | 9.5 (7) | 12 (9) | 13.5 (10) | 17 (12.5) |
| 5/16 | 7.7 (5.7) | 9.8 (7.2) | 12 (9) | 15.5 (11.5) | 19.5 (14.5) | 25 (18.5) | 28 (20.5) | 35 (26) |
| 3/8 | 13.5 (10) | 17.5 (13) | 22 (16) | 27.5 (20) | 35 (26) | 44 (32.5) | 49 (36) | 63 (46) |
| 7/16 | 22 (16) | 28 (20.5) | 35 (26) | 44 (32.5) | 56 (41) | 70 (52) | 80 (59) | 100 (74) |
| 1/2 | 34 (25) | 42 (31) | 53 (39) | 67 (49) | 85 (63) | 110 (80) | 120 (88) | 155 (115) |
| 9/16 | 48 (35.5) | 60 (45) | 76 (56) | 95 (70) | 125 (92) | 155 (115) | 175 (130) | 220 (165) |
| 5/8 | 67 (49) | 85 (63) | 105 (77) | 135 (100) | 170 (125) | 215 (160) | 240 (175) | 305 (225) |
| 3/4 | 120 (88) | 150 (110) | 190 (140) | 240 (175) | 300 (220) | 380 (280) | 425 (315) | 540 (400) |
| 7/8 | 190 (140) | 240 (175) | 190 (140) | 240 (175) | 490 (360) | 615 (455) | 690 (510) | 870 (640) |
| 1 | 285 (210) | 360 (265) | 285 (210) | 360 (265) | 730 (540) | 920 (680) | 1030 (760) | 1300 (960) |
| 1-1/8 | 400 (300) | 510 (375) | 400 (300) | 510 (375) | 910 (670) | 1150 (850) | 1450 (1075) | 1850 (1350) |
| 1-1/4 | 570 (420) | 725 (535) | 570 (420) | 725 (535) | 1280 (945) | 1630 (1200) | 2050 (1500) | 2600 (1920) |
| 1-3/8 | 750 (550) | 950 (700) | 750 (550) | 950 (700) | 1700 (1250) | 2140 (1580) | 2700 (2000) | 3400 (2500) |
| 1-1/2 | 990 (730) | 1250 (930) | 990 (730) | 1250 (930) | 2250 (1650) | 2850 (2100) | 3600 (2650) | 4550 (3350) |

*[a] Grade 2 applies for hex cap screws (not hex bolts) up to 6 in. (152 mm) long. Grade 1 applies for hex cap screws over 6 in. (152 mm) long, and for all other types of bolts and screws of any length.*

*[b] "Lubricated" means coated with a lubricant such as engine oil, or fasteners with phosphate and oil coatings.*

*[c] "Dry" means plain or zinc plated without any lubrication.*

DO NOT use these values if a different torque value or tightening procedure is given for a specific application. Torque values listed are for general use only. Check tightness of fasteners periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and that you properly start thread engagement. This will prevent them from failing when tightening.

Tighten plastic insert or crimped steel-type lock nuts to approximately 50 percent of the dry torque shown in the chart, applied to the nut, not to the bolt head. Tighten toothed or serrated-type lock nuts to the full torque value.

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## CCS Auxiliary Hydraulics Coupler Seed Delivery Fan Switch Diagnostics

*This procedure provides supporting information to troubleshoot a CCS Auxiliary Hydraulics Coupler Seed Delivery Fan Switch problem*

CCS Auxiliary Hydraulic Coupler (Optional) Diagnostics

Electrical Schematic

[General Information] [Solenoid Sequence Table]

Theory of Operation

[Overall Connector Locations A-C] [Overall Connector Locations A-X] [X300 - X399 Connector Information] [X400 - X499 Connector Information] [X500 - X599 Connector Information]

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## CCS Auxiliary Power Diagnostics

*This procedure provides supporting information to troubleshoot a CCS Auxiliary Power problem.*

CCS Auxiliary Power Diagnostics

Electrical Schematic

[General Information] [Solenoid Sequence Table]

Theory of Operation

[Overall Connector Locations A-C] [Overall Connector Locations A-X] [X300 - X399 Connector Information] [X400 - X499 Connector Information] [X500 - X599 Connector Information]

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## CCS Auxiliary Hydraulic Coupler Diagnostics

*This procedure provides supporting information to troubleshoot a CCS Auxiliary Hydraulic Coupler problem.*



CCS Auxiliary Hydraulic Coupler (Optional) Diagnostics

Hydraulic Schematic

General Information

Theory of Operation

[Overall Hydraulic Component Location A-N] [Overall Hydraulic Component Location O-U] [Hydraulic Component Locations]

KC01776,0001840 –19–18DEC03–1/1

## CCS Seed Delivery Fan Motor Diagnostics

*This procedure provides supporting information to troubleshoot a CCS Seed Delivery Fan Motor problem.*

CCS Seed Delivery Fan Motor Diagnostics

Hydraulic Schematic

General Information

Theory of Operation

[Overall Hydraulic Component Location A-N] [Overall Hydraulic Component Location O-U] [Hydraulic Component Locations]

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- Use proper terminals for any connector repairs.
  Why: In some connectors different terminal materials are used (to carry different currents). If improper terminals or terminal materials are used future electrical problems may occur from corrosion or current carrying capacity.

- When removing terminals from a connector body it is very important to use the proper extraction tool and procedure. Extraction tools are available through SERVICEGARD.
  Why: The connector body can be damaged if terminals are just "jerked" out. The damage caused by this action may not be readily visible, but may prevent new terminals from being properly retained and cause replacement of the connector body.

- When installing a new terminal on a wire make sure the proper crimping tools is used.
  Why: Each part of the electrical terminal is designed for a specific purpose, failure to properly crimp the terminal can result in future electrical or mechanical problems. Terminal crimping tools are available through SERVICEGARD. It is important to make sure the insulation and wire crimps on each terminal are made properly. Soldering terminals is not recommended. See repair procedures in the Connector Repair Procedures Group

- Soldering splices is not recommended.
  Why: Any repairs to wires in the harness should not allow moisture to come in contact with the actual copper conductor. Soldering a wire splice is not recommended because a portion of stranded wire will become solid and can cause it to break in the future, especially if it is subject to movement. When repairing a broken wire in a wiring harness, use "Heat-Shrinkable" butt splices. Be careful not to place a splice in any section of the harness subject to motion or flexing.

**Diagnostic Schematic and Schematic Symbols Information**

**How to use an Electrical Diagnostic Schematic**

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All electrical systems on this machine are divided into systems. Each system has a Diagnostic Schematic associated with it that provides a complete view of all associated components, connectors, terminal numbers, wiring harnesses, and ground points. An example is shown below.

Diagnostic Schematics are provided to allow a technician to all the electrical components associated with a particular system on the machine.

This schematic will allow you to follow the wiring from a component through all associated wiring harnesses to its final point of use.

Only the terminals of a connector that are used are shown.

Only the components of a system that are used are shown.

Every ground point on this machine has been assigned a connector identifier number (X999) and location info is available in Section 240 Connector Information group of this technical manual.

**Continued on next page**

## Solenoid Sequence Table

The following table shows which solenoid valves are energized when different system functions are selected and in operation.

| Sequence Operations | Solenoids | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Y1 | Y5 | Y6 | Y8 | Y9 | Y11 | Y13 | Y14 | Y15 | Y18 | Y19 | Y20 | Y21 | Y22 | Y23 | Y24 | Y25 |
| | | | | | | | | | | | | | | | | | |
| Plant | E | | | E | | | | | | E | E | E | E | | | | |
| Wing Wheels | E | | | E | | | | | | | | | | E | E | E | E |
| Fold | | | | E | E | | | | | | | | | | | | |
| Rockshafts | | | | | | E | E | | E | | | | | | | | |
| Left Marker Lower | | | E | | | | | | | | | | | | | | |
| Right Marker Lower | | | | E | | | | | | | | | | | | | |
| CCS Fan | | | | | | | | E | | | | | | | | | |

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| ❹ **CCS Fan Check with out Auxiliary Hydraulics Check** | Unplug the (W308) Auxiliary Hydraulic Harness connector X510.<br><br>Unplug the CCS Seed Delivery Fan Hydraulic Motor Solenoid X512.<br><br>Plug the Frame Harness (W302) X510 connector directly into the CCS Seed Delivery Fan Hydraulic Motor Solenoid (Y14).<br><br>Move CCS Clean Out Switch (S8) to PLANT/TANK CLEANOUT position.<br><br>Start tractor and run at 1800 RPM.<br><br>Set hydraulic system to MAXIMUM flow.<br><br>Lower Left and Right Rockshafts (Split Rows) on wings.<br><br>Unfold the planter completely.<br><br>Completely lower planter to ground and lock SCV lever in lower position, continuous detent.<br><br>Is the CCS Seed Delivery Fan operating? | **YES:** GO TO ❺<br><br>**NO:** GO TO **Section 240 - Electrical System Diagnosis and Test - CCS Seed Delivery Fan Diagnostics**<br><br>– – –1/1 |
| ❺ **Auxiliary Hydraulic CCS Fan Switch Power Check** | Planter in the unfolded and lowered plant position.<br><br>Tractor Key Switch to the Run Position.<br><br>Disconnect and measure voltage at Auxiliary Hydraulic CCS Fan Switch (S12) connector X511 (Harness End) between Pin A and frame ground.<br><br>Is the voltage 12 VDC? | **YES:** GO TO ❻<br><br>**NO:** Refer to Schematic and repair red wire from connector X510 and X511.<br><br>GO TO ❶<br><br>– – –1/1 |
| ❻ **Auxiliary Hydraulic CCS Fan Switch Check** | Auxiliary Hydraulic CCS Fans Switch in the Fan ON position.<br><br>Disconnect and measure resistance through Auxiliary Hydraulic CCS Fan Switch (S12) connector X511 between Pin A and Pin B.<br><br>Is the resistance less than 5 Ohms? | **YES:** GO TO ❼<br><br>**NO:** Replace Auxiliary Hydraulic CCS Fan Switch (S12).<br><br>GO TO ❶<br><br>– – –1/1 |

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| ❼ **Left and Right Bin Level Sensors Uncovered Check** | Be certain that neither the Left (B1) or Right (B2) Bin Level Sensors are covered.<br><br>Tractor key switch in ON position.<br><br>Is the Tank Low Warning Light located on the Frame Control Console ON? | **YES:** GO TO ❹<br><br>**NO:** GO TO ❽<br><br>– – –1/1 |

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| ❽ **Left and Right Bin Level Sensors Uncovered Voltage Check** | Disconnect Frame Harness (W302) from Frame Control Console Extension Harness (W301), X401.<br><br>Be certain that neither the Left (B1) or Right (B2) Bin Level Sensors are covered.<br><br>Tractor key switch in ON position.<br><br>Measure voltage between connector X401 Yellow/Black Wire (Pin 18) and frame ground.<br><br>Is voltage less than 1VDC? | **YES:** GO TO ❾<br><br>**NO:** GO TO ⓫<br><br>– – –1/1 |



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|---|---|---|
| ❾ **CC #14 between X402, Pin K and X401, Pin 18 Check.** | Disconnect Frame Control Console (A301) from Frame Control Console Extension Harness (W301), X402.<br><br>Be certain that neither the Left (B1) or Right (B2) Bin Level Sensors are covered.<br><br>Tractor key switch in ON position.<br><br>Measure voltage between connector X402 cc #14 (Pin K) and frame ground.<br><br>Is voltage less than 1VDC? | **YES:** GO TO ⓾<br><br>**NO:** There is a short between another power wire and circuit #14 between X402, Pin K and X401, Pin 18. Inspect the harness and repair as required.<br><br>GO TO ❸<br><br>– – –1/1 |

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| ⓾ **Control Console Check** | Disconnect Frame Control Console connector X402.<br><br>Disassemble Frame Control Console A301 by removing the four screws on the back side of the console.<br><br>Separate the circuit board from the back side of the console switches.<br><br>Remove Row Lift Switch/Tank Low Warning Lamp (S106) from printed circuit board.<br><br>Test Light Emitting Diode (LED) on the Row Lift Switch/Tank Low Warning Lamp (S106) by checking resistance in one direction with the test leads and then resistance in the other direction.<br><br>Do you have **Less** than 5 ohms in only one direction? | **YES:** Replace Control Console Circuit Board.<br><br>GO TO ❸<br><br>**NO:** Replace Row Lift Switch/Tank Low Warning Lamp (S106).<br><br>GO TO ❸<br><br>– – –1/1 |

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|---|---|---|
| ❺ **Agitation Motor Voltage Check** | Lower Left and Right Rockshafts (Split Rows) on wings.<br>Engine OFF.<br>Key Switch in RUN position.<br>Planter unfolded completely.<br>Planter lowered completely to ground.<br>Disconnect X432 at Agitation Motor (M4).<br>Measure voltage between Pin C of X432 and frame ground.<br>Is the voltage 12 VDC? | **YES:** GO TO ❸<br>**NO:** GO TO ❻<br>– – –1/1 |



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| ❻ **Circuit Between X433, Pin B and X432, Pin C Check** | Lower Left and Right Rockshafts (Split Rows) on wings.<br>Engine OFF.<br>Key Switch in RUN position.<br>Planter unfolded completely.<br>Planter lowered completely to ground.<br>Disconnect X432 at the Agitation Motor (M4) and remove fuse F4.<br>Measure resistance between Pin B of X433 and Pin C of X432.<br>Is the resistance more than 5 Ohms? | **YES:** Refer to schematic and repair Red/White wire between Pin B of X433 and Pin C of X432.<br>GO TO ❸<br>**NO:** GO TO ❼<br>– – –1/1 |

## Theory of Operation

**Plant Mode:**

With the CCS Seed Delivery System, a hydraulically driven fan provides airflow for seed delivery from a central tank to a hopper on the row unit. The metering of the seed is still handled by a meter at the row unit to maintain consistent and accurate seed spacing. CCS Seed Delivery acts as a tender for the row unit; It provides a small pool of seed at each row unit at all times to supply the need of the meter. In order for the CCS Seed Delivery Fan to turn, the Tractor's Key Switch must be in the ON position, planter must be completely unfolded and lowered to the ground, and the Right and Left Rockshafts must be completely lowered. Also, the Tractor's SCV associated with the Field Raise/Lower circuit must be in the Planter Lower Detent and supplying Continuous Hydraulic Flow.

