6020 to 6920S Tractors and SE Tractors Diagnostics

TECHNICAL MANUAL

6020 to 6920S Tractors and SE Tractors Diagnostics

TM4726 01NOV03 (ENGLISCH)

For complete service information also see:

John Deere Werke Mannheim

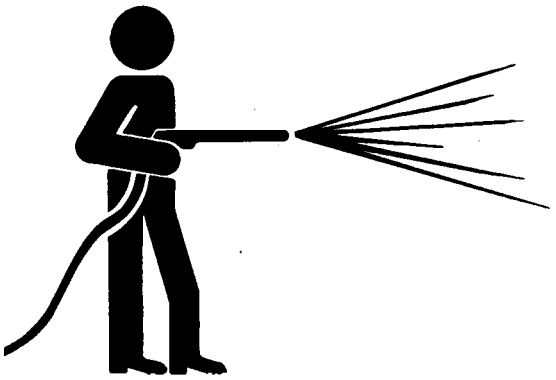
European Version

Printed in Germany

Work in Clean Area

Before starting a job:

- Clean work area and machine.
- Make sure you have all necessary tools to do your job.
- Have the right parts on hand.
- Read all instructions thoroughly; do not attempt shortcuts.



T6642EJ –UN–18OCT88

DX,CLEAN –19–04JUN90–1/1

Illuminate Work Area Safely

Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.

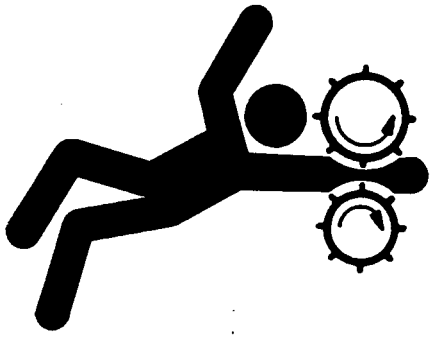
TS223 –UN–23AUG88

DX,LIGHT –19–04JUN90–1/1

Service Machines Safely

Tie long hair behind your head. Do not wear a necktie, scarf, loose clothing, or necklace when you work near machine tools or moving parts. If these items were to get caught, severe injury could result.

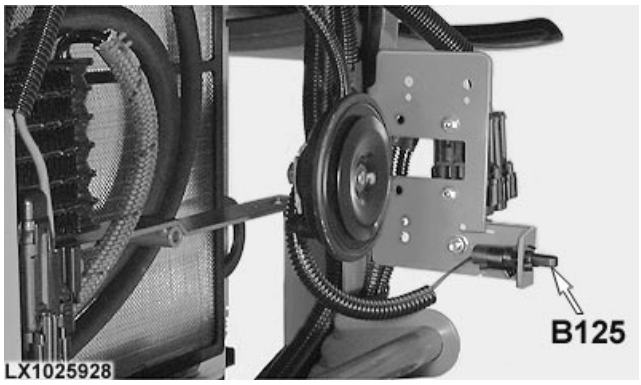
Remove rings and other jewelry to prevent electrical shorts and entanglement in moving parts.



TS228 –UN–23AUG88

DX,LOOSE –19–04JUN90–1/1

Continued on next page

❸ **Initial component test, sending unit (B125) for ambient temperature (front)**	At the air cleaner, perform a visual inspection of sending unit (B125; ambient temperature at the front) and of the connector associated with it:  LX1025928 –UN–30SEP03 **B125—Sending unit for ambient temperature at the front** ❒ Check for signs of damage or dirt. ❒ Check the electrical connections for bad, loose, widened, slid-back or corroded contacts.	**OK:** If there are no signs of damage: GO TO 4. **NOT OK:** Recondition sub-assemblies or contacts as required and do an Operational Check for Sending Unit (B125; Ambient Temperature at the Front), see 245-ATC. – – –1/1
❹ **Checking the circuit, sending unit (B125) for ambient temperature (front)**	Do a Circuit/Harness Test for Sending Unit (B125; Ambient Temperature at the Front), see 245-ATC.	**OK:** GO TO 7. **NOT OK:** Recondition as required and do an Operational Check for Sending Unit (B125; Ambient Temperature at the Front), see 245-ATC. – – –1/1

❺ **Additional checks and assessment of intermittent faults**	Type of error indicates a loose contact: • Before doing a check of the contacts at air-conditioning relay (K09/4), see summary of wiring layout in Circuit/Harness Test for Air-Conditioning Relay (K09/4) in 245-ATC. • For back-up, see also additional references for circuit checks: – Reference 245-ATC-100, Test Procedure in the Case of Occasional ATC Circuit Problems (ATC Beep Mode). – Reference 210-15-046, Troubleshooting Unsolved Problems.	**OK:** Diagnosis completed. **NOT OK:** Recondition as required and do an Operational Check for Air-Conditioning Relay (K09/4), see 245-ATC.

– – –1/1

ATC 000876.04 — Air-Conditioning Relay, Grounded Circuit

Diagnostic trouble code ATC 000876.04 is generated when the ClimaTrak™ controller registers a grounded circuit at line 277, which leads to relay K09/4.
Alarm level: *Information*

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LX12234,0000CF2 –19–02SEP03–1/1

Diagnostics

Reaction of controller: Temperature control is restricted.
Compressor clutch M02 cannot be switched on.

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-ATC-100, Theory of Operation.
- Reference 290-15-200, ClimaTrak™—Checks.
- Reference 290-20-200, Operation of the ATC (ClimaTrak™).

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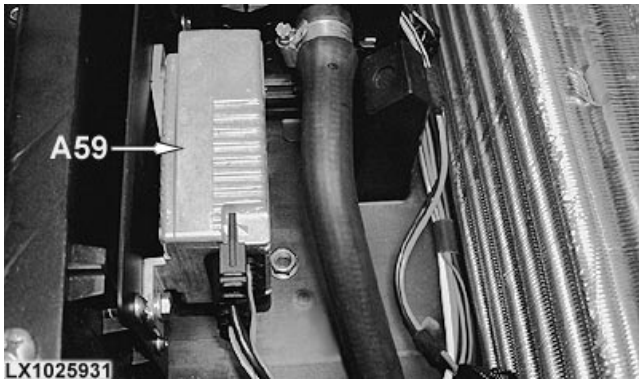
❷ **Checking the fan control**	• Ignition ON. • Turn the fan speed control as far as it will go to the left (OFF). • Turn the temperature control as far as it will go to the left (Lo). • Access address ATC005. • Slowly turn the fan speed control through its entire range till it stops at the other extreme. • Make sure that the information displayed at address ATC005 complies with the following: **ATC005 - Fan speed, shown in percent—Specification** Display:—Fan OFF ..... 000 Fan control turned as far to the right as it will go ..... 038 - 100 Fault in circuit or driver unit ..... Err	**OK:** GO TO 5. **NOT OK:** GO TO 3. – – –1/1
❸ **Initial component test**	In the heater/evaporator housing, perform a visual inspection of the driver unit for fan motors (A59) and of the contacts associated with it:  LX1025931 –UN–30SEP03 **A59—Driver unit for fan motors** ❒ Check for signs of damage or dirt. ❒ Check the electrical connections for bad, loose, widened, slid-back or corroded contacts.	**OK:** If there are no signs of damage: GO TO 4. **NOT OK:** Recondition sub-assemblies, connectors or contacts as required and do an Operational Check for Fan Motors, see 245-ATC. – – –1/1
❹ **Checking the circuit**	Do a Circuit/Harness Test for Fan Motor Driver Unit (A59), see 245-ATC.	**OK:** GO TO 5. **NOT OK:** Recondition as required and do an Operational Check for Fan Motors, see 245-ATC. – – –1/1

211 ATC 41

❹ **Checking the circuit**	Do a Circuit/Harness Test for Water Valve (B131), see 245-ATC.	**OK:** GO TO 5. **NOT OK:** Recondition as required and do an Operational Check for Water Valve (B131), see 245-ATC.

– – –1/1

❺ **Additional checks and assessment of intermittent faults**	Type of error indicates a loose contact: • Before doing a check of the connections at the water valve, see summary of wiring layout in Circuit/Harness Test for Water Valve (B131) in 245-ATC. • For back-up, see also additional references for circuit checks: – Reference 245-ATC-100, Test Procedure in the Case of Occasional ATC Circuit Problems (ATC Beep Mode). – Reference 210-15-046, Troubleshooting Unsolved Problems.	**OK:** Diagnosis completed. **NOT OK:** Recondition as required and do an Operational Check for Water Valve (B131), see 245-ATC.

– – –1/1

ATC 001547.03 — Sending Units for Evaporator Core Temperature, Shorted or Open Circuit

Diagnostic trouble code ATC 001547.03 is generated when the ClimaTrak™ controller measures over 5 volts at the signal input of the sending unit (B129; for evaporator core temperature). This indicates that circuit is shorted to a supply lead or is open.
Alarm level: *Information*

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LX12234,0000CFB –19–02SEP03–1/1

Diagnostics

Reaction of controller: Temperature control is restricted.

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-ATC-100, Theory of Operation.
- Reference 290-15-200, ClimaTrak™—Checks.
- Reference 290-20-200, Operation of the ATC (ClimaTrak™).

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** If the diagnostic trouble code is no longer generated: Diagnosis completed. **NOT OK:** If the diagnostic trouble code is active or is regenerated after it has been deleted and a functional test has been carried out: GO TO 2. – – –1/1

❷ **Checking the ATC plug (29-bit CAN BUS connection and power supply)**	Most wiring harness problems are caused by connector problems (contacts loose/bad/slid back) and/or bad ground connections. • Check the power supply. • Check the 29-bit CAN BUS communication lines (934/935). • Check the connections at the plug and control unit for loose, widened, slid-back or corroded contacts. **ATC –– plug X597 (W47)—Specification** Power supply:—Positive (lead 982) ..... 12 volts at pin 20 Positive (lead 203) ..... 12 volts at pin 22 Ground (lead 050) ..... at pin 9 29-bit CAN BUS communication lines:— CAN+ (lead 934) ..... at pin 5 CAN- (lead 935) ..... at pin 21	**OK:** GO TO 3. **NOT OK:** Recondition as required and carry out an operational test. – – –1/1

❸ **Checking the ECU plug (29-bit CAN BUS connection and power supply)**	Most wiring harness problems are caused by connector problems (contacts loose/bad/slid back) and/or bad ground connections. • Check the power supply. • Check the 29-bit CAN BUS communication lines (934/935). • Check the connections at the plug and control unit for loose, widened, slid-back or corroded contacts. **ECU Level 11 (HPCR) –– plug X570/1 (wiring harness W15)—Specification** Power supply:—Positive (lead 622) ..... 12 volts at pin E3 Positive (lead 032) ..... 12 volts at pins B1 and B2 Positive, ELX (lead 992) ..... 12 volts at pin G2 Ground (lead 050) ..... at pins C2 and C3 **ECU Level 11 (HPCR) –– plug X570/2 (wiring harness W15)—Specification** 29-bit CAN BUS communication lines:— CAN+ (lead 934) ..... at pin L1 CAN- (lead 935) ..... at pin L2 **ECU Level 12 (DE10) –– plug X570 (W15)—Specification** Power supply:—Positive (lead 622) ..... 12 volts at pin A2 Positive (lead 032) ..... 12 volts at pin K1 Positive (lead 992) ..... 12 volts at pin H1 Ground (lead 050) ..... at pin J2 29-bit CAN BUS communication lines:— CAN+ (lead 934) ..... at pin G1 CAN- (lead 935) ..... at pin F1	**OK:** GO TO 4. **NOT OK:** Recondition as required and carry out an operational test. – – –1/1

❻ **Checking for a mechanical defect at the air distribution**	Before checking the air distribution for a mechanical defect, see also “Replace Control Mode (Adjusting Motor for Air Distribution)” (Repair manual, 90-10).	**OK:** Diagnosis completed. **NOT OK:** Recondition as required and do an Operational Check for Adjusting Motor (B132; for Air Distribution), see 245-ATC.

– – –1/1

ATC 523848.13 — Adjusting Motor for Air Distribution, Not Calibrated

Diagnostic trouble code ATC 523848.13 is generated when the adjusting motor for air distribution is found to have an invalid calibration, or is not yet calibrated.
Alarm level: *Information*

LX12234,0000D0D –19–08SEP03–1/1

Diagnostics

Reaction of controller: Air distribution control is restricted.

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-ATC-100, Theory of Operation.
- Reference 290-15-200, ClimaTrak™—Checks.
- Reference 290-20-200, Operation of the ATC (ClimaTrak™).

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❷ **Check System Voltage (BCU System Voltage)**	Access address BCU 32 : **BCU 32 –– Voltage, System Voltage (BCU Operating Voltage)—Specification** Switch ignition ON; engine OFF:— Voltage ..... between 11.2 and 12.7 volts Engine running in low idle:—Voltage ..... between 11.2 and 15.4 volts Engine running at 1500 rpm:—Voltage..... between 12.5 and 15.4 volts	**OK:** Diagnosis completed. **NOT OK:** GO TO 3. – – –1/1

❸ **Checking the charging system**	• Check alternator, refer to "Alternator Checks", Section 240, Group 15. • Check battery, refer to "Battery Checks", Section 240, Group 15.	**OK:** Diagnosis completed. **NOT OK:** Repair as required. – – –1/1

BCU 000168.17 — System Voltage Too Low (Engine Speed Over 1500 rpm)

Diagnostic trouble code BCU 000168.17 is saved if the operating voltage of the basic control unit (ELX battery voltage) is less than 12.5 volts at an engine speed of more than 1500 rpm. The diagnostic trouble code triggers the alarm level: “CAUTION”.

LX16167,0000061 –19–03APR02–1/1

Diagnostics

NOTE: The following are possible causes:

- *Defective alternator drive.*
- *Defective battery.*
- *Defective alternator.*
- *Defective line connections.*

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-BCU-200, Operation of the Basic Control Unit (Basic Functions).
- Remove/Install the Alternator , (Section 40, Group 15 in the Repair manual)

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Diagnostics

NOTE: The following are possible causes:

- *Defective fuse F03/02.*
- *Defective rear PTO switch S21.*
- *Defective positive lead (cable 973).*
- *Defective signal lead (cable 525 or 586).*

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-BCU-200, Operation of the Basic Control Unit (Basic Functions).
- “Replacing the PTO Switch” (Section 40, Group 25 in the Repair manual).

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

– – –1/1

❷ **Checking the combination of signals in diagnostic address BCU 07**	Access address BCU 07 : **BCU 07 –– Status, Rear PTO Switch (S21) —Specification** Rear PTO disengaged:—Status..... XX01 Rear PTO engaged:—Status XX10	**OK:** Diagnosis completed. **NOT OK:** - On tractors with Command Arm: GO TO: Circuit/harness test for rear PTO switch (with Command Arm). - On tractors without Command Arm: GO TO: • Circuit/harness test for rear PTO switch. • Circuit/harness test for rear PTO switch - SE tractors. • Circuit/harness test for rear PTO switch - open operator’s station.

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BCU 302082.31 — INFORMATION FOR OPERATOR: Actuate the Front-Wheel Drive Switch

Diagnostic trouble code BCU 302082.31 is generated if front-wheel drive is switched off by the HMS II and the front-wheel drive switch is still in the ON or AUTO positions.

NOTE: This diagnostic trouble code is not stored in the controller's error memory. It is intended only as information for the operator

LX16167,000007B –19–03APR02–1/1

BCU 302085.31 — Front Wheel Drive, Switch Error

Diagnostic trouble code BCU 302085.31 is saved when the basic control unit receives the two output signals of the front wheel drive switch (AUTO and BRAKE ASSIST at switch S05 or front-wheel drive ON and OFF at switch S63) simultaneously for longer than 3 seconds. This indicates a short circuit to the supply voltage (battery voltage) in the switch circuit. The diagnostic trouble code triggers the alarm level: "Information".

LX16167,000007C –19–01SEP02–1/1

Diagnostics

NOTE: The following are possible causes:

- *Defective front-wheel drive switch S05 (tractors with HMS) or S63 (tractors without HMS).*
- *Defective signal lead (short circuit at cable 557 or 511).*

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-BCU-200, Operation of the Basic Control Unit (Basic Functions).
- "Replacing the Front-Wheel Drive Switch", (Section 40, Group 25 in the Repair manual).

– – –1/1

❸ **Check circuit of hazard warning light fuse F03/03 and F03/04**	Most wiring harness problems are caused by connector problems (contacts loose/bad/slid back) and/or bad ground connections. Before a detailed circuit check is performed and in the case of occasional circuit problems (loose contacts), all components of the respective circuit must be checked. For circuit diagram see: • Reference 240-10-021, SE16E - BCU (Hazard Warning and Turn Signal Lights) For component location and pin arrangement see: • Reference 240-26-004, Wiring Harnesses for 6120, 6220, 6320, 6420 and 6520 Tractors with PowrQuad Plus Transmission and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-005, Wiring Harnesses for 6320, 6420 and 6520 Tractors with AutoQuad Transmission and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-002, Wiring Harnesses for 6420S, 6620, 6820, 6920 and 6920S Tractors with PowrQuad Plus or AutoQuad Transmissions and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-003, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-501, Wiring Harnesses for Tractors with PowrQuad Plus or AutoQuad Transmissions and Stage II Engine to 97/68/EC — Summary of References. • Reference 240-26-502, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission and Stage II Engine to 97/68/EC — Summary of References.	**OK:** Diagnosis completed. **NOT OK:** Repair as needed and carry out an operational test.

– – –1/1

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BCU
47

BCU 302133.31 — Rear PTO Preselector, Switch Error

Diagnostic trouble code BCU 302133.31 is saved when the basic control unit receives an erroneous signal combination from the switch. The diagnostic trouble code triggers the alarm level: “Information”.

LX16167,0000089 –19–01NOV02–1/1

❸ **Checking the power supply circuit of the 5-volt components**	Most wiring harness problems are caused by connector problems (contacts loose/bad/slid back) and/or bad ground connections. Before a detailed circuit check is performed and in the case of occasional circuit problems (loose contacts), all components of the respective circuit must be checked. For circuit diagram see: • Reference 240-10-016, SE15 Electronic Hitch Control Unit. For component location and pin arrangement see: • Reference 240-26-004 , Wiring Harnesses for 6120, 6220, 6320, 6420 and 6520 Tractors with PowrQuad Plus Transmission and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-005, Wiring Harnesses for 6320, 6420 and 6520 Tractors with AutoQuad Transmission and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-002, Wiring Harnesses for 6420S, 6620, 6820, 6920 and 6920S Tractors with PowrQuad Plus or AutoQuad Transmissions and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-003, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-501, Wiring Harnesses for Tractors with PowrQuad Plus or AutoQuad Transmissions and Stage II Engine to 97/68/EC — Summary of References. • Reference 240-26-502, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission and Stage II Engine to 97/68/EC — Summary of References.	**OK:** Diagnosis completed. **NOT OK:** Repair as needed and carry out an operational test.

211
BCU
61

– – –1/1

BCU 303041.02 — Stepper Motor Coil 1, Open Lead

Diagnostic trouble code BCU 303041.02 is saved when no impulses are received from the stepper motor circuit (coil 1). This indicates that the stepper motor's circuit is open. This diagnostic trouble code does not necessarily have any real meaning. It is often stored by chance when the main switch is turned (ignition ON and OFF). For this reason, diagnosis only needs to be performed if one or more related faults occur in conjunction with this code.

LX16167,0000093 –19–01SEP02–1/1

❷ **Check rocker switch**	Access address BCU 103 : **BCU 103 –– Voltage, Rapid Raise/Lower Rocker Switch (S24)—Specification** Switch (S24) in center (OFF) position:— Voltage ..... 6 volts (with a 12-volt power supply) Switch (S24) in RAISE position:— Maximum voltage ..... 10.5 volts Switch (S24) in LOWER position:— Minimum voltage ..... 1 volt	**OK:** • Diagnosis completed. • Type of error indicates a loose contact. - On tractors without Command Arm: GO TO: • Circuit/harness test for rapid raise switch (S24). • Circuit/harness test for rapid raise switch (S24) - SE tractors. • Circuit/harness test for rapid raise switch (S24) - open operator's station . - On tractors with Command Arm: GO TO: Circuit/harness test for rapid raise switch (S24_A). **NOT OK:** - On tractors without Command Arm: GO TO: • Circuit/harness test for rapid raise switch (S24) . • Circuit/harness test for rapid raise switch (S24) - SE tractors. • Circuit/harness test for rapid raise switch (S24) - open operator's station. - On tractors with Command Arm: GO TO: Circuit/harness test for rapid raise switch (S24_A). – – –1/1

211 BCU 75

BCU 303051.03 — Left Draft Sender, Signal Voltage Too High

Diagnostic trouble code BCU 303051.03 is saved when the basic control unit measures a voltage over 4.75 volts at the signal input of the left draft sender. This indicates that the draft sensor's circuit is shorted.

LX16167,000009C –19–01SEP02–1/1

❸ **Check voltage supply of hitch height control potentiometer**	Access address BCU 116 : **BCU 116 –– Voltage, 5-volt Power Supply for Hitch Control Units—Specification** 5-volt power supply:—Voltage ..... 4.75 - 5.25 volts	**OK:** - On tractors without Command Arm: GO TO: • Circuit/harness test for hitch-height potentiometer . • Circuit/harness test for hitch-height potentiometer - SE tractors. • Circuit/harness test for hitch-height potentiometer - open operator's station. - On tractors with Command Arm: GO TO: Circuit/harness test for hitch-height potentiometer. **NOT OK:** Refer to diagnostics for faulty 5-volt power supply (diagnostic trouble code BCU 303037.03, Section 211, Group BCU).

– – –1/1

211 BCU 89

BCU 303054.04 — Hitch Height Control Potentiometer, Signal Voltage Too Low

Diagnostic trouble code BCU 303054.04 is saved when the basic control unit measures a voltage below 0.25 volts at the signal input of the potentiometer. This indicates that the potentiometer's circuit is open.

LX16167,00000A3 –19–01SEP02–1/1

Diagnostics

NOTE: The following are possible causes:

- *Defective rate-of-drop potentiometer (B27, B97 with Command Arm).*
- *Defective line connection between the potentiometer and the basic control unit (open or grounded circuit):*
  - *Positive lead (cable 873).*
  - *Ground lead (cable 871/531).*
  - *Signal lead (cable 875).*

Additional references:

- General hitch information: Reference 270-20-001, PFC Hydraulic System — Summary of References.
- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-BCU-201, Operation of the Basic Control Unit (Hitch Control).

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

– – –1/1

BIF 000096.03 — Fuel Gauge Sender, Shorted or Open Circuit

Diagnostic trouble code BIF 000096.03 is saved when there is an open or a short circuit to the supply voltage (battery voltage) in the sender circuit. The instrument panel displays an empty tank and the alarm level: "Information" is triggered.

LX16167,0000042 –19–01NOV02–1/1

Diagnostics

The following are possible causes:

- Defective fuse F04/11.
- Defective fuel gauge sender B03.
- Defective/bad ground connection (cable 310) via ground point XGND45 to XGND1.
- Defective positive lead (cable 320/322).
- Defective signal lead (cable 353).

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-BIF-200, Basic Informator - Theory of Operation.
- Reference 230-20-010, Fuel System Description.

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

– – –1/1

BIF 000110.04 — Coolant Temperature Sender, Short to Ground

Diagnostic trouble code BIF 000110.04 is saved when the instrument panel registers an unlikely temperature and therefore indicates that there is a short to ground in the sender circuit. The coolant temperature indicator is at the extreme right of the red warning zone and the alarm level: “Information” is triggered.

LX16167,0000049 –19–01NOV02–1/1

Diagnostics

The following are possible causes:

- Defective coolant temperature sender B08.
- Defective line connection (cable 329).

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-BIF-200, Basic Informator - Theory of Operation.

– – –1/1

❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

– – –1/1

❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 1.2
	Perform a visual inspection of the alternator and the drive belt. ❒ Check for visual signs of damage. ❒ Ensure that the belt tensioner and the belt are correctly installed, check for signs of slipping. ❒ Check the electrical connections for bad, loose, widened or corroded contacts. ❒ Check ground connections between battery/engine and cab. • Check mounting surfaces for corrosion / paint and loose mounting bolts.	**OK:** GO TO 2. **NOT OK:** Recondition as required and carry out an operational test. – – –1/1

❷ **Check Alternator D+ Voltage and Tractor System Voltage (Battery Voltage)**	Access address BIF 32: **BIF 32 –– Voltage, Alternator D+ Voltage—Specification** Engine running at low idle:—Voltage..... between 11.2 and 15.4 volts Engine running at 1500 rpm:—Voltage..... between 12.5 and 15.4 volts Access address BCU 32: **BCU 32 –– Voltage, system voltage (BCU operating voltage)—Specification** Ignition ON; engine OFF:—Voltage ..... between 11.2 and 12.7 volts Engine running at low idle:—Voltage..... between 11.2 and 15.4 volts Engine running at 1500 rpm:—Voltage..... between 12.5 and 15.4 volts	**OK:** • Diagnosis completed. • Type of error indicates a loose contact: GO TO: Circuit/Harness test for alternator D+ voltage (B03) **NOT OK:** GO TO 3. – – –1/1

❸ **Checking the charging system**	• Check alternator, refer to "Alternator Checks" Section 240, Group 15. • Check battery, refer to "Battery Checks", Section 240, Group 15.	**OK:** Check the electrical connections of the charging system for bad, loose, widened or corroded contacts. **NOT OK:** Recondition as needed and repeat the test. – – –1/1

❷ **Check transmission oil temperature display**	**2.1 Transmission oil temperature in °C:** Access address BIF 33 and compare the displayed temperature with the actual temperature of the transmission oil: **BIF 33 –– Status, transmission oil temperature sender (B60) in °C—Specification** Transmission oil temperature:— Temperature (050 is equivalent to 50 °C) ..... between -040 and +105	**OK:** • Diagnosis completed. • Type of error indicates a loose contact: GO TO: Circuit/harness test for hydraulic oil temperature sender (B60). **NOT OK:** Address BIF 33 displays the wrong value: GO TO 2.2.
	2.2 Transmission oil temperature in volts: Access address BIF 15: **BIF 15 –– Voltage, transmission oil temperature sender (B60)—Specification** Transmission oil temperature:—Voltage ..... between 0.5 and 4.0 volts	**OK:** GO TO: Circuit/harness test for hydraulic oil temperature sender (B60). **NOT OK:** GO TO 2.3
	2.3 Check sender supply voltage (cable 602): Access address BIF 15: **BIF 15 –– Voltage, transmission oil temperature sender (B60)—Specification** Sender B60 separated from the wiring harness (at an operating voltage of 12 volts):—Voltage ..... between 3.0 and 4.0 volts Use a multimeter to measure between pins A and B at connector X307 (wiring harness W28): **Voltage, transmission oil temperature sender (B60) at Connector X307—Specification** At a BIF operating voltage of 12 volts:— Voltage ..... between 3.0 and 4.0 volts	**OK:** GO TO 3. **NOT OK:** GO TO: Circuit/harness test for hydraulic oil temperature sender (B60). – – –1/1

❸ **Checking hydraulic oil temperature sender (B60) in diagnostic address BIF 33**	Access address BIF 33: **BIF 33 –– Status, transmission oil temperature sender (B60) in °C—Specification** Transmission oil temperature:— Temperature (050 is equivalent to 50 °C) ..... between -040 and +105	**OK:** Diagnosis completed. **NOT OK:** Address BIF 33 displays the wrong value. GO TO: Circuit/harness test for hydraulic oil temperature sender (B60). – – –1/1

ECU 000028.04 — Cruise Control Potentiometer Input Voltage Low

Diagnostics

NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.

Diagnostics and additional references for Level 1 ECU with Delphi (Lucas) DP201 pump:

See LEVEL 1 ECU - DTC SPN 28 FMI 4 - CRUISE CONTROL POTENTIOMETER INPUT VOLTAGE LOW - DIAGNOSTIC PROCEDURE in Section 04, Group 160 in CTM284.

Electrical information: See Reference 210-15-001, General References—Summary.

For information on functional and diagnostic schematics, see:

• Reference 240-10A-052, SE23A - Electronic Engine Control (PowrQuad Plus and AutoPowr transmissions)

For component location and pin arrangement, see:

• Reference 240-26-005, Wiring Harnesses for 6320, 6420 and 6520 Tractors with AutoQuad Transmission and Stage I Engine to 97/68/EC — Summary of References.

Diagnostics and additional references for Level 4 ECU with Bosch VP44 pump:

See LEVEL 4 ECU - T18 - CRUISE CONTROL POTENTIOMETER INPUT VOLTAGE LOW - DIAGNOSTIC PROCEDURE in Section 04, Group 160 in CTM170.

Electrical information: See Reference 210-15-001, General References—Summary.

For information on functional and diagnostic schematics, see:

Continued on next page

ECU 000091.03 — Accelerator Pedal Potentiometer Input Voltage High

Diagnostics

NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.

Diagnostics and additional references for Level 1 ECU with Delphi (Lucas) DP201 pump:

See LEVEL 1 ECU - DTC SPN 91 FMI 3 - ACCELERATOR PEDAL POTENTIOMETER INPUT VOLTAGE HIGH - DIAGNOSTIC PROCEDURE in Section 04, Group 160 in CTM284.

Electrical information: See Reference 210-15-001, General References—Summary.

For information on functional and diagnostic schematics, see:

• Reference 240-10A-052, SE23A - Electronic Engine Control (PowrQuad Plus and AutoPowr transmissions)

For component location and pin arrangement, see:

• Reference 240-26-005, Wiring Harnesses for 6320, 6420 and 6520 Tractors with AutoQuad Transmission and Stage I Engine to 97/68/EC — Summary of References.

Diagnostics and additional references for Level 4 ECU with Bosch VP44 pump:

See LEVEL 4 ECU - T3 - ACCELERATOR PEDAL POTENTIOMETER INPUT VOLTAGE HIGH - DIAGNOSTIC PROCEDURE in Section 04, Group 160 in CTM170.

Electrical information: See Reference 210-15-001, General References—Summary.

For information on functional and diagnostic schematics, see:

Continued on next page

ECU 000094.10 — Fuel Rail Pressure Loss Detected

Diagnostics

NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.

Diagnostics and additional references for Level 11 ECU with Denso HPCR:

LEVEL 11 ECU - DTC SPN 94 FMI 10 - FUEL RAIL PRESSURE LOSS DETECTED - DIAGNOSTIC PROCEDURE in Section 04, Group 160 in CTM220.

Electrical information: See Reference 210-15-001, General References—Summary.

For information on functional and diagnostic schematics, see:

• Reference 240-10-034, SE23B - Electronic Engine Control (PowrQuad Plus, AutoQuad and AutoPowr/IVT transmissions).