With the Key Switch in the RUN position, 12 VDC supplied by the tractor flows through connector X301 (7 pin Trailer Lighting and Accessory Outlet) on pin 7 (Red Wire). It then routes to pin A of the CCS ON/OFF Mercury Switch on the Right Rockshaft (X421). With the Rockshafts lowered, voltage exits X421 on pin B and enters the CCS Push Button Shut Off Switch (S5) on pin A of X419. When the Planter is completely unfolded and lowered, S5 is closed, and current is able to exit the switch on pin B as a Black Wire. The Black Wire passes through pin A of X420 at the CCS Seed Delivery Fan Hydraulic Motor Solenoid (Y14), energizing the solenoid. If continuous hydraulic flow is present, the fan is able to turn. Electrical Current on the Black Wire also flows to the CCS Agitator Motor Relay and associated Agitator Motor Circuits causing the Seed Agitators to turn.

**Purge Hoses Mode:**

For Clean Out purposes, the CCS Seed Delivery Fan can be turned on while the Planter is fully raised. This is done by selecting PLANT on the Plant/Transport Mode Switch (S101) of the Frame Control Console, PURGE HOSES on the CCS Clean Out Switch located near the Vacuum Gauge on the planter, and positioning the Tractor's SCV associated with the Field Raise/Lower Circuit to the Planter Lower Detent. This supplies Continuous Hydraulic Flow to the Fan without lowering the planter

With the Key Switch in the RUN position, 12 VDC supplied by the tractor flows through connector X301 (7 pin Trailer Lighting and Accessory Outlet) on pin 7 (Red Wire). It then routes to pin A of the CCS ON/OFF Mercury Switch on the Right Rockshaft (X421) and CCS Fan Motor Shut Off Relay (K33) on pin 30 of X438. With the Rockshafts lowered, voltage exits X421 as a Black Wire on pin B and enters the CCS Clean Out Switch (S8) on pin A of X431. When S8 is in the PURGE HOSES position, the switch is closed and current is able to exit the switch on pin B as a Black Wire. 12 VDC flows on the Black Wire to pin 85 of the CCS Fan Motor Shut Off Relay (K33), X438 and pin 85 of the Clean Out Mode Relay (K32), X437, energizing both Relays. When K33 becomes energized, current is able to exit the relay through pin 87 on a Black Wire. The Black Wire passes through pin A of X420 at the CCS Seed Delivery Fan Hydraulic Motor Solenoid (Y14), energizing the solenoid. If continuous hydraulic flow is present, the fan is able to turn. Electrical Current on the Black Wire also flows to the CCS Agitator Motor Relay and associated Agitator Motor Circuits causing the Seed Agitators to turn. As K32 is energized, the circuit to the CCS Center Frame Field Raise/Lower and Transport Raise/Lower Solenoid (Y1) is opened and the Planter's Raise/Lower Function is disabled.



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| **⑩ X419 Voltage Check** | STOP engine.<br><br>Key switch in RUN position.<br><br>Left and Right Rockshafts (Split Rows) lowered.<br><br>Planter unfolded completely.<br><br>Planter lowered completely to ground.<br><br>CCS Clean Out Switch (S8) in **PLANT/TANK CLEANOUT** position.<br><br>Disconnect and measure voltage at Push Button Shut Off Switch (S5) connector X419 (Harness End) between Pin A and frame ground.<br><br>Is the voltage 12 VDC? | **YES:** GO TO ⑪<br><br>**NO:** GO TO ⑫<br><br>– – –1/1 |



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|---|---|---|
| **⑪ CCS Push Button Shut Off Switch Check** | STOP engine.<br><br>Key switch in RUN position.<br><br>Left and Right Rockshafts (Split Rows) lowered.<br><br>Planter unfolded completely.<br><br>Planter lowered completely to ground.<br><br>CCS Clean Out Switch (S8) in **PLANT/TANK CLEANOUT** position.<br><br>Disconnect and measure resistance through Push Button Shut Off Switch (S5) at connector X419 between Pin A and Pin B.<br><br>Is the resistance more than 5 Ohms? | **YES:** Replace CCS Push Button Shut Off Switch (Row Unit) (S5).<br><br>GO TO ⑥<br><br>**NO:** Refer to schematic and repair Black wire between Pin B of X419 and Pin A of X420.<br><br>GO TO ⑥<br><br>– – –1/1 |

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|---|---|---|
| **⑫ Circuit Between X421, Pin A and X301, Pin 7 Check** | Lower Left and Right Rockshafts (Split Rows) on wings.<br><br>Engine OFF.<br><br>Key Switch in RUN position.<br><br>Planter unfolded completely.<br><br>Planter lowered completely to ground.<br><br>Disconnect and measure voltage at CCS ON/OFF Mercury Switch (S6) connector X421 between Pin A and frame ground.<br><br>Is the voltage 12 VDC? | **YES:** GO TO ⑬<br><br>**NO:** Refer to schematic and repair Red wire between Pin A of X421 and Pin 7 of X301.<br><br>GO TO ⑥<br><br>– – –1/1 |

**E305—CCS Tank Fill Lamp #1**
**E306—CCS Tank Fill Lamp #2**
**S11—CCS Tank Fill Light Switch**
**W302—Frame Harness**
**W307—CCS Tank Fill Lights Harness**
**X301—7-Pin Trailer Lighting and Accessory Outlet**

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# CCS Tank Fill Lights Diagnostics

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KC01776,0001928 –19–31DEC03–1/1

## CCS Tank Fill Lights Problem

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| ❶ **Preliminary Check** | Visually inspect the Planter for the following:<br><br>Electrical connections to tractor;<br><br>• 7-Pin Trailer Lighting and Accessory Outlet Connector X301<br>• Machine Harness to Extension Harness Connector X401<br>• Extension Harness to Control Console X402<br><br>Hydraulic connection to tractor;<br><br>• Hoses connected to correct SCV<br>• Hoses connected to correct SCV extend/retract ports<br>• Correct hose tips<br><br>**IMPORTANT: Seeding equipment harnesses are grounded to tractor and NOT the implement frame. When referencing frame ground in the following diagnostic steps, be sure there is continuity between the tractor battery negative (-) terminal and the implement frame. Once continuity is verified from battery (-) to implement frame, the implement frame may be used as frame ground to troubleshoot.**<br><br>Are all connections to the planter made correctly? | **YES:** GO TO ❷<br><br>**NO:** Correctly connect planter to tractor.<br><br>GO TO ❷<br><br>– – –1/1 |
| ❷ **Both CCS Tank Fill Lamps Check** | Turn Tractor's Light Switch to Field Light Position.<br><br>Turn CCS Tank Fill Lamp Switch (S11) to the **ON** position.<br><br>Do **Both** of the CCS Tank Fill Lamps illuminate? | **YES: DONE**<br><br>**NO:** GO TO ❸<br><br>– – –1/1 |
| ❸ **Either CCS Tank Fill Lamp Check** | Turn Tractor's Light Switch to Field Light Position.<br><br>Turn CCS Tank Fill Lamp Switch (S11) to the **ON** position.<br><br>Does **Either** one of the CCS Tank Fill Lamps illuminate? | **YES:** GO TO ❹<br><br>**NO:** GO TO ❻<br><br>– – –1/1 |

## Theory of Operation

The Optional Drawbar Hitch allows the machine to be hitched to the tractor drawbar instead of the tractors 3 point hitch. This allows the machine to be operated on a tractor without a rockshaft.

The Drawbar Hitch is used in place of the rockshaft on a tractor to raise and lower the planter hitch allowing the operator to unlatch or latch the tongue of the planter between folding and unfolding operations and to also increase transport height of the tongue of the planter. The machine must be equipped with Independent Markers since the hydraulic system is shared with the Independent Marker System.

The operator can select from a independent control console in the tractor cab the Drawbar Hitch function or the Independent Marker function. The same SCV will be able to be used for either function as the Solenoid valves will divert the oil to either the Drawbar function or the Independent Marker function.

The Drawbar Hitch receives it's power and ground through the Tractor Convenience Outlet. The Convenience Outlet Power Extension and Drawbar Hitch/Marker Switch Harness W308 plugs into the Tractor Convenience Outlet and also supplies another Convenience Outlet for the tractor which can be used to power up other items that are attached to the tractor.

With the Key Switch in the RUN position, 12 VDC supplied by the tractor and flows through connector X506 (Tractor Convenience Outlet) on pin 1 (Switched Power) and on to the Drawbar Hitch/Independent Marker Switch (SW12).

With the Drawbar Hitch/Independent Marker Switch in the Drawbar Position, power is routed through pin 2 of the X508 connector between the Convenience Outlet Power Extension and Drawbar Hitch/Marker Switch Harness W308 and the Drawbar Hitch/Independent Marker Harness W309. Power is then available at X472 pin A and X473 pin A to energize Y26 and Y27 Drawbar Hitch/Independent Marker Solenoid #1 (Y26) and Solenoid #2 (Y27). With these two solenoids energized, oil is diverted to the Drawbar Hitch cylinder. When the solenoids are not energized the oil is diverted to the Independent Markers.

Ground for the solenoids is achieved through pin B of both Solenoid #1 and Solenoid #2 back through connector X508 pin 3 and on to X506 pin 3 of the Tractor Convenience Outlet to complete the circuit. When neither of the two Solenoids Y26 or Y27 are energized the oil flows directly from the SCV to the marker system

The following chart shows which solenoid valves are energized when different system functions are in operation.