For component location and pin arrangement, see:

• Reference 240-26-501, Wiring Harnesses for Tractors with AutoQuad Transmission and Stage II Engine to 97/68/EC — Summary of References.

• Reference 240-26-502, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission and Stage II Engine to 97/68/EC — Summary of References.

• Reference 240-26-702, Wiring Harnesses for 6320, 6420, 6420S, 6520, 6620, 6820, 6920 and 6920S Tractors with PowrQuad Plus or AutoQuad Plus Transmission from Serial No. 398791[1] — Summary of References.

[1] *With ECU Level 11 (DENSO HPCR)*

Continued on next page

ECU 000100.03 — Engine Oil Pressure Input Voltage High

Diagnostics

NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.

Diagnostics and additional references for Level 4 ECU with Bosch VP44 pump:

See LEVEL 4 ECU - DTC SPN 100 FMI 3 - ENGINE OIL PRESSURE INPUT VOLTAGE HIGH - DIAGNOSTIC PROCEDURE in Section 04, Group 160 in CTM170.

Electrical information: See Reference 210-15-001, General References—Summary.

For information on functional and diagnostic schematics, see:

• Reference 240-10-034, SE23B - Electronic Engine Control (PowrQuad Plus, AutoQuad and AutoPowr/IVT transmissions).

For component location and pin arrangement, see:

• Reference 240-26-002, Wiring Harnesses for 6420S, 6620, 6820, 6920 and 6920S Tractors with AutoQuad Transmission and Stage I Engine to 97/68/EC — Summary of References.

• Reference 240-26-003, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission and Stage I Engine to 97/68/EC — Summary of References.

Diagnostics and additional references for Level 11 ECU with Denso HPCR:

See LEVEL 11 ECU - DTC SPN 100 FMI 3 - ENGINE OIL PRESSURE INPUT VOLTAGE HIGH - DIAGNOSTIC PROCEDURE in Section 04, Group 160 in CTM220.

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• Reference 240-10A-052, SE23A - Electronic Engine Control (PowrQuad Plus and AutoPowr transmissions), for tractors with cab.

• Reference 240-10A-021, SE23 - Electronic Engine Control, for tractors with open operator's station.

• Reference 240-10B-025, SE23 - Electronic Engine Control, for SE tractors.

For component location and pin arrangement, see:

• Reference 240-26-501, Wiring Harnesses for Tractors with PowrQuad Plus or AutoQuad Transmission and Stage II Engine to 97/68/EC — Summary of References.

• Reference 240-26-503, Wiring Harnesses for Tractors with Open Operator's Station and Stage II Engine to 97/68/EC - Summary of References.

• Reference 240-26-504, Wiring Harnesses for SE Tractors with Stage II Engine to 97/68/EC — Summary of References.

• Reference 240-26-701, Wiring Harnesses for 6120 and 6220 Tractors from Serial No. 398791 — Summary of References

LX25546,000061F –19–01SEP03–3/3

• Reference 240-10A-052, SE23A - Electronic Engine Control (PowrQuad Plus and AutoPowr transmissions), for tractors with cab.

• Reference 240-10A-021, SE23 - Electronic Engine Control, for tractors with open operator's station.

• Reference 240-10B-025, SE23 - Electronic Engine Control, for SE tractors.

For component location and pin arrangement, see:

• Reference 240-26-501, Wiring Harnesses for Tractors with PowrQuad Plus or AutoQuad Transmission and Stage II Engine to 97/68/EC — Summary of References.

• Reference 240-26-503, Wiring Harnesses for Tractors with Open Operator's Station and Stage II Engine to 97/68/EC - Summary of References.

• Reference 240-26-504, Wiring Harnesses for SE Tractors with Stage II Engine to 97/68/EC — Summary of References.

• Reference 240-26-701, Wiring Harnesses for 6120 and 6220 Tractors from Serial No. 398791 — Summary of References

LX25546,0000623 –19–01SEP03–3/3

• Reference 240-10A-021, SE23 - Electronic Engine Control, for tractors with open operator's station.

• Reference 240-10B-025, SE23 - Electronic Engine Control, for SE tractors.

For component location and pin arrangement, see:

• Reference 240-26-501, Wiring Harnesses for Tractors with PowrQuad Plus or AutoQuad Transmission and Stage II Engine to 97/68/EC — Summary of References.

• Reference 240-26-503, Wiring Harnesses for Tractors with Open Operator's Station and Stage II Engine to 97/68/EC - Summary of References.

• Reference 240-26-504, Wiring Harnesses for SE Tractors with Stage II Engine to 97/68/EC — Summary of References.

• Reference 240-26-701, Wiring Harnesses for 6120 and 6220 Tractors from Serial No. 398791 — Summary of References

• Reference 240-26-703, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission from Serial No. 398791 — Summary of References.

LX25546,0000633 –19–01SEP03–2/2

Electrical information: See Reference 210-15-001, General References—Summary.

For information on functional and diagnostic schematics, see:

- Reference 240-10-034, SE23B - Electronic Engine Control (PowrQuad Plus, AutoQuad and AutoPowr/IVT transmissions).

For component location and pin arrangement, see:

- Reference 240-26-501, Wiring Harnesses for Tractors with AutoQuad Transmission and Stage II Engine to 97/68/EC — Summary of References.

- Reference 240-26-502, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission and Stage II Engine to 97/68/EC — Summary of References.

- Reference 240-26-702, Wiring Harnesses for 6320, 6420, 6420S, 6520, 6620, 6820, 6920 and 6920S Tractors with PowrQuad Plus or AutoQuad Plus Transmission from Serial No. 398791[1] — Summary of References.

- Reference 240-26-703, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission from Serial No. 398791 — Summary of References.

[1] With ECU Level 11 (DENSO HPCR)

LX25546,000063C –19–01SEP03–2/2

• Reference 240-10A-021, SE23 - Electronic Engine Control, for tractors with open operator's station.

• Reference 240-10B-025, SE23 - Electronic Engine Control, for SE tractors.

For component location and pin arrangement, see:

• Reference 240-26-501, Wiring Harnesses for Tractors with PowrQuad Plus or AutoQuad Transmission and Stage II Engine to 97/68/EC — Summary of References.

• Reference 240-26-503, Wiring Harnesses for Tractors with Open Operator's Station and Stage II Engine to 97/68/EC - Summary of References.

• Reference 240-26-504, Wiring Harnesses for SE Tractors with Stage II Engine to 97/68/EC — Summary of References.

• Reference 240-26-701, Wiring Harnesses for 6120 and 6220 Tractors from Serial No. 398791 — Summary of References

• Reference 240-26-703, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission from Serial No. 398791 — Summary of References.

LX25546,000064A –19–01SEP03–2/2

- Reference 240-26-703, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission from Serial No. 398791 — Summary of References.

LX25546,0000651 –19–01SEP03–2/2

Electrical information: See Reference 210-15-001, General References—Summary.

For information on functional and diagnostic schematics, see:

- Reference 240-10A-052, SE23A - Electronic Engine Control (PowrQuad Plus and AutoPowr transmissions), for tractors with cab.

- Reference 240-10A-021, SE23 - Electronic Engine Control, for tractors with open operator's station.

- Reference 240-10B-025, SE23 - Electronic Engine Control, for SE tractors.

For component location and pin arrangement, see:

- Reference 240-26-501, Wiring Harnesses for Tractors with PowrQuad Plus or AutoQuad Transmission and Stage II Engine to 97/68/EC — Summary of References.

- Reference 240-26-503, Wiring Harnesses for Tractors with Open Operator's Station and Stage II Engine to 97/68/EC - Summary of References.

- Reference 240-26-504, Wiring Harnesses for SE Tractors with Stage II Engine to 97/68/EC — Summary of References.

- Reference 240-26-701, Wiring Harnesses for 6120 and 6220 Tractors from Serial No. 398791 — Summary of References

Diagnostics

NOTE: The following are possible causes:

- *An incorrect input signal at the basic control unit (BCU).*
- *Wheel size does not match manufacturer specifications.*
- *The wrong wheels are installed.*

Additional references:

- Electrical information: See Reference 210-15-001, General References—Summary.
- See Reference 245-BCU-001, Calibration and Input Signal Addresses (Basic Functions).
- See Reference 245-BIF-001, Calibration and Input Signal Addresses.

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

– – –1/1

❷ **Checking the input signals**	**Check the rolling circumferences in address BCU 56:** Access address BCU 56 and check value. For input value refer to: Address BCU056 — Basic Functions, Rolling Circumference, Technical Manual, Section 245, BCU Group.	**OK:** • Wheel size does not match manufacturer specifications. • Wrong wheels were mounted. **NOT OK:** Modify setting, confirm and carry out an operational test.

– – –1/1

ECU 001076.06 — Pump Solenoid Circuit Severely Shorted

Diagnostics

NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.

Diagnostics and additional references for Level 12 ECU with Stanadyne DE10 pump:

See LEVEL 12 ECU - DTC SPN 1076 FMI 6 - PUMP SOLENOID CIRCUIT SEVERELY SHORTED - DIAGNOSTIC PROCEDURE in Section 04, Group 160 in CTM331.

Electrical information: See Reference 210-15-001, General References—Summary.

For information on functional and diagnostic schematics, see:

- Reference 240-10A-052, SE23A - Electronic Engine Control (PowrQuad Plus and AutoPowr transmissions), for tractors with cab.

- Reference 240-10A-021, SE23 - Electronic Engine Control, for tractors with open operator's station.

- Reference 240-10B-025, SE23 - Electronic Engine Control, for SE tractors.

For component location and pin arrangement, see:

- Reference 240-26-501, Wiring Harnesses for Tractors with PowrQuad Plus or AutoQuad Transmission and Stage II Engine to 97/68/EC — Summary of References.

- Reference 240-26-503, Wiring Harnesses for Tractors with Open Operator's Station and Stage II Engine to 97/68/EC - Summary of References.

Continued on next page

ECU 001078.31 — ECU/Pump Timing Extremely Out of Sync

Diagnostics

NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.

Diagnostics and additional references for Level 4 ECU with Bosch VP44 pump:

See LEVEL 4 ECU - DTC SPN 1078 FMI 31 - ECU/PUMP TIMING EXTREMELY OUT OF SYNC - DIAGNOSTIC PROCEDURE in Section 04, Group 160 in CTM170.

Electrical information: See Reference 210-15-001, General References—Summary.

For information on functional and diagnostic schematics, see:

• Reference 240-10-034, SE23B - Electronic Engine Control (PowrQuad Plus, AutoQuad and AutoPowr/IVT transmissions).

For component location and pin arrangement, see:

• Reference 240-26-002, Wiring Harnesses for 6420S, 6620, 6820, 6920 and 6920S Tractors with AutoQuad Transmission and Stage I Engine to 97/68/EC — Summary of References.

• Reference 240-26-003, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission and Stage I Engine to 97/68/EC — Summary of References.

LX12234,000100A –19–01SEP03–1/1

• Reference 240-26-703, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission from Serial No. 398791 — Summary of References.

LX12234,000100F –19–01SEP03–2/2

EPC 000639.13 — 29-bit CAN BUS, High Error Rate

Diagnostic trouble code EPC 000639.13 does not necessarily have any real meaning. It is often stored by accident when the main switch (ignition key) is switched on or off too quickly. Pay attention to this diagnostic trouble code only if the transmission is not operating properly. Diagnostic trouble code EPC 000639.13 is saved when the transmission control unit recognizes a high error rate in the incoming CAN BUS messages. This diagnostic trouble code triggers the alarm level: "Information".

LX25546,0000355 –19–01APR02–1/1

Diagnostics

The following are possible causes:

- A general 29-bit CAN BUS problem.
  - If other diagnostic trouble codes from other control units are saved that indicate a problem in the 29-bit CAN BUS: Diagnostic trouble code BIF 000639.02 takes priority.
- Defective CAN BUS screen:
  - Defective fuse F04/13 (voltage supply for 29-bit CAN BUS screen).
  - Terminating resistors A14 and/or A15 defective.
  - Defective screen lines (cable +930 and/or -932).
  - Voltage supply line (cable 994 and 050) of the screen lines defective.
  - Defective/bad voltage supply ground connection via ground point XGND4 to XGND43.
- Defective 29-bit CAN BUS connection to the transmission control unit (cable +934 and/or -935).
- 29-bit CAN BUS malfunction caused by strong electromagnetic influences.

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.

- Reference 245-20-001, Data BUS Systems — Summary of References.

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active (and transmission is operating properly): Diagnosis completed. **NOT OK:** Diagnostic trouble code is active and transmission is NOT operating properly: Diagnostic trouble code BIF 000639.02 takes priority.

– – –1/1

Diagnostics

The following are possible causes:

- Defective forward solenoid (Y33).
- Defective/bad ground connection (XGND46).
- Circuit fault in forward solenoid:
  - – Open lead in forward solenoid circuit.
  - – Short circuit in forward solenoid circuit.

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.

- Reference 245-EPC-200, Theory of Operation, PowrQuad Plus and AutoQuad Transmissions.

- “Removing and Installing the Valves in the Front Valve Housing” on 6120 to 6620 tractors in Section 55, Group 10 in the Repair manual.

- “Removing and Installing the Valves in the Front Valve Housing” on 6820 and 6920 tractors in Section 55, Group 10 in the Repair manual.

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

– – –1/1

❸ **Checking the circuit**	Check the circuit: • On tractors with "N" indicator light at reverse drive lever (A68), see: – Circuit/harness test for reverse drive lever (A68) up to tractor serial no. 398790; see 245-EPC. – Circuit/harness test for reverse drive lever (A68) from tractor serial no. 398791; see 245-EPC. • On tractors without "N" indicator light at reverse drive lever (A47), see: – Circuit/harness test for forward switch; see Technical Manual, Section 245, Group EPC. – Circuit/harness test for reverse switch; see Technical Manual, Section 245, Group EPC.	**OK:** Diagnosis completed. **NOT OK:** Recondition as required and carry out an operational test.

– – –1/1

EPC 306042.31 — Forward Switch Closed and Not-Neutral Switch Open

Diagnostic trouble code EPC 306042.31 is saved when the transmission control unit registers that the forward switch is closed although the not-neutral switch is open (not activated). This diagnostic trouble code triggers the alarm level: “Information”.

LX25546,0000369 –19–01SEP03–1/1

Diagnostics

The following are possible causes:

- Defective forward switch in the reverse drive lever.
- Defective not-neutral switch in the reverse drive lever.
- Defective line connection between the reverse drive lever and the transmission control unit (EPC).
  – Line 590 for forward switch.
  – Line 561 for not-neutral switch.

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.

- Reference 245-EPC-200, Theory of Operation, PowrQuad Plus and AutoQuad Transmissions.

- “Replacing the Switches on the Multi-function Unit” on 6120 to 6620 tractors (Repair Manual, Section 40, Group 25).

- “Replacing the Switches on the Multi-function Unit” on 6820 and 6920 tractors (Repair Manual, Section 40, Group 25).

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Diagnostics

The following are possible causes:

- Operator error: Operator switches the reverse drive lever to forward or reverse directly after the ignition is switched ON. Only actuate the reverse drive lever 2 seconds after the ignition is switched ON.
- This diagnostic trouble code may be caused by mistake when ignition is switched ON. Deal with this diagnostic trouble code only if it occurs during operation.
- Defective forward switch in the reverse drive lever.
- Defective reverse switch in the reverse drive lever.
- Defective not-neutral switch in the reverse drive lever.
- Defective line connection between the reverse drive lever and the transmission control unit (EPC).
  - – Line 590 for forward switch.
  - – Line 569 for reverse switch.
  - – Line 561 for not-neutral switch.