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| **14 Field Raise/Lower Check** | Tractor running at 1800 RPM.<br>Set hydraulic system to MAXIMUM flow.<br>Lower Left and Right Rockshafts (Split Rows) on wings.<br>Completely unfold planter.<br>Select **PLANT** on the Plant/Transport Switch (S101) of the Frame Control Console.<br>Select **PLANT-CLEAN OUT** on the CCS Clean Out Switch (S8) on the planter.<br>Does the planter raise and lower when the appropriate SCV is activated? | **YES:** GO TO 15<br>**NO:** GO TO 29<br>– – –1/1 |



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| **15 Planter Unfold Hydraulic Circuit Charge Check** | Tractor running at 1800 RPM.<br>Set hydraulic system to MAXIMUM flow.<br>Lower Left and Right Rockshafts (Split Rows) on wings.<br>Completely unfold planter.<br>Once planter is completely unfolded, slightly fold planter so that the wings move forward 50-100 mm (2-4 in.)<br>Select **PLANT** on the Plant/Transport Switch (S101) of the Frame Control Console.<br>Select **PLANT-CLEAN OUT** on the CCS Clean Out Switch (S8) on the planter.<br>Lower Planter<br>Does the Planter Unfold Hydraulic Circuit charge, forcing the wings to completely unfold when the planter is lowered?<br>*NOTE: Each time planter is lowered, the unfold hydraulic circuit is charged to ensure that the fold cylinders maintain the fully extended position.* | **YES: DONE**<br>**NO:** GO TO 16<br>– – –1/1 |

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| **16 Magnetism Check** | Tractor key switch in ON position.<br>Lower Left and Right Rockshafts (Split Rows) on wings.<br>Completely unfold planter.<br>Select **PLANT** on the Plant/Transport Switch (S101) of the Frame Control Console.<br>Select **PLANT-CLEAN OUT** on the CCS Clean Out Switch (S8) on the planter.<br>Check for magnetism on Fold/Unfold Solenoid (Y8).<br>Is magnetism present on Solenoid Y8? | **YES:** GO TO **Section 270, Field Raise-Lower Diagnostics**<br>**NO:** GO TO 17<br>– – –1/1 |

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| **46 Plant Mode Raise/Lower Relay (K35) Check** | Tractor key switch in ON position.<br><br>Lower Left and Right Rockshafts (Split Rows) on wings.<br><br>Completely unfold planter<br><br>Select **PLANT** on the Plant/Transport Switch (S101) of the Frame Control Console.<br><br>Select **PLANT-CLEAN OUT** on the CCS Clean Out Switch (S8) on the planter.<br><br>Remove Plant Mode Raise/Lower Relay (K35) from X446.<br><br>Measure voltage between Pin 85 and Pin 86 (Harness End) of connector X446.<br><br>Is the voltage 12 VDC? | **YES:** GO TO 47<br><br>**NO:** GO TO 48<br><br>– – –1/1 |



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| **47 Plant Mode Raise/Lower Relay (K35) Check** | Tractor key switch in ON position.<br><br>Lower Left and Right Rockshafts (Split Rows) on wings.<br><br>Completely unfold planter<br><br>Select **PLANT** on the Plant/Transport Switch (S101) of the Frame Control Console.<br><br>Select **PLANT-CLEAN OUT** on the CCS Clean Out Switch (S8) on the planter.<br><br>Remove Plant Mode Raise/Lower Relay (K35) from X446.<br><br>Measure voltage between Pin 30 (Harness End) and Frame Ground of connector X446.<br><br>Is the voltage 12 VDC? | **YES:** Replace Plant Mode Raise/Lower Relay (K35).<br><br>GO TO 2<br><br>**NO:** Refer to schematic and repair Red wire between X446, Pin 30 and X301, Pin 7.<br><br>GO TO 2<br><br>– – –1/1 |

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| **❼ Red Wire Check** | Tractor key switch in ON position.<br><br>Unplug connector X401, Frame Harness/Frame Control Console Extension Harness Connection.<br><br>Measure voltage between connector X401, Harness End, Red Wire, (Pin 6) and frame ground.<br><br>Is it 12 VDC? | **YES:** GO TO ❽<br><br>**NO:** Refer to schematic and repair the Red Wire between X301, Pin 7 and X401, Pin 6.<br><br>GO TO ❷<br><br>– – –1/1 |

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15J
5

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| **❽ Black Wire Check** | Tractor key switch in ON position.<br><br>Unplug connector X401, Frame Harness/Frame Control Console Extension Harness Connection.<br><br>Measure voltage between connector X401, Harness End, Red Wire, (Pin 6) and Black Wire (Pin 11).<br><br>Is it 12 VDC? | **YES:** GO TO ❾<br><br>**NO:** Refer to schematic and repair the Black Wire between X301, Pin 1 and X401, Pin 11.<br><br>GO TO ❷<br><br>– – –1/1 |

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| **❾ CC#12A Check** | Tractor key switch in ON position.<br><br>Unplug connector X402, Frame Control Console.<br><br>Measure voltage between connector X402, Harness End, cc#12A, (Pin A) and frame ground.<br><br>Is it 12 VDC? | **YES:** GO TO ❿<br><br>**NO:** Refer to schematic and repair cc#12A between X402, Pin A and X401, Pin 6.<br><br>GO TO ❷<br><br>– – –1/1 |

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| **❿ CC "G" Check** | Tractor key switch in ON position.<br><br>Unplug connector X402, Frame Control Console.<br><br>Measure voltage between connector X402, Harness End, cc "G", (Pin J) and cc#12A (Pin A).<br><br>Is it 12 VDC? | **YES:** GO TO ⓫<br><br>**NO:** Refer to schematic and repair cc#G between X402, Pin J and X401, Pin 11.<br><br>GO TO ❷<br><br>– – –1/1 |

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| **⓯ CC "RCR" Check** | Tractor key switch in ON position.<br><br>Select **R** on the Right/Left Clutch Disengage Switch (S105) of the Frame Control Console.<br><br>With connector X402 plugged together, test for available voltage between Pin M (cc "RCR") and frame ground.<br><br>Is it 12 VDC? | **YES:** Refer to schematic and repair cc "RCR" between X402, Pin M and X401, Pin 12 .<br><br>GO TO ❷<br><br>**NO:** GO TO ⓰<br><br>– – –1/1 |



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| **⓰ Right/Left Clutch Disengage Switch (S105) Check** | Disconnect connector X402, Frame Control Console.<br><br>Disassemble the Frame Control Console A301 by removing the four screws on the back side of the console.<br><br>Separate the circuit board from the back side of the console switches.<br><br>Select **R** on the Right/Left Clutch Disengage Switch (S105) of the Frame Control Console.<br><br>Measure the resistance between pins C and 1 of S105.<br><br>Is the resistance less than 5 Ohms?<br><br>**IMPORTANT: During reassembly of the Frame Control Console, make certain that the Four Pin Backlighting Connector is securely mated to the Circuit Board. Failure to do so will result in damage to the circuit board.** | **YES:** Replace Frame Control Console Circuit Board<br><br>GO TO ❷<br><br>**NO:** Replace S105 Right/Left Clutch Disengage Switch<br><br>GO TO ❷<br><br>– – –1/1 |

**A302—Planter Module**
**E301—Right Amber Hazard Lamp**
**E302—Right Red Tail Lamp**
**E303—Left Red Tail Lamp**
**E304—Left Amber Hazard Lamp**
**W302—Frame Harness**
**W303—Lighting Extension Harness**
**W304—Lighting Harness**
**X301—7-Pin Trailer Lighting and Accessory Outlet**

KC01776,0001939 –19–31DEC03–2/2

# Lighting Overall Diagnostics



KC01776,000193A –19–31DEC03–1/1

## Lighting Problem

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| ❶ **7-pin Trailer Lighting and Accessory Outlet Connector Check** | Check 7-pin Trailer Lighting and Accessory Outlet connector X301 to make sure it is plugged in and making good connection.<br><br>**IMPORTANT: Seeding equipment harnesses are grounded to tractor and NOT the implement frame. When referencing frame ground in the following diagnostic steps, be sure there is continuity between the tractor battery negative (-) terminal and the implement frame. Once continuity is verified from battery (-) to implement frame, the implement frame may be used as frame ground to troubleshoot.**<br><br>Is 7-pin Trailer Lighting and Accessory Outlet connector properly connected and making good connection? | **YES:** GO TO ❷<br><br>**NO:** Reconnect or repair 7-pin Trailer Lighting and Accessory Outlet connector.<br><br>GO TO ❷ |

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| ❷ **Right Turn Selected, Right Amber Light Check** | Tractor key in ON position.<br><br>Tractor light switch in OFF position.<br><br>Move tractor turn signal lever to indicate a right turn.<br><br>Does the right side amber light flash at high intensity? | **YES:** GO TO ❸<br><br>**NO:** GO TO ⓬ |

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| **40 Harness Check** | Tractor key in ON position.<br><br>Tractor light switch in OFF position.<br><br>Tractor turn signal lever in right turn position.<br><br>Disconnect Flasher module connector X305.<br><br>Measure voltage at connector X305, between the Yellow Wire, (Pin C) and Black Wire (Pin A).<br><br>Is a constant voltage of 12VDC present? | **YES:** GO TO 41<br><br>**NO:** Refer to schematic and repair Black Wire between X305 and X304.<br><br>GO TO 5<br><br>– – –1/1 |



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| **41 Flasher Module Check** | Tractor key in ON position.<br><br>Tractor light switch in OFF position.<br><br>Tractor turn signal lever in right turn position.<br><br>With Flasher Module connector X305 connected, measure voltage at connector X305, between the Yellow Wire, (Pin C) and Yel/Blk Wire (Pin B).<br><br>Is the voltage a constant 12VDC? | **YES:** Refer to schematic and repair the Yel/Blk Wire between X305 and X308.<br><br>GO TO 5<br><br>**NO:** Replace flasher module.<br><br>GO TO 1<br><br>– – –1/1 |

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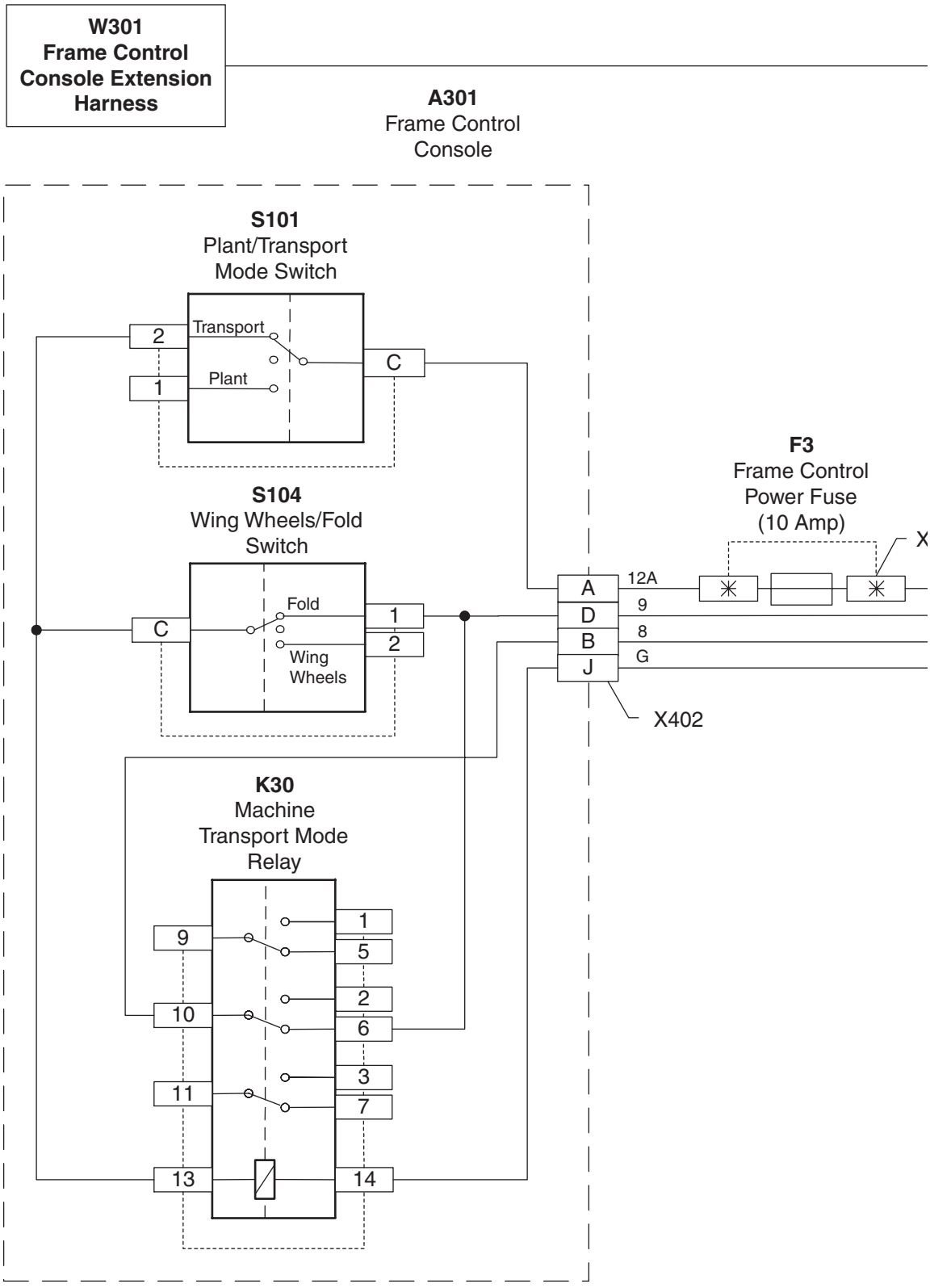
| **42 Connector X301, Pin 3 Check** | Tractor key in ON position.<br><br>Tractor light switch in OFF position.<br><br>Tractor turn signal lever in right turn position.<br><br>Disconnect Implement to Trailer 7-Pin connector X301.<br><br>Measure voltage between 7-pin Trailer Lighting and Accessory Outlet connector X301, Yellow Wire (Pin 3) and frame ground.<br><br>Is an ON/OFF voltage of 12VDC present?<br><br>*NOTE: If an ON/OFF voltage of 12VDC is being supplied by the tractor and the Left Amber Hazard Lamp illuminated steadily during a Right Turn, the circuits to the Left Amber Hazard Lamp and the Lamp itself are working properly.* | **YES:** GO TO 7<br><br>**NO: Refer to tractor tech manual for diagnosis and repair of turn signal circuits.**<br><br>GO TO 1<br><br>– – –1/1 |


W301
Frame Control
Console Extension
Harness
A301
Frame Control
Console
S101
Plant/Transport
Mode Switch
2
1
Transport
Plant
C
S104
Wing Wheels/Fold
Switch
C
Fold
Wing
Wheels
1
2
F3
Frame Control
Power Fuse
(10 Amp)
A
D
B
J
12A
9
8
G
X402
K30
Machine
Transport Mode
Relay
9
10
11
13
1
5
2
6
3
7
14

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|---|---|---|
| **㉑ Fold/Unfold Solenoid (Y8) Check** | Tractor key switch in ON position.<br><br>Select **TRANS** on Plant/Transport Mode Switch (S101) of Frame Control Console.<br><br>On Frame Control Console, hold Wing Wheels/Fold Mode Switch (S104) in **FOLD** detent.<br><br>Unplug connector X409, Fold/Unfold Solenoid (Y8).<br><br>Measure voltage between connector X409, Harness End, Violet Wire (Pin A) and Brown/White Wire (Pin B).<br><br>Is it 12 VDC? | **YES:** Replace Y8 Fold/Unfold Solenoid<br><br>GO TO ❷<br><br>**NO:** GO TO ㉒<br><br>– – –1/1 |

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| **㉒ Ground Check** | Tractor key switch in ON position.<br><br>Select **TRANS** on Plant/Transport Mode Switch (S101) of Frame Control Console.<br><br>On Frame Control Console, hold Wing Wheels/Fold Mode Switch (S104) in **FOLD** detent.<br><br>Unplug connector X409, Fold/Unfold Solenoid (Y8).<br><br>Measure voltage between connector X409, Harness End, Violet Wire (Pin A) and Frame Ground.<br><br>Is it 12 VDC? | **YES:** Refer to schematic and repair the Black and Brown/White Wire between connector X301, 7 pin Trailer Lighting and Accessory Outlet and X409, Fold/Unfold Solenoid (Y8).<br><br>GO TO ㉗<br><br>**NO:** GO TO ㉓<br><br>– – –1/1 |

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| **㉓ Circuit between X401, Pin 2 and X409, Pin A Check** | Tractor key switch in ON position.<br><br>Select **TRANS** on Plant/Transport Mode Switch (S101) of Frame Control Console.<br><br>On Frame Control Console, hold Wing Wheels/Fold Mode Switch (S104) in **FOLD** detent.<br><br>With connector X401 plugged together, test for available voltage between Pin 2 (Violet Wire) and frame ground.<br><br>Is it 12 VDC? | **YES:** Refer to schematic and repair the Wire between X401, Pin 2 and X409, Pin A.<br><br>GO TO ❷<br><br>**NO:** GO TO ㉔<br><br>– – –1/1 |

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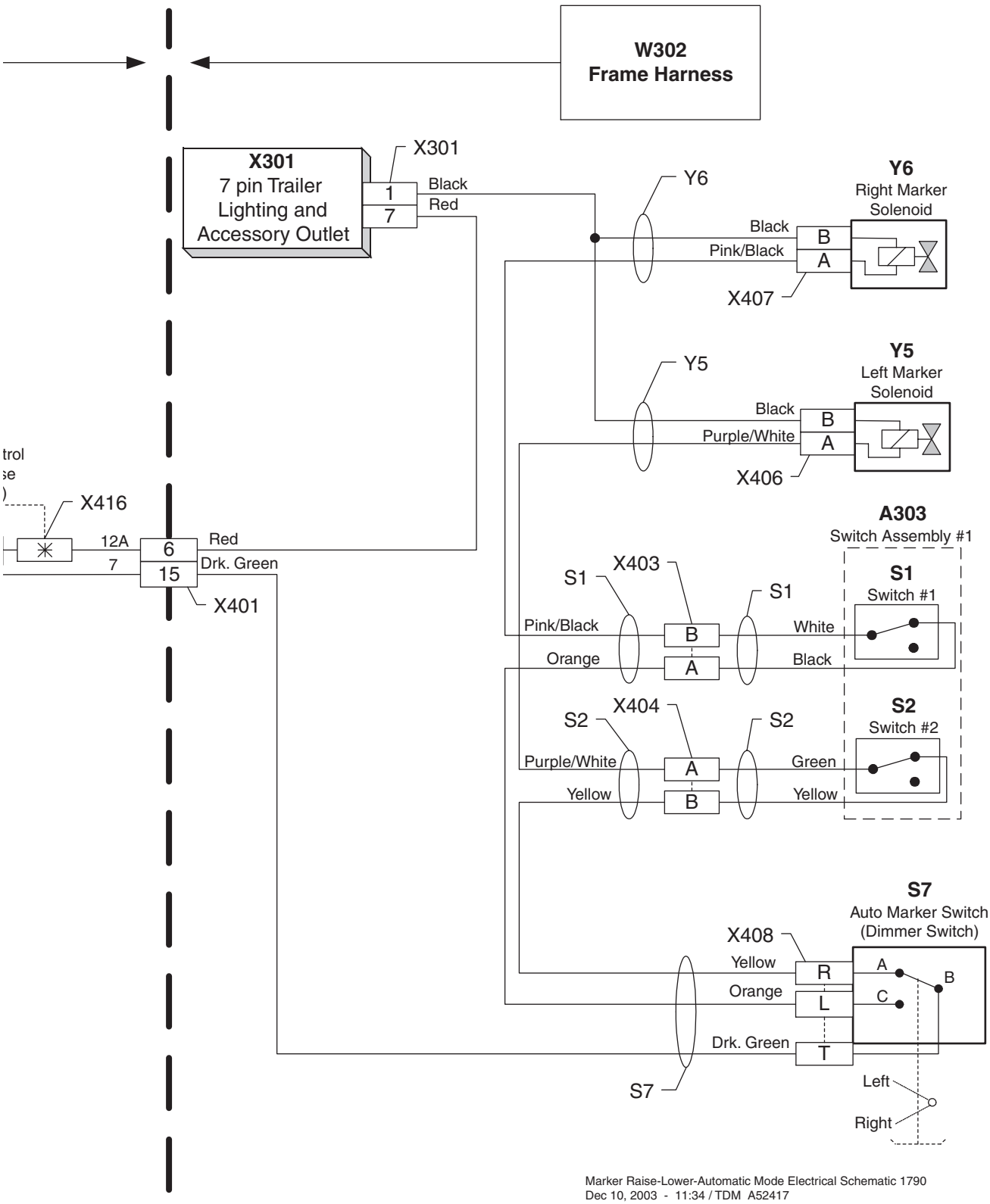
| **㉔ CC#8 Check** | Tractor key switch in ON position.<br><br>Select **TRANS** on Plant/Transport Mode Switch (S101) of Frame Control Console.<br><br>On Frame Control Console, hold Wing Wheels/Fold Mode Switch (S104) in **FOLD** detent.<br><br>With connector X402 plugged together, test for available voltage between Pin B (cc#8) and frame ground.<br><br>Is it 12 VDC? | **YES:** Refer to schematic and repair cc#8 between X402, Pin B and X401, Pin 2<br><br>GO TO ❷<br><br>**NO:** GO TO ⑲<br><br>– – –1/1 |

## Electrical Schematic

A52417 –UN–11DEC03




Marker Raise-Lower-Automatic Mode Electrical Schematic 1790
Dec 10, 2003 - 11:34 / TDM A52417

KC01776,000193F –19–31DEC03–1/2

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| **㉔ Marker Raise/Lower Check** | Tractor running at 1800 RPM.<br><br>Set hydraulic system to MAXIMUM flow.<br><br>Completely unfold planter.<br><br>Select **PLANT** on the Plant/Transport Switch (S101) of the Frame Control Console.<br><br>Select **AUTO** on the Auto/Manual Marker Mode Switch (S102) of the Frame Control Console.<br><br>Fully lower and raise planter twice.<br><br>During one of the up and down cycles, does the Left Marker extend and retract when the appropriate SCV is activated? | **YES: DONE**<br><br>**NO:** GO TO ㉕<br><br>– – –1/1 |

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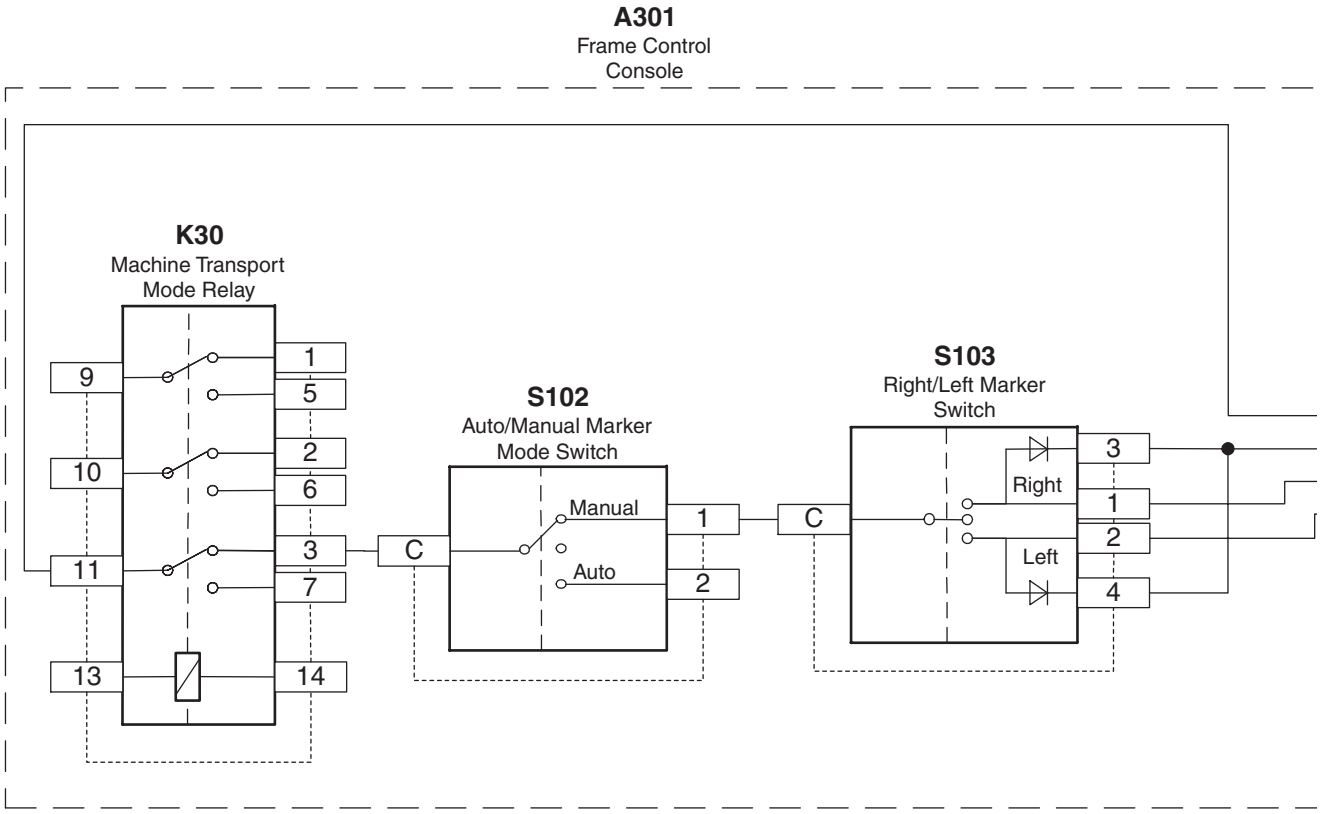
| **㉕ Magnetism Check** | Tractor key switch in ON position.<br><br>Completely unfold planter<br><br>Select **PLANT** on the Plant/Transport Switch (S101) of the Frame Control Console.<br><br>Select **AUTO** on the Auto/Manual Marker Mode Switch (S102) of the Frame Control Console.<br><br>Fully lower and raise planter twice.<br><br>Each time the planter is lowered, check for magnetism on Left Marker Solenoid (Y5).<br><br>Does magnetism ever occur on Solenoid Y5 when the planter is in the lowered position? | **YES:** GO TO **Section 270, Marker Raise/Lower-Stand Alone SCV**<br><br>**NO:** GO TO ⑭<br><br>– – –1/1 |