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.

- Reference 245-EPC-200, Theory of Operation, PowrQuad Plus and AutoQuad Transmissions.

- “Replacing the Switches on the Multi-function Unit” on 6120 to 6620 tractors (Repair Manual, Section 40, Group 25).

- “Replacing the Switches on the Multi-function Unit” on 6820 and 6920 tractors (Repair Manual, Section 40, Group 25).

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

– – –1/1

❷ **Checking the transmission speed sender (B104/1)**	**IMPORTANT: Perform the test only while the engine is running and range-shift (gear-shift) lever is in neutral.** • Use the hand throttle to set engine speed to 1000 rpm. • Select 4th gear. • Access address EPC 14. **EPC 14 –– Speed, transmission speed sender (B104/1)—Specification** Move the reverse drive lever to forward (clutch pedal not pressed):—Speed (with engine speed at 1000 rpm in 4th gear) ..... 1000 rpm *NOTE: Engine speed matches transmission speed only in 4th gear.*	**OK:** • Diagnosis completed. • Type of error indicates a loose contact: GO TO 3. **NOT OK:** GO TO 3. – – –1/1

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❸ **Checking the circuit of the transmission speed sender**	Checking the circuit of the transmission speed sender: • Circuit/harness test for transmission speed sender (B104/1) for 6820 and 6920 tractors; see Technical Manual, Section 245, Group EPC. • Circuit/harness test for transmission speed sender (B104/2) for 6120 to 6620 tractors; see Technical Manual, Section 245, Group EPC.	**OK:** Diagnosis completed. **NOT OK:** Recondition as required and carry out an operational test. – – –1/1

EPC 306063.14 — Control Unit, Internal Error

Diagnostic trouble code EPC 306063.14 is saved when an electronic malfunction is registered in the control unit. This diagnostic trouble code triggers the alarm level: “Information”.

LX25546,0000377 –19–01JUL01–1/1

Diagnostics

– – –1/1

Diagnostics

The following are possible causes:

- Defective K2 and/or K3 solenoid valve (up to serial no. 398790).
- Defective solenoid valve 1 and/or 2 (from serial no. 398791).
- Defective/bad ground connection (XGND46).
- Fault in circuit of K2 or K3 solenoid valve:
  - Open lead in solenoid circuit.
  - Short circuit in solenoid circuit.
- Fault in circuit of solenoid valve 1 or 2:
  - Open lead in solenoid circuit.
  - Short circuit in solenoid circuit.

Additional references:

• Electrical information: Reference 210-15-001, General References - Summary.

• Reference 245-EPC-200, Theory of Operation, PowrQuad Plus and AutoQuad Transmissions.

• “Removing and Installing the Shift Valve Housing” on 6120 to 6620 tractors in Section 55, Group 10 in the Repair manual.

• “Removing and Installing the Shift Valve Housing” on 6820 and 6920 tractors in Section 55, Group 10 in the Repair manual.

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** • For tractors up to serial no. 398790, GO TO 2. • For tractors from serial no. 398791, GO TO 4. – – –1/1

❹ **Checking the EPC plug (29-bit CAN BUS connection and power supply)**	Most wiring harness problems are caused by connector problems (contacts loose/bad/slid back) and/or bad ground connections. • Check the power supply. • Check the 29-bit CAN BUS communication lines (934/935). • Check the 29-bit CAN BUS screen lines (930/932). • Check the connections at the plug and control unit for loose, widened, slid-back or corroded contacts. **EPC –– plug X489 (W08)—Specification** Power supply:—Positive (lead 572) ..... 12 volts at pin 23 Positive (lead 503) ..... 12 volts at pin 2 Ground (lead 050) ..... at pin 1 Ground (lead 050) ..... at pin 24 29-bit CAN BUS communication lines:— CAN+ (lead 934) ..... at pin 44 CAN- (lead 935) ..... at pin 21 29-bit CAN BUS screen lines:—Lead 930- ..... at pin 20 Lead 932+ ..... at pin 43 For circuit diagram, see: • Reference 240-10A-053, SE26A - Transmission Control For component location and pin arrangement, refer to: • Reference 240-26-004, Wiring Harnesses for 6120, 6220, 6320, 6420 and 6520 Tractors with PowrQuad Plus Transmission and Stage I Engine to 97/68/EC — Summary of References • Reference 240-26-005, Wiring Harnesses for 6320, 6420 and 6520 Tractors with AutoQuad Transmission and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-002, Wiring Harnesses for 6420S, 6620, 6820, 6920 and 6920S Tractors with PowrQuad Plus or AutoQuad Transmissions and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-501, Wiring Harnesses for Tractors with PowrQuad Plus or AutoQuad Transmissions and Stage II Engine to 97/68/EC — Summary of References. • Reference 240-26-701, Wiring Harnesses for 6120 and 6220 Tractors from Serial No. 398791 — Summary of References. • Reference 240-26-702, Wiring Harnesses for 6320, 6420, 6420S, 6520, 6620, 6820, 6920 and 6920S Tractors with PowrQuad Plus or AutoQuad Plus Transmission from Serial No. 398791 — Summary of References	**OK:** Diagnosis completed. **NOT OK:** Recondition as required and carry out an operational test. – – –1/1

211 EPC 89

EPC 306122.09 — Engine Control Unit has Stopped Transmitting Data (Hand Throttle/Accelerator Pedal)

Diagnostic trouble code EPC 306122.09 is saved when no information regarding the hand throttle/accelerator pedal is registered via the CAN BUS for more than 2 seconds. This indicates a problem in transmitting data between the engine control unit (ECU) and the EPC. This diagnostic trouble code triggers the alarm level: "Information".

LX25546,0000383 –19–01SEP03–1/1

JDL 298885.31 — Control Unit Memory Capacity Exceeded

Use the following diagnostic procedure for this JDL diagnostic trouble code: JDLink System Check

Additional References:

Operation: Reference 245-JDL-200 , JDLink - Theory of Operation.

Electrical information: Reference 210-15-001, General References - Summary.

For circuit diagram see: Reference 240-10-038, SE30-JDLink Control Unit

For component location and pin arrangement see:

Reference 240-26-411, W41 — JDLink Wiring Harness.

NOTE: Take note of the processing procedures of Diagnostic Trouble Codes before starting the diagnosis, see Reference 245-05-002, Accessing Addresses and Diagnostic Trouble Codes.

LX26156,000010B –19–02OCT02–1/1

JDL 299616.31 — Call Disconnected

Use the following diagnostic procedure for this JDL diagnostic trouble code: JDLink System Check

Additional References:

Operation: Reference 245-JDL-200 , JDLink - Theory of Operation.

Electrical information: Reference 210-15-001, General References - Summary.

For circuit diagram see: Reference 240-10-038, SE30-JDLink Control Unit

For component location and pin arrangement see:

Reference 240-26-411, W41 — JDLink Wiring Harness.

NOTE: Take note of the processing procedures of Diagnostic Trouble Codes before starting the diagnosis, see Reference 245-05-002, Accessing Addresses and Diagnostic Trouble Codes.

LX26156,000011B –19–02OCT02–1/1

Diagnosis

NOTE: The following are possible causes:

- *Defective sender (B84; transmission output speed) (internal short circuit).*
- *A short to ground in the signal lead (cable 699) between the sender for transmission output speed B84 and the park lock controller (PLC).*

Additional References:

- Electrical information: Reference 210-15-001, General References - Summary.

- “Replacing the Sending Unit (B09, B35 or B84) ” on 6320 to 6620 tractors (Repair Manual, Section 56, Group 15).

- “Replacing the Transmission Output Speed Sending Unit (B84)” on 6820 and 6920 tractors (Repair Manual, Section 53, Group 15).

- Reference 245-PLC-200, Theory of Operation (Park Lock Controller)

- Reference 253-20-001, AutoPowr/IVT Transmission — Operation (Summary of References).

– – –1/1

❶ **Preliminary test**	*NOTE: Take note of the processing procedures of Diagnostic Trouble Codes before starting the diagnosis, see Reference 245-05-002, Accessing Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active, GO TO 2.

– – –1/1

PLC 328051.31 — Park Lock Alarm, Shorted Circuit

Diagnostic trouble code PLC 328051.31 is saved if the alarm's power supply line is shorted to the signal line or is shorted to ground. The diagnostic trouble code triggers the alarm level: "CAUTION".

NOTE: The following are possible causes:

- *Defective alarm K10/2.*
- *Defective lead connection in the positive lead (cable 614).*
  - *– Short to signal lead (cable 635).*
  - *– Short to ground lead (cable 330).*

NOTE: Go through the procedure for diagnostic trouble code PLC 328050.31 — Park Lock Alarm, Open or Shorted Circuit at Supply Line .

Additional References:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 253-20-024, AutoPowr/IVT Transmission — Operation of Park Lock.
- Reference 245-PLC-200, Theory of Operation (Park Lock Controller)
- Reference 253-20-001, AutoPowr/IVT Transmission — Operation (Summary of References).
- Reference 240-25-002, Fuses and relays.

LX25546,000040F –19–01SEP02–1/1

PLC 328061.31 — Signals Received from Reverse Drive Lever Do Not Match the CAN BUS Command from the TCU

Diagnostic trouble code PLC 328061.31 is stored if park lock commands sent from the user interface controller (UIC) to the PLC via the transmission control unit (TCU) and the CAN BUS do not match with the direction signals from the reverse drive lever. In its "active" state, this diagnostic trouble code also generates a diagnostic trouble code at the user interface controller (UIC) or transmission control unit (TCU) and sets off a "CAUTION" alarm.

LX25546,0000410 –19–01APR02–1/1

❸ **Check Keypad Status (Bottom)**	*NOTE: When testing the keys in the bottom two rows, always keep the "Width" key pressed. This prevents the address from changing.* Access address PRF 11: **PRF 11 –– Status, Keypad Status (Bottom)—Specification** No key pressed:—Status ..... 000000 “Width (7)” key pressed:—Status ..... XXXXX1 “Service (8)” key pressed:—Status ..... XXXX1X “PTO Speed (9)” key pressed:—Status ..... XXX1XX “Backlight” key pressed—Status ..... XX1XXX “Zero (0)” key pressed:—Status ..... X1XXXX “Set/Save” key pressed:—Status 1XXXXX	**OK:** Diagnosis completed. **NOT OK:** Replace the performance monitor and repeat the test. – – –1/1

SFA 324040.04 — Solenoid Y42, Grounded Circuit

Diagnostic trouble code SFA 324040.04 is saved when current measured by the control unit while the cab suspension is on is too low. This indicates a short to ground in the solenoid circuit. This diagnostic trouble code triggers the alarm level: “CAUTION”.

LX25546,00003D1 –19–01APR02–1/1

Diagnostics

The following are possible causes:

- Defective solenoid Y42.
- Defective line connection in solenoid circuit (lead 715).
  – Short to ground in solenoid circuit.

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 290-20-055, Hydro-pneumatic Cab Suspension — Operation.
- Reference 290-20-085, Hydro-Pneumatic Cab Suspension — Control Block, Components.

– – –1/1

❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: Circuit/harness test for cab solenoid valve (Y42); see Section 245, Group SFA in the Technical Manual.

– – –1/1

❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.* **1.2** Priority diagnostic codes must be processed first.	**OK:** Diagnostic trouble code is not active and no priority diagnostic trouble codes exist: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2. – – –1/1

❷ **Calibrate Suspended Front Axle**

Mode of operation of the solenoid valves Y10 and Y11		
Solenoid 1	Solenoid 2	Responsible for
Y10 open (activated electrically)	Y11 open (activated electrically)	Front axle moves up (hydraulic cylinders extend)
Y10 closed (not activated electrically)	Y11 open (activated electrically)	Front axle moves down (hydraulic cylinders retract)

To test solenoids Y10 and Y11, the suspended front axle must be calibrated.

Calibrate suspended front axle: See Reference 245-SFA-001, Calibration and Input Addresses, Front-Wheel Drive Axle with TLS.

IMPORTANT: If errors occur during the calibration, the calibration is interrupted and several diagnostic trouble codes are saved. These diagnostic trouble codes take priority.

OK: • Calibration was successful: Diagnosis completed.

• Type of error indicates a loose contact, GO TO: Circuit/harness test for TLS solenoid valve (Y10).

NOT OK: Calibration was not successful: GO TO 3.

– – –1/1

❸ **Check for mechanical defects on solenoid (Y10)**	Check if solenoid valve (Y10) is stuck in closed position: • “Reconditioning the Valves in the Control Block” in the Repair Manual, Section 80, Group 25 (for 6020 to 6620 tractors). • “Reconditioning the Valves in the Control Block” in the Repair Manual, Section 80, Group 20 (for 6820 and 6920 tractors).	**OK:** Solenoid Y10 is OK (no mechanical defect): GO TO 4. **NOT OK:** Repair as required and subsequently calibrate the suspended front axle: See Reference 245-SFA-001, Calibration and Input Addresses, Front-Wheel Drive Axle with TLS. – – –1/1
❹ **Checking the hydraulic circuit**	Reference 270-15-012, Checking the PFC Hydraulic System.	**OK:** Diagnosis completed. **NOT OK:** Recondition as required and carry out an operational test. – – –1/1

SFA 324063.31 — No Cab Movement During Calibration Although Command Was Given

Diagnostic trouble code SFA 324063.31 is saved when the control unit does not register any cab movement - via the position sensor - within 80 seconds during the calibration of the cab suspension. This diagnostic trouble code triggers the alarm level: “CAUTION”.

LX25546,00003E2 –19–16DEC03–1/1

Diagnostics

The following are possible causes:

- A circuit fault in the solenoid circuit (Y42 or Y43) is generating other diagnostic trouble codes (SFA 324040.04, SFA 324041.05, SFA 324042.04 or SFA 324043.05). Priority diagnostic trouble codes must be processed first.
- Mechanical defect at solenoid Y42 or Y43 (stuck in closed position).
- Hydraulic malfunction.

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-SFA-200, Theory of Operation (SFA Control Unit):
- Reference 290-20-055, Hydro-pneumatic Cab Suspension — Operation.
- Reference 290-20-085, Hydro-Pneumatic Cab Suspension — Control Block, Components.
- Reference 290-20-090, Hydro-pneumatic Cab Suspension — Hydraulic Diagram “Raising”.
- Reference 290-20-095, Hydro-pneumatic Cab Suspension — Hydraulic Diagram “Lowering”.

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❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.* **1.2** Priority diagnostic codes must be processed first.	**OK:** Diagnostic trouble code is not active and no priority diagnostic trouble codes exist: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

– – –1/1

Diagnostics

The following are possible causes:

- A problem in the 5-volt power supply circuit is generating another diagnostic trouble code (SFA 324066.03). This diagnostic trouble code takes priority.
- Defective line connection in position sensor circuit (lead 708).
  – Short circuit to 5-volt or 12-volt lead.
- Defective TLS position sensor B53.
- Position sensor rod misadjusted.

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 280-20-100, Front-Wheel Drive Axle with TLS — Components.
- Reference 280-20-110, Front-Wheel Drive Axle with TLS — Operation.
- Reference 280-20-130, Front-Wheel Drive Axle with TLS — Position Sensor.
- “Reconditioning the Position Sensor” in the Repair Manual, Section 80, Group 25 (for 6020 to 6620 tractors).
- “Reconditioning the Position Sensor” in the Repair Manual, Section 80, Group 20 (for 6820 and 6920 tractors).