**W301**
**Frame Control**
**Console Extension**
**Harness**



| | | |
|---|---|---|
| **㉑ Circuit between X401, Pin 17 and X404 (S2), Pin B Check** | Tractor key switch in ON position.<br><br>Completely unfold planter<br><br>Select **PLANT** on the Plant/Transport Switch (S101) of the Frame Control Console.<br><br>Select **MAN** on the Auto/Manual Marker Mode Switch (S102) of the Frame Control Console.<br><br>Select **L** on the Right/Left Marker Switch (S103) of the Frame Control Console.<br><br>With connector X401 plugged together, test for available voltage between Pin 17 (Yellow Wire) and frame ground.<br><br>Is it 12 VDC? | **YES:** Refer to schematic and repair the Wire between X401, Pin 17 and X404 (S2), Pin B.<br><br>GO TO ❷<br><br>**NO:** GO TO ㉒<br><br>– – –1/1 |

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| **㉒ CC# 5 Check** | Tractor key switch in ON position.<br><br>Completely unfold planter<br><br>Select **PLANT** on the Plant/Transport Switch (S101) of the Frame Control Console.<br><br>Select **MAN** on the Auto/Manual Marker Mode Switch (S102) of the Frame Control Console.<br><br>Select **L** on the Right/Left Marker Switch (S103) of the Frame Control Console.<br><br>With connector X402 plugged together, test for available voltage between cc# 5 (Pin R) and frame ground.<br><br>Is it 12 VDC? | **YES:** Refer to schematic and repair cc# 5 between X402 and X401.<br><br>GO TO ❷<br><br>**NO:** GO TO ㉓<br><br>– – –1/1 |

**M1—Compressor Motor**
**S10—Pneumatic Down Force Compressor Motor Switch**
**W305—Pneumatic Down Force Compressor Harness**
**W306—Convenience Outlet Power Extension Harness**
**X501—Convenience Outlet Power**
**X502—Convenience Outlet Power Extension**

KC01776,0001945 –19–31DEC03–2/2

# Pneumatic Down Force Diagnostics



KC01776,0001946 –19–31DEC03–1/1

## Pneumatic Down Force Compressor Motor Problem

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| ❶ **Preliminary Check** | Visually inspect the Pneumatic Down Force Motor and associated Harnesses.<br><br>**IMPORTANT: Seeding equipment harnesses are grounded to tractor and NOT the implement frame. When referencing frame ground in the following diagnostic steps, be sure there is continuity between the tractor battery negative (-) terminal and the implement frame. Once continuity is verified from battery (-) to implement frame, the implement frame may be used as frame ground to troubleshoot.**<br><br>Are X501, 3-Pin Convenience Outlet Power Extension Harness and X504, Extension Harness to Pneumatic Down Force Compressor Harness securely mated? | **YES:** GO TO ❷<br><br>**NO:** Properly connect the associated harnesses<br><br>GO TO ❷ |
| | | – – –1/1 |
| ❷ **Pneumatic Down Force Compressor Motor Operational Check** | Tractor key switch in ON position.<br><br>Select **ON** on the Pneumatic Down Force Compressor Motor Switch (S10).<br><br>Does Motor Run when switch is in the ON Position? | **YES: DONE**<br><br>**NO:** GO TO ❸ |
| | | – – –1/1 |
| ❸ **Compressor Motor (M1) Check** | Tractor key switch in ON position.<br><br>Select **ON** on the Pneumatic Down Force Compressor Motor Switch (S10).<br><br>Unplug connector X503, Compressor Motor (M1).<br><br>Measure voltage between connector X503, Harness End, cc #1 (Pin A) and cc #2 (Pin B).<br><br>Is it 12 VDC? | **YES:** Replace M1 Compressor Motor<br><br>GO TO ❷<br><br>**NO:** GO TO ❹ |
| | | – – –1/1 |

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| **⓯ Magnetism Check** | Tractor key switch in ON position.<br><br>Select **TRANS** on Plant/Transport Mode Switch (S101) of Frame Control Console.<br><br>Select **ROW LIFT** on Row Lift Switch (S106) of Frame Control Console.<br><br>Check for magnetism on the Rockshaft Raise/Lower Solenoid #2 (Y11).<br><br>Is magnetism present on Solenoid Y11? | **YES:** GO TO **Section 270, Hydraulic System Diagnosis and Tests Rockshaft Raise/Lower Diagnostics**<br><br>**NO:** GO TO ㉖<br><br>– – –1/1 |



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| **⓰ Rockshaft Raise/Lower Solenoid (Y15) Check** | Tractor key switch in ON position.<br><br>Select **TRANS** on Plant/Transport Mode Switch (S101) of Frame Control Console.<br><br>Select **ROW LIFT** on Row Lift Switch (S106) of Frame Control Console.<br><br>Unplug connector X425, Rockshaft Raise/Lower Solenoid (Y15).<br><br>Measure voltage between connector X425, Harness End, Dark Blue Wire (Pin A) and Black Wire (Pin B).<br><br>Is it 12VDC? | **YES:** Replace Y15 Rockshaft Raise/Lower Solenoid<br><br>GO TO ⑫<br><br>**NO:** GO TO ⑰<br><br>– – –1/1 |

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| **⓱ Ground Check** | Tractor key switch in ON position.<br><br>Select **TRANS** on Plant/Transport Mode Switch (S101) of Frame Control Console.<br><br>Select **ROW LIFT** on Row Lift Switch (S106) of Frame Control Console.<br><br>Unplug connector X425, Rockshaft Raise/Lower Solenoid (Y15).<br><br>Measure voltage between connector X425, Harness End, Dark Blue Wire (Pin A) and Frame Ground.<br><br>Is it 12VDC? | **YES:** Refer to schematic and repair the Black Wire between X301, Pin 1 and X425, Pin B.<br><br>GO TO ⑫<br><br>**NO:** GO TO ⑱<br><br>– – –1/1 |

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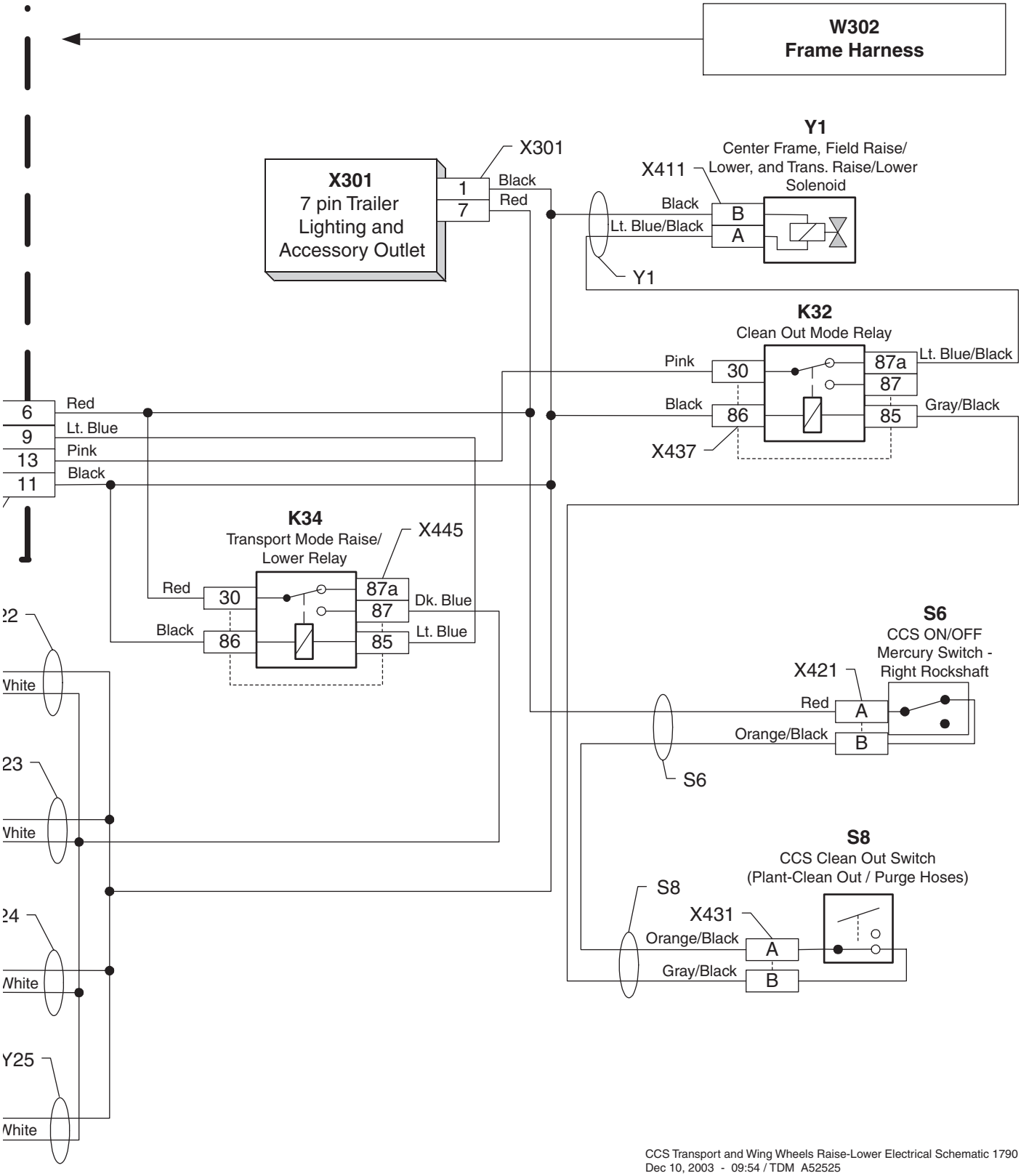
| **⓲ Circuit between X401, Pin 5 and X425, Pin A Check** | Tractor key switch in ON position.<br><br>Select **TRANS** on Plant/Transport Mode Switch (S101) of Frame Control Console.<br><br>Select **ROW LIFT** on Row Lift Switch (S106) of Frame Control Console.<br><br>With connector X401 plugged together, test for available voltage between Pin 5 (Dark Blue Wire) and frame ground.<br><br>Is it 12VDC? | **YES:** Refer to schematic and repair the Dark Blue Wire between X401, Pin 5 and X425, Pin A.<br><br>GO TO ⑫<br><br>**NO:** GO TO ⑲<br><br>– – –1/1 |

## Electrical Schematic

A52525 –UN–11DEC03




CCS Transport and Wing Wheels Raise-Lower Electrical Schematic 1790
Dec 10, 2003 - 09:54 / TDM A52525

KC01776,000194B –19–31DEC03–1/2

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|---|---|---|
| **19 Y23 Magnetism Check** | Tractor key switch in ON position.<br>Select **TRANS** on Plant/Transport Mode Switch (S101) of Frame Control Console.<br>Select **PLANT-CLEAN OUT** on the CCS Clean Out Switch (S8) on the planter.<br>Completely fold planter.<br>Completely Raise Left and Right Rockshafts (Split Rows) on wings.<br>Completely raise tractor three point hitch.<br>On Frame Control Console, hold Wing Wheels/Fold Mode Switch (S104) in **WING WHEELS** detent.<br>Check for magnetism on Transport Mode Raise/Lower Solenoid #2 (Y23).<br>Is magnetism present on Solenoid Y23? | **YES:** GO TO 20<br>**NO:** GO TO 30<br>– – –1/1 |

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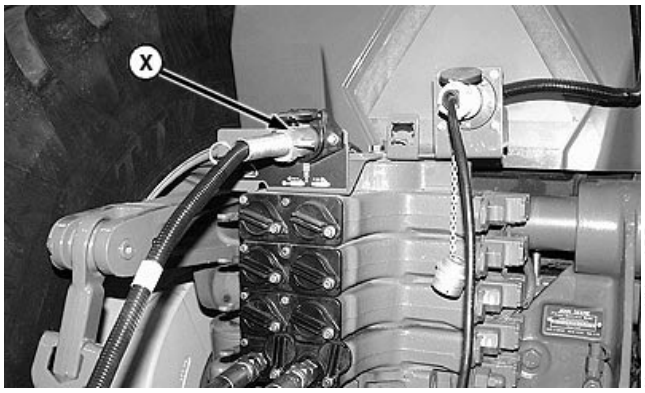
| **20 Y24 Magnetism Check** | Tractor key switch in ON position.<br>Select **TRANS** on Plant/Transport Mode Switch (S101) of Frame Control Console.<br>Select **PLANT-CLEAN OUT** on the CCS Clean Out Switch (S8) on the planter.<br>Completely fold planter.<br>Completely Raise Left and Right Rockshafts (Split Rows) on wings.<br>Completely raise tractor three point hitch.<br>On Frame Control Console, hold Wing Wheels/Fold Mode Switch (S104) in **WING WHEELS** detent.<br>Check for magnetism on Transport Mode Raise/Lower Solenoid #3 (Y24).<br>Is magnetism present on Solenoid Y24? | **YES:** GO TO 21<br>**NO:** GO TO 33<br>– – –1/1 |

## Connector Locations - X300-X399

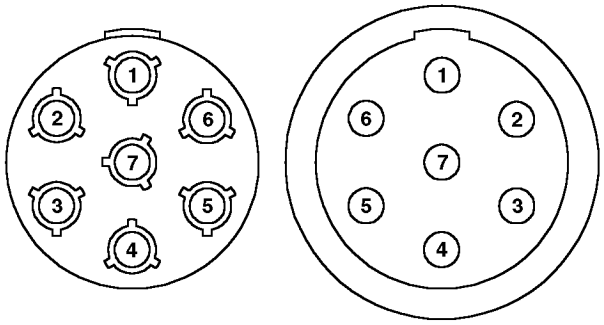
### X301 - 7 Pin Trailer Lighting and Accessory Outlet Connector

| Pin Number | Circuit Code |
|---|---|
| 1 | Black |
| 2 | Red |
| 3 | Yellow |
| 4 | Open |
| 5 | Dark Green |
| 6 | Brown |
| 7 | Red |

| Repair Procedure | No repair tools needed |
|---|---|




H53931 –UN–22APR99



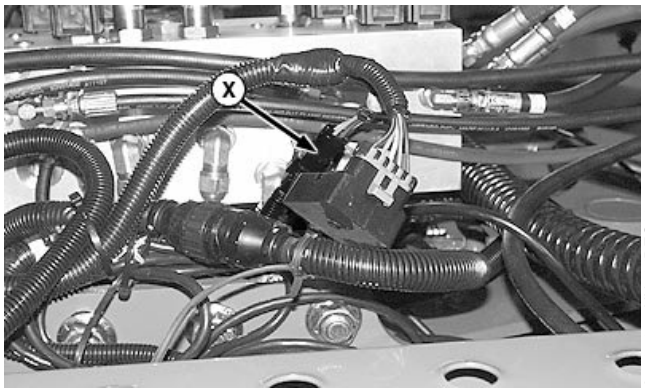

H54484 –UN–26APR99

KC01776,000194F –19–31DEC03–1/14

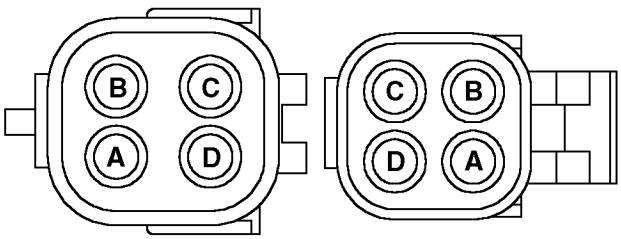
### X302 - 4 Pin Frame Harness/Enhanced Lighting "T" Harness Connector

| Pin Number | Circuit Code |
|---|---|
| A | Brown |
| B | Dark Green |
| C | Black |
| D | Yellow |

| Repair Procedure | R-A |
|---|---|




A50954 –UN–04DEC02




N55572 –UN–29NOV00

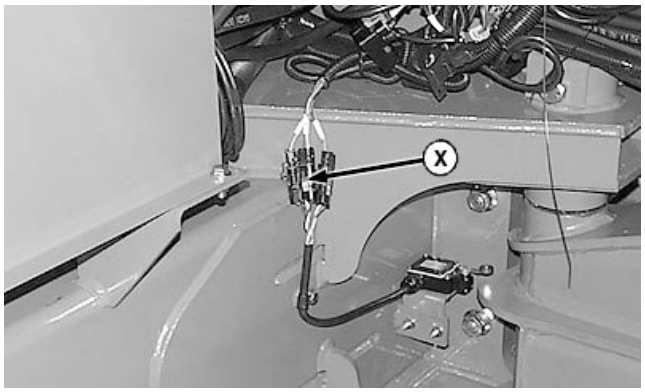
Continued on next page

KC01776,000194F –19–31DEC03–2/14

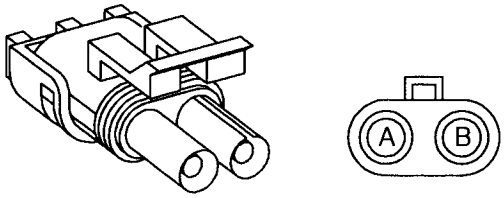
## X405 - Switch #3 Connector

| Pin Number | Circuit Code |
|---|---|
| A | Purple |
| B | Red/Green |

| Repair Procedure | R-A |
|---|---|




A52590 –UN–27AUG03



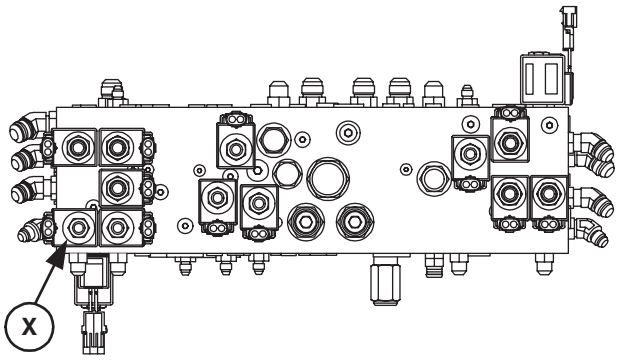

RW45627 –UN–25APR95

KC01776,0001950 –19–31DEC03–5/44

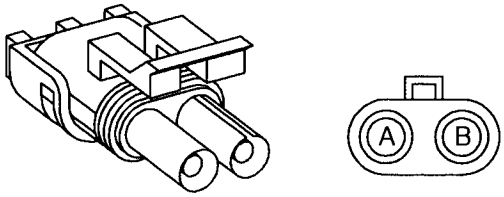
## X406 - Left Marker Solenoid Connector

| Pin Number | Circuit Code |
|---|---|
| A | Purple/White |
| B | Black |

| Repair Procedure | R-A |
|---|---|




A53640 –UN–12JAN04




RW45627 –UN–25APR95

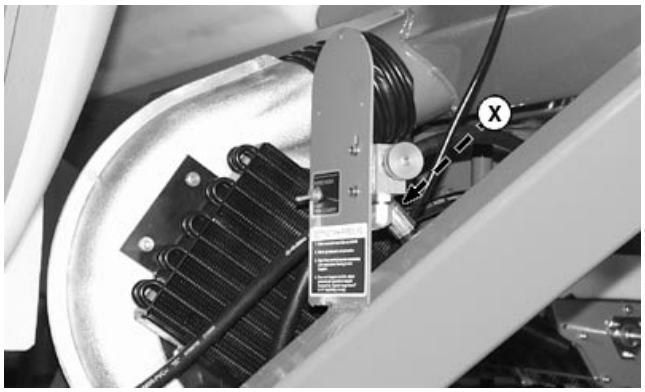
Continued on next page

KC01776,0001950 –19–31DEC03–6/44

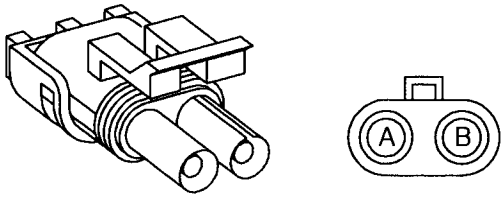
## X431 - CCS Clean Out Switch (Plant-Clean Out/Purge Hoses) Connector

| Pin Number | Circuit Code |
|---|---|
| A | Orange/Black |
| B | Gray/Black |

| Repair Procedure | R-A |
|---|---|




A50993 –UN–04DEC02



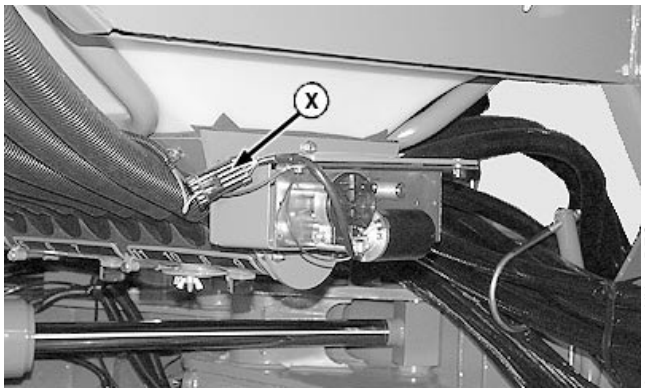

RW45627 –UN–25APR95

KC01776,0001950 –19–31DEC03–25/44

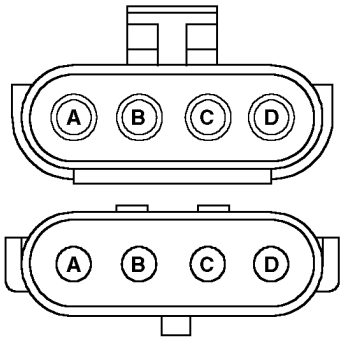
## X432 - Agitation Motor Connector

| Pin Number | Circuit Code |
|---|---|
| A | Open |
| B | Open |
| C | Red/White |
| D | Open |

| Repair Procedure | R-A |
|---|---|




A50994 –UN–05DEC02




H54480 –UN–27APR99

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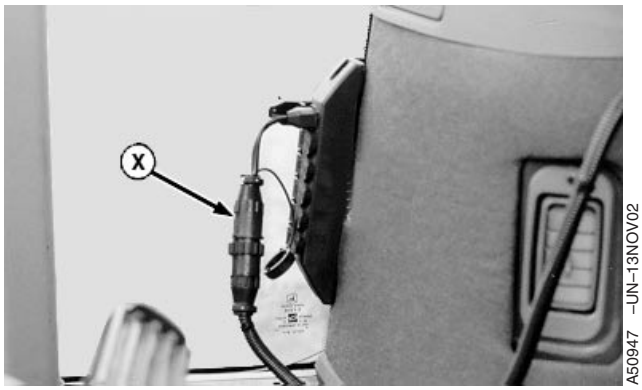
KC01776,0001950 –19–31DEC03–26/44

## Connectors Locations - X500-X599

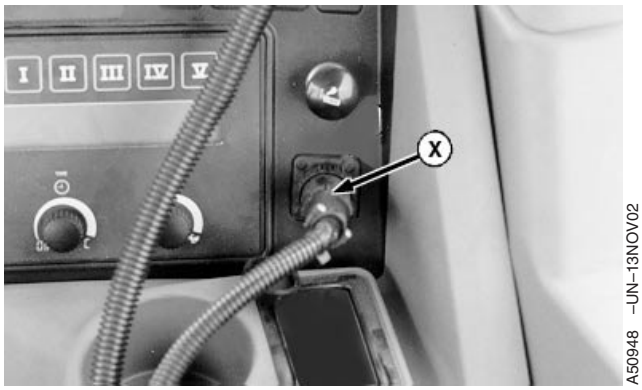
### X501 - Convenience Outlet Power

| Pin Number | Circuit Code |
|---|---|
| 1 | 1 |
| 2 | 31 |
| 3 | 2 |

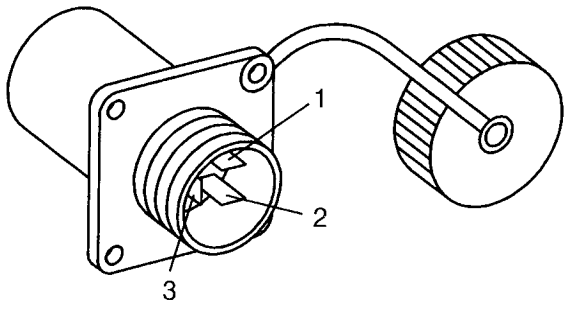
| Repair Procedure | — |
|---|---|




A50947 –UN–13NOV02




A50948 –UN–13NOV02




RW45616 –UN–25APR95

Continued on next page

KC01776,0001951 –19–31DEC03–1/12

240
20
33

# Section 270
# Hydraulic System Diagnostics

## Contents

9. If possible, operate machine. Activate all hydraulic functions and be alert for conditions that could isolate the problem. Also be alert for conditions that could cause further damage. Be prepared to stop the engine immediately.

**CAUTION: Keep hands away from moving parts. Stop engine before checking hydraulic or hydrostatic lines near moving parts.**

10. With engine operating, check for external and internal leaks. With all hydraulic functions in neutral, check function component return lines and housings for heating. If component control valves are leaking, return lines will be hot.

11. If these preliminary checks have failed to isolate the hydraulic problem, list all possible causes for the failure, then proceed to "DIAGNOSE MALFUNCTIONS" in the applicable group.