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❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.* **1.2** Priority diagnostic codes must be processed first.	**OK:** Diagnostic trouble code is not active and no priority diagnostic trouble code has been saved: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

– – –1/1

Diagnostics

The following are possible causes:

- A problem in the 5-volt power supply circuit is generating another diagnostic trouble code (SFA 324073.03). This diagnostic trouble code takes priority.
- Defective line connection in position sensor circuit (lead 719).
  – Short circuit to 5-volt or 12-volt lead.
- Defective cab position sensor B110.
- Position sensor rod misadjusted (linkage).

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 290-20-050, Hydro-pneumatic Cab Suspension — Components.
- Reference 290-20-055, Hydro-pneumatic Cab Suspension — Operation.
- Reference 290-20-065, Hydro-pneumatic Cab Suspension — Position Sensor.

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❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.* **1.2** Priority diagnostic codes must be processed first.	**OK:** Diagnostic trouble code is not active and no priority diagnostic trouble code has been saved: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

– – –1/1

❷ **Checking the signal from position sensor (B110)**	Access address SFA 07: **SFA 07 –– Status, signal voltage of cab position sensor (B110)—Specification** Signal recognized:—Status 001	**OK:** GO TO 3. **NOT OK:** Check the circuit of position sensor (B110), GO TO: Circuit/harness test for cab position sensor (B110); see Section 245, Group SFA in the Technical Manual.

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❸ **Checking the SFA plug (29-bit CAN BUS connection and power supply)**	Most wiring harness problems are caused by connector problems (contacts loose/bad/slid back) and/or bad ground connections. • Check the power supply. • Check the 29-bit CAN BUS communication lines (934/935). • Check the 29-bit CAN BUS screen lines (930/932). • Check the connections at the plug and control unit for loose, widened, slid-back or corroded contacts. **SFA –– plug X485 (W08)—Specification** Power supply:—Positive (lead 762) ..... 12 volts at pin 23 Positive (lead 992) ..... 12 volts at pin 45 Ground lead 050 ..... at pin 1 29-bit CAN BUS communication lines:— CAN+ (lead 934) ..... at pin 44 CAN- (lead 935) ..... at pin 21 For circuit diagram, see: • Reference 240-10-029, SE20-Front-Wheel Drive Axle with TLS and CSC Cab Suspension. For component location and pin arrangement, refer to: • Reference 240-26-004, Wiring Harnesses for 6120, 6220, 6320, 6420 and 6520 Tractors with PowrQuad Plus Transmission and Stage I Engine to 97/68/EC — Summary of References • Reference 240-26-005, Wiring Harnesses for 6320, 6420 and 6520 Tractors with AutoQuad Transmission and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-002, Wiring Harnesses for 6420S, 6620, 6820, 6920 and 6920S Tractors with PowrQuad Plus or AutoQuad Transmissions and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-003, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-501, Wiring Harnesses for Tractors with PowrQuad Plus or AutoQuad Transmissions and Stage II Engine to 97/68/EC — Summary of References. • Reference 240-26-502, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission and Stage II Engine to 97/68/EC — Summary of References • Reference 240-26-701, Wiring Harnesses for 6120 and 6220 Tractors from Serial No. 398791 — Summary of References • Reference 240-26-702, Wiring Harnesses for 6320, 6420, 6420S, 6520, 6620, 6820, 6920 and 6920S Tractors with PowrQuad Plus or AutoQuad Plus Transmission from Serial No. 398791[1] — Summary of References. • Reference 240-26-703, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission from Serial No. 398791 — Summary of References.	**OK:** Diagnosis completed. **NOT OK:** Recondition as required and carry out an operational test.

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[1] With ECU Level 11 (DENSO HPCR)

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Diagnostics

NOTE: The following are possible causes:

- *A general problem with the 29-bit CAN BUS (diagnostic trouble codes SIC 334002.09 and SIC 334003.09 are saved as well).*
  - *If other diagnostic trouble codes from other control units are saved that indicate a problem in the 29-bit CAN BUS: Diagnostic trouble code BIF 000639.02 takes priority.*
- *A fault in the ECU's monitoring circuit (faulty crankshaft speed sender B72).*
  - *ECU diagnostic trouble codes take priority.*
- *A fault in the BCU's monitoring circuit (faulty engine speed sender B01).*
  - *BCU diagnostic trouble codes take priority.*
- *Defective 29-bit CAN BUS connection or power supply to the basic control unit or engine control unit causes an intermittent problem in transferring data.*
  - *Other diagnostic trouble codes are saved that indicate a general problem in transferring data to/from the engine control unit (UIC 305051.09, UIC 305052.09, UIC 305053.09, UIC 305055.09, UIC 305056.09, EPC 306121.09, EPC 306122.09, SFA 324080.09, SFA 324082.09 and/or TCU 304160.09).*
  - *Other diagnostic trouble codes are saved that indicate a general problem in transferring data to/from the basic control unit (SFA 324081.09, UIC 305059.09 and/or EPC 306120.09).*
- *Defective 29-bit CAN BUS connection or power supply to the E-SCV/E-ICV control unit (SIC) causes an intermittent problem in transferring data.*
- *Intermittent 29-bit CAN BUS malfunction caused by strong electromagnetic influences.*
- *Defective engine control unit (ECU) or basic control unit (BCU).*

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.

- Reference 245-ECU-201, Theory of Operation, Engine Control Unit (ECU Level 4 with Bosch VP44 Injection Pump).

- Reference 245-BCU-101, Operation of the Basic Control Unit (Basic Functions).

- Reference 245-SIC-200, Theory of Operation, controller for E-SCVs and E-ICVs

- Reference 245-05-003, Description of Diagnostic Trouble Codes.

- Reference 245-20-001, Data BUS Systems — Summary of References.

❷ **Checking the temperature of the transmission oil**	**2.1 - Temperature check:** • Access address TCU 21: **TCU 21 –– Status, transmission oil temperature sender (displayed in °C)— Specification** Transmission oil temperature:— Temperature range..... -50°C to +120°C (-58°F to +248°F) Temperature alarm threshold..... 101°C (214°F)	**OK:** TCU temperature reading is equivalent to actual transmission oil temperature. Warm up the hydraulic oil. See Reference 270-15-010. **NOT OK:** GO TO 2.2.
	2.2 - Checking the transmission oil temperature sender at the 16-pin plug of the internal transmission harness: • Ignition OFF. • Disconnect plug X482/1 (connecting plug between internal transmission harness and valve block harness W29) and connect test harness KJD10265. • Check resistance at the 16-pin test plug between pin 8 (lead 642) and pin 9 (lead 641): **Transmission oil temperature sender (resistance)—Specification** Temperature-dependent:—Resistance ..... between 900 and 1100 ohms at 25°C (77° F)	**OK:** • Diagnosis completed. • Type of error indicates a loose contact: GO TO 4. **NOT OK:** Repair as needed and carry out an operational test. – – –1/1

Diagnostics

The following are possible causes:

- Defective potentiometer on control lever 3 (S98).
- Defective signal lead (lead 755):
  – Open, shorted or grounded circuit.
- Defective power supply between the SIC and control lever 3 switch/potentiometer (S98):
  – Open or shorted circuit at the ground lead (cable 741).
  – Open circuit at positive lead (cable 733).

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-SIC-001, Calibration and Input Addresses for Selective Control Valves (E-SCV and E-ICV)
- Reference 245-SIC-200, Theory of Operation, E-SCV / E-ICV Controller
- “Electrical actuation of selective control valves (E-SCV)” (6120-6620)
- “Electrical actuation of selective control valves (E-SCV)” (6620-6920)

– – –1/1

❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

– – –1/1

❷ **Checking the 5-volt power supply**	Access address SIC 30 : **SIC30 –– Voltage, 5-volt power supply for SIC components—Specification** 5-volt power supply:—Minimum voltage ..... 4.75 volts Maximum voltage ..... 5.25 volts	**OK:** • Diagnosis completed. • Type of error indicates a loose contact: GO TO 3. **NOT OK:** Check the 5-volt power supply circuit, GO TO 3. – – –1/1

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❸ **Checking the 5-volt power supply circuit (positive lead 733 and ground lead 741)**	The following components are powered by the 5-volt power supply circuit: • Multifunction lever functions 1, 2 and 3. • Control levers for the E-SCVs: S91, S97, S98 and S99 (harness W12 with Command Arm). • E-SCV function adjusting knob B115 (harness W16). *NOTE: Most wiring harness problems are caused by connector problems (contacts loose/bad/slid back) and/or bad ground connections.* *Before a detailed circuit check is performed and in the case of occasional circuit problems (loose contacts), all components of the respective circuit must be checked.* For circuit diagram see: • Reference 240-10-030, SE21-Electronic Actuation of SCVs. For component location and pin arrangement see Command Arm harness W12 (AutoPowr/IVT transmission) and SIC wiring harness W16 • Reference 240-26-004, Wiring Harnesses for 6120, 6220, 6320, 6420 and 6520 Tractors with PowrQuad Plus Transmission and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-005, Wiring Harnesses for 6320, 6420 and 6520 Tractors with AutoQuad Transmission and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-002, Wiring Harnesses for 6420S, 6620, 6820, 6920 and 6920S Tractors with PowrQuad Plus or AutoQuad Transmissions and Stage I Engine to 97/68/EC — Summary of References • Reference 240-26-003, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission and Stage I Engine to 97/68/EC — Summary of References. • Reference 240-26-501, Wiring Harnesses for Tractors with PowrQuad Plus or AutoQuad Transmissions and Stage II Engine to 97/68/EC — Summary of References. • Reference 240-26-502, Wiring Harnesses for Tractors with AutoPowr/IVT Transmission and Stage II Engine to 97/68/EC — Summary of References	**OK:** Check the connections for loose, widened, slid-back or corroded contacts. **NOT OK:** Repair as needed and carry out an operational test. – – –1/1

SIC 334144.18 — E-ICV No.2, Stepper Motor, Power Supply Too Low

Diagnostic trouble code SIC 334144.18 is saved if system voltage (battery voltage) at the stepper motor of E-ICV no.2 lies between 9 and 11 volts and hydraulic oil temperature is between -25 °C (-13°F) and -15 °C (5 °F). The diagnostic trouble code triggers the alarm level: "Information".

LX25546,0000430 –19–01APR02–1/1

Diagnostics

NOTE: The following are possible causes:

- *Defective alternator drive.*
- *Defective battery.*
- *Defective alternator.*
- *Defective line connection in circuit that supplies power to the stepper motors.*

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-SIC-200, Theory of Operation, controller for E-SCVs and E-ICVs.

– – –1/1

❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 1.2
	1.2 Perform a visual inspection of the battery, the alternator and the drive belt. ❒ Check for visual signs of damage. ❒ Ensure that the belt tensioner and the belt are correctly installed, check for signs of slipping. ❒ Check the electrical connections for bad, loose, widened or corroded contacts.	**OK:** GO TO 2. **NOT OK:** Repair as needed and carry out an operational test.

– – –1/1

❷ **Check system voltage (SIC system voltage)**	Access address SIC 32 : **SIC 32 –– Voltage, System Voltage (SIC Operating Voltage)—Specification** Ignition ON; engine OFF:—Voltage ..... between 11.2 and 12.7 volts Engine running in low idle:—Voltage ..... between 11.2 and 15.4 volts Engine running at 1500 rpm:—Voltage..... between 12.5 and 15.4 volts	**OK:** No problem with system voltage: GO TO 4. **NOT OK:** GO TO 3.

– – –1/1

❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: If the diagnostic trouble code is realistic (low outside temperature), GO TO 2. • If the diagnostic trouble code is unrealistic (high outside temperature), GO TO 3. – – –1/1

❷ **Warm-up phase**	The warm-up phase is initiated automatically when the engine is running and system voltage is over 12 volts.	**OK:** If the diagnostic trouble code becomes inactive after a sufficiently long warm-up phase: Diagnosis completed. **NOT OK:** If the diagnostic trouble code is still active despite a sufficiently long warm-up phase: GO TO 3. – – –1/1

❸ **Replacing the stepper motor**	• Replace the stepper motor with a new one. • An automatic stepper motor identification takes place (identification number of stepper motor in address SIC 40) if only one stepper motor is replaced. If more than one stepper motor has to be replaced, see address SIC 40 — Input address, stepper motor identification number, E-SCVs and E-ICVs (Section 245, Group SIC). • Calibrate the stepper motor. See reference 245-SIC-001, Calibration and Input Addresses for E-SCVs and E-ICVs.	**OK:** Diagnosis completed. – – –1/1

SIC 334157.14 — E-ICV No.3, Stepper Motor, Coil Temperature Too High

Diagnostic trouble code SIC 334157.14 is stored if the stepper motor registers a coil temperature more than 100 °C (212 °F). The stepper motor is not fully operational until coil temperature has dropped below 100 °C (212 °F). The diagnostic trouble code triggers the alarm level: “Information”.

LX25546,000043B –19–01OCT01–1/1

❸ **Checking the charging system**	• Check alternator, refer to "Alternator Checks" Section 240, Group 15. • Check battery, refer to "Battery Checks", Section 240, Group 15.	**OK:** Check all relevant connectors of the system voltage circuit (SIC operating voltage) for bad, loose, widened or corroded contacts. **NOT OK:** Repair as needed and carry out an operational test.

– – –1/1

❹ **Checking power supply to E-SCV Nr.2 stepper motor**	See: Circuit/harness test for E-SCV no.2 stepper motor (M37), power supply.	**OK:** Replace the stepper motor and carry out an operational check. **NOT OK:** Repair as needed and carry out an operational test.

– – –1/1

SIC 334170.00 — E-SCV No.2, Stepper Motor, Power Supply Too High

Diagnostic trouble code SIC 334170.00 is saved if the system voltage (battery voltage) is more than 16 volts at the stepper motor of E-SCV no.2. The diagnostic trouble code triggers the alarm level: “Information”.

LX25546,0000444 –19–01SEP01–1/1

Diagnostics

NOTE: The following is a possible cause:

- *Defective regulator at the alternator.*

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-SIC-200, Theory of Operation, controller for E-SCVs and E-ICVs.

– – –1/1

Diagnostics

NOTE: The following are possible causes:

- *Defective alternator drive.*
- *Defective battery.*
- *Defective alternator.*
- *Defective line connection in circuit that supplies power to the stepper motors (E-SCV no.3 and E-SCV no.4).*

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-SIC-200, Theory of Operation, controller for E-SCVs and E-ICVs.
- “Series 300 selective control valves (electr. actuated) — Reconditioning” (6120-6620)
- “Series 300 selective control valves (electr. actuated) — Reconditioning” (6820-6920)

– – –1/1

❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 1.2
	1.2 Perform a visual inspection of the battery, the alternator and the drive belt. ❒ Check for visual signs of damage. ❒ Ensure that the belt tensioner and the belt are correctly installed, check for signs of slipping. ❒ Check the electrical connections for bad, loose, widened or corroded contacts.	**OK:** GO TO 2. **NOT OK:** Repair as needed and carry out an operational test.

– – –1/1

❷ **Check system voltage (SIC system voltage)**	Access address SIC 32 : **SIC 32 –– Voltage, System Voltage (SIC Operating Voltage)—Specification** Ignition ON; engine OFF:—Voltage ..... between 11.2 and 12.7 volts Engine running in low idle:—Voltage ..... between 11.2 and 15.4 volts Engine running at 1500 rpm:—Voltage..... between 12.5 and 15.4 volts	**OK:** No problem with system voltage: GO TO 4. **NOT OK:** GO TO 3.

– – –1/1

Diagnostics

The following is a possible cause:

- Tractor is not equipped with an E-ICV (incorrect calibration value stored in address SIC 36).
- Stepper motor for E-ICV no.3 is not connected.
- Defective stepper motor plug X252.
  – Power supply or 11-bit CAN BUS connection.
- A general problem with the power supply to the stepper motors (fuse F03/10 and relay K02/5)
  – The following diagnostic trouble codes are also saved: SIC 334202.14 and/or SIC 334203.14.
- A general problem with the 11-bit CAN BUS connection or with the power supply.
  – The following diagnostic trouble codes are also saved: SIC 334201.14 and SIC 334202.14.
- Defective stepper motor (M14) for the E-ICV no.3 function.

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.

- Reference 245-SIC-200, Theory of Operation, E-SCV / E-ICV Controller

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❸ **Checking the input value at identification address SIC 40**	Check identification of stepper motor 4 (SCA 4). See: Address SIC 040 — Calibration of Stepper Motor - Identification, Section 245, Group SIC in the Technical Manual.	**OK:** If the input value in address SIC 40 is correct, GO TO 4. **NOT OK:** Enter the correct stepper motor in SIC 40 (calibrate), and perform an operational check.

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❹ **Performing an operational check on the stepper motor E-SCV no.3**	**4.1** Perform an operational check on the E-SCV no.3.	**OK:** If there is an E-SCV no.3 function: GO TO 4.2. **NOT OK:** If there is not any E-SCV no.3 unction: GO TO 11-bit CAN BUS test (Section 213, Group 45).
	4.2 • Ignition OFF. • Disconnect stepper motor (A38; for the E-SCV no.3 function) from plug X466. • Connect stepper motor plug (X466; for E-SCV no.3 function) to stepper motor (A39; for E-SCV no.4 function), and do an operational check.	**OK:** If there is still an E-SCV no.4 function after the plug has been replaced: GO TO Circuit test for E-SCV no.4 stepper motor (A39). Section 245, Group SIC in the Technical manual. **NOT OK:** If there is no E-SCV no.4 function after the plug has been replaced: Replace the stepper motor for E-SCV no.4, and recalibrate.

– – –1/1

SIC 334221.14 — E-ICV No.1, Stepper Motor Fails to Respond to Command from Controller

Diagnostic trouble code SIC 334221.14 is saved if there is a problem in transferring data between the stepper motor for E-ICV no.1 and the SIC. During operation, following a successful initialization (link made after ignition ON), the controller fails to establish a connection to the stepper motor, or makes only intermittent contact (possibly due to a loose wire). This diagnostic trouble code triggers the alarm level: “Information”.

LX25546,000045D –19–01APR02–1/1

Diagnostics

NOTE: The following are possible causes:

- *Harness problem caused by loose/bad/slid back contacts (loose connections) and/or bad ground connections.*
  - *Power supply circuit.*
  - *11-bit CAN BUS circuit.*
- *Defective stepper motor (A39) for the E-SCV no.4 function.*

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-SIC-200, Theory of Operation, controller for E-SCVs and E-ICVs.
- “Series 300 selective control valves (electr. actuated) — Reconditioning” (6120-6620)
- “Series 300 selective control valves (electr. actuated) — Reconditioning” (6820-6920)

– – –1/1

❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** GO TO 1.2.
	1.2 Are other diagnostic trouble codes (SIC 334204.14, SIC 334205.14, SIC 334206.14 and SIC 334207.14) saved that indicate a general problem with the power supply or in the 11-bit CAN BUS connection to the stepper motors?	**OK:** If other diagnostic trouble codes are saved: GO TO 11-bit CAN BUS test (Section 213, Group 45). **NOT OK:** If no other diagnostic trouble codes are saved: GO TO 2.

– – –1/1

❸ **Checking the BCU plug (29-bit CAN BUS connection and power supply)**	Most wiring harness problems are caused by connector problems (contacts loose/bad/slid back) and/or bad ground connections. • Check the power supply. • Check the 29-bit CAN BUS communication lines (934/935). • Check the 29-bit CAN BUS screen lines (930/932). • Check the connections at the plug and control unit for loose, widened, slid-back or corroded contacts. **BCU –– plug X483/1 (W08)—Specification** Power supply:—Positive (lead 571) ..... 12 volts at pin 23 29-bit CAN BUS communication lines:— CAN+ (lead 934) ..... at pin 44 CAN- (lead 935) ..... at pin 21 29-bit CAN BUS screen lines:—Lead 930- ..... at pin 20 Lead 932+ ..... at pin 43 **BCU –– plug X483/2 (W08)—Specification** Power supply:—Ground (lead 050) ..... at pin 1	**OK:** Diagnosis completed. **NOT OK:** Recondition as required and carry out an operational test.

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SSU 000628.02 — SSU Controller, Internal Fault (EEPROM)

If a fault occurs when the internal module (EEPROM) intervenes, diagnostic trouble code SSU 000628.02 is triggered.
Alarm level: *CAUTION.*

LX26156,00001AB –19–05AUG03–1/1

Diagnostics

Additional references:

• Electrical information: Reference 210-15-001, General References - Summary.

– – –1/1

❸ **Checking the seat switch**	• Access address UIC 10. **UIC 10 –– Status, seat switch (S40)—Specification** Operator sitting on seat:—Status ..... X1X Operator not sitting on seat:—Status X0X	**OK:** • Type of error indicates a loose contact, GO TO: Circuit/Harness Test for Seat Switch (S40); see Section 245, Group UIC in the Technical Manual. **NOT OK:** GO TO: Circuit/Harness Test for Seat Switch (S40); see Section 245, Group UIC in the Technical Manual. – – –1/1

❹ **Checking the seat switch**	Access address BCU008. **BCU008 –– Status, seat switch (S40)—Specification** Operator sitting on seat:—Status ..... XXX1 Operator not sitting on seat:—Status XXX0	**OK:** This fault indicates a problem in the CAN BUS. GO TO: Circuit/Harness Test for Seat Switch in Section 245, Group BCU. **NOT OK:** Do a Circuit/Harness Test for Seat Switch (see in Section 245, Group BCU). – – –1/1

SSU 001807.02 — Steering Input Device (SID), Calibration Fault

Diagnostic trouble code SSU 001807.02 is triggered if false signals are sent to the SSU controller while steering input devices SID 1 or SID 2 are being calibrated.
Alarm level: *CAUTION.*

LX26156,0000194 –19–30JUL03–1/1

Diagnostics

Additional references:

• Electrical information: Reference 210-15-001, General References - Summary.

Reference 245-SSU-001, Calibration and Input Addresses.

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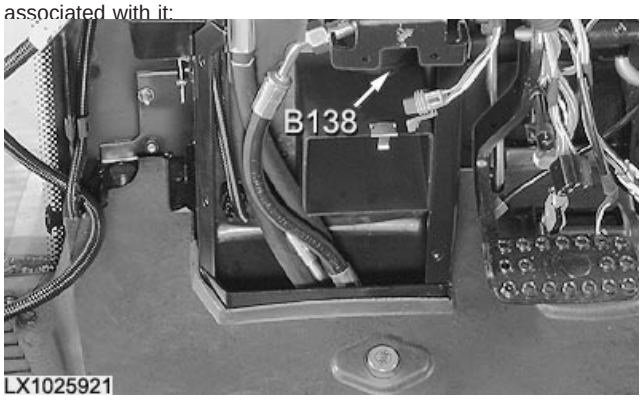
❸ **Initial component test**	Perform a visual inspection of steering input device SID 1 and of the connector associated with it:  LX1025921 –UN–07OCT03 *Steering input device (SID)* **B138—Steering input device (SID)** ❒ Check for signs of damage or dirt. ❒ Check the electrical connections for bad, loose, widened, slid-back or corroded contacts; also check the lines.	**OK:** If there are no visible signs of damage, GO TO 4. **NOT OK:** Recondition the circuit, sub-assemblies or contacts as required and do an Operational Check for Steering Input Device (B138), see 245-SSU. – – –1/1
❹ **Checking the circuit**	Do a Circuit/Harness Test for Steering Input Device (B138), see 245-SSU.	**OK:** GO TO 5. **NOT OK:** Recondition as required and do an Operational Check for Steering Input Device (B138), see 245-SSU. – – –1/1
❺ **Additional checks and assessment of intermittent faults**	Type of error indicates a loose contact: • Before doing a check of the connections, see summary of wiring layout in Circuit/Harness Test for Steering Input Device (B138) in 245-SSU. • For back-up, see also additional references for circuit checks: – Reference 245-SSU-100, Test Procedure in the Case of Occasional SSU Circuit Problems (SSU Beep Mode). – Reference 210-15-046, Troubleshooting Unsolved Problems.	**OK:** Diagnosis completed. **NOT OK:** Recondition as required and do an Operational Check for Steering Input Device (B138), see 245-SSU. – – –1/1

❸ **Initial component test**	Perform a visual inspection of the AutoTrac resume switch:  LX1025922 –UN–07OCT03 *AutoTrac resume switch* **S123—AutoTrac resume switch** ❒ Check for signs of damage or dirt. ❒ Check the electrical connections for bad, loose, widened, slid-back or corroded contacts; also check the lines.	**OK:** If there are no visible signs of damage, GO TO 4. **NOT OK:** Recondition the circuit, sub-assemblies or contacts as required and do an Operational Check for AutoTrac Resume Switch (S123), see 245-SSU. – – –1/1
❹ **Checking the circuit**	Do a Circuit/Harness Test for AutoTrac Resume Switch (S123), see 245-SSU.	**OK:** GO TO 5. **NOT OK:** Recondition as required and do an Operational Check for AutoTrac Resume Switch (S123), see 245-SSU. – – –1/1
❺ **Additional checks and assessment of intermittent faults**	Type of error indicates a loose contact: • Before doing a check of the connections, see summary of wiring layout in Circuit/Harness Test for AutoTrac Resume Switch (S123) in 245-SSU. • For back-up, see also additional references for circuit checks: – Reference 245-SSU-100, Test Procedure in the Case of Occasional SSU Circuit Problems (SSU Beep Mode). – Reference 210-15-046, Troubleshooting Unsolved Problems.	**OK:** Diagnosis completed. **NOT OK:** Recondition as required and do a Circuit/Harness Test for AutoTrac Resume Switch (S123), see 245-SSU. – – –1/1

SSU 523824.10 — The Signals from Steering Input Devices SID 2 and SID 1 are Unequal

Diagnostic trouble code SSU 523824.10 is triggered if the values received from steering input device SID 1 (address SSU007) and steering input device SID 2 (address SSU008) are different by more than 20 counts. This indicates a problem in steering input device SID2.
Alarm level: *CAUTION.*

LX26156,00001A1 –19–30JUL03–1/1

Diagnostics

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 240-10-045, SE35-Automatic steering system (AutoTrac)

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❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

– – –1/1

SSU 523826.10 — Signal from Wheel Angle Sensor (WAS) Not Recognized by Steering Identification Device (SID)

If a movement is detected by the wheel angle sensor (WAS) but not by the steering input device (SID), diagnostic trouble code SSU 523826.10 is triggered.
Alarm level: *CAUTION.*

LX26156,00001B0 –19–05AUG03–1/1

Diagnostics

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.

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❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

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❷ **Checking transmission enable relay K02/1 in Diagnostic Mode**	• Engine off. *NOTE: With the reverse drive lever in its neutral position, the correct display ("X11") must stay on the screen for longer than 5 seconds. The display must be watched for at least 5 seconds, as some of the faults at relay K02/1 take 5 seconds to appear on the screen. The relay is then de-activated after approx. 5 seconds.* • Access address UIC 11. **UIC 11 –– Status, transmission enable relay K02/1—Specification** Reverse drive lever in position for corner park (relay not activated):—Status ..... X10 Reverse drive lever in position for neutral (relay activated by UIC via ground cable 263):—Status X11	**OK:** GO TO 3 **NOT OK:** GO TO: Circuit/harness test for transmission enable signal from relay K02/1 and clutch pedal switch S72; see Technical Manual, Section 245, Group TCU. – – –1/1

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❸ **Checking transmission enable signal from relay K02/1 and clutch-pedal switch (S72) in Diagnostic Mode**	Engine OFF, ignition ON. • Access address TCU 07. • Do this check with the reverse drive lever in its position for neutral: **TCU 07 –– Status, clutch pedal switch (S72) and transmission enable signal from relay K02/1—Specification** Pedal declutched:—Status ..... X11 Pedal clutched:—Status X10	**OK:** GO TO 4. **NOT OK:** GO TO: Circuit/harness test for transmission enable signal from relay K02/1 and clutch pedal switch S72; see Technical Manual, Section 245, Group TCU. – – –1/1

Diagnostics

The following are possible causes:

- Defective hydrostatic speed sender B62 (internal short circuit).
- A grounded circuit in the lead between the hydrostatic speed sender and the transmission control unit (cable 689).

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.

- "Replacing the Hydrostatic Speed Sending Unit" on 6420 and 6620 tractors (Repair Manual, Section 53, Group 10).

- "Replacing the Hydrostatic Speed Sending Unit" on 6820 and 6920 tractors (Repair Manual, Section 53, Group 10).

- Reference 245-TCU-200, Theory of Operation (Transmission Control Unit).

- Reference 253-20-001, AutoPowr/IVT Transmission — Operation (Summary of References).

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

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TCU 304060.03 — Hydrostatic Speed Sender, Shorted or Open Circuit at Channel 2

Diagnostic trouble code TCU 304060.03 is saved when there is an open or a short circuit to the supply voltage (battery voltage) at channel 2 of the sender's circuit.

This diagnostic trouble code triggers the alarm level: "CAUTION".

LX12234,0000BBA –19–01OCT03–1/1

Diagnostics

The following are possible causes:

- Supply voltage of the hydrostatic speed sender is faulty (fuse F04/15):
  - Defective positive lead to sender (cable 572).
  - Defective ground lead to sender (cable 680).
- Defective hydrostatic speed sender B62 (internal short circuit).
- Contact problems at the connections.
- A shorted or open circuit in the lead between the transmission output speed sender and the transmission control unit (cable 695).

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.

- "Replacing the Hydrostatic Speed Sending Unit" on 6420 and 6620 tractors (Repair Manual, Section 53, Group 10).

- "Replacing the Hydrostatic Speed Sending Unit" on 6820 and 6920 tractors (Repair Manual, Section 53, Group 10).

- Reference 245-TCU-200, Theory of Operation (Transmission Control Unit).

- Reference 253-20-001, AutoPowr/IVT Transmission — Operation (Summary of References).

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Diagnostics

NOTE: The following are possible causes:

- *Mechanically defective hydrostatic speed sender (B62).*
- *A defect at the signal leads of channel 1 (cable 689) or channel 2 (cable 695) .*
  – *Diagnostic trouble codes TCU 304050.04, TCU 304052.04, TCU 304058.03 and TCU 304060.03 take priority.*
- *Incorrect installation of hydrostatic speed sender (sender's position).*

Additional references:

• Electrical information: Reference 210-15-001, General References - Summary.

• "Replacing the Hydrostatic Speed Sending Unit" on 6420 and 6620 tractors (Repair Manual, Section 53, Group 10).

• "Replacing the Hydrostatic Speed Sending Unit" on 6820 and 6920 tractors (Repair Manual, Section 53, Group 10).

• Reference 245-TCU-200, Theory of Operation (Transmission Control Unit).

• Reference 253-20-001, AutoPowr/IVT Transmission — Operation (Summary of References).