270
05
9

KC01776,0001952 –19–31DEC03–9/9

**D14—One Way Check Valve Kit**
**G1—Hydraulic Valve Block**
**G4—CCS Seed Delivery Fan Motor Case**
**H1—CCS Hydraulic Oil Cooler**
**M2—CCS Fixed Displacement Hydraulic Fan Motor**
**V1A—Tractor SCV Coupler**
**V2A—Tractor SCV Coupler**
**V3A—Tractor Case Drain Motor Coupler**
**V22—Flow Control Valve**
**Y14—CCS Hydraulic Fan Motor Solenoid Valve**

KC01776,0001957 –19–31DEC03–2/2

# CCS Seed Delivery Fan Motor Diagnostics

KC01776,0001958 –19–31DEC03–1/1

## CCS Seed Delivery Fan Problem



– – –1/1

| | | |
|---|---|---|
| **❶ Preliminary Check** | Visually inspect the Planter for the following:<br><br>Electrical connections;<br><br>• X301, 7-Pin Trailer Lighting and Accessory Outlet Connector<br>• X401, Frame Harness to Frame Control Console Extension Harness connector<br>• X402, Frame Control Console Extension Harness to Frame Control Console<br><br>Hydraulic connection to tractor;<br><br>• Hoses connected to correct SCV<br>• Hoses connected to correct SCV extend/retract ports<br>• Correct hose tips<br><br>Are all electrical and hydraulic connections to planter made correctly? | **YES:** GO TO ❷<br><br>**NO:** Make the appropriate connections and/or adjustments.<br><br>GO TO ❷ |

– – –1/1

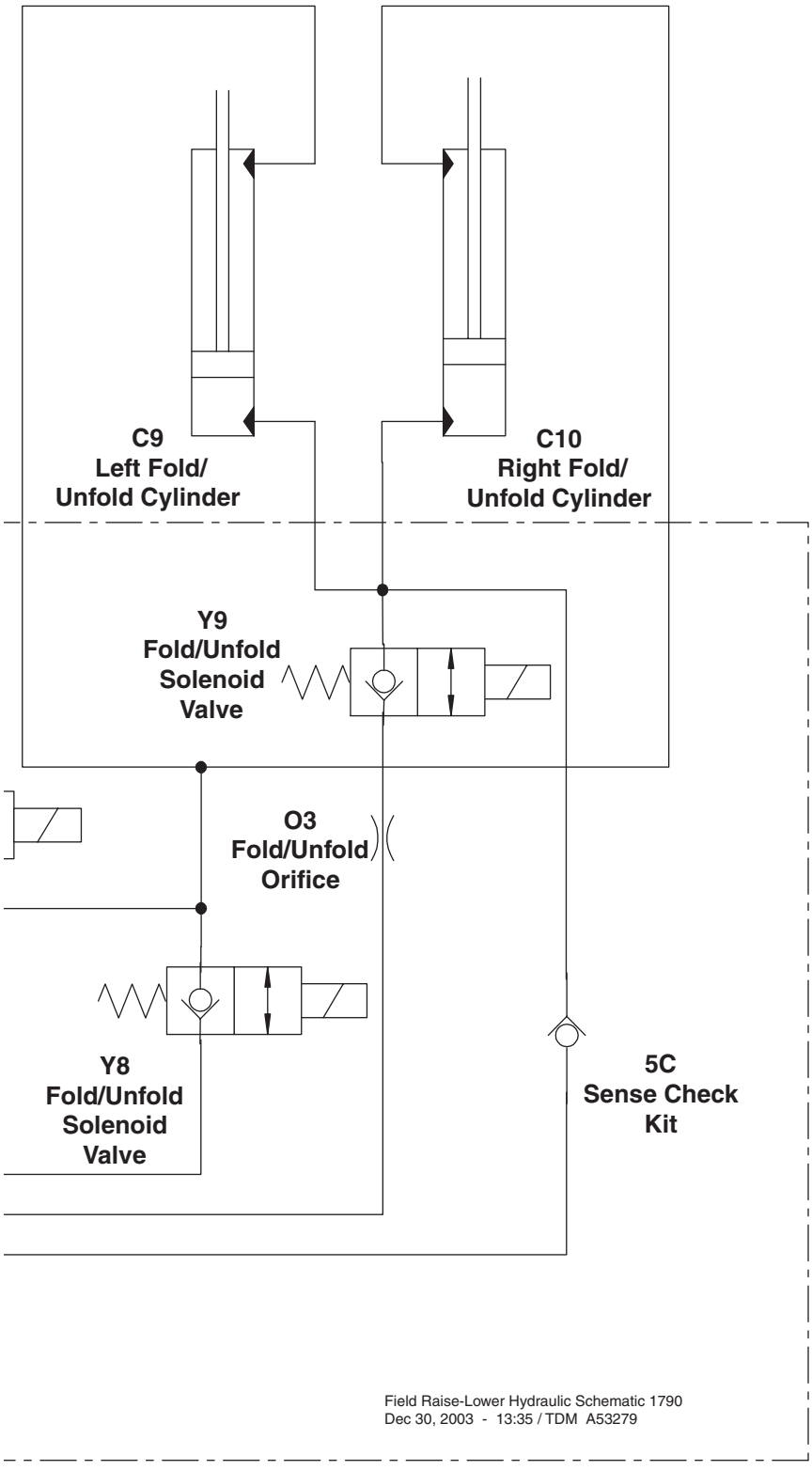
| | | |
|---|---|---|
| **❷ Machine Function Check** | Start tractor and run at 1800 RPM.<br><br>Set hydraulic system to MAXIMUM flow.<br><br>Using the control console switches, operate all functions on the planter.<br><br>Do any hydraulic functions on the machine work? | **YES:** GO TO ❸<br><br>**NO:** GO TO **Section 270 - Hydraulic Power Diagnostics** |

– – –1/1

| | | |
|---|---|---|
| ❼ **S26 Magnetism Check** | Key Switch ON.<br><br>Select Hitch on the Hitch/Marker Switch of the Hitch/Marker Control Console.<br><br>Check S26 Drawbar Hitch Solenoid Valve #1 for Magnetism.<br><br>Is S26 Magnetized? | **YES:** Replace S26 Drawbar Hitch Solenoid Valve #1.<br><br>GO TO ❸<br><br>**NO:** GO TO **Section 240 Electrical - Drawbar Hitch and Independent Marker Diagnostics.**<br><br>– – –1/1 |

## ılic Schematic

ı–05JAN04




Field Raise-Lower Hydraulic Schematic 1790
Dec 30, 2003 - 13:35 / TDM A53279

KC01776,000195D –19–31DEC03–1/2

## Theory of Operation

Hydraulic power is supplied to the Planter's Hydraulic Valve (G1) and the CCS Fan Motor through a single set of SCV's from the tractor. The two SCV's from the tractor consist of;

- Tractor SCV Extend Circuit - V1A
- Tractor SCV Return Circuit - V2A

If the Planter uses an independent or a Stand-Alone set of SCV's to operate the markers, the secondary set of SCV's consist of;

- Tractor SCV Extend Circuit - V1B
- Tractor SCV Return Circuit - V2B

With the tractor running, the appropriate SCV Lever/Switch in the raise or lower detent position, and the SCV's set at maximum flow, the Tractor SCV Extend and Retract Circuits - (V1A, V2A, V1B, and V2B) provide hydraulic flow and pressure to the Hydraulic Valve G1. When a particular function of the Planter is activated, the Hydraulic Valve (G1) distributes oil to the correct spool valve.



KC01776,000195F –19–31DEC03–1/1

| | | |
|---|---|---|
| ⑯ **Hydraulic Hose Check** | Is either the Left or Right Fold/Unfold Cylinder hydraulic hoses crimped and/or damaged? | **YES:** Repair and/or replace as necessary<br><br>**NO:** GO TO ⑰<br><br>– – –1/1 |

| | | |
|---|---|---|
| ⑰ **Magnetism Check** | Tractor Engine OFF.<br><br>Tractor key switch in ON position.<br><br>Select **TRANS** on Plant/Transport Mode Switch (S101).<br><br>Hold Wing Wheels/Fold Mode Switch (S104) of Frame Control Console in **FOLD** position.<br><br>Check for magnetism on Fold/Unfold Solenoid (Y8).<br><br>Is magnetism present on Solenoid Y8? | **YES:** GO TO ⑱<br><br>**NO:** GO TO **Section 240 - Electrical System Diagnosis and Tests - Machine Fold/Unfold Diagnostics**<br><br>– – –1/1 |



| | | |
|---|---|---|
| ⑱ **Solenoid Valve Y8 Check** | Relieve hydraulic system pressure.<br><br>Switch Fold/Unfold Solenoid Valve (Y8) with Fold/Unfold Solenoid Valve (Y9).<br><br>*NOTE: Refer to TM2058 1790 Front-Fold Planter Repair for instructions on relieving hydraulic pressure, removing, and installing valves.*<br><br>Tractor running at 1800 RPM.<br><br>Set hydraulic system to MAXIMUM flow.<br><br>Select **TRANS** on Plant/Transport Mode Switch (S101).<br><br>Lower Left and Right Rockshafts (Split Rows) on wings.<br><br>Hold Wing Wheels/Fold Mode Switch (S104) of Frame Control Console in **FOLD** position.<br><br>Unfold planter on solid, level ground.<br><br>When the appropriate SCV is activated, do both wings of the planter Unfold? | **YES:** Replace Solenoid (Y8)<br><br>GO TO ❺<br><br>**NO:** GO TO ⑲<br><br>– – –1/1 |

**C11—Left Marker Cylinder**
**C12—Right Marker Cylinder**
**G1—Hydraulic Valve Block**
**O1—Fixed Orifice**
**O2—Fixed Orifice**
**V1A—Tractor SCV Coupler**
**V2A—Tractor SCV Coupler**
**Y5—Left Marker Solenoid**
**Y6—Right Marker Solenoid**

KC01776,0001966 –19–31DEC03–2/2

# Marker Raise/Lower Integrated with Frame Raise/Lower

KC01776,0001967 –19–31DEC03–1/1

## Marker Raise/Lower integrated with Frame Raise/Lower Problem



– – –1/1

| | | |
|---|---|---|
| ❶ **Preliminary Check** | Visually inspect the Planter for the following:<br><br>Electrical connections;<br><br>• X301, 7-Pin Trailer Lighting and Accessory Outlet Connector<br>• X401, Frame Harness to Frame Control Console Extension Harness connector<br>• X402, Frame Control Console Extension Harness to Frame Control Console<br><br>Hydraulic connection to tractor;<br><br>• Hoses connected to correct SCV<br>• Hoses connected to correct SCV extend/retract ports<br>• Correct hose tips<br><br>**IMPORTANT: If extend and retract hoses are switched, hydraulic system will not function.**<br><br>Are all electrical and hydraulic connections to planter made correctly? | **YES:** GO TO ❷<br><br>**NO:** Make the appropriate connections and/or adjustments.<br><br>GO TO ❷ |

– – –1/1

| | | |
|---|---|---|
| ❷ **Machine Function Check** | Start tractor and run at 1800 RPM.<br><br>Set hydraulic system to MAXIMUM flow.<br><br>Using the control console switches, operate all functions on the planter.<br><br>Do any hydraulic functions on the machine work? | **YES:** GO TO ❸<br><br>**NO:** GO TO **Section 270 - Hydraulic Power Diagnostics** |