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❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing Addresses and Diagnostic Trouble Codes.* **1.2** Diagnostic trouble codes that have priority must be processed first.	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active and no priority diagnostic codes exist: GO TO 2.

– – –1/1

❷ **Checking the circuit of hydrostatic speed sender (B62)**	Check the lines for channel 1 and channel 2 from the sender to the TCU. See Circuit/harness test for hydrostatic speed sender (B62); see Section 245, Group TCU in the Technical manual.	**OK:** Replace the hydrostatic speed sender and carry out an operational test. **NOT OK:** Repair as needed and carry out an operational test.

– – –1/1

TCU 304080.02 — Failure in Warning Light Circuit

Diagnostic trouble code TCU 304080.02 is stored if the TCU detects a deviation in signal in the warning light's circuit (the signal does not correspond to the warning sent via the CAN BUS). This indicates a 12-volt warning light circuit that is open, shorted to the power supply (battery voltage), or shorted to ground. This diagnostic trouble code triggers the alarm level: "Information".

LX12234,0000BC5 –19–01NOV03–1/1

Diagnostics

The following are possible causes:

- Defective line connection between the TCU and the basic informator (cable 551).
  - – Short circuit.
  - – Open circuit.
  - – Grounded circuit.

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-TCU-200, Theory of Operation (Transmission Control Unit).
- Reference 245-BIF-200, Basic Informator - Theory of Operation.
- Reference 253-20-001, AutoPowr/IVT Transmission — Operation (Summary of References).

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2.

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❷ **Checking proportional solenoid valve (CR) of the reverse clutch**	• Engine OFF, ignition ON. • Reverse drive lever in corner park position. • Access address TCU 37. • Reverse drive lever in position for neutral: **TCU 37 –– Amperage, CR Proportional Solenoid Valve for Reverse Clutch—Specification** Display with reverse drive lever in position for neutral:—Status 025	**OK:** • Diagnosis completed. • Type of error indicates a loose contact, GO TO: Circuit/harness test for proportional solenoid valve (CR) of the reverse clutch; see Section 245, Group TCU in the Technical manual. **NOT OK:** GO TO: Circuit/harness test for proportional solenoid valve (CR) of the reverse clutch; see Section 245, Group TCU in the Technical manual.

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TCU 304097.04 — C1 Solenoid Valve, Grounded Circuit

Diagnostic trouble code TCU 304097.04 is stored if the TCU registers resistance at the solenoid valve that does not correspond with the switch status of the C1 range clutch and a drop in voltage can also be detected at the solenoid valve. This indicates a short to ground in the solenoid valve's 12-volt circuit. The diagnostic trouble code triggers the alarm level: "CAUTION".

LX12234,0000BD0 –19–01APR02–1/1

Diagnostics

NOTE: The following are possible causes:

- *A defective solenoid valve (C1).*
- *A shorted circuit at the ground lead (cable 656).*

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.

- "AutoPowr/IVT Transmission, Input Housing — Reconditioning (Summary of References)" on 6420 and 6620 tractors (Repair Manual, Section 53, Group 10).

- "AutoPowr/IVT Transmission, Input Housing — Reconditioning (Summary of References)" on 6820 and 6920 tractors (Repair Manual, Section 53, Group 10).

- Reference 245-TCU-200, Theory of Operation (Transmission Control Unit).

- Reference 253-20-001, AutoPowr/IVT Transmission — Operation (Summary of References).

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active (tractor's function is impaired), GO TO: Circuit/harness test for C1 solenoid valve; see Section 245, Group TCU in the Technical manual.

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TCU 304114.03 — C2 Solenoid Valve, Shorted Circuit

Diagnostic trouble code TCU 304114.03 is stored if the transmission control unit registers resistance and voltage at the solenoid valve that does not correspond with the switch status of the C2 range clutch. This indicates a short to the power supply (battery voltage) in the solenoid's circuit. The diagnostic trouble code triggers the alarm level: "CAUTION".

LX12234,0000BDB –19–01APR02–1/1

Diagnostics

The following are possible causes:

- Defective battery.
- Defective alternator G02.
- Drive belt is defective or slipping.
- High current requirements.
- High resistance in wiring harness.
- Defective lead connection to the transmission control unit (cable 052).

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-TCU-200, Theory of Operation (Transmission Control Unit).
- Reference 253-20-001, AutoPowr/IVT Transmission — Operation (Summary of References).

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❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 1.2
	1.2 Perform a visual inspection of he alternator and battery: • Check all components for visible damage. • Check all relevant connectors of the supply circuit for bad, loose, widened or corroded contacts. • Make sure that the drive belt is installed correctly and check for signs of it slipping. • Check ground connections between battery/engine and cab. – Check mounting surfaces for corrosion / paint and loose mounting bolts.	**OK:** GO TO 2. **NOT OK:** Recondition as required and carry out an operational test.

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❺ **Checking pressure at the park lock control block**	• Connect pressure test kit FKM10470 to the test port for measuring system power at the park lock control block. See Reference 253-15-021, AutoPowr/IVT Transmission — Checking Park Lock Pressure. • Start the engine. • Access address PLC 12. • Run the engine at 1800 rpm. **Park lock pressure and values on the display in diagnostic address PLC 12—Specification** Reverse drive lever in position for neutral:—Park lock control block, pressure ..... 2000 kPa (20 bar; 290 psi) Voltage in address PLC 12 ..... between 2.0 and 4.8 volts Reverse drive lever in corner park position:—Park lock control block, pressure ..... 0 kPa (0 bar; 0 psi) Voltage in address PLC 12 ..... between 0.3 and 0.75 volts	**OK:** Pressure exists, but voltage in address PLC 12 is not to specification: Replace the park lock's pressure sender (B90) and repeat the test. **NOT OK:** If pressure is not to specification: GO TO 6. – – –1/1

❻ **Problem in the park lock control block**	Check the control block's components for mechanical defects. • Solenoid valves Y15-1 and Y15-2, and check-valve.	**OK:** Check the control block for signs of damage. **NOT OK:** Repair as needed and carry out an operational test. – – –1/1

TCU 304150.00 — Power Zero Signal is Transmitted by the UIC for Too Long

Diagnostic trouble code TCU 304150.00 is saved when the transmission control unit receives the power zero signal from the user interface controller via the CAN BUS for more than 5 minutes. The diagnostic trouble code triggers the alarm level: "CAUTION".

LX12234,0000C6F –19–01SEP02–1/1

29-bit CAN BUS voltage (communication lines)—Specification

between CAN+ (lead 934) and a suitable ground connection (lead 050):—Voltage ..... 2.5 - 2.9 volts
between CAN- (lead 935) and a suitable ground connection (lead 050):—Voltage ..... 2.1 - 2.5 volts

For circuit diagram, see:

- Reference 240-10-034, SE23B-Electronic Engine Control

For component location and pin arrangement, see wiring harness W15.

OK: GO TO 3.

NOT OK: Recondition as required and carry out an operational test.

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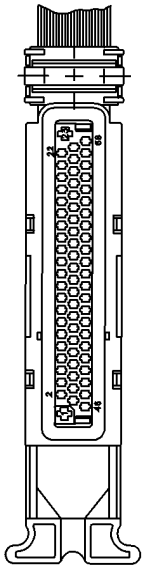
❸ Checking the TCU plug (29-bit CAN BUS connection and power supply)

Most wiring harness problems are caused by connector problems (contacts loose/bad/slid back) and/or bad ground connections.

- Check the power supply.
- Check the 29-bit CAN BUS communication lines (934/935).
- Check the connections at the plug and control unit for loose, widened, slid-back or corroded contacts.



LX1025887 –UN–28NOV01
X332 68-pin plug for TCU

X332 68-pin plug for TCU—Specification

Power supply:—Lead 572 (positive, ELX) ..... 12 volts at pin 45
Lead 052 (positive, BAT)..... 12 volts at pins 23 and 68
Lead 050..... Ground at pins 1 and 2
29-bit CAN BUS communication lines:—
CAN+ (lead 934)..... at pin 44
CAN- (lead 935)..... at pin 21
29-bit CAN BUS screen lines:—Lead 930-..... Ground at pin 20
Lead 932+..... 12 volts at pin 43

29-bit CAN BUS voltage (communication lines)—Specification

between CAN+ (lead 934) and a suitable ground connection (lead 050):—Voltage..... 2.5 - 2.9 volts
between CAN- (lead 935) and a suitable ground connection (lead 050):—Voltage..... 2.1 - 2.5 volts

For circuit diagram, see:

- Reference 240-10-035, SE26-Transmission Control Unit (AutoPowr/IVT transmission).

For component location and pin arrangement, see cab wiring harness W08.

OK: Diagnosis completed.

NOT OK: Recondition as required and carry out an operational test.

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❹ **Isolating the problem**	**4.1 - Check the components that are dependent on system pressure** While observing system pressure, switch the following components on and off one after the other: rear PTO, front PTO[1], differential lock and FWD. Engage and disengage the park lock. If pressure falls after any of these are switched on or off, there must be excessive leakage in the system affected. See the following references: • Reference 256-15-004, Checking Pressure at the Rear PTO. • Reference 256-15-005, Checking Pressure at the Front PTO. • Reference 256-15-003, Checking Pressure at the Hydraulic Differential Lock. • Reference 256-15-002, Checking Pressure at the Front-Wheel Drive Clutch. • Reference 253-15-021, AutoPowr/IVT Transmission — Checking Park Lock Pressure.	**OK:** GO TO 4.2 **NOT OK:** Repair as needed and repeat the test.
	4.2 - Reasons for problems with system pressure: • Defective transmission oil pump drive. • Transmission oil pump or suction circuit is damaged (check the primary hydraulic oil filter screen).	**NOT OK:** Repair as needed and repeat the test.

[1]If equipped

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❺ **Checking transmission oil pressure switch (S74)**	*NOTE: The transmission oil pressure switch is normally open and should close as pressure increases:* **Specifications, transmission oil pressure switch (S74)—Specification** Closing pressure of switch S74 as pressure increases:—Pressure ..... between 1435—1565 kPa (14.35—15.65 bar; 208—227 psi) Opening pressure of switch S74 as pressure decreases:—Pressure ..... between 1185—1315 kPa (11.85—13.15 bar; 172—191 psi)	**OK:** GO TO: Circuit/harness test for transmission oil pressure switch S74; see Section 245, Group TCU in the Technical manual. **NOT OK:** Repair as needed and repeat the test.

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TCU 304178.07 — Filter By-pass Valve (Cold-weather Starting) is Closed by Mistake

Diagnostic trouble code TCU 304178.07 is stored if under the following conditions a sender circuit for the filter by-pass valve (cold-weather starting) is closed:
- Transmission input speed (engine speed) is over 900 rpm and transmission oil temperature in below -5 °C (23 °F).
- The engine is OFF.
The diagnostic trouble code triggers the alarm level: "Information".

LX12234,0000BF9 –19–01APR02–1/1

❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: Deal with the PLC diagnostic trouble code(s).

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TCU 304236.19 — Data Transmitted by Park Lock Controller is Incomplete (Park Lock Solenoid Valve Y15-2)

Diagnostic trouble code TCU 304236:19 is stored if the park lock controller (PLC) does not register the status of the park lock solenoid valve (Y15-2) and so cannot provide the requisite data to the CAN BUS either. A transmitted replacement value generates this diagnostic trouble code in the TCU. In its "active" state, this diagnostic trouble code also generates a diagnostic trouble code at the park lock controller (PLC) and sets off an "information" alarm.

LX12234,0000C07 –19–01AUG01–1/1

Diagnostics

Additional references:

- Reference 245-TCU-200, Theory of Operation (Transmission Control Unit).
- Reference 245-PLC-200, Theory of Operation (Park Lock Controller)
- Reference 253-20-001, AutoPowr/IVT Transmission — Operation (Summary of References).

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: Deal with the PLC diagnostic trouble code(s).

– – –1/1

TEC 298753.31 — Fault in the Power Supply to the Implement BUS

The power supply to the implement BUS is switched via a relay. If, with relay K47 switched on, the power supply is too low (less than 6 volts), or, with the relay switched off, a power supply is detected, then diagnostic trouble code 298753.31 is triggered. This indicates damage either at the harness or at relay K47.
Alarm level: *Information.*

LX26156,0000179 –19–09JUL03–1/1

Diagnostics

Additional references:

- “Replacing Fuses of 60-amp GreenStar Power Outlet Socket”
- “Replacing Relay of 60-amp GreenStar Power Outlet Socket”.

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active: GO TO 2. – – –1/1

❷ **Checking input address UIC032**	See Address UIC032 — Input address for anti-jack-knife control, 245-UIC.	**OK:** GO TO 3 **NOT OK:** Modify setting, confirm and carry out an operational test. – – –1/1

❸ **Checking the operation of the anti-jack-knife control**	For test purposes, the anti-jack-knife control may be activated as follows: 1. Via input address UIC 49 (test conditions: reverse drive lever in corner park position and engine OFF): • Input value in address UIC 049: **100000** 2. Braking sharply from a speed in excess of 2.5 km/h (1.6 mph). **For diagnosis with the basic informator or performance monitor:**The main (key) switch must be at “IGN” for at least **8** seconds before the diagnostic mode is activated. If the diagnostic mode was activated previously, the tractor cannot be moved. Access address UIC 10: **UIC 10 –– Status, solenoid valve in anti-jack-knife control (Y31)—Specification** Anti-jack-knife control is not active:— Status ..... XX1 Anti-jack-knife control is active:—Status XX0	**OK:** • Diagnosis completed. • Type of error indicates a loose contact, GO TO: Circuit/harness test for air brake solenoid valve (Y31) (for tractors up to serial no. 398790); see Technical Manual, Section 245, Group UIC. **NOT OK:** GO TO: Circuit/harness test for air brake solenoid valve (Y31) (for tractors up to serial no. 398790); see Technical Manual, Section 245, Group UIC. – – –1/1

UIC 305010.07 — Fault at Brake Pedal Sensor

Diagnostic trouble code UIC 305010.07 is stored if the output signal of the brake pedal potentiometer does not match the shift status of the brake pedal switch.

This diagnostic trouble code triggers the alarm level: “CAUTION”.

LX12234,0000AE3 –19–01APR02–1/1

❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.* **1.2** Priority diagnostic trouble codes must be processed first.	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active and no priority diagnostic codes exist: GO TO 2. – – –1/1

❷ **Checking the cruise control potentiometer (A19)**	*NOTE: Slowly turn the AutoPowr selector through its full range. Do not exceed the maximum voltage or go below the minimum voltage (see below). An acoustic signal or sudden voltage change while the clutch is actuated indicates a defective potentiometer.* • Access address UIC 25. **UIC 25 –– Voltage, cruise control potentiometer (A19)—Specification** Right to end-position:—Minimum voltage ..... 0.5 volts Right to detent position:—Voltage range ..... 0.9 - 1.1 volts Left to end-position:—Maximum voltage ..... 3.9 - 4.1 volts	**OK:** • Diagnosis completed. • Type of error indicates a loose contact, GO TO: Circuit/harness test for cruise control potentiometer (A19); see Technical Manual, Section 245, Group UIC. **NOT OK:** GO TO: Circuit/harness test for cruise control potentiometer (A19); see Technical Manual, Section 245, Group UIC. – – –1/1

UIC 305022.03 — Cruise Control Potentiometer, Signal Voltage Too High

Diagnostic trouble code 305022.03 is saved if the user interface controller measures a voltage in excess of 4.5 volts at the signal input of the potentiometer. This indicates a short in or a problem with the ground connection in the potentiometer's circuit. This diagnostic trouble code restricts engine speed to a maximum of 1650 rpm and triggers the alarm level: "Information".