– – –1/1

| | | |
|---|---|---|
| **㉔ Fixed Orifice (O2) Check** | Relieve hydraulic system pressure.<br><br>Disconnect hydraulic hose from Rod side of Right Marker Cylinder.<br><br>*NOTE: Refer to TM2017 1770NT MaxEmerge Plus Drawn 16-Row Narrow Flex-Fold Planter for instructions on relieving hydraulic pressure and removing orifices.*<br><br>Is the Fixed Orifice (O2) clean and properly installed in the hydraulic fitting of the Rod end of the Cylinder? | **YES:** GO TO ㉕<br><br>**NO: Clean and install Fixed Orifice (O2) in rod end of cylinder.**<br><br>GO TO ❼<br><br>– – –1/1 |

| | | |
|---|---|---|
| **㉕ Solenoid Valve Y6 Check** | Relieve hydraulic system pressure.<br><br>Remove Solenoid Valve (Y6) and replace with a known good.<br><br>*NOTE: Refer to TM2017 1770NT MaxEmerge Plus Drawn 16-Row Narrow Flex-Fold Planter for instructions on relieving hydraulic pressure, removing, and installing valves.*<br><br>Tractor running at 1800 RPM.<br><br>Set hydraulic system to MAXIMUM flow.<br><br>Completely unfold planter<br><br>Select **PLANT** on the Plant/Transport Switch (S101) of the Frame Control Console.<br><br>Select **MAN** on the Auto/Manual Mode Switch (S102) of the Frame Control Console.<br><br>Select **R** on the Right-Left Marker Switch (S103) on the Frame Control Console.<br><br>When the Stand Alone SCV for the Markers is activated, does the Right Marker arm raise and lower? | **YES: Replace Solenoid Valve (Y6).**<br><br>GO TO ❼<br><br>**NO:** GO TO ㉖<br><br>– – –1/1 |

| | | |
|---|---|---|
| **㉖ Right Marker Arm Position Check** | Is the Right Marker Arm in the raised position? | **YES:** GO TO ㉗<br><br>**NO:** GO TO ㉘<br><br>– – –1/1 |

| | | |
|---|---|---|
| **17 Hydraulic System Pressure Check** | Relieve hydraulic system pressure.<br><br>*NOTE: Refer to TM2058 1790 Front-Fold Planter Repair for instructions on relieving hydraulic system pressure.*<br><br>Disconnect hydraulic hose from **Piston** side of the **Left** Rockshaft Cylinder.<br><br>Attach pressure gauge to end of disconnected hydraulic hose.<br><br>Tractor running at 1800 RPM.<br><br>Set hydraulic system to MAXIMUM flow.<br><br>Select **TRANS** on Plant/Transport Mode Switch (S101) of Frame Control Console.<br><br>Select **ROW LIFT** on Row Lift Switch (S106) of Frame Control Console.<br><br>Hold correct SCV to Raise Detent for a minimum of five seconds.<br><br>Does gauge indicate tractor system pressure greater than 1800 psi? | **YES:** Replace Pilot Operated Lock Valves (21A)<br><br>GO TO 5<br><br>**NO:** Replace Pilot Operated Lock Valves (21B)<br><br>GO TO 5<br><br>– – –1/1 |
| **18 Physical Damage Check** | Visually inspect the Planter's Right Rockshaft (Split Rows), Rockshaft Lift Arm, and hinge pin.<br><br>Does there appear to be any physical damage that is preventing the Rockshaft from lowering? | **YES: Repair and/or replace as necessary**<br><br>GO TO 4<br><br>**NO:** GO TO 19<br><br>– – –1/1 |
| **19 Right Rockshaft Raise/Lower Cylinder Condition Check** | Visually inspect the Right Rockshaft Raise/Lower Cylinder.<br><br>Does the Right Rockshaft Raise/Lower Cylinder appear to have any physical damage, a dented barrel or a bent rod? | **YES: Repair and/or replace as necessary**<br><br>GO TO 4<br><br>**NO:** GO TO 20<br><br>– – –1/1 |
| **20 Hydraulic Hose Check** | Is the Right Rockshaft Raise/Lower Cylinder hydraulic hoses crimped and/or damaged? | **YES: Repair and/or replace as necessary**<br><br>GO TO 4<br><br>**NO:** GO TO 21<br><br>– – –1/1 |
| **21 Fixed Orifice (O7) Check** | Relieve hydraulic system pressure.<br><br>Disconnect hydraulic hose from Piston side of Right Rockshaft Raise/Lower Cylinder.<br><br>*NOTE: Refer to TM2058 1790 Front-Fold Planter Repair for instructions on relieving hydraulic pressure and removing orifices.*<br><br>Is the Fixed Orifice (O7) Clean and Properly Installed in the hydraulic fitting of the Piston end of the Cylinder? | **YES: Replace Pilot Operated Lock Valves (21A and 21B)**<br><br>GO TO 4<br><br>**NO: Clean and Install Fixed Orifice (O7) in rod end of cylinder.**<br><br>GO TO 4<br><br>– – –1/1 |

**5A—Sense Check Kit**
**5B—Sense Check Kit**
**5D—Sense Check Kit**
**5F—Sense Check Kit**
**5G—Sense Check Kit**
**8A—Left Counter-Balance Valve**
**8B—Right Counter-Balance Valve**
**12A—Left Center Lift Cylinders Rephasing Valve**
**12B—Right Center Lift Cylinders Rephasing Valve**
**21C—Pilot Operated Lock Valve**
**21D—Pilot Operated Lock Valve**
**C1—Left Wing Wheel Cylinder**
**C2—Left Wing Wheel Cylinder**
**C3—Center Lift Cylinder**
**C4—Center Lift Cylinder**
**C5—Center Lift Cylinder**
**C6—Center Lift Cylinder**
**C7—Right Wing Wheel Cylinder**
**C8—Right Wing Wheel Cylinder**
**F1—Flow Divider Valve/Combiner**
**G1—Hydraulic Valve Block**
**V1A—Tractor SCV Coupler**
**V2A—Tractor SCV Coupler**
**V10—Left Wing Wheel Cylinders Rephasing Valve**
**V23—Right Wing Wheel Cylinders Rephasing Valve**
**V24—6000 psi Pressure Relief Valve**
**V25—4500 psi Pressure Relief Valve**
**Y1—Field Raise/Lower and Transport Raise/Lower Solenoid**
**Y22—Transport Mode Raise/Lower Solenoid #1**
**Y23—Transport Mode Raise/Lower Solenoid #2**
**Y24—Transport Mode Raise/Lower Solenoid #3**
**Y25—Transport Mode Raise/Lower Solenoid #4**



KC01776,000196F –19–31DEC03–2/2

## Transport and Wing Wheels Raise/Lower Diagnostic

KC01776,0001970 –19–31DEC03–1/1

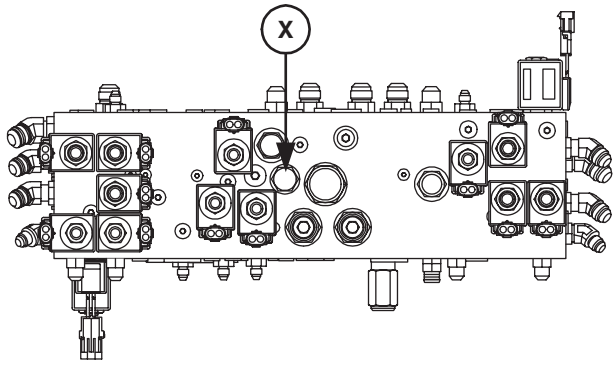
### Transport and Wing Wheels Raise/Lower Problem

– – –1/1

| | | |
|---|---|---|
| ❶ **Preliminary Check** | Visually inspect the Planter for the following:<br><br>Electrical connections;<br><br>• X301, 7-Pin Trailer Lighting and Accessory Outlet Connector<br>• X401, Frame Harness to Frame Control Console Extension Harness connector<br>• X402, Frame Control Console Extension Harness to Frame Control Console<br><br>Hydraulic connection to tractor;<br><br>• Hoses connected to correct SCV<br>• Hoses connected to correct SCV extend/retract ports<br>• Correct hose tips<br><br>**IMPORTANT: If extend and retract hoses are switched, hydraulic system will not function!**<br><br>Are all electrical and hydraulic connections to planter made correctly? | **YES:** GO TO ❷<br><br>**NO:** Make the appropriate connections and/or adjustments.<br><br>GO TO ❷ |

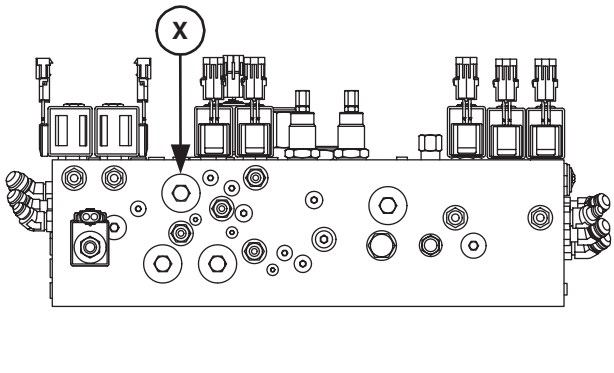
– – –1/1

**12B - Right Center Lift Cylinders Rephasing Valve (1600 psi)**



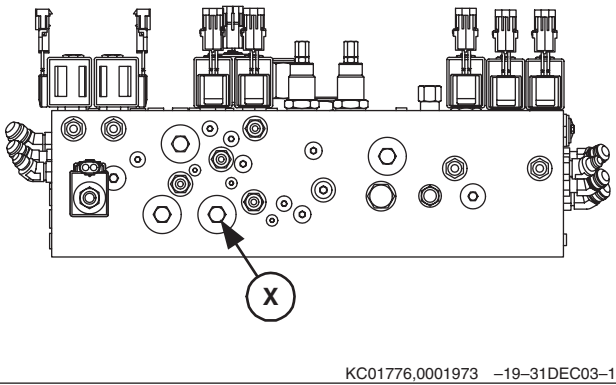

KC01776,0001973 –19–31DEC03–9/71

**21A - Pilot Operated Lock Valve (Left Rockshaft)**



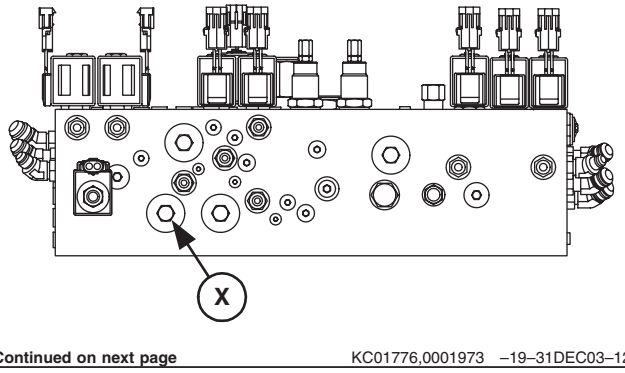

KC01776,0001973 –19–31DEC03–10/71

**21B - Pilot Operated Lock Valve (Right Rockshaft)**




KC01776,0001973 –19–31DEC03–11/71

**21C - Left Pilot Operated Lock Valve**

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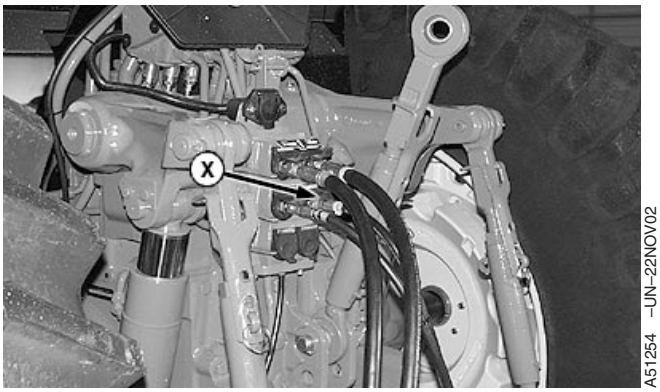
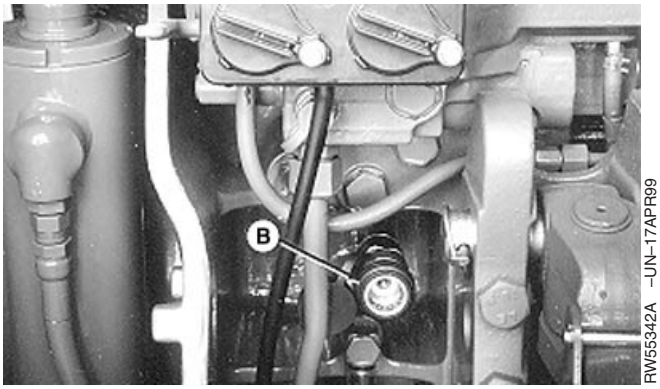
KC01776,0001973 –19–31DEC03–12/71

**V2B - Hydraulic Return**




KC01776,0001973 –19–31DEC03–49/71

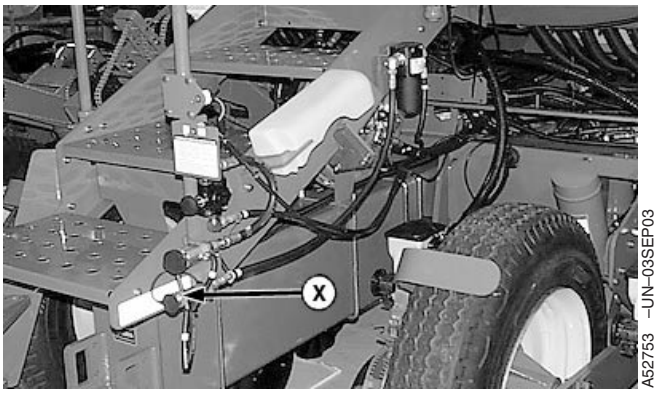
**V3A - Tractor Case Drain Motor Coupler**




*Case Drain - 8000 Series Tractor Illustrated*

KC01776,0001973 –19–31DEC03–50/71

**V4A - Rear Auxiliary SCV Coupler**

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KC01776,0001973 –19–31DEC03–51/71