LX12234,0000AEC –19–01NOV03–1/1

❷ **Checking the hand throttle potentiometer**	*NOTE: Slowly move the hand throttle's potentiometer through its full range. Do not exceed the maximum voltage or go below the minimum voltage (see below). An acoustic signal or sudden voltage change while the clutch is actuated indicates a defective potentiometer.* **2.1 - Check channel 1 of the Hall-type potentiometer:** • Access address UIC 20. **UIC 20 –– Voltage, hand throttle potentiometer (B78; channel 1)—Specification** Hand throttle at minimum setting:— Voltage range ..... 0.5 - 0.8 volts Hand throttle at maximum setting:— Voltage range ..... 3.7 - 4.0 volts **2.2 - Check channel 2 of the Hall-type potentiometer:** • Access address UIC 21. **UIC 21 –– Voltage, hand throttle potentiometer (B78; channel 2)—Specification** Hand throttle at minimum setting:— Voltage range ..... 0.25 - 0.4 volts Hand throttle at maximum setting:— Voltage range ..... 1.85 - 2.0 volts	**OK:** • Diagnosis completed. • Type of error indicates a loose contact, GO TO: Circuit/harness test for hand throttle potentiometer (B78); see Technical Manual, Section 245, Group UIC. **NOT OK:** GO TO: Circuit/harness test for hand throttle potentiometer (B78); see Technical Manual, Section 245, Group UIC.

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211 UIC 33

UIC 305037.04 — Hand Throttle Potentiometer, Voltage at Channel 1 Too Low

Diagnostic trouble code UIC 305037.04 is saved when the user interface controller measures a voltage of less than 0.5 volts at the signal input of channel 1 of the potentiometer. This indicates that the potentiometer's circuit is open. This diagnostic trouble code triggers the alarm level: "Information".

LX12234,0000AF4 –19–01NOV03–1/1

❷ **Checking the brake pedal potentiometer**	*NOTE: Slowly press the brake pedal all the way down. An acoustic signal or sudden voltage change while the clutch is actuated indicates a defective potentiometer.* **Check the potentiometer on the right brake:** • Access address UIC 28. **UIC 28 –– Voltage, right brake pedal potentiometer (B88)—Specification** Right brake pedal not activated:— Minimum voltage ..... 0.9 volts Voltage range ..... 0.9 - 1.1 volts Right brake pedal activated:—Maximum voltage ..... 4.5 volts	**OK:** • Diagnosis completed. • Type of error indicates a loose contact, GO TO: Circuit/harness test for brake pedal potentiometer (B88); see Technical Manual, Section 245, Group UIC. **NOT OK:** GO TO: Circuit/harness test for brake pedal potentiometer (B88); see Technical Manual, Section 245, Group UIC.

211 UIC 47

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UIC 305050.12 — Speed Wheel, Output Signals do Not Match

Diagnostic trouble code UIC 305050.12 is stored if the UIC detects an incorrect combination of signals at the output channels (channels 1 and 2) of the speed wheel. This diagnostic trouble code triggers the alarm level: “Information”.

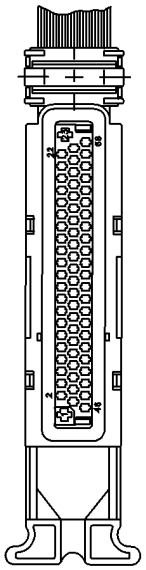
LX12234,0000B6E –19–01APR02–1/1

❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.* **1.2** ECU diagnostic trouble codes take priority.	**OK:** If the diagnostic trouble code is no longer generated: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active and no priority diagnostic codes exist: GO TO 1.3
	1.3 Check ECU fuses F04/1 and/or F04/2.	**OK:** GO TO 1.4 **NOT OK:** Put in a new fuse.
	1.4 - A general 29-bit CAN BUS problem Check whether additional diagnostic trouble codes are saved from other control units that indicate a general problem in the 29-bit CAN BUS.	**OK:** If no diagnostic trouble codes are saved from other control units that indicate a general problem in the 29-bit CAN BUS: GO TO 2. **NOT OK:** If diagnostic trouble codes are saved from other control units that indicate a general problem in the 29-bit CAN BUS: Do the 29-bit CAN BUS - Check (tractors with cab), (Section 213, Group 45). – – –1/1

❷ Checking the ECU plug (29-bit CAN BUS connection and power supply)

Most wiring harness problems are caused by connector problems (contacts loose/bad/slid back) and/or bad ground connections.

- Check the power supply.
- Check the 29-bit CAN BUS communication lines (934/935).
- Check the 29-bit CAN BUS screen lines (930/932).
- Check the connections at the plug and control unit for loose, widened, slid-back or corroded contacts.



LX1025887

LX1025887 –UN–28NOV01

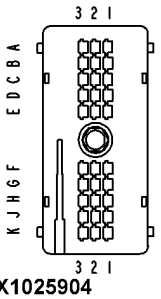
X361 68-pin plug for engine control unit (ECU) (Level 4)

X361 68-pin plug for engine control unit (ECU) (Level 4)—Specification

Power supply:—Lead 622
(positive, IGN) ..... 12 volts at pin 19
Lead 032 (positive, BAT) ..... 12 volts at pin 23
Lead 050 ..... Ground at pin 1
29-bit CAN BUS
communication lines:—
CAN+ (lead 934) ..... at pin 44
CAN- (lead 935) ..... at pin 21
29-bit CAN BUS screen
lines:—Lead 930- ..... Ground at pin 20
Lead 932+ ..... 12 volts at pin 43

29-bit CAN BUS voltage (communication lines)—Specification

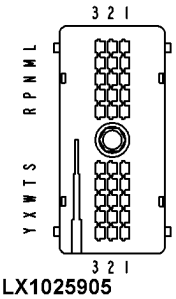
between CAN+ (lead 934)
and a suitable ground
connection (lead 050):—
Voltage ..... 2.5 - 2.9 volts
between CAN- (lead 935)
and a suitable ground
connection (lead 050):—
Voltage ..... 2.1 - 2.5 volts



LX1025904

LX1025904 –UN–20SEP02

X570/1 30-pin plug for engine control unit (ECU)



LX1025905

LX1025905 –UN–20SEP02

X570/2 30-pin plug for engine control unit (ECU)

ECU Level 11 (HPCR) –– plug X570/1 (wiring harness W15)—Specification

Power supply:—Positive (lead 622) ..... 12 volts at pin E3
Positive (lead 032) ..... 12 volts at pins B1 and B2
Positive, ELX (lead 992) ..... 12 volts at pin G2
Ground (lead 050) ..... at pins C2 and C3

ECU Level 11 (HPCR) –– plug X570/2 (wiring harness W15)—Specification

29-bit CAN BUS communication lines:—
CAN+ (lead 934) ..... at pin L1
CAN- (lead 935) ..... at pin L2

UIC 305075.04 — Potentiometer on the left brake pedal, set-up error

Diagnostic trouble code UIC 305075.04 is stored if the voltage at the signal input of the left brake pedal potentiometer indicates that a brake pedal is incorrectly adjusted. The diagnostic trouble code will be generated if the following voltage conditions exist for more than 10 minutes:

- *The voltage at the signal input of the left brake pedal potentiomenter is below 0.6 volts or above 1.4 volts with a voltage of 1.4 volts at the signal input of the right brake pedal potentiomenter.*
- *A steady voltage of 1.3 volts (+/- 0.05 volts) is received at the input signal of the left brake pedal potentiomenter.*

The diagnostic trouble code triggers the alarm level: "CAUTION".

LX12234,0000C6D –19–01SEP02–1/1

Diagnostics

The following are possible causes:

- Brake pedal adjusted incorrectly.
- Defective brake pedal sensor unit (B88).
- A general problem with the power supply to the 5-volt components:
  – Diagnostic trouble codes UIC 305179.02 and/or UIC 305180.04 take priority.

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- Reference 245-UIC-200, Theory of Operation (User Interface Controller).
- Reference 245-BCU-200, Theory of Operation of the Basic Control Unit (Basic Functions).
- Reference 253-20-001, AutoPowr/IVT Transmission — Operation (Summary of References).
- Reference 260-15-070, Adjusting the Brake Pedals and Switches.

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❶ **Preliminary test**	**1.1** *NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.* **1.2** Diagnostic trouble codes that have priority must be processed first.	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** If no other priority diagnostic trouble codes are saved: GO TO 2. – – –1/1

❷ **Checking the park lock pressure sender**	**2.1 Check the basic setting (neutral position) of the park lock's pressure sender:** • Access address PLC 12. **PLC 12 –– voltage, park lock's pressure sender (B90)—Specification** Park lock's pressure sender (B90) not under pressure, with ignition ON:—Voltage (neutral range) ..... between 0.3 and 0.75 volts	**OK:** GO TO 2.2 **NOT OK:** GO TO: Circuit/Harness test for park lock's pressure sender (B90); see Technical Manual, section 245, group PLC.
	2.2 Checking the operation of the park lock: • Start the engine. • Access address PLC 12. • Do this test with the engine running and the reverse drive lever in the positions for corner park and neutral. **PLC 12 –– voltage, park lock's pressure sender (B90)—Specification** Reverse drive lever in position for corner park (with engine running):—Voltage (no pressure exists) ..... between 0.3 and 0.75 volts Reverse drive lever in position for neutral (with engine running):—Voltage (pressure exists) ..... between 2.0 and 4.8 volts	**OK:** • Diagnosis completed. • Type of error indicates a loose contact: Circuit/Harness test for park lock's pressure sender (B90); see Technical Manual, section 245, group PLC. **NOT OK:** GO TO 3. – – –1/1

❸ **Checking the park lock solenoid valve Y15-1**	• Start the engine. • Access address TCU 38. • Do this test with the engine running and the reverse drive lever in the positions for corner park and neutral. **TCU 38 –– Status, park lock solenoid valve Y15-1—Specification** Reverse drive lever in corner park position:—Status (park lock ON, solenoid valve de-activated) ..... XX0 Reverse drive lever in position for neutral:—Status (park lock OFF, solenoid valve activated) XX1	**OK:** GO TO 4. **NOT OK:** GO TO: Circuit/Harness test for park lock solenoid valve (Y15-1); see Technical Manual, section 245, group UIC. – – –1/1

Diagnostics

The following are possible causes:

- A defective reverse drive lever (S80).
- A problem at the signal leads (cables 209 and/or 219) between the reverse drive lever and the UIC.

Additional references:

- Electrical information: Reference 210-15-001, General References - Summary.
- “Reconditioning the Reverser Control” on 6420 and 6620 tractors (Repair Manual, Section 53, Group 05).
- “Reconditioning the Reverser Control” on 6820 and 6920 tractors (Repair Manual, Section 53, Group 05).
- Reference 245-UIC-200, Theory of Operation (User Interface Controller).
- Reference 253-20-001, AutoPowr/IVT Transmission — Operation (Summary of References).

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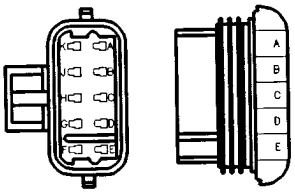
❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active, GO TO: Reference 245-UIC-101, Circuit test for reverse drive lever (S80).

– – –1/1

UIC 305148.02 — Forward Switch or Reverse Switch has been Opened by Mistake

Diagnostic trouble code UIC 305148.02 is stored if the UIC detects a problem at the reverse drive lever. The output signals from the forward or reverse switches are no longer being received. This diagnostic trouble code triggers the alarm level: “CAUTION”.

LX12234,0000B8E –19–01APR02–1/1

❷ **Checking the power supply**	**2.1 Power supply for user interface controller/reverse drive lever:** Access address UIC 29: **UIC 29 –– Voltage, System Voltage (UIC Operating Voltage)—Specification** Ignition ON; engine OFF:—Voltage ..... between 11.2 and 12.7 volts Engine running in low idle (over 512 rpm):—Voltage ..... between 11.2 and 15.4 volts Engine running at 1500 rpm:—Voltage..... between 12.5 and 15.4 volts	**OK:** Check the power supply circuit of the reverse drive lever, GO TO 2.2. **NOT OK:** A general problem with the power supply to the user interface controller: GO TO 3.
	2.2 Power supply for reverse drive lever:  **LX1017898** LX1017898 –UN–10OCT97 Use multimeter JT05791A to check the power supply: **Power supply for reverse drive lever at plug X323 (W09)—Specification** between pin H (cable 050) and pin F (cable 672):—Voltage..... 12 volts	**OK:** Check the connections for loose, widened, slid-back or corroded contacts. **NOT OK:** GO TO 3. – – –1/1

❸ **Checking the power supply circuit for reverse drive lever/user interface controller**	Most wiring harness problems are caused by connector problems (contacts loose/bad/slid back) and/or bad ground connections. Before a detailed circuit check is performed and in the case of occasional circuit problems (loose contacts), all components of the respective circuit must be checked. For circuit diagram, see: • Reference 240-10-036, SE27-Transmission Shift (User Interface Controller). For component location and pin arrangement see cab wiring harness W08 and cowl harness W09.	**OK:** Diagnosis completed. **NOT OK:** Recondition as required and carry out an operational test. – – –1/1

UIC 305208.02 — Internal Transmission Power Supply (VPS), Shorted Circuit

Diagnostic trouble code UIC 305208.02 is generated if the UIC detects 12 volts at the monitor input of the internal transmission power supply (VPS1) during its initialization phase (self-check after ignition is switched on). This diagnostic trouble code is not stored in the controller's memory but it does trigger the alarm level: "Information".

LX12234,0000BA6 –19–01NOV03–1/1

Diagnostics

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❶ **Preliminary test**	*NOTE: Take note of the processing procedures of diagnostic trouble codes before starting the diagnosis, see Reference 245-05-002, Accessing the Addresses and Diagnostic Trouble Codes.*	**OK:** Diagnostic trouble code is not active: Diagnosis completed. **NOT OK:** Diagnostic trouble code is active (code is regenerated after it has been deleted and the ignition switched ON/OFF): GO TO 2.

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❷ **Checking internal transmission power supply (VPS)**	Engine OFF, ignition ON. • Access address UIC 11. **UIC 11 –– Status, power supply (cable 652) for transmission enable relay K02/1— Specification** Internal transmission power supply (VPS) present:—Status X1X	**OK:** GO TO 3. **NOT OK:** GO TO: Circuit/harness test for transmission enable signal from relay K02/1 and clutch pedal switch S72; see Technical Manual, Section 245, Group TCU.

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Control Unit(s) Not Displayed (Tractors with Cab)

Symptom indicates that one or more controller(s) is/are not displayed. If you enter diagnostic mode and find that only the word "ALL" is displayed, or if diagnostic mode cannot be accessed at all, you must go through the procedure for the symptom "Diagnostic Mode Cannot Be Entered".

LX12234,0000C12 –19–01NOV03–1/1

Diagnosis of observable symptoms

The following are possible causes:

- Faulty power supply to the control unit:
  - Blown fuse.
  - A fault in the lead connection (lead or contact).
  - Faulty ground connection.
- Defective CAN BUS connection to the control unit:
  - A fault in the lead connection of the communication lines (lead or contact).
- Internal problem in the control unit.

– – –1/1

❶ **Preliminary tests**	*NOTE: All related codes must be resolved before proceeding. Access the codes.*	**NOT OK:** If no related diagnostic trouble codes are saved: GO TO 2. **OK:** Recondition as needed, then access control unit.

– – –1/1